



## SEASONAL VARIATIONS IN THE INCIDENCE OF INFECTION IN AQUATIC SNAILS

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### ABSTRACT

It is seen that the percentage of infection in a particular species of snail is not constant either in different months of a season or during the same seasons in different years. It is also seen that the occurrence of amphistomes infections is seasonal; the incidence of infection being high both in the South-west monsoon and Post-monsoon seasons. Trematode infections have been found to be high both in Post-monsoon and winter seasons.

**KEYWORDS :** Seasonal incidence, Amphistomes, Trematodes, Snails.

### INTRODUCTION

Sewell (1922) and Porter (1938) have rightly pointed out that to estimate the degree of seasonal incidence of infection in snails it is absolutely necessary that one should confine his attention to a definite locality all the year round. Sewell is of the opinion that to arrive at definite conclusion one should examine a large number of snails individually from a definite locality to estimate the intensity of infection and to study them for several years by tubing and dissecting them.

### GEOGRAPHICAL LOCATION AND CLIMATE OF ETAH DISTRICT

The district of Etah lies in the U.P. State, in northern India. Geographically it is located between the parallels of 28° 1' and 28° 54' north latitude and those of 78° 58' and 79° 47' east longitude. In its general appearance the district is an open plain, sloping gradually from north of south. During the winter, the coldest months are January and February. After February, the temperature rises gradually in March and April, reaching its maximum in May and June. It then falls gradually due to rain in July, August and September. The end of the October marks the commencement of winter. The average rain fall for the whole district is near about 44 - 45 inches, but the total varies considerably in the different subdivisions, being much greater in the north than in the South and specially the south - west. The maximum and minimum temperature usually found in the district in different months of the year.

### MATERIAL AND METHODS

For the present study, the year was divided into four seasons according to the Metrological Department, Poona (India) : (1) Winter season comprising December; January and February, (2) Hot weather season consisting of March, April and Maya, (3) South-West Monsoon Season comprising June, July, August and September, and (4) Post-monsoon season in October and November. Snails were collected mainly in the morning hours from various sources. They were sorted out, counted and examined for amphistome cercariae and other trematode infection on the same day, using Leiper's (1915) Test-tube technique.

### RESULTS AND DISCUSSION

During the present survey, the nature and extent of variations in the incidence of amphistome and other trematodes infection in aquatic snails in the above four seasons were studied.

### AMPHISTOME INFECTION

On a perusal of Table 1, it is seen that the occurrence of amphistomes infections is seasonal; the incidence of infection being high both in the South-west monsoon and Post-monsoon seasons. As far the individual species, *I. exustus* was found to be heavily infected (12.43%) in the South-west monsoon season and lightly (4.22%) in winter, whereas in Hot weather they were found negative for amphistome infection. *L. luteola* was found heavily infected (10.62%) in the Post-monsoon and lightly infected (1.75%) in winter, with no infection in the Hot weather and South-West

monsoon. *B. pulchellus* was observed to harbor maximum amphistome infection (6.52%) in the Post-monsoon, with no infection in other seasons. *G. convexiusculus* carried only light infection, the maximum (3.46%) in Post-monsoon and minimum (0.49%) in winter, while no amphistome infection was found in Hot weather.

**Table-1: Seasonal variations in the % incidence of amphistome infection in Snail**

Snails Species	Seasons in different years											
	Post -monsoon (Oct-Nov)			Winter (Dec-Feb)			Hot Weather (Mar-May)			South-West monsoon (June-Sept)		
	2000	2001	2002	2000-2001	2001-2002	2002-2003	2000-2001	2001-2002	2002-2003	2000-2001	2001-2002	2002-2003
<i>B.pulchellus</i>	1.8	2.6	16.3	-	-	-	-	-	-	-	-	-
<i>G.convexiusculus</i>	2.7	2.8	4.5	0.51	0.55	0.39	-	-	-	-	0.9	2.0
<i>I.exustus</i>	5.6	7.2	4.7	5.73	4.87	1.69	-	-	-	5.5	5.0	17.2
<i>L.luteola</i>	13.3	15.3	4.9	-	4.7	-	-	-	-	-	-	-
<i>L.auricularia</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>M.lineatus</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>M.tuberculatus</i>	-	-	-	-	-	-	-	-	-	-	-	-

### TREMATODE INFECTIONS OTHER THAN OF AMPHISTOMES

Trematode infections have been found to be high both in Post-monsoon and winter seasons. Only one species, i.e. *I. exustus* showed the maximum infection (25.12%) in the South-west monsoon, and minimum (3.57%) in the Hot weather. In *I. exustus* a second rise in infection was observed in Winter (17.28%) and Post-monsoon (16.52%). *L. luteola* was found heavily (16.87%) infected only in the Post-monsoon and lightly (10.52%) in Winter, with no infection in Hot Weather and South-west monsoon seasons. *L. auricularia* was found infected in all the seasons, the maximum (14.83%) infection being in the Post-monsoon and minimum (4.42%), in Hot weather. *B. pulchellus* was found infected throughout the year, the maximum (29.62%) infection being in the Winter and minimum (2.19%) in Hot weather. In the Post-monsoon period, *B. pulchellus* carried 8.15% infection and in South-west monsoon 3.65%. *G. convexiusculus* was found to harbour only light infection though it was found infected in all the seasons; the maximum (3.62%) infection was in the Post-monsoon and minimum (1.22%) in South-west monsoon, while in Winter and Hot weather it had only 2.51% and 1.97% infection, respectively.

*M.(T.) tuberculatus* was mostly found negative, except during the Post-monsoon and Winter when infection was found 0.70% and 1.25% respectively. *M.(T.) lineatus* was found infected in all the seasons with only slight variations in the incidence (1.90% in Winter, 2:19% in Hot weather, 3.38% in South-West monsoon and 2.70% in the Post-monsoon), (Table 2).

**Table-2: Seasonal variations in the % incidence of trematode (other than amphistome) infection in Snail**

Snails Species	Seasons in different years											
	Post -monsoon (Oct-Nov)			Winter (Dec-Feb)			Hot Weather (Mar-May)			South-West monsoon(June-Sept)		
	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002
	0	1	2	2001	2002	2003	1	2	3	1	2	3
<i>B.pulchelus</i>	14.54	3.94	7.54	25.0	33.0	33.3	4.12	2.12	1.96	4.1	3.14	4.66
<i>G.convexiusculus</i>	0.55	4.67	8.57	2.59	2.34	2.52	1.11	1.72	3.2	0.69	2.25	-
<i>I.exustus</i>	18.54	15.84	12.08	24.1	17.07	11.01	4.54	7.69	-	12.03	6.77	35.3
<i>L.luteola</i>	13.33	20.51	4.96	5.0	9.5	18.75	-	-	-	-	-	-
<i>L.lauricularia</i>	19.24	16.43	8.19	6.5	6.98	5.52	2.95	5.09	4.73	-	12.2	1.88
<i>M.lineatus</i>	2.19	4.6	2.27	2.56	1.17	2.12	1.85	1.78	2.77	1.38	4.16	4.66
<i>M.tuberculatus</i>	1.12	-	-	1.11	1.14	1.58	-	-	-	-	-	-

From Tables 1 and 2. It is seen that the percentage of infection in a particular species of snail is not constant either in different months of a season or during the same seasons in different years. Variations in the incidence of trematode infection in snails during different seasons were observed by various workers in the past. The present author is of the view, like Kemp and Gravely (1919), Sewell (1922), Sahai (1967) and Jain (1976) that the trematode infection in aquatic snails is seasonal.

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