

Studies on Seasonal Prevalence of Helminth Parasite Infection in the Freshwater Fish *Mastacembelus armatus* from Aurangabad District (M.S.), India

Pardeshi P.R. & Wahule V.K

S. B.E.S. College of Science, Chhatrapati Sambhajnagar

Karm. Ramraoji Aher ACS College, Deola, Nashik

E-mail. Prem1182@gmail.com

ABSTRACT:

The present study investigates the seasonal prevalence of helminth parasites infecting the freshwater fish *Mastacembelus armatus* collected from various regions of Aurangabad District, Maharashtra. Monthly sampling from June 2008 to May 2009 allowed assessment of parasite occurrence during rainy, winter and summer seasons. A total of 414 fishes were examined, out of which 55 were infected with helminth parasites. Three parasite species were recorded the cestodes, *Circumoncobothrium* sp. and *Senga* sp., and the trematode, *Allocreadium* sp. The prevalence of infection showed clear seasonal variation, with the lowest levels in the rainy season, moderate infection in winter, and high occurrence in summer. Seasonal temperature differences, rainfall patterns and feeding behaviour likely influenced parasite transmission. The findings provide baseline data on helminth parasitology in *M. armatus* and highlight the seasonal dynamics of parasite infections in freshwater ecosystems of Aurangabad District.

KEYWORDS: Freshwater fish, Helminth parasites, Seasonal prevalence, Aurangabad District

INTRODUCTION:

Fish serves as an important and affordable source of protein in India, supplying essential minerals and low saturated fats (Lom and Dyková, 1992). To maintain nutritional value and fish health, it is essential that fishes remain free from harmful pathogens including bacteria, protozoans and helminths (Scholz, 1999). Parasitic infections are recognized as a major challenge in freshwater fish populations due to their impact on growth, immunity and marketability (Woo, 2006).

Helminth parasites are widespread in freshwater ecosystems, particularly in predatory species that feed on organisms acting as intermediate or transient hosts (Paperna, 1996). These parasites may damage host tissues by attachment, migration or feeding mechanisms, making fishes more vulnerable to secondary infections (Taqdees Farooq et al., 2016). In Indian freshwater aquaculture, helminth infections have been reported as a cause of significant economic loss (Lakra et al., 2006).

Seasonal environmental factors such as temperature, rainfall and host feeding activity strongly influence helminth transmission (Genc et al., 2005; Wali et al., 2016). Previous studies indicate that

infection levels often peak during warmer months and decline during rainy or colder periods (Borde & Jawale, 2012).

The present study examines the seasonal prevalence of helminth parasites in *Mastacembelus armatus* collected from Aurangabad District over an annual cycle (June 2008 to May 2009), providing insights into infection patterns during rainy, winter and summer seasons.

MATERIALS AND METHODS:

Study Area, Study Period and Sampling Procedures:

The study was carried out in freshwater bodies of Aurangabad District, Maharashtra, where distinct seasonal variations influence parasitic activity. Monthly sampling of *Mastacembelus armatus* was conducted from June 2008 to May 2009. Freshly caught adult fish were obtained from local fishermen, packed in ice and examined promptly.

The collected species of fish, *Mastacembelus armatus* were observed externally. After external examination body cavity of the fish was cut, open and organs such as; the intestine, gills, liver, kidney and spleen were removed and placed in normal saline solution. These organs were dissected and examined under a stereomicroscope. Helminth parasites were separated gently, fixed in 4% formalin, stained with Harris haematoxylin, dehydrated, cleared in xylene and mounted in DPX. Parasites were identified using descriptions given by Yamaguti (1956, 1971).

Epidemiological Analysis and Data Treatment:

Prevalence of helminth infection was calculated as:

$$\text{Prevalence} = \frac{\text{Total no. of infected fish}}{\text{Total no. of fishes host examined}} \times 100$$

Monthly values were grouped into rainy, winter and summer seasons. Data were tabulated and simple graphs were prepared using Microsoft Excel.

RESULTS:

A total of 414 specimens of *Mastacembelus armatus* were examined, and 55 fishes were found to be infected with helminth parasites. Three helminth parasites were identified: the cestodes, *Circumoncobothrium* sp. and *Senga* sp., and the trematode, *Allocreadium* sp. Infection occurred throughout the year, but the extent of parasitism varied markedly between seasons.

Table 1. List of Helminth Parasites and Affected Organs of *Mastacembelus armatus*:

Host	Parasite Group	Parasite Species	Affected Organ
<i>Mastacembelus armatus</i>	Cestode	<i>Circumoncobothrium</i> sp.	Intestine
		<i>Senga</i> sp.	Intestine
	Trematode	<i>Allocreadium</i> sp.	Liver

Rainy Season:

The rainy season recorded the lowest prevalence of helminth infection.

- *Circumoncobothrium* sp. showed a prevalence of 4.9%,
- *Senga* sp. recorded 1.6%,
- *Allocreadium* sp. exhibited 0.5%.

The low infection levels suggest that heavy rainfall, high water flow and reduced feeding behaviour may limit parasite transmission. Dilution of infective stages in flowing water may also contribute to reduced infection.

Table 2. Helminth Parasitic Infection During Rainy Season:

Host	Total no. of fishes examined	Total no. of fishes infected	Helminthic parasites	No. of parasites collected	Prevalence (%)
<i>Mastacembel usarmatus</i>	182		Cestode		
		9	<i>Circumoncobothrium</i>	11	4.9
		3	<i>Senga</i> sp.	5	1.6
			Trematode		
		1	<i>Allocreadium</i> sp.	1	0.5

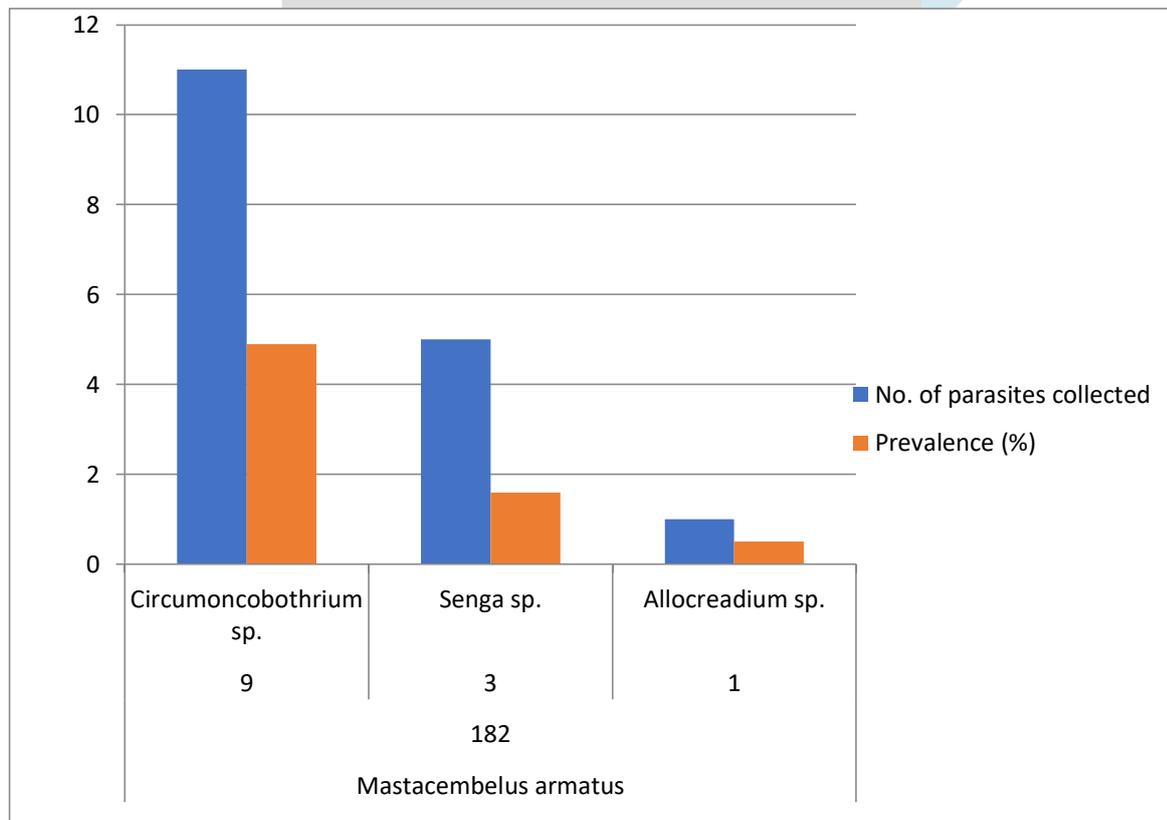


Fig. 1. Seasonal prevalence of helminth parasites in *Mastacembelus armatus* during the rainy season.

Winter Season:

Winter showed a moderate rise in infection.

- *Circumoncobothrium* sp. prevalence increased to 8.9%,
- *Senga* sp. reached 3.5%,
- *Allocreadium* sp. increased to 2.6%.

These values indicate that stable water conditions, moderate temperatures and improved feeding activity support parasite establishment. The rise from rainy to winter months reflects favourable ecological conditions for transmission.

Table 3. Helminth Parasitic Infection During Winter Season:

Host	Total no. of fish examined	Total no. of fish infected	Helminthic parasites	No. of parasites collected	Prevalence (%)
<i>Mastacembelusar matus</i>	112		Cestode		
		10	<i>Circumoncobothrium</i> sp.	13	8.9
		4	<i>Senga</i> sp.	8	3.5
			Trematode		
		3	<i>Allocreadium</i> sp.	4	2.6

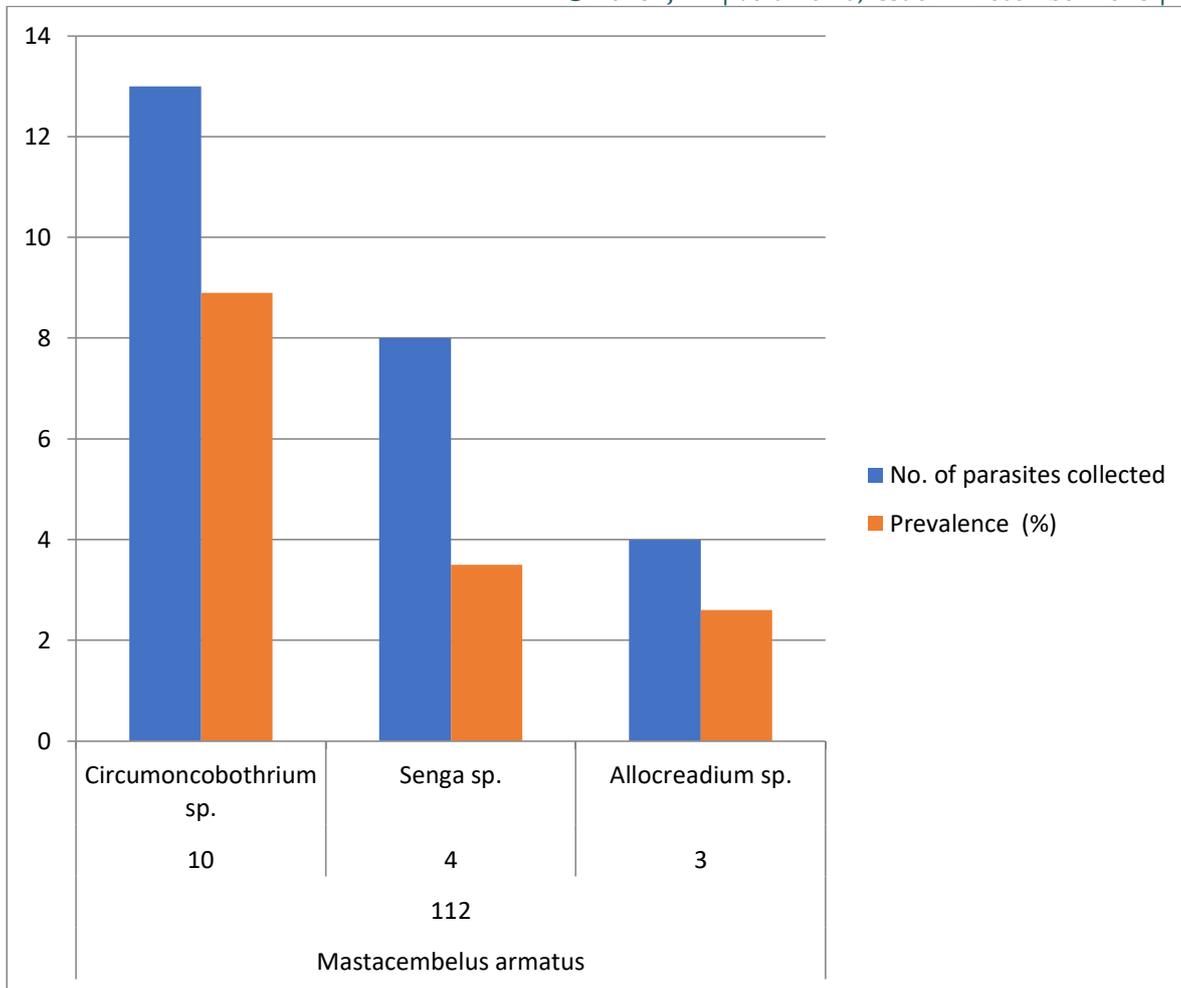


Fig. 2. Seasonal prevalence of helminth parasites in *Mastacembelus armatus* during the winter season.

Summer Season:

Summer recorded the highest infection across all parasite species.

- *Circumoncobothrium* sp. showed 10% prevalence,
- *Senga* sp. increased to 5.8%,
- *Allocreadium* sp. reached 5.0%.

Summer temperatures enhance metabolic activity in hosts and parasites, increase the availability of intermediate hosts and intensify feeding behaviour in fishes, resulting in peak infection.

Table 4. Helminth Parasitic Infection During Summer Season:

Host	Total no. of fishes examined	Total no. of fishes infected	Helminthic parasites	No. of parasites collected	Prevalence (%)
<i>Mastacembelusarmatus</i>	120		Cestode		
		12	<i>Circumoncobothrium</i> sp.	15	10
		7	<i>Senga</i> sp.	10	5.8
			Trematode		
		6	<i>Allocreadium</i> sp.	9	5.0

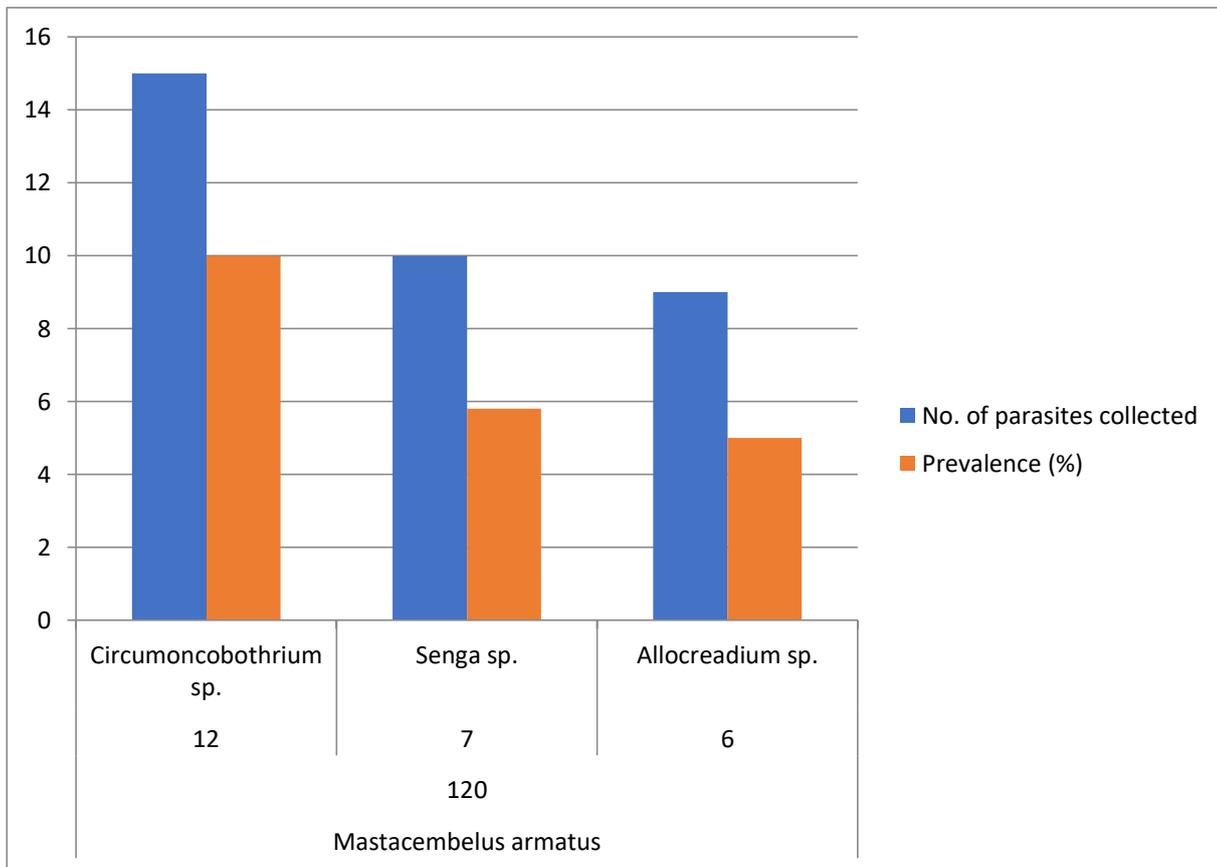


Fig. 3. Seasonal prevalence of helminth parasites in *Mastacembelus armatus* during the summer season.

Overall Seasonal Trend:

The combined data clearly show the pattern: **Summer > Winter > Rainy season.**

The prevalence of cestode parasites, *Circumoncobothrium* sp. and *Senga* sp. were highest than trematode, *Allocreadium* sp. All species displayed a similar seasonal rise toward summer, indicating strong environmental influence on infection dynamics.

DISCUSSION:

The present study clearly demonstrates that helminth infection in *Mastacembelus armatus* is strongly influenced by seasonal fluctuations, showing a rise from the rainy season to winter and reaching maximum levels in summer. This pattern agrees with previous studies that highlight temperature, rainfall, feeding intensity and intermediate host availability as key factors in helminth epidemiology (Genc et al., 2005; Wali et al., 2016). During the rainy season, infection remained lowest due to high water flow, dilution of infective stages and reduced activity of intermediate hosts (Paperna, 1996), a trend also reported in *Clarias batrachus* and *Channa punctatus* (Sharma et al., 2010; Gautam et al., 2018).

Winter showed moderate infection levels, supported by stable water conditions and favourable temperatures that promote larval development (Lakra et al., 2006; Borde and Jawale, 2012). In summer, elevated temperatures, increased feeding and higher intermediate host abundance resulted in the highest parasite prevalence (Woo, 2006; Khalida et al., 2020). Similar seasonal peaks have been reported in *Channa striatus*, *Clarias gariepinus* and *Schizothorax plagiostomus* (Genc et al., 2005; Wali et al., 2016; Taqdees Farooq et al., 2016).

Cestodes (*Circumoncobothrium* sp. and *Senga* sp.) dominated the infections, suggesting favourable ecological conditions and the predatory feeding behaviour of *M. armatus* (Yamaguti, 1956; Paperna, 1996). Overall, the results confirm that temperature, rainfall and feeding ecology strongly regulate helminth prevalence and reflect seasonal patterns observed across tropical freshwater systems.

The present results are in close proximity with Genc et al., (2005), Wali et al., (2016), Gautam et al., (2018) and Khalida et al., (2020) who reported the highest prevalence of helminth parasites during summer and lowest during winter. According Bodhe and Wghai (2021) showed that, the highest prevalence of cestode parasite (50%), prevalence of trematode (20%) and nematode prevalence (70%) recorded during summer season whereas, the lowest prevalence of trematode (30%), Cestode prevalence (10%) and Nematode prevalence (40%) in monsoon season.

High prevalence occurs in summer followed by other seasons Sharma et al. (2010). Borde and Jawale (2012), reported high cestodes infection (45.33%) from *Clarias batrachus* in summer season.

CONCLUSION:

Helminth infection in *Mastacembelus armatus* follows a clear seasonal pattern, with the highest prevalence in summer, moderate levels in winter and the lowest in the rainy season. These variations are influenced by temperature, rainfall, host feeding behaviour and intermediate host activity. The study provides essential baseline information on seasonal parasite dynamics in freshwater fishes of Aurangabad District. Such findings are useful for understanding fish health and developing disease management strategies. Continued monitoring is recommended to track long-term trends and environmental impacts on parasite transmission.

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