ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 14 (2): 100-102, 2015
ISSN 1682-8356

Effect of Light Color on Some of Performance Indices of Hybrid Cup 500-Broilers

Wessam Assaf, Ibrahim Mohra and Yassin Hashem
Department of Animal Production, Faculty of Agriculture, University of Damascus, Damascus, Syria

Abstract: This study was conducted at private poultry station to determine the effect of light color on the most important performance indices of broilers. A total of 559 broiler chicks of Hybrid Cup 500, one-day-old were distributed randomly into three groups at a rate of 188 birds in the first group (the control, G1) and 188 birds in the second group (G2) and 183 birds in the third group (G3), each group included six replicates, at a rate of 30-32 birds per replicate. The chicks per group were raised, fattened, housed and managed under the same procedures in independent different sections of closed pen until the age of 49 days. Three different light color lights (white, control, WLG), green (GLG) and Yellow (YLG) were applied from day one to the end of fattening period (49 days). Results showed that the application of green or yellow lights on broilers did not significantly affect the mortality rate, average live weight and average feed consumption compared with white light. However, application of green light on the broilers has led to a significant reduction (4.4%, $p<0.05$) in the feed conversion rate for the whole period of fattening compared with white light.

Key words: Light color, broiler, performance indices

INTRODUCTION

Light including: intensity, photoperiod length and color is an important exogenous factor affecting behavior, growth and production in the birds. Many researchers have conducted studies on the intensity of the light and photoperiod length, while color of the light still has a few and conflicting reports. Thus it needs further studies and investigations.

Hakan and Ali (2005) reported that the blue, green and yellow lights have a positive effect on the productive performance of broilers, while the orange and red lights cause negative effect on the productive performance of broilers.

North and Bell (1993) and Prayitno (1994) concluded that blue, green and yellow lights increase growth and improve feed conversion rate of broilers. Firouzi *et al.* (2014) indicated that the weight of the birds exposed to yellow light was significantly higher in comparison with weight of the birds exposed to green, blue or red lights. They also showed that the feed conversion rate was the best in the birds exposed to red light compared with blue and green lights and the mortality rate was less in the broilers of group exposed to green light in comparison with the blue light.

Rozenboim *et al.* (2004) reported that the weight of broilers reared under green or blue light was significantly heavier compared with those reared under red or white light. Rozenboim *et al.* (1999) demonstrated that feed conversion and mortality rates were unaffected by the color of the light. Halevy *et al.* (1998) and Cao *et al.* (2008) demonstrated that the green light accelerates muscle growth and stimulates growth in the early ages of the broilers, whereas blue light stimulates growth in older broilers.

Prayitno *et al.* (1997) found that the broilers raised under white or red lights were more active than those raised under the blue or green lights. Whereas Son and Ravindran (2009) stated that the color of light has no effect on the body weight or feed consumption of broilers and they found that feed conversion rate of broilers exposed to blue light was better compared with those exposed to white or red lights.

Due to the above observed differences and conflicting results on the effect of light color on the broiler, this research aimed to investigate the effects of light color on some of the performance indicators in broiler chicks of Hybrid Cup 500.

MATERIALS AND METHODS

A total of 559 broiler chicks of Hybrid Cup 500, one-day-old were distributed randomly into three groups at a rate of 188 birds in the first group (the control, G1) and 188 birds in the second group (G2) and 183 birds in the third group (G3), each group included six replicates, at a rate of 30-32 birds per replicate. The birds of each group were fattened in the closed of the pen that divided into three sections by insulating walls and they were raised on the deep litter system until the age of 49 days.

All the birds in the different groups were exposed during the two weeks of age to continuous lighting (day and night) and by the beginning of the third week, continuous lighting system was applied during the day (12 h continuous) and intermittent lighting at night (2h light: 2h darkness). The color of lights was applied differently as follow: G (the control): was exposed to whit light(WL), G2: was exposed to green light (GL) and G3 was exposed to yellow light (YL).

Corresponding Author: Wessam Assaf, Department of Animal Production, Faculty of Agriculture, University of Damascus, Damascus, Syria

All birds of different groups were fed by the same three feed mixtures balanced and manufactured in the form of pellets, in the first stage of age (1-14 days) were fed on a mixture containing 2867 Kcal/kg and 21.2% crude protein and in the age of the second phase of age (15-35 days) were fed a mixture containing 2972 Kcal/kg and 18.1% crude protein and in the third phase of age (36-49 days) fed a mixture containing 3031 Kcal/kg and 16.3% crude protein.

The total mortality rate in each group based on daily mortality was counted, the live weight of 100 random birds at one day old and 15 random birds in each replicate and at the end of first and second raising stages was also calculated while the live weight of each broiler was calculated at the end of the third stage, feed consumption was at each stage and for the whole fattening period, was calculated by the following formula: Average feed consumption of birds during the stage (g) = The amount of consumed feed during the stage (g)/Average number of birds during the stage (birds) and food conversion rate was calculated for each replicate at each stage of the ages and for whole the fattening period by the following relation:

$$\text{Food conversion rate} = \frac{\text{Amount of consumed feed by the bird (g)}}{\text{Average weight gain for bird}}$$

Statistical analysis: Significant differences between percentages of the mortality rates among the groups were tested according to Fisher test. The other indicators were subjected to One Way ANOVA according to Plahinski (1970) using, SPSS Inc. (2001).

RESULTS AND DISCUSSION

Mortality rate (MR): Results in Table 1 indicate that there was a significant decrease ($p<0.05$) in the MR among groups only during the first raising period (up to 14 days of age) and the result was in favor of the control group (GWL) while the MR in third group (GYL) was the worst (2.7%). In general the mortality rate was in all studied groups at the end of fattening within the acceptable limits, It was also observed that the color of light did not have significant effect on MR of broilers older than 14 days of age and this agrees with Rozenboim *et al.* (1999) and disagrees with Firouzi *et al.* (2014).

Average of body weight (ABW): Results showed no significant effect ($p<0.05$) for the light color on the ABW at each of fattening periods even the white color was the preferable and associated with the highest ABW of broilers (1969.8 g) up to 35 days of age, while ABW was the highest in GGL during the last period of fattening (2995.5 g vs. 2908.2 g in GWL and 2962.3 g in GYL). This disagrees with North and Bell (1993) and Prayitno (1994) and Hakan and Ali (2005) who indicated that the green and yellow light have positive effects on improving growth of broiler whereas these results agree with Son and Ravindran (2009) who confirmed that the color light has no effect on the body weight of broiler.

Table 1: Cumulative mortality rate (%) in broilers of Hybrid Cup 500 exposed to different light colors during 49 days of fattening

	Studied groups		
Ages of birds (day)	GWL	GGL	GYL
14	0[a]	1.6[b]	2.7[b]
35	1.6	3.2	4.4
49	5.3	6.4	5.5

In this and the subsequent tables the percentages or the averages shared with a different character with at least within the confines of a single line, including significant differences ($p<0.05$)

Table 2: Average of body weight (g) in broilers of Hybrid Cup 500 exposed to different light colors during 49 days of fattening

	Studied groups		
Ages of birds (day)	GWL	GGL	GYL
1	40	40	40
14	482.2	485.6	476.3
35	1969.8	1966.2	1895.8
49	2908.2	2995.5	2962.3

Table 3: Average feed consumption per bird (g). broilers of Hybrid Cup-500 exposed to different light colors during 49 days of fattening

	Studied groups		
Ages of birds (day)	GWL	GGL	GYL
1-14	566.1	555.7	553.5
15-35	2670.0	2599.5	2623.9
35-49	2355.8	2357.3	2368.6
1-49	5591.9	5512.5	5546.0

Table 4: Average feed conversion rate broilers of Hybrid Cup-500 exposed to different light colors during 49 days of fattening

	Studied groups			
Ages of birds (day)	GWL	GGL	GYL	L.S.D 5%
1-14	1.280	1.247	1.269	-
15-35	1.797	1.761	1.851	-
35-49	2.530	2.308	2.232	-
1-49	1.951	1.866[b]	1.899[ab]	0.066

Average feed consumption (AFC): It was found (Table 3) that light color did not have significant effect ($p<0.05$) on the average feed consumption per birds during each of fattening periods and the overall AFC was 5591.9, 5512.5 and 5546.0 g in GWL, GGL and GYL, respectively. These results agrees with the results reported by Son and Ravindran (2009).

Food conversion rate (FCR): Results indicated (Table 4) that there were no significant differences among the different groups with relative to feed conversion rate during the first, second and third periods of fattening, but these differences becomes significant ($p<0.05$) during the whole study period (49 days) of fattening and in favor of GGL. The average feed conversion rate for the whole

period of fattening of birds in the second group (GGL) was 4.4% less than that of birds in the first group (WL) whereas the average feed conversion rate for the whole fattening period at the birds of the third group (YL) was ranked between the other two figures. This improvement agrees with results reported by North and Bell (1993) and Prayitno (1994) and disagrees with Rozenboim *et al*. (1999) and Firouzi *et al*. (2014).

It was concluded that the application of green or yellow lights on broilers did not significantly affect mortality rate, average live weight, average feed consumption compared with white light, but exposing the birds for the green light during all the fattening periods led to a significant reduction in the average feed conversion rate. Thus, application of green light is recommended to improve the FCR.

REFERENCES

Cao, J., W. Liu, Z. Wang, D. Xie and Y. Chen, 2008. Green and blue monochromatic lights promote growth and development of broilers via stimulating testosterone secretion and microfiber growth. J. Poult. Res., 17: 211-218.

Firouzi, S., H.N. Hadi, H. Hamid, S.J. Seyed, N. Yaser, R. Fatemeh, A. Razieh and M. Marzieh, 2014. Effects of color lights on performance, immune response and hematological indices of broilers. J. World's Poult. Res., 4: 52-55.

Hakan, B. and A. Ali, 2005. Effects of light wavelength on broiler performance. Hayvansal. Uretim, 46: 22-32.

Halevy, O., I. Biran and I. Rozenboim, 1998. Various light source treatments affect body and skeletal muscle growth by affecting skeletal muscle satellite cell proliferaten in broilers. Bio. Phy., 120: 317-323.

North, M.O. and D.D. Bell, 1993. Commercial chicken production manual. 4th ed. AVI Publishing Co. Westport, CT.

Plahinski, 1970. Biotic statics. Moscow.

Prayitno, D.S., 1994. The effects of color and intensity of light on the behaviour and performance of broilers. Ph.D. thesis, University of Wales, Bangor, UK.

Prayitno, D.S., C.J.C. Philips and H. Omed, 1997. The effect of color of lighting on the behavior and production of meat chickens. Poult. Sci., 76: 452-457.

Rozenboim, I., B. Robinzon and A. Rosenstrauch, 1999. Effect of light source and regimen on growing broilers. Br. Poult. Sci., 40: 452-457.

Rozenboim, I., I. Biran, Y. Chaiseha, S. Yahav, A. Rosenstrauch, D. Sklan and O. Halevy, 2004. The effect of green and blue monochromatic light combination on broiler growth and development. Poult. Sci., 83: 842-845.

Son, J.H. and V. Ravindran, 2009. Effect of light color on the behaviour and performance of broilers. Proceedings of the Poult. W. Sy. Cervia. Italy, 63.

SPSS Inc., 2001. SYSTAT. Version, 11.5.