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ORIGINAL ARTICLE

Impact of Cestodal Infection on Haematological Profie of *Gallus gallus Domesticus*

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ABSTRACT

To investigate the effect of natural infection with gastrointestinal Cestodes and its severity on some hematological aspects of Gallus gallus domesticus during February, 2013 to January, 2014. Out of 120 Gallus gallus domesticus, 82 are infected with cestode parasite. The taxonomic observation turns then to genus Cotugnia Diamare, 1893. The significant increase in size of RBC and number of WBC; however reduction in the count of RBC, Hb, PCV, MCV in infected Gallus gallus domesticus as compaired with normal one. The haematological parameters of the infected bird Gallus gallus domesticus shows high infection cause macrocytic anaemia, lymphocytosis due to difficiency of related factors.

Keywords: *Cotugnia, Gallus gallus domesticus, Haematological parameters*

INTRODUCTION

South-east Asian region is recognized as the natural habitat of the red jungle fowl (Gallus gallus), the ancestor of the domestic fowl. Poultry industry is the most effective and economical source of animal protein in shortest possible time. These chickens are the most important protein sources of human population in some developed and developing countries of the world and also serve as means of generating income. Poultry is an important sub sector of agriculture and has contributed enormously to food Production by playing a vital role in the national economy by contributing towards food security of the country reducing pressure on demand for mutton and beef and earning of foreign exchange. Poultry products (eggs and meat) are one of the important sources of protein for man. They constitute about 30% of entire protein consumed worldwide. 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 invitable 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. In last few years many authors are working on haematological parameters of vertebrates in releated with toxicology but not much work done on haematological aspect of vertebrates which related with parasitic infection.

Tapeworm infection is a major health problem in *Gallus gallus domesticus* because it affect the normal blood parameters and produces anemia, lymphocytosis etc. The study of haematological Parameters is very important in recent era. Only few information is available to the haematological parameters of birds and fishes. Totterman, 1944 observed occurance of pernicious anaemia due to cestode parasite *Diphyllobothrium carriers* infected to fishes. Sinha and Sirkar, 1974 studied haematological investigation of pigion Ot set *et al,* 1998 studied the haematological characters of *Great tit.* Datta *et. al,* (1994) studied the haematological values of local duck of Assam. Wankhede *et.al.,* 2007 described some haematological parameters of normal and infected *Capra hircus* by nematode infection. In 2010 Bhure *et. al.,* determined haematological values of normal and infected *Columba livia* parasitized by helminthic infection.

In the present communication, attempts have been made to analyze and correlate the haematological parameters of normal and infected *Gallus gallus domesticus*.

MATERIALS AND METHODS

Blood sample were collected aseptically with sterile syringe and needle either from heart and wing vein. Immediately after collection the blood was transferred to sterile glass bottles containing

Ethylenediamine tetra acetic acid (EDTA) as anticoagulant.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) and using the routine methods. (Talib V.H. and Khurana S. K. 1995). From the value of PCV, Hb and RBC count the mean corpuscular volume (MCV) and (MCH) main corpuscular hemoglobin were estimated.

RESULTS AND DISCUSSION

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

Table 1: Showing haematological status *Gallus gallus domesticus* for normal and infected with Cestode of the genus *Cotugnia* Diamare, 1893

Sr.No.	Blood Parameters	Normal Host	Infected Host
1	RBC 10^6/mm3	3.8 ± 2.0	1.96 ± 0.03
2	WBC 10^3/ mm3	7 ± 3.2	9.8 ± 0.9
3	Hb /100ml	10.8 ± 1.7	8.6 ± 0.8
4	PCV %	33.3 ± 1.2	25.9 ± 2.5
5	MCV %	123.8 ± 23.5	146.53 ± 10.2
6	MCH %	38.09 ± 2.7	46.41 ± 1.8

The present study indicates a very interesting feature that accounts for infected birds show restlessness and different types to helminths produce different types of changes in haematological parameters in birds which is quite comparable to those in mammals including man (Natt M.P.et.al, 1952). The similar results i.e. decrease in RBC count and increase in WBC count in infected host as compare to normal host also reported by Ramkrishnan, 1950 from albino rats infected with *Plasmodium* parasites. The erythrocyte count of 6.4 million/cu in normal, while decrease to 4.6 million/cu during acute infection. As well as he suggests the physiological significance of leukocyte like their phygocytic action, release toxin globins from lymphocytes. The role of globins in tissue repair and blood clotting, result in their increase during parasitic infection. Denisov (1979) reported RBC count decreased by 25% while TLC increased by 44% in silver carp infected with *Posthodiplostomun jiicokt.* Wankhede *et.al.,* 2007 also recorded similar finding of blood parameters from *Capra hircus* infected with nematode infection. Bhure *et. al.,* 2010 also reported increase in WBC count, MCV while decrease in RBC count from normal and infected *Columba livia*. Saxena *el al.,* 1993 reported TLC increased by 3.72% in *Heteropneiisteus fossils* due to infected with *Lucknoma indica.*

Ibraq Khurshid and Fayaz Ahmad, 2013 reported decreased value of RBC, HB and increased value of TLC and ESR in infected *S.labiatus* with Helminth parasites than normal host. Pinky Kaur and Rekha Shrivastav, 2014 found decrease in Haemoglobin and Erythrocyte count, increase in granulocyte and lymphocyte count in *Channa punctatus* and *Channa striatus* infected with Cestode *Senga*. Shah *et al.,* 2009 also revealed an increase in eosinophils due to helminth parasitism in fish. Bhure *et.al.,* 2011 reported significant increase in size of RBC and number of WBC; however reduction in the count of RBC, Hb, PCV, MCV in infected *Gallus gallus domesticus* as compaired with normal one. Haidar Ali and Ansari K.K., 2012 reported significant reduction ($P<0.01$) in RBC, haemoglobin, haematocrit (PCV) and lymphocyte in monogenean infected fishes, whereas total leucocyte count (TLC), neutrophils, eosinophils and monocytes significantly increased ($P<0.01$ and $P<0.05$) in infected test fish. Ade *et.al.,* 2012 recorded 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.*

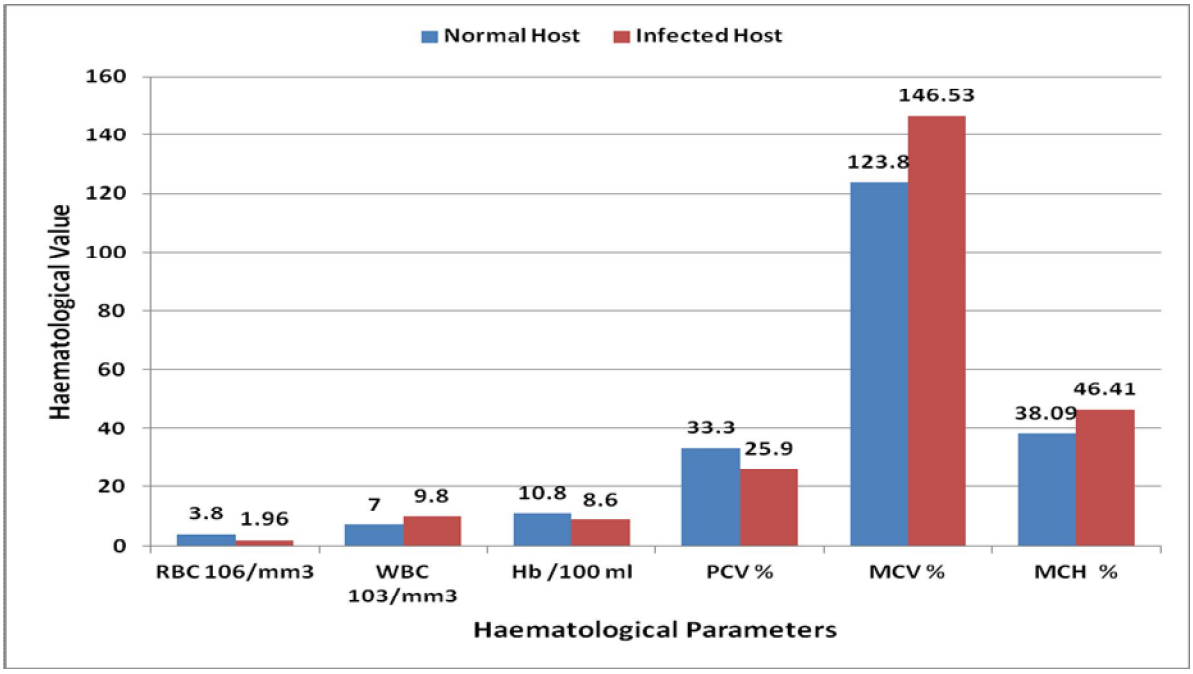

Figure 1: Graphical representation showing haematological status *Gallus gallus domesticus* for normal and infected with Cestode of the genus *Cotugnia* Diamare, 1893

Khurshid and Ahmad, 2012 studied the impact of helminth parasitism (cestode, trematode and acanthocephalan) on haematological profile of *Schizothorax spp.* and *Cyprinus spp*. and concluded that mechanical injury caused by invasion of parasite in host tissue lead to side tracking of iron and responsible for erythropoiesis and could also lead to deficiency of vitamin B-12 and folic acid.

CONCLUSION

Present study reveals that the intensity of Cestodal infections is responsible for altering the haematology of *Gallus gallus domesticus*. Mechanical damage caused by *Cotugnia* to the host intestine could cause vitamin B-12 and folic acid deficiency, which may result in formation of large but few RBC. This type of results shows formation of anaemia i.e. macrocytosis, anisocytosis, and poikilocytosis.

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