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Physiochemical relationship of water with prevalence of cestode parasite in fishes from Ghodazari Lake, Nagbhid, district chatrapur (MS)

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Abstract
Physiochemical parameters revealed that the prevalence of cestode parasite increase according to change the quality of water. In the Present study, freshwater fishes from Ghodazari Dam infected with cestode parasite were recorded high incidence of cestode infection in all these host were recorded high prevalence of cestode infection in April month and it was 38.46%, in March month 30.43% and followed by Feb 20.83% and also least in month of January 2024 respectively. These results clearly showed that infection of cestode mostly lowest in winter month and highest in summer month. The present investigation was carried out in freshwater fishes from Somthana dam which *Mastacembalus armatus*, *Channa punctatus* (Bloch) and *Wallago attu* (Bleaker, 1857) collected from Ghodazari dam. Among freshwater fishes were contaminated with cestode parasite during dissection of fishes. Three species were detected *viz*. *Circumonchobothria sp*. *Gangasia sp*. and *Senga sp*.

Keywords: *Mastacembalus armatus*, *Channa punctatus* (Bloch), *Wallago attu* (Bleake, 1857)

Introduction

Cestodes are an important class of endo parasitic organism commonly called as tapeworm are flat, segmented worm in phylum Platyhelminthes, Class cestoda, they infect to host through oral ingestion of egg or larvae. Generally, body divided into Scolex, Neck and Proglottids.

Second most host of cestode is a fish. In fish, juvenile cestode stages (metacestodes) are found in internal organs or muscle, with the adult stages in the intestine. Cestodes lack a digestive system in both larval and adult stage. The exchange of nutrients and waste products taking place through the body wall or integuments. Adult worm is hermaphrodites that are both male and female reproductive organ present in each proglottids. The prevalence of cestode parasite in fish increases rapidly and results in fish mortality (Nidhi Arora *et.al*, 2010). Also, Asawari Fartade *et.al*, investigated in 2018, the high infections of helminth parasite (incidence, intensity, density and index of infection) were occurred in summer season. Then it was followed by winter whereas very low in monsoon season. . Lee (1968) stated that parasitic infection in freshwater fish might correlate to the season. Temperature change has been considered the most important factor that influences seasonality, which can directly influence free-living stages of helminths or helminths within poikilothermic hosts. Chubb (1979) found that freshwater digeneans often showed seasonal changes in the prevalence and abundance related to cercarial emergence with an increase in water temperature. Among the factors that influence the composition of parasite fauna, the host alimentary habit is the most important characteristic since it may include numerous animals that may serve as intermediate hosts; these biotic and abiotic environments provide the basis for the life of both hosts and parasites alike (Dogiel *et al*., 1961). Infection patterns of helminth in fish populations are influenced by the availability of infective larvae, feeding habits of hosts, parasite mortality and abiotic factors such as temperature (Kennedy, 1970).

So present investigation on prevalence of cestode parasite in freshwater fishes from Ghodazari Dam located in Nagbhid, chandrapur district Maharashtra, India.

Material and method

Fishes sample were collected from Ghodazari Dam located in Nagbhid, chandrapur district Maharashtra, India. At the GPS 20°32'57 "N 79°37'46"E". Ghorazari Dam was constructed as parts of Irrigation Projects by the Britishers during the British Raj in the Year 1923. It is built on and impounds Gorazari River. Nearest city to dam is Nagbhir in Chandrapur District of Maharashtra. during the year 2023 and 2024. In present investigate cestode parasite prevalence from freshwater fishes *viz Mastacembelus armatus*, *Channa punctatus* and *Wallago attu* they collected and examined for cestode infection. Then cestode parasite were preserved in 4% formaline, washed in saline and water, dehydrated in various alcoholic grades, stained with Harris haematoxylin and Borax carmine, cleared in xylene, mounted in D.P.X. Drawings were made with the aid of camera Lucida and identification by standard methods (Gerald D. Schmidt, 1934; Yamaguti, S., 1959; Hiware, Jadhav and Mohekar, 2003; and Bhure, 2008) [2, 8, 9, 10].

Prevalence (Incidence) of infection were recorded and calculated according to Margolis *et.al*., (1982). and D. B. Bhure *et.al*, (2016) [6].

$$\textbf{Prevalence of Infection (\%)} = \frac{Number\ of\ Infected\ Host}{Number\ of\ Total\ Host\ Examined} X100$$

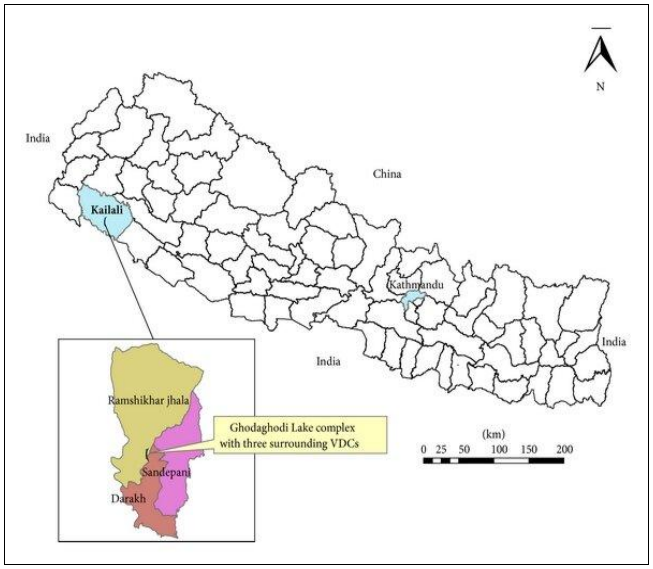


Fig 1: Map of Ghodari Dam

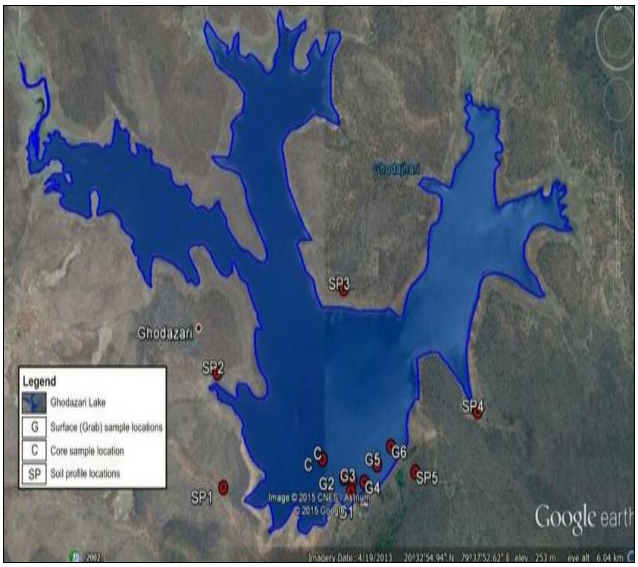


Fig 2: GPS location Dam

Results and Conclusion

The present investigation was carried out in freshwater fishes from Ghodazari Dam which Mastacembalus armatus, Channa punctatus (Bloch) and *Wallago attu* (Bleaker, 1857) collected from yeldari dam. Among freshwater fishes were contaminated with cestode parasite during dissection of fishes. Three species were detected *viz*. *Circumonchobothria sp*. *Gangasia sp*. and Senga *sp.* mentioned in following Table No.1.

D. B. Bhure *et.al*, (2016) [6] Reported the Diversity of piscean Cestodes includes 26 species of five genera. Ten species of *Senga*, Seven of *Gangesia*, Four of *Silurotaenia*, Three of *Polyoncobothrium* and Two of Proteocephalus were reported from *Channa sp.* from different localities of Ghodazari Dam located in Nagbhid, chandrapur district Maharashtra, India.

Table 1: Cestode parasite found in freshwater fishes from Ghodazari Dam

Cestode Parasite sp	Host	Habitat	Locality
1) *Circumonchobothria yelderensis n.sp.* 2) *Gangesia sp*. 3) *Senga punctatusae n. sp.*	1) *Mastacembelus armatus* *2) Channa punctatus* *3) Wallago attu*	Intestine	Somthanadam

Wallago attu

Mastacembalus armatus

Channa punctatus

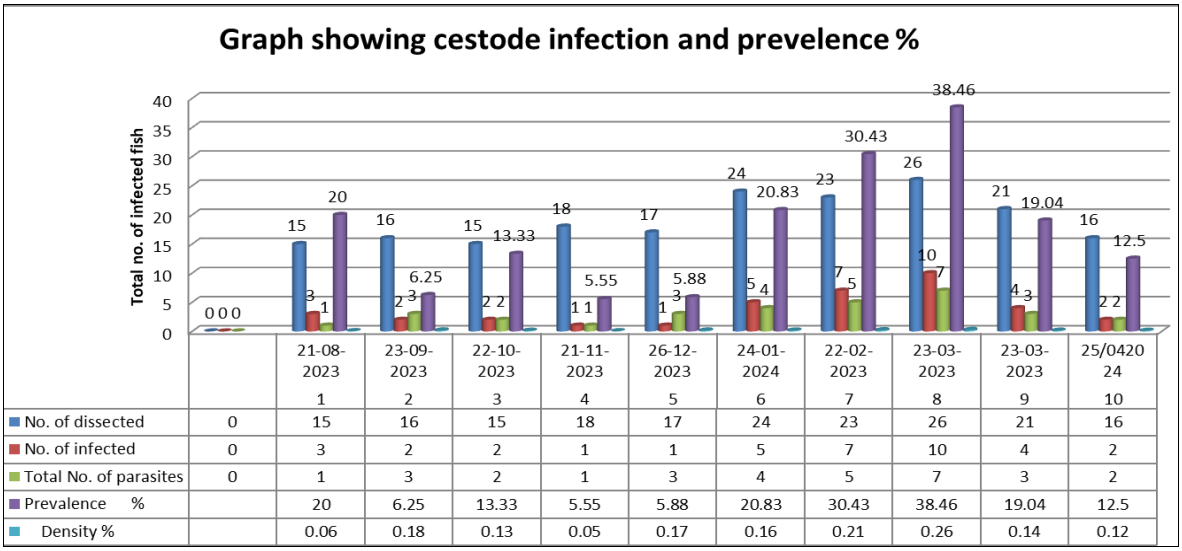
In the Present study, freshwater fishes from yeldari dam infected with cestode parasite were recorded high incidence of cestode infection in all these host were recorded high prevalence of cestode infection in April month and it was 38.46%, in March month 30.43% and followed by Feb 20.83% and also least in month of January 2024 respectively. These results clearly showed that infection of cestode mostly lowest in winter month and highest in summer month as shown in table and graph. Some of the physicochemical parameters in the reservoir fell within acceptable limits for aquaculture. Furthermore, the study also revealed relationships between the prevalence of helminth parasites and water quality parameters in the reservoir. However, further studies are recommended with greater intervals in order to identify the effects of physicochemical parameters in the infestation success of helmith parasites in the study area.

Bhure *et al*., 2010 [3], Reported that high prevalence of cestode parasite found in carp fish in summer followed by winter and rainy season. Also, Borde and Jawale, 2012 [4] reported high cestode infection to *Clariasbatrachus* in summer season.

Bhure and Nanware, 2014 [5] reported high cestodes infection from Channa puntatus in summer season and Deshmukh Shaziya Sultana, 2019 [7] also reported high incidence of infections of all the cestode species were recorded in summer followed by winter where as low in monsoon season.

Table 2: Monthly variation of Cestode parasite in freshwater fishes from Ghodazari Dam

Sr. No	Month & Year (DD/MM/YY)	No. of dissected Hosts	No. of infected Hosts	Total No. of parasites collected	Prevalence %	Density %
1	21/08/2023	15	03	01	20.00	0.06
2	23/09/2023	16	02	03	06.25	0.18
3	22/10/2023	15	02	02	13.33	0.13
4	21/11/2023	18	01	01	05.55	0.05
5	26/12/2023	17	01	03	05.88	0.17
6	24/01/2024	24	05	04	20.83	0.16
7	22/02/2024	23	07	05	30.43	0.21
8	23/03/2024	26	10	07	38.46	0.26
9	23/03/2024	21	04	03	19.04	0.14
10	25/042024	16	02	02	12.50	0.12



		21-08-2023	23-09-2023	22-10-2023	21-11-2023	26-12-2023	24-01-2024	22-02-2023	23-03-2023	23-03-2023	25/0420 24
		1	2	3	4	5	6	7	8	9	10
No. of dissected	0	15	16	15	18	17	24	23	26	21	16
No. of infected	0	3	2	2	1	1	5	7	10	4	2
Total No. of parasites	0	1	3	2	1	3	4	5	7	3	2
Prevalence %		20	6.25	13.33	5.55	5.88	20.83	30.43	38.46	19.04	12.5
Density %		0.06	0.18	0.13	0.05	0.17	0.16	0.21	0.26	0.14	0.12

Conclusion

Freshwater fishes infected by cestode parasite are positively correlation with season that are summer, winter and rainy. Out of that high infection of cestode found in summer season. It menaces that environmental factor both that are biotic and abiotic, positively effect on fishes Also, these result help for further studies about effect of cestode parasite on fish health and their biochemistry and also it helps to awareness within consumer. Qayoom and Shah' 2017) [11] who indicated that several physico-chemical parameters including water temperature, dissolved oxygen, pH, and total ammonia-nitrogen and eutrophication might have influence on the occurrence of parasite populations. Correlation of water quality parameters with the prevalence of helminth parasites in this study suggests the influence of the parameters monitored on the prevalence of helminth.

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