Haematological parameters change in *Gallus gallus domesticus* infected with cestode parasite.

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**Abstract**

The study deals with the haematological parameters in *Gallus gallus domesticus* (Linnaeus, 1758) which is naturally infected with cestode parasites. Inspite of the fact that the haematological value of birds (*Gallus gallus domesticus*) are of clinical significant rates than commercial importance. The total erythrocytes and leukocyte count, haemoglobin and haematocrit value, mean corpuscular volume and differential leukocyte count were determined. There is a significant decrease in erythrocytes count and haemoglobin concentration, haematocrit value. While the total leukocyte count was increase in the infected as compare to the normal *Gallus gallus domesticus*. The obtained result collectivities indicate the change in haematology of *Gallus gallus domesticus* infected with cestode parasites. The haematological parameters of the infected bird *Gallus gallus domesticus* shows high infection cause macrocytic anemia, lymphocytosis due to deficiency of related factors.

**Keywords:** Cestode parasite, *Gallus gallus domesticus*, Haematological parameters.

**INTRODUCTION**


The South-east Asian region is recognized as the natural habitat of the red jungle fowl (*Gallus gallus*), the ancestor of the domestic fowl. Although the haematology of the domestic chicken and other avian species has been studied and documented (Lucas and Jamroz, 1961[10]), no haematological study has been made on the jungle fowl. Haematological studies are important in diagnosing the structural and functional status of the body. Haematology is the study of blood, and its different components. The vertebrates are inevitable subjected to various kinds of stresses that may lead to down regulation of immunity. Hence, to start the development of infection and diseases may occur. (D.B. Bhure, S.S. Nanware, 2011[6]). Various workers studied haematological investigation of some animals due to parasitic infection. (i.e.) on pigeon (Shinha D.P.,1974 [17]), on Great tit (Ots I *et al*., 1998[12]), on local duck(Datta *et al*., 1994 [5]) of Assam, of normal and infected Capra hircus (H.J. Wankhede 2007[8]) by nematode infection and on normal and infected Columba livia (D.B. Bhure 2010)parasitized by helminthic infection.

**MATERIALS AND METHODS**

**Host Examination**

Twenty hosts (Gallus domesticus) were examined and blood was collected through the branchial wing vein and examined for parasitanemia. Then the hosts (*Gallus domesticus*) were dissected and the intestines were examined for cestode infection. Out of which sixteen were found heavily infected and four were normal.

**Blood sample**

The blood collected were kept in a bottle containing anticoagulant Solution Ethylenediamine Tetra Acetic Acid i.e. EDTA. Determination of haematological parameters Red blood cell count (RBC) packed cell volume (PCV), haemoglobin (Hb) concentration, white blood cell (WBC) count and the differential leukocyte count were done by the standard procedure deserted by (Benjamin, M.M. 1985[3]) and using the routine methods. (Talib V. H. and Khurana S. K. 1995 [19]). From the value of PCV, Hb and RBC count the mean corpuscular volume (MCV) mean corpuscular hemoglobin concentration (MCHC) were and (MCH) mean corpuscular hemoglobin estimated.

**Statistical analysis**

The level of significant differences between the mean values of the infected and control stages were determined using students t-test at p<0.05 (STEEL & TORRIE 1982 [16]). Were all parameter calculated as:

\[
PCV \times 1000
\]

\[
MCV = \frac{PCV \times 1000}{RBC \text{ count}}
\]

\[
Hb \text{ Value} = \frac{MCV}{RBC \text{ count}} 
\]

\[
MCH = \frac{MCV \times 1000}{RBC \text{ count}}
\]

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Table 1. Showing haematological status Gallus gallus domesticus for normal and infected with cestode parasite (Raillietina, Fuhrman, 1920 and Cotugnia, Diamare 1893)

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Parameters</th>
<th>Normal Host</th>
<th>Infected Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>RBC (x10^6/ul)</td>
<td>3.5±0.5</td>
<td>2.6±0.2</td>
</tr>
<tr>
<td>2.</td>
<td>WBC (x10^3/ml)</td>
<td>26±1.5</td>
<td>29±2.0</td>
</tr>
<tr>
<td>3.</td>
<td>Hb(g/l)</td>
<td>8.5±0.4</td>
<td>7.2±0.2</td>
</tr>
<tr>
<td>4.</td>
<td>PCV</td>
<td>29.5±1.4</td>
<td>25.4±1.2</td>
</tr>
<tr>
<td>5.</td>
<td>MCV%</td>
<td>86.9±14.3</td>
<td>175±7.9</td>
</tr>
<tr>
<td>6.</td>
<td>MCH(pg)</td>
<td>24.3±4.2</td>
<td>5.0±2.5</td>
</tr>
</tbody>
</table>

Graphical representation of haematological value of normal and infected host Gallus gallus domesticus with cestode parasite (Raillietina, Fuhrman, 1920 and Cotugnia, Diamare 1893)

RESULTS AND DISCUSSION

The data on the hematological values of Gallus gallus domesticus both normal and infected with cestode parasites are presented in tables 1.

The result of this study indicate that cestode parasite affect the blood parameter of Gallus domesticus a significant reduction in the level of local chicken (Gallus domesticus ) especially considering the fact that PCV, RBC count Haemoglobin concentration show significant changes when compare with the Normal. The implications in the reduction of the parameter lead to anaemia, which may be functionally defined as a decreased oxygen-carrying capacity of the blood, a very interesting feature that accounts for infected birds show restlessness and different types to helminthes produce different types of changes in haematological parameters in birds (Natt M. P. and Harrick C. A. 1952 [11]) which is quite comparable to those in mammals including man.

The role of globins in tissue repair and blood clotting, result in their increase during parasitic infection. The similar finding also recorded of blood parameters from Capra hircus infected with nematode infection (H.J. Wankhede, K.M. Shaikh, 2007[8]). Increase in WBC count, MCV while decrease in RBC count from normal and infected Columba livia (D.B. Bhure, S.S. Nanware 2010[6]). The parasite infects domestic chickens, penguins, ducks, canaries, falcons, pigeons and several marine avifaunas (Brossy, 1992[2]; Bui et al., 2005[4]; William, 2005 [20]; Schultz and Whittington, 2005 [18]). In the infected birds, the clinical disease is associated with fever, depression, anorexia, loss of body weight, dyspnea, hepatomegaly, splenomegaly, ocular haemorrhage, haemolytic anaemia, haemoglobinuria, leukocytosis, lymphocytosis, hypoalbuminaemia, nephritis, fatty liver, oedema of the lungs, hydropericardium and occlusion of capillaries of the brain (Jordan and Pattison, 1998[9]; Aiello, 1998[1] William, 2005 [20]). Mortality in bird due the disease may be up to 90 % (Jordan and Pattison, 1998[9]).

CONCLUSION

The entire study reveals that the intensity of cestode infections is responsible for altering the haematology of hosts and shows the relationship of infection with the haematological alterations. It is further speculated that Due to the cestode infection the occurrence of deficiency of Vitamin B12, may result in formation of large but few RBC. This type of results shows formation of anaemia i.e. macrocytosis, anisocytosis, and poikilocytosis. Conclusively it can be said that due to tapeworm infection there is change in blood parameters of Gallus gallus domesticus.

ACKNOWLEDGMENTS

The authors are thankful to Prof. and Head of the Department of Zoology for providing necessary facilities during my research work.

REFERENCES


