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HAEMATOLOGICAL CHANGES IN A FRESHWATER FISH *LABEO ROHITA* OF TARAI REGION, INFECTED WITH TRYPANOSOMES

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ABSTRACT

Infected hill stream fish *Labeo rohita* revealed the present of Trypanosomes in the blood which causes conspicuous fall in Total Erythrocyte Count (TEC), Packed Cell Volume (PCV), Haemoglobin content (Hb), MCHC content and rise in Total leucocyte count (TLC), Erythrocyte sedimentation rate (ESR), Mean Corpuscular Volume (MCV). The differential leucocyte count (DLC) revealed a rise in the small lymphocyte, basophils and monocytes, while the neutrophils, thrombocytes, large lymphocytes and eosinophils fall in the infected fish.

KEYWORDS : Fish *Labeo rohita*, trypanosomes, TEC, TLC, Hb, PCV, ESR, MCHC, MCV, DLC.



INTRODUCTION :

Presence of trypanosomes in fishes has been reported from all over the world such as Abolarian (1970), Tandon and Joshi (1973 & 1977), Joshi (1979), Joshi and Dabral (1981), Sharma et.al. (1984), Gupta and Agarwal (1985), Gupta and Gupta (1987), Joshi (1989), Sharma and Joshi (1991) and Rauthan (2004). But the impact of this parasite on human blood parameters in valley zone of India is not well known. Therefore to fill this gap, the present investigation is an attempt to

obtain the results on some haematological values obtained from the hill stream fish *Labeo rohita* infected with trypanosomes under natural condition of Tarai region.

MATERIALS AND METHODS

Live fishes were collected from the reservoirs of Tarai region fishes were brought to laboratory in plastic containers and transferred to glass aquaria for 10 days acclimatization. During acclimatization the fishes were fed on usual diet. For all kind of haematological investigated blood was collected from branchial vein using a microsyringe with 24 gauge needle. The fishes were sacrificed and studies were made on the haematological parameters. Out of these 30 specimens, 12 were found trypanosomes. The studies were made on the selected parameters viz. Total Erythrocyte Count (TEC), Total Leucocytes Count (TLC), Haemoglobin Contents (Hb), Packed Cell Volume (PCV), Erythrocyte Sedimentation Rate (ESR), Mean Corpuscular Haemoglobin Concentration (MCHC), Mean Corpuscular Volume (MCV) and Differential Leucocyte Count (DLC) following the standard methods as

used Joshi (1989) and Rauthan (2004).

RESULTS AND DISCUSSION

TEC was found lowered in diseased fish as compared to the healthy ones. The fall in diseases fish was 28.0% against the normal healthy fish ($2.89 \pm 22 \times 10^6/\text{cmm}$). The haemoglobin content (Hb) were also found depleted by 27.8% in diseases fish against the healthy fish ($10.4 \pm 1.03\text{gm}\%$) (Tables 1 & 2).

Table 1 : Haematological changes in freshwater fish *Labeo rohita*. All values are mean \pm SE for six specimens each.

Parameters	Healthy Fish	Infected Fish
TEC ($\times 10^6/\text{cmm}$)	2.80 ± 0.22	2.05 ± 0.20
TLC ($\times 10^6/\text{cmm}$)	8840.81 ± 12.02	10742.0 ± 205.0
Hb (gm %)	10.3 ± 1.03	7.3 ± 1.06
PCV (%)	30.0 ± 2.0	2.80 ± 1.80
ESR (mm/hour)	1.12 ± 0.40	2.30 ± 0.20
MCV (μm^3)	170.0 ± 10.0	202.0 ± 13.0
MCHC (%)	34.0 ± 1.4	28.3 ± 1.6

Table 2 : Differential blood cell counts (%)

Parameters	Healthy Fish	Infected Fish
Large lymphocytes	6.2 ± 0.52	5.2 ± 1.2
Small lymphocytes	24.50 ± 2.3	30.0 ± 3.0
Monocyte	1.30 ± 0.56	2.40 ± 0.30
Neutrophil	20.0 ± 3.5	16.0 ± 0.30
Eosinophil	0.38 ± 0.2	2.2 ± 0.4
Basophil	1.69 ± 0.4	1.90 ± 0.6
Thrombocyte	42.0	30.1 ± 4.6

The TLC value was found to have increased under disease by about 16.1% against the healthy fish value of $8840.81 \pm 120.2 \times 10^6/\text{cmm}$. The PCV value also showed a fall of about 15.6%. The MCHC was found lower in infected fish as compared to the healthy fish 20.1%. The MCV value had rise in the infected fish by about 15.8% and the ESR value rose by about 51.3% as compared to the healthy fish values. The Differential cell counts also revealed conspicuous change.

The number of small lymphocyte, bisophils and eosinophils rose due to infection, but the number of thrombocytes and neutrophils fall in the diseased fishes, as compared to the healthy fishes. The number of lymphocytes, like those of the neutrophils also fell by a little margin in infected fish as compared to the health ones (Table 2). The monocytes were found higher in infected fishes as compared to the healthy fishes.

Parasitic infections have been found to destroy erythrocytes and cause anaemia (Ven Brand, 1973). Decrease Hb Percentage, High value of ESR and fall in PCV value is infected fishes in the present study are clear indications of anaemia. The present study support to Englel and Davis (1961), Smirnova (1971), Tandon and Joshi (1973), Joshi (1979), Joshi and Dabral (1981) and Joshi (1989).

As many as ten species of freshwater teleosts having haemoflagellate trypanosomes in their blood fully revealed that trypanosomiasis cause definite alterations in various blood component TE, Hb and PCV values fall due to these haemaflagellates while the TLC usually rise (Tandon and Joshi, 1973) but Joshi and Dabral (1981) reported the TCL value fell sharply and significantly between 60-100% under heavy infection. The RBC, WBC, Hb and PCV values were found to have depleted in cat fish.

Kumar et.al. (1984) reported TLC and ESR values are highest in *Schizothorax richardsonii* severally suffering from black spot disease. Smirnova (1970) in the perch *Lota lota* infected with

trypanosomes noted decrease TEC, and Hb but increased number of leucocytes.

Similarly a recent report by Gupta and Gupta (1990) following experimental inoculation of trypanosomes in the fresh water shark as *Wallago attu* also found severe anaemia 39 days post infection, where TEC had from 2.4 to 1.6 x 10⁶/cmm and Hb from 11.4 to 8.0 gm%. The differential blood cell counts also revealed noticeable changes. The small lymphocytes, basophils, monocytes and eosinophils rose in the infected fish (Table 1), while the number of neutrophils and thrombocyte and large lymphocytes fall (Table 2).

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REFERENCES

1. Abolarin M.O. 1970. A note on the trypanosomes of African freshwater fishes and some comments on the possible relationship between taxonomy and pathology in trypanosomes. Bull. Epizoot. Dis. Afr. 18: 221-228.
2. Engel, D.W. and Davis, E. M. 1964. Relationship between activity and blood composition in certain teleosts; Copeia. 31 : 586-587.
3. Gupta, N. and Gupta, D. K. 1986. Trypanosomes infectivity and changes in the glucose level of two fresh water fishes. J. Parasitology 10 : 213-223.
4. Joshi, B. D. and Sharma, T. 1992 : On some haematological changes in a hill stream fish *Tor putitora* infected with trypanosomes. Him. J. Env. Zool. 6 : 60-64.
5. Joshi, B.D. 1979. Hyperlactemia in the fish blood infected with trypanosomes. Sci. Cult. 45 : 320-321.
6. Joshi, B.D. 1982. Three new species of haematozoans from freshwater teleosts (pisces) Proc. Indian Acad. Sci. (anim. sci.) 91 : 397-406.
7. Joshi, B.D. 1989. Physico-pathological studies on the blood of few hill stream Teleosts. Proc. Natl. Symp. Pp. 127-137.
8. Joshi, B.D. and Dabral, R. 1981. Some haematological changes in a fresh water cat fish *Heteropneustes fossilis* infected with trypanosome. Proc. Ind. Acad. Sci. 90 : 295-301.
9. Kumar, A. and Singh, H. R. 1984. Haematological changes in cold water fish *Schizothorax plagiostomus* (Heckel), infected with black and disease. Ind. J. Parasit. 8 : 129-131.
10. Laird, M. 1951. Some trypanosomes of New Zealand fish, Proc. Zool. Soc. London, 12 : 285-309.
11. Mandel, A. K. 1979. Studies on the haematozoa of some catfishes belonging to the genus *Mystus* (scopali) from India. Bull. Zool. Sury. India 2 : 17-23.
12. Pandey, K. C. and Pandey, A. K. 1974. Studies on a new species of trypanosome from fishes and its effect on piscine hosts. Indian J. Zootomy, 15 : 15-18.
13. Radhakrishnan, S. Nair, N. B. and Balasubramaniam, N. K. 1984. *Gymnorhynchus gigas* plerocercoid infection of the liver of *Diodon hystrix* (Pisces : Diodontidae) II. Haematological changes infected fish. Fish and Umwelt. 13 : 27-39.
14. Rauthan, J.V.S, Rauthan, Geeta and Grover, S.P. 2004. Haematological changes in a hill stream fish *Garra gotyla gotyla* (Gray). Indian J. Environ. & Ecoplan. 8(3) : 667-670.
15. Smrihova, L. I. 1970. Trypanosome in the blood of *Lota lota* L. (*Trypanosoma loti* sp. nov.) Parasitologiya. 4 : 296-297.
16. Tandon, R. S. and Joshi, B.D. 1973. Studies on the physiopathology of blood of fresh water fishes infected with two new forms of trypanosomes. Z. Wies Zool. Leipz. 185 : 207-221.

- 17.Von Brand, T. 1973. Biochemistry of Parasites. 2nd Ed. Academic Press, New York, Pp. 213.
18.Woo, PTK, 1979. Trypanoplasma salmostica : Experimental infection in rainbow trout *Salmo gairdneri* Exp. parasitol, 47 ; 68.48.



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