ISSN: **0976-3031**

Available Online at http://www.recentscientific.com

International Journal of Recent Scientific Research
Vol. 3, Issue, 4, pp270 -272, April, 2012

International Journal of Recent Scientific Research

GASTRO-INTESTINAL HELMINTH INFECTION IN FISHES RELATIVE TO SEASON FROM SHALLABUGH WETLAND

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ARTICLE INFO

Article History:

Received 12th February, 2012
Received in revised form 20th March, 2012
Accepted 28th March, 2012
Published online 28th April, 2012

Key words:

Ethnomedicinal uses, *Andrographis elongata*, Tribal, Non-tribal, Pachamalai Hills, Tamilnadu.

ABSTRACT

Helminths are of great interest to the ecologists because of their ordered life cycle. They are also considered as one of the important sensitive parasites to any changes in the water quality. Helminth parasites of exotic and indigenous fish were examined with the aim to evaluate their possible use as biological tags. This study quantified the seasonal prevalence and intensity of the helminth parasites in Shallabugh Wetland. Fish hosts studied includes two native fish of genus-*Schizothorax* and two exotic fish of genus-*Cyprinus.* 486 Fish specimens were examined out of which 197 were infected showing the overall prevalence of 40.53%. Our results show highest prevalence of helminth parasites in all the hosts examined *viz., S. niger* =59.25%, *S. labiatus* = 55.55%, *C. c. communis* = 61.11% and *C. c. specularis* = 55.55%, during summer months than spring and autumn. Positive relation between the infection indicies of Helminth parasites and temperature suggests that helminth parasites can be used as stress indicators. It is further suggested that helminth parasites should be integrated with biomonitoring programmes, as they can provide supplementary information on pollution.

INTRODUCTION

Helminths are a major cause of reduced productivity in fishes, characterised by devastating effects on fish health in terms of mortality and morbidity, particularly in developing countries. Various risk factors, including those of the host and environment, play an important role in the onset of GIH infection in fishes. The effect of the helminth infections on production of particular fish spp. depends mostly on the age of the fish, genotype, parasite species involved and the intensity of helminths. The climate in a particular locality is also one of the important factors that determine the type severity of parasitic infections in fishes.

Fishing is an economically important aspect of the people in Kashmir valley; as the most people live in rural areas earn their live hood through fishing. Therefore, it is of prime importance to identify the helminths and to demonstrate the associated factors that influence the epidemiology of GIH infection of fishes in this climatically different and unique zone of the world.

MATERIALS AND METHODS

Fishes used for the study were bought from same fisherman operating with gill nets and cast nets. The fish samples were kept in plastic coolers containing river water and ice blocks before being transported to the laboratory. In the laboratory the fishes were identified to species level using keys provided by Holden and Reed (1972) and Lowe-Mc Connel (1972). Fish standard length (SL – from the snout to the base of the caudal peduncle) were determined with a meter rule while body weight (BW) was determined using a weighing balance. The gills, muscles, intestine, stomach and oesophagus of the fish were examined for parasites. Parasites recovered from each site were properly washed, fixed in alcohol-formol- acetic acid according to Olurin and Somorin (2006) and site of infection noted. Identification of parasites was carried out according to Yamaguti (1958, 1959, 1961 and 1963).

RESULTS AND DISCUSSION

During the course of study, a total of 486 fish samples were subjected to parasitological investigation. Out of these 197 fish were found infected with 507 parasites. Thus the overall prevalence of parasitic infection in these fishes was 40.53%. Parasites recovered were Nematodes, Acanthcephalans, Cestodes and Trematodes. The gills, stomach and intestine were infected; no parasites were

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found infecting the liver and eye lens. The data pooled for seasonal estimation of helminth infection revealed definite seasonality of infection ($p<0.05$) in fishes over a period of 1 year, with highest infection in summer and lowest in winter. (Table1).

Table 1 Season wise prevalence of helminth infection in *Schizothorax niger*

Season	No. examined	Positive	Prevalence %
Spring	45	22	48.88
Summer	27	16	59.25
Autumn	32	20	55.55
Winter	22	7	31.81
Total	126	65	51.58

P=0.043

The maximum prevalence of GIH infection (59.25) occurred in summer season, and they were lowest in winter (31.81) with significant difference between the seasons ($p>0.05$). The rainy season which started in spring and continued to early summers, made the environmental conditions more favourable for the development and survival of the pre-parasitic stages of helminth parasites and lead to an increased availability of infective stages in rainy and post-rainy season. This resulted in higher prevalence and level of parasitism in summer and post-summer months; therefore, parasite burden also reached maximum levels in summer and autumn.

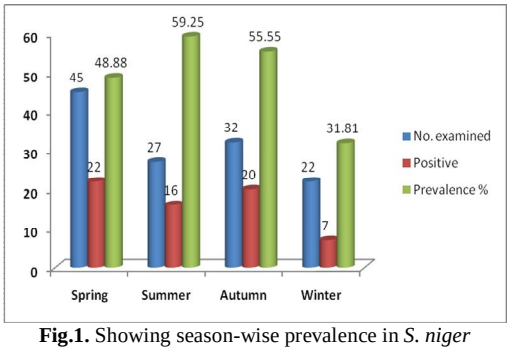

Fig.1. Showing season-wise prevalence in *S. niger*

These findings of high prevalence during summer seem to agree closely with the agro climatic conditions of the Kashmir valley. The valley has a temperate climate marked by well-defined seasonality, consisting of four different seasons with wide variations in temperature and other weather conditions that influence the occurrence of parasitic infection in fishes.

Table 2 Season wise prevalence in Schizothorax labiatus

Season	No. examined	Positive	Prevalence
Spring	30	16	53.33
Summer	36	20	55.55
Autumn	22	10	45.45
Winter	20	5	25.00
Total	108	51	47.22

P =0.028

This pattern of infection is supported by various researchers like Chishti and Peerzada (1998), who while working on seasonal occurrence of acanthocephalan infection in fishes of Wular Lake observed that the infection was higher in spring and low from summer in all fish host.

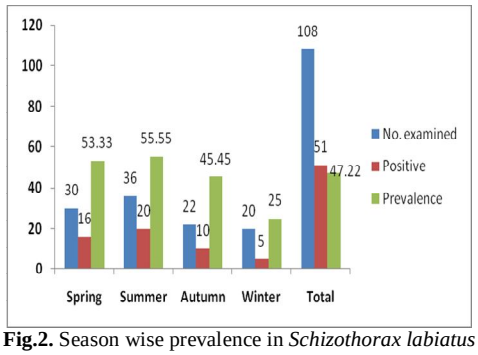

Fig.2. Season wise prevalence in *Schizothorax labiatus*

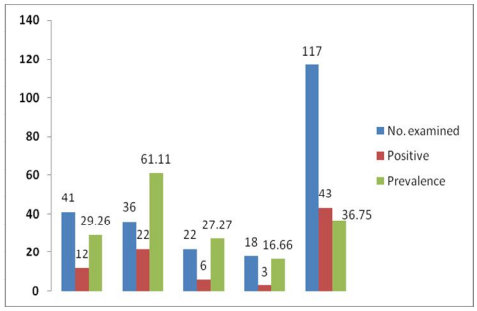

Fig.3. Season wise prevalence in *C. c. communis*

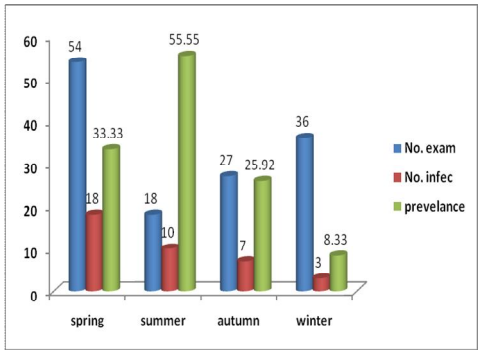

Fig.4 Season wise prevalence in *C. c. specularis*

Table 3 Season wise prevalence in *C. c. communis*

Season	No. examined	Positive	Prevalence
Spring	41	12	29.26
Summer	36	22	61.11
Autumn	22	6	27.27
Winter	18	3	16.66
Total	117	43	36.75

P = 0.037

Table 4 Season wise prevalence in *C.c. specularis*

Season	No. examined	Positive	Prevalence
Spring	54	18	33.33
Summer	18	10	55.55
Autumn	27	7	25.92
Winter	36	3	8.33
Total	135	38	28.14

P = 0.027

Jha *et al.* (1992) reported that acanthocephalan *Acanthosentis dalti* showed prevalence of 11.1-76% during different months and having highest incidence in the month of May. Frequency of infection and maturation was highest during the spring as reported by Amin (1975) and Ashley and Nicol (1989) who showed highest prevalence in spring (April-June) and

autumn (September-November). Infection patterns of acanthocephalan were greatly influenced by feeding behaviour, temperature, fish species, availability of intermediate host and type of water body. It was seen that overall prevalence rate of *Pomphorhynchus* was low which is in accordance to the studies done by Spall and Summer felt (1969) and Trejo (1994) who showed 0.7% infection of acanthocephalan parasites. The low prevalence might be due to low consumption of intermediate hosts. Seasonal variation in incidence of helminth parasitism in fishes was probably influenced by the annual life cycle of the parasites.

In conclusion, these findings needed to be taken into consideration while designing the control strategies for these helminth infections of fishes living under the agro-climatic conditions in the Kashmir valley, as well as similar climatic zones of other parts of world.

Vincent and Font (2003) while working on seasonal and yearly population dynamics of two exotic helminths observed that in *Carnalanus cotti* prevalence and mean abundance were higher in Hawaiian summer (47.7%) than in winter and Jha *et al.* (1992) reported the incidence of *Procamallanus heteropneustus* highest in June which clearly supports the present observation. Abundance of *Cystidicoloides tenuissima* in the infected fish varied from peak in summer to low in winter as worked out by Glenn (1980). Majidah and Khan (1998) reported the distribution pattern of the helminth populations in different fish hosts, which exhibited a regular seasonal trend and the infra-population concentration was relatively greater during summer. *Rhabdochona kidderi* occurred in fishes with the highest values of prevalence and mean intensity in April and June, respectively (Caspeta-Mandujano, 2000), which is in agreement to the present study.

The variation in prevalence rates depends on the life cycle pattern of the parasite, availability of intermediate and definitive host and the climatic conditions mainly water temperature.

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