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Study on Population Dynamics of *Circumoncobothrium* Sp. and *Senga* Sp. Parasitizing Freshwater Fish *Mastacembelus armatus* (Lacepede)

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Abstract: ***The present work deals with the study of population dynamics of Circumoncobothrium Sp. Shinde, 1968 and Senga Sp. Dollfus 1938, from Mastacembelus armatus from different places and fish market at Aurangabad and Beed region for the period of one annual cycle (July 2021 to June 2022). The percentage of incidence, intensity, density and index of infection is recorded along with the influence of seasons on these values during study period.***
Keyword: Circumoncobothrium, Senga, Mastacembelus armatus, Population dynamics.

I. INTRODUCTION

Teleost fish plays a central role in ecosystems as consumers in food chains, and because they offer a large surface area for encounter and colonization. They are frequently utilized as hosts by range of parasites that are taxonomically diverse and that exhibit a wide variety of life cycle strategies. The invasion of parasitic infection affects nutrition, metabolism, and the secretory function of the alimentary canal (Markov, 1961). It also harms the neurological system. Stress is a result of unfavorable environmental factors, which also erode immunity and make a person more susceptible to diseases (Eissa, 2002). The research of helminth parasite variety and distribution began in India in the middle of the 19th century, and multiple works have been completed in various regions of the country by Bhalerao, 1937; Gupta, 1984; Soota, 1981; Sood, 1989; Tondon *et al.*, 2005; Pandey and Agrawal, 2008; and Deshmukh, 2015. The distribution of helminths is not only affected by seasons but also by host age, size, diet, abundance of fishes and an independent number of parasites within the fi sh. Change in climatic conditions is predicted to affect the prevalence of parasites in freshwater and marine ecosystems. A study of Chubb (1977) showed the seasonal occurrence of helminthes of freshwater fishes from different climatic zones. Parasitic disease have posed a complex problem and has become a great challenge to the parasitologists in the world today, coupled with the rapid changing world; the changes in the human ecology and the effect of climatic changes on parasitic system have further increased the threat to human as well as animals life.

The studies on Population dynamic of fish parasites with respect to the fluctuation of the entire parasites fauna of any host species are still meager. The majority of these investigations have been carried out in seasonal cycles. Seasonal environmental changes of water affect occurrence of parasites of aquatic host (Dogieal *et al.*, 1970).

The population dynamics, incidence of infection and seasonal variation of helminth parasites to the host particularly fish, the following literature is available: Hiware (2007), Chubb (1977), Forbs *et al.*, (1989), Anderson (1976), Dobson (1985), Dogiel (1958), Esch (1977), Lawerence (1970), Thomas (1964), Satpute *and* Agarwal (1974), Firdaus (1988) and carried out work on different aspect of parasites. According to Kennedy (1976), the study can be used as the biological of method to regulate population of parasites.

II. MATERIAL AND METHOD

The hosts *Mastecembelus armatus* were collected from the local markets of Aurangabad and Beed district of Marathwada region with more or less regular periodicity, brought to laboratory, autopsied and examined for cestode infection for a period of one annual cycle July 2021 to June 2022. The parasites were collected washed with saline solution and preserved in 4% formalin, some were processed for taxonomic study: stained with Harris Haematoxylin stain, dehydrated, cleared in xylene, mounted in DPX and identified. The data obtained throughout the year was processed scrutinized and analyzed to derive the various biostatical parameters such as incidence, intensity, density and index of infection by using following formulae.

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$$\text{The \% incidence of infection} = \frac{\text{Infected host} \times 100}{\text{Total host examined}}$$

$$\text{Intensity of infection} = \frac{\text{No of host infected}}{\text{No of host infected}}$$

$$\text{Density of infection} = \frac{\text{No of host infected}}{\text{No of host infected}}$$

$$\text{Index of infection} = \frac{\text{No of host infected} \times \text{No of parasites collected}}{\text{No of host (infected + uninfected) examined}}$$

III. RESULT AND DISCUSSION

Table no 1: The value of incidence, intensity, density and index of infection for *Circumoncobothrium* Sp. in *Mastacembelus armatus* from Aurangabad dist. during the period of July 2021 to June 2022.

Year & month	No. of host examined	No of host infected	No. of parasites collected	% of incident of infection	Intensity of infection	Density of infection	Index on infection
July 2021	14	08	10	57.14	1.25	0.71	0.40
Aug 2021	14	08	11	64.28	1.22	0.78	0.50
Sep 2021	16	11	14	68.75	1.27	0.87	0.60
Oct 2021	17	12	16	70.58	1.33	0.94	0.66
Nov 2021	09	02	02	22.22	1.00	0.22	0.04
Dec 2021	-	-	-	-	-	-	-
Jan 2022	09	02	02	22.22	1.00	0.22	0.04
Feb 2022	11	03	04	27.27	1.33	0.36	0.09
Mar 2022	11	04	05	36.36	1.25	0.45	0.16
Apr 2022	13	06	08	46.15	1.33	0.61	0.28
May2022	14	06	08	42.85	1.33	0.57	0.24
Jun 2022	14	07	10	50.00	1.42	0.71	0.35

Table no 2: The value of incidence, intensity, density and index of infection for *Senga* Sp. in *Mastacembelus armatus* from Aurangabad dist. during the period of July 2021 to June 2022.

Year & month	No. of host examined	No of host infected	No. of parasites collected	% of incident of infection	Intensity of infection	Density of infection	Index on infection
July 2021	16	9	11	56.25	1.25	0.71	0.4
Aug 2021	16	9	12	56.25	1.22	0.78	0.5
Sep 2021	18	13	15	72.22	1.27	0.87	0.6
Oct 2021	19	13	17	68.42	1.33	0.94	0.66
Nov 2021	11	3	3	27.27	1	0.22	0.04
Dec 2021	-	-	-	-	-	-	-
Jan 2022	8	3	3	37.5	1	0.22	0.04
Feb 2022	11	4	5	36.30	1.33	0.36	0.09
Mar 2022	13	5	5	38.46	1.25	0.45	0.16
Apr 2022	15	7	9	46.66	1.33	0.61	0.28
May2022	14	7	9	50	1.33	0.57	0.24
Jun 2022	17	8	11	47.05	1.42	0.71	0.35

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Table no 3: The value of incidence, intensity, density and index of infection for *Circumoncobothrium* Sp. in *Mastacembelus armatus* from Beed dist. during the period of July 2021 to June 2022.

Year & month	No. of host examined	No of host infected	No. of parasites collected	% of incident of infection	Intensity of infection	Density of infection	Index on infection
July 2021	15	08	11	53.33	1.37	0.73	0.39
Aug 2021	16	09	11	56.25	1.22	0.68	0.38
Sep 2021	17	10	12	58.82	1.20	0.70	0.41
Oct 2021	19	14	19	73.68	1.35	1.00	0.73
Nov 2021	08	02	02	25.00	1.00	0.25	0.06
Dec 2021	-	-	-	-	-	-	-
Jan 2022	09	03	04	33.33	1.33	0. -44	0.14
Feb 2022	10	03	04	30.00	1.33	0.40	0.12
Mar 2022	12	05	07	41.66	1.40	0.58	0.24
Apr 2022	13	05	08	38.46	1.60	0.61	0.23
May2022	13	06	08	46.15	1.33	0.61	0.28
Jun 2022	15	07	09	46.66	1.28	0.60	0.28

Table no 4: The value of incidence, intensity, density and index of infection for *Senga* Sp. in *Mastacembelus armatus* from Beed dist during the period of July 2021 to June 2022.

Year & month	No. of host examined	No of host infected	No. of parasites collected	% of incident of infection	Intensity of infection	Density of infection	Index on infection
July 2021	16	9	12	56.25	1.37	0.73	0.39
Aug 2021	18	10	12	55.5	1.22	0.68	0.38
Sep 2021	20	11	13	55.5	1.2	0.7	0.41
Oct 2021	21	15	20	71.42	1.35	1	0.73
Nov 2021	7	3	3	42.85	1	0.25	0.06
Dec 2021	-	-	-	-	-	-	-
Jan 2022	10	4	5	40	1.33	0. -44	0.14
Feb 2022	11	4	5	36.36	1.33	0.4	0.12
Mar 2022	14	6	8	42.85	1.4	0.58	0.24
Apr 2022	16	6	9	37.5	1.6	0.61	0.23
May2022	18	6	9	33.33	1.33	0.61	0.28
Jun 2022	14	8	10	57.14	1.28	0.6	0.28

The collected parasites after closer taxonomic observation turned out to be the genus *Circumoncobothrium* and *Senga*

The values for the percentage of incidence , intensity, density and index of infection for *Circumoncobothrium* Sp. Shinde, 1968 in Aurangabad and Beed district is shown in Table 1 2, and *Senga* in Table no 3, 4.

Table no 1 shows the values for the percentage of incidence, intensity, density and index for *Circumoncobothrium* Sp infecting *Mastacembelus armatus* in Aurangabad dist, were it revealed that the incident of infection was highest (62.50%) in the month of October 2021, whereas the value was lowest (11.11%) in the month of January 2022, during the remaining month it was ranging from 20.00% (March 2022), 25.00% (September 2022) and 37.50% (October 2022). The incident of infection in the month of December was totally absent. The value for intensity density and index of infection was very high during the month July 2022, but intensity of infection it was low than the month of September 2022, whereas lowest during July 2021.

Hiware and Pawar (2007) observed the incidence of infection highest in rainy season and moderate in winter season, incidence of infection was lowest in summer season in *Gangesia* Sp. and *Protocephalus* Sp.

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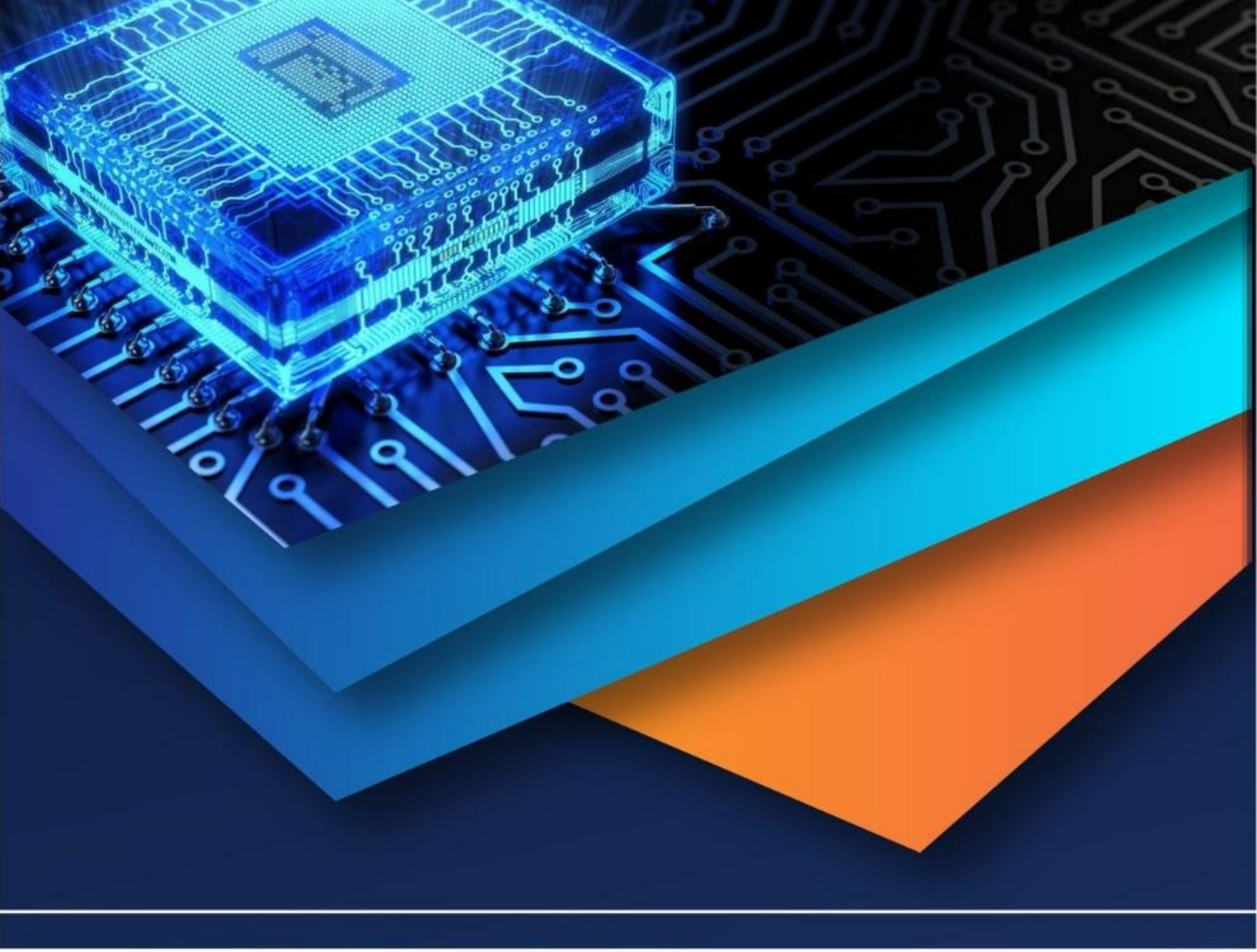
According to Fartade and Chati (2016) high incidences, intensity, density and index of infection of all the helminth parasites occurred in summer season followed by winter season where as lower infections in monsoon season .The intensity varies greatly with respect to helminth parasites and host species, host size and feeding habitats, season and locality.

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