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STUDIES ON SEASONAL HAEMATOLOGICAL VARIATIONS IN FRESH WATER FISH *CHANNA PUNCTATUS* (BL.) INFECTED WITH TREMATODE PARASITE OF DIFFERENT WATER BODIES OF BUNDELKHAND REGION

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ABSTRACT

The present investigation carried out seasonally from March 2006-February 2008 is an attempt to study the impact of helminth parasitism on the fish Haematology of different water bodies of Bundelkhand region Jhansi. Vary scanty work has been done on haematology of fishes which were very important source of high quality of protein food for human being specially heart patient. Fishes are the main source of protein, fat, vitamins A & D and also provide a large amount of phosphorus, calcium and other elements. Fishes are delicious and easily digestible. The fish Channa punctatus inhabiting the different water bodies carried trematode, cestode, nematode and acanthocephalan infestations either singly or missed. The result showed a mean significant decrease from 14.7-12.8% for hemoglobin. Further a decrease from 3.86 X 10^6 mm^3-3.22 X 10^6 mm^3 for RBCs count in summer season was observed. However, a significant increase in WBC count was observed with a mean increase from 2.9 X 10^3-3.3 X 10^3 mm^3. Further decrease value of PCV from 42-38 was recorded in summer. The increase value of ESR, MCH and MCV were recorded during infection. The diseased species with heavy infection, causing metabolic disorder in the fishes and also disturbing the quantity and quality of meat.

Table: 02 **Figure: 00** **Reference: 15**

Kew words: T.E.C, T.L.C., H^b, P.C.V, M.C.H., E.S.R. Helminth parasite and Haematology.

Introduction:- For the last few decades, fishes have been extensively used as a protein rich diet for human consumption in India and thus, contribute a lot to its economy. In India the fish management has occupied an important place value especially, in the agriculture economy, when the value and usefulness of fish is a cheap source of protein-diet have been greatly realized and emphasized.

Keeping the view the increasing importance of fish as a cheap source of protein rich diet, helminth infections in fresh water fishes has drawn attention of the fish biologist, ichthyologists and parasitologists under fish pathology. Therefore, the present study was designed to study the haematological abnormalities on seasonal basis in the fish *Channa punctatus* of Bundelkhand region Jhansi, arising due to helminth infections so that necessary steps are taken to improve the health condition of the economically important fish *Channa puncatus* (Bl.).

Material and Methods:- Fishes were collected regularly for two years (2006-2008) from different water bodies of Bundelkhand region, were brought in a laboratory for haematological observation. Healthy living fishes of size 9.5-12.8 inches in length and 175-220 gm in weight approximately, were sorted and kept in 0.2% $KMno_4$ solution to check the microbial infection and were kept in a laboratory condition. Temperature was set according to weather between 28^0-35^0c. The fishes were fed regularly with infection free food pallets. Oxygen level of the aquarium was daily observed and maintained. The fishes showing movement were collected from the aquarium for the study of the haematological changes.

For the haematological fishes were cut, open with the help of sharp knife at caudal region. Fresh blood was stored in a clean vial heaving anticoagulants EDTA. For the estimation of hemoglobin (H^b) Haemoglobinometer was used. For the counting of RBC and WBC Haemocytometer and Neubauer chamber were used. For observation of E.S.R. and P.C.V Westergren's methods and Wintrobe's tube method were used. M.C.V and M.C.H.were determined by following formula.

$$M.C.V. = \frac{P.C.V \times 10}{\text{RBC in million / c.mm.}}$$

$$M.C.H = \frac{\text{Haemoglobin/ 100 ml. X 10}}{\text{RBC in millions / c. mm.}}$$

The parasitic worms were collected according to the routine parasitological techniques and proper record was maintained.

Results and Discussion:- On the basis of haematological studies carried out during the present investigation, fishes are divided into three groups, healthy group (A), containing healthy fish, infected group (B), containing fish infected with trematode infection and infected group (C) containing fish infected with trematode and larval infections.

Different haematological parameters H^b %, TEC, TLC, PCV%, ESR, MCH and MCV were calculated under standard haematological methods (Table. No.2). Size and weight of fishes of different group recorded in (Table. No.1).

During the course of investigation, the mean seasonal value of haemoglobin percentage fluctuated from minimum of 13.8 (summer) to a maximum 14.7 (winter) in healthy fish, while as in case of infected fish the value fluctuated from a minimum of 12.8 (summer) to a maximum 14.2 (winter). Thus, the haemoglobin showed a negative correlation with prevalence of infection and decreased as intensity of infection increased. The decrease in haemoglobin content under infected condition has been also observed by Lvasck and V. repo (1969) in carp, Evans (1974) in cut throat due to *Sanguinicola kiamatheusis*; Sinha (2000) in *Clarius batrachus* due to helminthes; Yoshinaga et al (2001) in Japanese flounder infected with *Neoheteriobothrium hirame*; S. F. Siddiqui and S. Naz (2007) due to helminthes infection and A. W. Shah, M. Parveen, S. H. Mir, S. G. Sarwar and A. R. Yausuf (2009) due to helminths parasite.

The reduction in the number of RBCs was found related to the intensity of infection. During the course of investigation, the mean seasonal value of RBCs count fluctuated from a minimum 3.78 X 10^6 mm^3 (summer) to a maximum 3.86 X 10^6 mm^3 (winter) in healthy fish, while in case of infected fish the value fluctuated from a minimum of 3.22 X 10^6 mm^3 (summer) to a maximum of 3.58 X 10^6 mm^3 (winter). The RBCs count thus showed a negative correlation with

prevalence of infection and decreased with increase in the intensity of infection. The increase in RBCs count was also observed in *Rita rita* infected with trematode (Agarwal, 1989); in *clarius batrachus* carrying helminth infection (Sinha, 2000); in Japanese flounder infected with Neoheterobothrium hirame (Mushiake et al., 2001); helminth infection in Channa punctatus (S. F. Siddique, 2007) and helminths parasitism of Anchar Lake, Kashmir (A. W. Shah, M. Parveen, S. Mir, S. G. Sarwar and A. R. Yousuf, 2009).

Season	Name of the fish	Type of the fish	Size (inch.)	Width (inch.)	Weight (gm.)
Summer	*Channa punctatus*	Healthy Group (A)	12.5	5.0	210
		Infected Group (B)	11.2	4.4	180
		Infected Group (C)	10.5	4.0	175
Rainy	*Channa punctatus*	Healthy Group (A)	11.5	4.5	190
		Infected Group (B)	10.5	4.0	175
		Infected Group (C)	9.5	3.8	160
Winter	*Channa punctatus*	Healthy Group (A)	12.8	4.8	220
		Infected Group (B)	11.6	4.1	190
		Infected Group (C)	10.8	3.8	180

Table: 1 Morphological changes in the fishes due to trematode infection during March 2006- February 2008.

The WBC count increased in all fish specimens according to the intensity of infection. The mean seasonal value of WBC fluctuated from a minimum of 2.9 X 10^3 mm^3 (winter) to a maximum 3.1 X 10^3 mm^3 (summer) in healthy fish, while as in case of infected fish the value fluctuated from a minimum of 3.1 X 10^3 mm^3 (winter) to a maximum 3.3 X 10^3 mm^3 (summer). Increase TLC number under infectious conditions are in total agreement with Denisov (1979)

who observed an increase of TLC by 44% in silver carp infected with *Posthodislostomum cuticola* Saxena and Cahauhan (1993) found TLC increase by 2.77% in *Heteropneustus fossilis* infected with *Lucknowia indica.* A higher degree of eosinophilia was observed in *Clarius batrachus* carrying helminth infection (Sinha, 2000), S. F. Siddique and S. Naz, (2007) observed the increase of TLC in *Channa punctatus* and A. W. Shah. M. Parveen, S. H. Mir, S. G. Sarwar and A. R. Yousuf (2009) also observed the increase of TLC during helminth infection.

Season	**Name of fish**	**Type of fish**	**H^b %**	**TEC $x10^6$ mm**	**TLC $x10^3$ mm**	**PCV %**	**ESR**	**MCH**	**MCV m^3**
Summer Season	***Channa punctatus***	Healthy Group (A)	13.8	3.78 x 10^6	3.1 x 10^3	40	1.0	36.20	105.82
		Infected Group (B)	13.2	3.42 x 10^6	3.2 x 10^3	39	1.2	38.59	114.03
		Infected Group (C)	12.8	3.22 x 10^6	3.3 x 10^3	38	1.3	39.75	118.01
Rainy Season	***Channa punctatus***	Healthy Group (A)	14.2	3.76 x 10^6	3.0 x 10^3	41	1.1	37.76	108.75
		Infected Group (B)	13.7	3.56 x 10^6	3.1 x 10^3	40	1.2	38.48	112.35
		Infected Group (C)	13.5	3.44 x 10^6	3.2 x 10^3	39	1.4	39.24	113.37
	Channa	Healthy Group	14.7	3.86 x 10^6	2.9 x 10^3	42	1.2	38.08	108.80

Winter Season	***punctatus***	(A)							
		Infected Group (B)	14.2	3.58 x 10^6	3.0 x 10^3	40	1.4	39.66	111.73
		Infected Group (C)	13.8	3.38 x 10^6	3.1 x 10^3	39	1.5	40.82	115.38

Table: 2 Seasonal Haematological variations in *Channa punctatus* (Bl.) infected with trematode parasites during March 2006- February 2008.

The PCV value fluctuated from a minimum of 40 (summer) to a maximum 42 (winter) in healthy fish while as in case of infected fish the value fluctuated from a minimum of 38 (summer) to a maximum 39 (winter). The decrease PCV value is in conformity with (Sinha, 2000) and S. F. Siddique and S. Naz, (2007).

The ESR value fluctuated from a minimum of 1.0 (summer) to a maximum 1.2 (winter) in healthy fish while as in case of infected fish the value fluctuated minimum 1.3 (summer) to a maximum 1.5 (winter). The increase ESR value is in agreement with (Sinha, 2000) and S. F. Siddique and S. Naz, (2007).

The MCH value fluctuated from a minimum of 36.20 (summer) to a maximum 38.08 (winter) in healthy fish while as in case of infected fish the value fluctuated minimum 39.75 (summer) to a maximum 40.82 (winter). The increase MCH value is in total agreement with (Sinha, 2000) and S. F. Siddique and S. Naz, (2007), also observed decrease of MCH value during helminths infection.

The MCV value fluctuated minimum of 105.82 (summer) to a maximum 108.80 (winter) in healthy fish while as in case of infected fish the value fluctuated minimum 114.03 (summer) to a maximum 115.38 (winter). The increase MCH value is in total agreement with (Sinha, 2000) and S. F. Siddique and S. Naz, (2007), also observed decrease of MCH value during helminths infection.

During the course of present investigation haematological indices are more prominently altered by trematode parasite infestation showing highest alterations during summer months than winter seasons, which may be attributed to higher level of water pollution during summer season Zutshi, 1980; Yousuf and Shah, 1988; Sarwar, 1999; Shamim and Pandit, 2002; S. F. Siddique and S. Naz, (2007) and A. W. Shah. M. Parveen, S. H. Mir, S. G. Sarwar and A. R. Yousuf (2009). The results also revealed that trematode infection produces anemia with decrease RBC number and increase in TLC in fish.

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