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# Taxonomical And Ecological Aspect On Digenetic Trematode Parasite Of Fresh Water Fishes From Uttar Pradesh (India)

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**Abstract**

Fresh water fishes are commonly found in river, different ponds, lakes and canals. Fresh water fishes are the common shelter for various species of digenetic trematode parasites in Lucknow (Uttar Pradesh). Fishes carry heavy infection of helminth parasites and serve as the potent source of these parasites. Fishes are gold coin of aquatic environment and play an important major role in economy of persons depending on the river as well as coastal areas. Their population rapidly dropped down due change in environmental conditions. We have studied helminth parasites of fresh water fishes river Gomti. (26°51'30" North 80°56'14" East). These parasites are abundantly found in river Gomti of Lucknow. Infection of these parasites may result in poor growth, postponed sexual maturity and mortality of fishes, and also cause human as well as different animal diseases due to weak association of host and parasites relationship. In this paper we have reported the seasonal fluctuation in the prevalence, intensity and relative density patterns and systematic taxonomical study of digenean in fresh water fishes from river Gomti Lucknow (India).

**Key words:** Digenetic trematodes, Intensity, Prevalence, Infection, *Macrotrema*.

## INTRODUCTION

Digeneans are important group of helminth parasites which usually invade gastro-intestinal tract of marine piscian hosts (Mishra et al. 2013). Fishes are important due to their high nutritional value, medicinal and economic value, thus we can call it gold coin of the aquatic environment. Marine fishes are the common host for various species of digenetic trematode parasites in Puri (Odisha). Majority of fresh water fishes carry heavy infection of digenean parasites which cause deterioration in the food value of fish and may even result in their mortality (Yadav et al. 2010). Besides these, there are a number of helminth parasites which are transmitted to human beings only through fishes, due to weak association of host and parasites called zoonotic parasites. These parasites use the fish for their shelter, food and destroy more or less each and every organ resulting in pathogenic effects (Lilley et al. 1992). Parasites interfere with the nutrition, metabolism and secretory function of alimentary canal, damage nervous system and even upset the normal reproduction of the hosts. During the helminth parasite survey, we have found infected fish with genus: *Macrotrema* (Gupta, 1951); two specimens of the this form were collected from the intestine of a fresh water fish *Mystus cavasius* (Ham,1822) from river Gomti (Lucknow). (Rahman et al. 1998a and 1998b).

## MATERIALS AND METHODS

### Sampling of fish and parasites:

Monthly surveys were done at river Gomti (26°51'30" North 80°56'14" East) in Lucknow between January 2015 and December 2015. Fresh water fishes were collected by fishermen at river side. These fishes were transported to the laboratory alive. During the examination of the fresh water fish, specimens of the above genus were recovered from the intestine of fish *Mystus cavasius* (Ham, 1822). The specimens were collected and identified by standard fish books. Fishes were sacrificed and dissected to examine all internal organs and tissues. The alimentary

canal of host was removed and cut open in normal saline water in petridish. It was lightly shaken and the content decanted several times. The intestine and its contents were examined thoroughly under a binocular microscope. The helminth parasites were sorted out, flattened, fixed in A.F.A. fixative (50% alcohol, formalin and acetic acid in ratio of 100: 6: 2.5). The fixed parasites were stored in 70% ethanol for 24 to 48 hours then counted separately. All parasites were stained in aceto-alum carmine, dehydrated in ascending grades of ethanol and these were cleared in xylol and mounted in canada balsam or DPX (Chandra, 2016). The diagrams were made with the help of camera Lucida then identified by Camera Lucida diagrams. All the measurements were in millimeters: unless otherwise stated. The voucher specimens were submitted into the depository of the Helminthological Society of India of Late Prof. S.P. Gupta, University of Lucknow, India.

**Ecological Analysis:**

Data were studied in terms of prevalence, mean intensity and relative density.

The above following parameters were formulated by Chandra et al. (2016).

$$\text{Prevalence} = \frac{\text{Total No. of Hosts Infected}}{\text{Total No. of Hosts Examined}} \times 100$$

$$\text{Mean Intensity} = \frac{\text{Total No. of Infected Hosts examined}}{\text{Total No. of Hosts Examined}}$$

$$\text{Rel. Density} = \frac{\text{Total No. of parasites}}{\text{Total No. of Hosts Examined}}$$

## RESULT & DISCUSSION

**Description:**

***Macrotrema macronis* Gupta, 1951**

(Fig. 1: Entire Body; Fig. 2: Eggs)

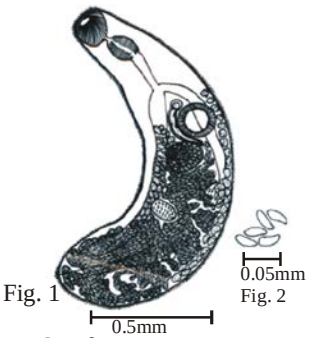


Fig 1: Entire Body of *Macrotrema micronis* Gupta, 1951; Fig 2: Eggs

**Family : Allocreadiidae (Stossich, 1903) Odhner, 1910**

**Sub-family :** Orientocreadiinae Yamaguti, 1958

**Genus :** *Macrotrema* Gupta, 1951

Body small, cylindrical, spinose , anterior end narrow while blunt at posterior end, 1.50 – 1.60 mm long, 0.36 – 0.37 mm wide. Oral sucker terminal, sub-spherical, sub-equal to ventral sucker, 0.10 – 0.14 mm long, 0.095 – 0.15 mm wide. Pre-pharynx short 0.02- 0.05mm long, 0.02 – 0.03 mm wide. Pharynx muscular, globular, 0.09 – 0.13 mm long 0.06 – 0.07 mm wide. Oesophagus long, tubular 0.10 – 0.15 mm long, 0.04- 0.06 mm wide. Intestinal caeca simple extending up to posterior end of the body. Ventral sucker, sub-median, pre-equatorial, pre-ovarian, sub-spherical 0.10 – 0.14 mm long, 0.10 – 0.15 mm wide, at 0.65 – 0.67 mm from anterior extremity. Excretory pore terminal; excretory bladder tubular. Genital pore, median, pre-acetabulum lying just above ventral sucker; at 0.33 – 0.52 mm from anterior extremity. Testes entire, sub-median, oval shape, diagnal, post-equatorial, unequal. Anterior testis larger than posterior testis, 0.12 – 0.13 mm long, 0.08 – 0.20 mm wide at 0.90 – 0.92 mm from anterior extremity. Posterior testis 0.08 – 0.09 mm long, 0.12 - 0.18 mm wide, at 0.47 – 0.52 mm from posterior extremity. Cirrus sac tubular present between acetabulam and ovary. Vesicula seminalis externa lying free in parenchyma, extending up to anterior end of ovary , 0.04 – 0.22 mm long, 0.03 – 0.04 mm wide and vesicular interna 0.07 mm long, 0.02 mm wide. Parsprostatica long, short Ejaculatory duct, 0.05 – 0.06 mm long, 0.010 – 0.011 mm wide. A large number of prostate gland cells present within cirrus sac surrounding vesicula seminalis and pars prostatica. Ovary entire, sub-spherical, equatorial, pre-testicular, median 0.12 – 0.13 mm long, 0.10 – 0.16 mm wide, at 0.68 – 0.70 mm from anterior extremity. Receptacula seminalis absent. Vitelleria extending from anterior level of ventral sucker up to posterior end of the posterior testis. Eggs are large, oval, non-operculated 0.027 – 0.030 mm long, 0.015 - 0.019 mm wide.

**Host** : *Mystus cavasius* (Ham., 1822)
**Location** : Intestine
**Locality** : Lucknow

**Prevalence :** Two specimen from one host out of twenty examined.

## RESULT AND DISCUSSION

**Table 1: Monthly variations in Prevalence %, Mean Intensity and Relative Density of trematode parasites of Fresh Water Fishes**

| Month/(2015) | Number of host Examined | Infected | Prevalence % | Number of trematodes Obtained | Mean Intensity | Relative Density |
|---|---|---|---|---|---|---|
| January | 27 | 15 | 55.55 | 12 | 0.8 | 0.44 |
| February | 53 | 11 | 20.75 | 5 | 0.45 | 0.09 |
| March | 44 | 25 | 56.81 | 50 | 2 | 1.13 |
| April | 21 | 11 | 52.38 | 6 | 0.54 | 0.28 |
| May | 60 | 21 | 35.00 | 15 | 0.71 | 0.25 |
| June | 63 | 18 | 28.57 | 8 | 0.44 | 0.12 |
| July | 56 | 25 | 44.64 | 18 | 0.72 | 0.32 |
| August | 35 | 18 | 51.42 | 4 | 0.22 | 0.11 |
| September | 35 | 10 | 28.57 | 10 | 1 | 0.28 |
| October | 28 | 19 | 67.85 | 7 | 0.36 | 0.25 |
| November | 48 | 11 | 22.91 | 16 | 1.45 | 0.33 |
| December | 30 | 3 | 10 | 11 | 3.66 | 0.36 |

**Table 2: Seasonal variation in Prevalence, Mean Intensity and Relative Density of trematode parasites of Fresh Water Fishes.**

| Season | Number of host Examined | Infected | Prevalence % | Number of trematodes Obtained | Mean Intensity | Relative Density |
|---|---|---|---|---|---|---|
| Winter | 133 | 72 | 54.13 | 46 | 0.63 | 0.34 |
| Summer | 186 | 82 | 44.08 | 76 | 0.92 | 0.40 |
| Rainy | 181 | 33 | 18.23 | 40 | 1.21 | 0.22 |

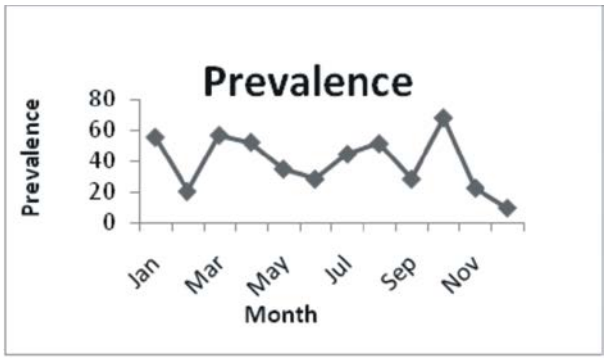


Fig. 1: Graphical presentation of Monthly prevalence.

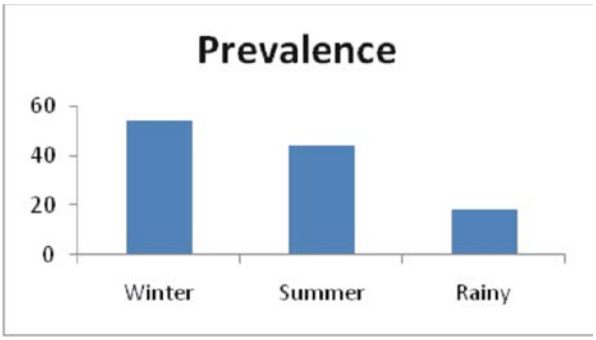


Fig. 2: Graphical presentation of Seasonal prevalence.

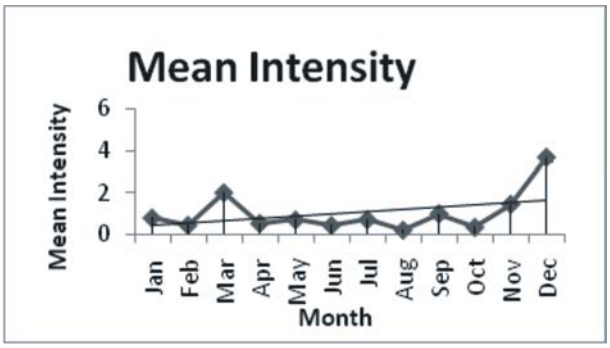


Fig. 3: Graphical presentation of Monthly intensity.

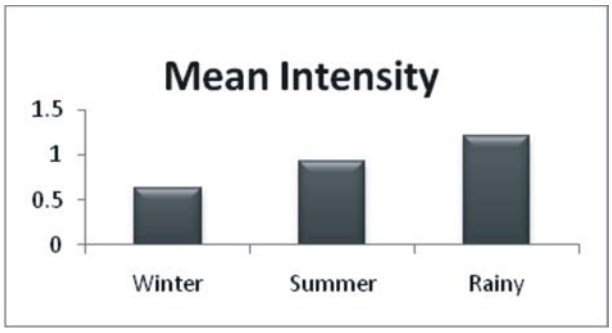


Fig.4: Graphical presentation of seasonal means intensity.

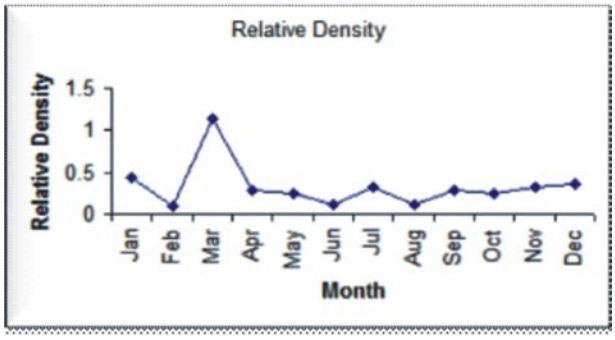


Fig.5: Graphical presentation of Monthly relative density

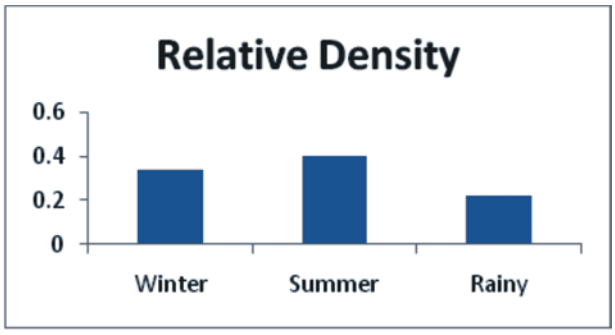


Fig.6: Graphical presentation of seasonal relative density

The study of the prevalence, mean intensity and relative density of trematode infection in fresh water fishes was carried out from January 2015 to December 2015 (Table 1). A total of 500 hosts were examined and only 275 trematode parasites found. Seasonal fluctuations in prevalence and abundance are common in many helminthes infecting freshwater fishes (Table 2). In the present observation we found the maximum prevalence in the months of October (67.85%) and March (56.81%) while minimum prevalence was reported in December (10%) (Fig. 1). The maximum mean intensity was reported in the month of December (3.66) whereas minimum was in August (0.22) (Fig. 3). The maximum relative density was reported in the month of March (1.13) and minimum in February (0.09) (Fig. 5). On the seasonal point of view, the maximum prevalence was in winter (54.13%) while minimum prevalence was reported in rainy season (18.23%) (Fig. 2). The maximum mean intensity was reported in the rainy season (1.21) while minimum was in winter season (0.63 (Fig 4). The maximum relative density was reported in the summer (0.40) and minimum in rainy season (0.22) (Fig. 6). The study suggests that highest prevalence of infection occurred in winter season followed by summer and rainy season.

## CONCLUSION

The results show the morphological, physiological and ecological factors effecting the distribution of parasites. The present form closely resembles the species *Macrotrema macronis* (Gupta, 1951) in which there is presence of pre-pharynx, oesophagus, and in the position of testes (Gupta, 1951) but differs from it in having position of ovary, genital pore and in relative shape and size of various organs. These differences are considered as intra-specific variations within the species.

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