

Temperature Dependent Haematological Alterations of Freshwater Cultivable Fish, *Oreochromis Mossambicus* from Nanded District (Ms) India

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ABSTRACT: Temperature is an essential and fluctuating environmental factor influencing all life activities which dominate remarkable changes on hematological parameters of aquatic animals. The present investigation deals with temperature dependent influence on Haematology of freshwater cultivable fish *Oreochromis mossambicus*. The fishes were exposed to different temperatures such as 20°C, 25°C, 30°C 35°C and 40°C for 96 hr exposure. The result reveals that the RBC and WBC count were steadily decreased at higher temperature as compared to control.

KEY WORDS: Temperature, Haematology, *Oreochromis mossambicus*.

I. INTRODUCTION

The temperature regulation in homeotherms and poikilotherms have emerged through the study on the effect of temperature on animals. Ectothermic animals can be subject to large and sometimes rapid change in their environmental temperature. It plays important role in determining animal distribution in any aquatic environment. Global warming is today an issue of concern for every nation. A change in ambient temperature alter the behavioral and hematological activities.

Haematological parameters are important for the evaluation of fish physiological status and their changes depend on the fish species, age, sexual cycle and health status [3,7,8,9,10,11,12]. The impact of temperature may affect the growth, maturity and reproductive status of the fish and ultimately the population size and economic value of the nation. Hence present investigation was undertaken on temperature dependent influence on haematological aspects of freshwater cultivable fish *Oreochromis mossambicus*.

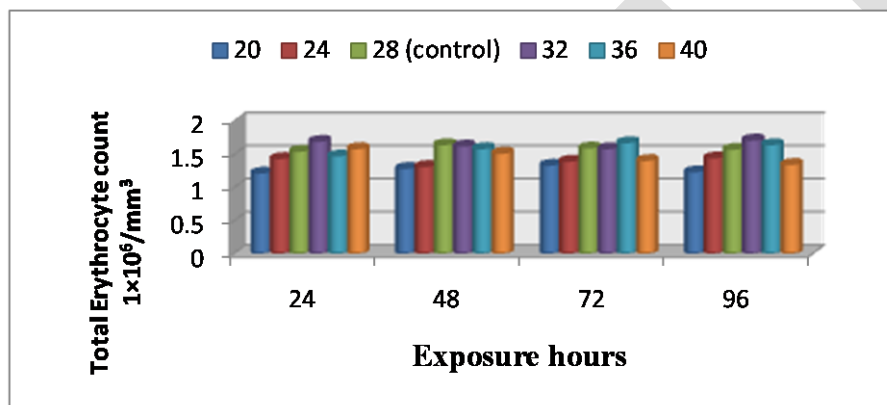
II. MATERIALS AND METHOD

The fresh water cultivable fish *Oreochromis mossambicus* were collected from Godavari River at Nanded with the help of local fisherman. They were acclimated for 7 days prior to experimentation. The varying size of fishes ranging from 50-55 g were selected for experiment. The blood samples were taken from the caudal peduncle of fish with the help of sterilized syringe. RBC and WBC count were done by using improved Neubaur's Haemocytometer [5,6]. The total RBC count expressed in terms of $10^6/\text{mm}^3$ and the total WBC count expressed in terms of $10^3/\text{mm}^3$ blood sample.

III. RESULTS AND DISCUSSION

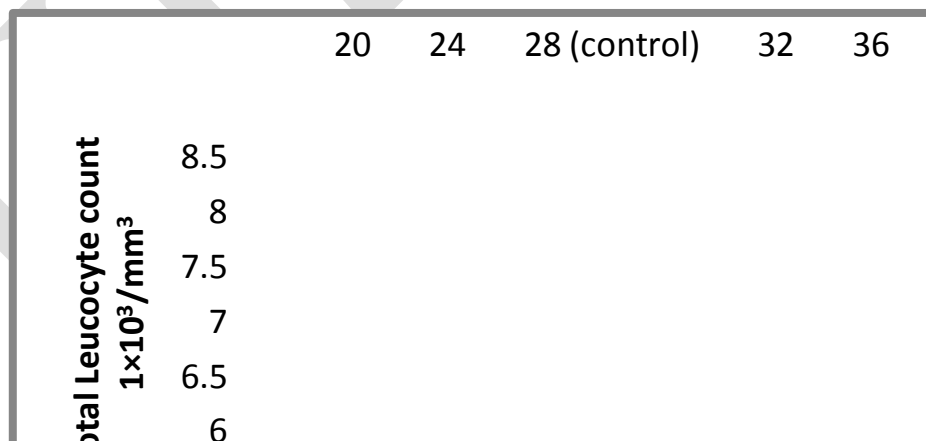
In the present investigation, *Oreochromis mossambicus* were exposed to variable temperatures up to 96 hours. The haematological indices showed different sensitivity to various environmental factors [11]. The temperature sensitivity is comparatively more dominant than the other experimental factors. It is studied in detail and represented in following (Figure 1 and 2). The following Figures 1 and 2 shows the Temperature dependent influence on Red Blood Cell (RBC) count of fresh water fish, *Oreochromis mossambicus* at 20°C, 24°C, 32°C, 36°C and 40°C. In present investigation the total count of RBC was decreased at low temperature (20°C) and at High temperature (40°C). The Slightly increased RBC count observed at 32°C as compared to control.

Figure-1: Temperature dependent influence on Red Blood Cell (RBC) count of fresh water fish, *Oreochromis mossambicus* at 20°C, 24°C, 32°C, 36°C and 40°C.



(Each value is mean of six observations ± SD)

Figure-2: Temperature dependent influence on White Blood Cell(WBC)count of fresh water fish, *Oreochromis mossambicus* at 20°C, 24°C, 32°C, 36°C and 40°C.



(Each value is mean of six observations ± SD)

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The properties of blood are highly sensitive to temperature. Increase in temperature causes a large decrease in oxygen affinity of the blood which causes increase in RBC in blood [2]. In earlier studies, [1] observed similar results in *Clarius gariepinus*. The increased RBC's count may be due to stimulation of erythropoietin by elevated demands for O₂ or CO₂ transport as a result of increased metabolic activity. In the present investigation the WBC count also decreased at low and high temperature as compared to control set in the fish *Oreochromis mossambicus*. This decrease in leucocytes count may be due to the reduction in secretion of thyroid hormone which causes reduction in the synthesis of white blood cells. Study of haematological parameters are important in diagnosing the structural and functional status of fish under various stress [3]. Water quality is affected by different temperature. Any physiological change will be reflected in the values of one or more of haematological parameters [9]. Both erythropoiesis and leucopoiesis processes showed considerable reduction in *Oreochromis mossambicus* as a temperature increases gradually then the natural (control). It may affect the natural physiology of reproduction and ultimately the population size of fishes. Hence we all should try to reduce the global warming to save the natural aquatic biota.

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