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# SEASONAL VARIATION IN THE HAEMATOLOGICAL VALUES OF THE INDIAN EEL *ANGUILLA BICOLOR* (MCCLELLAND)

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## ABSTRACT

A live freshwater eel *Anguilla bicolor* were collected from the fish landing centres of Cauvery delta in and around Thanjavur from January 2009 and December 2009. The blood samples were collected every month from the healthy fishes of different size group. Blood chemistry was thoroughly analysed adopting standard procedures. The result indicating that there was a significant fluctuation in total protein, glucose, cholesterol and triglycerides with references to size group and seasons. TEC and Hb content were positively correlated with body length in both the sexes. Higher value of biochemical components observed in rainy season than summer months. In the overall analysis, the total blood protein showed maximum value when compared to other components in all seasons. The study reveals the fact that the eel *Anguilla bicolor* has a rich source of animal protein and moderate amount of soluble cholesterol. Hence it suggested that this fish is more suitable for human consumption.

**Keywords: Haematology, *Anguilla bicolor,* Cholesterol**

## INTRODUCTION

Fish is the main source of animal protein and is therefore important in the diets of the lowest income group **[1].** Haematology of fish is increasingly gaining recognition due to its importance in the study of fish health and diagnosis of various diseases **[2, 3, 4, 5].** The study of haematological parameters in fish

helps for understand the toxicology and environmental stress **[6, 7, 8].**

In many instances the body size along with sex and season which are important factors to bring about changes in blood parameters **[9].** According to Das *et al*. **[10]** haematological parameters may closely related to the response of the animal to the environment. Further the environmental pollutants, disease attack and starvation also alter the blood chemistry **[11, 12, 13].** The seasonal variation in haematological study of fishes is limited. Hence the present paper deals with blood chemistry of Indian freshwater eel *Anguilla bicolor* in relation to seasons.

## MATERIALS AND METHODS

Alive freshwater eel *Anguilla bicolor* were collected from the fish landing centres of Cauvery delta in and around Thanjavur as monthly sample from January 2009 to December 2009. They were brought to the laboratory and weighed to select median size group. The blood samples were collected from individual fishes by cardiac puncture using 21 gauge hypodermic needle in collection bottle containing EDTA. Standard haematological procedures described by Blaxhall and Diasley **[14]** were employed in the assessment of the various blood parameters. Total protein was estimated by Biuret method **[15].** Glucose was estimated by enzymatic colorimetric method **[16]** Cholesterol was done by enzymatic colorimetric method **[17],** triglycerides **[18],** haemoglobin **[19],** TEC **[20].** The data were analysed statistically and presented in a vivid manner.

## RESULTS

Result obtained for haematological parameters of Indian freshwater eel *Anguilla bicolor* are given in the **Table 1** and **Figure 1-4**. From the data, it is clearly showed that the haematological parameters showed significant fluctuation between different seasons. In the present study, the entire year can be divided into four seasons namely summer, pre-monsoon, monsoon and post-monsoon. The protein content was found to be maximum (4.08 ± 0.32 g/dl) in monsoon months and minimum (2.41 ± 0.22 g/dl) in summer seasons. The total glucose varied from 98 ± 2.34 to 168 ± 2.08 mg/dl. It was found to maximum (98 ± 2.34) in summer season and minimum (168 ± 2.08) in monsoon season. The biochemical pictures such as protein, cholesterol, triglycerides, haemoglobin and RBC showed higher value in monsoon season and they were lower in summer season. WBC was found to be an elevated level in summer than monsoon.

**Table 1: Biochemical Composition on the Blood of Eel *Anguilla Bicolor* in Different Seasons**

| Biochemical components | Summer | Pre-monsoon | Monsoon | Post-monsoon |
|---|---|---|---|---|
| Protein (g/dl) | 2.41 ± 0.22 | 3.16 ± 0.28 | 4.08 ± 0.32 | 3.74 ± 0.27 |
| Glucose (mg/dl) | 108 ± 2.8 | 102 ± 1.98 | 98 ± 2.34 | 99 ± 2.29 |
| Cholesterol (mg/dl) | 174 ± 2.56 | 183 ± 2.48 | 195 ± 2.96 | 179 ± 2.65 |
| Triglycerides (mg/dl) | 112 ± 2.11 | 127 ± 2.31 | 148 ± 2.43 | 146 ± 2.39 |
| Haemoglobin (g/dl) | 9.1 ± 0.68 | 9.4 ± 0.72 | 9.8 ± 0.79 | 9.5 ± 0.64 |
| RBC (millions cells/cu.mm) | 2.6 ± 0.54 | 2.8 ± 0.66 | 3.2 ± 0.67 | 2.9 ± 0.58 |
| WBC (thousand cells/cu.mm) | 4.9 ± 0.76 | 4.6 ± 0.81 | 4.2 ± 0.58 | 4.4 ± 0.62 |

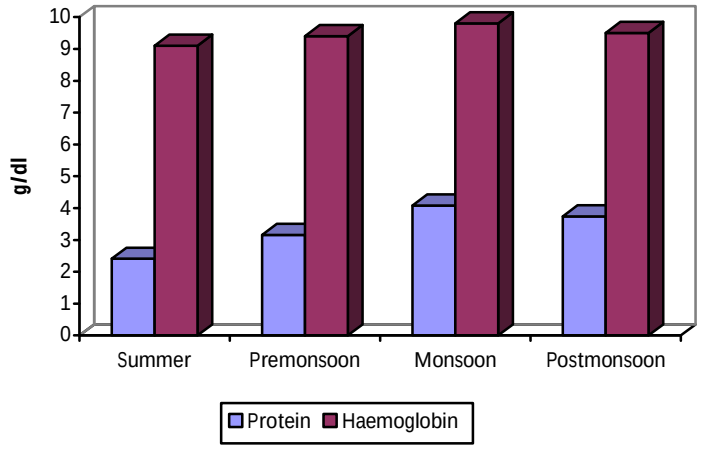


**Figure 1: Protein and Haemoglobin Content**

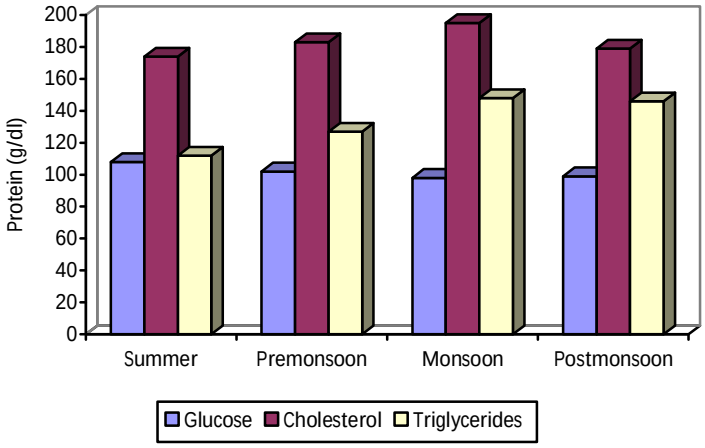


**Figure 2: Glucose, Cholesterol and Triglycerides Content**

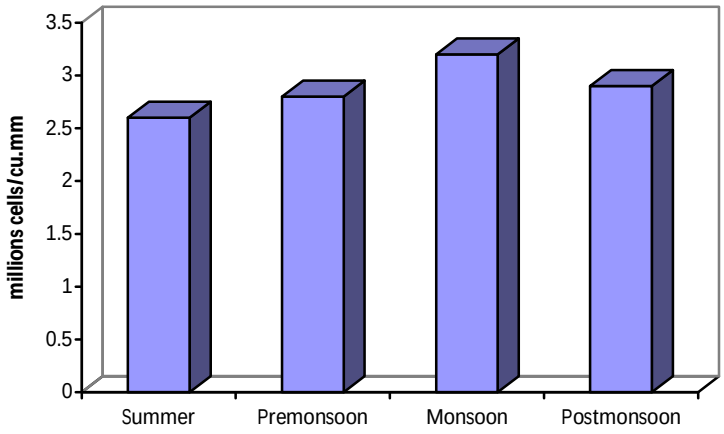


**Figure 3: RBC Content**

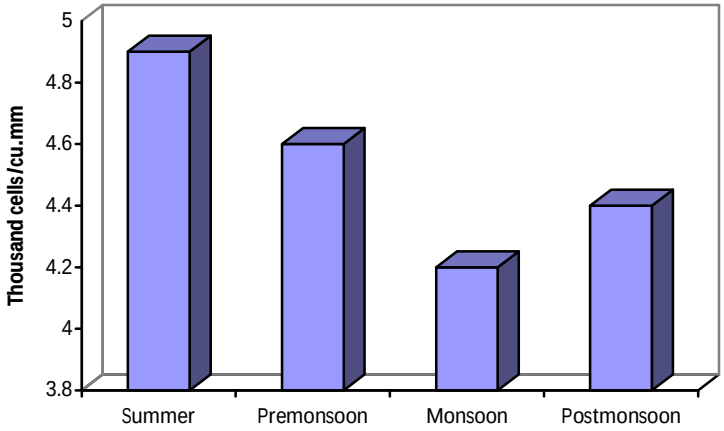


**Figure 4: WBC Content**

## DISCUSSION AND CONCLUSION

The biochemical composition of blood showed seasonal variation significantly. Most of the parameters were found to be high value during monsoon months and lower value during summer months. The maximum value of the protein in all seasons in *Anguilla bicolor* is agreement with earlier findings **[1, 3, 4].** The present observation on protein in experimental fish was comparable with *Cirrhinus mrigala* **[2]** and plasma protein level in estuarine and freshwater fishes **[4].** In air breathing eel *Amphipnous cuchia* TEC and Tb content significantly increased during winter and rainy season **[6].** However in *Clarias gariepinus* no significant difference observed in protein level in the blood of male and female species **[11].** In *Cyprinus carpio* significant fluctuation observed in

haematological parameters when the fish exposed to chloropyrifos **[13].**

Glucose content in the blood of experimental fish showed variation in relation to seasons similar trend was reported by earlier workers **[3, 5, 7, 8]** with reference to the differences in glucose level was observed with respect to the body size, age, development, environment and seasons **[10].** In the present study, cholesterol, triglycerides, haemoglobins, RBC and WBC in the blood *Anguilla bicolor* showed significant variation in different seasons and this may be due to food availability, optimum temperature, rainfall and it was conveniently compared with earlier workers **[9, 12].** Haematological parameters and enzymes were found to be varied in freshwater eel *Anguilla bicolor* exposed to sublethal concentration of copper sulphate. The study reveals the fact that eel *Anguilla bicolor* has a rich source of animal protein and good for human consumption.

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