

Short communication

## EFFECTS OF INFECTIOUS CORYZA DISEASE IN GROWING TURKEYS ON SOME ERYTHROCYTE PARAMETERS

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The effect of infectious coryza disease on the red blood cell count, packed cell volume, mean corpuscular volume, mean corpuscular haemoglobin concentration, mean corpuscular haemoglobin, erythrocyte osmotic fragility and body weight in 8 weeks old White England turkeys were determined. The erythrocyte osmotic fragility was significantly higher but the haemoglobin concentration and body weight were significantly lower in infected turkeys than in the healthy turkeys. The two groups of turkey however had similar red blood cell count, packed cell volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration and mean corpuscular volume.

Keywords: infectious coryza disease, turkeys, erythrocyte

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### INTRODUCTION

Infections coryza is a respiratory disease caused by the bacterium *Haemophilus gallinarium* to which chickens are very susceptible (Yoder, 1967). The disease, which has also been observed in turkeys (Beach and Schalm, 1936), is characterized by nasal discharge, frequent swelling and edema of the face, coughing and difficulty in breathing (Yoder, 1967; Bains, 1979).

Although there are reports on the hematological parameters (Makinde and Fatumbi, 1985) and osmotic fragility of the erythrocytes (Oyewale and Ajibade, 1990) of physiologically normal exotic breeds of turkey in Nigeria, the authors are not aware of any available information on the effect of infections coryza on the haematological parameters of turkeys. The present study was therefore undertaken to determine the effect of infectious coryza on the erythrocyte values of turkeys.

### MATERIALS AND METHODS

Twenty 8 weeks old stags were used for this study. The White England turkeys were imported from Britain at day old and were reared intensively on deep litter at the University of Ibadan Teaching and Research Farm.

The turkeys were provided adequate quantities of feed whose protein concentration was 28% and were also provided with fresh water *ad libitum*. They were dewormed with piperazine wormer (Pfizer Products Plc, Ikeja, Nigeria) at 0.7 g/L of drinking water single dose. They were also given coccidiostatic drug sulphadimidine sodium (Vetacox®, Associated Pharmaceutical Products Ltd. P.O Box 5571, Lagos, Nigeria) for 3 days at 0.2g/L of drinking waters per day. Prior to the outbreak of infectious coryza on the Teaching and

Research Farm of the University of Ibadan, some of the turkeys were transferred to a nearby private farm. The remaining turkeys on the U.I Teaching and Research farm came down with infectious coryza disease through natural infection; they yielded pure colonies of *Haemophilus gallinarium* when cultures were made from the conjunctival and esophageal swabs.

Blood was collected from the jugular veins of 10 healthy and 10 infected turkeys into bottles containing ethylene diamine tetra acetic acid (EDTA) as anticoagulant.

The red blood cell (RBC) count was determined using the haemocytometer. The packed cell volume (PCV) was estimated by the microhaematocrit method and the haemoglobin concentration by cyanmethaemoglobin method. The mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were calculated (Jain, 1986). The osmotic fragility of erythrocytes was determined as described previously (Oyewale *et al*, 1998) using phosphate buffered sodium chloride (NaCl) solution pH 7.7 at 29°C in concentration of 0.0%-0.7% (see figure 1). The percentage of haemolysis at each concentration of NaCl was evaluated by comparison with that in distilled water (0% NaCl) as 100%. Data obtained were statistically analyzed by Student's t-test.

### RESULTS

Table 1 shows the mean values of the weight, RBC, PCV, Hb, MCV, MCH and MCHC in the healthy and coryza infected White England turkeys. The body weight and Hb concentration were significantly ( $P < .001$  and  $P < 0.05$ , respectively) higher, in the healthy than in the

coryza-infected turkeys. The RBC count, MCH, MCHC and MCV were however similar in the two groups of turkeys.

As shown in Figure 1, the erythrocyte osmotic fragility of the healthy White England turkeys was significantly lower ( $P < 0.001$ ) than the Coryza infected turkeys at NaCl concentrations of 0.7%, 0.6%, 0.5%, 0.4%, 0.3%, 0.2% and 0.1%.

## DISCUSSION

The values of RBC, PCV, Hb, MCV, MCH and MCHC obtained in the healthy turkey of the present study are similar to value reported for the same bird in Nigerian (Makinde and Fatumbi, 1985; Oyewale and Ajibade, 1990).

In the present study except for the Hb concentration which is significantly higher in the healthy than in the coryza infected turkeys all the other erythrocyte values (RBC, PCV, MCV, MCH and MCHC) were similar in the two groups of turkeys.

**Table I**  
Body Weights and Erythrocyte Values (Means  $\pm$  S.D) of Healthy and Coryza infected British United Turkeys

Parameters	Healthy	Infected
Body weight (kg)	6.26 $\pm 0.57$	4.64 $\pm 0.82^*$
RBC ( $\times 10^6 / \mu\text{l}$ )	2.11 $\pm 0.26$	1.98 $\pm 0.26$
PCV (%)	35.90 $\pm 6.42$	32.50 $\pm 1.18$
Hb (g/dl)	10.27 $\pm 1.83$	7.56 $\pm 2.77^{**}$
MCV (fl)	166.93 $\pm 23.68$	173.58 $\pm 26.63$
MCH (pg)	48.97 $\pm 7.43$	38.95 $\pm 15.79$
MCHC (g/d)	29.01 $\pm 5.42$	23.24 $\pm 8.35$

Number of animals in parentheses; Value significantly different from healthy turkeys at \*  $P < 0.001$  and \*\*  $P < 0.005$ .

**Fig. 1.**

Osmotic fragility of erythrocytes of Coryza infected turkeys (0----0) and healthy turkeys (●-----●). Each point is the mean  $\pm$  S.E.M.

This may be because *Haemophilus gallinarium* which is the causative agent of infectious coryza disease is an obligate parasite of the mucous membrane (Scalan, 1988). Their effect on the haematological parameters is probably insignificant. However, severe anaemia

has been reported in turkeys infected with blood parasites (*Leucocytozoon* sp, *Haemoproteus* sp and *Plasmodium* sp (Zinkl, 1986).

The erythrocytes of infected turkeys were found to be more fragile than those of normal turkeys. This may be due to the reduced metabolic activity in the infected turkeys caused by the

disruption to the normal respiratory process. It was reported that there is coughing, difficulty in breathing and catarrhal inflammation of the mucous membrane of the nasal passage, sinuses and air sacs of birds having infectious coryza (Page, 1962; Bain, 1979). March *et al* (1966) reported that the proportion of erythrocytes of different ages in the blood varies with the level of metabolic activity. In the present study the reduced metabolic activity in the coryza infected turkeys may have increased the numbers of aging red blood cells. Perk *et al* (1964) and Pranker (1961) observed that osmotic fragility varies with the age of circulating erythrocytes, the old cells being more fragile.

The observed significant drop in body weight of turkeys with infections coryza is probably due to the inability of the birds to feed adequately as it was observed that infectious coryza causes swelling of the sinuses which is accompanied with conjunctivitis and in some cases the eyes were completely closed resulting in difficulty in eating and drinking (Bain 1999).

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