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ABUNDANCE OF TWO GILL PARASITES (MONOGENEAN) IN A SINGLE HOST, *LABEO ROHITA* (HAM.) OF DIFFERENT LENGTH GROUPS IN DOON VALLEY

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ABSTRACT : On examining 561 specimens of *Labeo rohita* (Ham.), two monogenean parasites *viz*., *Bifurcohaptor gorakhnathai* (Kumar and Agarwal, 1982) and *Haplocleidus vachi* (Tripathi, 1959) were recovered from the gills of *the fish* collected from river Song and Asan, respectively. Both the parasites could not be obtained in the fishes under the length group of 10-12 and 12-14 cm. However, *Bifurcohaptor gorakhnathai* could be recovered in the fishes between 14 cm to 30 cm in length. On the other hand, *Haplocleidus vachi* was recovered 18 cm. onwards and up to 34 cm. More infection of *Bifurcohaptor gorakhnathai* was recorded in 22-24 cm. length group followed by 24-26 cm.

Key words : Gill parasite, monogenea, *Labeo rohita.*

INTRODUCTION

Parasite is an important group of pathogen that causes infection and diseases of fish both in freshwater and marine environments. Generally, in host parasite association, there is a positive correlation between the abundance of parasitism and the fish size. In some of them the parasites is present from the lowest size-classes while in others a threshold size situated inside the limits sample has been observed. According to Saad-Fares and Combes (1992) in parasite host systems, three types of relationships have been observed. Firstly, there is the relationship between the number of parasite species and the maximum size of the host. Secondly, there is the relationship between the number of parasite species and size of individuals of a particular host species. Lastly, there is the relationship between a demographic parameter (prevalence, intensity, abundance *etc*.) of parasitism and the size of individuals of a particular host species.

Upadhyay *et al* (2011) conducted a study on Abundance of a Monogenoidea parasite *Lobotrema rajendrai* in different host species (*Garra gotyla* and *Tor putitora*) at Kotdwar (Uttarakhand). As far as the information on Monogenoidea parasites from Garhwal region is concerned it is in infancy stage and comparatively only few publications are available (Srivastava & Jauhari, 1983; Upadhyay & Jauhari, 2010; Upadhyay *et al*, 2010, 2012).

With the increasing interests in aquaculture, parasitic infestations are becoming threats for fish health management and aquatic crop production throughout the world. Moreover, no comprehensive study is being made on the abundance of parasite species in fish host in general and from Doon Valley in particular, henceforth, the present study deals the abundance of 2 parasite Species from the gills of different length groups of the same host *Labeo rohita* (Ham.).

MATERIAL AND METHODS

During the study period (March 2014-February 2015), the specimens of *Labeo rohita* (Ham.) were collected from river Song and Asan in Doon Valley, with the help of fishermen by using relevant fishing nets. In all, 561 specimens of *Labeo rohita* (Ham.) were collected and examined for parasitic infestation. Firstly, the length groups of chosen fish were categorized into 14 categories at a difference of 2 cm. and thereafter the microscopic examination was done for parasitism and for any cyst, ulceration and scares on and inside the body of each fish. Then the gill filaments were dissected out of branchial cavity and placed in petri dish containing normal saline. For the collection of monogenoides, all the collected parasites were processed using standard techniques. For monogeneans, Mizelle's (1936, 1938) refrigeration technique was followed for easily release of worms, particularly when the parasitological studies were conducted at laboratory conditions in Dehradun. The monogenean species has been identified based on

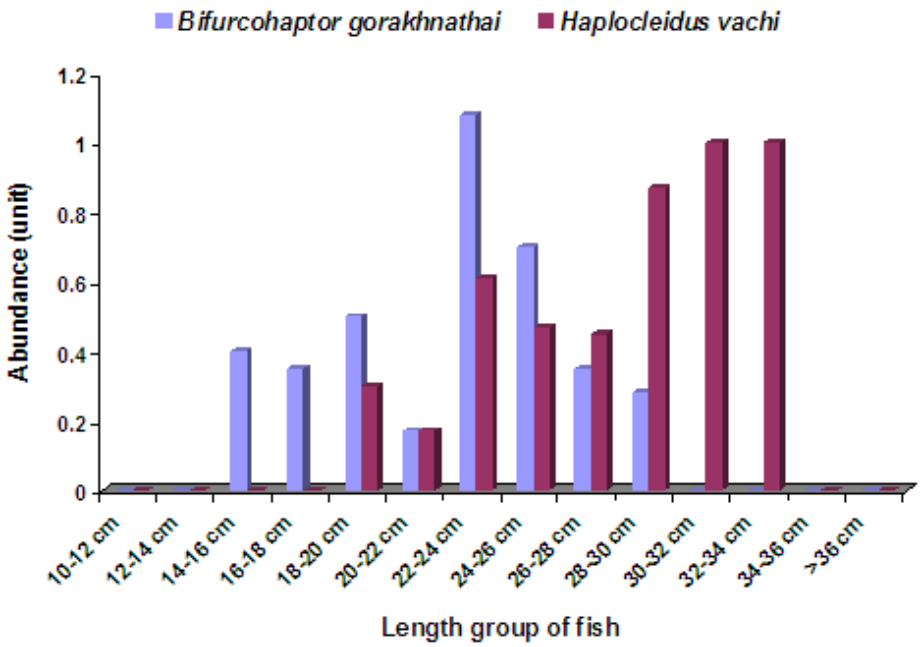

Fig. 1 : Abundance of parasites (*Bifurcohaptor gorakhnathai* and *Haplocleidus vachi*) in same host (*Labeo rohita*) of different length groups during March 2013- February 2014.

diagnostic features and after following the keys of Yamaguti (1963). Besides this, other standard techniques described in literature and time to time modified have also been consulted before confirming the identification at species level. For permanent mounting, the specimens as preserved in 70% alcohol were transferred to distilled water in small specimen tubes. The dehydration was performed through a graded series of alcohols, stained in aceto-alum carmine, cleared in clove oil and mounted either in Canada balsam or DPX by following the methods as described by Tripathi (1959), Jauhari and Agarwal (1981) and Kritsky *et al* (2004). Ecological analysis has been carried out according to the recommendations of Margolis *et al* (1982) and Bush *et al* (1997). Abundance (%) was calculated as

$$= \frac{\text{Number of parasites}}{\text{Number of fish examined}} \times 100$$

RESULTS

Two monogenean parasites *viz*., *Bifurcohaptor gorakhnathai* (Kumar and Agarwal, 1982) and *Haplocleidus vachi* (Tripathi, 1959) were recovered from the gills of *Labeo rohita* (Ham.) collected from river Song and Asan respectively. The length groups of the chosen fish have been categorized into 14 categories at a difference of 2 cm (Table 1, Fig. 1). Both the parasites could not be obtained in the fishes under the length group of 10-12 and 12-14 cm. However, *Bifurcohaptor gorakhnathai* could be recovered in the fishes between 14 cm to 30 cm in length. On the other hand, *Haplocleidus vachi* was recovered 18 cm. onwards and up to 34 cm. More infection of *Bifurcohaptor gorakhnathai* was recorded in 22-24 cm. length group followed by 24-26 cm. On the contrary, the parasite *Haplocleidus vachi* was collected between 24 to 32 cm. length groups. Based on the abundance of both the parasites, it is said that the abundance starts at 18 cm. upto 30 cm. and beyond 30 cm and below 18 cm. there was single infection. As far as the maximum abundance of both the parasite is concerned, *Bifurcohaptor gorakhnathai* was recovered in the fishes between 22-24 cm.

DISCUSSION

In the present investigation, two monogenean parasites *viz*., *Bifurcohaptor gorakhnathai* and *Haplocleidus vachi* were recovered from the gills of *Labeo rohita* (Ham.) collected from river Song and Asan, respectively. Both the parasites could not be obtained in the fishes under the length group of 10-12 and 12-14 cm. However, *Bifurcohaptor gorakhnathai* could be recovered in the fishes between 14 cm. to 30 cm in length. On the other hand, *Haplocleidus vachi was* recovered in fishes 18 cm. onwards and up to 34 cm.

The fact that the two monogenoidea parasites offers similar infection dynamics when present in a single species of fish host seems to alter the hypothesis of infestation by prey, which the fish selects on the basis of size (Price and Clancy, 1983; Guegan, 1990). With regard to abundance of parasite in different length groups of

Table 1 : Prevalence of Infection and abundance of monogenean parasites in different length groups of the fish *Labeo rohita* (Ham.) during March 2013-February 2014.

Length group (cm.)	*Bifurcohaptor gorakhnathai*					*Haplocleidus vachi*				
	No. fish		No of parasites recovered	Prev.	Abund.	No. fish		No of parasites recovered	Prev.	Abud.
	Exam.	Infect.				Exam.	Infect.			
10-12	17	-	-	-	-	20	-	-	-	-
12-14	18	-	-	-	-	24	-	-	-	-
14-16	22	3	3	13.6	.0.22	24	-	-	-	-
16-18	20	5	7	25.0	0.3	26	-	-	-	-
18-20	18	7	9	38.8	0.55	23	7	7	30.4	0.34
20-22	29	3	5	10.3	0.24	24	3	4	12.5	0.25
22-24	25	17	27	68.0	1.16	28	10	17	35.7	0.67
24-26	24	14	17	58.3	0.75	36	15	17	41.6	0.58
26-28	23	6	8	26.0	0.39	42	12	19	28.5	0.54
28-30	18	3	5	16.6	0.33	30	18	26	60	0.9
30-32	14	-	-	-	-	20	14	20	70	0.95
32-34	13	-	-	-	-	13	7	13	53.84	1.07
34-36	-	-	-	-	-	5	-	-	-	-
>36	-		-	-	-	5	-	-	-	-

fish hosts, the findings of the present study slightly resemble with Saad-Fares and Combes (1992) but differ in the nature of parasitic infection. According to the findings of Saxena (2001) the same trematode species offers similar infection dynamics when present in different fish species i.e. *Eucreadium pandeyi* (Srivastava *et al*, 1983) infects both *Channa punctatus* and *Mastacembelus armatus* while *Gangatrema hanumanthai* (Kumar and Tripathi, 1990) was recovered from *Xenentodon cancila* and *Labeo dero*. Our findings differ with Saxena (2001) with regard to the kind of parasite as in the present study the parasite is a monogenetic trematode.

The findings of present study reveal that the infection was more in a particular range of fish size; below and above to that particular range the infection decreases. Almost similar observations were recorded by Saxena (2001) while undertaking studies on fish trematode diversity in the Garhwal riverine ecosystem.

For most species of parasites studied in this survey, we had samples large enough in number and offering a sufficient range of different sizes, to analyse the relationships with host size. Although a correlation is generally taken to exist between size and age, it is however, necessary to recall that i) the correlation between the size of a fish and its real age is approximate, ii) the correlation is different in different fish species and iii) the correlation is contingent upon environmental conditions. Despite this reservation on the precise relationship between age and size, the present study demonstrates that the age structure of fish population has a marked influence on the distribution of parasite population. Thus, the age / size relationship could be probably one of the major factors which contribute to the aggregated characters of these distributions.

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