Uttar Pradesh J. Zool. 25(1) : 23-27, 2005 ISSN 0256-971X

SEASONAL OCCURRENCE OF HELMINTH PARASITES IN FISHES OF LOKTAK LAKE, MANIPUR

M. SHOMORENDRA, A.N. JHA* AND PANKAJ KUMAR*
DEPTT. OF ZOOLOGY, THAMBAL MARIK COLLEGE, OINAM-795 139, INDIA.
DEPTT. OF ZOOLOGY, B.R.A. BIHAR UNIVERSITY, MUZAFFARPUR-842 001, INDIA*.

From four species of fishes namely *Channa gachua* (Ham.), *Channa striatus* (Bl.), *Clarias batrachus* (L.) and *Anabas testudineus* (Bloch.), five species of helminth parasites were collected comprising one species of digenetic trematode, two species of cestodes, one species of nematode and one species of acanthocephala. Nematode and acanthocephala showed moderate to high occurrence during different months while adult digenetic trematode and cestodes having quite low prevalance and even the infestation was absent during certain months of the investigation period.

INTRODUCTION

Studies related to seasonal occurrence of helminth parasites of fresh water fishes have been extensively carried out in many countries but chiefly limited to temperate climates. Chubb (1977, 1979, 1980 & 1982) worked in detail the seasonal occurrence of helminths in fresh water fishes of different climatic zones of the world. Pal (1963), Madhavi (1979) and Jha *et al.* (1992) worked on the occurrence of helminth parasites of fresh water fishes in India. The present study deals with the prevalance and density of infections of five species of helminth parasites for a period of 13-months extending from January 2000 to January 2001. The water temperature is one of the significant abiotic variable for seasonal variation has also been taken into account.

MATERIALS AND METHODS

More than 18 number of specimens of *Channa gachua* (Ham.), *C. striatus* (Bl.) and *Clarias batrachus* (L.) and *Anabas testudineus* (Bloch.) were studied each month during January 2000 to January 2001. The fishes were collected almost alternate day from the fishing site of Loktak lake and brought to laboratory in polythene bags containing water of the very lake. Monthwise water temperature was recorded with the help of centigrade thermometer. The external surface, mouth, gills, musculature, viscera and mesenteries of the host organs were examined during the study. The parasites collected, upon being fully relaxed, were fixed in the fixatives prescribed for different helminthic groups. The trematode was fixed in AFA (Alcohol, Formalin-Acetic acid) solution and stored in 70% alcohol, acanthocephala fixed and preserved in AFA. Cestodes in 5% formalin and nematode after immersing in hot 70% alcohol were finally stored in 70% alcohol. To facilitate identification of worms, the trematodes and cestodes were stained in Alum carmine, dehydrated in glacial acetic acid, cleared in methyl salicylate and mounted in canada balsam while in the case of nematode and acanthocephala the worms were cleared in lactophenol and mounted in glycerine jelly. The ecological terms used in the present work are based on the description of Margolis *et al.* (1982).

RESULTS

Table I Shows the number of fish of each species examined during different months of investigation period, while Table II and III indicate the prevalance and intensity of infection of helminth parasites collected from fish hosts respectively during different months. The parasites collected during the present investigation comprise-*Astiotrema reniferum* (Looss, 1898) Looss,

Table I : Number of fish examined for helminthic infection during different months.

Months	*C. batrachus*	*C. gachua*	*C. striatus*	*A. testudineus*
January 2000	25	18	24	25
February	20	18	20	23
March	21	18	25	22
April	25	27	21	25
May	25	24	25	28
June	24	25	20	24
July	25	20	22	24
August	24	25	23	23
September	25	25	20	25
October	25	20	26	21
November	21	20	21	25
December	24	21	25	23
January 2001	24	18	27	26
Total	308	279	299	314

1900; *Djombangia penetrans* Bovein, 1926; *Capingentoides singhi* Verma, 1971; *Camallanus anabantis* Pearse, 1933; and *Pallisentis ophiocephali* (Thapar, 1930) Baylis, 1933.

The digenetic trematode *Astiotrema reniferum* showed prevalance of infection in *Clarias batrachus* varying from 4 to 33.3% during different months and having worm load of 1-10 per fish. July-August were the months of peak prevalance while July was the peak period for intensity of infection. No record of this parasite was available during the months of January 2000 to April 2000 and December 2000 to January 2001 of the investigation period.

The cestodes collected during the present study showed their occurrence having low to slightly higher prevalance, varying 4.16 to 20.8% for *Djombangia penetrans* and 4 to 23.8% for *Capingentoides singhi* in *C. batrachus*. Peak incidence period for *D. penetrans* was found during the months May-June, August and December. The intensity of infection was highest in the month of June and the worms recovered from the fish was in the range of 1-6. No record of this parasite was found during the months of October and November.

C. singhi showed lowest peak during August and highest peak during November. The intensity of occurrence was highest in the month of July and the worm load was very low having a range of 1-3. No record of this parasite was available during the months of January to February 2000 and December 2000 to January 2001.

The nematode *Camallanus anabantis* showed prevalance varying from 23.07 to 67.85% in *Anabas testudineus* while 5 to 48.1% in *Channa gachua* respectively. The months of May, June and September showed higher rate of infection in both host and species and highest in April in *C. gachua*. Though there was variation in the prevalance percentage during different months of investigation period. The intensity of infection was highest in the month of May in *A. testudineus*. The worm load of 1-9 per fish in *A. testudineus*. The intensity of infection was highest in March in *C. gachua* and the worm load of 1-8 per fish.

The acanthocephala *P. ophiocephali* collected from *C. striatus* showed prevalance of 33,3 to 78.26% during different months and having three clear peaks : 1st during February, 2nd during

Table II : Prevalance of infection of helminth parasites during different months at different water temperatures (^{0}C).

Prevalance percentage of parasite species at monthly water temperature (^{0}C)														
Parasite Species	**Jan 2000**	**Feb**	**Mar**	**Apri**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan 2001**	**Fish species**
Temp. (^{0}C)	**17**	**18**	**20**	**28**	**28**	**28**	**29**	**31**	**28**	**27**	**22**	**20**	**16**	
A. reniferum	-	-	-	-	4	8.3	28	33.3	4	8	14.2	-	-	***C. batrachus***
D. penetrans	8	5	4.76	8	20	20.8	8	16.6	12	-	-	20.8	4.16	***C. batrachus***
C. singhi	-	-	4.76	4	4	4.16	4	8.3	4	16	23.86	-	-	***C. batrachus***
C. anabantis	44	34.78	50	32	67.85	66.6	50	30.43	56	52.38	40	26.08	23.07	***A. testudineus***
C. anabantis	27	22.2	44.4	48.1	37.5	44	25	20	32	15	5	-	22.2	***C. gachua***
P. ophiocephali	41.6	70	40	33.3	52	65.0	59.09	78.26	55	57.69	61.9	64	55.5	***C. striatus***

Table III : Intensity of infection of helminth parasites during different months at different water temperatures (^{0}C).

Parasite Species	**Jan 2000**	**Feb**	**Mar**	**Apri**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan 2001**	**Fish species**
Temp. (^{0}C)	**17**	**18**	**20**	**28**	**28**	**28**	**29**	**31**	**28**	**27**	**22**	**20**	**16**	
*A. reniferum**	-	-	-	-	1.0	1.5	4	2.25	1.0	2	2.33	-	-	***C. batrachus***
**	-	-	-	-	-	1-2	1-10	1-4	-	1-3	1-4	-	-	
D. penetrans	1	2	1	2.5	2.4	3	2.5	1.25	2.23	-	-	1.6	1	***C. batrachus***
	-	-	-	1-4	1-4	1-6	-	1-2	-	-	-	1-3	-	
C. singhi	-	-	1	1	1	1	3	1	1	2	2.2	-	-	***C. batrachus***
	-	-	-	-	-	-	-	-	-	1-3	1-3	-	-	
C. anabantis	2.8	1.62	2.72	2.25	3.15	2.87	2.58	2.57	2.14	2.09	1.4	1.33	1.66	***A. testudineus***
	1-4	1-3	1-9	1-3	1-8	1-6	1-5	1-2	1-3	1-4	1-2	1-2	1-4	
C. anabantis	2.2	2.25	2.8	1.8	2.2	1.7	2	1.2	1.5	1.6	1	-	2	***C. gachua***
	1-3	1-5	1-7	1-3	1-8	1-3	1-4	1-2	1-2	1-2	-	-	-	
P. ophiocephali	3.3	4.57	3.0	1.28	2.15	2.61	4.04	4.11	7.08	2.53	2.92	3.5	2.4	***C. striatus***
	1-11	1-12	1-11	1-2	1-6	1-5	1-15	1-8	1-16	1-5	1-7	1-6	1-5	

* = Mean; ** = Range.

June and 3rd during August. The intensity of occurrence was highest in the month of September having a worm load of 1-16 per fish.

DISCUSSION

From the data of prevalance and intensity of infection of helminth parasites studied, it appears that picture is somewhat different in the case of individual parasite species. Water temperature seems to have no clearcut impact on the occurrence pattern of helminth parasites. Jha *et al.* (1992) also showed that water temperature did not play an important role in the seasonal occurrence of helminth parasites. The digenetic trematode and cestodes did not show regular presence all through the months having low prevalance which may be attributed to ecological conditions and particularly distribution of intermediate hosts. Ecological factors have been held widely responsible for the occurrence of adult digenetic trematodes by Halvorsen (1972) quoted from Chubb (1979) and Madhavi (1978). Though high water temperature of July and August may be held responsible for the high prevalance of *A. reniferum. D. penetrans* was found in warm seasons and cold season. Granath & Esch (1983) also held water temperature and other factors responsible for regulation of composition and intra-population densities of Cestoda *Bothriocephalus achilognathi* in *Gambusia affinis*.

The occurrence of nematode and acanthocephala is quite regular and with low to high prevalance and intensity of infections. Variations in incidence of intermediate hosts, recruitment of parasites and food habits of fish concerned may be some of the factors of importance for the variations found in their occurrence in absence of any proper calculus.

Choice of food items by fish has also been held responsible for the variation in occurrence of nematode larvae by Chubb (1980) and it is evident in the present study for *Camallanus anabantis* in *A. testudineus* and *C. gachua* having different food habits. No pronounced periodicity in rate and intensity of infection of acanthocephala species also agrees with that of Amin & Burrow (1977) who also found same trend for *Echinorhynchus salmonis* in fishes of lake Michigan.

ACKNOWLEDGEMENTS

The authors are thankful to the Head, Zoology Department, B.R.A. Bihar University, Muzaffarpur for providing laboratory facilities. The authors are also thankful to the UGC, North-Eastern Regional Office, Guwahati for granting a minor research project to the first author.

REFERENCES

AMIN, O.M. & BURROWS, J. 1977. Host and seasonal associations of *Echinorhynchus salmonis* (Acanthocephala : Echinorhynchidae) in lake Michigan fishes. *J. Fish. Res. Bd. Can.* **34** : 325-331.

CHUBB, J.C. 1977. Seasonal occurrence of helminths in freshwater fishes. Part I. *Monogenea.* Advances in Parasitology. Academic Press, London & New york. **15** : 133-199.

CHUBB, J.C. 1979. Seasonal occurrence of helminth parasites in fishes. Part II. *Trematoda.* Advances in Parasitology. Academic Press, London & New York **17** : 171-313.

CHUBB, J.C. 1980. Seasonal occurrence of helminth parasites in fishes. Part III. *Larval Cestoda and Nematoda.* Advances in Parasitology. Academic Press, London & New York. **18** : 1-120.

CHUBB, J.C. 1982. Seasonal occurrence of helminth parasites in fishes. Part IV. Adult Cestoda, Nematoda and Acanthocephala. Advances in Parasitology. Academic Press, London & New York. **20** : 1-292.

JHA, A.N., SINHA, P. & MISHRA, T.N. 1992. Seasonal occurrence of helminth parasites in fishes of Sikandarpur reservoir, Muzaffarpur (Bihar). *Indian J. Helminth.* **44**(1) : 1-8.

MADHAVI, R. 1978. Life hisotry of *Genarchopsis goppo* Ozaki, 1925 (Trematoda : Hemiuridae) from fresh water fish *Channa punctata*. *J. Helminth.* **52** : 251-259.

MADHAVI, R. 1979. Cbservations on the occurrence of *Allocreadium fasciatusi* in *Aplocheilus melastigma*. *J. Fish. Biol.* **14** : 47-58.

MARGOLIS, L., ESCH, G.W., HOLMES, J.C., KURIS, A.M. & SCHAD, G.A. 1982. The use of ecological terms in parasitology (Report on an adhoc committee of the American Society of Parasitologists). *J. Parasit.* **68** : 131-133.

PAL, R.N. 1963. Observations on fluctuations in parasitization of the Indian Shad *Hilsa ilisha* (Ham.) of the Hooghly estury. *Indian J. Helminth.* **15** : 119-126.