PREVALENCE AND DENSITY OF CESTODE PARASITES OF FRESHWATER FISHES FOUND IN AND AROUND THE KRISHNA RIVER BASIN IN MAHARASHTRA

Patil S. U.
Department of zoology, K. R. P. Kanya Mahavidyalaya Islampur, 415409 India.

Abstract: -
The study was undertaken to determine the prevalence and density of cestode parasites found in and around the Krishna river basin in Maharashtra. Fishes were collected from different collection sites of Satara, Sangli, and Kolhapur district from August 2017 to August 2018. Cestode parasites were collected from the intestine of fresh water fishes namely *Mastacembelus armatus*, *Labeo rohita, Labeo fimbratus Clarius batrachus*, *cirrina mrigala, Wallago attu, Tilapia mossambica* and *Catla catla.* Total 307 fishes were dissected and examined, 109 were found infected. Total 144 parasites were collected throughout the year, preserved in 4% formalin for further study. The high incidence was recorded in summer followed by winter and was low in rainy season.
Keywords: - prevalence, cestode parasites, freshwater fishes, Krishna river

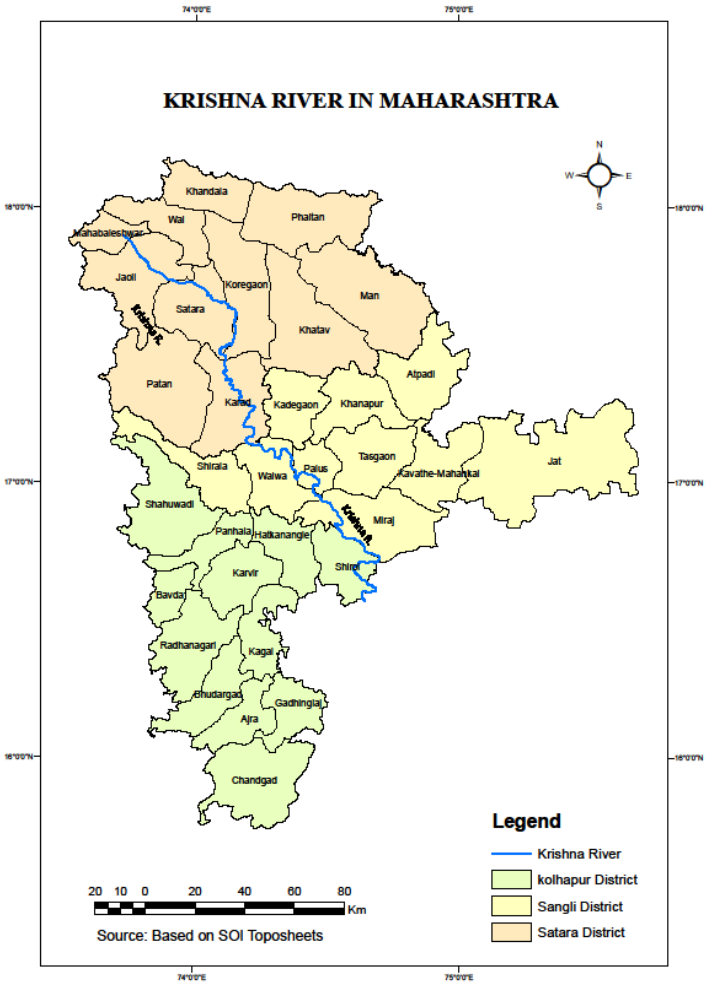
Introduction: -

Krishna River is one of the largest rivers in India and flows through Maharashtra, Karnataka, Telangana, and Andhra Pradesh and finally meets the sea in Bay of Bengal. It originates at Mahabaleshwar, Satara district and flows further through Sangli and Kolhapur district of Maharashtra. Maharashtra is blessed with an abundant supply of water so that the life is enriched by farming as well as fish farming and fishery. Fishery provides a major source of food, employment, and economic wellbeing for the present and future human generations. The nutritive and medicinal value of fish has been recognized since time immemorial. Fishes are the excellent source of proteins, vitamins, and minerals. Fishes are considered as rich protein food for poor people. (Mishra and Sharma, 2004) Under natural conditions 50 – 90 % of the fresh water fishes harbor at least one species of parasites. (Sieszko 1975, Daniel 1978) Crompton (1973) reported that worms prefer alimentary canal of fish, and high concentration occur in intestine. Heavy infection may block the lumen of alimentary canal which affects the growth, health, and the productivity of fishes. These edible fishes are known to harbour a number of cestode parasites which cause deterioration in their health include emaciation (significant loss of body mass), nodules or masses present in skin or muscle, growth inhibition, abnormal swimming, and weakness or death, hence their market, and nutritive value is affected. (Sharma, 2016) Parasites also cause some diseases which finally lead into death of host fishes. Now a days aquaculture contributes for human nutrition. (Chakraborty et.al 2013) Aquaculture supplies almost 50 percent of fish for human consumption globally and it is a source of income for more than 20 million people. (FAO) Hence in order to meet increasing demand of growing population it is necessary to increase productivity and to deserve special attention on aquaculture. The present work has contributed for the study of prevalence and density of cestode parasites of fresh water fishes in and around the Krishna river basin in Maharashtra.

Study area:-

The study was conducted in Maharashtra in and around the Krishna river basin. Krishna river basin is about 257369 sq. km. and in Maharashtra it is about 69425 sq. km. spreading through Satara Sangli and Kolhapur districts and total 21 Tehsil.

Map of study area:-



Material and method:-

The freshwater host fishes were collected at different collection sites from local fishermen. After collection fishes were brought to the laboratory for further study. The host fishes were dissected out and intestines were cut open for parasitological examination. Dissected intestines were examined under stereomicroscope to observe the degree of infection. The cestode parasites were collected, placed in saline solution and freed from the mucus by shaking well. Further the parasites were flattened, and preserved in 4% formalin. These preserved parasites were dehydrated by passing through alcohol grades and finally stained with Harry's haematoxylin cleared in xylene and mounted in DPX for taxonomical study. The drawings were made with the aid of camera Lucida and identified with the help of 'Systema Helminthum' by Yamaguti 1961.

Incidence of infection was calculated according to Margolis et.al. (1982). Population dynamics of cestode parasites were determined with the help of following formulae.

1. Incidence of infection = $\frac{\text{No. of infected host} \times 100}{\text{No, of total hosts examined}}$

2. Intensity of infection = $\frac{\text{No. of parasites collected}}{\text{No. of infected host}}$

3. Density of infection = $\frac{\text{No. of parasites collected}}{\text{No. of total hosts examined}}$

4. Index of infection = $\frac{\text{No. of infected host} \times \text{No. of parasites collected}}{\text{No. of total hosts examined}}$

Results: -

Mastacembelus armatus, Clarius batrachus, channa striatus, Wallago attu, Labeo rohita, Labeo fimbratus, Tilapia mosambica and *Catla catla,* were collected from the different regions of study area. Total 307 fishes were examined for the study of cestode parasites, out of these 109 were infected. Total 144 parasites were collected during present investigation. The % values for prevalence, density, and intensity were given in Table no. 1 whereas seasonal variation given in the Table no 2. The graph 1 and 2 shows the incidence of infection, density, intensity and index of infection while graph 3 and 4 shows seasonal variation of the infection of cestode parasites. The incidence of infection (prevalence) of cestode parasites was 35.50 %, density of infection was 0.46%, and intensity infection was 1.32%.

Discussion:-

The incidence of infection of cestode parasites was highest in summer season (41%) followed by winter (34%) and low in rainy season (30%). The results of the present investigation clearly indicate that environmental factors like temperature, rainfall, feeding habitat, breeding season, etc. directly or indirectly affects the seasonal variation of parasitic infection (Jadhav and Bhure, 2006). Environmental factors are favorable for heavy parasitic infection in summer (Pennyuick1973). Changes in the fish feeding behavior, and annual temperature regime have been considered as the main factors responsible for the seasonal variation of parasites (Eure, 1976). Borde and Jawale (2012) reported high cestode infection (45.33%) from *Clarius batrachus* in summer season. High prevalence was recorded with high intensity and index of infection of *Siluro taenia raoii* in summer followed by winter whereas infection was lowest in monsoon (Bhure and Nanaware, 2010).

Conclusion:-

In the present study it has been observed that incidence of cestode parasites was highest in summer followed by winter, and low in rainy season. This seasonal variation may be due to environmental factors like temperature, rainfall, humidity, breeding period, feeding habitat, etc. The study also revealed the high incidence of cestode parasites i. e. 35.50%. It decreases the growth and protein content and increases the mortality of fishes. By 2050 to feed the estimated population there is requirement of increase in food production. (Singh et.al 2014) so to meet the increasing demand of growing population it is essential to enhance the production of good quality and sufficient quantity of fishes as an affordable source of protein.

Table no. 1

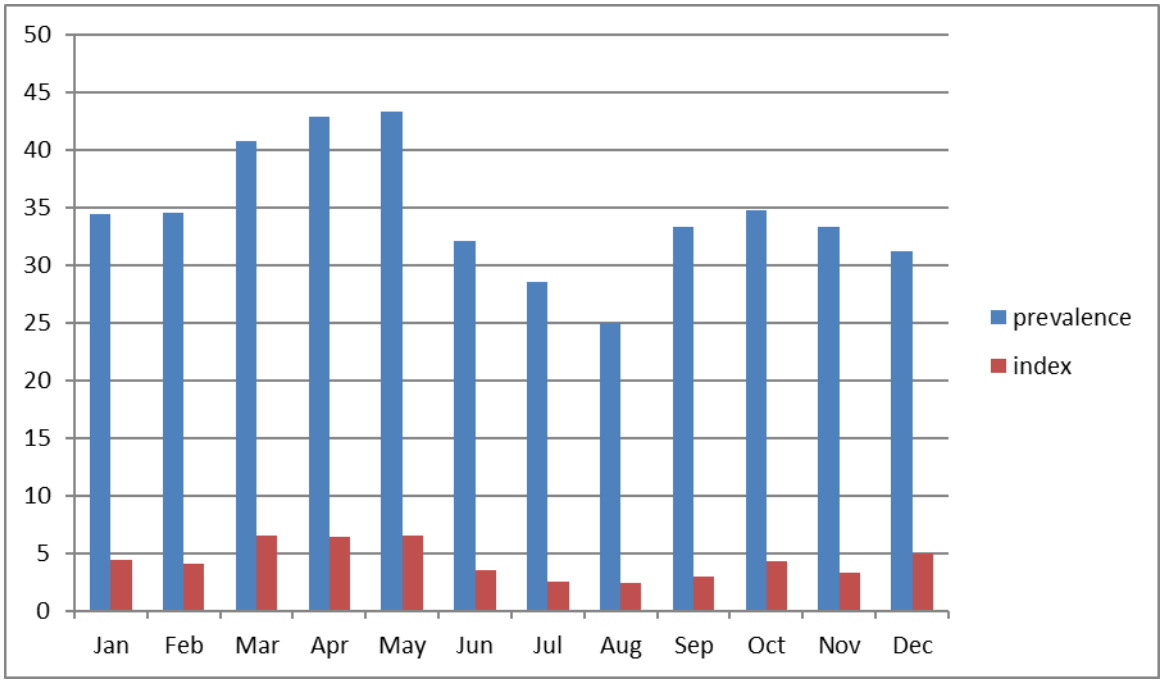
The prevalence (incidence), intensity, density and index of cestode parasites in fresh water fishes.

No. Sr.	Month & Year	No. of dissected Hosts	No. of infected Hosts	No. of Cestode Parasites collected	Prevalence %	Density %	Intensity %	Index %
1	Aug. 2017	20	5	8	25.00	0.40	1.6	2.4
2	Sept. 2017	21	7	9	33.33	0.42	1.28	3
3	Oct. 2017	23	9	11	34.78	0.47	1.37	4.3
4	Nov. 2017	24	8	10	33.33	0.41	1.25	3.3
5	Dec. 2017	32	10	16	31.25	0.42	1.6	5
6	Jan. 2018	29	10	13	34.48	0.43	1.3	4.4
7	Feb. 2018	26	9	12	34.61	0.46	1.33	4.1
8	Mar. 2018	27	11	16	40.74	0.59	1.45	6.5
9	Apr. 2018	26	12	14	42.85	0.53	1.16	6.4
10	May 2018	30	13	15	43.33	0.50	1.15	6.5
11	Jun.2018	28	9	11	32.14	0.39	1.22	3.5
12	Jul. 2018	21	6	9	28.57	0.42	1.5	2.57

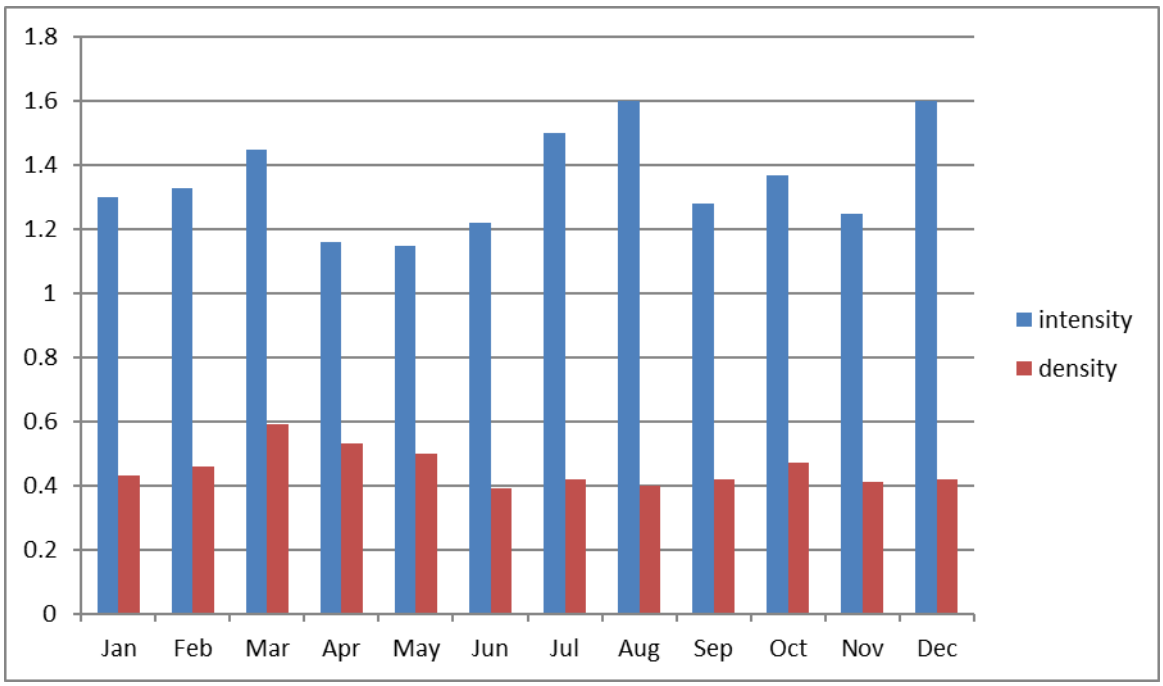
Table no. 2

Influence of seasons on infection of cestode parasite.

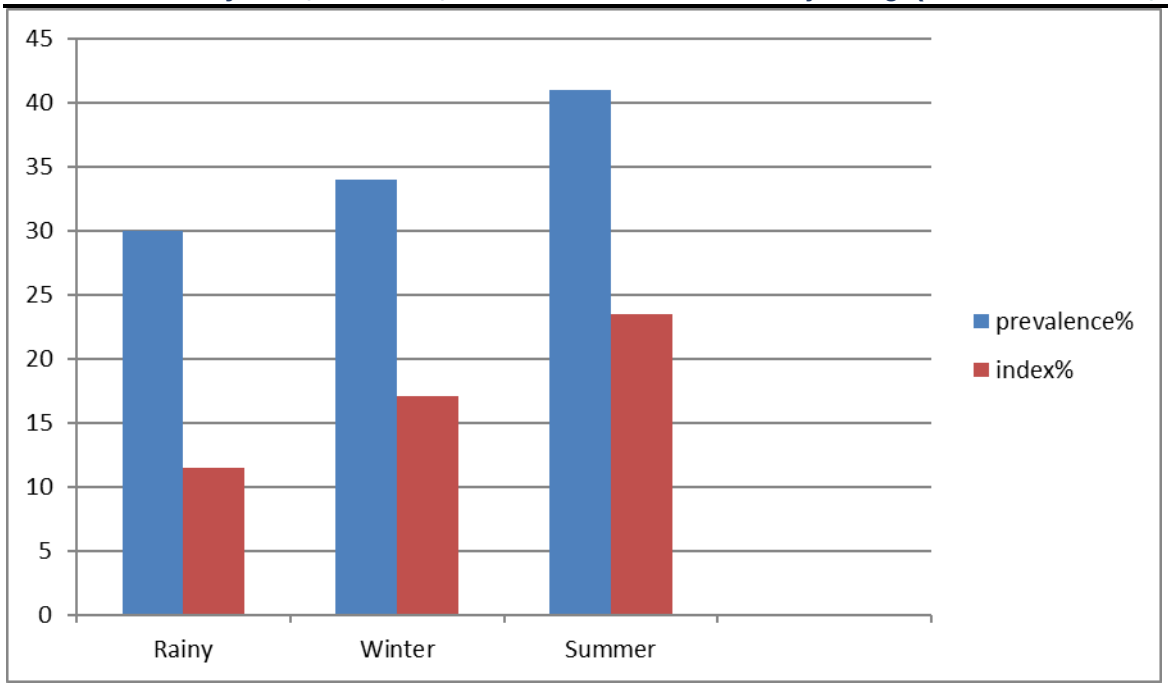
Season	Prevalence %	Density%	Intensity%	Index%
Rainy	30	0.41	1.3	11.1
Winter	34	0.46	1.35	17.12
Summer	41	0.52	1.26	23.53



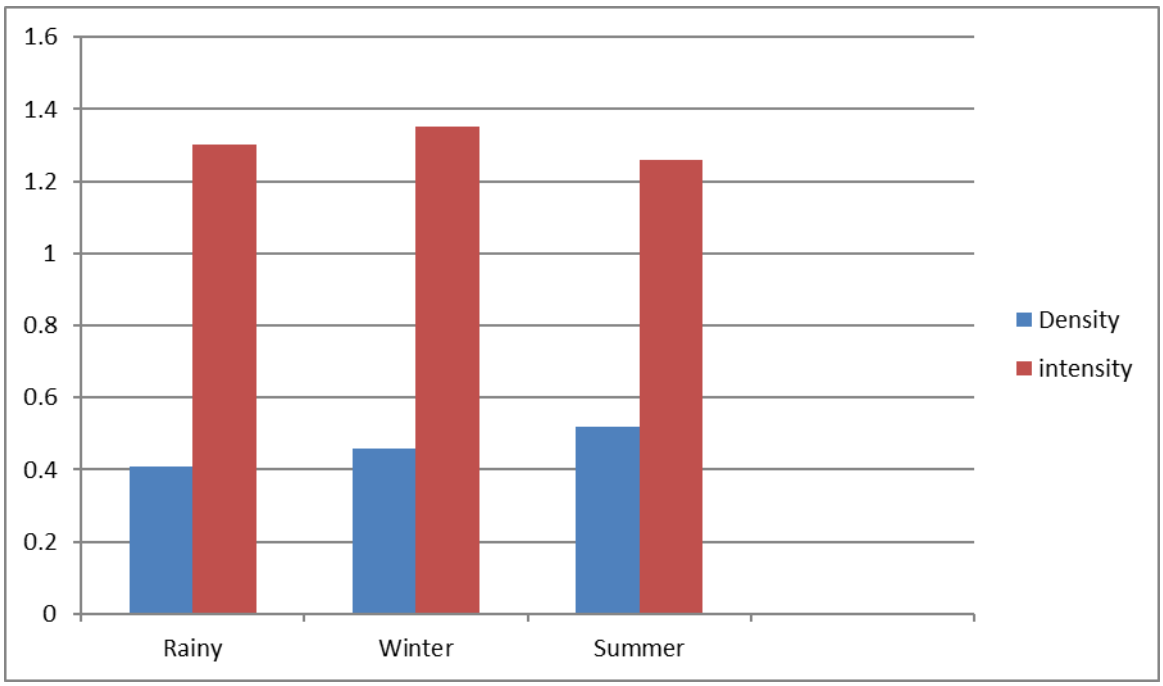
Graph 1: The prevalence (incidence), of cestode parasites in fresh water fishes



Graph 2: The prevalence (incidence), of cestode parasites in fresh water fishes



Graph 3: Influence of seasons on cestode infection in fresh water fishes.



Graph 4: Influence of seasons on cestode infection in fresh water fishes.

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