

SHORT COMMUNICATION

**BROILER CHICKEN'S GROWTH RATE IN THREE DIFFERENT
NOCTURNAL LIGHTING REGIMES**

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ABSTRACT

An experiment of 35 days' duration was designed using Completely Randomized Design to study broiler chicken growth rate in three different nocturnal lighting regimes, comprising, continuous darkness (0L: 12D), light (12:0D) and extended light (6L; 6D). The study was carried out at the Teaching and Research Farm of the Rivers State University of Science and Technology, Port Harcourt- Nigeria. A total of ninety unsexed broiler chickens were randomly distributed into the three lighting treatments at the end of three weeks of age. Each treatment replicated twice with 15 chickens per replicate. The broiler chickens were brooded together for 3 weeks on deep litter in an open-sided brooding house. Three 200 watts incandescent bulbs were used to provide a brooding temperature of 34-39°C. Black polythene sheets were used in covering the brooding pens to conserve heat and to maintain a uniform temperature. There was no light restriction during the brooding period. At the end of the third week, the birds were randomly distributed into three different lighting treatments of two replicates each with 15 birds per replicate. The three different lighting regimes were administered using a fluorescent tube between the hours of 6.00pm and 6.00am as follows: continuous light (12:0D), extended light (6L: 6D) and continuous darkness (0L: 12D). Black polythene materials were used to prevent light penetration from adjoining treatments during the night. Artificial light was provided by a 40 watt 'day light' fluorescent tube in each of the treatments. The parameters measured included body weight, body weight gain, daily feed consumption and feed conversion efficiency. The results obtained showed that there was no significant differences ($P>0.05$) in the weekly body weight and body weight gain in all the treatments. Also, feed conversion efficiency was not significantly different ($P>5.0$) in all the treatments. It was, therefore, concluded that since varying photoperiod has no significant effect on broiler growth rate, it will be wasteful for broiler farmers to incur additional cost of providing and /or extending the duration of light under similar geographical zones of this experiment. Therefore, artificial light is not recommended for a profitable broiler production.

Key words: Light, broiler, feeding, growth, photo-period

INTRODUCTION

The two major factors for a successful and economic broiler production are fast growth rate and efficient feed conversion [1]. These can be achieved through efficient management practices that ensure effective disease prevention and control, coupled with the availability of high quality feed, fed *ad libitum* and the flock maintained under continuous illumination.

Previous works done on the effect of different durations of photoperiods on the growth rate and feed conversion efficiency have shown contrasting results, that birds grown under continuous lighting consistently exhibited depressed body weight; while those on restricted light of 6 hours per day treatment had increased body weight and feed conversion compared to 14 hours of light per day [1,2,3]. In contrast, numerous investigations have demonstrated that meat type chickens exposed to continuous light are heavier at broiler age than those given period of light and darkness [4,5].

In Nigeria, all commercial poultry are of exotic temperate breeds evolved from different ecological zones of variable photo-periods and temperatures. It may be speculated that stock obtained from a population acclimated to such variations may react differently, albeit adversely to photostable environmental conditions such as those found in Nigeria.

Limited information in Nigeria and other tropical environments has necessitated the study to investigate the relationship between photo-period and chicken growth rate.

The objective of this experiment was to investigate the effect of three different nocturnal lighting regimes on the growth rate and feeding behaviour of broiler birds.

MATERIALS AND METHODS

The study was carried out at the Teaching and Research Farm of the Rivers State University of Science and Technology, Port Harcourt, Nigeria.

Ninety unsexed broiler chickens were brooded together for 3 weeks on deep litter in an open-sided brooding house. Three 200 watts incandescent bulbs were used to provide a brooding temperature of 34-39°C. Black polythene sheets were used in covering the brooding pens to conserve heat and maintain a uniform temperature. There was no light restriction during the brooding period and the birds were fed *ad libitum* with commercial broilers starter mash containing 21% crude protein and 2600Kcal ME/ kg diet from day old to the end of the 5th week of age. Broiler finisher mash containing 18.5% crude protein and 3000Kcal ME/kg was fed to the birds from 6 weeks to the end of the experiment. At the end of the third week, the birds were randomly distributed into three different lighting treatments of two replicates each with 15 birds per replicate. The birds had mean of 298.0-359.5g at the onset of the study.

Black polythene materials were used to prevent light penetration from adjoining treatments during the night. Feed consumption was recorded on daily basis. The polythene materials were raised during the day to facilitate ventilation and covered only at night to serve the purpose. The data were analyzed by analysis of variance procedure of a Completely Randomized Design (CRD) according to [6]. The means were tested for significance using [7].

RESULTS

The results of the effects of varying lighting treatments on the live body weight, live body weight gain, daily feed consumption and feed conversion efficiency of broiler chicken are shown in Table 1.

There were no significant differences ($P>0.05$) in the weekly body weight, body weight gains and feed efficiency in all the treatments.

DISCUSSION

The findings of this research were similar to the observations reported by Feltman and Nakae, Quarles and Kling [8,9] for the broilers on continuous and intermittent illuminations. The results of this work are also consistent with the findings of Cave [10] and Perry [11], who reported no significant difference in weight gain of broilers reared under continuous and intermittent light programmes (1L: 3D) at 42 and 56 days of age respectively.

A general depression in body weight gain was observed at the end of the experiment week contrasting the findings of Amakiri and Monsi [1], who reported a similar depression at weeks 4 and 6 for birds exposed to different lighting treatments including continuous lighting. The depression observed in this experiment for birds under 12L: 0D and 6D: may be due to the incessant light failures during the 8th week, while the depression for these birds under 0L: 12D cannot be explained. Feed consumption was not significantly affected in all the groups but birds under continuous light consumed slightly more feed than others. This observation contrasted with that of Amakiri and Monsi [1] who reported that birds under 0L: 12D consumed more feed. The difference in feed intake may not necessarily be due to the different photo-periods as a variation in lighting does not appear to have any detrimental effect on feed intake. This is because birds on restricting light regimens can maintain intakes similar to those illuminated continuously by increasing their rate of intake per unit of illumination time [10,11]. The differences may also be assumed to be caused by the differences in the appetite levels as birds have innate capacity to adjust their feed intake to their level under different lighting regimes.

The percentage of birds under 0L: 12D feeding was highest at the beginning and at the end of the daily light period similar to the diurnal pattern in feeding behaviour observed by others [12,13,14]. The high feed intake in the morning was probably due to the commencement of the normal morning feeding routine, which could have been a stimulus to the birds. The increased feed intake at the end of the daylight was

apparently showing that birds were able to condition themselves to a long period of darkness by consuming more food to take them through the night [1].

CONCLUSION

Since varying photo-period has no significant effect on broiler growth rate, it would be wasteful for broiler farmers to incur additional cost of providing and/ or extending the duration of light under a similar geographical zone of this experiment. Therefore, artificial light is not recommended for a profitable broiler production.

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Table 1: Effects of varying lighting treatments on the performance characteristics of broiler chickens raised from 3 to 8 weeks of age

Performance Characteristics	Treatments		
	12L:0D	6L:6D	0L:12D
Mean body at 3 weeks (gm/bird)	313.5 ±2	359.5±3	298±2
Final live body weight (gm/bird)	1677.0 ± 75	1706.0 ± 83	1606.0 ± 80
Weekly live body weight gains (gm/bird/day)	272.7 ± 13	269.3 ± 10	261.6 ± 11
Mean Daily Feed Consumption (gm/bird/day)	113.1 ± 3	111.7 ± 2	108.2 ± 2
Feed Conversion Efficiency	2.9 ± .03	3.0 ± .02	3.0 ± 0.3

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