



ISSN : 0973-7057

Int. Database Index: 616 www.mjl.clarivate.com

Analytical studies on the effect of cestode parasites on some commercially important freshwater fishes of Madhepura region

Amrita Kumari, Kumar Ramashankar & Arun Kumar

University Department of Zoology, B.N.M. University, Madhepura, Bihar, India

Received : 15th February, 2022 ; Revised : 16th March, 2022

Abstract- Fish production plays an important role in the economy of a country. They are rich source of protein diet. There are many factors which effects the production of fishes, parasites infection is one of the main reasons for increasing mortality of fish. The present study was performed to find out the effect of parasites on some economically important freshwater fishes with special reference to cestodes (tapeworms), as two more types of parasites were there other than cestodes which can badly affect the fish production such as trematode (flatworms) and nematode (roundworms). A total of 160 commercially important fishes belonging to eight families were taken for this study. 20 each from the following species *Catla catla*, *Labeo rohita*, *Channa punctatus*, *Clarias batrachus*, *Cirrhinus mrigala*, *Heteropneustes fossilis*, *Mystus vittatus*, *Wallago attu* were taken. Extreme infestations were observed in the fishes. The production of fishes were decreased due to the infestation of cestode parasites. Very few work has been done in this topic till date, especially studies on cestode parasites. It is an attempt to find out those parasites which are particularly affecting these commercially important fishes.

Key words: Cestodes, Nematodes, Trematodes, fishes, infestation.

INTRODUCTION

Fishes are considered as good source of income and government of many countries promote fish farming and provides financial support to their citizens for the production. As fishes are very rich source of protein diet, many doctors also prescribe their patient to consume fish instead of red meat. Fish meat contains ample amount omega-3 fatty acids, vitamin D, vitamin B2, phosphorus, calcium, iron, magnesium, iodine, zinc and potassium.¹ It contains high quality protein with low fat, which keeps our heart and brain healthy. Fishes provide around one-sixth of worlds total protein.² Some studies prove that if

people consume fish at least once a week, they are less likely to die of heart disease.³ Fish have had a role in culture for centuries, religious symbols, serving as deities and many more.

Although much smaller than the host, the parasite can cause significant damage to its host. So, parasites are not passive organisms, merely 'riding' with their hosts; To be classified as a parasite, a normal organism must meet criteria that include the fact that its presence has a negative effect on its host.⁴ Fish serve as host for parasites as they very diverse. Some parasites usually use fish as their intermediate host. They were found mainly in the intestine of fishes.

*Corresponding author :

Phone : 9006991000

E-mail : amritakir1993@gmail.com

MATERIALS & METHODS

Collection of the specimens

For the current study 160 species of commercially important fishes were taken, 20 species each of *Catla catla* (F. Hamilton, 1822), *Labeo rohita* (F. Hamilton, 1822), *Channa punctatus* (Bloch, 1793), *Clarias batrachus* (Linnaeus, 1758), *Cirrhinus mrigala* (Hamilton, 1822), *Heteropneustes fossilis* (Bloch, 1794), *Mystus vittatus* (Bloch, 1794), *Wallago attu* (Bloch & Schneider, 1801).

Fishes were purchased from the local waterbodies with the help of fisherman. We have tried to purchase the fish of equal shape and size. Fishes were brought to the laboratory. Total length and weight of the fishes were measured in the laboratory. Their fins and gills were separated and were dissected from the ventral side. The body cavity, spleen, stomach, kidney, liver, intestine etc. all were searched for the presence of parasites. The gastrointestinal tract, the rectum to the esophagus were opened longitudinally and examined carefully.⁵

Table 1. Showing cestode parasites in different host along with their habitat

| Sl. No. | Host | Cestode Parasites | Habitat |
|---------|--|--|-----------|
| 1. | <i>Catla catla</i> F. Hamilton, 1822 | <i>Ligula intestinalis</i> L. | Intestine |
| 2. | <i>Heteropneustes fossilis</i> Bloch, 1794 | <i>Crecentovitus biloculus</i> Murhar 1963 | Intestine |
| 3. | <i>Heteropneustes fossilis</i> Bloch, 1794 | <i>Djombangia penetrans</i> Bovien, 1926 | Intestine |
| 4. | <i>Heteropneustes fossilis</i> Bloch, 1794 | <i>Procamallanus spiculogubernaculus</i> Agarwal, 1958 | Intestine |
| 5. | <i>Channa punctatus</i> Bloch, 1793 | <i>Senga raoi</i> Majid et al. 1984 | Intestine |
| 6. | <i>Channa punctatus</i> Bloch, 1793 | <i>Senga lucknowensis</i> Johri, 1956 | Intestine |
| 7. | <i>Channa punctatus</i> Bloch, 1793 | <i>Gangesia paithanensis</i> Kadam et al. 1983 | Intestine |
| 8. | <i>Channa punctatus</i> Bloch, 1793 | <i>Polygonobothrium srivastavai</i> Pande et al. 2006 | Intestine |
| 9. | <i>Clarias batrachus</i> Linnaeus, 1758 | <i>Lytocestus clariae</i> Tandon, Chakravarty and Das, 2005 | Intestine |
| 10. | <i>Clarias batrachus</i> Linnaeus, 1758 | <i>Lytocestus longicollis</i> Ramadevi, 1973 | Intestine |
| 11. | <i>Clarias batrachus</i> Linnaeus, 1758 | <i>Lytocestus birmanicus</i> Lynsdale, 1956 | Intestine |
| 12. | <i>Clarias batrachus</i> Linnaeus, 1758 | <i>Djombangia penetrans</i> Bovien, 1926 | Intestine |
| 13. | <i>Cirrhinus mrigala</i> Hamilton, 1822 | <i>Djombangia penetrans</i> Bovien, 1926 | Intestine |
| 14. | <i>Mystus vittatus</i> Bloch, 1794 | <i>Lytocestus indicus</i> (Moghe, 1925) Woodland, 1926 | Intestine |
| 15. | <i>Wallago attu</i> Bloch & Schneider, 1801 | <i>Gangesia punjabensis</i> | Intestine |
| 16. | <i>Wallago attu</i> Bloch & Schneider, 1801 | <i>Gangesia bengalensis</i> | Intestine |
| 17. | <i>Wallago attu</i> Bloch & Schneider, 1801 | <i>Gangesia vachai</i> | Intestine |
| 18. | <i>Labeo rohita</i> F. Hamilton, 1822 | No cestodes | |

Fixation

Parasites were removed from the intestine of the infected species of fishes. The parasites collected were kept for relaxing, upon being fully relaxed parasite specimens were fixed in the fixatives prescribed for different helminthic group i.e. parasites were washed in 0.6% saline solution and then fixed in 5% formalin solution. After fixation parasites were identified, for this purpose they were stained in Alum carmine, dehydrated in glacial acidic acid, then after cleared in methyl salicylate and finally mounted in canada balsam.

RESULTS

Parasites were present in 88% of the fish specimens examined. In which *Clarias batrachus* and *Channa punctatus* were infected with most varieties of parasites, whereas *Catla catla*, *Cirrhinus mrigala*, *Mystus vittatus* were infected with only one species of cestode parasites, *Wallago attu* and *Heteropneustes fossilis* were infected with moderate number of species. The cestode infection were higher in *Clarias batrachus*, *Wallago attu*, *Channa punctatus*, *Heteropneustes fossilis* whereas minimum in *Catla catla*, *Cirrhinus mrigala*, *Mystus vittatus*. No cestodes were found in *Labeo rohita* probable reason for this may be, they are herbivores.

One of the species of cestode parasites i.e. *Djombangia penetrans* was common in *Clarias batrachus*, *Cirrhinus mrigala* & *Heteropneustes fossilis*.

Many researchers have studied about cestode parasite of freshwater fishes throughout the world.⁶⁻¹⁰ In India also many workers have worked on the cestode parasitic of freshwater fishes.¹¹⁻¹⁵

ACKNOWLEDGEMENT

Authors are very grateful to the Faculty members of Department of Zoology, B.N.M. University, Madhepura for their continuous help and support in completing the work.

REFERENCES

1. Schonfeldt H. C. and Hall N. 2013. Fish, chicken, lean meat and eggs can be eaten daily: a food-based dietary guideline for South Africa. *South African Journal of Clinical Nutrition*. 26:S66-S76.

2. Helfman Gene S. 2007. Fish Conservation: A Guide to Understanding and Restoring Global Aquatic Biodiversity and Fishery Resources. Island Press. p. 11. ISBN 978-1-59726-760-1.
3. He K., Song Y., Daviglus M. L., Liu K., Van Horn L., Dyer A. R. and Greenland P. 2004. Accumulated evidence on fish consumption and coronary heart disease mortality: a meta-analysis of cohort studies. *Circulation*. 109(22):2705-2711.
4. Begon M., Harper J. L. and Townsend C.R. 1990. Ecology: Individuals, Populations and Communities, 2nd edition. Blackwell Scientific Publications, Boston, MA, 945 pp.
5. Amlacher E. 1970. Textbook of fish diseases, (Engl. Transl.). T.F.H. Publ., Jersey City.
6. Alam M. J., Rakibuzzaman M., Hasan M. M. 2010. Comparative study of endo-parasitic infestation in *Channa punctatus* (Bloch, 1793) collected from Hatchery and Sewage lagoon. *Nat Sci*. 8:152-156.
7. Baylis B. A. 1933. On some parasitic worms from Java with remarks on the Acanthocephalan genus *Pallisentis*. *Ann Mag Nat His*. 10:443-449.
8. Cohn L. 1908. Die Anatomie eines neuen Fischcestoden. *Centralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Abteilung L Originale*. 46:134-139.
9. Dollfus R. P. 1934. Sur un cestode Pseudophyllidae parasite de Poisson d'Ornement. *Bull Soc Zool Fr*. 59:476-490.
10. Fuhrmann O., Baer J. G. 1925. Zoological results of the third Tanganyika expedition conducted by Dr. W. A. Cunningham, 1904-1905. Report on the Cestodes. In: *Proceedings of the Zoological Society of London*, pp 79-100
11. Gairola D, Malhotra SK. 1986. Cestode fauna of food fishes in river Ganges around an Indian subhumid region. I. *Senga gangesii* n. sp. from *Mystus vittatus*. *Jpn Journal Parasitol*. 36:471-474.
12. Gupta V, Parmar S. 1986. On a new cestodes, *Senga indica* sp. nov. from the intestine of the freshwater fish *Mastacembelus armatus* (Lacep) from Lucknow. *Indian Journal Helminthol*. 37:96-99.

Biospectra : Vol. 17(1), March, 2022

An International Biannual Refereed Journal of Life Sciences

13. **Hasnain M. 1922.** On a new cestode *Senga chauhani* sp. nov. from a fish host *Channa punctatus* from Jamshedpur. *Indian J Helminthol.* **44:**123–127.
14. **Hiware C. J. 2010.** The occurrence of cestode parasites collected from some freshwater fishes of Maharashtra state, India. *Trend Res Sci Technol.* **2:**31–38.
15. **Jadhav B. V., Ghavane A. B., Jadhav A. P. 1991.** Two new Pseudophyllidean cestodes from *Mastacembelus armatus* at Daryapur (M.S) India. *Riv Parasitol.* **8:**19–22.
