



ECOLOGY AND SEASONAL DYNAMICS OF OCCURRENCE OF NEMATODE PARASITE *RHABDOCHONA PUTITORI* IN ALIMENTARY CANAL OF FRESH WATER FISH HOST *TOR PUTITORA* FROM POONCH RIVER OF J&K STATE

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ABSTRACT

Data on seasonal variation in the occurrence of *Rhabdochona putitori* in its definitive host *Tor putitora* are provided based on samples fish collected every month starting from Dec. 2009 to Nov. 2011. A total of 480 fish were examined out of which 25 were found infected with 67 nematodes. The host was recovered from Poonch river only from March 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 June and July both the years.

KEYWORDS: seasonal variation, 67 nematodes, Poonch River.

INTRODUCTION

Genus *Rhabdochona* was proposed by Railliet (1916) for *Dispharagus denudatus*, Dujardin, 1845, which forms the type of the genus. Alongwith other genera he also included *Rhabdochona* in the family Thelaziidae. Gendre (1921), while giving an account of some helminth parasites from Africa, gave a historical account of the genus *Rhabdochona*. Travassos, Artigas and Pereira (1928) proposed a new sub family Rhabdochoninae for three genera, *Rhabdochona* Railliet, 1916, *Spinitectus* Pourment, 1883, *Cystidicola* Fischer, 1792. Skrjabin (1924) however did not agree to place Rhabdochoninae under Spiruridae Cerley, 1885. Skrjabin, *et al* (1967) included four genera, namely *Rhabdochona*, *Filochona*, *Pseudorhabdochona* Liu and Wu, 1941 and *Parascarophis* Campana-Rouget, 1955 under the sub-family Rhabdochoninae and recognized 39 species under *Rhabdochona* (including 4 *Rhabdochona* sp.) and 13 species under *Filochona*. Agarwal, (1965) stated that under this genus *Filochona smythi* should also be added as it has eggs with a single polar filament. A total of 67 mature worms were recovered from the intestine of 25 fish hosts *Tor putitora*, inhabiting fast moving Poonch stream during the course of present investigation.

MATERIALS & METHODS

The host *Tor putitora* was obtained from Poonch river of J&K state. 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). Drawing were made with the aid of camera lucida. The type and voucher specimens have been deposited in the museum of Zoology dept., University of Jammu, Jammu, J&K State, India. Regarding physicochemical parameters, the water and air temperature was recorded using mercury bulb thermometer, pH was analysed using electronic pH meters and DO, FCO_2 , CO_3^{2-} and HCO_3^- were analysed following (APHA, 1985).

RESULTS & DISCUSSION

The fish host *Tor putitora* was found infected by the trematode parasite *Allocreadium tori*. The annual catch of *Tor putitora* and no of parasites recovered, their prevalence, mean intensity & relative density in each month is shown in the following table no 1. The physico-chemical parameters on monthly basis are given in table no 2 & 3 and are depicted graphically in fig. 1 to 4. The correlation between physico-chemical parameters and prevalence of parasite *Allocreadium tori* is shown in table 4 & 5.

TABLE 1: Prevalence, Mean Intensity and Relative Density of *Rhabdochona putitora* infection recorded from host *Tor putitora* from Poonch river, Station I for period period Dec. 2006 to Nov. 2008.

Month	No. Exam	<i>Rhabdochona putitora</i>				
		No. Inf.	Tot. P.	Pr.	M.I.	R.D.
Dec. 2006	20	0	0	0.00	0.00	0.00
Jan. 2007	20	0	0	0.00	0.00	0.00
Feb. 2007	20	0	0	0.00	0.00	0.00
Mar. 2007	20	1	2	10	1	0.2
April 2007	20	1	2	10	2	0.2
May 2007	20	2	4	20	2	0.2
June 2007	20	2	6	20	3	0.3
July 2007	20	2	6	20	3	0.3
Aug. 2007	20	1	4	20	2	0.2
Sep. 2007	20	2	4	20	2	0.2
Oct. 2007	20	1	3	20	1.5	0.15
Nov. 2007	20	1	2	10	2	0.2
Dec. 2007	20	0	0	0.00	0.00	0.00
Jan. 2008	20	0	0	0.00	0.00	0.00
Feb. 2008	20	0	0	0.00	0.00	0.00
March 2008	20	1	2	10	2	0.2
April 2008	20	1	3	10	3	0.3
May 2008	20	2	4	20	2	0.2
June 2008	20	2	6	20	3	0.3
July 2008	20	2	6	20	3	0.3
Aug. 2008	20	1	4	20	2	0.2
Sept. 2008	20	1	4	20	2	0.2
Oct. 2008	20	1	3	20	1.5	0.15
Nov. 2008	20	1	2	10	2	0.2
Total	480	25	67			

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

FIGURE 1: Graph Showing Mean value of temperature (air & water) of Station I i.e. Poonch River

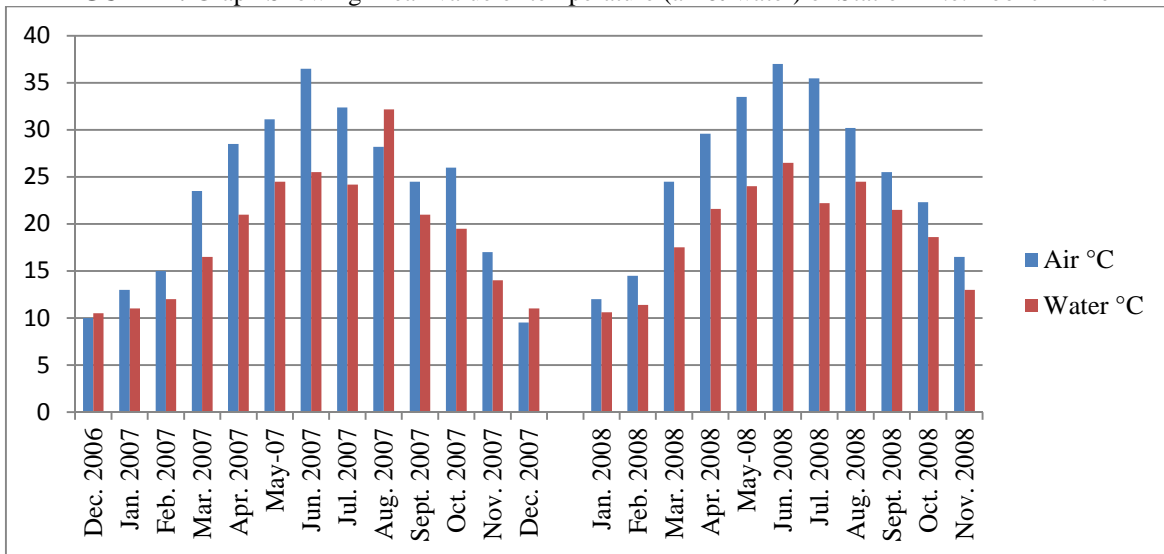


TABLE 2: Mean value of temperature (air & water), transparency & depth of Station I i.e. Poonch river

S.No.	Months & Year	Station I			
		Temperature		Transparency in cms	Depth in cms
		Air (°C)	Water (°C)		
1	Dec. 2006	10	10.5	36.0	36.0
2	Jan. 2007	13	11	36.6	36.0
3	Feb. 2007	15	12	35.5	35.5
4	Mar. 2007	23.5	16.5	48.8	48.8
5	Apr. 2007	28.5	21.0	56.0	56.0
6	May 2007	31.12	24.5	52.6	52.6
7	Jun. 2007	36.5	25.5	52.6	52.6
8	Jul. 2007	32.4	24.2	17.5	65.9
9	Aug. 2007	28.2	32.2	23.5	62.6
10	Sept. 2007	24.5	21.0	58.0	58.0
11	Oct. 2007	26.0	19.5	56.2	56.2
12	Nov. 2007	17.0	14.0	56.1	56.1
1.	Dec. 2007	9.5	11.0	53.4	53.4
2.	Jan. 2008	12	10.6	37.0	37.0
3.	Feb. 2008	14.5	11.4	36.9	36.9
4.	Mar. 2008	24.5	17.5	47.0	47.0
5.	Apr. 2008	29.6	21.6	54.7	54.7
6.	May 2008	33.5	24.0	51.5	51.5
7.	Jun. 2008	37.0	26.5	50.0	50.0
8.	Jul. 2008	35.5	22.2	11.6	62.0
9.	Aug. 2008	30.2	24.5	20.5	55.4
10.	Sept. 2008	25.5	21.5	43.9	43.9
11.	Oct. 2008	22.3	18.6	40.0	40.0
12.	Nov. 2008	16.5	13.0	38.0	38.0

FIGURE 2: Graph Showing Mean value of temperature in cms of Station I i.e. Poonch River

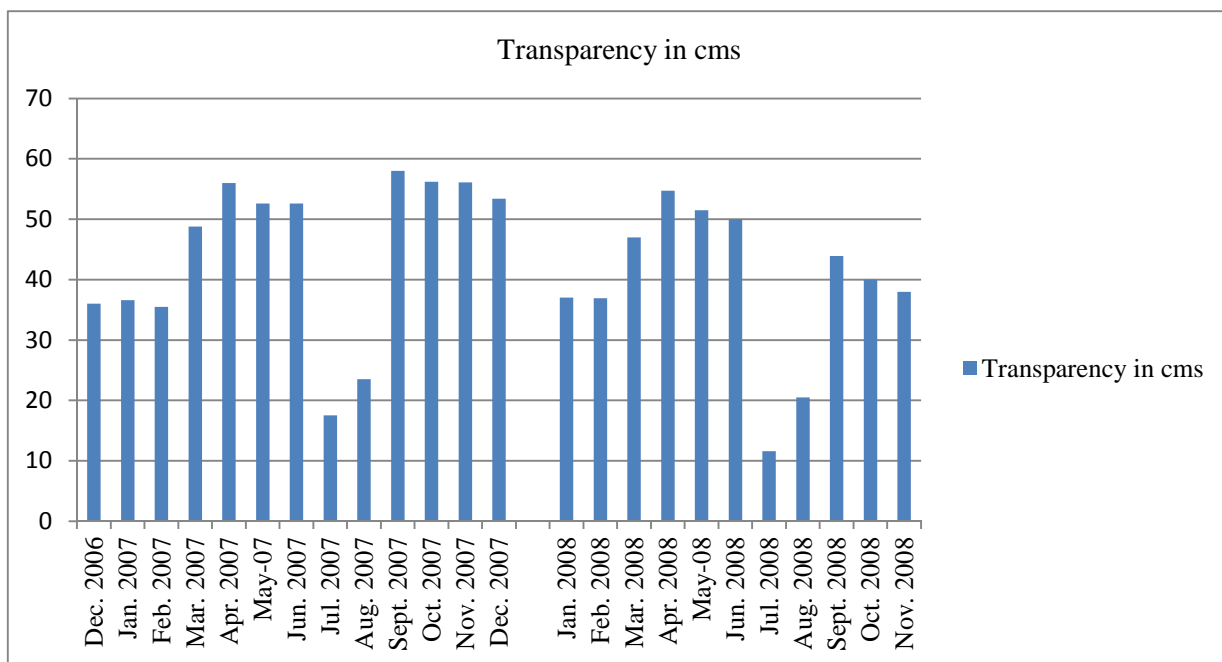


FIGURE 3: Graph Showing Mean value of depth in cms of Station I i.e. Poonch River

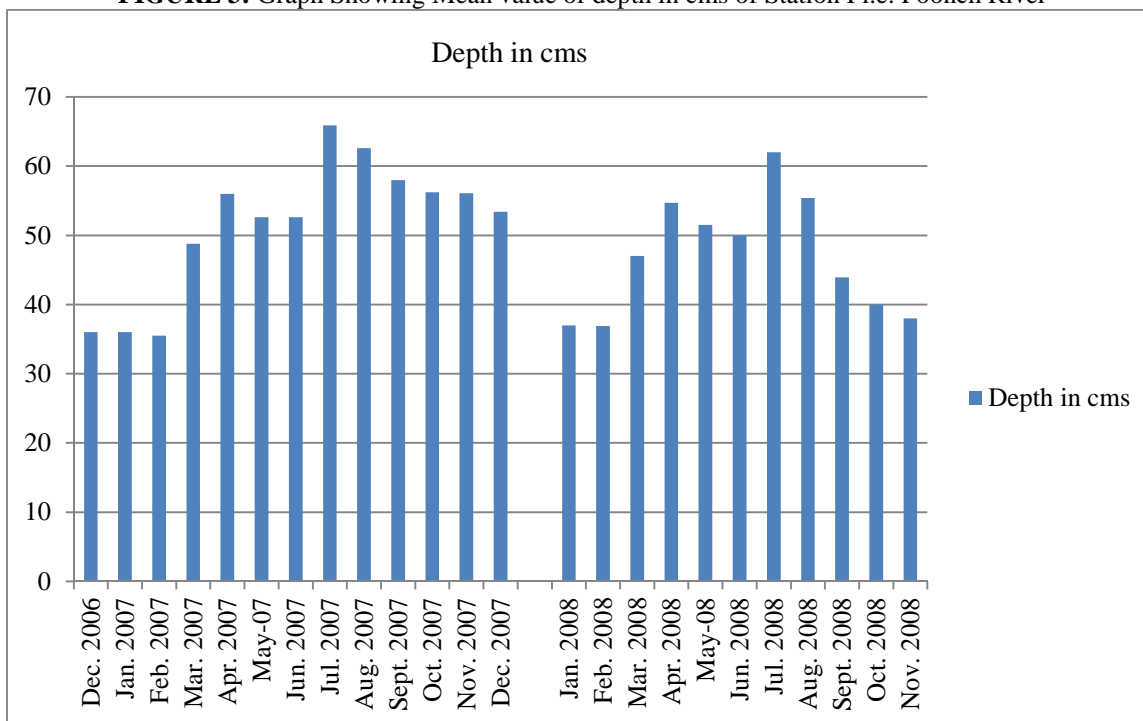


TABLE 3: Mean value of Chemical Parameters of Station I (Poonch river) Poonch

S.No.	Period	pH	DO(mg/ml)	CO ₂ (mg/ml)	CO ₃ ^{''} (mg/ml)	HCO ₃ ['] (mg/ml)
1	Dec. 2006	8.7	10.8	-	14.7	50.2
2	Jan. 2007	8.6	9.8	-	14.1	52.0
3	Feb. 2007	8.5	9.9	-	12.6	52.6
4	Mar. 2007	8.4	10.0	-	12.0	45.5
5	Apr. 2007	8.4	10.8	-	12.3	36.5
6	May 2007	8.3	7.8	-	10.5	33.2
7	Jun. 2007	8.3	6.8	-	10.8	31.6
8	Jul. 2007	8.5	8.8	-	12.9	30.2
9	Aug. 2007	8.6	7.8	-	14.4	32.0
10	Sept. 2007	8.5	7.4	-	13.2	32.6
11	Oct. 2007	8.5	7.2	-	13.2	33.9
12	Nov. 2007	8.5	9.0	-	13.3	38.9
1	Dec. 2007	8.6	10.0	-	15.0	49.9
2	Jan. 2008	8.6	9.8	-	14.9	54.0
3	Feb. 2008	8.4	10.0	-	13.8	53.7
4	Mar. 2008	8.4	10.3	-	13.6	48.9
5	Apr. 2008	8.5	9.9	-	14.6	38.5
6	May 2008	8.4	9.0	-	14.0	34.2
7	Jun. 2008	8.5	7.8	-	14.7	32.8
8	Jul. 2008	8.4	9.0	-	13.6	31.5
9	Aug. 2008	8.5	8.6	-	15.1	33.2
10	Sept. 2008	8.4	6.8	-	13.8	34.6
11	Oct. 2008	8.6	7.9	-	15.2	36.9
12	Nov. 2008	8.7	9.1	-	15.8	39.2

FIGURE 4 : Mean value of Chemical Parameters of Station I i.e. Poonch river

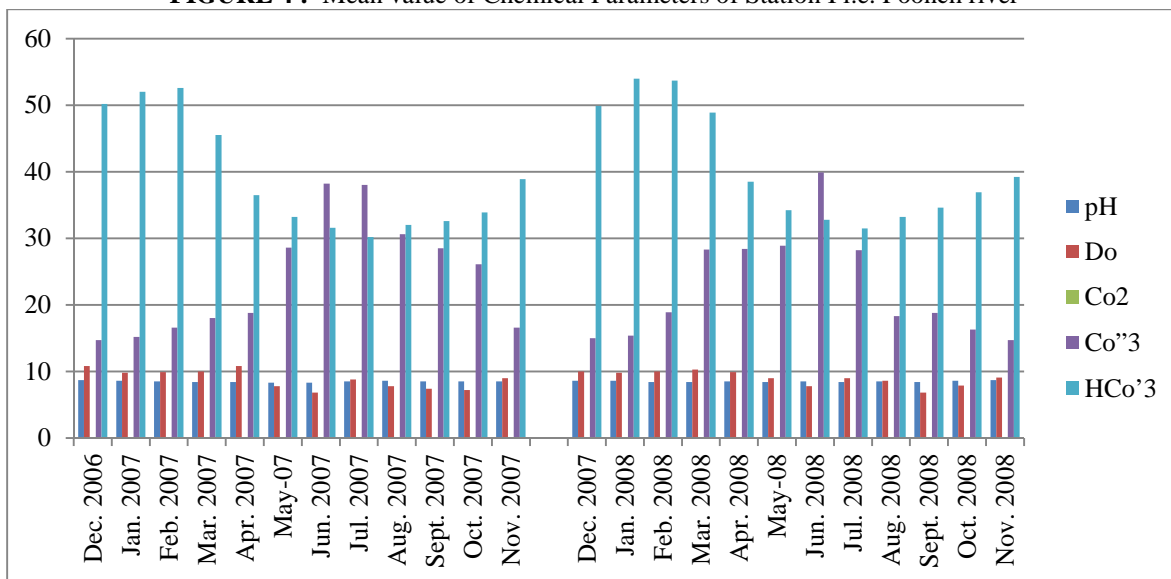


TABLE 4: Correlation between physico-chemical parameters and Prevalence of *Rhabdochona putitori* infection from the fishes of Station I.

Month	Temperature °C		Transparency	Depth	pH	DO	FCO ₂	CO ³	HCO ³	Prevalence
	Atmospheric	Water								
Dec. 2006	10.0	10.5	36.0	36.0	8.5	10.8	-	14.7	50.2	0
Jan. 2007	13.0	11.0	36.0	36.0	8.4	9.8	-	15.2	52.0	0
Feb. 2007	15.0	12.0	35.5	35.5	8.5	9.9	-	16.6	52.6	0
March 2007	23.5	16.5	48.8	48.8	8.3	10.0	-	18.0	45.5	10.0
April 2007	28.5	21.0	56.0	56.0	8.1	10.8	-	18.8	36.6	10.0
May 2007	31.2	24.5	52.6	52.6	7.9	7.8	-	28.6	33.2	20.0
June 2007	36.5	25.5	52.6	52.6	7.8	6.8	-	38.2	31.6	20.0
July 2007	32.4	24.2	17.5	65.9	8.1	8.8	-	38.0	30.2	20.0
Aug. 2007	28.2	23.2	23.5	62.6	7.9	7.8	-	30.6	32.0	20.0
Sept. 2007	24.5	21.0	58.0	58.0	8.0	7.4	-	28.5	32.6	20.0
Oct. 2007	26.0	19.5	56.2	56.2	8.0	7.2	-	26.1	33.9	20.0
Nov. 2007	17.0	14.0	56.1	56.1	8.2	9.0	-	16.6	38.9	10.0
	0.871	0.919	0.156	0.871	-0.483	-0.829		0.861	-0.962	

TABLE 5: Correlation between physico-chemical parameters and Prevalence of *Rhabdochona putitori* infection from the fishes of Station I.

Month	Temperature °C		Transparency	Depth	pH	DO	FCO ₂	CO ³	HCO ³	Prevalence
	Atmospheric	Water								
Dec. 2007	9.5	11.0	53.4	53.4	8.6	10.0	-	15.0	49.9	0
Jan. 2008	12.0	10.6	37.0	37.0	8.3	9.8	-	15.4	54.0	0
Feb. 2008	14.5	11.4	36.9	36.9	8.2	10.0	-	18.9	53.7	0
March 2008	24.5	17.5	47.0	47.0	8.4	10.3	-	28.3	48.9	10.0
April 2008	29.5	21.6	54.7	54.7	8.0	9.9	-	28.4	38.5	10.0
May 2008	33.5	24.0	51.5	51.5	8.2	9.0	-	28.9	34.2	20.0
June 2008	37.0	26.5	50.0	50.0	8.5	7.8	-	39.9	32.8	20.0
July 2008	33.5	22.2	11.6	62.0	8.0	9.0	-	28.2	31.5	20.0
Aug. 2008	30.2	24.5	20.5	55.4	8.0	8.6	-	18.3	33.2	20.0
Sept. 2008	25.5	21.5	43.9	43.9	8.0	6.8	-	18.8	34.6	20.0
Oct. 2008	22.3	18.6	40.0	40.0	8.6	7.9	-	16.3	36.9	20.0
Nov. 2008	16.5	13.0	38.0	38.0	8.7	9.1	-	14.7	39.2	10.0
	0.845	0.890	-0.247	0.416	-0.271	-0.754		0.440	-0.937	

Out of 480 *Tor putitora* fishes examined to see the metazoan parasitic burden during present investigations only a total of 25 fishes were observed to harbour 67 *Rhabdochona putitori* n.sp. Maximum prevalence 20% of the nematode was observed during May to October in both the years. Mean intensity was however, found to be maximum of 3.0 in month of June and July of 1st year and during April, June and July in 2nd year. Relative density was observed to be highest of 0.3 in same months of the consecutive years as does the mean intensity. Peak values of prevalence of *Rhabdochona putitori* were recorded during summer months of both years under investigations, when temperature, depth and carbonates (CO₃²⁻) recorded their highest values in summer months (Table 74 & 75). *Rhabdochona putitori* population has been found to show positive correlation with temperature (0.91, 0.88 atmospheric, 0.15, 0.88 water) depth (0.93, 0.41) and carbonates CO₃²⁻ (0.86, 0.44) but it exhibited negative correlation with transparency (-0.87, -0.24), pH (-0.483, -0.271), DO (-0.829, -0.75) and HCO₃³⁻ (-0.92, -0.93). 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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