

**POPULATION DYNAMICS OF CARYOPHYLLIDEAN TAPEWORMS IN *CLARIAS BATRACHUS* FROM AURANGABAD DISTRICT (M.S.) INDIA.**

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**ABSTRACT**

The present investigation deals with the population dynamics of Caryophyllidean tapeworms in *Clarias batrachus* from different places of Aurangabad Districts during Jan. 2009 to Dec. 2009. Total 136 (45.33%) cestode parasites were recovered from 300 fishes. The collected cestode parasites are including 07 species of the genus *Lytocestus* (Cohn, 1928) and 06 species of the genus *Lytocestoides* (Baylis, 1928). This report summarizes the percentage of incidence, intensity, density and index of infection. The high prevalence occurs in summer season especially in the month of March to May, while low prevalence occur in winter season followed by autumn and very less occur in rainy season. The present study indicates the seasonal infection of cestodes (*Lytocestus* & *Lytocestoides*) in *Clarias batrachus*.

**KEY WORDS:** Caryophyllidean tapeworms, *Clarius batrachus*, Population dynamics.

**INTRODUCTION**

Fishes are important animals in ecosystem. They are useful item of human food as well as the source of income. These edible fishes are known to harbour a number of cestode parasites which cause deterioration in their health, hence their market and nutritive value is affected. Parasite can have a wide range of impact on the ecology of their hosts in terms of health (Atme and Owen, 1967) behavior (Milinski1984, Moore1984) sexual selection (Howard and Minchella, 1990) Watve and Sukmar, 1977) and regulation of the host population (Freeland, 1983). The present investigation deals with population dynamics of Caryophyllidean tapeworms from *Clarias batrachus* for three seasons' i.e. rainy, winter and summer during the year of January, 2009 to December, 2009.

Assessment of infection levels in the host as well as host population provides important information about the success of the parasite life cycle. The severity if its pathogenesis and the effectiveness of host immunity. While studying the parasite age and development rate, the additional information about infection levels proves to reconstruct the recent history by exploring the involvement of the parasites into individual host and population. The current infection rates directly reflect successful parasitic invasion moderated by host defensive response and other behavioral influences such as competition.

Many authors have carried out studies on the helminth parasites and population dynamics of those occurring in piscian hosts and work on different aspects of parasites. The study of population dynamics can be used as the biological basis of method to regulate population of parasites.

**MATERIALS AND METHODS**

The freshwater fishes including the genus *Clarias batrachus* are collected from fish markets of different places of Aurangabad district. The Caryophyllidean tapeworms were collected, preserved, processed to a permanent slide and identified under a compound microscope while drawings are made with the aid of camera lucida. The identification was made with the help of "Systema Helminthium" vol. II. "Cestode of vertebrates" by Yamaguti S. (1961).

Population dynamics of cestode parasites were determined by following formulae,

- 1) Incidence of infection =  $\frac{\text{Infected host}}{\text{Total hosts examined}} \times 100$
- 2) Intensity of infection =  $\frac{\text{No. of parasites collected in a sample}}{\text{No. of infected host}}$
- 3) Density of infection =  $\frac{\text{No. of parasites collected in a sample}}{\text{Total host examined}}$
- 4) Index of infection =  $\frac{\text{no. of host infected} \times \text{No. of parasite collected}}{(\text{Total hosts examined})^2}$

**Table 1.** The values of incidence, intensity, density and index of infection for *Lytocestoid* sp. In the population of *Clarias batrachus* from Aurangabad district during the period of January 2009 to December 2009.

Name of Month	No. of Host examined	No. of Host infected	Total no. of Parasite collected	Incidence %	Intensity	Density	Index of Infection	Locality
Jan-09	25	5	10	20	02	0.4	0.08	Paithan
Feb-09	25	7	13	28	1.8	0.52	0.145	Tisgaon
Mar-09	25	8	19	32	2.3	0.76	0.243	Sillod
Apr-09	25	10	20	40	02	0.8	0.32	Aurangabad
May-09	25	9	20	36	2.2	0.8	0.288	Soyagaon
Jun-09	25	00	00	00	00	00	00	Khultabad
Jul-09	25	00	00	00	00	00	00	Fulambri
Aug-09	25	01	03	04	03	0.12	0.004	Kaigaon
Sep-09	25	02	05	08	2.5	0.2	0.016	Gangapur
Oct-09	25	01	04	04	04	0.16	0.006	Kannad
Nov-09	25	03	06	12	02	0.24	0.028	Aurangabad
Dec-09	25	04	10	16	2.5	0.8	0.064	Tisgaon
Total	300	50	110	16.66	2.2	0.36	0.061	

**Table 2.** The values of incidence, intensity, density and index of infection for *Lytocestus* sp. In the population of *Clarias batrachus* from Aurangabad district during the period of January 2009 to December 2009.

Name of Month	No. of Host examined	No. of Host infected	Total no. of Parasite collected	Incidence %	Intensity	Density	Index of Infection	Locality
Jan-09	25	04	06	16	1.5	0.24	0.038	Paithan
Feb-09	25	03	05	12	1.6	0.2	0.024	Tisgaon
Mar-09	25	02	02	08	01	0.08	0.006	Sillod
Apr-09	25	01	02	04	02	0.08	0.003	Aurangabad
May-09	25	04	05	16	1.2	0.2	0.032	Soyagaon
Jun-09	25	00	00	00	00	00	00	Khultabad
Jul-09	25	00	00	00	00	00	00	Fulambri
Aug-09	25	00	00	00	00	00	00	Kaigaon
Sep-09	25	00	00	00	00	00	00	Gangapur
Oct-09	25	01	01	04	01	0.04	0.001	Kannad
Nov-09	25	01	02	04	02	0.08	0.003	Aurangabad
Dec-09	25	02	03	08	1.5	0.12	0.009	Tisgaon
Total	300	18	26	06	1.4	0.08	0.005	

**Table 3.** The influence of season on the parasitic infection

Genera	Seasons	Incidence %	Intensity	Density	Index of infection
<i>Lytocestoid</i>	Rainy	00	00	00	00
	Winter	08	1.5	0.12	0.009
	Summer	10	1.4	0.14	0.014
<i>Lytocestus</i>	Rainy	03	2.66	0.08	0.002
	Winter	13	2.30	0.03	0.039
	Summer	34	2.11	0.72	0.244

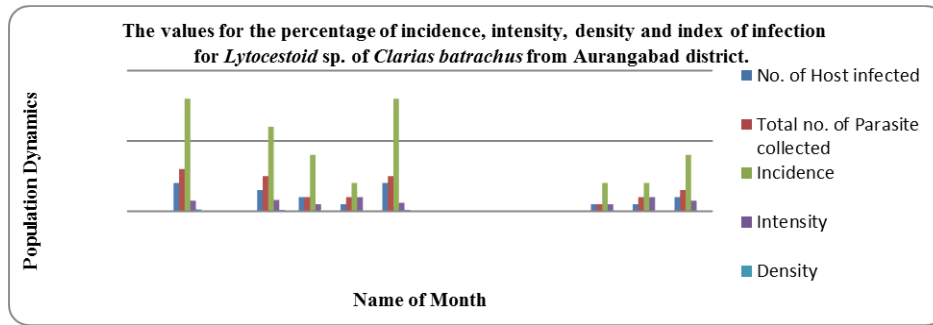


Figure 1.

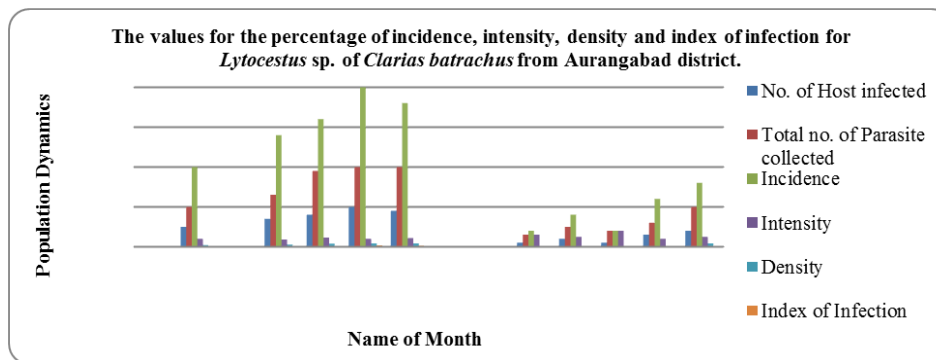


Figure 2.

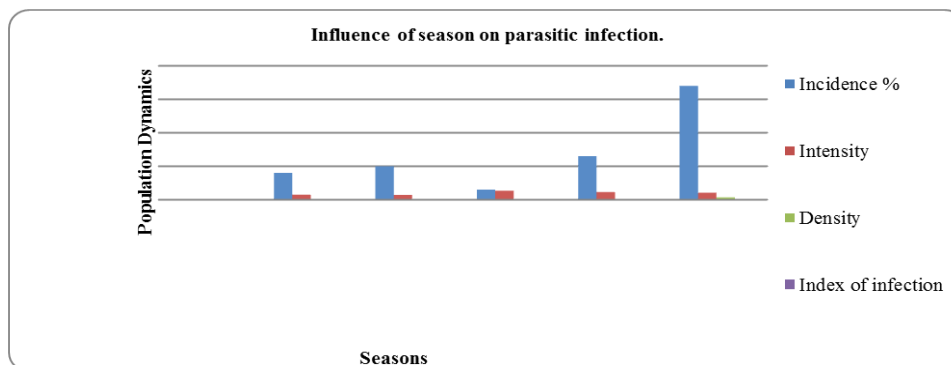


Figure 3.

## RESULTS AND DISCUSSION

The present investigation indicates that out of 300 freshwater fishes, 68 are infected with Caryophyllidean tapeworms. A total 136, tapeworms are collected, out of these 110 parasites from the genus *Lytocestus* (Cohn, 1908) and 26 parasites from the genus *Lytocestoides* (Baylis, 1928). The seasonal variations of Caryophyllidean tapeworms show the maximum infection i.e. 86 (14 *Lytocestoides* and 72 *Lytocestus*) parasites occur in summer seasons (86%) followed by, 42 parasites (12 *Lytocestoides* and 30 *Lytocestus*) in winter season (42%) whereas lower infection 8 parasites (00 *Lytocestoides* and 08 *Lytocestus*) in rainy season (8%). The development of parasite needs high temperature and sufficient moisture. Environmental variations are reflected in seasonal difference in the incidence of diseases. Hence high incident occurs in summer season followed by winter season.

The present investigation shows that the occurrence of infection was host specific because the morphological, physiological and ecological factors affect the host specificity. The morphological factors are those which like a parasite with its host at the site of attachment (Agarwal, 2006). The ecological factors means distribution and environment of the host and Physiological factors means the diet and mode of feeding (Kennedy, 1976). Jadhav and

Bhure (2006) also explained the distribution of parasites are host specific. This type of result indicates the morphological, physiological and ecological factor affects the distribution of parasites.

## CONCLUSION

After the analysis of data it was concluded that the high infection of Caryophyllidean parasites (incidence, intensity, density and index of infection) occurred in summer seasons followed by winter where as low in monsoon season. This type of results indicates that environmental factors and feeding habitat are influencing the seasonality of parasitic infection either directly or indirectly.

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## REFERENCES

- Anderson R. M. (1976).** Seasonal variation in the population dynamics of *Caryophyllaceus lattices*. *Parasitol.* (72) 281-395.
- Baba Jadhav, Bhure D.B. and Nitin Padwal (2008).** Caryophyllidean review from catfishes of Maharashtra (India). *Flora Fauna.* **14**(1):03-22.
- Baylis H. A. (1928).** Some parasitic worms from Lake Tanganyika. *Ann. Mag. Nat. Hist. ser.* **10**(1): 552-562.
- Jadhav B. V. and Bhure D. B. (2006).** Population dynamics of helminth parasites in freshwater fishes from Marathwada region (M.S.) India. *Flora Fauna.* **12**(2):143-148.
- Hiware C.J. et. al. (2007).** Population dynamics of the Proteocephalids Cestode parasitizing freshwater catfish, *Mystus cavasius*. *Flora Fauna.* **13**(2):384-388.
- Dhole Jaywant, Sushil Jawale and Ram Chavan (2009).** Population dynamics of cestode parasites in *Mastacembalus armatus* (LECEPEDE 1800) from Osmanabad District (M.S.) India. *Ecotech.* **1**(2): 156-159.
- Dobson A.P. (1985).** The population dynamics of competition between parasites. *Parasitol.* **91**(2): 317-347.
- Dogiel V.A. (1985).** Parasitology of fishes. Leningrad university press, Olivear and Boyed, Edinburgh and London. 1-348.
- Esch G.W. (1977).** Regulation of parasite population. Academic press, INC, New York. 253.
- Hiware C. J. (1999).** Population dynamics of the Caryophyllidean cestode parasitizing freshwater air breathing predatory fish *Clarias batrachus* Linnaeus. *Riv. Di. Parasitol.* **19**(1).
- Kennedy C. R. (1976).** Ecological aspect of Parasitology. North Holand publishing. Company. Amsterdam 10 X Ford.
- Pennyuick K.L. (1973).** Seasonal variation in the parasite population of three spined stickle backs, *Gasterostes aculeatus* L. *Parasitol.* **63**:373-388.
- Satupute L.R. and Agarwal S.M. (1974).** Seasonal infection of *Clarias batrachus* (Bloch) by *Lytocestus indicus* Moghe and parasitic effects on its hematology and histopathology. *Ind. J. Exp. Biol.* **12**(6): 584-586.
- Thomas J.D. (1964).** Studies on population of helminth parasites in trout (*Salmo trutta* L.) *J. Anim. Ecol.* **33**:83-85.
- Williams D.D. (1978a).** Seasonal incidence of *Isoglaridacris wisconsinensis* (cestoda: Caryophyllaeidae) in its fish host. *Lowa state J. Res.* **53**(4): 305-310.
- Yamaguti S. (1934).** Studies on Helminth Fauna of Japan Part – IV, cestodes of fishes. *Jap. J. Zool.* (6):1-112.