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Effects Of Different Feed Trough And Water Trough Positions On Weight Gain Of Broilers

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Abstract - Broilers weight gain in battery cages with three (3) different feed trough and water trough positions was investigated to determine the best position that gives the highest weight gain of the broilers under study. The experiment was conducted at the Teaching and Research Farm of Rufus Giwa Polytechnic, Owo, over a period of 10weeks at two consecutive times. The result of the experiment showed that the position of feed trough and water trough does not have any significant effect on weight gain of broilers at p<0.05 level. Weight gain of broilers increased with their age in a linear order. Cage with feed trough below water trough wasted a lot of the input feed, as a result of water spillage from water trough above feed trough. The study shows that as far as feed and water is available in accessible manner, the growth of birds (broilers) will not be hindered but feed wastage occurs when water trough is placed above feed trough which could result in increased production cost and possibly, build-up of pathogen.

Keywords—Broiler, weight gain, battery cages, feed trough position, water trough position.

I. INTRODUCTION

The focus of the poultry industry is the production of meat and egg under intensive management situation. The meat and egg component of poultry industry consist primarily of chicken, turkey, duck and geese (Mench, 2004). The poultry industry is the largest (in term of animal number) and the most highly automated, vertically integrated and intensified of the animal production industries (Mench, 2004). Poultry bird production has largely moved from range rearing to total confinement rearing on litter floors and cages (Elson, 1985). The essence of rearing nearly all broilers in confinement on litter floors and cages, according to Mench, (2004) is to regulate feed intake and improve weight gain of birds.

Also, battery cage has an added advantage apart from weight gain. It provides efficient method for disposing wastes, reducing feed wastage, maintaining an adequate environmental temperature and inspecting the condition of individual birds (Siegel, 1997). These advantages make it difficult to phase out battery cages in poultry production as suggested by (European Commission, 2000) especially in developing countries where other option seems expensive to accomplish. The battery cage system is structurally a small confinement with tilted floor and equipment for feeding, drinking and egg collection (for laying birds) mounted to the front (European Commission, 2000).

However, cage have come under increasing criticism largely because of the behavioral restrictions that birds are expensive (Mench, 2004; Apple-by and Hughes, 1997; Taylor *et al*., 2003; Rollin, 1995; Rollins, 2004).

Welfare groups, public and researchers have become increasingly concerned about the welfare of animals for production purposes. These concerns have resulted in increased pressure for regulating of practice like feeding trough arrangement, space within cells in order to improve bird well-being. It was pointed out by (Mench, 2002) that birds well-being play a significant role in performance level of birds. Performance level can be measured by the ability of birds to convert feed to meat and eggs (Craig and Muir, 1993; and Rollin, 1995). Fraser and Broom (1997) posited that if feed and water are not well accessed by birds; it can lead to stress, which invariably reduces performance. Hill (1983) emphasized that stress can lower immunity and cause chain reactions that decrease immune antibody response. Stressor, according to Fraser and Broom (1997) is an unfavorable condition that can lead to a fitness reduction.

Since broilers are kept in total confinement to enhance weight gain and reduce disease infection, efforts are therefore required to improve the feeding and feeding trough arrangement in an accessible manner in order to increase bird fitness in poultry industry.

The system of rearing and managing poultry birds in cages with feed trough above drinkers is relatively new practice in commercial egg and meat production in most rural communities, especially in Nigeria. Much work has been done about space requirement for birds, but not much has been done on feeder/drinker arrangements.

Evaluating the performance of broilers in battery cages requires that drinkers and feeders be positioned at

convenient location within the battery cage.

The objective of this study is to determine whether cages designed with drinkers below feeding trough differently affects fitness of broilers as indicated by weight gain of birds and feed wastage.

II. MATERIALS AND METHODS

The study was conducted at the poultry unit of the Teaching and Research Farm of Rufus Giwa Polytechnics, Owo, Nigeria, during the mid of October end of December, 2015 and mid January to end of March, 2016. The battery cages used for the study were fabricated in the Agricultural Engineering Technology Workshop of the polytechnic. Three cages were used, and each cage is a unit consisting of 10cells.The size of each cell was 800cm^2 as against the 600cm^2 recommended by (FAWC, 2003) for laying birds which is to create adequate space for the fattening birds. The cages were arranged under an asbestos shed of 10feet high with an area of 30feets X 16feets, with all sides open.

Prior to birds (broilers) arrival, the surroundings were cleaned manually and fumigated.

One Hundred (100) day old broilers were purchase from a reputable hatchery in Ibadan and brooded for three (3) weeks on deep liters system and at four (3) weeks of age the sixty (60) birds were transferred to the cages. The initial weight of the bird (w_1) of each bird was taken using an electronic weighing machine. Birds were randomly allotted into cages by balloting technique.

Broiler started feed was given 3 times daily for the first 7 days with antibiotic via oral dose. As from the 8th day (5th week) broilers finisher was given throughout the 10 weeks of the experiments at the two consecutive times. Water was given in troughs placed in 3 different positions in relation to feed troughs. Routine checks and proper monitoring were carried out.

The cages were labeled based on the position of water troughs (drinkers) as;

1. Drinker above feed trough.....DAF
2. Drinker below feed trough.....DBF
3. Drinker and feed trough same level.....DFL

Data on weight gain were collected after the first 7 days of feeding and subsequently on weekly basis with an electronic weighing machine after the last feeding; recording was done in kilogram (kg).

Feed that was moistened as a result of water spillage were removed and recorded based on frequency of change carried out.

Experimental design used for this study was CRD (Completely Randomized Design). Data were summarized as means with standard deviation for the position of water trough (drinkers).Analysis of data was done with one way ANOVA technique of Microsoft Excel 2003 with LSD mean separation for each observed water trough's (drinkers) positions.

III. RESULTS AND DISCUSSION

The observed gains in weight of the birds over the two periods of observation are shown in Table 1.

Table 1: Weight gains of broilers raised in cages with three different positions of drinkers and feeders

	Oct. – Dec., 2015			Jan. – March, 2016		
No of Weeks	DBF	DAF	DFL	DBF	DAF	DFL
1.	0.87	0.88	0.86	0.99	1.01	1.00
2.	1.18	1.08	1.14	1.12	1.14	1.14
3.	1.31	1.47	1.47	1.30	1.28	1.29
4.	1.52	1.62	1.58	1.49	1.50	1.48
5.	1.92	1.84	1.79	1.88	1.87	1.88
6.	2.31	2.31	2.37	2.28	2.27	2.27
7.	2.55	2.62	2.65	2.61	2.61	2.60
8.	2.71	2.82	2.89	2.80	2.81	2.80
9.	2.88	3.05	3.08	3.02	3.02	3.02
10.	3.31	3.32	3.25	3.29	3.28	3.28

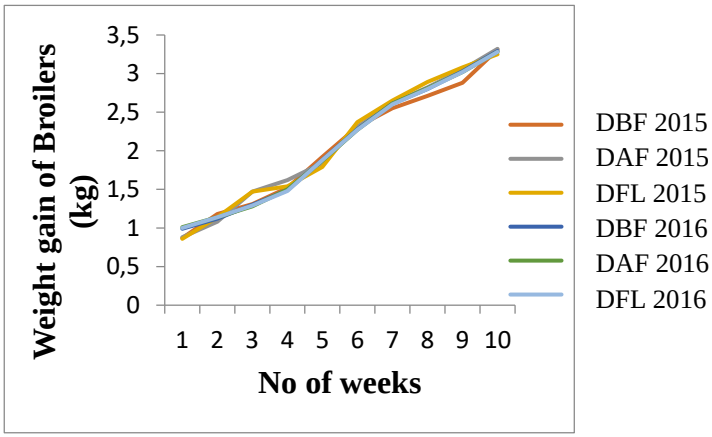

Fig1. A graph showing weight gain of broilers in a cage with three different positions of drinkers and feeders

Table 2: Mean weight gain of broilers troughs arrangement for two consecutive years (2015 and 2016)

	Troughs arrangement			
Year	DBF	DAF	DFL	LSD
2015	2.183	2.193	2.196	NS
2016	2.158	2.147	2.208	NS

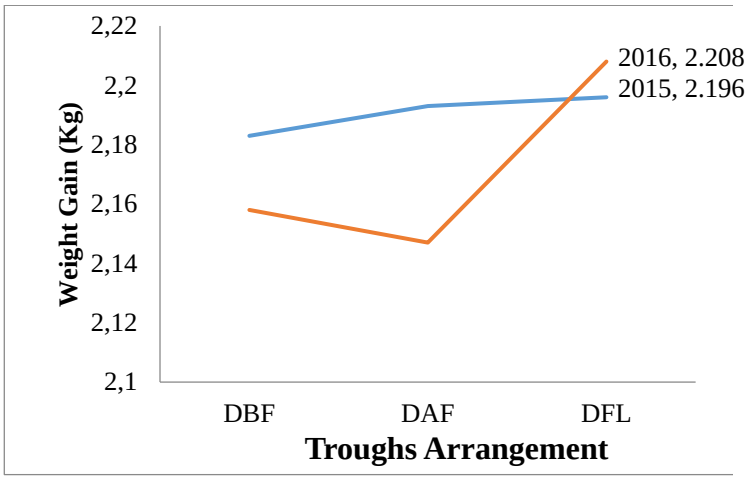

Figure 2: Weight gains of broilers reared in cages with different position of drinkers and feeders for two consecutive years (2015 and 2016).

The results showed that broilers weight gain increased with age in the three cages irrespective of the different feeder/drinker arrangements as shown in Table 1 and this is also presented in fig. 1 which shows that at a point, all the line of the graph met, i.e., the birds almost has the same weight gain irrespective of the arrangement of drinkers and feeders

The results also showed that there was no significant difference observed in weight gain of broilers under the three different feeder/drinker arrangement investigation at $p<0.05$ significant level for the two consecutive years as presented in Table 2 and this also is represented in fig. 2 which shows at a point both lines of 2015 and 2016 intercepted with no significant difference only that there was frequent change of feed in DAF, drinkers above feed troughs.

The frequency of change of it feeds as a result of water spillage in cage with feed trough below drinker was about 80% during the periods of the experiment at the two times.

Table shows the gains in weight by broilers kept in cages with the drinkers and feeders located at three different positions as reported under materials and methods. Results show that the positions of drinkers and feeders in relation to feeders do not significantly ($p<0.05$) influence weight gain of broilers raised in cages irrespective of the position of the drinkers in the battery cage, broilers gain in weight increased with age in a linear order. These results are in agreement with the findings of Appleby and Hughes (1995) that the physical needs of birds are not in any way infringed by the different water and feeder troughs arrangement or position. Although this study did not show any effect of the positions of water and feeding troughs on the weight gain of broilers, it reveals that production cost should be moderated by placing feed troughs above water trough which to large extent prevents feed wastages since feed cannot become aired due to water spillage from water troughs if placed above feed troughs.

IV. CONCLUSION

The position of water trough in relation to that of feeding trough does not affect weight gains in broilers raised in cages but affects the amount of feed wasted due to water spillage when water troughs is placed above feed troughs. s

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