

INTESTINAL PARASITES OF SPOTTED MURREL *CHANNA PUNCTATUS*, AND POPULATION DYNAMICS RELATED TO MONTH AND HOST SEX

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ABSTRACT

Monthly variations and the effects of host sex on parasite population dynamics were examined in spotted murrel (*Channa punctatus*). This study was carried out for a period of one year (July 2000 – June 2001). A total of 233 fish were examined. Two helminth parasitic species were identified in intestine of the fish viz., *Palisentis nagpurensis*, *Lytocestus indicus*. The analysis of the data showed that the helminth parasites showed a cyclic variability and seasonal periodicity in their occurrence with reference to host sex.

INTRODUCTION

Helminthology in recent years has received the attention of man researchers and has been recognized as a unique field of investigation for the reason that it includes a good many number of pathogenic organisms that are important from medical and veterinary point of view. Fish are heavily infected animals especially in crowded hatcheries. Many parasites find optimum conditions in crowded ponds leading to enormous loss. Acanthocephalans have become adapted to the bodies of freshwater fishes and cause physiological changes in the organ of infection of the host. Intestine is the primary organ commonly harboured by *Palisentis nagpurensis* and *lytocystus indicus*. It is observed those helminth parasites which inhabit the intestine mostly cause several pathogenic, biochemical and physiological changes. The helminthes are found in almost all the animals including fish throughout the world (Bychowsky, 1962). Trematodes live in all vertebrates inhabiting the digestive tract, accessory tubes and cavities (Roberts and Janovy, 1996) and have been reported from different species of fish (Needham and Wootten, 1978; Dhar and Kharoo, 1984; Nazir, 1996). Helminths damage health of fish by inducing variable intensity of infection depending upon the quality of environmental conditions (Read, 1992). The relationship between the host and the parasite form the main crux of the subject. The degree of parasitism varies in different hosts and in different environments. The helminthes parasite distribution pattern, studies have been made by a number of authors' like Cole (1954); Schad (1963); Tenora (1973); Gupta et al., (1984); Devi (1995); Rajaiah (1997); Richardson and Nickol (2000). The paper deals with population dynamics of intestinal parasite of *Channa punctatus* in context of seasonality

and host sex.

MATERIALS AND METHODS

In the present study *Channa punctatus* was procured from local markets in and around Warangal district, during the year 2000-2001. The collected fishes were brought to laboratory, autopsied and examined for parasitic infection. From the infected organs parasites were collected and washed with saline solution and preserved in 4% formalin, further, the parasites were stained with Alum carmine and after the end of staining process the parasites were mounted with DPX mountant. The prepared slides were observed to obtain various biostatistical parameters such as incidence of infection, intensity of infection, density of infection and index of infection by using following formulae.

$$\% \text{ Incidence} = \frac{\text{Number of infected host}}{\text{Total host examined}}$$

I) Incidence of infection

II) Intensity of infection

$$I = C/a$$

Where,

I = intensity; C = Number of parasite collected; a = Number of infected host

III) Density of infection

$$\text{Density of infection (D)} = C/a$$

Where,

C = Number of parasite collected; a = Total number of host examined

Table 1: The incidence of infection of *Acanthocephalan* parasites in the male and female populations of *Channa punctatus* during 2000-2001

Month and Year	No. of hosts examined	No. of hosts infected	No. of Males infected	No. of Females infected	Percentage of total infection	Percentage of infection in males	Percentage of infection in females
<i>Palisentis nagpurensis</i>							
Jul 2000	31	12	7	5	38.70	22.58	16.12
Aug 2000	28	11	6	5	39.28	21.42	17.85
Sep 2000	32	10	8	2	31.25	25.00	6.25
Oct 2000	30	10	9	1	33.33	30.00	3.33
Nov 2000	28	10	6	4	35.71	21.42	14.28
Dec 2000	32	14	10	4	43.75	31.25	12.50
Jan 2001	28	14	12	2	50.00	42.85	7.14
Feb 2001	34	16	10	6	47.05	29.41	17.64
Mar 2001	36	13	9	4	36.11	25.00	11.11
Apr 2001	28	11	8	3	39.28	28.57	10.71
May 2001	22	10	7	3	45.45	31.81	15.15
Jun 2001	28	10	5	5	35.71	17.85	17.85
<i>Lytocestus indicus</i>							
Jul 2000	31	12	8	4	38.70	22.80	12.90
Aug 2000	28	11	7	4	39.28	25.00	14.28
Sep 2000	32	10	8	2	31.25	25.00	6.25
Oct 2000	30	10	8	2	33.33	26.66	6.66
Nov 2000	28	10	7	3	35.71	25.00	10.71
Dec 2000	32	14	10	4	43.75	12.50	12.50
Jan 2001	28	14	9	5	50.00	32.14	17.85
Feb 2001	34	16	11	5	47.05	32.35	14.70
Mar 2001	36	13	9	4	36.11	25.00	11.11
Apr 2001	28	11	8	3	39.28	28.57	10.71
May 2001	22	10	6	4	45.45	27.27	18.18
Jun 2001	28	10	7	3	35.71	25.00	10.71

IV) Index of infection

It is expressed by the formula

$$Z = b \times c / a^2$$

Where,

Z = index of infection; b = Number of host infected; c = Number of parasite collected; a = Number of host examined both infected and uninfected in a given sample.

RESULTS AND DISCUSSION

In this study, the two parasite species *Palisentis nagpurensis* and *Lytocestus indicus* were identified in the intestine of fish. These species have been known as a parasite of various freshwater fish. Intensity of infection varied might be due to variable physical conditions of the water, particularly dissolved oxygen. Schmidt (1998) pointed out that embryonic development in the eggs of parasites stops at the dissolved oxygen content. The factors like muddy bottom water and feeding habits of *Channa punctatus* might also contribute for the low incidence of helminth parasites in the fish. The distribution and abundance of helminth parasite population, particularly of alimentary canal and associated organs were accurately estimated, analyzed and were related to variations such as months and host sexes. Changes in incidence, intensity, density, index of infection were ascertained from the observed data and interpreted carefully. The sex of the host has relevant bearing on the stability of host-parasite system. It has been confirmed by several authors (Smith, 1969; Sanwal and Agarwal, 1974; Sinha, 1984; Rajaiah, 1997) that the sex of the host has relevant effect on the regulation and periodicity of the parasites. The differences in the infection levels of the

parasites in the male and female hosts may be due to the physiological changes in quantity and quality of the steroid hormones presumably androgens of male and estrogens of the female hosts. Kisielewska (1970) observed that during summer the rate of infection is more in males than in females and observed that adult females showed higher infection than the young ones. The differences in parasitic fauna between animals of different sexes are less common and less well understood. The differences of distribution of parasites between the different sexes are not due to any one single factor, but due to combination of several factors including host's diet and their physiology.

To evaluate the infection levels, the piscian hosts procured from random field collections were dissected and separated sex-wise on the basis of gonads. The incidence of helminth infection in the two sexes was calculated separately (Table 1). The available data was analyzed and it has revealed that the incidence of infection was invariably very high in the male host and it was very much less in the female host of *Channa punctatus*. The month-wise data presented in Table 1 showing the infection levels of *Palisentis nagpurensis* indicated that both the sexes of the hosts were infected with the parasites throughout the year and the infective levels were higher in the males than in the females in two annual cycles. The mean incidence of infection in the female host was 17.85 in the month of August 200 and June 2001 and incidence of infection in the male hosts was 42.85 in the month of January 2001. While, the infection levels of *Lytocestus indicus* indicated that both the sexes of the hosts were infected with the parasites throughout the year and the infective levels were higher in the males than in the females in two annual cycles. The mean

incidence of infection in the female host was 6.25 in the month of September 2000 and the incidence of infection in the male hosts was 18.18 in the month of May 2001. These results are confirmed similarly by the observations of Smith, 1969; Sanwal and Agarwal, 1974; Sinha, 1984; Rajaiah, 1997.

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