International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Seasonal Prevalence and Diversity of Helminth Parasites in Channidae Fishes from Jalna and Chhatrapati Sambhajinagar (MS)

Indani, L. S.[1], Pawar, R. T.[2]

Department of Zoology, Rajmata Jijau Mahavidyalaya, Kille-Dharur, Dist. Beed.
Email: *drrajtpawar[at]gmail.com*

Abstract: ***Snakehead fishes (Channa spp.) are widely consumed throughout India due to their high nutritional and medicinal value. Fish constitute a major source of animal protein and contribute significantly to the Indian economy; however, parasitic infections cause serious economic losses in freshwater fisheries. The present study investigates the seasonal prevalence and diversity of helminth parasites infecting Channa gachua and Channa striata. A one-year survey was conducted from August 2024 to July 2025 covering summer, monsoon, and winter seasons in freshwater bodies of Jalna and Chhatrapati Sambhajinagar (Aurangabad), Maharashtra, India. A total of 626 fishes were examined, of which 410 fishes were infected, yielding 409 helminth parasites belonging to Cestoda, Trematoda, and Nematoda. The highest prevalence and intensity of infection were recorded during the summer season, followed by winter, while the lowest infection rate was observed during the monsoon. The study reveals significant seasonal variation in helminth infections influenced by environmental factors such as temperature, rainfall, and host feeding behavior. Understanding seasonal parasitic dynamics is essential for effective fish health management and sustainable fisheries development.***

Keywords: *Channa gachua*; *Channa striata*; Helminth parasites; Seasonal prevalence; Freshwater fishes; Maharashtra

1. Introduction

India ranks third in global fisheries production and second in aquaculture, underscoring the economic and nutritional importance of fish. Freshwater fishes form a crucial component of aquatic ecosystems and serve as an affordable source of high-quality animal protein, often referred to as the "rich food for poor people."

Among freshwater fishes, snakehead fishes of the genus *Channa* are highly valued for their taste, nutritional composition, and medicinal properties. Large and medium-sized *Channa* species are extensively cultured and consumed throughout Asia. In several regions, snakeheads are traditionally used to promote wound healing and alleviate post-operative discomfort.

Although *Channa* species are generally resistant to parasitic infections, environmental stressors such as water pollution, temperature fluctuations, low dissolved oxygen, and inadequate food availability increase their susceptibility to helminth parasites (Sharma, 2012). Helminth infections are among the most common parasitic diseases affecting freshwater fishes in tropical regions and are known to impair growth, reproduction, and overall fish health (Hoffman, 1967).

Extensive studies on fish helminths in India have been conducted by Bhalerao (1937), Soota (1981), Gupta (1984), Hiware (1999), Tandon *et al*. (2005), Bhure, (2008), Pandey and Agrawal (2008), and Deshmukh (2015). However, limited information is available on the seasonal variation of helminth parasites infecting *Channa gachua* and *Channa striata* from the Marathwada region. The present study aims to fill this gap.

2. Materials and Methods

Study Area and Sample Collection:
Freshwater fishes were collected from different reservoirs and water bodies of Jalna and Chhatrapati Sambhajinagar districts, Maharashtra, India, during early morning hours from August 2024 to July 2025.

Examination of Hosts:
Collected fishes were transported to the laboratory and dissected dorso-ventrally. Organs such as fins, gills, stomach, and intestine were isolated and examined separately in Petri dishes containing physiological saline.

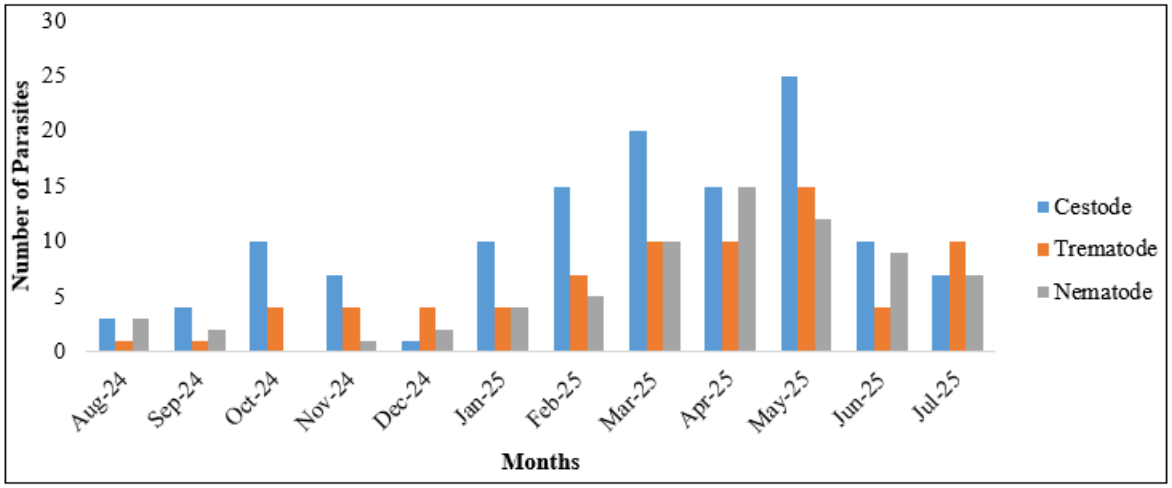
Collection and Preservation of Parasites:
Helminth parasites were isolated using fine needles and forceps under a compound microscope. Cestodes and trematodes were relaxed and preserved in 4% formalin, stained with Harris haematoxylin, dehydrated through graded alcohol series, cleared in xylene, and mounted in DPX. Nematodes were fixed in 10% glycerol and cleared in lactophenol.

Identification:
Line drawings were prepared using a camera lucida (Francis Weesner, 1964). Identification was performed following Yamaguti's Systema Helminthum (1958, 1961).

3. Results and Discussion

Table 1: Seasonal study of parasitic infection in freshwater fishes from Jalna and Chhatrapati Sambhajinagar, during year August 2024 to July 2025.

Month	Name of Parasite	No. of Host Examine	No. of Host Infected	Total No. of Host Infected	Total No. of Parasite Collected	Incidence	Intensity	Density	Index of Infection
Aug-24	Cestode	50	30	20	3	40.00	0.15	0.06	1.20
	Trematode			4	1	8.00	0.25	0.02	0.08
	Nematode			6	3	12.00	0.50	0.06	0.36
Sep-24	Cestode	40	20	15	4	37.50	0.27	0.10	1.50
	Trematode			3	1	7.50	0.33	0.03	0.08
	Nematode			2	2	5.00	1.00	0.05	0.10
Oct-24	Cestode	46	25	14	10	30.43	0.71	0.22	3.04
	Trematode			10	4	21.74	0.40	0.09	0.87
	Nematode			0	0	0.00	0.00	0.00	0.00
Nov-24	Cestode	60	20	10	7	16.67	0.70	0.12	1.17
	Trematode			5	4	8.33	0.80	0.07	0.33
	Nematode			5	1	8.33	0.20	0.02	0.08
Dec-24	Cestode	60	20	10	1	16.67	0.10	0.02	0.17
	Trematode			5	4	8.33	0.80	0.07	0.33
	Nematode			5	2	8.33	0.40	0.03	0.17
Jan-24	Cestode	50	35	30	10	60.00	0.33	0.20	6.00
	Trematode			2	4	4.00	2.00	0.08	0.16
	Nematode			3	4	6.00	1.33	0.08	0.24
Feb-24	Cestode	30	25	10	15	33.33	1.50	0.50	5.00
	Trematode			10	7	33.33	0.70	0.23	2.33
	Nematode			5	5	16.67	1.00	0.17	0.83
Mar-24	Cestode	70	65	45	20	64.29	0.44	0.29	12.86
	Trematode			10	10	14.29	1.00	0.14	1.43
	Nematode			10	10	14.29	1.00	0.14	1.43
Apr-24	Cestode	50	45	25	15	50.00	0.60	0.30	7.50
	Trematode			10	10	20.00	1.00	0.20	2.00
	Nematode			10	15	20.00	1.50	0.30	3.00
May-24	Cestode	50	50	30	25	60.00	0.83	0.50	15.00
	Trematode			10	15	20.00	1.50	0.30	3.00
	Nematode			10	12	20.00	1.20	0.24	2.40
Jun-24	Cestode	50	25	10	10	20.00	1.00	0.20	2.00
	Trematode			5	4	10.00	0.80	0.08	0.40
	Nematode			10	9	20.00	0.90	0.18	1.80
Jul-25	Cestode	70	50	20	7	28.57	0.35	0.10	2.00
	Trematode			20	10	28.57	0.50	0.14	2.86
	Nematode			10	7	14.29	0.70	0.10	1.00



Graph 1: Comparative seasonal abundance of cestode, trematode and nematode parasites infecting *Channa spp*.

A total of 626 freshwater fishes (Table 1), including *Channa gachua* (Hamilton, 1822) and *Channa striata* (Bloch, 1793), were examined from different localities of Jalna and Chhatrapati Sambhajinagar districts during the study period. Out of these, 410 fishes (65.49%) were found infected with helminth parasites, yielding a total of 409 parasites belonging to Cestoda, Trematoda, and Nematoda (Table 2).

The monthly analysis revealed marked seasonal fluctuation in helminth infection, with maximum parasite abundance during summer months (March–May) and minimum during monsoon, indicating strong environmental influence on parasite dynamics (Table 3).

Table 2: Overall helminth infection in *Channa* species

Parameter	Value
Total fishes examined	626
Total fishes infected	410
Overall prevalence (%)	65.49
Total helminth parasites recovered	409

Table 3: Season-wise prevalence of helminth infection

Season	Examined	Infected	Prevalence (%)
Summer	210	165	78.57
Winter	206	150	72.81
Monsoon	210	95	45.24
Total	626	410	65.49

Seasonal analysis revealed a significant variation in helminth infection among different seasons (Table 3; Graph 1). The highest prevalence and intensity of infection were recorded during the summer season, followed by winter, whereas the lowest infection rate was observed during the monsoon season. During summer (April–May), a maximum number of parasites were recovered from the hosts, indicating that environmental conditions during this period are favorable for parasite development and transmission.

The incidence of cestode and trematode infections was highest during summer, while cestode infection was lowest in winter and moderate during the monsoon season. Trematode infection showed moderate prevalence in winter and minimum prevalence during the monsoon. In contrast, nematode infection was highest during winter, moderate during summer, and lowest during the monsoon season (Table 3). These differences may be attributed to variations in parasite life cycles, intermediate host availability, and host feeding behavior across seasons.

Table 4: Seasonal distribution of helminth parasite groups

Parasite group	Summer	Winter	Monsoon	Total
Cestoda	120	45	35	200
Trematoda	95	60	14	169
Nematoda	35	45	10	90
Total	250	150	59	409

Analysis of parasitic diversity indicated that cestodes and trematodes were more abundant than nematodes (Table 4). This dominance suggests that higher temperature, lower humidity, and reduced rainfall, characteristic of the summer season, provide optimal conditions for the growth and development of cestode and trematode parasites. Similar seasonal trends have been reported by Hiware (1999) and Jadhav and Bhure (2006), who emphasized the role of environmental factors in regulating helminth population dynamics.

Table 5: Region-wise prevalence of helminth infection

Region	Examined	Infected	Prevalence (%)
Jalna	313	190	60.70
Chhatrapati Sambhajinagar	313	220	70.29

Both *Channagachua* and *Channastriata* were found infected with helminth parasites; however, regional variation in infection intensity was observed. Fishes collected from Jalna district were heavily infected with cestodes and trematodes, whereas fishes from Chhatrapati Sambhajinagar district showed heavy infection with all three helminth groups, including nematodes (Table 5). Such variation may be due to differences in water quality, ecological conditions, and anthropogenic activities at different sampling stations.

Seasonal analysis of helminth infection revealed pronounced variation across different seasons. The highest prevalence and parasite abundance were recorded during the summer season, followed by winter, whereas the monsoon season showed the lowest infection levels. Elevated temperature, reduced water volume, and increased feeding activity of hosts during summer may enhance parasite transmission and survival. The dominance of cestode and trematode infections in summer suggests favorable conditions for completion of their life cycles, including availability of intermediate hosts. In contrast, nematode infections showed relatively higher occurrence during winter, indicating differences in life cycle dynamics and environmental tolerance. Reduced prevalence during the monsoon may be attributed to dilution effects, increased water flow, and unfavorable conditions for parasite development. Similar seasonal trends have been reported earlier, emphasizing the significant role of environmental factors in regulating helminth population dynamics in freshwater fishes.

The observed seasonal fluctuation in helminth infection suggests that parasites cause depletion of nutritional contents in the host body, leading to reduced growth and productivity of fishes. This ultimately results in economic losses in the fish industry, as also reported by Hiware (1999).

4. Conclusion

The present investigation reveals that the freshwater snakehead fishes *Channa gachua* and *Channa striata* from the Marathwada region of Maharashtra harbor a diverse assemblage of helminth parasites, including cestodes, trematodes, and nematodes. The study clearly demonstrates a distinct seasonal pattern in helminth infection, with the highest prevalence and intensity during the summer season, followed by winter, and the lowest occurrence during the monsoon season.

Cestodes and trematodes were found to be the dominant parasite groups, indicating that higher temperature, reduced rainfall, and lower humidity during summer create favorable conditions for parasite development and transmission. In contrast, nematode infections showed a higher incidence during winter, suggesting differences in life cycle dynamics and host–parasite interactions. Regional variation in infection intensity further indicates that local environmental conditions and water quality significantly influence parasitic infestation.

Helminth infections adversely affect the nutritional status and overall health of fish hosts, leading to reduced growth and productivity, which may ultimately result in economic losses to freshwater fisheries. The findings of the present study emphasize the importance of seasonal monitoring of parasitic infections and the adoption of appropriate management strategies, particularly during high-risk seasons, to ensure fish health and sustainable fish production.

Acknowledgment
The author is very much thankful to the Head, Department of Zoology Rajmata Jijau Mahavidyalaya, Kille-Dharur (Beed) For Providing the Laboratory Facilities During this Work.

References

[1] Bhalerao, G.D. (1937): Studies on the Helminths of Indian Trematoda, IV. *J. Helminthol*., 15 (2): 97 – 124. DOI: 10.1017/S0022149X00030753.
[2] Bhure, D. B., Jadhav, B. V., Pathan, D. M., &Padwal, N. D. (2006). Population indices of some trematode parasites in freshwater fishes from Aurangabad district. *In Proceedings of the 16th All India ZSI Congress*, Aurangabad, pp. 217–229.
[3] Bhure, D.B. (2008): Faunal diversity of Helminth parasites of freshwater fi shes of Maharashtra State, India. PhD, thesis, India, Aurangabad: Dr. B. A. M. University.
[4] Bloch, M. E. (1793). Naturgeschichte der ausländischen Fische. *Berlin.* v. 7: i-xiv + 1-144, Pls. 325-360.
[5] Deshmukh, V. S. (2015). Biosystematic studies on some helminth parasites of freshwater fishes. Ph.D. Thesis, Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, India, pp. 1–347.
[6] Frances M. Weesner SC (1964). General Zoological Techniques. *The Waverly Press, Inc*., Baltimore 2, Md. USA.
[7] Gupta PC (1984).Bifurcohaptorhemlatae n. sp. (Monogenea: Dactylogyridae) from a freshwater fish *Rita rita* from Kanpur. *Indian J Helminthol* 7:233–235.
[8] Hamilton, F. (1822). *An account of the fishes found in the river Ganges and its branches*. Edinburgh: Archibald Constable and Company. pp. vii + 405, pls. 1-39
[9] Hiware, C. J. (1999). Population dynamics of helminth parasites in freshwater fishes. *Journal of Parasitic Diseases*, 23, 45–52.
[10] Hiware, C. J. (2002). Population dynamics of caryophyllaeidcestodes parasitizing freshwater air-breathing predatory fish *Clariasbatrachus* (Linn.). *Rivista di Parassitologia*, 19(62), 45–48.
[11] Hoffman, G. L. (1967). Parasites of North American freshwater fishes. *University of California Press, Berkeley*. 345-346.
[12] Jadhav, B. V., &Bhure, D. B. (2006). Population dynamics of helminth parasites in freshwater fishes from Marathwada region (M.S.), India. *Flora and Fauna*, 12(2), 143–148.
[13] Kundu S. and Bhuiyan I. (2016). Abundance of Helminth Parasite in Channa Straiatus (BLOCH,1793) From Punarbhabha and Atrai rivers. Dhaka Univ.*J.Biol.Sci*.25(1):39-46
[14] Margolis, L., Esch, G. W., Holmer, J. C., Kuris, A. M., Schad, G. A. 1982.The use of ecological terms in Parasitology (Report of an Ad Hoc Committee of the American Society of Parasitology). *J. Parasitol*., 68:131 133.
[15] Pandey, K.C., Agrawal, N. (2008): An encyclopedia of Indian Monogenoidea. New Delhi, *Vitasta Publishing Pvt Ltd*, pp. 552.
[16] Roy S.and Kumari N. (2020). Seasonal Variation of Helminthic Infestation in Relation to Length and Gender of Fish Hosts in Two Districts of Western U.P. *Int. Jour. of Sc Res and Tech* .9(1):1851-1855.
[17] Sharma, R (2012) Investigations on helminth parasites of freshwater fish fauna of Muzaffarnagar. Ph.D. Thesis, Chaudhary Charan Singh University, Meerut, India.
[18] Soota, T.D. (1981): On some nematodes from the unnamed collection of the zoological survey of India, along with the description of a new species. Rec. *Zool. Surv. Ind*., 79: 55 – 71
[19] Tandon V, Chakravarty R, Das B (2005) Four new species of the genus *Lytocestus* (Caryophyllidea, Lytocestidae) from edible catfishes in Assam and Meghalaya, India. *J Parasit Dis*29:131–142.
[20] Yamaguti, S. (1958). Systema Helminthum, Vol. I: The digenetic trematodes of vertebrates. *Interscience Publishers, New York*, pp. 1–1575.
[21] Yamaguti, S. (1961). Systema Helminthum, Vol. II: The cestodes of vertebrates. *Interscience Publishers Inc., New York and London*, pp. 1–860.
[22] Yamaguti, S. (1961). Systema Helminthum, Vol. III: The nematodes of vertebrates, Parts I & II. *Interscience Publishers Inc., New York and London*.