EFFECT OF DIFFERENT COLOURS OF LIGHT ON SURVIVABILITY AND PERFORMANCE OF THE HELMETED GUINEA FOWL KEETS

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ABSTRACT

A total of four hundred and fourteen-2-weeks old guinea fowl keets raised in the humid tropical environment were used to evaluate the performance of guinea fowl reared under 6 (six) different colours of light. The experimental design was a complete randomized design and each of the treatment groups were replicated thrice. The birds (keets) were subjected to a starter diet formulated to contain 12.05 MJ/Kg ME and 21% CP and were allotted to treatments of Green, Blue, White, Red, Yellow and Black lights. Each colour of light was provided with a 60 watts bulb placed in a room to provide temperature of 27^0C-30^0C and was monitored with a thermometer hung at the middle if the pens and read 3 times each day. At the end of 7 weeks, daily feed intake, daily body weight gain, daily water intake and mortality were recorded while feed conversion ratio was calculated. There were no significant differences ($P>0.05$) among the treatment means in the final body weight, daily weight gain and feed conversion ratio. But the birds showed significant differences ($P<0.05$) in their feed intake, water intake and mortality. Birds reared under yellow light gave the best value (3.25g) as per the daily weight gain, while those reared under yellow light gave the least value (2.46g) with feed conversion ratio ranging from 4.62-5.84, showing no significant difference of (13.98) was obtained among treatments when daily feed intake was considered. Birds reared under green, blue, white, red and yellow (13.04 – 13.98) were comparable while those reared under black light (14.45g) showed significant difference. In conclusion, green produced low value of 1.45% better than other colours viz11.59, 7.25 and 4.435.

Keywords: Different Colours, Survivability, Performance, and Helmeted Guinea Fowl Keets

INTRODUCTION

Guinea fowl domestication and rearing are not yet popular especially in the humid tropical zone of Nigeria. Rearing practices and management standard are also not yet properly established. Yet, guinea fowl meat and eggs are accepted and relished in the area. The standard management that needs to be established is lighting system for optimum reproductive performance of the birds. The chicks of the guinea fowl are called "keets" and can be hatched in a reliable incubator or by a sitting hen of the same specie. Guinea fowl eggs are usually small and are hatched out in the 28 days circles, akin to chicken eggs. The young keets are usually subjected to a relatively high temperature in brooder house to assist their development. According to Olujemi and Robert (1982), the body temperature of day-old keet is 38.9^0C which is lower than that of the adult (40^0C). The young keets lack effective feather covering which functions as an insulator to heat and so need supplemental heating to maintain homoeothermic (Oluyemi and Robert, 1982). The optimum recommended temperatures for brooding are; $32.2\text{-}35^0$C, $29.7 – 322^0$C and $26.6 – 29.7^0$C for the first, second and third week of brooding respectively. The heating may be stopped completely in the fourth week. The quantity and quality of light to which they are exposed are critical to growth, reproduction and other production processes. In temperate climate, lighting duration have been reported to affect various performance parameters such as spermatogenesis, egg production, body weight and feed efficiency (Bukland *et al*., 1973; McSonald *et al*., 1977; Nesheim *et al*., 1979). Proper control of light (natural and artificial) is therefore adopted as a critical

management technique. The implication of this lighting principle in the humid tropical environment like Nigeria has not been extensively evaluated.

MATERIALS AND METHODS

Source of birds and experimental materials

Guinea fowl eggs were bought from Kano in Northern Nigeria. The eggs were set in commercial incubator/hatchery. After 28 days of incubation, the eggs hatched and 414 keets were elected as day old, brooded for 2 weeks and used for the study. The keets were brooded in a deep litter pen of a tropical-type, open-sided poultry house whose sides and demarcation between pens were covered with wire guaze. Heat was provided with kerosene stove under galvanized metal hovers (Amaefula and Obioha, 2005). The keets were vaccinated against new castle disease (1/0) at day old. Commercial starter (Top ® feed was fed to the keets for the first two weeks of brooding period.

Management of keets

Four hundred and fourteen-2-weeks old guinea keets were used to evaluate the effect of colours of light on survivability and performance in a CRD design in the humid tropic zone of Nigeria.

They were weighted and randomly allotted to six different colours of light. The colour of light are green, blue, white, red, yellow and black with each of regarded as a treatment. Sixty-nine keets were assigned to each light colour and replicated thrice as 23 keets per replicate. Starter diet was formatted to contain 12.05MJ/kg ME and 21%CP. The keets were reared for six weeks and all routine vaccinations and necessary action given as in broiler birds. Feed and water were provided ad-libitum. The keets were reared on deep liter with wood shavings as the liter material.

At the end of eight weeks, daily feed intake, daily body weight gain, daily water intake and mortality were recorded and feed conversion ratio calculated.

Data collection

The following parameters were measured. Initial weight was obtained by weighing the keets in each of the replicates within the treatment groups and divided by the number of keets using a top loading Han ® 25kg scale. Final weight changes of the birds were obtained weekly on replicate bases. The replicate weight was divided by the number of birds in the treatment. The measurement taken in the last week was taken as the final weight. Weighing of the birds was at the beginning of the experiment and subsequently on a weekly basis and this was one in the morning hours (7:30 – 8:30). Average daily weight gain was obtained as the difference between final weight gain and initial weight divided by the number of days of the experiment. Feed intake was obtained by the difference between quantity of feed offered and left over feed. Daily water intake (ml/bird) was obtained on a daily basis for 42 days by measuring the quantity of water consumed by birds in a replicate and dividing by the total number of birds in the replicate. Feed conversion ratio (FCR) was obtained by dividing daily feed intake with daily weight gain. Mortality was recorded daily.

Data analysis

Proximate composition of diets was determined according to methods of AOAC (19900. All data were subjected to analyses of variance (ANOVA) in a Completely Randomized Design (CRD) in accordance with the procedure of steel and Torrie (1980), using SPSS (2004) computer package. Duncan's Multiple Range Test 9Dunca, 1995) was used in separating significant treatment means.

The percentage composition of the experimental diets and proximate composition of their diets are presented in tales 1 and 2.

Table 1: Composition of Starter Diet Fed to the Guinea Keets

Feed Ingredients	Percentage
White Maize	42.88
Millet	18.37
Groundnut cake	34.85
Bone meal	3.00
Nacl	0.25
Vitamin Min (Premix)	0.25
Lysine	0.20
Methionine	0.20
Total	100.00
CP (%)	21.00
ME (MJ/kg)	12.05

Vitamin/Mineral Premix (1.25kg) contained. Vitamin A (15.000i.u), VIT D3(3.500I.U), vit E (30.000mg); folic acid (1.00mg) ; Niacin (30.000mg); Capan (10.000); vit B(8.00mg); vit B2 (20mg); vit B1(3.000mg) vit B6 (4.00mg); Biotin (30mg); Antioxidant (125.000mg); Cobalt (240mg); Selenium (300mg); Iodine (1.400mg); Iron (46.000mg); Manganese (96.000mg); Copper (6.000mg); Zinc (80.000mg); Chlorine (500.000mg).

Table 2: Proximate Composition of Starter (Top ®) Diet (% DM Basis)

Composition	Percentage
Percent dry matter	90.23
Percent crude protein	20.20
Percent crude fiber	6.08
EE	2.08
Ash	8.72
NFE	53.15

RESULTS AND DISCUSSION

The effects of the different colours of light on performance of guinea fowl keets represented in Table 3. There is no significant difference ($p>0.05$) among the treatment means of the final body weight, daily weight gain and feed conversion ratio of the birds. But significant differences ($p<0.05$) existed only in means feed intake, water intake and mortality. The none significant increase in the body weight over time is consistent with the findings of Nsoso *et al.,* (2003, 2006) where guinea fowl keets had similar live weights at the stage of growth and development. Theses growth rates are slow compared to broilers which reached 1.5 to 2kg in 6-8 weeks. Ayorinde and Ayemi (1983) also reported that guinea fowls tend to be slow in growing, weighting less than 1kg at eight weeks of age. Ayorinde *et al.,* (1988) also showed that low live weight was a characteristic feature of guinea fowls. It could be that the low body weight and body structure of guinea fowl was suited for rapid flight and fast movement that could have been evolutionary adaptations for survival in the wild and that nature may have selected against either heavy weight or plumpness (VAB International, 1987).

Successful poultry production depends on fast growth and efficient feed conversion poultry farmers have attempted to achieve these objectives by providing feed *ad-libium* under continuous illumination. However, light intensity plays an important role in rearing bird, mainly because birds need a certain light intensity to be photo-stimulated. Our results are not in agreement with the report of Neishem *et al.,* (1979) which stated that in temperate climate, various lighting duration have been reported to affect

various animal performance of parameters such as body weight. This disagreement may be attributed to the climatic feed, breed and management differences between the two environments. Daily feed intake was significantly affected ($p<0.05$) with the highest mean value (14.45g) for black light. This may be as a result of increased appetite for food. There were significant differences ($p<0.05$) in the daily water intake among guinea fowls placed under different light colour treatments. Birds placed under black and green light consumed more water than the others.

The results also showed that birds kept under yellow light had feed conversion ratio (4.6), while green light gave the lowest mortality rate of 1.45% which may be attributed to an improved management practice. Guinea fowls raised under blue colour gained significantly ($p<0.05$) higher weight (221.97g) than those reared under red, white or yellow light, while birds kept under green and black light had similar body weight which may be of interested and benefit to a poultry farmer.

Table 3:Effect of Light on Performance of Guinea Fowl Keets Different Colours of Light

Parameter	Green	Blue	White	Red	Yellow	Black	SEM
Initial live wt(g)	58.93	57.27	56.49	66.55	55.56	72.32	2.18NS
Final weight gain(g)	205.89	221.97	196.64	198.16	197.74	206.40	4.64NS
Daily weight gain(g)	2.76	3.09	2.65	2.46	3.25	2.52	0.15NS
Daily feed intake (g)	13.77^{b}	13.93^{b}	13.64^{b}	13.04^{b}	13.84^{b}	14.45^{b}	0.10*
Daily water intake (g)	28.42^{ab}	30.07	25.77	27.28^{c}	26.30	29.45	0.38
Feed conversion ratio	5.09	4.62	5.42	5.33	4.61	5.84	0.24NS
Mortality	1.45^{d}	11.59^{a}	11.59^{a}	7.25^{b}	4.35^{c}	11.59^{a}	1.23*

a-d means in the same row with different superscripts are significantly different ($p<0.05$).
SEM = Standard Error of Means
NS – Not Significant
* Significant

CONCLUSION

Blue light colour encouraged growth of guinea fowl keets at early age (0-6 weeks), while green and yellow light colour reduced early mortality of keets at the same age. Yellow light colour produced the highest value for feed conversion ration and daily weight gain among other light colours which encourages growth parameters. From foregoing guinea fowls do not only respond to the intensity of light but also to the colour of light. This is because under the influence of different colours of light, the small pituitary gland in the bird's brain sends out hormones to stimulate hens to become mature and lay eggs. So the amount of light is of major importance to the rearing of young guineas. Their behaviour and performance can also be manipulated by the use of specific colours such as red, black, yellow, green and blue. It would be profitable to rear guinea fowl keets under blue and green light colours for higher survivability rate and for optimum performance of the birds especially in the humid tropics of Nigeria. Rearing guinea fowl under blue and green light colours are the standard management practices that encourages production and keeping of guinea fowls in the humid tropics which in turn increase protein intake of the populace.

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