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**Differential blood cell counts of the fish *Heteropneustes fossilis* (Bloch.) infected with Trypanosomes**

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**ABSTRACT [ Note this title is in 14 font size of Times New Roman script ]**

In a batch of 30 individuals of *Heteropneustes fossilis*, purchased from the fish market of Haridwar, in the month of October 2013, ten fishes were found hosting the haemoflagellate parasite Trypanosomes. XXXXXXXXXXXX.....XXXXXXXXXX.

**[Note this Abstract matter is in 10 font size , bold and in Times New Roman script]**

**INTRODUCTION**

Haematological techniques are important for the assessment of the impact of trypanosome infections on fish health( Baker 1960). Since the first piscine trypanosome was discovered from the blood of *Salmo fario* by Valentin in 1841, more than 190 trypanosome species have been recorded from around the world, Campbell (Campbell 2004). Several authors have recorded piscine trypanosomes from many of the major freshwater systems of Africa(Joshi 1973, Gupta & Gupta,2012 Hickey,1976 & Mulcahy,1970) . The disease caused by trypanosomes in fishes is termed as *Piscine Trypanosomiasis*. Generally the parasitaemia is low and often trypanosome detection is difficult. Fish reared and propagated in indoor ponds seldom pose a serious problem due to the lack of leech vectors ( Tandon & Joshi,1973 and Gupta & Gupta,2012) . This paper presents variations in the differential leucocyte and red blood cell counts and in the haemoglobin contents of the fish *Heteropneustes fossilis* infected with trypanosomes.

**[Note this matter is in 12 font size of Times New Roman and not bold]**

**MATERIAL AND METHODS**

Fresh water fishes were purchased from the Pheet Bazaar of BHEL Haridwar and were brought alive in laboratory in the plastic bags and transferred to the aquarium and maintained under laboratory condition for the purpose. The fish were rested for acclimation of at least 24- 40 hrs. To make various estimations from blood samples fishes were handled, anaesthetized, blood drawn, and processed for making studies on different selected parameters including slide preparations were followed as describe by Tandon & Joshi (1973), Wintrobe (1973) and Kocabatmaz,M.,Ekingen,G (1984). The first 100 red corpuscles were also counted and listed for differential red blood cell counts.

**RESULTS AND DISCUSSION**

Fishes infected with trypanosomes named *Typanosoma maguri* were found to be sluggish and inactive in comparison with the healthy ones. Body of trypanosomes was long and attenuated at the two ends. The nucleus is usually on the concave side and may be towards the center. It is generally placed either in the middle of the body or slightly behind the middle but in some specimens it was towards the posterior end of the body.

Higher prevalence of infection of Tryps. when compared to the healthy fishes then the presence of Trypanosomiasis caused marked changes in the blood values of infected fishes has been pointed earlier by many authors (Snieszko,S.F.,J.Camper, F.Howard, L.L.Pettijohn, 1960 ; Snieszko,S.F.,J.Camper, F.Howard, L.L.Pettijohn, 1960 ). Gupta & Gupta(2012) and Joshi *et al*, (2014) again conformed that fishes having Trypanosomes infection were anemic and anemia increased with the intensity of infection as the fishes with mildly infected are less and heavily infected fishes are showing more anemia.

Table -1: Comparative values of Hemoglobin (gm %) contents of *Heteropneustes fossilis* (Bloch). All values are of 10 observations each [ Note this table title is in 12 font size of bold Times New Roman script]

| Sex    | Standard body length(cm) | Hemoglobin (gm %) |          |
|--------|--------------------------|-------------------|----------|
|        |                          | Healthy           | Infected |
| Male   | 13.95<br>(13.1-14.8)     | 14.3              | 12.5     |
| Female | 14.75<br>(14.5-15.0)     | 15.2              | 11.2     |

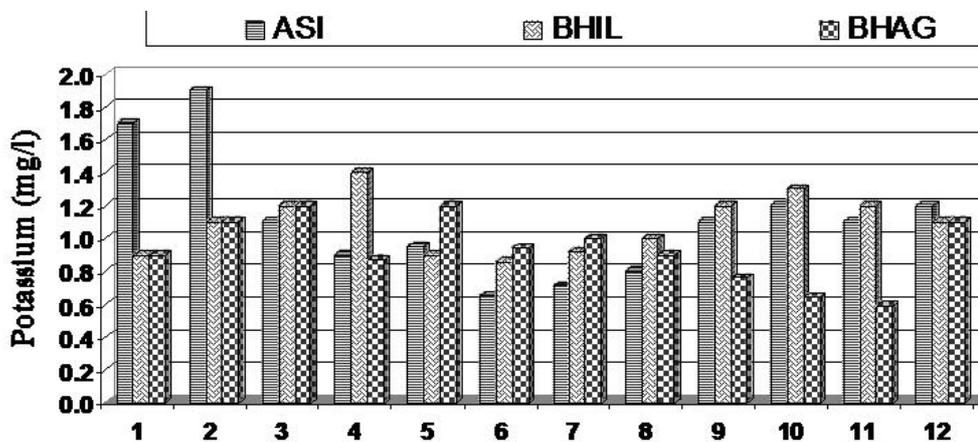


Fig.28- Monthly variation in Sodium Contents of Bhagirathi river and its two tributaries.

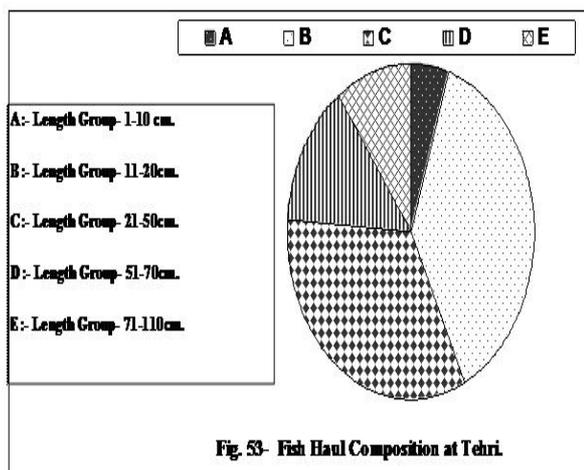


Fig. 53- Fish Haul Composition at Tehri.

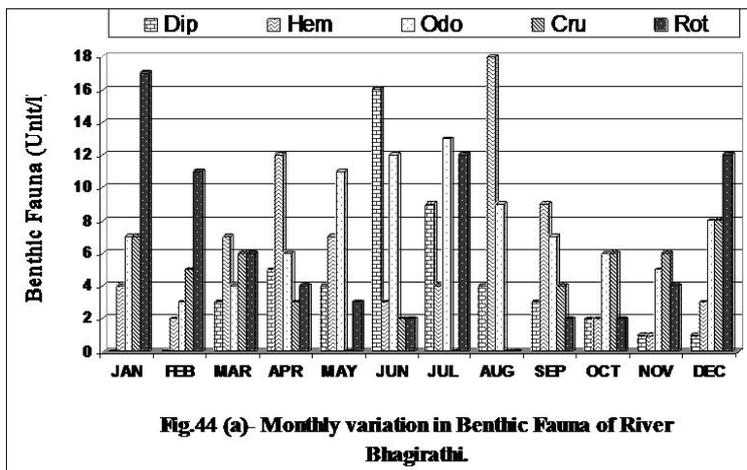
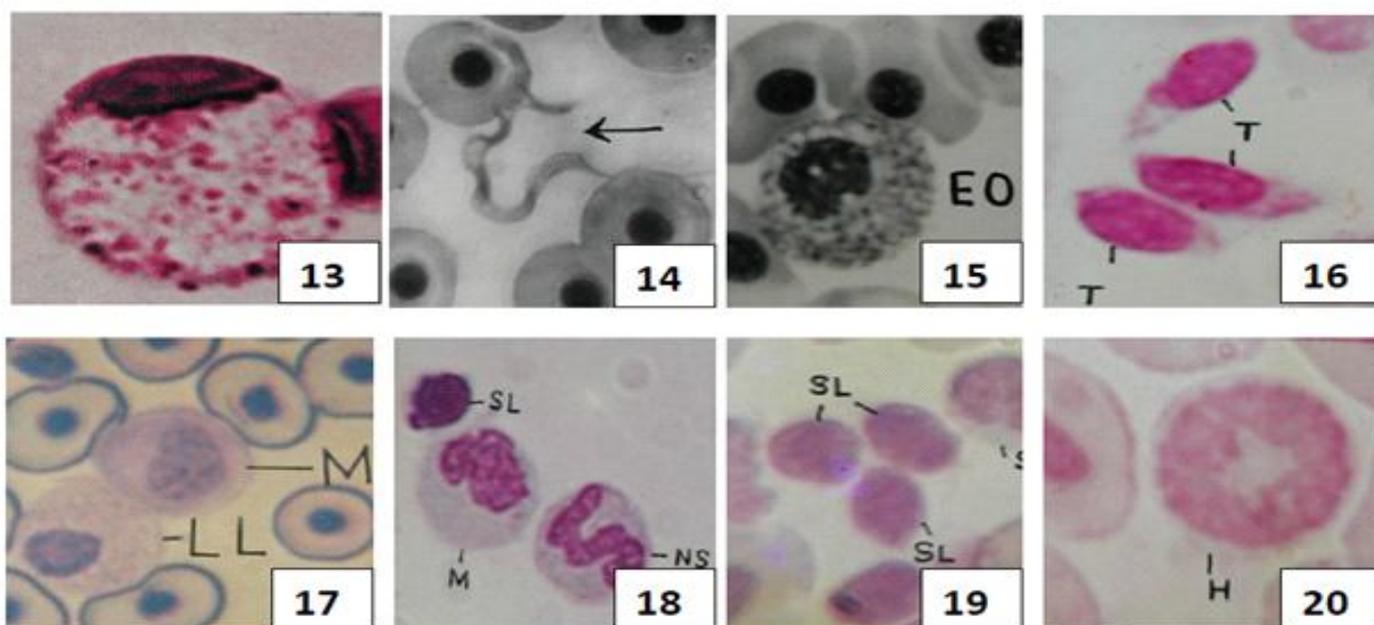


Fig.44 (a)- Monthly variation in Benthic Fauna of River Bhagirathi.

Please Note : All the words / Letters over the Pictures / Photographs / Graphics / Pi- diagrams / Histograms for their Labeling must be clearly Legible.

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## Plate-A

**Plate -A : Explanation to the micro-photographs from a Frog Nos. -13 to -20 is as following:**

13. An eosinophil.
14. Trypanosome in the blood.
15. An eosinophil (EO).
16. Three thrombocytes.
17. A lymphocyte with a monocyte.
18. A small lymphocyte, one monocyte and a neutrophil with stab shaped nucleus.
19. A group of small lymphocyte .
20. An early stage haemoblast.

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