

Study on prevalence of Cestode parasites in freshwater Fishes from Jafrabad Region (M.S.) India

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Abstract

Present study was based on survey of Helminth parasites from economically important freshwater fishes *Channa punctatus*, *Channa marulis*, *Clarius batrachus* and *Wallago attu* from various collection sites of Purna basin, Jafrabad Region (MS) India during June 2018 to May 2019. Four cestode genera *Gangesia* (Woodland, 1924), *Proteocephalus* (Weinland, 1858), *Senga* Dollfus (1934) and *Circumoncobothrium* Shinde (1968) were found high in the fishes during summer season as compared to the winter and monsoon season. The fish specimens with intermediate weight group showed highest prevalence of infestation. However, further study is still required to find out many enclosed parasitic infections of fishes and their causative agents, particularly in this region with high diversity of fishes.

India is among the 17 megadiversity countries¹ and hosts as many as 55 families of freshwater fish (Teleostei)⁴. For the last few decades, fish (both Chondrichthyes and Osteichthyes) have been extensively used as a protein rich diet for human consumption in the Indian subcontinent and thus contribute substantially to its economy. It is estimated that about 10 million tons of fish are required annually to meet the present-day demand of fish proteins in India compared to an actual annual production of only 3.5 million tons¹². Catfishes are an important part of the fish fauna in wetlands and many of them are economically important as a food source of high nutritive value. In India, there have been described about 160 species of inland catfishes from 50

genera distributed in 13 families, namely Akysidae, Amblycipitidae, Ariidae, Bagridae, Chacidae, Clariidae, Heteropneustidae, Olyridae, Pangasiidae, Plotosidae, Schilbeidae, Siluridae and Sisoridae¹⁴. Five of them, namely Bagridae, Clariidae, Heteropneustidae, Schilbeidae and Siluridae, have been reported as definitive hosts of cestodes^{5,7}.

Parasitic disease is the single most important factor threatening the fishery industry worldwide, particularly in the tropics⁸. Among the parasites that infect teleostean fishes, helminths represent the largest and important group. No other group of vertebrates has such a diversity of helminth species and some of the helminth groups like monogeneans

are unique to fish. It is estimated that there are more than 30000 helminth species parasitizing marine and freshwater fish¹⁵ and some of them are known to be the agents of serious fish diseases or may represent an important public health problem. Fish helminths with their mostly complex life cycles may also represent excellent models for the solution of a number of theoretical questions, including host-parasite relationships including host manipulation, biology, ecology, zoogeography and phylogeny of these parasites and their hosts¹⁵. Several investigators studied on the seasonal variation, intensity of infestation and habitat specific infection in freshwater fishes therefore present study is important to know the status of intensity of infection in freshwater fishes from this region.

The study was conducted from different collection sites of Purna river Jafrabad. In present study, survey on cestodes parasites was conducted on intestines of freshwater fishes viz. *Channa punctaus*, *Channa marulis*, *Clarius batrachus* and *Wallago attu* during the period of June 2018 to May 2019. The infection of each group of parasites were treated as follows: collected cestodes and trematode were first relaxed and then fixed in hot 4% formalin and stained using Harris haematoxyline. Stained parasites were washed in distilled water, dehydrated in ascending grades of alcohol, cleared in xylene, mounted in D.P.X. Nematodes were fixed in hot 10% Glycerol and cleared in lacto phenol. Drawings were made using a camera lucida. The identification is made with the help of "Systema Helminthum¹⁶" by Yamaguti¹⁶. Population dynamics of helminth parasites were determined by following formula

$$\text{Incidence (Prevalence) of infection} = \frac{\text{Infected hosts}}{\text{Total no. of host examined}} \times 100$$

$$\text{Density of infection} = \frac{\text{No. of parasites collected in a sample}}{\text{No. of hosts examined}}$$

Cestodes are the most common and abundant parasites of freshwater fishes. They are occurring as endoparasites usually in the gut. Morphological studies on cestode parasites of fishes were initiated in the early 19th century itself by scientists, but they received momentum in the 20th century. To date around 10,000 species of cestode parasites were recorded from freshwater fishes. The present investigation deals with morphology of cestode parasites includes the genera like *Gangesia* Woodland, 1924, *Senga* Dollfus, 1934, *Proteocephalus* (Weinland, 1858) and *Circumoncobothrium* Shinde, 1968.

The present study has contributed, to some extent, to know about intensity of the cestode parasites from freshwater fish in Jafrabad region. However, considerable gaps still exist in our knowledge of the diversity and species composition of fish cestodes in the Indian subcontinent. In addition, there are still vast areas, where ichthyoparasitological surveys oriented at the fish parasites have not been carried out. Bhure *et. al.*,³ described twelve species of genus *Cotugnia*, five sp. of *Davainea*, five sp. of *Rallietina*, four sp. of *Valipora* and four sp. of *Mogheia* Parasitic in *Gallus gallus domesticus* of locality Nanded³. Jadhav *et. al.*,⁸ studied population dynamics of *Cotugnia* sp. parasitizing domestic fowl and showed High incidence, density and index of infection were reported in Summer followed by Winter whereas infection was low in monsoon⁸. Bhure and Nanware² studied Faunestic diversity of Piscean, Avian and

mammalian cestodes of genus *Lytocestus*, *Senga*, *Gangesia*, *Cotugnia*, *Davainea*, *Raillietina*, *Moniezia*, *Stilesia* and *Avitellina* from Nanded region (M.S.) India².

Availability of food and feeding activity of host also may be reasons for occurrence of parasitic diversity. Maximum infections occurred in host *Channa punctatus* and *Channa marulis*. Infections are host specific because morphological, physiological and ecological factors affect host specificity. Morphological factors are those which like a parasite with its host at the site of attachment. Ecological factors are such as, distribution, and environment of host, diet and mode of feeding.

These adaptations often provide important role for limiting a parasite to a particular host sp. in particular season.

The present result shows high incidence occurs in summer season and monsoon season where as low incidence were recorded in winter season. The survey was carried out with 375 Freshwater fishes from various locations of Purna river in Jafrabad region. Out of 375 freshwater fishes 187 were infected with cestode found in annual cycle from June-2018 to May-2019. The intensity of infestation of each species, the host – specificity and the variation in the infestation of fishes were discussed.

Table-1: Prevalence of cestode parasites from freshwater fishes during the period June 2018 to May 2019 from Purna river, Jafrabad region.

Sr. No.	Month	No. of host examined	No. of host infected	No. of Cestode Parasites collected	Prevalence %	Density of infection
1	June	30	11	12	36.67%	0.40
2	July	30	10	13	33.33%	0.43
3	August	30	12	17	40.00%	0.57
4	September	35	10	13	28.57%	0.37
5	October	30	13	16	43.33%	0.48
6	November	25	14	18	56.00%	0.72
7	December	30	16	21	53.33%	0.70
8	January	35	19	24	54.28%	0.68
9	February	30	20	24	66.67%	0.80
10	March	35	21	29	60.00%	0.82
11	April	30	19	26	63.33%	0.87
12	May	35	22	28	62.85%	0.80
Total		375	187	241	49.87%	0.64

It was found that, high incidence of infection of these species were recorded in Summer where prevalence percentage was in between (62% to 66%) followed by winter whereas infection was low (43% to 54%), in monsoon (28% to 40%) due to environmental factors and feeding habitat influence the seasonality of parasitic infection either directly or indirectly. Similar type of results were also observed in case of *Senga* sp, *Gangesia* sp., *Proteocephalus* sp. infected to *Channa* sp. in summer, winter and monsoon². Similar trend was also observed for incidence, density and index of infection in Piscean nematode of genus *Camallanus* sp. and *Spinitectus* sp². The seasonal variation study of Caryophyllidean tapeworms show infection trend as, rainy < winter < summer season¹³. Seasonal environmental changes of water such as temperature, pH and conductivity affect on the occurrences of parasites from aquatic host⁹. Kennedy⁹ explained temperature; humidity and rainfall, feeding habits of host, availability of infective host and parasite maturation are responsible for influencing the parasitic infections⁹. Jadhav and Bhure⁶, reported high temperature, low rainfall and sufficient moisture were necessary for development of parasite⁶.

The analysis of data shows that the occurrence of helminth parasites vary according to seasons. The incidences and density of infection of all the helminth parasites were found to be high in summer, medium in winter whereas lower in rainy season. Helminth parasite and host species, host size and feeding habitats, seasons and locality were also influence the intensity.

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