



ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Diversity & prevalence of piscine helminth parasites of Madhepura, Bihar, India

Chandan Kumar Chand*

University Department of Zoology, B.N.Mandal University, Madhepura, Bihar

Received : 15th December, 2019 ; Revised : 11th February, 2020

Abstract : The present investigation was made to study the diversity & prevalence along with , seasonality & intensity of infestation of helminthes parasites in selected fishes *Heteropneustes fossilis*, *Anabas testudineus*, *Labeo rohita*, *Cirrhinus cirrhosus* & *Clarias batrachus* of Madhepura, Bihar during the experimental year 2016-2018. Five helminth parasites *Eustrongylides* sp (Nematode), *Euclinostomum heterostomum* (Trematode), *Clinostomum* (Trematodes) *Diplostomum* (Trematodes) and *Pallisentis allahabadii* (Acanthocephalan) were collected from abdominal cavity, liver and intestine of the infected hosts. *Eustrongylides* sp. (Nematodes-), *Euclinostomum heterostomum* (Trematodes) exhibited highest prevalence in different host fishes while *Clinostomum* (Trematodes) remained at low. The cumulative diversity value of all the parasites as per S-W statistical equation has been found to be 0.675.

Keywords : Piscine hosts, helminth parasites, prevalence, diversity, infestation, S-W diversity value

INTRODUCTION

India is considered as one of the major wetlands that preserve a rich variety of fish species & due to the protein rich source fish is in great demand. Hence to obtain healthy and quality fish meat, it is necessary that the fish should be free from all types of pathogens like viruses, bacteria, algae, protozoans, helminths, annelids, arthropods and molluscs. Parasites of fish constitute one of the major problems to fish health. Besides the direct losses caused by mortality, parasites have considerable impact on growth, resistance to other stressing factors, susceptibility to predation, marketability and pave way for secondary infections.¹ Helminth parasites remain one of the most important problems confronting aquaculture. Potentially all freshwater and brackish water fish may be affected by

helminthes with heavier infections in predatory fish, particularly of species utilizing fish as intermediate or transient host.² The snake headed freshwater fishes such as *Heteropneustes fossilis*, *Anabas testudineus*, *Labeo rohita*, *Cirrhinus cirrhosus* & *Clarias batrachus* has a wide geographical distribution, a high growth rate and contributes significantly to fishery sector in India. It usually inhabits swamps, pools, rice fields and is known for its nutritive and invigorating qualities. Data regarding the parasitic infestation of helminth parasites of fishes in Madhepura district of Bihar is limited. Many workers like Bhalerao^{3,4} Dayal⁵, Gupta⁶ have made valuable contribution on the taxonomy of digenetic trematode and cestode parasites. Fish nematodes of Indian region have been studied by Karve⁷, Agarwal⁸ have worked significantly on acanthocephalan taxonomy but in order to control parasitic infestation of fresh water fishes much emphasis needs to be given on epidemiological studies so that preventive

*Corresponding author :

Phone : 7004459956

E-mail : chandan.chand84@gmail.com

measures can be taken. Therefore, the present study was undertaken to investigate the prevalence, mean intensity and abundance of infestation of helminth parasites and the seasonal variation of such infestation in relation to physicochemical parameters of the water quality of the fish farms.

MATERIAL AND METHODS

Collection of the hosts

The test fishes (5 species), (17-21 cm long) weighing 50–75 g were collected from fish farms of district of Madhepura during the period of 2016-2018 and were brought alive in the parasitology laboratory for examination. They were kept for 3 weeks under observation for acclimatization in glass aquaria (40 × 60 × 100 cm). Water was changed after every 24hr and commercial fish food was supplied to fish during acclimatization period. Dead fish (if any) were removed from the aquaria as soon as possible to avoid water fouling.

Collection of Parasites

Fishes were dissected out and body cavity was thoroughly examined for any parasite. Visceral organs were placed and dissected out in petridish containing normal saline (0.6% NaCl) to allow adhering parasites to be released. Collected nematodes were fixed in hot 70% ethanol and stored in glass vials containing glycerine alcohol (1:3). Nematodes were later cleared in lactophenol for morphological observation and identification. The trematodes were fixed in between the folds of glass slides and cover slips tied with rubber bands or thread. AFA or 70% ethanol were allowed to run through the slides and cover slips and the fixed specimens were then preserved in coupling jars containing 70% ethanol and 5% glycerine. In case of acanthocephalans, collected parasites were thoroughly washed with saline and kept in distill water to facilitate complete eversion of the proboscis. Further, parasites kept over glass slides were flattened under slight pressure of cover glass, fixed in A.F.A. and after 24 hours preserved in glycerified 70% alcohol. Relative parameters were measured and identification was performed using selected identification keys.

S-W diversity statistics of the parasites

On the data of number of parasites isolated from different hosts, relative abundance (pi), log of pi as the indicators of parasite species abundance and richness in different hosts shall be calculated statistically as per S-W diversity index equation.⁹

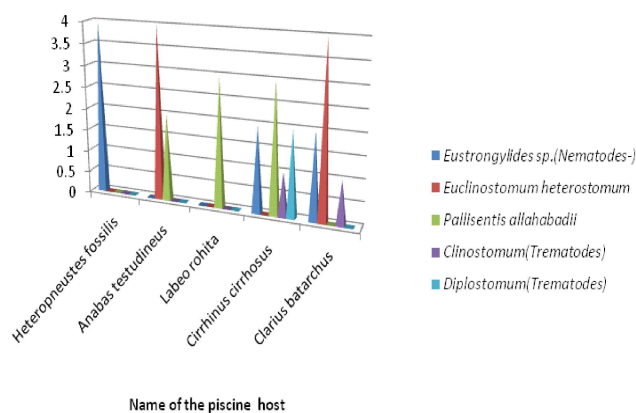
RESULTS AND DISCUSSION

Five different fishes were sampled from different water bodies of Madhepura district. Out of which all of the fishes were found to have infected with different helminth parasites.¹⁰ Coincidentally, five parasites have been found which include one nematode *Eustrongylides* sp, three trematode, *Euclinostomum heterostomum* and one acanthocephalan, *Pallisentis allahabadii*. *Eustrongylides* species have been isolated from abdominal cavity, liver and intestine, *Euclinostomum heterostomum* from liver and *Pallisentis allahabadii* from intestine of the infected fishes.¹¹ The total of 28 number of parasites, belonging to the Nematoda, Acanthocephalan and Trematoda were recovered that have been shown in the Table 1 .

Cirrhinus cirrhosus was found to be the most highly infested fish with different fish parasites. While *Labeo rohita* were found to be the least infested species. The nematode, *Eustrongylides* sp. showed prevalence degree of variance with respect to other trematodes as well as acanthocephalons.^{12,13} The prevalence of infection was maximum in *Cirrhinus cirrhosus* and minimum in September and December. *Euclinostomum heterostomum* exhibited peak prevalence and lowest *Labeo rohita*.

The cumulative diversity value of all the parasites in different piscine host considered together reflects the value of 0.675 having integrated individual parasite diversity values as per the Shannon & Weiner equation.

Species diversity (S-W) value of five helminth parasites infestation (single & multiple) in five different piscine host of Madhepura, Bihar (2016-2018)



Prevalence & diversity of helminth parasites found in the five different fishes as host of Madhepura, Bihar

SL. No	Name of the fish host	Common name	Name of the isolated parasites	Individual parasite no.	Total number of parasites	Nature of infection	$\pi=n/N$	$\log \pi$	$\pi^*\log \pi$	H
1	<i>Heteropneustes fossilis</i>	Singhi	<i>Eustrongylides sp.</i> (Nematodes-)	4	4	Single	0.142	-0.847	-0.120	0.675
2	<i>Anabas testudineus</i>	Kawai	<i>Euclinostomum heterostomum</i> (Trematodes)	4	6	Double	0.214	-0.669	-0.143	
			<i>Pallisentis allahabadii</i> (Acanthocephalan)	2						
3	<i>Labeo rohita</i>	Rohu	<i>Pallisentis allahabadii</i> (Acanthocephalan)	3	3	Single	0.107	-0.970	-0.103	
4	<i>Cirrhinus cirrhosus</i>	Mrigal	<i>Eustrongylides sp.</i> (Nematodes)	2	8	Multiple-4	0.285	-0.545	-0.155	
			<i>Pallisentis allahabadii</i> (Acanthocephalan)	3						
			<i>Clinostomum</i> (Trematodes)	1						
			<i>Diplostomum</i> (Trematodes)	2						
5	<i>Clarius batarchus</i>	Magur	<i>Euclinostomum heterostomum</i> (Trematodes)	4	7	Multiple- 3	0.28	-0.552	-0.154	
			<i>Eustrongylides sp.</i> (Nematodes)	2						
			<i>Clinostomum</i> (Trematodes)	1						

REFERENCES

- Bhalerao, G.D. 1937.** Studies on the Helminths of Indian Trematoda, IV. *J. Helminthol.*, **15 (2)**: 97-124. DOI: 10.1017/S0022149X00030753
- Bhattacharya, S.B. 2007.** Handbook on Indian Acanthocephala. Kolkata, India, Zoological Survey, 225pp. University
- G.D. Bhalerao. 1936.** Studies on the helminths of India Trematoda IV. *Journal of Helminthology*. **14(4)**:181-206.
- G.D.Bhalerao. 1942.** Some metacercarial forms of Clinostomatidae (Trematoda) from India. The Proceedings of the National Academy of Sciences, **16**:67-71.
- J. Dayal. 1961.** Trematode parasites of Indian fishes-II, *Indian Journal of Helminthology*. **I(2)**: 93-116.
- S.P. Gupta.** Morphology, life history and biophysical studies of helminth parasites, D. Sc. Thesis, Lucknow University, Lucknow,.
- J.N .Karve. 1930.** Some parasitic nematodes of frogs and toads. *Annals of tropical medicine and Parasitology*. **24**:481-491.
- V.Agarwal.** Studies on some nematode parasites of freshwater fishes from Lucknow, *Annales de Parasitologie Humaine et Comparee (Paris)*. **41**:217-237.
- Stiling, P. 2002.** Ecology & species diversity: theory and practise, chapter 11, pp298-322, EEE publisher.
- Bhuiyan, A.S., Akter, S., Musa, G.M. 2007.** Occurrence of parasites in *Labeo rohita* (Hamilton) from Rajshahi University. *J. Zool. Rajshahi Univ*. **26**:31-34
- Bhure, D.B., Nanware, S.S. 2014.** Studies on Prevalence of Cestode Parasites of Freshwater Fish, *Channa punctatus*. *J. Entomol. Zool. Stud*. **2(4)**:283-285
- N. Gupta, P.Singhal & D.K Gupta. 2012.** Population dynamics of a parasite *Palicentis* in two species of fish *Channa punctatus* & *C. striatus*. *Journal of environmental biology*. **33(2)**:195-199.
- P.Sinha. et al. 2008.** Studies on the helminth infestation of *Channa punctatus* in & around Patna, proceedings of Zoological Society of India. **7**:79-84.

