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Research Article

Occurrence of Helminth Parasites of Freshwater Murrel, *Channa punctatus* (Bl.)

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ABSTRACT

Present study was conducted to investigate the prevalence of different helminth parasites of freshwater murrel, *Channa punctatus* (Bl.). Seventy five specimens of *C. punctatus* were examined for the occurrence of helminth parasites. Two species of digentic trematode (*E. heterostomum* and *Clinostomum complanatum*) and one species of acanthocephala (*Pallisentis* sp.) were recovered from different organs. According to their prevalence (%), *E. heterostomum* (28.0%) is dominant species followed by *Pallisentis* sp. (26.6%). While *Clinostomum complanatum* (20.0%) showed least prevalence.

Keywords: Helminth parasites, prevalence, *Channa punctatus*.

INTRODUCTION

Snake headed fishes are 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 central India the fish shows vulnerable to different type of parasite effect and cause great loss to the fish farmer.

Parasitic diseases, either alone or in conjunction with other environmental stresses, may influence weight or reproduction of the host, alter its population characteristics and affect its economic importance (Rohde)¹. Parasites occupy a definite position in the animal kingdom for their remarkable adaptations and damaging activities to host. The importance of parasite is related directly to the fish that may affect the general public health (Hoffman)². Encysted metacercariae parasitic diseases have the upper hand in fish parasitic diseases regarding the low body gain, high mortality. The present study therefore aims to investigate the prevalence of different parasite and their seasonal variation in *Channa punctatus*.

EXPERIMENTAL DESIGN AND SETUP

Collection of fish host: Living and morbid specimens of *Channa punctatus* were collected from local fish markets of Bhopal. They were brought to the laboratory and examined morphologically and internally for the occurrence of helminth parasites.

Collection of parasites: The host fish specimens were identified; their sex and standard length were recorded. The fishes were examined for the presence of helminth parasites by adopting the methods employed by Mayer and Olsen ^[3], Cable ^[4], Madhavi *et al.* ^[5]. The fins and scales were examined for the presence of ectoparasitic helminths while the gills, muscles, liver, gut, gonads and body cavity were carefully investigated for endoparasitic helminths.

Digenean and acanthocephalan collected from different organs were fixed in AFA solution (alcohol - 85 ml, formalin - 10 ml and acetic acid - 5 ml) 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 aceto - carmine. After washing the parasites were processed through a series of graded alcohol (70%, 90%, 95% and 100%). Dehydrated parasites were cleared in xylene and mounted in DPX for the preparation of permanent whole mounts. Taxonomical identification of helminth parasites was done by adopting the works of Yamaguti ^[6,7,8], Bhattacharya ^[9] and Gibson ^[10].

STATISTICAL ANALYSIS

Ecological terms are studied as per Margolis ^[11].

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

$$(ii) \text{ Mean Intensity} = \frac{\text{Total No. of parasites}}{\text{Total No. of Infected Hosts Examined}}$$

$$(iii) \text{ Relative Density} = \frac{\text{Total No. Parasites}}{\text{Total No. of Hosts Examined}}$$

Or Abundance

RESULT AND DISCUSSION

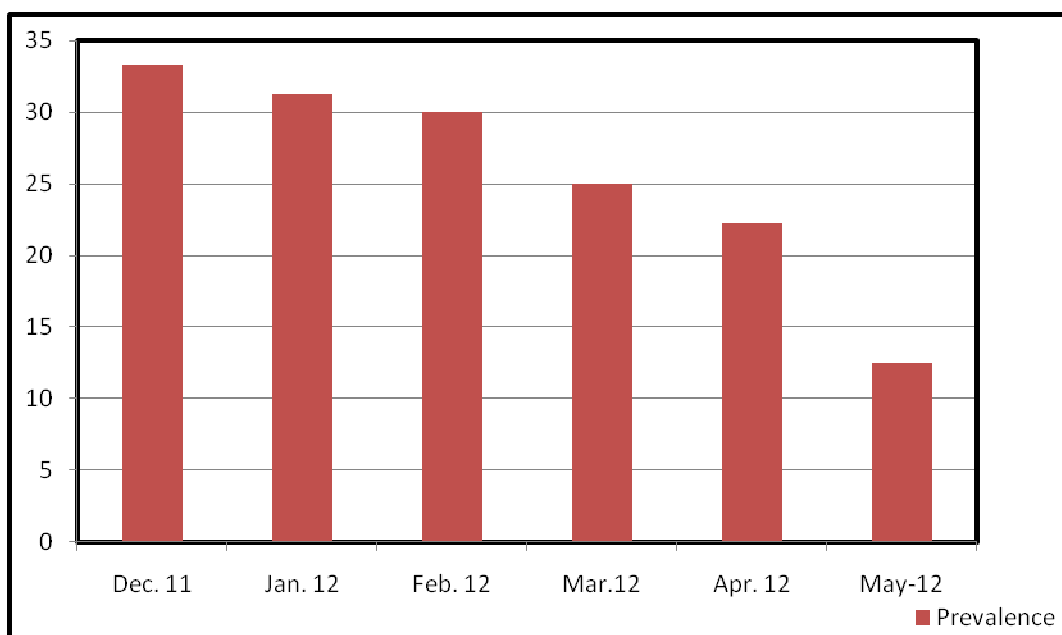
Under present study, *C. punctatus* was observed to be infected by three major species of helminth parasite namely *E. heterostomum*, *C. complanatum* & *Pallisentis* sp. Monthly variation in their occurrence was observed following

1. Monthly variation in prevalence, intensity and abundance of *E. heterostomum*

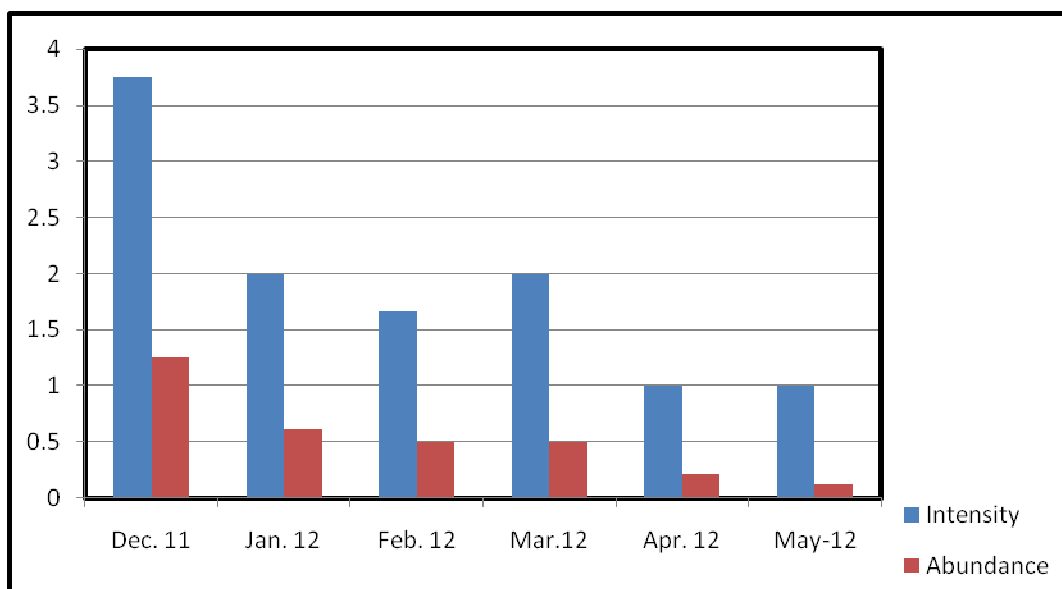
Out of 75 specimens of *Channa punctatus* examined, 21 were found infected with metacercariae of *Euclinostomum heterostomum*. It is recovered from liver and body cavity and showed an overall prevalence of 28.0%.

Prevalence (%): The maximum prevalence of 33.3 % was recorded on month of December, 2011 while the minimum prevalence of 12.5 % was recorded in May, 2012. The percentage of prevalence gradual decrease was observed from the months of winter towards the months of summer.

Intensity and Abundance: In *C. punctatus*, the maximum intensity (3.75) was recorded in December, 2011. The lowest intensity (1.0) was recorded in months of April and May, 2012. The recorded value of relative abundance ranged from 0.12 - 1.25. The highest value of abundance (1.25) was recorded in December, 2011 and the lowest value of abundance (0.12) was calculated in month of May, 2012 (Graph 1&2).



Graph 1: Monthly variation in the prevalence of *Euclinostomum heterostomum*



Graph 2: Monthly variation in the intensity of *Euclinostomum heterostomum*

2. Monthly variation in prevalence, intensity and abundance *Clinostomum complanatum*

Out of 75 specimens of *Channa punctatus* examined, 15 were found infected with metacercariae of *Clinostomum complanatum*. It was recovered from the body cavity and showed an overall prevalence of 20.0%.

Prevalence (%): The maximum prevalence of 25.0 % was recorded on month of January, 2012 while the minimum prevalence of 10.0 % was recorded in May, 2012. The percentage of prevalence sharp decreases was observed from the months of winter towards the months of summer.

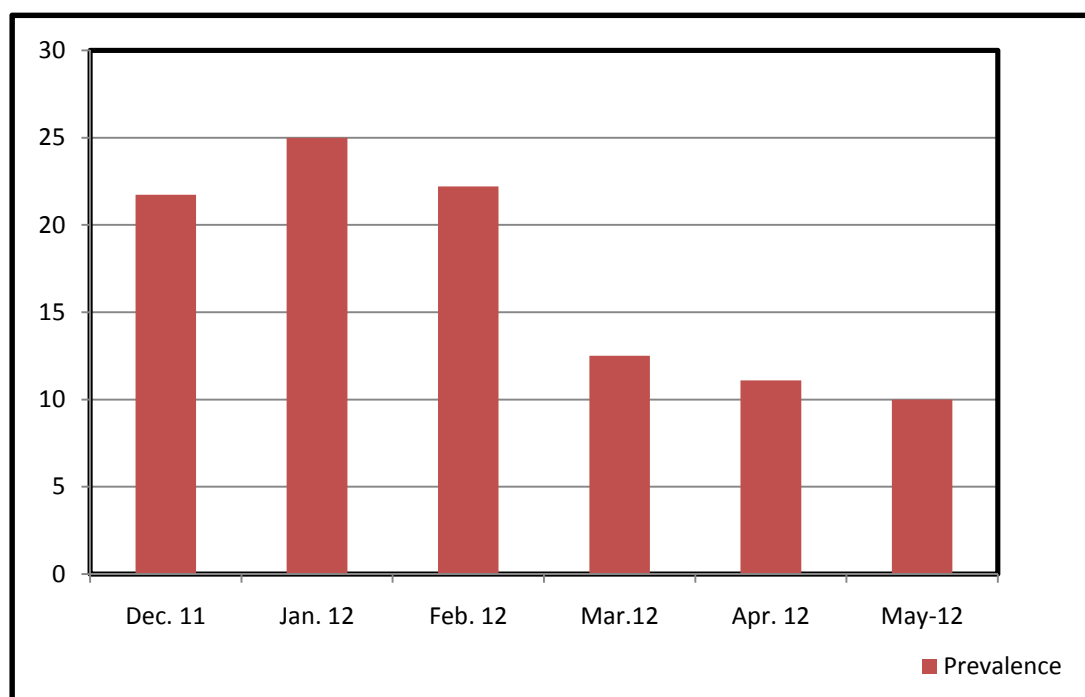
Intensity and Abundance: In *C. punctatus*, the maximum intensity (2.5) was recorded in February, 2012. The lowest intensity (1.0) was recorded in month of May, 2012. The recorded value of relative abundance ranged from 0.1 – 0.56. The highest value of abundance (0.56) was recorded in January, 2012 and the lowest value of abundance (0.1) was calculated in month of May, 2012 (**Graph 3 & 4**).

3. Monthly variation in prevalence, intensity and abundance of *Pallisentis* sp.

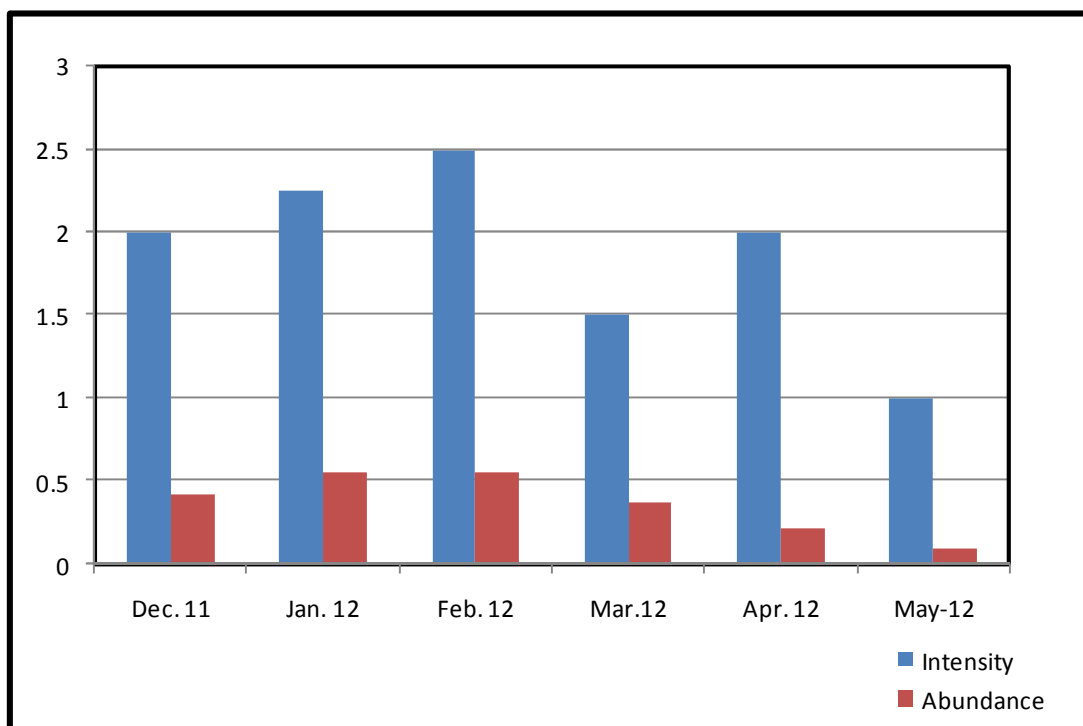
Out of 75 specimens of *Channa punctatus* examined, 20 were found infected with *Pallisentis* species. They were recovered from the mid gut of host while in case of heavy infection they were found to infect the entire gut. It exhibited an overall prevalence of 26.6%.

Prevalence (%): The maximum prevalence of 37.5 % was recorded on month of May, 2012 while the minimum prevalence of 25.0 % was recorded in March, 2012. An abrupt disappearance in percentage of prevalence was observed in April, 2012.

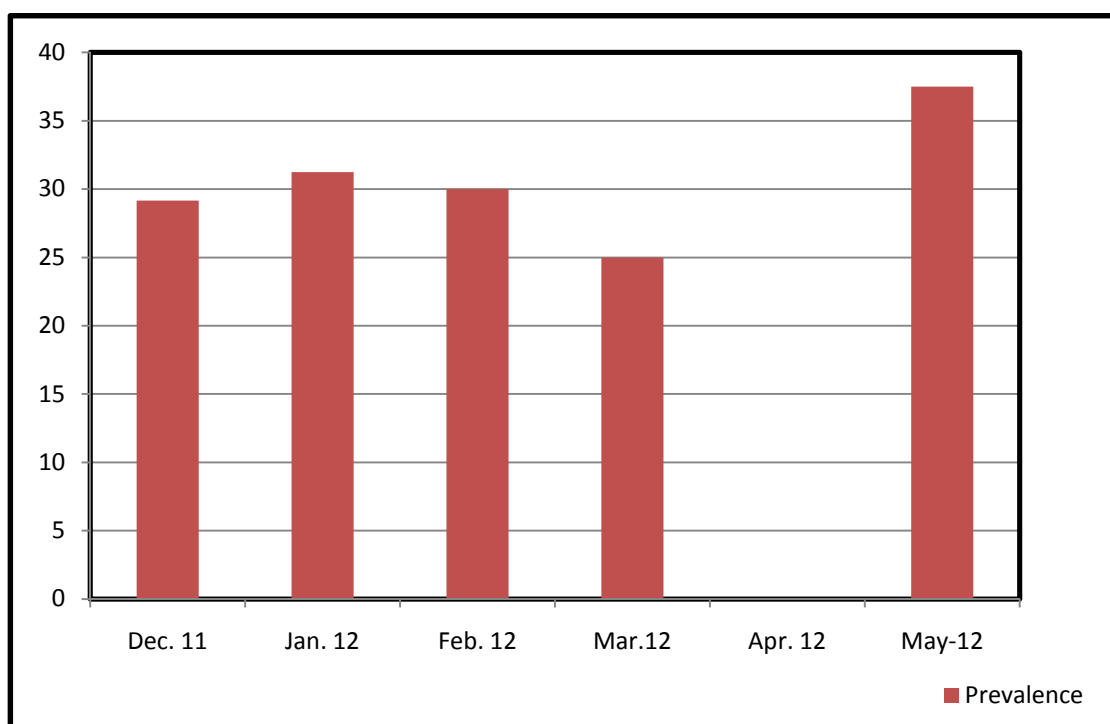
Intensity and Abundance: In *C. punctatus*, the maximum intensity (3.3) was recorded in May, 2012. The lowest intensity (1.3) was recorded in month of February, 2012. The recorded value of relative abundance ranged from 0.4 - 1.25. The highest value of abundance (1.25) was recorded in May, 2012 and the lowest value of abundance (0.4) was calculated in month of February, 2012 (**Graph 5& 6**).



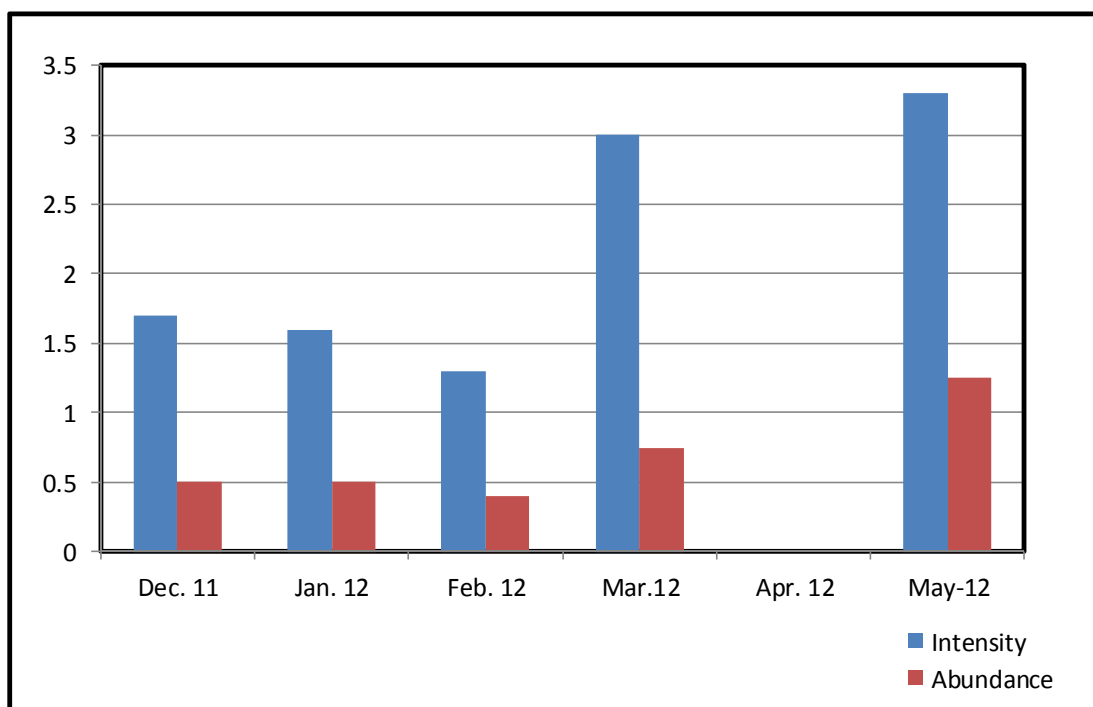
Graph 3: Monthly variation in the prevalence of *Clinostomum complanatum*



Graph 4: Monthly variation in the intensity of *Clinostomum complanatum*



Graph 5: Monthly variation in the prevalence of *Pallisentis sp.*



Graph 6: Monthly variation in the intensity of *Pallisentis* sp.

Present investigation revealed that the prevalence was maximum in month of December, 2011 i.e. during winter month. And the percentage of prevalence gradually decreased in summer season. Kaur *et al.*^[12] also recorded the maximum prevalence (71%) for *Clinostomum complanatum* collected from freshwater fish, *Nandus nandus* and concluded that this may be due to the decrease in water volume during dry season. Akhter *et al.*^[13] and Chandra^[14] also reported the similar finding.

In the present study there was concurrent infection by two or more helminth parasites. Gupta *et al.*^[15] and Amin^[16] have also reported concurrent infection of helminth. Concurrent infection causes niche segregation and reduction in the number of helminth parasites in fish. Gupta *et al.*^[17] studied the population dynamics of *Pallisentis* (Acanthocephala), in relation to host sex from freshwater fishes, *Channa* of Rohilkhand region. A total of 517 fishes (*Channa punctatus*, n= 198 and *C. striatus*, n= 319) were examined regularly from August 2006 to February 2010. Overall prevalence of *Pallisentis* in *C. striatus* was higher in females (67.78%) as compared to males (63.52%). In case of *C. punctatus*, overall prevalence of *Pallisentis* was higher in males (53.77%) as compared to females (52.17%) whereas, relative density was higher in females (61.41%) than in males (52.72%). Intensity (2-3 parasite/host, in both sexes), density (1.36 in males and 1.69 in females) and infection index (0.73 in males and 0.88 in females) were recorded.

Kanth and Srivastava^[18] Showed that *Pallisentis ophiocephali* had two peak periods during May and August and then the infestation rate declined gradually through September to February. Khan *et al.*^[19] Studied seasonal variation in the occurrence of *P. ophiocephali* and *Acanthosentis betwai* in relation to their fish hosts. *C. striatus* showed greater prevalence of *P. ophiocephali* infection between March and May and males were more heavily infected than females. *P. ophiocephali* collected from *C. punctatus* showed highest prevalence in the month of September, the intensity of infection being highest in August Jha *et al.*^[20] and Malhotra and Banerjee^[21] observed peak infectivity in October of *P. allahabadi*.

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