

Full Length Research Paper

Fish Parasites (*Labeo rohita* and *Schizothorax niger*) of Jammu and Kashmir in India

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The present study has been carried out to find out the parasites of *Schizothorax niger* and *Labeo rohita* during different months of the year 2013 to 2014. Parasites belonging to two groups viz. ciliophoran (*Chilodonella*) and crustacean (*Argulus*) were recorded from 200 fishes of Rohu (*L. rohita*) and *S. niger* collected from different parts of Jammu and Kashmir. These two parasites belong to Ectoparasitic group and no other parasite was recorded in the present study. The highest prevalence (60%) of infection has been recorded in ciliophorans and the lowest was in crustacean (48%). It was observed that highest parasitic prevalence (54%) was recorded during winter season (December-February) while the lowest prevalence (0%) recorded during rainy season (June-August). Cyprinid fish *S. niger* infested with ciliophoran had no pathogenic signs and the clinical signs were represented as increase of mucus laden masses on the surface of gills. No pathogenic signs were seen in *L. rohita* infested with Crustacean parasite and clinical signs were represented as gasping air, pale skin color, sluggish swimming, increase of mucus production and floating on surface often causes mortality. This is first report of protozoan parasites from fishes of Jammu and Kashmir.

Key words: Ectoparasites, Protozoan, Ciliophoran, *Labeo rohita*, *Schizothorax niger*.

INTRODUCTION

Jammu and Kashmir bestowed with water resources of about 40,000 ha comprising lakes, streams, rivers, sars, springs etc. suitable for fish culture. Aquaculture is one of the most economically important applied strategies all over the world and fishes are one of the most beneficial and nutritional resources of human beings. The entire water area of Jammu and Kashmir supports the potential fish farming of the state as well as the whole country. The major carp farming mainly dominates in Jammu. The

most important prerequisite of fish production is availability of healthy fish fingerlings of carps. It is evident from the available literature that the parasitic diseases have caused significant damage in nursery system of carp fishes mostly affecting the fry and fingerlings (Gopalkrisnan, 1961). The parasitic community of fish show considerable changes with the environmental conditions in which fish live (Hossain et al., 2008).

Fish harbor a variety of parasites viz., protozoa,

cestodes, trematodes and acanthocephalans (Ali, 1990) and the degree of damage by infection is influenced to a large extent by the type and numbers of parasites present (Bauer, 1941). When they are present in large numbers, can often cause gross pathological changes and damages to the host (Heckman, 1996; Hoffman, 1998). Some of the environmental conditions are more conducive to disease among which water temperature is one of the important criteria associated with disease outbreak. According to Mitra and Haldar (2004) in their First Record of *Chilodonella hexasticha* in West Bengal India parasites occur mainly in the colder months and in summer no infection was recorded.

Workers have observed that the prevalence of the disease was more in the winter season (Ahmed et al., 1991) than the other months of the year. A significant work has been done on Ciliophorans in the Indian freshwater and estuarine fishes by Mitra et al. (2013), Mitra and Bandyopadhyay (2005, 2006a, b, 2009), Mitra et al. (2012a, b) and Ortega and Aguilar (2014) while working on parasites of fishes in Mexico recorded first report of ciliates belonging to genus *Trichodina* parasitizing characid fish *Astyanax mexicanus* as previous reports were from exotic cultured fishes (Aladro-Lubel et al., 2006). Asian carps being the original host and has been introduced to different countries including Mexico. Keeping in view the increasing importance of fish as a cheap source of protein rich diet, protozoan infections in fresh water fishes has drawn attention of the fish biologists and parasitologists worldwide. *Labeo rohita* is much demanded and highly cultured fish in farms of Jammu Division and *S. niger* local fish of Kashmir also highly demanded food fish in Kashmir Division. To our knowledge no study has been done on these protozoan parasites in fishes of Jammu and Kashmir that is why the present study deals with parasitic prevalence of *L. rohita* and *S. niger* from Jammu and Kashmir which are commercially important food fishes of Jammu and Kashmir.

MATERIALS AND METHODS

The present study was done during the period of July 2013 to June 2014. Live carp fishes having an average weight of 300 g belonging to two species, that is, Rohu (*L. rohita*), were randomly collected from the adjacent fish market and ponds of Jammu and local Snowtrout *S. niger* collected through local fishermen from River Jhelum and Dal Lake in Kashmir. 200 fishes were observed for all types of parasitic infection. The fishes were collected and brought to Parasitology Laboratory Center of Research for Development (CORD), University of Kashmir for further examination. All the body organs were examined for parasitic infection. The smear of different organs were prepared on clean grease free slides with a drop of 0.5% NaCl solution and air-dried. The clinical and pathogenic signs were investigated. The ciliophoran parasites were subjected to silver nitrate impregnation after the method of Klein (1958) and crustacean parasites were stained with lactophenol cotton blue stain for permanent preparation. The four seasons were designed as June to August (Rainy), September to November (Autumn), December to February (winter) and March to May

(Summer). The prevalence was calculated as the percentage (%) of infested fish over the total number of analysed fish.

RESULTS AND DISCUSSION

Naturally infested Cyprinid fish *S. niger* had no pathogenic signs and the clinical signs were represented as mucus laden masses present on the surface of gills. No pathogenic signs were seen in *L. rohita* and clinical signs were represented as gasping air, pale skin color, sluggish swimming and increase in mucus production. Fishes were seen floating on surface and most often mortality was seen in the floating fishes. Crustacean parasites, that is, *Argulus* spp. were recorded in fish ponds around Jammu and infected fish was *L. rohita* and Ciliophorans, that is, *Chilodonella* spp. were recorded in River Jhelum and Dal lake and infected fish was *S. niger*. Abundance of Ciliophorans were mostly found on fishes of River Jhelum. The percentage of infection by different ectoparasites in four groups with months has been incorporated in Table 1. Out of 200 fishes 40 were infected with ciliophorans which means average of 20 and similarly is the case of crustaceans an average of 13 was found. The average prevalence of each group of ectoparasites, that is, ciliophoran and crustacean together have been listed in Table 2 showing prevalence of both the groups in the same season. It is clear from the table that prevalence of ectoparasitic infection changes with month. In winter season, that is, December to February it reaches its peak as is shown in Table 2. Crustacean parasites are found only in the months of December to May but not in rest of the year similarly *CHILODONELLA* infection is absent in the month of June to August.

The results reveal that the ectoparasitic infection is heavy during the months of Winter, that is, December to February similarly (Bhuiyan et al., 2007; Ahmed et al., 1991) have reported their occurrence during Winter in their study. Many other workers such as Akhter et al. (1997), Banu et al. (1993), Chandra et al. (1997) and Hossain et al. (1994) have also found similar observations and heavy infections in the particular season of the Year. Some authors have recorded that ectoparasites have maximum rate of infection both in winter and spring (Abu El-Wafa, 1988; Hassan, 1999; Özer and Erdem, 1999; Özer, 2000, 2003; Jerônimo et al., 2011). Also it has been found that low temperatures being more congenial for reproduction of *Chilodonella* spp. The more parasitic infection in rainy season indicates that the ectoparasitic infection changed with the change of season. Similarly it was observed by Mortuza and Al-Misned (2013) in their study regarding the different parasitic infections in fishes. Researchers such as (Rahman et al., 2007; Farhaduzzaman et al., 2010; Mofasshalin et al., 2012) have reported that Winter as a period of high susceptibility of fish to pathogens especially Ectoparasites.

Table 1. Prevalence of parasites in *L. rohita* and *S. niger* in different seasons of the year.

Month	Ciliophorans	Prevalence (%)	Site of infection	Crustaceans	Prevalence (%)	Site of infection
June - August	<i>Chilodonella</i> spp.	0	Gills	<i>Argulus</i> spp.	0	Skin and Fins
September - November	<i>Chilodonella</i> spp.	12	Gills	<i>Argulus</i> spp.	0	Skin and Fins
December - February	<i>Chilodonella</i> spp.	60	Gills	<i>Argulus</i> spp.	48	Skin and Fins
March - May	<i>Chilodonella</i> spp.	8	Gills	<i>Argulus</i> spp.	4	Skin and Fins
Average in total Year	Ciliophorans	20		Crustacean		13

Table 2. Monthly prevalence (%) of parasites in *L. rohita* and *S. niger*.

Parasite	June - August	September - November	December - February	March - May
Ciliophorans	0	6	30	4
Crustaceans	0	0	24	2
Average of total parasitic prevalence	0	6	54	6

Due to high stocking density of fingerlings and Polyculture practices employed is another reason for ectoparasitic disease outbreak (Hossain et al., 2008). This may also increase the chance of ectoparasite transmission from fish to fish easily and the availability of host for the disease transmission. Gills of *S. niger* were found infected with *Chilodonella* spp. and fins, skin of *L. rohita* were found infected with *Argulus* spp. Similarly (Bhuiyan et al., 2007) have recorded similar observations in their study which may also indicate their tissue specificity.

Conclusion

Thus it can be concluded that biological factors of host and the water quality has a great impact on the abundance of parasites and their ability to survive on the host. Proper stocking density is important to reduce disease outbreak and water quality should be maintained properly to avoid parasitic infection in pond. Gills, fins and skin were mostly found infected. The medium size fishes having a size of 100 to 150 g were found to be more vulnerable due to their poor immunity power and wide spread surface area, which may favours more colonization of parasites.

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