

Parasitic Infestation of *Diplostomulum cerebralis* (Digenean Trematode) in *Channa punctatus* From Meerut District

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Abstract:

This investigation was done for parasitic infestation of Diplostomulum cerebralis, a digenean trematode in Channa punctatus from different ponds of Meerut District. A total of 275 specimen of Channa punctatus were observed for infestation of parasite. The study was done on monthly basis for seasonal occurrence of digenean trematodes from June 2014 to May 2015. The prevalence percentage of Diplostomulum cerebralis in Channa punctatus was observed to be 13%. The occurrence of this parasite was found highest during winter season i.e. in month of November and December. Findings show that beginning of the breeding period and feeding habitat are influencing the seasonality of parasitic infection.

Keywords: *trematode, infestation, seasonal occurrence, prevalence.*

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Introduction

Snake headed fish, *Channa punctatus*, is regarded as a valuable food fish because their flesh is claimed to be rejuvenating, particularly during recuperation from serious illness. *Channa punctatus* is one of highly demanded market fish in India as a table fish for high quality of nutritional value and as well as to aquarium keepers as a hard aquarium fish. In many region of India, particularly in Uttar Pradesh the fish shows vulnerable effect to different type of parasitic diseases and cause great loss to the fish farmer. These parasitic diseases, either alone or in conjunction with other environmental stresses, may influence weight or reproduction of the host, alter its population characteristics or affect its economic importance (Rhode, 1993).

Parasites occupy a definite position in the animal kingdom for their remarkable adaptations and damaging activities to host. The importance of parasites is related directly to the fish that may affect the general public health (Hoffman, 1967). Parasitic diseases caused by digenean parasites particularly *Diplostomulum cerebralis*, have the upper hand in fish parasitic diseases regarding the high mortality. Prevalence assessment of these parasites provides important information about the success of the parasite life cycle, the severity of its pathogenicity, it is also extremely

important to achieve early and correct diagnosis of the larval stages of the parasites for successful prevention and elimination of such infections (Rhode, 1993). The present study therefore aims to investigate the prevalence of *Diplostomulum cerebralis*, digenean trematode parasite including their seasonal variation in *Channa punctatus*.

Materials And Methods

Study was conducted in different blocks of Meerut district viz: Hastinapur, Parikshitgarh, Sardhana, Sarurpur khurd, Daurala, Rohta, Jani, Rajpura, Macchra, Mawana and Kharkoda, Meerut. In the present study, body cavity of *Channa punctatus* were examined for infection of *Diplostomulum cerebralis* during the period of June, 2014 to May, 2015 from Meerut, Uttar Pradesh, India. Digenean parasites were collected & fixed in AFA solution kept individually on plain slide, covered with coverslip and slight pressure was exerted on the coverslip to press the specimen slightly. The specimens were fixed in AFA for 12 – 24 hours. The fixed parasites were thoroughly washed with water and stained with acetocarmine. After washing the parasites were processed through a series of graded alcohol. Dehydrated parasites were cleared in xylene and mounted in DPX for the preparation of permanent whole mounts (Madhvi et al, 2007). Taxonomical

identification of these parasites was done by adopting the works of Yamaguti, 1958. Obtained data was recorded and studied for seasonal variation.

Results

The survey was carried out with 300 freshwater fishes, *Channa punctatus*, from various water bodies of Meerut district. Out of 300 freshwater fishes 39 were infected with *Diplostomulum cerebralis*, as found in annual cycle from June 2014 to May 2015. Results of present study showing prevalence of *Diplostomulum*

cerebralis, are presented in Table 1. Out of 300 specimens of *Channa punctatus* examined, 39 were found infected with *Diplostomulum cerebralis*. It was recovered from the body cavity and showed an overall prevalence of 13% as shown in Table 1, 2 and fig 1, 2. The maximum prevalence of 22.6 % was recorded in winter season while the minimum prevalence of 4.45 % was recorded in summer season. The percentage of prevalence decreased sharply from the months of winter towards the months of summer.

Table 1: Number of Host examined & Infected in different Season during June, 2014 to May, 2015.

Seasons	No. of the host Examined	No. of the host Infected
Monsoon (June, 2014 –Sept.,2014)	95	9
Winter (Oct.,2014- Jan., 2015)	115	26
Summer, (Feb.,2015-May,2015)	90	4

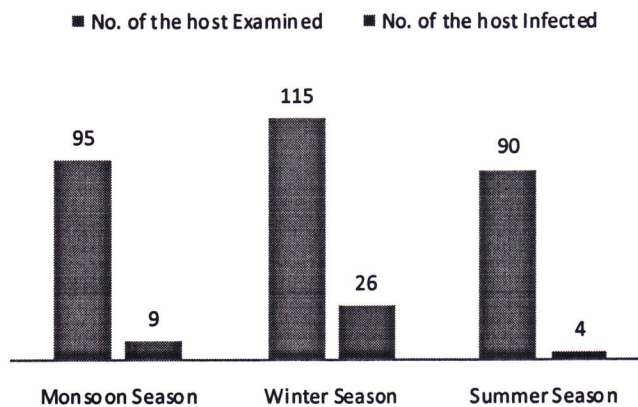


Fig 1: Number of Host examined & Infected in different Season.

Table 2: Prevalence of *Diplostomulum cerebralis* during June, 2014 to May, 2015.

Seasons	No. of the host Examined	No. of the host Infected	Incidence %
Monsoon (June, 2014 – Sept.,2014)	95	9	9.47 %
Winter (Oct.,2014- Jan., 2015)	115	26	22.6 %
Summer, (Feb.,2015- May,2015)	90	4	4.45 %

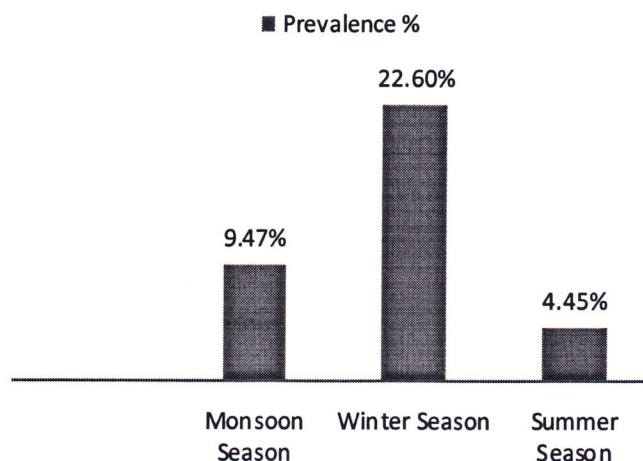


Fig 2: Prevalence of *Diplostomulum cerebralis* in different season.

Discussion

The present results shows high incidence occurs in winter season followed by monsoon season where as low incidence were recorded in summer season. The valuable information pertaining to the influence of season on digenean trematodes particularly *Diplostomulum cerebralis* parasite was contributed by several workers. Singh & Sinha (2010) studied *Diplostomulum* sp.

infestation in *Channa puntatus* in Bihar and concluded that prevalence of these parasites occurred highest in winter season followed by monsoon season. Athokpam & Tandon (2013) also reported high helminthes infection from *Channa puntatus* in winter season. Murad & Mustafa (1988) also studied blood parameters of catfish like *Heteropneustes fossilis* and reported highest incidence of *Diplostomulum* sp. in winter season.

The prevalence of gastrointestinal parasites, the genera of helminth parasites, species and the severity of infection also vary considerably depending on local environmental conditions such as humidity, temperature, rainfall, vegetation and management practices. Climatic conditions are responsible for the distribution and prevalence of the disease. It is well recognized that in regions of the world where the resources are poor, helminth infections of sheep and goats are major factors responsible for economic losses through reduction in productivity and increased mortality (Over *et al.*, 1992). Factors like temperature, humidity and rainfall, feeding habits of host, availability of intermediate host and parasite maturation are responsible for influencing the parasitic infections (Khan, 2012).

The parasitic fauna, its composition, the incidence and intensity of infestations it produces, are largely determined by the host's mode of life and type of food (Kennedy, 1975). Thus fishes were infected with large number of parasites in late winter to end of

summer months, as ecological factors are favorable in these months (Pennyuck, 1973). The increase in helminthes infection particularly digenean trematodes in winter supports the hypothesis that the parasite life cycle could be synchronized with the beginning of host reproduction, probably induced by increasing fish hormone levels in the spring (Simková *et al.*, 2005). Changes in the fish feeding behavior have been considered as the principal factors responsible for the seasonal incidence and intensity pattern of parasites (Eure, 1976).

In the present study, recorded data showed high prevalence of infections of *Diplostomulum cerebralis* in winter season followed by moonsoon where as low in summer season. Our results suggest that *Channa punctatus* fishes are more susceptible to *Diplostomulum cerebralis* parasite infection in winter season. The results clearly indicate that environmental factors, breeding period and feeding habitat are influencing the seasonality of parasitic infection.

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