Effects of Acarida GalleInfection on Body Weight, Packed Cell Volume, Hemoglobin Level and Total Plasma Protein of Experimentally Infected Domestic Pigeons (C. L. Domestic) In Zaria, Nigeria

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***Abstract*-A study on the effects of *Ascaridia galli* infection on the body weight, packed cell volume, haemoglobin level and total plasma protein of experimentally infected Domestic Pigeons was carried out at the postgraduate laboratory of the department of Biological Sciences, Ahmadu Bello University, and Zaria, Nigeria. Two groups (A and B) made up of 30 birds each, were used. Birds in group A were each infected with a 700 dose of infective eggs of *A. galli* while birds in group B served as controls.Clinical signs observed in the infected birds were blood-tinged diarrhoea, loss of appetite, birds looking dropsy, head nodding downwards, ruffled feathers, shivering and emaciation.At the termination of the experiment, 12 weeks after infection, a significant difference in body weight (P <0.05) was observed over the weeks in group A, and not in group B. Although there were differences in the values of the packed cell volume (PCV), haemoglobin level (Hb) and total plasma proteins over the weeks within the infected and control groups, these differences were not statistically significant, in both groups (P>0.05).The implications of these findings are discussed.**

I. Introduction

Ascaridiasis is an intricate problem to poultry breeders, and so it could be to pigeon breeders and fanciers. It is one of the major causes for the reduction in egg production, reduced growth rate in broilers and consequently responsible for economic losses to the poultry industry. In severe infections, intestinal blockage occurs and chickens infected with a large number of ascarids, suffer from loss of blood, reduced blood sugar content, increased urates, shrunken thymus glands, retarded growth, and greatly increases mortality (Reid and Carmon, 1958; Ikeme, 1971a). Perusal of the available literature indicated, very meager published information exists on the effects of *A. galli* infection in pigeons on these parameters. The purpose of this study was therefore, to evaluate the effects of *A. galli* infection on these parameters in Domestic pigeon in Zaria, Nigeria, based on weekly changes in body Weights, plasma protein values, packed cell volume (PCV) values and haemoglobin (Hb) level values.

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II. Materals and Methods

a) procurement and acclimatization of birds

A total of 60 pigeons comprising of 30 males and 30 females, bought from Sabo and Samaru markets in Zaria, Nigeria were used for the experiment.The birds were housed in the postgraduate animal laboratory of the department of Biological Sciences, Ahmadu Bello University, Zaria, Nigeria. The birds were acclimatized for a period of three weeks prior to the commencement of the experiment. During this period, the birds were checked and treated for various parasites, to certify them parasite-free.

At the end of the acclimatization period, the birds were divided into two groups of 30 birds each, consisting of 15 males and 15 females.Group A comprised of infected *C. l. domestica* while group B comprised of non-infected *C. l. domestica* (controls)The birds in each group were tagged with numbers for proper identification during data collection.The birds were fed al libitum and via cocktail or cafeteria style, with guinea corn and millet, red maize and groundnut as sources of protein. Vitalites were added to drinking water as recommended to cater for vitamins and mineral salts.Water and feed were provided in drinking and feeding troughs. The cages were fitted with dropping boards that were regularly emptied. Prior to infection, the following parameters were taken for all the birds; weight, PCV, total plasma protein and Hb level values

b) production of infective eggs of ascaridia galli

Eggs used for infection were obtained from live adult females of *A. galli*collected from Pigeons slaughtered at Sabo, Samaru and Tudun wada markets all in Zaria, Nigeria. The worms were collected in specimen bottles containing 0.9% physiologic saline and taken to the laboratory.

decanted. The sediments were then washed with 0.5 M Sodium hydroxide solution into a beaker and agitated gently for 30 minutes in order to dissolve the sticky albuminous layer of eggs and allowed for uniform sampling (Fairbairn, 1970; Hansen *et al*., 1954).This was then placed in centrifuge tubes and centrifuged at 1500 rpm for 3 minutes to recover the eggs. The recovered eggs were then washed

three times in distilled water and also three times in embryonating fluid which was a solution of 0.05 M Sulphuric acid.The eggs collected were suspended in embryonating fluid and placed in plastic troughs. These were then left to stand for 12 days in the laboratory at 30°c. Embryonating fluid was periodically added to the eggs cultures to avoid drying. Embryonated eggs were stored at room temperature for two weeks before infection of the birds.

c) *bird infection*

The birds were dosed by taking equal amounts of agitated egg suspension with

5 ml syringe and injecting directly into the crop, using 20 G x 1.5inch needles. The birds in group A (infected birds) each received 0.75 ml of egg suspension containing 700 viable eggs.The birds in group B (non-infected birds) serving as controls, were each given 0.75 ml of egg-free suspension fluid (Sucrose solution).The birds were weighed and blood samples taken before infection. After infection, the birds were weighed and blood samples were taken for determination of packed cell volume (PCV), total plasma protein and haemoglobin level on weekly bases.

The birds were weighed using sartorius electric weighing balance (CP 8201) sensitive to 0.01g. Blood samples were obtained by saphenous venipunture using 20 G x 1½ inches needles collected using heparinised capillary tubes. Packed Cell Volume (PCV) was determined using capillary microhaematocrit procedure (Coles, 1986). Plasma protein values were obtained from plasma in the capillary tubes, by putting drops on total solids meter, hand refractometer and reading the plasma protein concentration directly in g/100 ml. Haemoglobin level values were determined by dividing the PCV values by a factor of three (Coles, 1986).Faecal sample examination was carried out using simple floating technique, from the second week after infection, until infection was ascertained by detection of ascarid eggs in the faeces of infected birds. The experiment was terminated on the 12th week after infection.

d) Data analysis

The data collected was subjected to statistical analysis, using the Analysis of Variance (ANOVA).

III. Results

Changes in body weightThe weekly weight means of infected and non-infected pigeons are shown in Figure 1. Weekly changes in body weights in the infected group (Group A) were statistically significant ($P<0.05$) compared to those in the non-infected group (Group B) which were not significant ($P>0.05$).

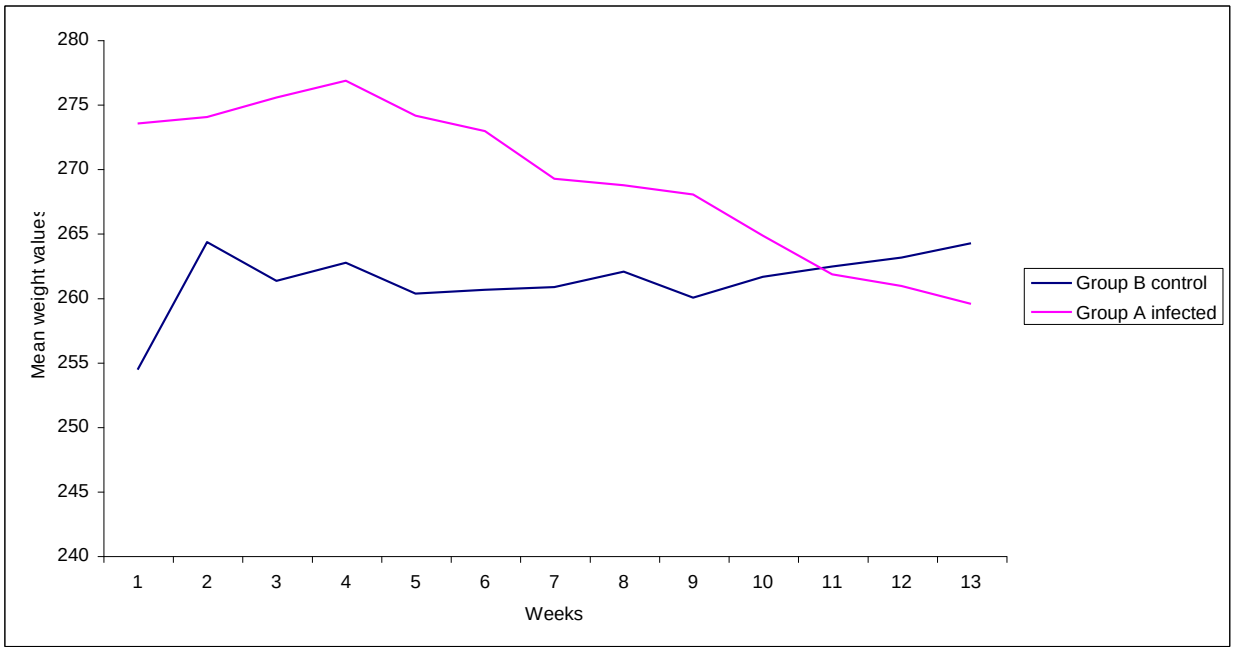


Figure 1: Weekly weight means of infected and control groups of pigeons.

1) packed cell volume (pcv)

The weekly means of packed cell volume values of infected and non-infected birds are shown in Figure 2. There was no consistent change in the PCV values in both the infected and non-infected groups. Weekly changes in PCV values were rather erratic in both groups showing no statistically significant differences ($P>0.05$).

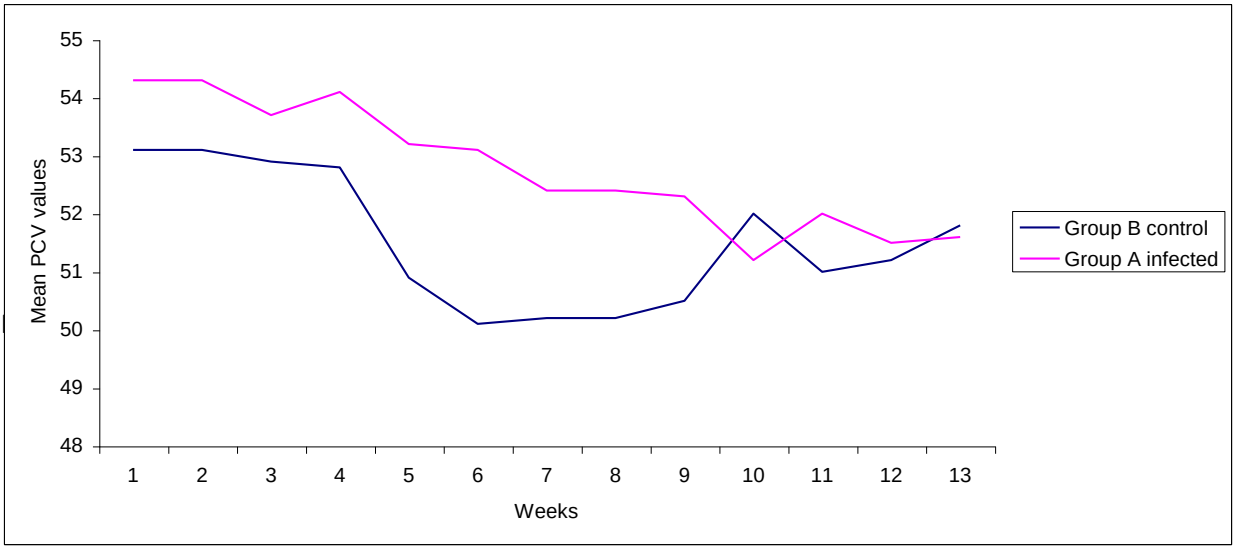
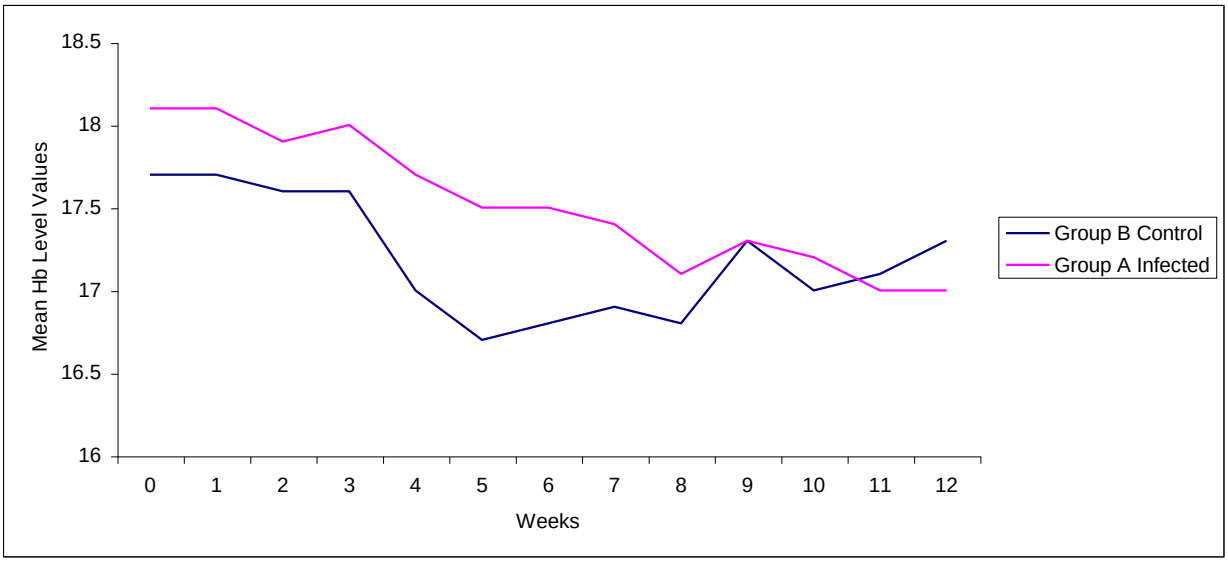


Figure 2: Weekly means of PCV of infected and control groups of pigeons

2) haemoglobin level

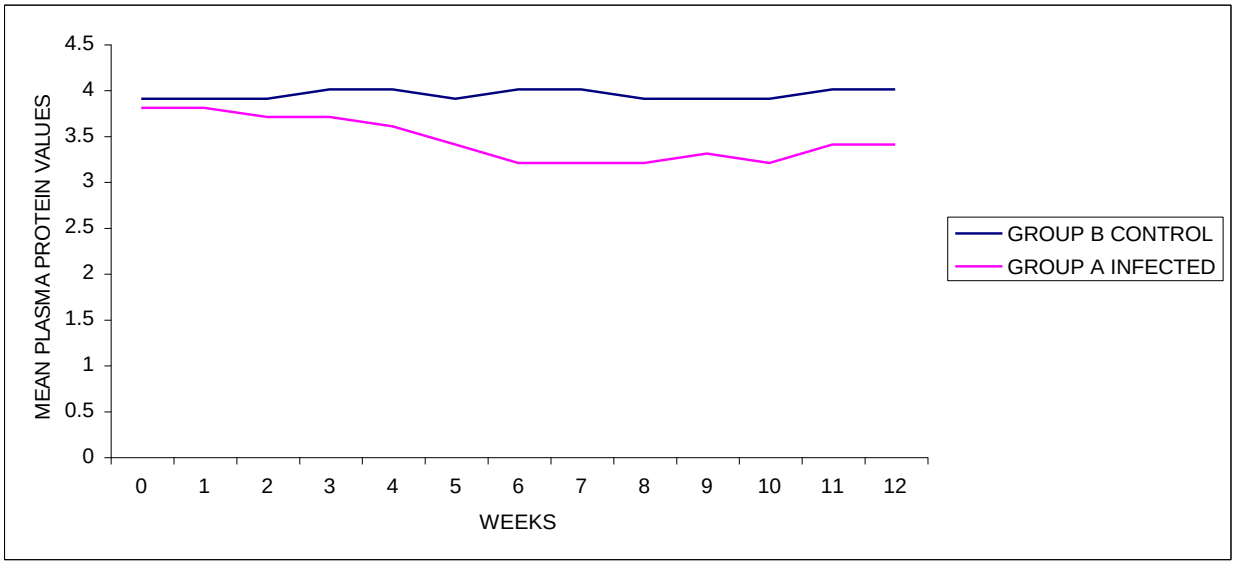
The weekly means of Hb level values of infected and non-infected birds are shown in Figure 3. There was no consistent change in the Hb level values in both the infected and non-infected groups. There was also no statistically significant differences in the Hb level values within the two groups over the 12 weeks period of experimentation (P>0.05).



figer 3: Weekly means of Haemoglobin level of infected and control groups of pigeons

3) Total plasma protein

Figure 4 shows the weekly means of total plasma protein values of infected and non-infected birds. The infected birds recorded lower mean total plasma protein values than those of the non-infected birds (controls). Changes in total plasma protein values, decreased slightly over the weeks in the infected group, and almost consistent in the control group. Differences in the total plasma protein values in both infected and non-infected groups, over the weeks were not statistically significant (P< 0.05).



IV. Discussion

The significant weight loss observed among the infected birds agrees with findings of Ikeme (1971c) and Ntekim (1983). Loss of weight in the infected group especially after infection may be due to loss of appetite (poor feeding) and the extraction or absorption of some of the host's nutrients by the parasite, such as amino acids and glucose (Oniye *et al*., 2000).*Ascaridia galli* infection causes weight depression in the host, which correlates with increasing worm burden (Reid and Carmon, 1958). Loss of weight is a common finding associated with *A. galli* infection, and Reid and Carmon (1957) had worked out the weight loss attributable to each worm at 1.39g. The non-statistically significant differences (P>0.05) in the weekly changes of PCV, Hb level and total plasma protein values particularly in the infected group, tally with the findings of Ikeme (1971a). This is probably an indication that infection with *A. galli* has little or no effect on these parameters. Some of the birds in the infected group showed lower PCV values than some in the control group. This could be attributed to the effects of larval migration in the tissue phase of the life cycle of the parasite, which involves some blood loss. However, the higher PCV values observed in some of the birds in the infected group relative to some birds in the control group, might be due to haemoconcentration sequel to the diarrhoea, observed in some birds of the infected group. Ikeme (1971c) observed that chickens infected with *A. galli* produced higher PCV values from the second to the fifth weeks, than the controls. The high repeated dosing resulted in a more severe diarrhea from the onset, thus causing marked haemoconcentration in the infected chickens.The albumin-globulin ratios employed by Ikeme (1971a) in comparing serum protein levels between chickens were not statistically significant. This is in agreement with the findings of this study where differences in the weekly changes in the total plasma protein values for both the infected and non-infected birds were not statistically significant (P>0.05)However, the higher total plasma protein values recorded in some of the infected birds relative to some of the control birds, might have been due to dehydration resulting from diarrhoea. Dubinsky *et al*. (1974) observed no changes in the total protein, total lipids and glucose levels in the serum of chicks infected with 300 eggs of *A. galli*. *Ascariadia galli* infection obviously has some effects on these parameters and no matter how small, this could affect the normal growth and productivity of the birds.

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