A Survey on Parasitic Prevalence of Gut in *Heteropneustes fossilis* Collected from Local Market of Kolkata

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Research Journal of Agricultural Sciences
An International Journal

P- ISSN: 0976-1675
E- ISSN: 2249-4538

Volume: 13
Issue: 01

Res. Jr. of Agril. Sci. (2022) 13: 173–175

CARAS

Res. Jr. of Agril. Sci. (Jan-Feb 2022)
13(1): 173–175

ISSN: 0976-1675 (P)
ISSN: 2249-4538 (E)

www.rjas.org

Short Communication

A Survey on Parasitic Prevalence of Gut in *Heteropneustes fossilis* Collected from Local Market of Kolkata

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Received: 30 Nov 2021 | Revised accepted: 08 Jan 2022 | Published online: 01 Feb 2022

***Key words*:** *Heteropneustes fossilis*, Parasites, Fish, Prevalence, Infection

Fish serve as a potential source of animal protein and provide 16% of the world population's protein requirements. Majority of the fishes serve as an intermediate host for many parasites, which reduces the food value and cause mass mortality. The indigenous catfish popularly known as Singhi, *Heteropneustes fossilis* has been contributed greatly as a delicious and nutritious food of the tropical countries as well as in the Indian subcontinent [1]. Fish parasites are an integral part of aquatic ecosystems and they are commonly found in wild and aqua cultural systems [2]. Due to certain environmental circumstances and stressful condition, the fish become more susceptible to a wide variety of opportunistic parasite and pathogen [3]. The present study is indicative of extensive distribution of parasites in stomach and intestine of edible catfish. The parasitic infection of this experimental fish results in economic losses due to not only mortality, but also higher treatment costs and decreasing growth that reduces the expansion of aquaculture.

A total of 150 individuals of *Heteropneustes fossilis* (size 22-27 cm, weighing 70-80 gm) were collected from a local market of Kolkata, West Bengal, India during November to April in a year i.e., during the entire period of study and freshwater fishes were transported to the laboratory in large containers. The collected fishes were taken immediately for experimentation.

Parasitological studies

Fish samples collected from local market were taken in live condition during each time interval i.e., Nov-Dec, Jan-Feb and Mar-Apr for experimentation. The fishes were dissected in order to collect the parasites. An incision was made along with mid-ventral line of the fish. After separating the internal organ stomach and intestine was examined individually for parasite in petri dishes with formalin solution. The gut was carefully opened by an incision and then was shaken to dislodge the parasites that might remain attached to the lining of the epithelium by their head ends. The epithelial layers of the gut were scrapped with a scalpel to remove any parasites that remain attached to the layers. The collected parasites were then washed in fresh saline solution. The contents of each Petri dish were then stirred well and allowed to settle in the bottom of it. The sediment was then examined with a dissecting microscope. The collected parasites were fixed in AFA (Alcohol Formalin Acetic acid) for a few minutes. After fixation, the parasites were preserved in 70% ethyl alcohol in vials for prolonged storage [4]. The collected helminthic parasites were kept in lacto phenol for five to seven days for visibility of the internal organs as well as its mounting. The parasites were stained with borax carmine for one and half to two hours and then after dehydrating in alcohol graded series of 50%. 70%, 90% and 100%, the parasites were cleaned with xylene and mounted in Canada Balsam [5] for microscopic study and photo documentation.

Analysis of parasitic infestation

The analyses of parasitic manifestation (prevalence) were studied as Margolis *et al*. [6].

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

The analyses of parasitic infestation for index were carried out by following formulae after Williams [7] as:

$$\text{Index of infection} = \frac{\text{No of host infected} \times \text{No. of parasites collected}}{\text{Total hosts examined}}$$

Out of 150 specimens of *Heteropneustes fossilis* examined in the time of interval, 133 were found infected with nematode, like *Contracaecum sp*. (Fig 1A), Acanthocephalon like *Pallisentis sp*. (Fig 1B) and trematodes, like *Clinostomum sp*. (Fig 2) and Monogenea (Fig 3). The maximum prevalence of parasitic infection (90%) (Fig 4) was recorded during the

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time period November to December while the minimum prevalence as 60% was recorded in the time span of March to April (Fig 4). The parasites exhibit clear preference for a particular region of the alimentary canal, but it is capable of swimming in all the regions of the alimentary canal. The parasites remain in the same site throughout the period of infection. The highest index of infection (14.4) was recorded in the time interval of Nov-Dec whereas the lowest index of infection (6.6) was observed in the time interval of Mar-Apr (Fig 5). Fish in their quest for survival might have fed on other food particles that it would normally not feed on were food very abundant thereby taking up these infective organisms in the process and their increased food intake to meet up to the food requirement for various developmental process might have exposed them to more contact with the parasites which subsequently increases their chance of being infected [8]. The helminth and acanthocephalon usually cause the damage in the surrounding of their micro-habitat into the host body. This damage occurs when the parasites pierce the various organs of digestive system for having their food from the host's body; their migration causes disturbances to the host's multiple systems, the cluster of parasites block the channel of fluid in the host body, heavy infection causes deficiency of hosts nutrition, lesions, ulcer and finally the death of the host [9]. The invasion was maximum at the beginning of winter and minimum in spring. This was probably due to feeding habit and availability of food. The seasonal influence on prevalence is due to change in atmospheric conditions on the definitive host causing physiological changes which influence the occurrence of parasitic populations [10].

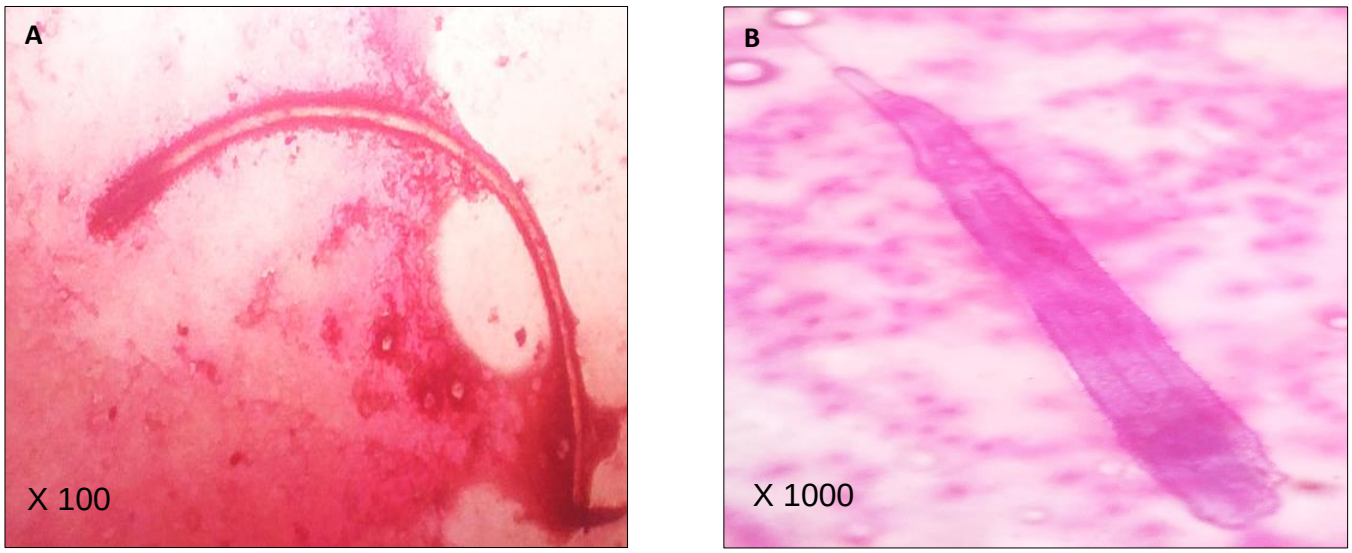

Fig 1 Photomicrograph of isolated intestinal parasites (A). Nematode (*Contracaecum sp.*) (B). Acanthocephalans (*Pallisentis sp.*)

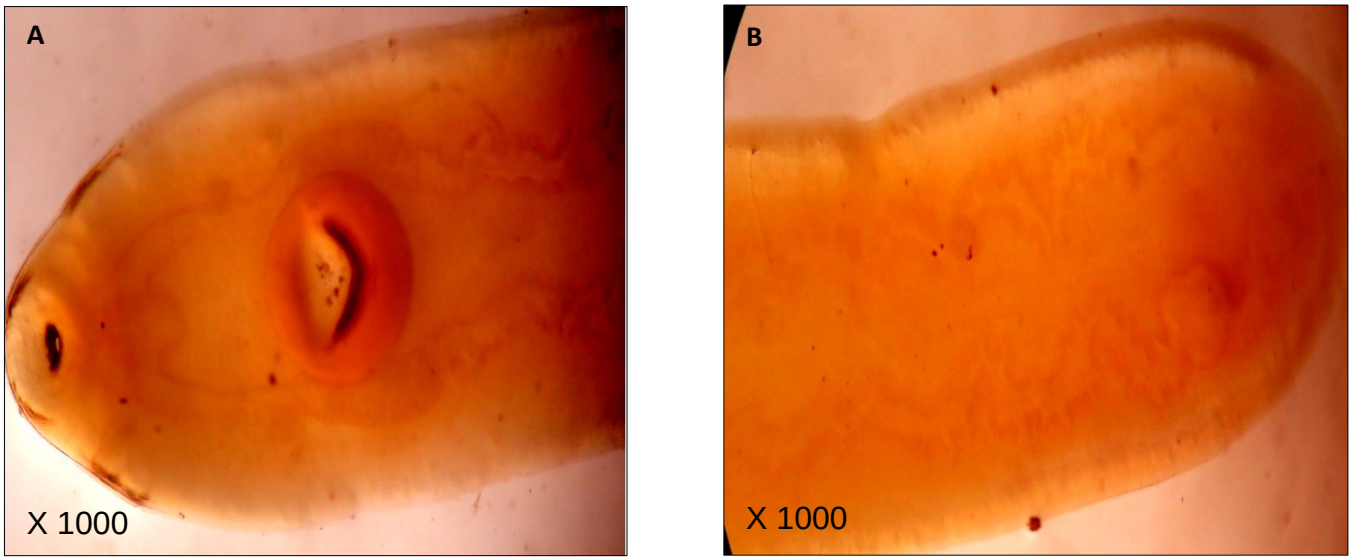

Fig 2 Photomicrograph of *Clinostomum sp*. (A. Anterior portion & B. Posterior portion) isolated from stomach

SUMMARY

The catfish (*Heteropneustes fossilis*) has been known to be the most popular fish in the tropical countries as well as in the Indian subcontinent. It is a good source of protein where malnutrition is a major problem. A total of 150 *Heteropneustes fossilis* collected from local market of Kolkata, West Bengal, India during specific time period in a year and were investigated for parasitic infestation. Out of the fish samples analyses and examined for endoparasites, trematode, nematode and acanthocephalans accounted as the most invasive parasites. The highest prevalence (90%) and index of infection (14.4) were recorded during the time interval of November-December. Parasite infection and diseases are some of the factors hindering high productivity in fish. Fish parasites result in huge economic losses as they increase mortality causing reduction in growth

rate and possibly weight loss during and after the period of parasitic diseases outbreak. The parasitic infection of fish results in economic losses due to not only mortality, but also treatment cost, decrease in growth that reduces the expansion of aquaculture. Enhanced concern in fish farming showed consciousness of parasites that infest fish health, growth and survival.

Acknowledgements

The author takes this opportunity to acknowledge the cooperation of Principal, Bidhannagar College for extending the facility of the department for research.

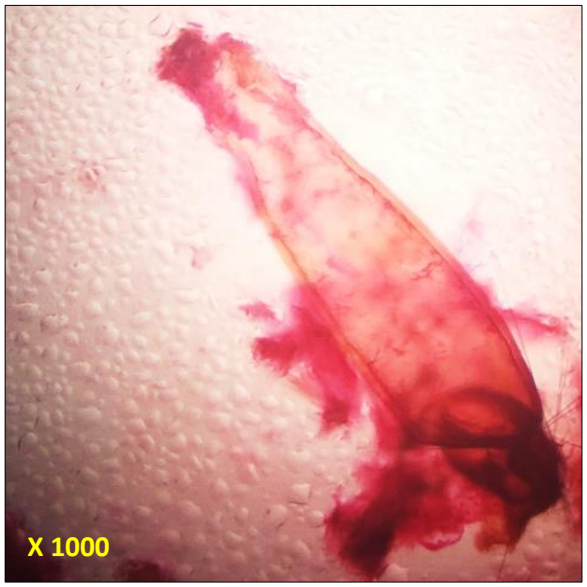

Fig 3 Photomicrograph of Monogenea isolated from intestine

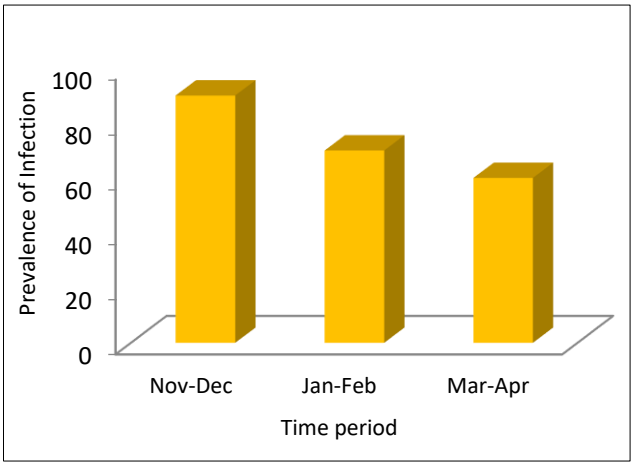

Fig 4 Prevalence of gut infection for varied time intervals

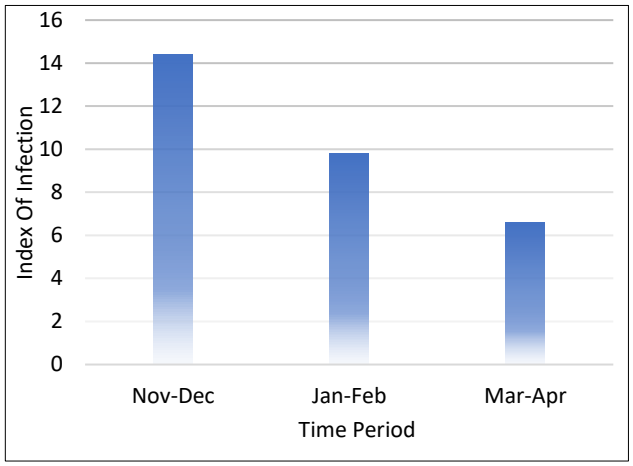

Fig 5 Index of gut infection for varied time intervals

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