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Effect of Litter Depth on the Performance of Three Strains of Broiler Chickens

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Abstract: A total of 144 day-old broiler chicks of three different strains (Anak 2000, Arboracre and Hybro G) were used in the study to determine the effect of litter depth on the performance of the birds. Two litter depths of 30 and 60 mm were used for the study and wood shaving was used as litter material. The 3 strains were allocated to each litter depth and the birds were managed for 56 days. The results showed no significant ($p>0.05$) difference in the parameters considered. The main effect gave higher values in the final weight, weight gain and the protein efficiency ratio at the 60 mm litter depths. Anak, 2000 strain gave the highest values in the final weight, weight gain protein intake and protein efficiency ratio. A better feed: gain was obtained in the 60mm litter depth while Anak 2000 strain gave the best feed: gain in the strain effects. The interactive effect showed that Arbor acre has the highest ($p>0.05$) final weight, weight gain and the best feed: gain in the 60 mm litter depth. It was concluded that litter depths of 30mm or 60 mm could be used in raising the 3 strains of broiler chickens without any deleterious effects on performance.

Key words: Litter depth, wood shaving, broiler strains, performance

INTRODUCTION

The challenge, which continually faces broiler production, is the provision of suitably designed house to provide optimum environment for maximum growth and production[1,2] also stated that in spite of provision of specially formulated feeds, vitamin supplements, antibiotics, vaccines and other aids to intensive poultry production, the provision of appropriate good quality housing is still the most basic requirement for successful poultry production.

Broilers are mostly reared on floor and an important point in maintaining comfortable conditions for floor, housed poultry is the provision of right kind of litter. An effective litter material must be absorbent, lightweight, inexpensive and non-toxic. Litter is an integral element in providing the proper environment for efficient poultry production. Litter functions as a medium for faecal decomposition, moisture absorption and as insulation between the ground and live birds, thus it is important to maintain quality litter integrity during the flock growth period. Past researches[3] have shown that optimal litter conditions would enhance bird weight gain and decrease processing condemnation rates. Poor litter quality has been correlated with reduced growth, poor feed conversions, increased respiratory disease, increased hock burns and breast blistersand increased incidence of leg disease. Most of these harmful effects are due to the aggravating litter management problems. Hence, the need to get adequate litters material for effective broiler production. The experiment was designed to determine the effects of litter depths on the performance of Anak 2000, Arbor acre and Hybro G strains of broiler chicken.

MATERIALS AND METHODS

Location of study: The experiment was carried out in the Poultry Unit of the Teaching and Research Farm of the University of Agriculture, Abeokuta, Nigeria.

Experimental animals: A total of one hundred and forty-four day old broiler chicks made up of three different strains (Arbor acre, Anak 2000 and Hybro G) was used in the study. Each strain consisted of 48 birds. The birds were subjected to two different litter depths of 30mm and 60mm, respectively in three replications of eight birds each. The birds were managed intensively.

Housing and equipment: The birds were raised for eight weeks under a deep litter system. The housing consisted of a concrete floor well partitioned into six compartments with dividers and covered with wire mesh to prevent each bird in a replicate from mixing with birds in other replicates. Each pen floor and wall was scrubbed with

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Table 1: Composition (%) of the experimental diet

Ingredients	Composition
Maize	46.50
Soybean meal	16.00
Wheat offal	18.00
Fishmeal (72%)	2.50
Groundnut cake meal	12.00
Bone meal	3.00
Oyster shell	1.00
Vitamin/mineral premix	0.25
Salt	0.25
Methionine	0.25
Lysine	0.25
Total	100.00

Calculated Analysis Energy (MJ kg^{-1}) = 10.80, Crude protein (%) = 21.18
Crude fiber (%) = 4.59, Calcium (%) =1.63, Phosphorus (%) =1.08

detergent solution and disinfected. All the equipment were thoroughly washed, disinfected and rinsed. The pens were labeled according to treatments and replicates.

Experimental diet: A diet Table 1 which is an interphase between the starter and the finisher diets was compounded for the birds as shown in the Table 1.

Statistical analysis: The data obtained were subjected to analysis of variance in a 2×3 factorial experimental layout[4]. Significant ($p<0.05$) mean among variables were separated using Duncan Multiple Range Test[5].

RESULTS AND DISCUSSION

The main effects of litter depths and strains on the performance of broiler chickens Table 2 show non-significance ($p>0.05$) in all the parameters considered. In the 60 mm litter depths higher values of 1648.89g/bird, 7.71g/bird/day and 1.82 were obtained in the final weight, weight gainand protein efficiency ratio, respectively. A ower and best feed: gain of 2.65 was obtained in the 60mm litter depth. The results confirmed the findings of Oliveria and Hague[6,7] that types and depth of litter have no effect on growth rate of broilers. In addition, Anak 2000 gave the highest values of 1778.33g/bird, 29.79g/bird/day, 15.31g/bird/day and 1.95 in the final live weight, weight gain, protein intakeand protein efficiency ratio, respectively. The values obtained for Hybro G line in all the parameters considered were lowest, though comparable ($p>0.05$) to the values

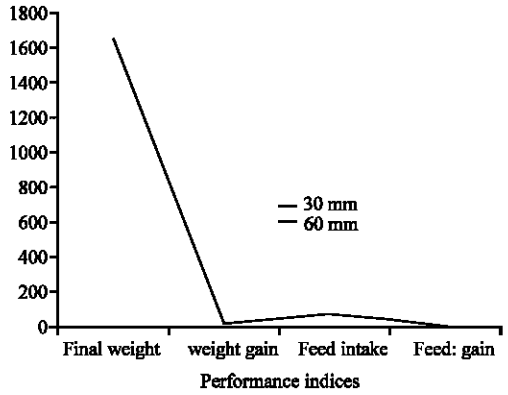

Fig.1: Main effect of litter depth on performance

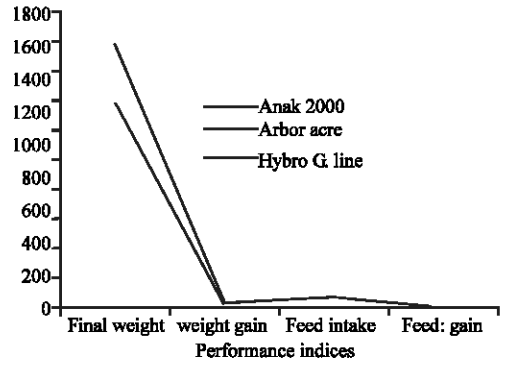

Fig. 2: Main effect of broiler strains on performance

obtained for the other two strains. The highest and poorest feed: gain of 3.12 was obtained in the birds. Fig. 1 showed that birds on 30 and 60 mm litter depths have close similarities in performance with no distinct distance in the lines. Figure 2 on the other hands showed that Anak 2000 and Arbor acre strains performed distinctly than Hybro G line particularly in the final live weight and weight gain.

Table 3 shows the interactive effects of litter depths and strains on performance of broiler chickens. There was no significant ($p>0.05$) difference in all the parameters considered. In the 30mm litter depth Anak 2000 recorded the highest values of 1786.67 and 29.76 g in the final

Table 2: Main effects of litter depth and strains on the performance characteristics

	litter depths			Strains			
Parameter	30 mm	60 mm	SEM	Anak 2000	Arbor Acre	Hybro G	SEM
Initial weight (g/bird)	116.11	97.00	2.97	110.00	130.50	79.17	3.64
Final weight (g/bird)	1644.44	1648.89	43.46	1778.33	1768.33	1393.33	53.23
Weight gain (g/bird/day)	27.05	27.71	0.76	29.79	29.24	23.11	0.93
Feed intake (g/bird/day)	72.75	71.91	0.26	72.31	72.92	71.76	0.32
Feed: gain	2.73	2.65	0.08	2.45	2.52	3.12	0.10
Protein intake (g/bird/day)	15.41	15.23	0.06	15.31	15.20	15.20	0.07
Protein efficiency ratio	1.76	1.82	0.05	1.95	1.52	1.52	0.06

Table 3: Interactive effects of litter depths and strains on performance characteristics

	30 mm			60 mm			
Parameter	Anak 2000	Arbor acre	Hybro G.	Anak 2000	Arbor acre	Hybro G.	SEM
Initial weight (g/bird)	120.00	131.67	96.67	100.00	129.33	61.67	5.14
Final weight (g/bird)	1786.67	1726.67	1420.00	1770.00	1810.00	1366.67	75.27
Weight gain (g/bird/day)	29.76	28.48	22.92	29.82	30.01	23.30	1.31
Feed intake (g/bird/day)	72.14	73.31	72.80	72.47	72.53	70.73	0.45
Feed:gain	2.44	2.59	3.17	2.45	2.44	3.07	0.14
Protein intake (g/bird/day)	15.27	15.53	15.42	15.36	15.36	14.98	0.10
Protein efficiency ratio	1.95	1.83	1.95	1.95	1.95	1.56	0.09

weight and feed intake, respectively. The lowest values were recorded in Hybro G line in all the parameters considered. However, the 60 mm litter depth showed that Arbor acre recorded the highest ($p>0.05$) values in the final live weightand weight gain. Also, the lowest and best feed: gain of 2.44 was recorded in the Arbor acre strain at 60mm litter depth. The results agreed with the findings of Hague and Chowdhury [7]. Hence, the litter strain at 60mm litter depth. The results agreed with the findings of Hague and Chowdhury [7]. Hence, the litter depths of about up to 60 mm could be used in raising broiler chicks without any deleterious effects on performance.

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