



ECOLOGY AND SEASONAL DYNAMICS OF OCCURRENCE OF NEMATODE PARASITE *PARALEPTUS JAMMUENSIS* IN ALIMENTARY CANAL OF FRESH WATER FISH HOST *MASTACEMBELUS ARMATUS* FROM A TRIBUTARY OF POONCH RIVER OF J & K STATE

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ABSTRACT

Data on seasonal variation in the occurrence of *Paraleptus jammuensis* in its definitive host *Mastacembelus armatus* are provided based on samples fish collected every month starting from Dec. 2009 to Nov. 2011. A total of 96 fish were examined out of which 51 were found infected with 247 nematodes. The host was recovered from tributary of Poonch River only from April to November during both the years. In all these months when host was available nematodes were recovered throughout the study period with highest value of prevalence and mean intensity in August and November respectively.

KEYWORDS: seasonal variation, *Mastacembelus armatus*, *Paraleptus jammuensis*, Poonch River.

INTRODUCTION

The family Mastacembelidae which include spiny eels inhabits the fresh waters from Africa to eastward to Korea and Malasia and include 4 genera and 74 species (Froese and Pauly, 2004). Mastacembelid species generally are found at high altitude as well as in low land in both still and running waters (Woo, 1995). The river of Poonch is also a high altitude stream, at an elevation of about 1010 m between 33, 61'N and 71, 20'E. The fish of this high altitude fish is tasty and nutritious but at the same time vulnerable as host to many parasitic organisms especially metazoan parasites (Chambrier *et al.*, 2008). Kritsky *et al.* (2004) redescribed *Mastacembelocleidus heteranchorus* parasite (Kulkarni 1969) from gills of *Mastacembelus armatus* in Lucknow, India. In this paper ecology and seasonal dynamics of occurrence of a nematode parasite *Paraleptus jammuensis* in alimentary canal of *Mastacembelus armatus* from a tributary of Poonch river was investigated in detail for a period of two years w.e.f. Dec. 2006 to Nov. 2008.

MATERIALS & METHODS

The host *Mastacembelus armatus* was obtained from a tributary of river Poonch of J & K state. The fish were caught by hook and bait method. Recovery of parasites was done as per methods employed by Moravec *et al.* (1997). The nematodes were fixed in hot 70% alcohol and preserved in 10% glycerine alcohol. These specimens were cleared in lactophenol for appropriate observations. En face preparations followed the methods of Anderson (1958), and identification of nematodes to species level was based on Yamaguti (1961), Moravec and Arai (1971) and Sood (1989).

RESULTS & DISCUSSION

The fish host *Mastacembelus armatus* was found infected by the nematode *Paraleptus jammuensis*. The annual catch of *Mastacembelus armatus* and no of parasites recovered in each month is shown in the following table no. 1, showing monthly catch of fish *Mastacembelus armatus* and number of parasites recovered:

TABLE 1: Prevalence, Mean Intensity and Relative Density of *Paraleptus jammuensis* infection recorded from host *Mastacembelus armatus* from Janyar Bawli Kool, Station II for period Nov. 2009 to Dec. 2011.

Month	No. Exam	<i>Paraleptus jammuensis</i>				
		No. Inf.	Tot. P.	Pr.	M.I.	R.D.
Dec. 2009	0	0	0	0.00	0.00	0.00
Jan. 2010	0	0	0	0.00	0.00	0.00
Feb. 2010	0	0	0	0.00	0.00	0.00
Mar. 2010	0	0	0	0.00	0.00	0.00
April 2010	6	2	8	33.3	4	1.3
May 2010	6	3	12	50.0	4	2.0
June 2010	6	2	4	33.3	2	0.6

July 2010	6	3	8	50.0	2.6	1.3
Aug. 2010	6	3	8	50.0	2.6	1.3
Sep. 2010	6	3	15	50.0	5	2.5
Oct. 2010	6	3	18	50.0	6	3.0
Nov. 2010	6	3	23	50.0	7.6	3.8
Dec. 2010	0	0	0	0.00	0.00	0.00
Jan. 2011	0	0	0	0.00	0.00	0.00
Feb. 2011	0	0	0	0.00	0.00	0.00
March 2011	0	0	0	0.00	0.00	0.00
April 2011	6	3	24	50.0	8	4
May 2011	6	3	16	50.0	5.3	2.6
June 2011	6	2	8	33.3	4	1.3
July 2011	6	3	11	50.0	3.6	1.8
Aug. 2011	6	4	16	66.6	4	4.0
Sept. 2011	6	4	20	66.6	4	4.0
Oct.. 2011	6	5	26	83.3	5.2	4.3
Nov. 2011		5	30	83.3	6.0	5.0
Total	96	51	247	849.70	73.90	42.80
No. Exam. =	Number of fishes examined					
No. Inf. =	Number of fishes infected					
Tot. P. =	Total number of Parasites					
Pr. =	Prevalence					
M.I. =	Mean Intensity					
R.D. =	Relative Density					

TABLE 2: Mean value of temperature (air & water), transparency & depth of Station II *i.e.* Janyar Bawli Kool

S.No.	Months & Year	Station II			
		Temperature		Transparency cms	Depth cms
		Air °C	Water °C		
1	Dec. 2009	9.5	16.0	22.0	22.0
2	Jan. 2010	14	16.6	24.1	24.1
3	Feb. 2010	15.5	14.0	24.3	24.3
4	Mar. 2010	23.8	19.5	24.5	24.5
5	Apr. 2010	28.8	22.8	25.5	25.5
6	May 2010	32.0	26.8	25.0	25.0
7	Jun. 2010	37.0	28.0	26.6	26.6
8	Jul. 2010	33.0	26.6	10.9	28.6
9	Aug. 2010	30.2	25.0	10.5	31.7
10	Sept. 2010	25.2	23.0	28.2	28.2
11	Oct. 2010	26.5	22.5	26.2	26.2
12	Nov. 2010	17.5	18.5	25.1	25.1
1	Dec. 2010	10.0	16.6	24.4	24.4
2	Jan. 2011	11.0	12.5	21.9	21.9
3	Feb. 2011	13.5	14.0	21.6	21.6
4	Mar. 2011	25.0	18.0	22.4	22.4
5	Apr. 2011	30.0	22.5	24.5	24.5
6	May 2011	33.2	26.0	25.5	25.2
7	Jun. 2011	37.5	28.9	12.5	27.2
8	Jul. 2011	34.0	23.2	11.5	32.0
9	Aug. 2011	30.5	25.9	10.9	28.4
10	Sept. 2011	26.0	21.9	27.0	27.0
11	Oct. 2011	23.2	19.2	24.4	24.4
12	Nov. 2011	17.5	18.8	24.0	24.0

TABLE 3: Mean value of Chemical Parameters of Station II i.e. Janyar Bawli Kool, Poonch

S.No.	Period	pH	DO	CO ₂	CO ₃ ^{''}	HCO ₃ [']
1	Dec. 2009	7.5	8.4	1.60	-	50.0
2	Jan. 2010	7.8	8.9	1.51	-	52.69
3	Feb. 2010	7.6	8.7	1.61	-	52.8
4	Mar. 2010	7.2	8.6	1.83	-	45.8
5	Apr. 2010	7.1	8.0	2.22	-	36.80
6	May 2010	6.9	7.0	2.74	-	33.8
7	Jun. 2010	6.8	7.2	3.60	-	31.9
8	Jul. 2010	7.4	7.6	2.00	-	30.8
9	Aug. 2010	7.3	7.5	1.35	-	32.9
10	Sept. 2010	7.4	7.4	1.66	-	32.0
11	Oct. 2010	7.5	7.7	1.55	-	33.0
12	Nov. 2010	7.6	7.7	1.59	-	38.1
1	Dec. 2010	7.8	8.6	1.60	-	49.2
2	Jan. 2011	7.2	9.2	1.43	-	54.60
3	Feb. 2011	7.4	9.0	1.38	-	51.0
4	Mar. 2011	7.1	8.9	1.40	-	43.2
5	Apr. 2011	7.5	8.3	1.9	-	37.40
6	May 2011	7.3	7.5	3.2	-	32.0
7	Jun. 2011	6.5	7.1	5.4	-	31.9
8	Jul. 2011	7.0	7.9	4.6	-	31.0
9	Aug. 2011	6.9	7.8	1.30	-	32.3
10	Sept. 2011	7.3	7.0	1.43	-	34.2
11	Oct. 2011	7.8	8.0	1.42	-	34.5
12	Nov. 2011	7.7	8.4	1.02	-	39.0

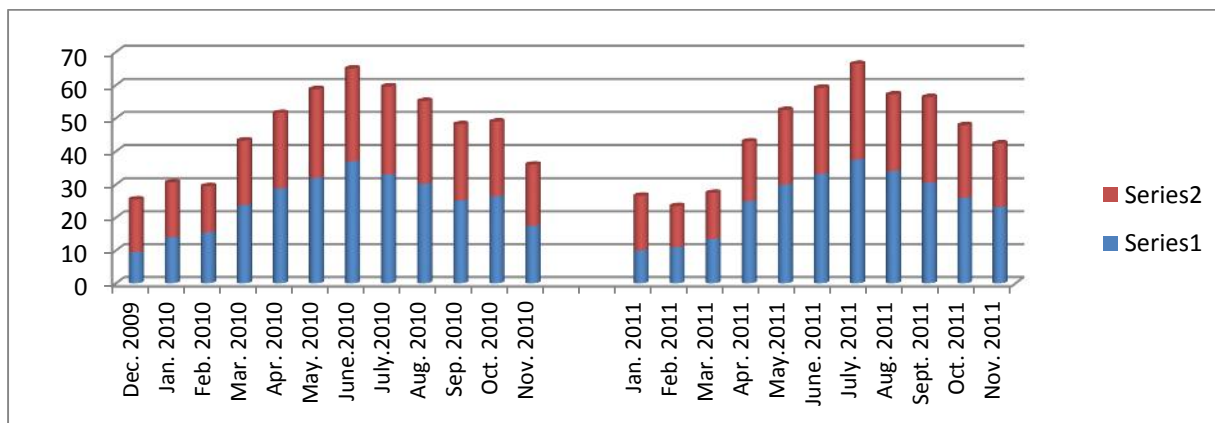


FIGURE 1: Showing mean value of temperature (air & water) of Janyar Bawli kool

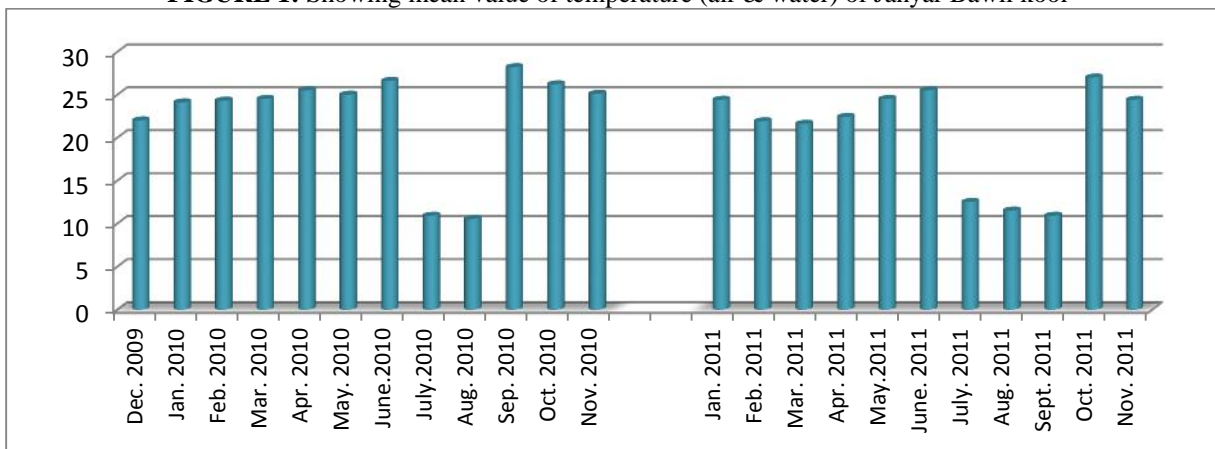


FIGURE 2: Showing mean value of transparency at station Janyar Bawli kool

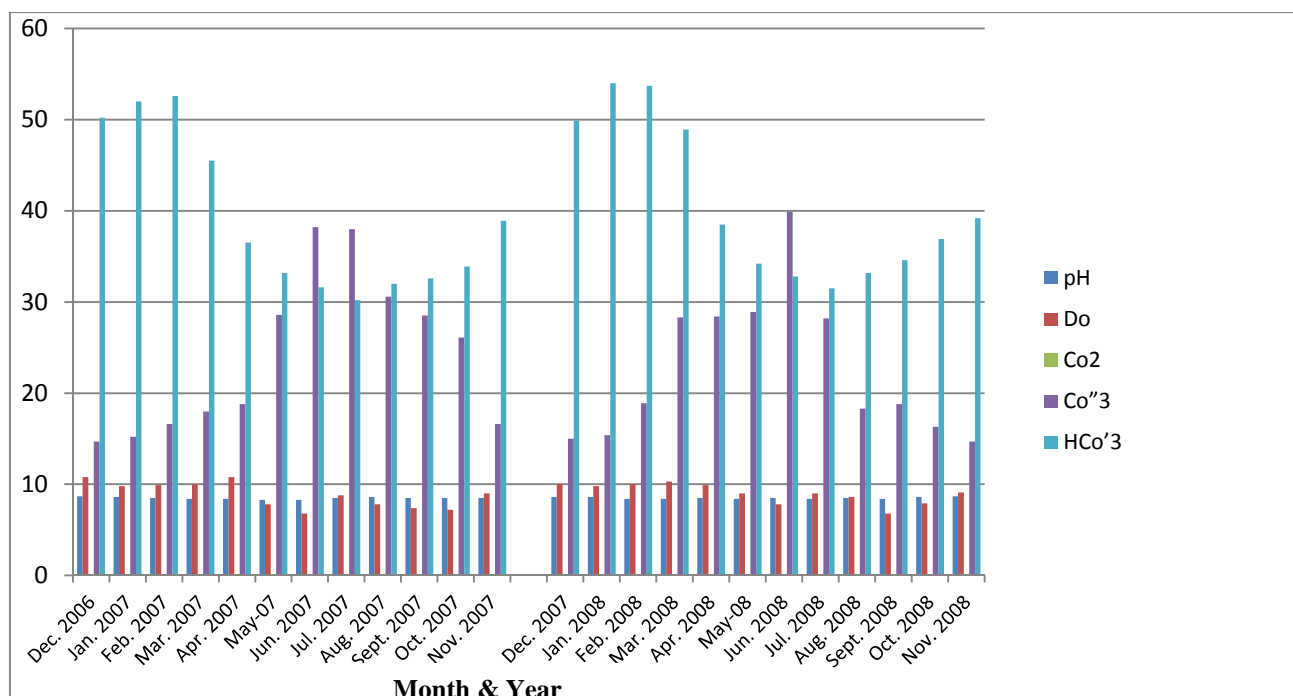


FIGURE 3: Mean value of Chemical Parameters of Station I i.e. Poonch River

The nematode *Paraleptus jammuensis* was recovered from fish host *Mastacembelus armatus* from a tributary of river Poonch of J&K state of India. Out of 96 fishes dissected 51 were found infected with 247 *Paraleptus jammuensis*. Prevalence was maximum 50% in May; July to Nov. during first year and in second year prevalence was maximum 83% in Oct. and Nov. While mean intensity was recorded

maximum 7.6 in Nov. 1st year 8.0 in April 2nd year. Relative density was recorded maximum in 3.8 and 5.0 in Nov. 1st and 2nd year respectively. No host could be obtained in period from Dec. to March both years. It appears that seemingly the host appears to undergo hibernation &/ or migration to some other locality. (Table 1 to 3).

TABLE 4. Correlation between physico-chemical parameters and Prevalence of *Paraleptus jammuensis n.sp.* infection from the fishes of Station II

Month	Temperature °C		Transparency	Depth	pH	Do	FCO ₂	Co' ₃	HCo' ₃	Prevalence
	Atmospheric	Water								
Dec. 2009	9.5	16.0	22.0	22.0	7.5	8.4	1.51	-	50.0	0.0
Jan. 2010	14.0	16.6	24.1	24.1	7.8	8.9	1.61	-	52.69	0.0
Feb. 2010	15.5	14.0	24.3	24.3	7.6	8.7	1.83	-	52.8	0.0
Marh 2010	23.8	19.5	24.5	24.5	7.2	8.6	2.22	-	45.8	0.0
April 2010	28.8	22.8	25.5	25.5	7.1	8.0	2.74	-	36.8	33.3
May 2010	32.0	26.8	25.0	25.0	7.0	7.0	3.60	-	33.8	50.0
June 2010	37.0	28.0	26.6	26.6	7.2	7.6	2.00	-	31.9	33.3
July 2010	33.0	26.6	10.9	28.6	7.4	7.5	1.35	-	30.8	50.0
Aug. 2010	30.2	25.0	10.5	31.7	7.3	7.4	1.66	-	32.9	50.0
Sept. 2010	25.2	23.0	28.8	28.2	7.4	7.7	1.55	-	32.0	50.0
Oct. 2010	26.5	22.5	26.2	26.2	7.5	7.8	1.55	-	33.0	50.0
Nov. 2010	17.5	18.5	25.1	25.1	7.6	7.6	1.60	-	38.1	0.0
	0.083	0.745	-0.205	0.686	0.0	-0.915	0.083		-0.928	

TABLE 5: Correlation between physico-chemical parameters and Prevalence of *Paraleptus jammuensis* n. sp. infection from the fishes of Station II

Month	Temperature °C		Transparency	Depth	pH	Do	FCO ₂	Co ³⁺	HCo ₃ ⁻	Prevalence
	Atmospheric	Water								
Dec. 2010	10.0	16.6	24.4	24.4	7.8	9.2	1.49	-	49.2	0.0
Jan. 2011	11.0	12.5	21.9	21.9	7.2	9.0	1.43	-	54.60	0.0
Feb. 2011	13.5	14.0	21.6	21.6	7.4	8.9	1.38	-	51.0	0.0
Marh 2011	25.0	18.0	22.4	22.4	7.1	8.3	1.40	-	43.2	0.0
April 2011	30.0	22.5	24.5	24.5	7.5	7.5	1.9	-	37.40	50.0
May 2011	33.0	26.0	25.2	25.2	7.3	7.1	3.2	-	32.0	50.0
June 2011	37.0	28.9	12.2	27.2	7.1	7.9	5.4	-	31.9	33.3
July 2011	34.0	23.2	11.5	32.0	7.0	7.8	4.6	-	31.0	50.0
Aug. 2011	30.5	25.9	10.9	28.4	7.2	8.0	1.30	-	32.3	66.6
Sept. 2011	26.0	21.9	27.0	27.0	7.3	8.0	1.43	-	34.2	66.6
Oct. 2011	23.2	19.2	24.4	24.4	7.8	8.1	1.42	-	35.5	83.3
Nov. 2011	17.5	18.8	24.0	24.0	7.7	8.4	1.02	-	39.0	83.3
	0.451	0.514	-0.0202	0.474	0.243	-0.581	0.008		-0.752	

Prevalence of *Paraleptus jammuensis* infection in *Mastacembelus armatus* at Station II Poonch (Table 1 to 5 & Fig. 1 to 3) showed a positive correlation with temperature (0.083, 0.451 atmospheric and 0.745, 0.514 water), depth (0.686, 0.474) and FCO₂ (0.083, 0.008) with pH it showed no correlation (0.0) in first year but in second year of investigation it showed positive correlation (0.243). The prevalence of *Paraleptus jammuensis* at this station showed negative correlation with transparency (-0.205, -0.020), Do (-0.915, -0.581) and HCO₃⁻ (-0.928, -0.752).

The nematode parasite *Paraleptus* have never been reported earlier from the state of Jammu & Kashmir. Moreover it is first report of any nematode parasite from the host *Mastacembelus armatus* from this state.

The present investigation is a preliminary attempt of its type from the region as far as correlation between environmental factors and prevalence of parasites is concerned. Detailed studies on the life histories of these parasites on one hand and their relationship with external ecological factors on the other hand are however required which would be of great significance to design a preventive protocol against their infection particularly for fish farmers/culturists,

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