

SEASONAL INCIDENCE OF PROTOZOAN PARASITIC INFESTATION IN FRESHWATER FISHES OF AURANGABAD REGION (M.S), INDIA

Siddiqui Shaista Rahat¹, T.T Shaikh²

¹Research Scholar, Department of Zoology, Maulana Azad College Aurangabad - 431001 (M.S.).

²Associate Professor & Research Guide, Department of Zoology, Dr. Rafiq Zakaria Campus Maulana Azad College Aurangabad -431001 (M.S.)

Abstract:

Present study deals with the prevalence of protozoan parasites of the freshwater fish of the Aurangabad region. During the study, more than seven hundred fish have been examined from different areas of the Aurangabad region during pre-monsoon, monsoon, and post-monsoon seasons. The highest protozoan infection has been recorded during post-monsoon season i.e., from October to January, followed by the monsoon period while the lowest infection was recorded during Pre-monsoon i.e. from February to May which may lead to the conclusion that environmental factors are responsible for spreading infection.

Keywords: Protozoan parasitic infestation, freshwater fish, seasonal variation

Introduction:

Over 90% of the world's freshwater fish are caught in developing countries and provide a major protein source and livelihood to millions of poor people. Freshwater fishes and their habitats contribute to the economy through export commodity trade, tourism, and recreational activities. Eating at least two servings of fish per week, especially fatty fish, has been recommended as a powerful preventive measure against cardiovascular diseases (Raviz). Parasitic diseases in freshwater fishes are one of the main problems both for farmers and aquarists. Parasites make a great loss because they could reduce fish performance such as scale loss, colour change, and many pathological aspects as well as mortality. It has been found that protozoan parasites cause severe diseases in the fishes. (Smyth 1994) Due to parasitic infestation highest mortality of fish has been recorded from the nursery pond (Hossain et al. 1944). Protozoan parasites cause fatal diseases to the fishes directly or indirectly (Kabata 1985). During the study, the variation and abundance of those parasites depending on environmental condition has been found. The parasitic community of fish shows considerable variation with the aquatic environment in which fish live (Hossain et al. 2008). Certain environmental conditions, particularly temperature play a significant role in disease outbreaks. Ahmed et al. (1991) stated that the prevalence of the disease was higher in the post-monsoon period as compared to other seasons. It was further observed that there was a seasonal variation in the rate of infection and infestation of parasites in fish. The most susceptible period of the year was October to January when fish parasites are abundant. This could be due to high stocking density, low water depth, and low temperature along with other physio-chemical parameters and management practices maintained as pointed out by Banu and Khan (2004). The present study has been undertaken to assess the prevalence of parasitic infestation in freshwater fishes.

Materials and Methods:

During the period of 12 months from October 2021 to September 2022 total 720 sample were examined for protozoan parasites from Aurangabad of Marathwada region. The months were divided into three periods, for example February to May (Pre-monsoon) and June to October (Monsoon) and November to January (Post-monsoon). The prevalence rate was calculated as, number of infested fish divided by the number of observed fish multiplied by hundred. The water quality parameters like water temperature and pH have also been measured in every month. The experiment method was survey method. The experimental fishes were measured and examined by standard parasitology examination. The external examination was

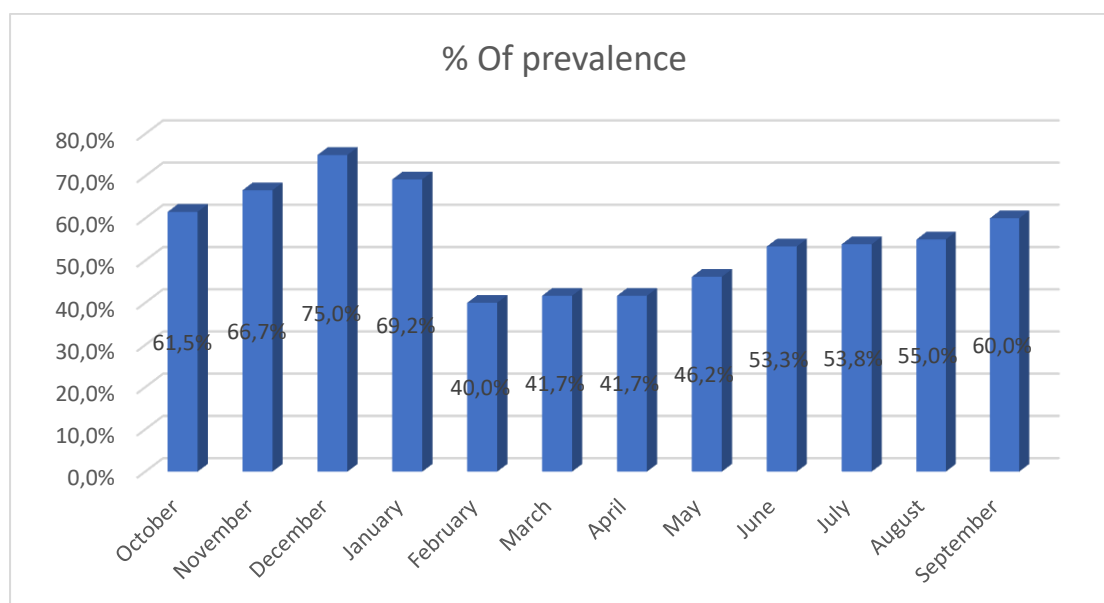
observed to identify the pathological damage caused by parasites. The body, skin, fins, and gill were thoroughly examined as well as the intestine for external parasites and endoparasites infestation. The surface of the body and fins were scrapped, and the intestine were cut to observe parasite infestation. The parasite examination and identification were done by using microscopic examination.

Results and Discussions:

The study of protozoan parasitic infection in different freshwater fish was done and three groups of parasites *Chilodonella*, *Tetrahymena sp*, *Trichodina* and *Ichthyoptherius multifilis* species were observed. About 720 samples were observed out of which 400 fish were positive. The percentage prevalence was 55.6%. The incidence of parasitic infection in freshwater fish could be the main problem in the fish industry. The identified parasites in this study have not been reported as parasitic problem in Aurangabad, though the rate of infection in these freshwater fishes was low. The transmission of contamination among freshwater fishes and customer satisfaction taken into consideration. Considering the average intensity of parasitic infection throughout the year, it may be commented that the maximum parasitic infections occurred during the post-monsoon season (October to January) and the minimum during the pre-monsoon season (February to May) (Table 1).

Table 1: Prevalence, of protozoan parasite in freshwater fish in different seasons of the year

Sr. No	Season	Month	No. of sample examined	No of sample positive	% Of prevalence
1	Post-Monsoon	October	65	40	61.50%
2	Post-Monsoon	November	60	40	66.70%
3	Post-Monsoon	December	60	45	75.00%
4	Post-Monsoon	January	65	45	69.20%
5	Pre-Monsoon	February	50	20	40.00%
6	Pre-Monsoon	March	60	25	41.70%
7	Pre-Monsoon	April	60	25	41.70%
8	Pre-Monsoon	May	65	30	46.20%
9	Monsoon	June	60	32	53.30%
10	Monsoon	July	65	35	53.80%
11	Monsoon	August	60	33	55.00%
12	Monsoon	September	50	30	60.00%
Grand Total			720	400	55.60%



This investigation of parasites of freshwater fish can be stated that the prevalence of a total average of parasites are more during the post-monsoon period in comparison to other seasons. Usually, the parasites cause diseases in freshwater fishes are more delicate, since they are susceptible to infection and may die very quickly. Due to rapid fluctuation of water quality parameters during post to pre-monsoon season, the fish becomes more affected by diseases in these two seasons. These findings corroborated with those of Ahmed et al. (1991).

Conclusion:

The protozoan parasites that infected freshwater fish which were sold in market were three species *Chilodonella*, *Tetrahymena* and *Ichthyophtheriummultifilis*. The percentage prevalence was being 55.6%. Furthermore, fluctuation of temperature and poor water quality are also responsible for spreading of disease to delicate freshwater fish. Srivastava (1975) reported that the characteristics of the water body can determine its parasitic fauna. When the water quality deteriorates, the ectoparasitic infection is increased during post-monsoon season due to decrease of the temperature and dissolved oxygen level in the water body. In winter, fish require more O₂ and due to lack of O₂ they become more prone to infection. In Post-monsoon season the pH level also decreases and low pH influences the disease outbreak. Therefore, it can be concluded that the water quality plays an important role for the abundance of parasites and their ability to survive on the host. The finding of Akhter et al. (1997) and Hossain et al. (1944) corroborated with the present findings. Environmental fluctuations and management practices such as handling, transport, drug treatment, crowding, undernourishment, fluctuating temperature and poor water quality limit parasitic infection in freshwater fish (Subasinghe 1997; Wildgoose 1998; Scholz 1999). Thus, it may be inferred that high temperature reduces the life cycle of these parasites or apparently they remain in the dormant stage, thereby the prevalence of the parasites is very much dependent on temperature as also reported by Majumdar et al. (2013) and Hossain et al. (2008). The information about advance research in parasitic infection of freshwater fish is needed along with economic value and the burden that is caused by it. Routine monitoring in parasitic prevalence could prevent the huge economic losses caused by parasitic diseases. These results also provide relevant “baseline” data for assessing the effectiveness of future control strategies against protozoan parasites in freshwater fish.

References:

1. A. A. Siddiqui, Effects of Seasons, Host Age, Size and Sex on Monogenetic Trematode, *Hamatopeduncularia indicus* of Host Fish, *Arius jella*. Journal of Chemical, Biological and Physical Sciences
2. A.K.M. Bahirullah, A brief survey of helminth fauna of certain marine and freshwater fishes of Bangladesh, Bangladesh Journal of Zoology,
3. Ahmed A, Ali SMK, Samad A. Probable cause of fish ulcer in Bangladesh.
4. Al-Rasheid, K.A.S., M.A. Ali, T. Saakran, A.A.A. Baki& F.A.A. Ghaffar. 2000. Trichodinid ectoparasites (Ciliophora: Peritrichida) of some River Nile fish, Egypt.
5. Andras v. Ornamental fish product / market report. Thai trade center. Hungary
6. Baia RRJ, Florentino AC, Silva LMA, Tavares-Dias M (2018) Patterns of the parasite communities in a fish assemblage of a river in the Brazilian Amazon region. Acta Parasitol
7. Banu ANH, Khan MH. Water quality, stocking density and parasites of freshwater fish in four selected areas of Bangladesh.
8. Blas, 2008. Epidemiology in the control of fish disease. Workshop AcquacolturaMediterranea: AspettiNormativi e Sanitari a Confronto, XV Convegno Nazionale
9. Bush AO, Lafferty KD, Lotz JM, Shostak AW et al (1997) Parasitology meets ecology on its own terms: Margolis et al. revisited. J Parasitol

10. Chanda M, Paul M, Maity J, Dash G, Gupta SS, Patra BC. Ornamental fish goldfish, *Carassius auratus* and related parasites in three districts of West Bengal, India.
11. Dewi et.al (2018) The prevalence of parasites in ornamental fish from fish market in Medan Animal Science, University, Indonesia
12. G.M. Sinha, Mechanisms of mucous release in the alimentary canal of a freshwater major. Carp *Labeorohita* (Hamilton): A light and scanning electron microscopic study, Proc. Indian National Science Academy
13. Hossain MA, Banu ANH, Khan MA. Prevalence of ectoparasites in carp nursery of Greater Mymensingh. Prog Agric.
14. Hossain MD, Hossain MK, Rahaman MH, Akter A, Khanom DA. Prevalence of ectoparasites of carp fingerlings at Santaher, Bogra. Univ J ZoolRajshahi Univ. 2008
15. J.D. Smith, The physiology of Acanthocephalan (Freeman-San francisco, California, 1969)
16. Kabata Z. Parasites and diseases of fish cultured in the tropics. London: Taylor and Francis; 1985.
17. Kudo RR. A taxonomic consideration of myxosporidia.
18. L.R. Sanwal, and S.M. Agarwal, B. diverticulosis of the fish duodenum infected with cestodes, Indian Journal of Experimental Biology
19. Lom J, Vavrá J. Mucous envelope of spores of the subphylum Cnidospora (Deflein, 1901)
20. Lom J. On the systematics of the genus *Trichodinella*
21. Lom J. *Trichodina reticulata* Hirschmann and Partsch 1955 from Crucian carp, and *T. domergueif. latispina* Dogel 1940 from *Diaptomus*. Acta Soc ZoolBohemoslo.
22. Madhuri S, Mandloi AK, Pandey Govind, Srivastav AB. Transgenic Fish Model in Environmental Toxicology. (2018)
23. Majumder S, Panda S, Bandyopadhyay PK. Effect of temperature on the prevalence of different parasites in *Cirrhinus mrigala* Hamilton of West Bengal. J Parasit Dis. 2013
24. Mohan CV (1999) Social and economic impacts of aquatic animal health problems in aquaculture in India. Paper presented at the aquatic animal health care in rural aquaculture, Dhaka, Bangladesh
25. Noga E J fish disease diagnosis and treatment USA (2010)
26. Scholz T. Parasites in cultured and feral fish. Vet Parasitol.
27. Seasonal incidence of protozoan parasitic infestation in ornamental fishes of West Bengal, India Mandira Saha and P.Kbandyopadhyay (2017)
28. Shrestha, S. P., Bajracharya, P., &Rayamajhi, A. (2019). Study on Status of Fish Diseases in Nepal. Nepalese Veterinary Journal
29. Smyth JD. Introduction to animal parasitology. 3. Cambridge: Cambridge University Press
30. Srivastava CB (1975) Fish pathological studies in India: a brief review. Dr. B.S. Chauhan Comm
31. Subasinghe R. Live fish handling and exportation.
32. Subasinghe RP. Hatchery diseases of freshwater fish in Sri Lanka. In: Shariff M, Subasinghe RP, Arthur JR, editors. Diseases in Asian aquaculture 1. Philippines: Asian Fisheries Society; 1992.
33. T.T.Shaikh, (2021)*Ichthyophtherius multifiliis* external parasite from ornamental fishes
34. V.A. Dogiel, Ecology of parasites of freshwater fishes, Transl. by Kabata Z 1961, Oliver and Boyd, Edinburgh,
35. Wildgoose W. Skin disease in ornamental fish: identifying common problems.
36. Woo P T K fish disease and disorder: protozoa and metazoan infection