

Abundance and Distribution of Helminth Parasites in The Fishes of Sone Beel, The Biggest Wetland in Assam



Life Science

KEYWORDS : Helminth, Parasites, Sone Beel, Karimganj District, Assam.

Romen Singh Ngasepam

Department of Life Science and Bioinformatics, Assam University, Silchar-788011

Devashish Kar

Department of Life Science and Bioinformatics, Assam University, Silchar-788011

ABSTRACT

The present study was made on helminth fauna of freshwater fishes of Sone Beel located in Karimganj, District of Assam. The study was conducted between January 2012 to December 2012 and found four groups of parasites in 700 fishes belonging to 42 species to 27 genera, 18 families and 8 orders. Among the fishes, 111 were found to be infected with helminth parasites belonging to four different groups in which 40 parasites belong to class Acanthocephala, 2 parasites to class Cestoda, 66 to class Trematoda and 11 parasites belonged to class Nematoda. Among the fish parasites depicted some are widely distributed while some others are endemic.

Introduction

Fish are valuable sources of high-grade protein and other organic products. They are occupying a significant position in the socio-economic fabric of South-Asian countries by providing the population, not only the nutritious food but also income and employment opportunities. Fish is one the main items of food for most of the people in Assam. The demand for fish is high in the province. About 90% of the people in the State are fish eaters. Sone Beel lies between 24° 40' 00" N, 92° 26' 10" E and an elevation of above of 21m mean sea level (M.S.L). Sone Beel (Fig: 1) is situated at an altitude of 23 m MSL, between 92° 24' 50" – 92° 28' 25" E and 24° 36' 40" – 24° 44' 30" N within Karimganj District of Assam and falls in a valley geologically called syncline¹⁻⁷. The physiography of the district consists of small hillocks intervened by wide low valleys. The hillocks have NE-SW and NE-SSW trend near the Barail range and N-S trend towards south away from the Barail range. Notably, Sone Beel, the biggest 'Beel' (wetland) in Assam is situated in between two hill ranges, viz., the Badarpur-Saraspur range and the Chowkirmukh-Dohalpur range. In the East, the neighbouring structure is the Badarpur line of folding; while, there is the Chargola anticline towards the west.

Fish illness due to helminth parasites is one of the important problems in fish farming. The importance of the fish parasites is related directly to the importance of the fish they may affect. There is a bewildering array of fish parasites. Probably all the fish species harbour one or more parasite species. Chubb (1977, 1979, 1980, and 1982) illustrated the studies of seasonal occurrence of helminthes in freshwater fishes in different climatic zones of the world. Work of Yamaguti (1958, 1961) related the occurrence of helminth parasite in vertebrate host is of immense importance, Gupta (1961) described new Cestodes from freshwater fishes. Jha (1989) studied the characterization of parasite fauna of fishes of Muzaffarpur, Bihar. Shomorendra and Jha (2009) studied the acanthocephalan parasites of certain fishes from Manipur. Kar made detailed study of the limnology and ichthyofaunal of the water bodies of north-east India including disease in fishes. Kar and Sen (2007) studied the systematic list and distribution of fish biodiversity in Mizoram, Tripura and Barak drainage in North East (NE) India. Kar D *et al.* (2008) studied the panorama of fish biodiversity in certain rivers and wetlands protected areas in Assam. Sangeeta O *et al.* (2010) studied the diversity of fish Nematodes of Oinam Lake in Bishnupur District of Manipur. Shomorendra, M. *et al.* (2011) studies on Cestode parasites of Manipur: An observation on some caryophyllid infection in some freshwater fishes of Manipur. Binky *et al.* (2011) studied the diversity of helminth parasites in fishes of Karbhala wetland in Cachar District of Assam. Singha R *et al.* (2011) studied the influence of host species, sex, length and different seasons on the helminth parasite infection in the fishes of Dolu Lake, Silchar, Assam. Puinyabati H *et al.* (2013) studied the

helminth parasites of fishes of Awangsoi Fishery, Manipur. Rani-bala Th *et al.* (2013) discussed briefly about the seasonal variation of the nematode *Camallanus anabantis* in the fish *Anabas testudineus* in Loktak Lake, Manipur, India.

Materials and Methods

The fishes were collected live and carried in containers to the laboratory in polythene bags containing water of the same locality. The external and internal body organs were thoroughly examined for the parasites. The parasites collected were fixed in the fixatives prescribed for different helminth groups. The acanthocephalan were fixed and preserved in the AFA (alcohol-formalin-acetic acid), cestode in 5% formalin, nematode stretched in glacial acetic acid and fixed in 70% alcohol and Trematode is fixed in A.F.A and preserved in 70% alcohol. To facilitate identification of worms Cestodes were stained in alum carmine and mounted in Canada balsam while the acanthocephalans were cleared in lactophenol and observed under stereo binocular microscope.

Results and Discussion:

The Sone Beel contains about 42 species belonging to 27 genera, 16 families and 6 orders belonging to major families like Nandidae, Notopteridae, Belonidae, Claridae, Heteropneustidae, Bagridae, Synbranchidae, Synbranchidae, Clupeidae, and Mastacembelidae etc. The common fishes found in this lake are *Channa sp.*, *Puntius sp.*, *Trichogaster sp.*, *Amblypharyngodon mola*, *Channa sp.*, *Chanda sp.*, *Mystus sp.*, etc. (Table no. 1). From this wetland, 238 nos. of helminth parasites were recorded belonging to four helminth groups viz. Nematode, Trematode, Acanthocephalan and Cestode. Of these, 16 were nematodes, 132 were Cestodes and 22 were Trematode and 168 of Acanthocephalans respectively. (Table no. 2). Out of 42 fish species collected for examination only 10 species were found infected with helminth parasites. The prevalence percentage of infection is highest in *Channa striata* (59.09%) in and lowest in *Macroglythys aral* (3.22%) (Table no. 3). Fish internal organs are disturbed (bulging of stomach and intestine) by the parasites. The infestation rate was lower in males than females. Helminth parasites inhabit in stomach, intestine, liver, body cavity, duodenum and airbladder. Hosts of intermediate length and weight were found to be more infected than the hosts of smaller and larger length.

Table 1: List of helminth parasites infecting in the fishes of Sone Beel

SL. N.	Name fish host	Acanthocephala	Cestode	Nematode	Trematode	Mono-genea
1.	Anabas testudineus	–	–	+	–	–
2.	Trichogaster fasciatus	–	–	–	–	+

3.	Channa punctatus	-	-	-	+	-
4.	Channa striata	+	-	-	-	-
5.	Notopterus chitala	-	-	+	-	-
6.	Clarias batrachus	-	+	-	-	-
7.	Macrognathus aral	-	+	+	-	-
8.	Mastacembelus armatus	-	-	+	-	-
9.	Ompok bimaculatus	-	+	-	-	-
10.	Wallago attu	-	+	-	-	-

PLUS (+) =PRESENT, MINUS (-) =ABSENT

Table 2: Showing prevalence and intensity of helminth parasites groups of Sone Beel.

Sl. No.	Fish species	Total no. of fish examined	Total no. of fish infected	Total no. of parasites	Parasites Group	Intensity	Prevalence (%)
1.	<i>Anabas testudineus</i>	22	2	1	NT	0.5	9.09
2.	<i>Trichogaster fasciatus</i>	56	6	43	M	5.6	10.71
3.	<i>Channa punctatus</i>	22	2	6	TM	3	9.09
4.	<i>Channa striata</i>	88	52	120	AC	2.30	59.09
5.	<i>Notopterus chitala</i>	52	2	1	NT	0.5	3.84
6.	<i>Clarias batrachus</i>	44	23	32	CT	1.39	52.27
7.	<i>Macrognathus aral</i>	31	1	1	CT	1	3.22
8.	<i>Mastacembelus armatus</i>	38	2	4	NT	2	5.26
9.	<i>Ompok bimaculatus</i>	41	3	5	CT	1.25	7.31
10.	<i>Wallago attu</i>	56	3	7	CT	2.33	5.35

NT=NEMATODE, CT=CESTODE, AC=ACANTHOCEPHALA, TM=TREMATODE

Table 4: Descriptive Analysis of Fish and parasites populations:

Statistical parameters	Fish	Parasites
Mean	45.00	22.00
Standard Error	6.20	11.81
Median	42.50	5.50
Mode	22.00	1.00
Standard Deviation	19.61	37.36
Sample Variance	384.44	1395.78
Kurtosis	1.64	6.12

Skewness	1.01	2.41
Range	66.00	119.00
Minimum	22.00	1.00
Maximum	88.00	120.00
Sum	450.00	220.00
Count	10.00	10.00

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Parasites	1.862	9	.095	22.000	-4.73	48.73

Conclusion

A systematic survey of the fish diversity and fish parasite infection in the Sone Beel, has been done in this present work, and found to have fish species *Channa striata* is mostly effected by parasite (59.09%), while *Macrognathus aral* have been less effected (3.22%), (Table 2). The relationship between intensity of fish species and parasites prevalence shows no significant difference $t= 1.862, df=9, p<0.05$. Thus the result indicates a no significant relation between parasite populations and each species of fishes at 0.05 and 0.01 percent level.

Acknowledgement

The authors are thankful to Assam (Central) University, Silchar and Also thanks to the UGC, New Delhi for granting UGC-fellowship to the first author.

Figure: 1 Map showing study site



REFERENCE

- Ahmed, M.S., Iqbal, T., Mahmood, A., Gulzarin, M. and Abid, M. (2007). Helminth parasites of some freshwater fishes. Punjab Univ. J. Zool. Vol. 22:1-2. PP. 01-06. | 2. Akinsanya, B. Otubanjo, O. A., Hassan A. A. (2007). Helminth Parasites of Malapterurus Electricus (Malapteruridae) From Lekki Lagoon, Lagos, Nigeria. Journal of American Science, 3(3). | 3. Akinsanya, B, Hassan, A.A and Adeogun, A.O. (2008) .Gastrointestinal Helminth Parasites of the fish *Synodontis clarias* (Siluriformes: Mochokidae) from Lekki lagoon, Lagos, Nigeria. Rev. Biol. Trop. Vol. 56 (4): 2021-2026. | 4. Binky, K., Ranibala, T., Shomorendra, M. and Kar, D. (2011b). Diversity of Helminth Parasites in Fishes of Karbhala Wetland in Cachar District of Assam. Environment & Ecology. 29 (1): 20-21. | 5. Bylund, G., Fagerholm, H. P., Calenius, G., Wikgreen, B. J. and Wikstrom, M. (1980). Parasites of fish in Finland – ii. Methods for studying parasite fauna in fish, Acta Acad. Aboensis, Ser. B., 40(2):1-23. | 6. Chubb, J.C. (1977). Seasonal occurrence of helminth parasite in fishes Part I. Monogenea. Advances in parasitology. Academic Press, York, USA. 15: 133-199pp. | 7. Chubb, J.C. (1979). Seasonal occurrence of helminth parasite in fishes Part II. Monogenea. Advances in parasitology. Academic Press, York, USA. 17: 171-199pp. | 8. Chubb, J.C. (1980). Seasonal occurrence of helminth parasite in fishes Part III. Monogenea. Advances in parasitology. Academic Press, York, USA. 18: 1-120pp. | 9. Chubb, J.C. (1982). Seasonal occurrence of helminth parasite in fishes Part IV. Adult Cestoda, Nematoda and Acanthocephala. Advances in parasitology. Academic Press, New York, USA. 20: 1-292pp. | 10. Das, B. K., Dutta, B., Singh, Ng. R. and Kar, D., Length-Weight Relationship of *Labeo calbasu* (Hamilton-Buchanan) from Sone Beel the Biggest Wetland of Assam, India. PARIPEX-Indian Journal of Research. 2 (10): 11-13, (2013). | 11. Gupta, S.P. (1961). Morphology life history and biophysical studies of helminth parasites. D. Sc. Thesis. Dep Zool., Lucknow Univ., Lucknow, India | 12. Jha, A.N. (1989). Characteristics of parasitic fauna of the fishes of Sikandarpur reservoir as the Muzzaffarpur, Bihar, India | 13. Kar, D. (2007). Fundamental of Limnology and Aquaculture Biotechnology. Xiv +609, Daya Publishing House (New Delhi), Biodiversity Conservation Prioritisation, pp-172, Swastik Publication (New Delhi). | 14. Kar, D. and Sen, N. (2007). Systematic list and distribution of fish biodiversity in Mizoram, Tripura and Barak drainage in North East India. Zoos Print Journal 22(3):2599-26007pp. | 15. Kar, D., Wetlands and Lakes of the World, pp. xxx + 687, Springer (London), (2013). | 16. Kar, D., Fundamentals of Limnology and Aquaculture Biotechnology, xvi + 609, Daya Publishing House (New Delhi), (2007). | 17. Puinyabati, H., Shomorendra, M., and Kar, D. (2011). Helminth parasites fishes of Awangsoi fishery, Manipur. Uttar Pradesh J. Zool. 33(1):109-113pp. | 18. Ranibala, Th., Shomorendra, M., and Kar, D. (2013). Seasonal variations of the Nematode *Camallanus anabantis* in the fish *Anabas testudineus* in Loktak Lake, Manipur, India. Journal of Applied and Natural Sciences 5(2):397-399pp. | 19. Sangeeta, O., Shomorendra, M., and Kar, D. (2010). Diversity of fish Nematodes of Oinam Lake in Bishnupur District of Manipur. Environment & Ecology 28 (4A):2618-2620pp. | 20. Singha, R., Shomorendra, M., and Kar, D. (2011). Influence of host species, sex, length and different seasons on the helminth parasite infection in fishes of Dolu Lake, Silchar, Assam. Uttar Pradesh J. Zool. 31(2):215-219pp. | 21. Shomorendra, M. and Jha, A.N. (2009). Acanthocephalan parasites of certain fishes from Manipur, India: One known species of genus *Acanthocephalus*. UP J. Zool. 29: 1-6pp. | 22. Shomorendra, M., Ranibala, Th., Puinyabati, H., Sangeeta, O., Geetarani, B., Kumar, P. and Jha, A.N. (2011). Studies on Cestode parasites of Manipur: An observation on some Caryophyllid infections in some freshwater fishes of Manipur. Uttar Pradesh J. Zool 31(2):199-205pp. | 23. Yamaguti, S. (1958). Systema helminthum Volume I. The digestive Trematodes of vertebrates. Interscience, New York, USA. | 24. Yamaguti, S. (1961). Systema helminthum. Volume III. The nematode vertebrates Part I and II. Interscience, New York, USA. 1-1261pp. |