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A STUDY ON SEASONAL VARIATION OF TREMATODE INFESTATION OF *Heteropneustes fossilis* IN CHAPRA, BIHAR, INDIA

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AUTHORS' CONTRIBUTIONS

Both authors conceived and planned the experiments. Author AK wrote the manuscript, performed the analytic calculations and performed the numerical and searched literature. Author DS supervised the work and given helpful suggestions. Both authors discussed the results and contributed to the final manuscript.

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ABSTRACT

Fish *Heteropneustes fossilis* is popularly known as singhi and abundantly found in rivers, ponds and canals of Bihar. This fish species play an important role in fish market because of their high nutritional and medicinal value among human population. Parasites are causing the major health problem in freshwater fish. In result occurring economic loss to our country and also effect on human health and others fish eating animal too. This study includes seasonal variation of trematode infection in *Heteropneustes fossilis* during the period from September, 2016 to August, 2017. Month-wise infection rate is highest in September (100 per cent) and lowest in month of February (22.22 per cent). Seasonally, highest infection rate in rainy season followed by summer and winter season.

Keywords: *Heteropneustes fossilis*; prevalence; fish; trematode parasites.

1. INTRODUCTION

Stinging catfish, *Heteropneustes fossilis* is an important fish in country and getting increasingly popular showing a promising future for commercial culture [1]. Fish like, *Heteropneustes fossilis* get easily infected by parasites because they feed upon mollusks, copepods, weeds, fungus and other organism of water bodies. Parasites are major problem especially trematode parasites invade the host organs and causes poor growth in result not only economic loss to fish farmers but also cause disease in human and other fish eating animals [2]. Several helminth parasites can be transmitted to humans and domestic animals only through fish and remain a subject matter of major public health concern [3]. It is considered a highly accepted food our country and esteemed as food for convalescence and invalids by Bhuiyan [4]. Zoonotic infections are being caused by eating of raw or undercooked fishes [5]. This paper deals with the

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seasonal changes in prevalence, intensity and abundance of trematode parasites in *Heteropneustes fossilis* in Chapra (Bihar).

2. MATERIALS AND METHODS

The seasonal changes in infection of trematodes in *Heteropneustes fossilis* were studied during the period from September, 2016 to August, 2017. The host fish species of *Heteropneustes fossilis* were collected randomly from local fish market of Chapra district. Live host fishes were brought in polythene bags containing water to the laboratory. Fishes were dissected vertically and all internal organs were sorted out and placed in petridish with saline water. One by one all organs were examined thoroughly for trematode infection. Trematode parasites were recovered from different organs mainly from liver, intestine and stomach. Then the parasites were stored in vials with 10% of formalin for the study of their morphology and identified with the help of light microscope. Trematode parasites are counted and all data was recorded. For seasonal variation of trematode infection, the prevalence rate, mean intensity and abundance were calculated according to Margolis et al. [6], which has been given as below:-

$$\text{Prevalence} = \frac{\text{No. of infected fishes}}{\text{No. of fishes host examined}} \times 100 \quad \text{(i)}$$

$$\text{Mean intensity} = \frac{\text{No. of parasites recovered}}{\text{No. of infected host}} \quad \text{(ii)}$$

$$\text{Abundance} = \frac{\text{No. of parasites recovered}}{\text{No. of fishes host examined}} \quad \text{(iii)}$$

For Statistical analysis, chi-square test has been applied to reveal the significance in rate of parasitization in different months & seasons.

3. RESULTS AND DISCUSSION

3.1 Month-wise and Season-wise Infection of Trematode Parasites in *Heteropneustes fossilis*

In month wise study, a total number of 309 fish of *Heteropneustes fossilis* are examined for trematode parasites, out of which 144 are infected. The highest prevalence rate of trematode infection was found in the month of September (100 per cent), where lowest infection rate in the month of February (22.22 per cent). The highest mean intensity was observed in the month of October (3), where lowest mean intensity observed in the month of February (0.66). The abundance was highest in the month of September (2.91) and lowest observed in the month February (0.14).

In this investigation, season-wise study of trematode infection in *Heteropneustes fossilis*, in winter season total 81 host fishes examined, out of which 21 fishes found infected and number of obtained trematodes were 28. In summer season, total 129 fishes examined, out of which 63 fishes found infected and 106 trematodes were obtained. In Rainy season total 99 fishes were examined, out of which 60 fishes found infected and 158 trematodes obtained.

The highest prevalence rate (60.60 per cent) was recorded in rainy season, moderate (48.83 per cent) in summer season and lowest (25.92) in winter season. Mean intensity was recorded highest (2.63) in rainy season, moderate (1.68) in summer and lowest (1.33) in winter seasons. Abundance was recorded highest (1.59) in rainy season, moderate (0.82) in summer and lowest (0.34) in winter seasons.

Table 1. Month-wise infection of trematode parasites in *Heteropneustes fossilis*

Months	Host examined	Host infected	Prevalence	Number of trematode obtained	Mean intensity	Abundance
September (2016)	12	12	100	35	2.91	2.91
October (2016)	15	6	40	18	3.00	1.20
November (2016)	21	6	28.57	11	1.83	0.52
December (2016)	9	3	33.33	3	1.00	0.33
January (2017)	24	6	25	10	1.66	0.41
February (2017)	27	6	22.22	4	0.66	0.14
March (2017)	39	24	61.53	27	1.12	0.69
April (2017)	33	18	54.54	39	2.16	1.18
May (2017)	33	9	27.27	17	1.88	0.51
June (2017)	24	12	50	23	1.91	0.95
July (2017)	30	18	60	44	2.44	1.46
August (2017)	42	24	57.14	61	2.54	1.45

Month wise infection of trematodes parasite in Heteropneustes fossilis statistically, significant. ($X^2$55df = 125.873) p>0.05

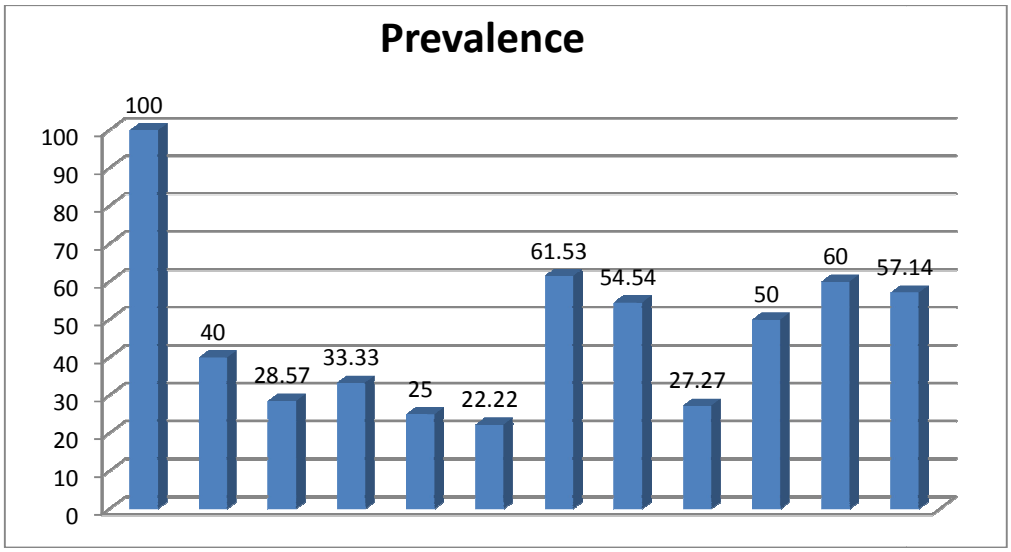

Fig. 1. Graphical presentation of month-wise prevalence rate of infection of trematode parasites

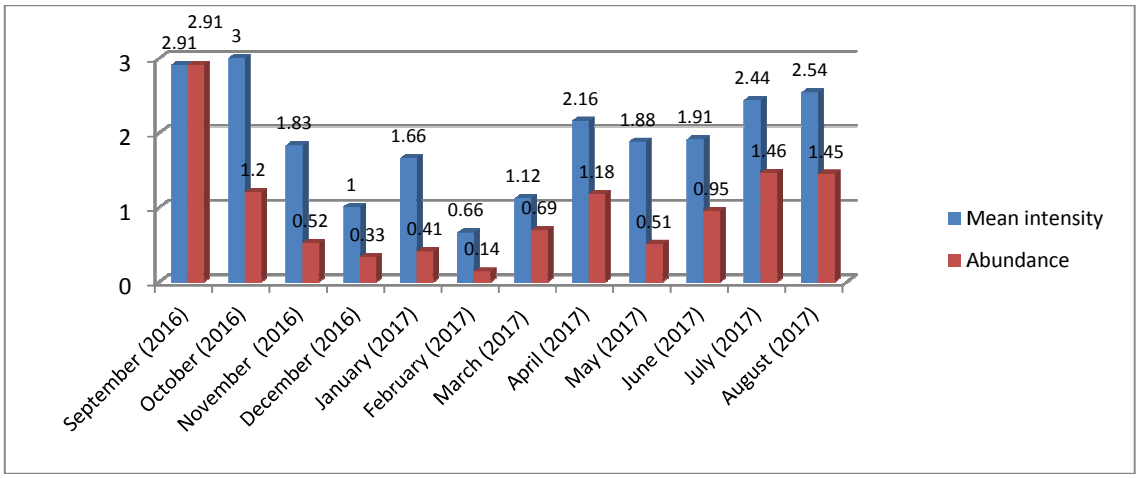

Fig. 2. Graphical presentation of month-wise mean intensity and abundance of trematode parasites

Table 2. Season-wise infection of trematode parasites in *Heteropneustes fossilis*

Season	Host examined	Host infected	Prevalence	Number of trematodes obtained	Mean intensity	Abundance
Winter	81	21	25.92	28	1.33	0.34
Summer	129	63	48.83	106	1.68	0.82
Rainy	99	60	60.60	158	2.63	1.59

Season wise infection of trematodes parasite in Heteropneustes fossilis statistically, significant. (X^2 10df = 44.32) p>0.05

In the present study, highest prevalence rate of infection was recorded in rainy season, while lowest in winter season. Present finding are in contrary to the findings of Murad & Mustafa [7] also studied blood parameters of catfish like *Heteropneustes fossilis* and reported highest incidence of Diplostomulum sp. in winter season. Guchhait et al. [8] reported highest trematode infection was during winter season in *Heteropneustes fossilis,* obtained from different districts of West Bengal. Low pH value of water and low temperature were one major factor for the several parasitic diseases [9]. Kennedy C.R. [10] reported temperature; humidity, rainfall, feeding habits of host, availability of infective host and parasite maturation

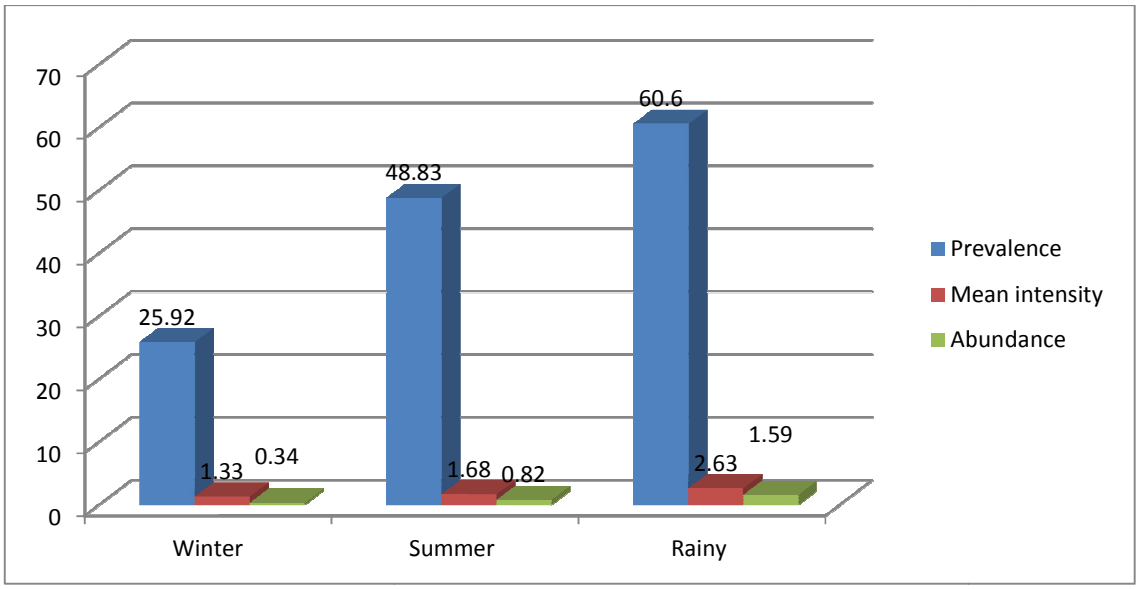

Fig. 3. Graphical presentation of season-wise infection of trematode infection

are responsible for influencing the parasitic infections. The Prevalence of trematode was highest in both summer and rainy seasons, two main categories of factors may be held responsible for the seasonal variations in host infectivity, those linked to the host and other linked to the parasites [11].

The prevalence and intensity of parasite infection depends on many factors such as temperature, types of parasite and host's feeding habits [2].

All these variartion may be due to enrichment of water body, fluctuation of Physico-chemical parameter and availability of intermediate host of the parasites which affect the trematode infection.

4. CONCLUSION

The prevalence rate, mean intensity and abundance were varied with season. The rainy season was more favorable for trematode infestation in the host. The environmental factor and feeding habitat are responsible factor for trematode infection in host.

India is 3rd largest country in fish production in world, therefore if we not aware about the parasitic infection; it may cause mortality in fish fauna and economical loss to our country.

ETHICAL APPROVAL

Animal ethical care guidelines were followed as freshwater fishes used in this study. It has been informed that as per CPCSEA guidelines for experimentation on fishes does not required approval.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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