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PERFORMANCE AND HEMATOLOGICAL PARAMETERS OF LOMAN BROWN HEN AS INFLUENCED BY *Balsomina mamodica* SUBSTITUTING LASOTA VACCINE IN SEMI-ARID ZONE OF NIGERIA

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ABSTRACT

The study was carried out at University Research Farm of the Department of Animal Science, Kano University of Science and Technology, Wudil, to evaluate the growth performance and hematological parameters of Loman Brown hen as influenced by inclusion levels of Balsomina mamodica substituting lasota vaccine in semi-arid zone of Nigeria. The birds were randomly allotted into four treatment in a completely randomized design with fifty (50) birds per treatment. Treatment 1 was given lasota vaccine (NCDV) at first, third, seven and seventeen weeks respectively. Treatment 2 was given Garafuni 0.5g per litre for six days in the week whereas Treatment 3, 1.0g per litre and Treatment 4, 1.5g per litre of Garafuni for four and two days in the week respectively. At the end of the study, blood samples were collected from five (5) birds from each treatment for hematological studies. The result shows that, intake and performance of Lohman Brown Hen administered Balsomina mamordica substituting Lasota vaccine at laying phase is shown in Table 1. The result indicated that no significant (P>0.05) difference was shown with respect to initial body weight (IBWT), final body weight (FBWT), weight gain (WT), average weight gain (AWG), feed conversion ratio (FCR) and metabolic mass.T4 recorded the highest mean value (600.0) whereas animals in T2 (0.5g garahuni) had the least mean value (525.00). Data on haematological parameters of Loman brown hen are presented on Table 2. The result showed non- significant differences among the treatments means. Haemogloblins, packed cell. Highest mean value (12.23g/dl) for haemoglobins was recorded in birds under 0g (Control) whereas birds under 1.0g (T3) had the lowest mean (10.76g/dl). There was significant (P < 0.05) difference for red blood cell in which birds under 1.0g had the highest mean (9.98x106/ul) whereas birds under 1.0g (T3) had the lowest mean (6.70x106/ul). It could be concluded that Balsomina mamodica has no effect performance and heamatological parameters of loman brown hen. Base on the results of this study it is therefore recommended that birds can be giving Balsomina mamodica up to 1g without deleterious effect on performance and heamatological parameters of loman brown hen

Keywords: Growth performance, heamatological parameters, Loman brown, Lasota vaccine

INTRODUCTION

Poultry (domestic chickens, turkeys, ducks, geese and certain other birds) are kept throughout the World. Poultry production involves egg and eat production from egg type and broiler chickens (Kumaravel *et al.*, 2012). Poultry meat and eggs offer considerable potential for meeting human needs for dietary supply of animal protein (Folorunsho and Onibi, 2005). Egg production in laying hens is a process that takes around 24 to 27 hours (Sturkie, 1976; Akbas, *et al.*, 2002). The Lohmann Brown strain of chicken is an early maturing hybrid bird which is among the best egg producers with good quality eggs and excellent feed conversion rate (Lohmann Tierzucht, 2015). The Lohmann Brown strains are easy to manage and are adaptable to all types of production systems with laying commencing at about 18 weeks of age, producing about 300 to 320 eggs in a year (Lohmann and Tierzucht, 2015). Eggs are the major business output in commercial egg production and the higher the egg production the better will be the profit (Farooq *et al.*, 2001). The economic significance of poultry varies considerably, although poultry production in many countries has become increasingly specialized and integrated into a dynamic industry of major national and international importance (Farooq *et al.*, 2001). World production of poultry meat represented 14.38b in 2018 whereas in 2000 23.7 (FAO, 2000). This represents an expansion of over 2% since 1986. Consumption per head, amounting to a world average of 7.9 kg, an expansion of 1.2 kg since 1986, was higher in countries with a developed market economy than in those with developing economies (FAO, 2003). Important factors in the continued growth of the poultry industry in many countries are the efficiency of poultry in converting vegetable protein into animal protein. In Nigeria, Feed cost is estimated to represent over 70% of the total cost of producing poultry intensively. The feed industry

in Nigeria is currently faced with acute shortage and prices of feed ingredients this is presently responsible for increases in the cost of livestock feeds. *Mamordica balsamina* L. commonly known as (African cucumber), Balsam Apple (or Balsam pear) and locally called "*Garahunii*" (Among the Hausa communities), belong to the family *cucurbitaleae.* The plant is a perennial herb with soft stems and tendrils that climb up shrubs, boundary fields and fences. The green leaves are deeply palmately 5-7 lobubed about 12cm Long, margin toothed, stalked. The plant produces spindle shaped fruits (dark green when unripe and bright to deep orange

MATERIALS AND METHODS

Source of Experimental Birds

The experimental birds were sourced from SOVET International Company at Tarauni quarter of Kano metropolis. Two hundred (200) healthy Lohmann Brown birds were purchased and transported early in the morning to the experimental site.

Experimental Location and Duration of Study

The study was conducted at the Poultry Unit of the Teaching and Research Farm of the Department of Animal Science Kano University of Science and Technology, Wudil (GPS coordinates: N11.97643°, E008.42995°) for the periods of five (5) month.

Experimental Design and Treatment

The experiment was laid in a Completely Randomized Design, comprising four treatments with fifty birds (50) per treatment. The four treatments were 0, 0.5, 1.0 and 1.5g of Garahuni per litre. These doses were administered via drinking water.

Health Management

The pen was washed and disinfected thoroughly using Izal containing Saponated Cresol (Izal®, Nath Peters Hygean Ltd, India/Medreich Ltd, India) two weeks before the arrival of the experimental birds. Upon arrival of the experimental hens, they were given Multivitamins (Anupco Vitalyte Extra®, Anglian Nutrition Products Company, UK) at 0.5 mg per litre to serve as anti-stress and Oxytetracycline Hydrochloride powder (Oxywin®, Sellwell Pharmaceuticals Ltd, India) at 1 g per litre to guard against secondary bacterial infections. The drugs are in powdered form and were administered orally via drinking water during the 2-week adaptation period.

Experimental Diet

Experimental birds were fed using Sovet feed. Similarly, at 22 weeks of age and 5% eggs production was attained Sovet Layer Mash® was also used, it contains 16.0 % crude protein, 5.0 % fat, 6.0 % fibre, 3.5 %calcium, 0.4 % phosphorus, and 2600 kcal/kg energy. The birds were fed *ad libitum* and supplied with clean and fresh water throughout the experimental period.

Intake and performance

Daily feed intake was recorded throughout the experimental period. Body dimensional traits was measured using measuring tape whereas body weight was measured using measuring scale.

Haematological Indices Determination

Seven (7) ml of blood sample was collected from five (5) birds in each treatment using sterile syringe and needle, placed in a sample bottle and then taken to Haematology Laboratory (for haematological analysis) at the Aminu Kano Teaching Hospital, Kano. The blood sample was drawn via wing vein after restraining the bird. Seven (7) ml of the blood was placed in a sterile sample bottle containing Ethylene Diamine Tetracetic Acid (EDTA) for haemotological studies as described by Coles (1986). The haematological parameters measured were Haemoglobin (Hb) content using cyanmethaemoglobin method (Coles, 1986). Packed cell volume (PCV), red blood cell, white blood cell and its white cell count (leucocytes), lymphocytes and neutrophils were determined as described by Coles (1986). Mean corpuscular volume (MCV) and mean corpuscular haemoglobin concentration (MCHC) were calculated using the formula described by Haold and Amstutz, (1998). MCV (fl) = Haematocrit (%) x 10 RBC in millions/mm3 Mean Corpuscular Haemoglobin (MCH) was calculated using the formula as follows Hb in g/100ml blood x 10 MCH (pg) = RBC in millions/mm3 The mean corpuscular hemoglobin concentration (MCHC) was calculated as follows. MCHC (g/dl) = Hb in g/100ml blood x 10 Haematocrit

RESULTS

The result of intake and performance of Lohman Brown Hen administered *Balsomina mamordica* substituting Lasota vaccine at laying phase is shown in Table 1. The result indicated that no significant (P>0.05) difference was shown with respect to Initial Body Weight (IBWT), Final Body Weight (FBWT), Weight Gain (WT), Average Weight Gain (AWG), Feed Conversion Ratio (FCR) and metabolic mass.T4 recorded the highest mean value (600.0) whereas animals in T2 (0.5g garahuni) had the least mean value (525.00). No significant (P>0.05) difference was observed with respect to final body weight, T4 (1.5g Garahunu) had the highest mean value of (1200.00) while T1 had had the lowest mean value of (1000.00). Data on haematological parameters of Loman brown hen are presented on Table 2. The result showed non- significant differences among the treatments means. Haemogloblins, packed cell. Highest mean value (12.23g/dl) for haemoglobins was recorded in birds under 0g (Control) whereas birds under 1.0g (T3) had the lowest mean (10.76g/dl). There was significant ($P < 0.05$) difference for red blood cell in which birds under 1.0g had the highest mean ($9.98x10^6$/ul) whereas birds under 1.0g (T3 had the lowest mean ($6.70x10^6$/ul). No significant ($P > 0.05$) difference was observed for monocyte among the birds under different levels of inclusion even though highest mean (4.37%) was recorded in birds under 1.0g whereas birds under 0.5g had the lowest value (1.60%) as presented in Table 3.

DISCUSSION

The result of body dimensional parameters of Loman Brown hen as influenced by various level of inclusion of *Balsomina mamodica* as shown in Table 2. The result in the present study was at variance with the findings of Akbas *et al.,* (2001) who reported that age at laying significantly affect body dimensional traits of local fowl the variation could probably be due to stress. Weight gain was positively correlated with fed intake and the health status of animals this is supported by the findings of Nasir *et al.,* (2014) who reported that birds fed 0.125g per head per day at the point of laying may show an increase in weight up to 0.3 to 4g per per day. There were no much studies on the use of traditional herbs in poultry production especially in the semi-arid zone of Nigeria (Bennet, 2002). However, in the current study, Garahuni was used as a substitute of lasota vaccine on actively laying Lohmann Brown hens in order to evaluate its effect on performance and heamatological parameters. The results obtained in this study was consistent with the findings of Liu *et al*. (2001); Bacon and Liu (2004) who reported that low administration of organic substance may have partial effect on turkeys performance. High concentrations of organic substances in arrested hens might have negative feedback on the ability of the hypothalamus to secrete surges of GnRH and subsequently surges of LH, or on the ability of the pituitary to

respond to surges of GnRH secretion if they occur (Liu *et al*., 2001; Bacon & Liu, 2004; Liu & Bacon, 2005). As the level of *Garahuni* is increasing the performance of laying bird is increasing as shown in Table 1 above, this results was supported by the findings of Alkan (2008) who reported that an increase in the dosage of exogenous progesterone affects embryo development eggs laying and thickness of the shell. It was observed in this study that high level of *Garahuni* in laying chickens favored heamatological parameters of Loman Brown hens this is consistent with the report of Johnson (2002) who observed that as the level of organic substances is increasing have a significant effect on heamatological parameters more importantly PCV and Hb especially within the age of 30 to 38 weeks. Similarly, the result also concur with the findings of Muhammad *et al*., (2005) who reported that high dosage of organic substances on laying birds had detrimental effect on laying performance , liver function and may result to high level of blood pH and subsequently lead to death.

Table 1: Body dimensional parameters of Loman brown hen as influenced by various levels *Garahuni* Substituting Lasota vaccine

	Inclusion levels of *Mamodica balsomina*				
Parameters	0g	0.5g	1.0g	1.5g	SEM
BL	21.36^{ab}	22.00^{a}	20.75^{b}	20.88^{ab}	0.11
NL	8.13^{b}	10.13^{a}	11.05^{a}	10.33^{a}	0.24
WL	16.65	17.3	16.13	17.13	0.29
SL	6.10^{c}	8.00^{a}	7.38^{ab}	6.88^{bc}	0.16
CC	30.3	30.88	33.38	31.35	0.58
TL	15.08^{a}	13.80^{bc}	14.63 ^{ab}	13.50^{c}	0.18
CL	2.56^{b}	2.90^{a}	2.48^{b}	2.58^{b}	0.047
PL	2.45	2.35	2.48	2.45	0.036
PC	11.18	11.38	11.90	10.92	0.21

^{abc} Means with different superscript with the same rows are significantly (P<0.05) different. SEM = standard error of means

Table 2 Heamatological Parameters of Loman brown hen as influenced by various levels *Garahuni* Substituting Lasota vaccine

	Inclusion levels of *Mamodica balsomina*					
Parameters	0g	0.5g	1.0g	1.5g	SEM	Reference Values
Hb (g/dl)	12.23	11.98	10.76	12.13	0.72	9-l5
PCV (%)	41.33	42.33	37.89	40.33	2.86	27-45
RBC (x10^{6}/ml)	7.00^{b}	8.33^{b}	7.06^{b}	13.56^{a}	0.79	11-15
MCV (fl)	84.33^{ab}	6.70^{b}	9.89^{a}	7.56^{ab}	7.54	28-40
MCHC (g/dl)	16.00	14.33	15.30	15.67	12.48	31-54
MCH (pg)	88.33^{a}	72.70^{b}	76.90^{ab}	84.69^{ab}	6.79	31-34
White blood cell (%)	17.49	18.00	18.91	19.47	1.32	8-12
Neutrophils (%)	20.13^{b}	20.56^{b}	24.54^{a}	23.54^{a}	1.02	10.-50
Lymphocytes (%)	40.82	53.55	42.10	42.69	6.21	40-75
Eesinophils (%)	7.00^{a}	6.00^{ab}	5.11^{b}	6.00^{ab}	0.67	1-15
Basophils (%)	2.50^{ab}	1.66^{b}	2.88^{a}	2.00^{ab}	0.39	0-3
Monocytes (%)	2.67	1.60	4.37	3.99	0.96	0-6

^{abc} Means with different superscript with the same rows are significantly (P<0.05) different. SEM = standard error of means

Table 3 Intake and Performance of Lohman Brown Hen Administrate *Balsomina Mamordica* as a Substitute Lasota Vaccine

	Inclusion levels of *Mamodica balsomina*				
Parameters	0g	0.5g	1.0g	1.5g	SEM
IBWT	550.00	525.00	537.50	600.00	22.17
FBWT	1000.00	1100.00	1050.00	1200.00	54.49
WG	450.00	562.50	525.00	600.00	57.25
AWG	13.633	17.04	18.65	18.18	1.79
FCR	8.25	7.85	7.15	6.79	0.82
MM	600.00	800.00	787.5	900.00	51.44

^{abc} Means with different superscript with the same rows are significantly (P<0.05) different. SEM = standard error of means

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