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Body weight and gain in weight of caged broilers as influenced by different lighting sources

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Abstract
The present experiment was conducted on 36 day old broiler up to four weeks of age to investigate "Body weight and gain in weight of caged broilers as influenced by different lighting sources" 36 day old Broiler chicks were randomly divided in to four groups with three sub groups of 3 chicks in each. Control (first) group received 100 watt incandescent bulb. Chicks in, second, third and fourth received 10 watt LED 60 watt incandescent bulb, 15 watt CFL 60 watt incandescent bulb and 5 watt CFL 100 watt incandescent bulb, respectively. Present result revealed that there was non-significant effect of different lighting sources on mean body weight and mean average gain in weight on performance of broilers was observed.

Keywords: Day old broiler chicks, lighting source, body weight and gain in weight

Introduction
India is the third largest egg producer in the world (after China and the United States of America) and the nineteenth largest broiler producer. The impressive growth is a result of several factors such as active developmental support from the state and central government, research and development support from research institutes, international collaboration and private sector participation. The growth of the poultry sector is mainly attributed to the interventions of the corporate sector with an enabling policy environment provided by the Government of India / State Governments from time to time. The activity provides huge employment opportunities for the rural poor either under Backyard poultry production system or under small scale commercial broiler farming units. Over 5 million people are engaged in the poultry sector either directly or indirectly. Owing to the considerable growth in broiler industry, high quality chicks, equipment, vaccines and medicines, technically and professionally competent guidance are available to the farmers. The management practices have improved and disease and mortality incidences are reduced to a great extent. Many institutions are providing training to entrepreneurs. Increasing assistance from the 2 Central/ State governments and poultry corporations is being given to create infrastructure facilities so that new entrepreneurs are attracted to take up this business. Broiler farming has been given considerable importance in the national policy and has a good scope for further development in the years to come. Poultry meat is an important source of high quality proteins, minerals and vitamins to balance the human diet. Specially developed varieties of chicken (broilers) are now available with the traits of quick growth and high feed conversion efficiency. Depending on the farm size, broiler farming can be a main source of family income or can provide subsidiary income and gainful employment to farmers throughout the year. Poultry manure is of high fertilizer value which can be used for increasing yield of all crops.

Light quality, levels, and duration are all extremely important to broilers. Light is one of the major microclimate factors for poultry production which influences growth development and physiological functioning, of birds. Artificial lighting is extensively used in raising poultry every where. One of the major functions of lighting programs, especially intensity, is to influence growth rate of broilers, which allows birds to achieve physiological maturity prior to maximal rate of muscle mass accretion. Many new lighting technologies that exceed energy efficiency requirements are currently being developed by different companies as potential replacements for ICD light sources, including cold cathode fluorescent lamps (CCFL), compact fluorescent lamps (CFL), and light emitting diodes (LED), among others. The major benefits of these bulbs are high efficiency, long operating life, moisture resistance, and

availability in differing peak wavelengths Craford M. G. and Tannas L. E (1985) [6]. The costs of these LED light bulbs have been decreasing since their first development and therefore have become affordable for the poultry industry. However, choosing the correct LED lighting source can be difficult since some do not dim well to accommodate different production stages or circadian lighting intensity levels in poultry facilities as projected by manufacturers, while some of the available results are inconsistent. Evaluation of these new light sources is needed, especially the commercially available bulbs based on energy use, duration, and cost on broiler growth and production performance, welfare, and physiological responses. There are a number of studies focusing on the effect of differing light sources and schedules on broiler growth performance, welfare, meat quality, and muscle tissue accretion with conflicting reports. More studies are still needed on how these differing light sources impact growth and production performance responses and welfare indices of broilers grown to heavy weights (>3.0 kg) to ensure optimum production efficiencies, reduce electricity consumption, and ensure the health and welfare of broilers.

Lighting is considered as one of the most important environmental factors because of its established effect on growth of broilers. Lighting on poultry farm plays a important role in broiler production. It is possible to reduce energy costs by making small changes to the lighting on daily operation inside the poultry farm. Well designed energy efficient different lighting sources system can mean higher lighting levels, better performance and lower energy costs in broilers farming.

Therefore the present experiment entitled was planned **"**Body weight and gain in weight of caged broilers as influenced by different lighting sources**"** with the following

Objectives

1. To determine weekly body weight of caged broilesr as influenced by different lighting sources.
2. To find out the effect of different lighting sources on gain in weight of caged broilers.

Materials and Methods

Thirty six day old chicks (DOC) of same hatch were procured and reared in battery cages of Small Animal Laboratory in the Department of Animal Husbandry and Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh, India. 36 day-old broiler chicks were randomly divided into four groups with three sub groups comprising of three chicks in each to serve as replicates under following of different lighting sources used as treatments.

Treatments	Different lighting sources
T_0 (Control)	Chicks reared under 100 watt incandescent bulb
T_1	Chicks reared under 10 watt LED and 60 watt incandescent bulb
T_2	Chicks reared under 15 watt CFL and 60 watt incandescent bulb
T_3	Chicks reared under 5 watt CFL and 100 watt incandescent bulb

36 DOC were weighed and leg banded and distributed randomly into four groups as treatments. Self prepaed, standard starter ration upto two weeks of ages and then broiler finisher ration upto four weeks as per BIS (1992) specifications for energy and protein were fed.

Statistical analysis

Data collected on various parameters were tabulated and subjected to statistical analysis by Analysis of variance technique as and per Snedecor GW and Cochran WG (1994) [15].

Results and Discussion

Body Weight of Broilers

Average weekly body weight of broilers.

The following observations were made;

1. At one weeks of age the highest body weight of broilers was recorded in T_1 (176.00 g) followed by T_2 (166.44 g), T_3 (160.66 g), and T0 (156.44 g), respectively.
2. At two weeks of age the highest body weight of broilers was recorded in T_2 (464.00 g) followed by T_1 (434.88 g), T_3 (419.99 g), and T_0 (389.33 g), respectively.
3. At three weeks of age the highest body weight of broilers was recorded in T_2 (866.44 g) followed by T_1 (823.55 g), T_3 (798.66 g), and T_0 (798.66 g), respectively.
4. At four weeks of age the highest body weight of broilers was recorded in T_2 (1389.13 g) followed by T_1 (1333.63 g), T_3 (1158.40 g), T_1 and T_0 (1065.13 g), respectively.
5. Irrespective of treatments the mean body weight of broilers in T_0, T_1, T_2 and T_3 week of age was 581.05, 692.02, 721.50, and 634.43 g, respectively.
6. Irrespective of weeks the mean body weight of broilers in first, second, third and fourth was 164.89, 427.05, 800.52 and 1236.54 g, respectively.
7. The differences in the mean body weight of broilers, the treatments were found non-significant.

From the perusal of data on weekly body weight of broilers, it may be observed that mean body weight of broilers, irrespective of weeks at one, two, three, four and five weeks of age was 164.89, 427.05, 800.52 and 1236.54 g, respectively. Regarding the influence of treatments on weekly body weight of broiler was observed that mean body weight of different treatments were recorded (Fig:-1) T2 (721.50g) and followed by, T1 (692.02g), T3 (634.43g) and T0 (581.05g). However, the differences between the values of weekly body weight of broilers between the treatments were non- significant, indicating there by a non- significant effect of different sources of light on body weight of boilers chicks. The results of this study are in agreement with Sharideh and Zaghari (2017) [14].

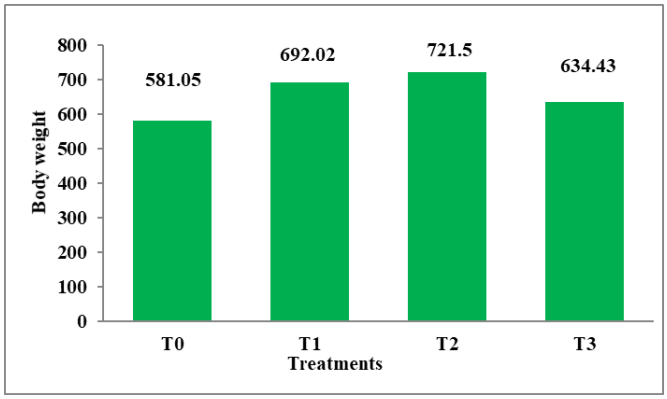

Fig 1: Average weekly body weight (g) of broilers on different lighting sources

Gain in Weight of Broilers

Average weekly gain in weight of broilers of different treatments (g.)

The data regarding average weekly gain in weight per broiler of different treatments are presented and ANOVA of the same is given. The following observations were made:

1. At one week of age, the highest gain in weight per broiler as recorded in T_1 (135.55) followed by T_2 (127.11), T_3 (119.78), and T_0 (117.78).
2. At two weeks of age, the highest gain in weight per broiler as recorded in T_2 (297.56) followed by T_3 (259.33), T_1 (258.89), and T_0 (232.89).
3. At three weeks of age, the highest gain in weight per broiler as recorded in T_2 (402.45 g) followed by T_1 (388.67 g), T_3 (378.67), and T_0 (324.11 g).
4. At four weeks of age, the highest gain in weight per broiler as recorded in T2 (522.70 g) followed by T_1 (510.08 g), T_3 (359.74), and T_0 (351.69 g).
5. Irrespective of week, the mean average gain in weight per broiler at one, two, three, and four weeks of age was 125.06, 262.17, 373.48, and 436.05 g, respectively.
6. Irrespective of treatments, mean average gain in weight per broiler in T_0, T_1, T_2, and T_3 was 256.62, 323.30, 279.38 and 337.46g respectively.
7. The differences in the mean average gain in weight per broiler due to treatments were found non-significant.

From the data on weekly average gain in weight per broiler, it may be noted that mean body weight of broilers, irrespective of weeks at one, two, three and four weeks of age was 125.06, 262.17, 373.48, and 436.05 g, respectively. The differences in these were found non-significant, which indicate a non-significant effect of age on weekly gain in weight of broilers in all treatments. These results were expected regarding the influence of treatments on weekly gain weight of broiler was noted that mean gain in weight of different treatments were recorded (Fig:-2) T3 (337.46g) and followed by, T1 (323.30g), T2 (279.38g) and T0 (256.62g). However, the differences between the values of weekly gain in weight of broilers between the treatments were non- significant, indicating there by a non- significant effect of different sources of light on gain in weight. The results of this study are in agreement with Cherry and Barwick (1962) [5].

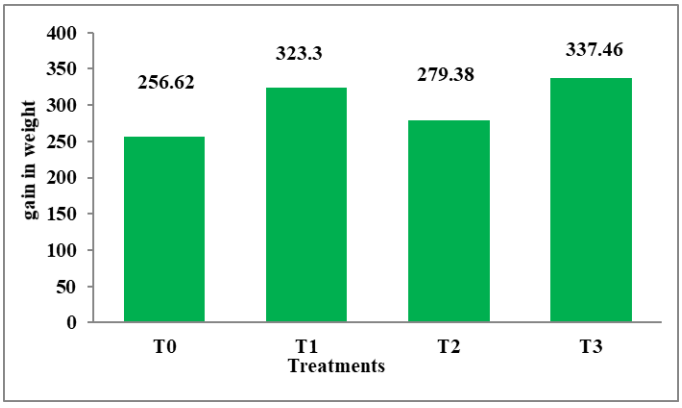

Fig 2: Average weekly gain in weight (g) of broilers on different lighting sources

Conclusion

A total 48 DOC of same hatch were procured and distributed in to four groups with four sub groups comprising of three birds in each consisting of four treatments. Broilers in all treatments were fed diet as per NRC standard. The birds were reared in battery type cages under standard management practices from day – old to four weeks of age's.Different sourse of light. Broiler starter ration containing CP: 22 percent and ME:2900 K.Cal./kg. Feed was fed up to three weeks and broiler finisher ration containing CP: 19 percent and ME:3000 k.cal/kg. Feed up to four weeks the ration were fed *ad libitum* to the birds .Initial weight of each chicks were recorded on arrival and then weekly to obtain the growth rate. The feed consumption was also recorded weekly to determine the feed conversion ratio. Broilers was given floor spaces @0.75 sq. ft.- 1 sq.ft. The data on body weight, feed intake, were recorded weekly to determine gain in weight and FCR. The data were analyzed statistically and the results are summarized as follows:

- Irrespective of treatments the mean body weight of broilers in T_0, T_1, T_2 and T_3 week of age was 581.05, 692.02, 721.50 and 634.43 g, respectively.
- Irrespective of treatments, mean average gain in weight per broiler in T_0, T_1, T_2, and T_3 was 256.62, 323.30, 279.38 and 337.46g respectively.
- The differences in the mean body weight of broilers and mean average gain in weight per broiler due to treatments were found non-significant.

It may be concluded that the Performance of caged broilers for their mean body weight, and mean gain in weight was non-significant effected by different lighting sources. Accoding to the Gain in weight of broilers under 5 watt CFL and 100 watt incandescent bulb was found the best compared to all the treatments.

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