

Infection status of *Clinostomum complanatum* (Rudolphi, 1819) metacercaria from *Channa punctatus* of Meerut District

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Abstract: Metacercaria *Clinostomum complanatum* is a digenetic trematode, which is mainly found in fresh water fishes. Present communication deals with the infection status of *C. complanatum* in *C. punctatus* of Meerut district, which is supported by the data spreading over one year. About 250 specimens of *C. punctatus* from different ponds of Meerut were studied through regular periodical collection in the year Jan 2010 to Dec 2010. Overall prevalence 35.6%, mean intensity 3.06 and abundance 1.09 were reported. The infection was maximum in winter and minimum in rainy season. Prevalence, intensity and abundance of the infestation were also found to be related to different length group and sex of the hosts, the medium sized fishes were more infected and the larger size fishes were less infected while the smaller size fishes showed moderate infection. Susceptibility of infection was not significantly different between male and female fish.

Keywords: *Clinostomum complanatum*, Freshwater fish, *Channa punctatus*

INTRODUCTION

Family Clinostomatidae has a widespread distribution. *C. complanatum* (Rudolphi, 1819) is a digenetic trematode which causes yellow grub in the muscle of fish and makes them unsuitable for human consumption. At many occasions human infection has also been recorded (Chung *et al.*, 1995; Isobe *et al.*, 1994; Kifune *et al.*, 2000). Many species of fresh water fishes were recorded as the second intermediate host of *C. complanatum* (Yamaguti, 1933; Aohagi *et al.*, 1992a and 1993). In Indian subcontinent presence of this larval digenea has been noticed at several places. *C. complanatum* metacercariae infect the skin, muscle, fins, head and viscera, causing pathologies and changes in the host behavior, with consequent economic losses in fish farms (Kagei *et al.*, 1984; Eiras, 1994; Mitchell, 1995). The infection of *Clinostomum* also depends on the host size (Kalantan *et al.*, 1987). The present study was aimed to consider the seasonal variation with respect to prevalence, mean intensity and abundance of *C. complanatum* with regard to sex and length groups of the fish *C. punctatus*.

MATERIALS AND METHODS

Fishes were bought live to the laboratory throughout the year from different water bodies of Meerut district viz: village Kohalla, village Ikri, village Kakkapur, village Sururpur, village Durjanpur, Ramtal Vatika, Hastinapur, Daulatpur, Baadam, Daha, Mehrawati and Qilla Parikshitgarh, examined within 24hr of capture. The standard length of each fish was measured and their sex

was determined. Fish were examined for the presence of external metacercaria then dissected and studied for internal metacercaria but no external metacercaria was found. The location of internal metacercaria and their number was recorded. Collected specimens were washed and preserved in 70% alcohol, after flattening under a moderate pressure using a cover glass slide. Fixed specimens were stained with aceto carmine, dehydrated, cleared and mounted in Canada balsam.

Prevalence, mean intensity and abundance concepts as suggested by Margolis *et al.* (1982) are used in present study.

$$\text{Prevalence \%} = \frac{\text{Total no. of host infected}}{\text{Total no. of host examined}} \times 100$$

$$\text{Mean Intensity} = \frac{\text{Total no. of parasite}}{\text{Total no. of host infected}}$$

$$\text{Abundance} = \frac{\text{Total no. of parasites}}{\text{Total no. of host examined}}$$

RESULTS

A total of 250 *C. punctatus* were sampled throughout the year from January 2010 to December 2010. The infection status of *C. complanatum* was studied throughout the year. During the course of entire study, 89 fishes were infected out of 250. 273 *C. complanatum* were collected from the body cavity and muscles and tissues around the gills of *C. punctatus*. 174 parasites were recovered

Table 1. Monthly variation in prevalence %, mean intensity and abundance of *C. complanatum* in *C. punctatus* during the year 2010.

Month	No. of host examined	No. of host infected	Prevalence %	No. of parasites	Mean intensity ratio	Abundance ratio
January	15	05	33.3	17	3.40	1.13
February	15	04	26.6	09	2.25	0.60
March	18	06	33.3	13	2.16	0.72
April	25	08	32.0	17	2.12	0.68
May	24	08	33.3	20	2.50	0.83
June	21	6	28.5	14	2.33	0.66
July	22	05	22.7	11	2.20	0.50
August	20	04	20.0	08	2.0	0.40
September	15	04	26.6	09	2.25	0.60
October	20	06	30.0	12	2.0	0.60
November	25	16	64.0	82	5.12	3.28
December	30	17	56.6	61	3.58	2.03
Total	250	89	35.6	273	3.06	1.09

from the body cavity and 99 from the muscles and tissues around the gills. During this study highest prevalence were observed in Nov (64.0%) and Dec (56.6%) and lowest were observed in July (22.7%) and Aug (20.0%), maximum mean intensity (5.12) was recorded in Nov and minimum (2.0) in Aug and Oct, highest abundance (3.28) was noticed in Nov and lowest in Aug (0.40) (Table.1).

On the basis of length group highest prevalence (50.0%) were recorded from medium length group (10-12 cm) and lowest (20.0%) from larger length group (Above 16 cm), highest mean intensity (4.26) was observed in smaller length group (Less than 10 cm) and lowest mean intensity (2.50) in larger length group (Above 16 cm), highest abundance (1.34) were recorded from medium length group (10-12 cm) and lowest abundance (0.50) in larger length group (Above 16 cm) (Table.2). Infection (in female fishes 37.9%, in male fishes 33.3%) and abundance (in female 1.32, in male fishes 0.86) was comparatively more in female fishes than male fishes respectively, but differences are not significant. (Table 3).

DISCUSSION

The prevalence, mean intensity and abundance of parasite as recorded from monthly observation were maximum in the month of November-December (winter season) and the minimum in the month of July-August (Rainy season). According to Sithithaworn and Haswell-Elkins (2003) fish have their highest metacercarial burden in winter because

snail population and fluke transmission are low during earlier winter dry season, and with the resumption of rain and high temperature, snail population increase, and fluke eggs shed into the environment are more likely to be washed into water bodies (Long-Qi *et al.*, 2004). The events lead to increasing snail infection and cercarial production, which result in the accumulation of fish metacercariae at about the time the rainy season ends in the late fall and winter (approximately Nov-Dec). The fall in water temperature during cooler months reduces the immune response in fish and makes them more vulnerable to disease vectors Akhter *et al.* (1977) and Banu *et al.* (1993) also reported more incidence of diseases in fish during winter months.

The prevalence of infection of the parasites in relation to size showed that the larger the fish the lower the infestation, possibly due to development of immunity against it. It was found that fish above the length of 16 cm had lowest parasitic infection while those having the length of 10-12 cm had the highest level of infection. This agrees with the work of Malek and Mobedi (2001). It was observed that among the different size groups of fishes, the maximum infestation were recorded from the medium length group than the smaller and larger length group of fishes. The rate of infestation was more in smaller length group than larger, but prevalence of infestation in the medium group was more than smaller group (Golder *et al.*, 1987).

Table 2. Prevalence, mean intensity and abundance of *C. complanatum* in different length groups of *C. punctatus*.

Length group (cm)	No. of host examined	No. of host infected	No. of parasites	Prevalence %	Mean intensity ratio	Abundance ratio
Less than 10	50	15	64	30.0	4.26	1.28
10-12	70	35	94	50.0	2.68	1.34
12-14	65	24	69	36.9	2.87	1.06
14-16	35	9	31	25.7	3.44	0.88
Above 16	30	6	15	20.0	2.50	0.50
Total	250	89	273	35.6	3.06	1.09

Table 3. Comparative prevalence %, mean intensity and abundance of *C. complanatum* in male and female *C. punctatus*.

Fish	No. of host examined	No. of host infected	No. of parasites	Prevalence %	Mean intensity ratio	Abundance ratio
Male	126	42	109	33.3	2.59	0.86
Female	124	47	164	37.9	3.48	1.32

In *Aphanius sophiae* prevalence of infection in male and female were observed to be 53.5 and 32.9, respectively (Hosseini, 1987). In *C. punctatus* prevalence was found to be 50 among females and 33 among the male (Firdaus, 1988) and in *Aphanius dispar* 47.5% male and 55.9% female fish were infected (Kalantam *et al.*, 1987). The result of present study showed there is no significant difference in susceptibility of infection between male and female.

It was concluded that the prevalence of parasites significantly decrease with increase in length and no significant difference was observed in relation to abundance. Decrease in the prevalence of infection in the larger fish could be due to increase in the mortality of infected fish, increase in the built up of humoral and non specific immunity against the parasites. As the small size fishes survive the infection, they grow to occupy new niches and acquire better microhabitat against parasitic infestation. In winter season metacercarial burden was maximum due to reduced immune response of fishes because of fall in water temperature. Keeping in view of the significance of the pathogenicity of the infection further research on the ecology and epidemiology of the larval forms is needed to understand the major risks threatening the fish industry.

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