POPULATION DYNAMICS OF PROTOZOAN ECTOPARASITES IN SOME CAT FISHES INHABITING DOMRI RESERVOIR, BEED DISTRICT (M.S.)

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ABSTRACT

The present study was conducted to find out the prevalence and intensity of protozoan ectoparasites of freshwater catfishes. Total four species of protozoan parasites were collected from 294 fishes. Total three ectoparasites were observed during study period, July 2020 to June 2021. Among the ectoparasites, *Ichthyophtherius* is the most prevalent ectoparasites followed by *Trichodina* and *Myxobolus*. Among the infected fishes, *Wallago attu* (48.43%) harboured maximum number of ectoparasites followed by *Ompok pabda* (40.27%), *Mystus cavasius* (37.93%), and *Mystus vittatus* (32.78%). Due to the presence of these parasites, the physiological activities of the host fishes are hindered and their developmental growth is retarded which cause economic loss to the fishery industry.

Keywords: Prevalence, Intensity, Protozoan ectoparasite, Catfish.

INTRODUCTION

Fishes are aquatic vertebrates having streamlined body (Verma and Prakash, 2020). These are the important source of animal protein (Verma, 2007) to ensure food security for human and also play an important role in national economy as it provides employment opportunity (Prakash *et al.*, 2021a). The fishes get infection from various kinds of parasites frequently (Peddinti *et al.*, 2021). Diseases affect the normal health conditions and cause reduction of growth, abnormal metabolic activities and even death. Aquaculture contributed over 95% of the total inland fish production during 2014-15 as against 34% during 1984-85. It was so, even after the fact that less than 40% of available ponds and tanks in the country (total available estimated resource 24.41 lakh ha) are estimated to be scientifically utilized at present. Although fish production has increased manifold in India but freshwater productivity especially inland culture fishery decreases due to various parasites which affect the metabolic activities, normal health conditions and even death of culturable fishes (Prakash *et al.*, 2021b). Because of

increased stocking density of fishes in fishery ponds, fish pathogens can easily transmit from one fish to another (Prakash, 2021). Since these pathogens affect the reproductive potential of host fishes, a parasitic disease reduces the fish production, profitability, and market as well as nutritive value (Prakash and Singh, 2020). The parasites may cause mortality and morbidity in cultivable fishes resulting in great loss in fish production as well as economic loss to be culturists (Prakash and Verma, 2017). Parasitic diseases are the limiting factors in fish culture, because of increased density of fish in lentic water bodies where the fish pathogens can easily transmit from one fish to another. These pathogens may cause fish mortality in cultural fishes where the entire fish population of water body may be killed, resulting the great economic loss of fish farmers (Prakash and Verma, 2020). Thus, parasites of fish are one of the major problems to fish health (Verma *et al.*, 2006, 2007; Narayan *et al.*, 2021).

Among the various parasites, parasitic protozoa play an important role in the growth and development of fishes and

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most hazardous threats to fish health. Protozoans are now a part of kingdom Protista (Verma, 2021). These parasites attack the fish and causes great loss of skin and gill epithelium. Even moderate infection of these parasites may cause a fatal disease, since the infected fish lose its appetite and stop feeding (Meyer, 1991). Extensive works on the protozoan parasites of fish have been carried out by some worker (Aguilar *et al.*, 2017; Prakash and Verma, 2017 & 2020; Prakash *et al.*, 2021b). The distribution, incidence and intensity of infestation of fish parasites vary from one place to another (Wahab and Saidin, 2014). Studies on protozoan diseases of fishes particularly in Maharashtra State are fragmentary. Keeping in view, importance of parasitic infection to freshwater fishes, present study was designed to evaluate seasonal variation in prevalence, intensity, density and index of infection of protozoan parasites in freshwater cat fishes of Domri reservoir of Beed district of Maharashtra.

MATERIALS AND METHODS

Domri reservoir is situated near the Ukhandia village Tq. Patoda, district Beed. It is located on 18°-54' longitude and 75°-34' latitude. It covers about 2371 ha water spread area. It is constructed during the year 1996. It is 16 km away from Beed city. Its water is used in agriculture and also by animal as well as man for different purposes. Due to the pollution as well as entry of sewage, waste water or matter and interaction between all these factors some notable changes were recorded in this aquatic ecosystem (Jogdand and Sirsat, 2012).

Fresh water cat fishes *Ompok pabda*, *Wallago attu*, *Mystus cavasius*, and *Mystus vittatus* were randomly collected in every month from Domri reservoir during July 2020 to June 2021 and were observed for parasitic infection. Live infected fishes were brought to the laboratory and kept in small plastic aquaria containing freshwater.

For examined the ectoparasitic protozoan parasites, the mucus of gills and body surface were collected by pipette, dropper and needle on a slide. With a drop of 0.5 N NaCl solution, mucus smear slide were prepared and air dried. These air dried smear slides were placed in absolute methyl alcohol for 8-10 minutes than stained with the Geimsa stain for 25 minutes. Washed the slide in distilled water to remove excess stain, and then allow the smear to dry and mount in DPX. The collected parasites were identified under a compound light microscope with the help of standard literature (Lucky, 1971; Kabata, 1985; Mukherjee *et al.*, 2019). Prevalence of parasitic infection were calculated by following the formula (Margolis *et al.*, 1982).

$$\text{Prevalence \%} = \frac{\text{Total no. of infected fishes}}{\text{Total no. of fish examined}} \times 100$$

$$\text{Intensity of Infection} = \frac{\text{Total no. of parasites collected}}{\text{Total no. of infected fish examined}}$$

Table 1: Protozoan ectoparasites of fishes in Domri reservoir, Beed (M.S.).

Group	Genus	Type	Host	Infected organ
Ciliate	<i>Trichodina</i> , <i>Ichthyophtherius</i>	Ectoparasite	<i>Wallago attu</i> , <i>Ompok pabda</i> <i>Mystus vittatus</i>	Gills & Skin
Myxozoan	<i>Myxobolus</i>	Ectoparasite	<i>Mystus cavasius</i> , <i>Wallago attu</i>	Gills

Table 2: Prevalence of Protozoan Ectoparasites in different freshwater catfishes.

Host Fish	No of Fishes Examined	Total no. of infected fishes	Total No. of Parasite collected	Prevalence (%)
Wallago attu	64	22	31	48.43
Ompok pabda	72	25	29	40.27
Mystus cavasius	58	19	22	37.93
Mystus vittatus	61	15	20	32.78
Total	255	72	102	40.00

Table 3: Prevalence, Intensity and Density of Ectoparasitic Protozoan in different freshwater cat fishes in Domri reservoir, Beed (M.S.).

Host Fishes	No. Fishes Examined	Total No. of fish infected	Name of Parasite	Number of Fishes Infected with each parasite	Total No. of Parasite collected	Prevalence %	Intensity
<i>Wallago attu</i>	64	22	<i>Trichodina</i> ,	10	12	15.62	1.20
			<i>Ichthyopttherius</i>	08	13	12.50	1.62
			<i>Myxobolus</i>	04	06	9.37	1.50
<i>Ompok pabda</i>	72	25	<i>Trichodina</i> ,	11	11	15.27	1.00
			<i>Ichthyopttherius</i>	09	10	12.50	1.11
			<i>Myxobolus</i>	05	08	6.94	1.60
<i>Mystus cavasius</i>	58	19	<i>Trichodina</i> ,	09	12	15.51	1.33
			<i>Ichthyopttherius</i>	10	10	17.24	1.00
<i>Mystus vittatus</i>	61	15	<i>Trichodina</i> ,	08	12	13.11	1.50
			<i>Ichthyopttherius</i>	07	08	11.47	1.14

Total 255 freshwater catfishes (*Wallago attu*, *Ompok pabda*, *Mystus cavasius* and *Mystus vittatus*) were examined for indentifying the parasitic protozoans. Out of 255 examined fishes, only 102 fishes were found infected with protozoan parasites. Total three ectoparasites namely *Trichodon*, *Ichthyopttherius* and *Myxobolus* were identified (Table 1).

Among the infected fishes, *Ompok pabda* harboured maximum number of ectoparasites (25) followed by *Wallago attu* (22), (23), *Mystus cavasius* (19) and *Mystus vittatus* (15) (Table 1&2). Ectoparasitic protozoans are commonly found on the gills and skin of host fishes. The infected fishes show following clinical sign: swim rapidly and rub their bodies against the substratum; the fish come on the surface for gasping the oxygen and become lethargic and eventually stop feeding. The highest prevalence rate was observed in *Wallago attu* (48.43%) followed by *Ompok pabda* (40.27%), *Mystus cavasius* (37.93%), and *Mystus vittatus* (32.78%). Among the ectoparasites, *Ichthyopttherius* is the most prevalent ectoparasites followed by *Trichodina* and *Myxobolus* (Table 3). The result of the present investigation correlated with minor differences to the finding of other researchers (Kabata, 1985; Mukherjee *et al.*,

2019; Prakash *et al.*, 2021b). The prevalence and intensity of parasites depends on many factors such as nature of parasites and its life cycle, host, feeding habits and the physico-chemical factors of water body where the fish inhabited. Ectoparasitic prevalence increases when water temperature and hardness decreases. Due to the presence of these parasites, the physiological activities of the host fishes are hindered and their developmental growth is retarded which cause economic loss to the fishery industry.

CONCLUSION

The result of present study indicated that the prevalence, intensity and density of infection of protozoan parasite were highest in *Wallago attu* followed by *Ompok pabda*, *Mystus cavasius* and *Mystus vittatus*. The high organic load and poor quality of aquatic environmental has great impact on the abundance of pathogens either directly or indirectly. Therefore, it is concluded that the healthy water quality should be maintained properly to avoid the appearance of parasites in the water bodies.

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