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STUDIES ON PREVALENCE OF PLATYHELMINTH PARASITES OF FRESHWATER FISHES FROM JAIKAWADI DAM AT AURANGABAD DISTRICT, (M.S.) INDIA

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ABSTRACT

In present study, at Jaikawadi dam we collect 230 fish species Ophiocephalus (*n=150*), Mystus (*n=40*), Mastacembalus (*n=40*) Spp. along with common carp and other Indian major carp fishes. Out of these 141 fishes were found infected with four genus of cestode parasites viz., Lytocestus, Senga, Circumonchobothrium Silurotenia spp. and three species of trematode parasites viz., Allocreadium, Orientocreadium and Genarchopsis during January 2010 to December 2012. The population dynamics shows the prevalence, mean intensity, abundance and dominance of the collected cestode and trematode parasites. During this study, we also observed protozoans, crustaceans, Monogenea as well as Acanthocephala and Nematodes.

KEYWORDS

Cestode, trematode, Jaikawadi Dam, population dynamics.

RESEARCH PAPER

INTRODUCTION : India is among the 17 mega diversity countries (Mittermeier *et al.*, 1997) and hosts as many as 55 families of freshwater fish (Froese and Pauly, 2015). For the last few decades, fishes have been extensively used as food for human consumption in the Indian subcontinent and thus contribute substantially to its economy. In India, it is estimated that about 10 million tons of fish are required to meet the annual demand of fish proteins as compared to an actual annual production of only 3.5 million tons (Shukla and Upadhyay, 1998). Catfishes are an important in fish fauna of wetlands and many of them are economically important as a food source of high nutritive value. Schimidt and Roberts, (2000) have reported that endoparasitic helminths, with indirect life cycles, involve one or more hosts. Hafeezullah, (1993) and Jadhav *et al.*, (2010) reported, host belongs to family Bagridae, Heteropneustidae, Schilbeidae and Siluridae, Mastacembelidae, Clariidae have been reported as definitive hosts of cestodes.

Parasitic infestation tends to decrease the growth rate resulting in stunting of the fish. The damage caused by helminths to their hosts is generally related to the intensity of infestation and the depth of parasite penetration with the host tissue. Seasonal fluctuation, locality, age, size and sex of the host also determine the parasitic community diversity and burden. Dogiel *et al.*, (1961) stated that seasonal environmental changes of water such as temperature, pH and conductivity affect on the occurrence of parasites from aquatic host. Parasitic diseases of fishes are very common all over the world. Globally the parasites (defined broadly as infectious agents of diseases) are responsible for 19% of human mortality (WHO, 2004). With the ever-increasing demand for natural resources such as water due to high populations as well as minimizing the effects of drought, the government constructed dams which supply water to the local communities for farming, industry and general house hold use. Such developments have brought with them benefits that can be exploited by the locals such as commercial and/or subsistence fishing activities. During the study of 'Population Dynamics and Seasonal Variations' of Platyhelminth parasites from Jaikawadi dam The prevalence, incidence, intensity, index of infection, abundance and dominance were calculated from collected cestode and trematode parasites.

MATERIALS AND METHODS

Godavari river which is the largest river of southern India, and the Jaikwadi Dam (Nath Sagar) (lay at 19^{o} 29' 8.07" N and 75^{o} 22' 12" E.) is one of the largest irrigation projects in the Indian state of Maharashtra. It is a multipurpose project. Its water is used mainly to irrigate agricultural land in the drought-prone Marathwada region of Maharashtra. The

surrounding area of the dam has a Bird Sanctuary.

Fishes like *Labeo rohita, Catla catla, Cirrhinus mrigala, Cyprinus carpio* and other exotic spp. like Ctinopharyngdon, Hypothalamus and Chela spp. are commonly found in this dam. Some of the carnivorous fishes such as Ophiocephalus, Clarius, Mystus, Heteropneustes, Tilapia, Wallago, etc. are commonly found in the reservoirs. The aim of the present study was to determine the helminth parasite fauna of fish, during the study period, an attempt was made to collect nearly an equal number of fishes of which most were of the small and medium size. The fishes were killed immediately before examination, since it was found that the small monogenetic trematodes rapidly disintegrated after the death of the fish. The examinations were made with a binocular stereoscopic microscope. When possible, helminths were removed from the host and identified while in the living state. Weight and length was measured after collection of fishes. Common necropsy and parasitological techniques were used to isolate the parasites. Parasites were preserved in 4% formalin. Worms were cleared in lactophenol, Parasites were preserved in 4% formalin, cleared in xylene, staining with hematoxylin, mounted in Canada balsam line drawings are made with the aid of drawing tube, identified by using standards keys (Khalil, 1991 and Parpena, 1996).

External examination on the gills, fins and surfaces of the fish for ectoparasites was first carried out using hand lens for detection of parasitic manifestations. Later, skin smear was made using scalpel blade. The procedure was performed using a spatula by which the skin scrapings (smears) from the head to the tail were obtained, mucus mixed with epidermal cells. Thereafter, the scraped samples of mucus together with the tissues were placed on a Petri-dish containing 3mls of 0.9% saline solution and stirred using a mounted pin (Omeji, *et al.*, 2010, Bichi and Ibrahim, (2009) and Emere and Egbe, 2006*)*. Some drops of the mixed solution were collected using dropper, placed on a clean slide and examined under microscope.

The mean intensity was determined by dividing the total number of collected parasites by the number of infected fish samples, while abundance was calculated by dividing the total number of collected parasites by the number of host fish examined. The dominance of a parasite species was calculated as n/N sum (where n=abundance of a parasite species and N sum = sum of the abundance of all parasite species found.

RESULTS AND DISCUSSIONS

A total of 12 *Lytocestus mystusensis* sp. nov. were found in *Mystus seenghala* (65% of fishes are infected from Jaikwadi dam), Maximum intensity and abundance of this parasites was recorded during winter period. 17 species of *Circumonchobothrium ratnaensis* sp. nov. were collected from *Ophiocephalus gachua* (66.67% of fishes are infected from Jaikwadi dam); maximum number of species was collected

during the summer i.e. April and May 2011. 12 species of genus *Senga maruliusensis* sp. nov. were collected from *Ophiocephalus marulius* at Jaikwadi dam (66.67% of fishes are infected from Jaikwadi dam, Maximum intensity of infection (0.67 was found in April 2012 from Jaikawadi dam. 8 species of genus *Silurotaenia jaikwadiensis* sp. nov. were collected from *Mastacembalus armatus* (37.50% of fishes are infected from Jaikwadi dam). Maximum abundance was recorded in the month of May 2010 from *Mastacembalus armatus at* Jaikwadi dam.

A total of 10 *Allocreadium wallagoensis* sp. nov. were found in the samples of *Wallago attu* (40% of fishes were infected from Jaikwadi dam), the highest index of infection (2.00) in May 2011 and 2012 and lowest (0.33) was recorded in the month of and March 2011. 8 species of *Orientocreadium jadhavae* sp. nov. were collected from fish *Wallago attu*. (47.50% of fishes were infected from Jaikawadi dam), the highest index of infection (2.40) and lowest (0.80) was recorded in the month of March 2012 and May 2012 respectively. 6 species of *Genarchopsis aurangabadensis* sp. nov. were collected from *Ophiocephalus gachua* and the incidence of infection 66.67% was found. Lower abundance (0.13) was recorded in the month of February 2011.

During the study, we collected nematodes, *P. cyathopharynx* from *Clarias batrachus.* The ectoparasite *Argulus* was collected from all fish species. Most *Argulus* was collected from the mouth cavity, gills and the fins. The current study showed that *Mastacembalus armatus* had the greatest diversity of helminth parasites. Tapeworms are widespread throughout all over world (Campbell, 1999). Major water systems of India and demonstrate a high degree of host specificity, with Siluriform fish being the most common hosts for both monozoic and segmented cestodes. This could be attributed to the habitat favoured by *Clarias batrachus* that consists of turbid environments and shore areas which are covered with vegetation, as was the case of Jaikwadi Dam (Nimbalkar *et al.*, 2010). This habitat also favours the intermediate hosts of cestodes as well as trematode digeneans. Hoffman in 1967 reported that in the mud habitat second intermediate hosts of many fish digeneans such as larvae of aquatic insects like Ephemeroptera, Odonata, Chironomidae and various Crustacea are found and form part of the diet of *Clarias batrachus.* Another reason for the recovery of a large number of helminths in *Clarias batrachus* could be related to the large size of *Clarias batrachus* as compared to other fish species (Table 1). The occurrence of very few helminth parasites in *Heteropneustes fossilis* and *Wallago attu* could be attributed to resistance to helminth infections.

Aquatic birds are important in the ecology of fish parasites because most helminths complete their life cycles in the bird host. Another interesting finding of our study was the recovery of piscine coccidia in *Clarias batrachus* only. *Coccidiosis* in fish usually manifests itself as a

chronic infection and mortality is gradual and overlooked in most fish farms. In conclusion, the obtained results show that helminths are important parasites of fishes in Jaikawadi dam, and detailed studies on the seasonal variations of these helminth parasites is recommended.

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Table : The prevalence, mean intensity, abundance and dominance of Platyhelminth Parasites in freshwater fishes from Jaikawadi Dam during January 2010 to December 2012

Host	Parasites	No. of Infected fish	Prevalence %	Mean intensity	Range	Abundance	Dominance %
Mastecembalus armatus	*Silurotaenia jaikawadiensis* sp. nov.	15	37.50%	0.53	0-8	0.20	0.006
Wallago attu	*Allocreadium wallagoensis* sp. nov.	24	40.00%	0.42	0-6	0.17	0.015
	Orientocreadium jadhavae sp. nov.	19	47.50%	0.42	0-8	0.20	0.018
Mystus seenghala	*Lytocestus mystusensis* sp. nov	40	65.00%	0.46	0-7	0.30	0.009
Ophiocephalus gchua	*Circumonchobothrium ratnaensis* sp. nov.	60	66.67%	0.28	0-7	0.19	0.005
Ophiocephalus marulius	*Senga maruliusensis* sp. nov.	40	66.67%	0.30	0-8	0.20	0.005

