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COMPARATIVE PERFORMANCE OF LAYER STRAIN CHICKS REARED IN SEMI ARID REGION AND FED HONEY AS AN ADDITIVE

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ABSTRACT

Two experiments were conducted to evaluate the performance of two strains of layer chick reared in the semi-arid region and feeding of honey in place of an additive. In the first experiment 90 day old chicks of each of two egg layer strains, made up of one brown (Lohman Brown classic), one black (Nera Black) were used in completely randomized with each strain serving as a treatment. Each treatment was replicated thrice with 30 chicks per replicate. In the second experiment, 84 seven weeks old chicks from each of the strains were used in a 2 x 2 factorial arrangement in a completely randomized design with the two strains (Lohmann brown classic and Nera black) and administration of honey (with and without) as the factors. These made up four treatments which were replicated thrice with 14 chicks per replicate. In both experiments, feed intake and body weight were measured and weight gain and feed conversion ratio were determined. Mortality was also recorded. The results of the study showed that performance parameters of two strains measured were statistically similar except for mortality. Nera black strain had a higher mortality. Feeding honey did not affect ($P>0.05$) performance indicators measured except for mortality also. Mortality was higher ($P<0.05$) for chicks that were not fed with honey. According to these results, Nera black strain may require more care during chick phase and honey has beneficial effect on chick performance.

Keywords: Strain, semi-arid, honey, performance, chicks

INTRODUCTION

The egg industry is enjoying increased production as consumers become more educated about the nutritive value of eggs and as more eggs are processed (Leeson and Summers, 2005). Eggs are relatively inexpensive per unit of protein and energy contained in yolk and albumen, and so egg consumption continues to increase in developing countries (Leeson and Summers, 2005). Most of the major international poultry breeders are located in temperate countries while much of the world's poultry production takes place under more extreme temperature conditions in the tropical regions. Often humid conditions are very extreme, in addition to the prolonged periods when the temperature is over 30°C (Hassan *et al.* 2018).

The availability and affordability of eggs and poultry meat will go a long way to meet the protein needs of several populations in hot regions. An obvious constraint on poultry production in these regions is the climate. It is certain that the genetic potential of poultry is greatly affected by the environment.

It is certain that the genetic potential of poultry is greatly affected by the environment (Smith, 2001). The question then arises whether commercial stocks developed in more moderate climates are optimal for the high heat and humidity conditions of a very large segment of the poultry-producing areas in the world. Stocks developed in temperate climates are now being sold and used throughout the world but are they the best genetic material for all conditions? Would it be possible to select strains that are resistant to heat stress and that have all the other economic characteristics and are therefore more profitable under these conditions? (Gowe and Fairfull 2008). It is in response to some of these questions that this study was conducted to evaluate comparative performance of commercial layer strains reared in semi-arid tropics and fed honey as an additive.

MATERIALS AND METHODS

Experimental Site

The study was conducted at the Poultry Unit, Livestock Teaching and Research Farm, Department of Animal Science, Federal University Dutsin-Ma. Dutsin-Ma lies on latitude 12°26'N and longitude 07°29'E. The climate is the tropical wet and dry type (tropical continental climate). Rainfall is between May and September with a peak in August. The average annual rainfall is about 700 mm. The mean annual temperature ranges from 29 °C – 31 °C. The highest air temperature normally occurs in April/May and the lowest in December through February. The vegetation of the area is the Sudan Savanna type which combines the characteristics and species of both the Guinea and Sahel Savanna (Abaje *et al.*, 2014).

Source(s) of Birds

Two egg layer chicken strains, made up of one brown (Lohman Brown classic), one black (Nera Black) were sourced from a reputable hatchery.

Birds Management

The birds were reared on deep litter covered with a thick layer of wood shavings. The pens were partitioned with each partition serving as replicate. The birds were reared up to 10 weeks of age. Feed and water were supplied *ad libitum* during the whole period. Commercial chick mash supplying having a crude protein content of 20.0% and energy of 2,800kcal/kg as recommended by NRC (1994 and Leeson and Summers (2005) was used for the study.

Experimental Design

Two experiments were conducted in this study to evaluate the performance of two strains of layer chick reared in the semi-arid region and feeding of honey as additive.

In the first experiment 90 day old chicks of each of two egg layer strains, made up of one brown (Lohman Brown classic), one black (Nera Black) were used in completely randomized with each strain serving as a treatment. Each treatment was replicated thrice with 30 chicks per replicate. The experiment lasted for 10 weeks.

In the second experiment, 84 seven weeks old chicks from each of the strains were used in a 2 x 2 factorial arrangement in a completely randomized design with the two strains (Lohmann brown classic and Nera black) and administration of honey (with and without) as the factors. These made up four treatments which were replicated thrice with 14 chicks per replicate. Honey was administered at 10ml/litre of drinking water. Birds offered honey were not offered any antibiotics during the study period. The experiment lasted for four weeks.

Measurements

Feed intake

A given quantity of feed was measured and fed to the birds on a weekly basis. From which weekly feed intake was measured. Daily feed intake, total feed intake and total feed cost were determined.

Body weight

The birds were weighed in the early morning before receiving any feed and water using a weighing balance at two weeks' interval during the experimental period. Initial and final body weights of the birds were measured at the beginning and end of the experiment respectively. Weight gain, feed conversion ratio and feed cost per kilogram weight gain were determined.

Water intake

A given quantity of water with or without honey was measured using a measuring cylinder and placed in a drinker which was offered according to the treatments. Water left in the drinker was measured the next to determine water intake. Evaporative water loss was also determined on a daily basis and factored in the calculation of water consumption.

Mortality

Mortality was recorded as it occurred.

Data Analysis

Data from all experiments were analyzed using the general linear models (GLM) procedure of SAS software (SAS Institute Inc., 1994) according to a completely randomized design. Data were subjected to analysis of variance. Where the analysis of variance was significant ($P<0.05$), Duncan's multiple range test was used to separate the treatment means (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Performance of Chicks of Two strains of Commercial Layer Chickens in Semi-Arid Region (0-8 weeks)

The growth performance of chicks of two strains of commercial layer chicken is shown in Table 1. All the performance parameters of two strains measured in this study were statistically similar except for Mortality. Contrary to this Olawumi and Dudusola (2012) and Yakubu *et al.* (2007) reported that Nera black genotypes are more feed efficient and converted feed given to produce more egg than Lohman brown strain under the same condition.

Table 1: Performance of Chicks of two Strains of Commercial Layer Chickens in Semi-Arid Region

Parameters	Brown strain	Black strain	SEM
Initial weight (kg/bird)	0.036	0.032	0.001
Final weight (kg/bird)	0.529	0.569	0.021
Weight gain (kg/bird)	0.493	0.537	0.021
Total feed Intake (kg/bird)	1.448	1.584	0.014
Feed conversion ratio	2.937	2.950	0.130
Total feed cost (₦/bird)	220.096	240.768	5.600
Feed cost/kg gain (₦)	446.424	448.400	7.002
Mortality	2.750^{b}	4.250^{a}	0.382
Feed cost (₦/kg)	152	152	-

Means in the same row bearing different superscripts differ significantly ($P<0.05$)

In both total feed cost and feed cost/kg gain, there was no difference between the two layer strains. The total feed cost of the brown strain was higher having (₦240.768) as compared with Lohmann Brown strain having (₦220.096).
The black strain has higher total feed cost than the brown strain because the Black strain had higher feed intake, which translates to the higher feed cost.
Even though there are no significant differences between the treatments in feed cost per kg gain, numerically black strain had higher feed cost per kg gain (₦448.400) than brown strain (₦446.4241) birds.

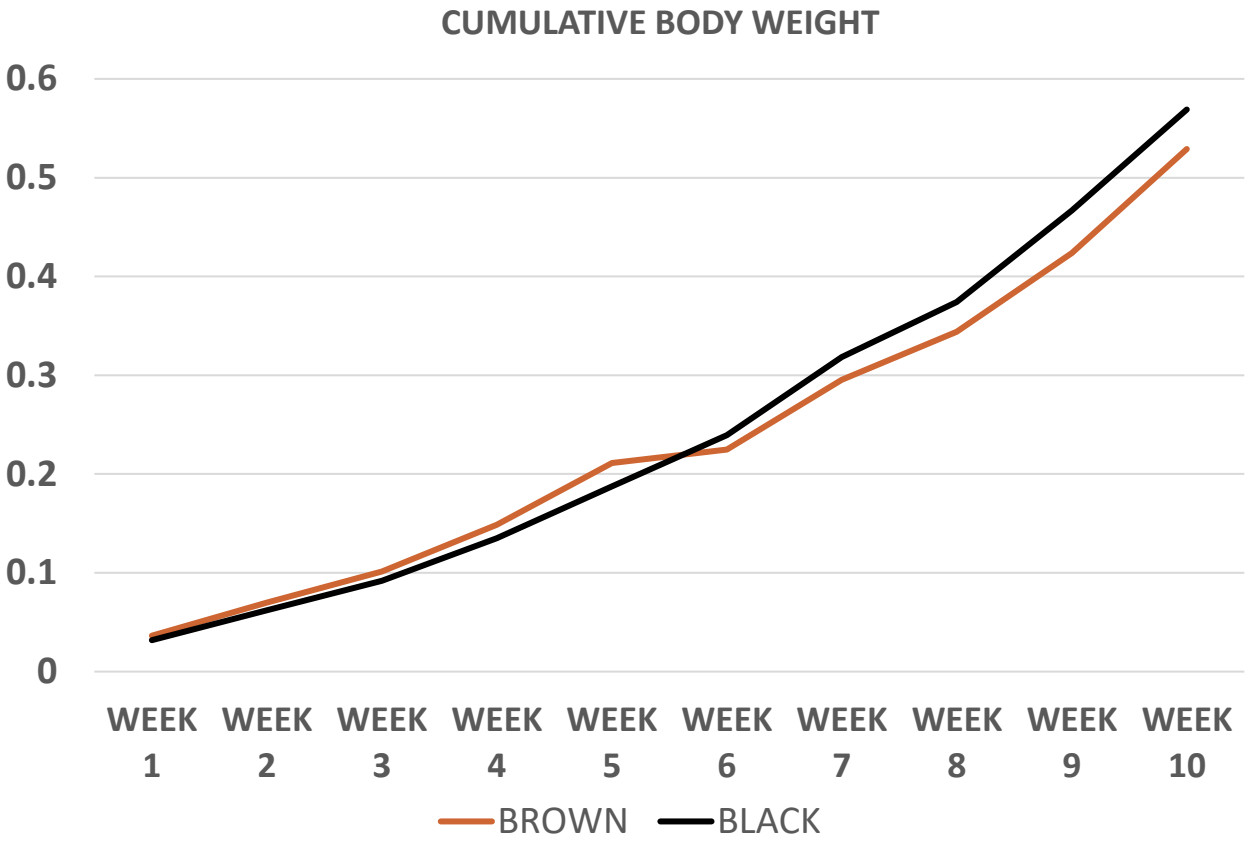

Figure 1**:** Cumulative Weight Gain of Commercial Layer Strain Chicks Reared in Semi-Arid Tropics

The cumulative weight gain of commercial layer strain chicks reared in semi-arid tropics shown in figure 1. The body weight of the Brown strain is slightly higher than black strain at initial stage but decline at 6 weeks while Black strain continuously increasing.

Performance of Chicks of Two Strains of Commercial Layer Chickens Fed Honey as an additive (7-10 weeks)

Main effect of Strain of Commercial Layer Strains fed honey as an additive

The initial weight, final weight, weight gain, FCR and mortality were similar (P>0.05) for the two strains. Total feed intake and water intake were statistically different for the two strains of the layer chicks as shown in table 2. Total feed intake was higher (P<0.05) for the black strain (1.253kg/bird) compared to the brown strain (1.127kg/bird). The black strain also consumed more (P<0.05) water (290.800 ml/bird) than the brown strain (243.297 ml/bird).

Table 2: Performance of Chicks of two Strains of Commercial Layer Chickens Fed Honey as an additive

	Initial weight (kg/bird)	Final weight (kg/bird)	Weight gain (kg/bird)	Total feed Intake (kg/bird)	FCR	Total Water Intake (ml/bird)	Mortality
Strain							
Brown	0.295	0.529	0.234	1.127[b]	4.816	243.297[b]	1.000
Black	0.318	0.569	0.251	1.253[a]	4.992	290.800[a]	1.750
SEM	0.005	0.021	0.019	0.011	0.440	6.957	0.426
Honey							
Water + honey	0.317	0.534	0.217	1.172	5.401	267.090	0.750[b]
Water – Honey	0.297	0.564	0.267	1.208	4.524	267.007	2.000[a]
SEM	0.005	0.021	0.019	0.011	0.440	6.957	0.426

Means in the same column bearing different superscripts differ significantly (P<0.05)

Main effect of honey fed to Commercial Layer Strains as an additive

The final weight, weight gain, total feed intake FCR and total water intake were similar (P>0.05) for layer strain chicks fed water with or without honey. Mortality is slightly higher (P<0.05) for layer strain chicks that are not fed water with honey then those fed water with honey. This is agree with the observation of Babaei *et al.* (2016) who reported that feed intake was not affected when they fed honey to Japanese quails. Contrary to the results of this study Babaei *et al.* (2016) observed differences in the weight gain and FCR of Japanese quails fed honey.

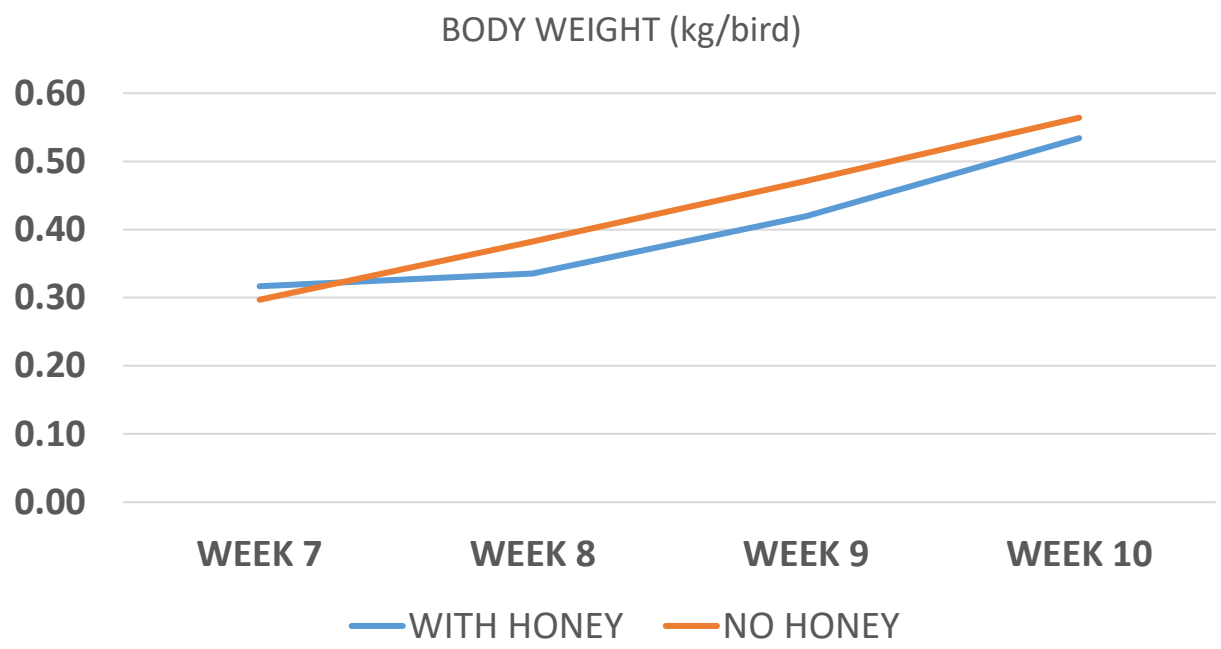

Figure 2: Cumulative body weight gain of commercial layer strain chicks fed honey as a an additive

The cumulative body weight gain of commercial layer strain chicks fed honey is shown in figure 2. The body weight of layer strain chicks fed water without honey is continuously increasing while those fed water with honey very slow at initial stage but increased as the birds grow.

CONCLUSION AND RECOMMENDATION

From the result of the study, the two layer strains performed similarly in all measured parameters except for mortality which was higher for Nera black strain. Feeding honey in reduced mortality of layer strain chicks. More researches should be conducted to further compare the performance of different layer strains chicks during laying phase

and the possibility of the use of honey in place of antibiotics and its mechanism of action.

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