1-1-1987

Lighting of end of lay broiler breeders: fluorescent versus incandescent.

D. R. Ingram

T. R. Biron

H. R. Wilson

F. B. Mather

Recommended Citation
Ingram, D., Biron, T., Wilson, H., & Mather, F. (1987). Lighting of end of lay broiler breeders: fluorescent versus incandescent.. *Poultry science, 66* (2), 215-217. https://doi.org/10.3382/ps.0660215

EDUCATION AND PRODUCTION

Lighting of End of Lay Broiler Breeders: Fluorescent *Versus* Incandescent

D. R. INGRAM and T. R. BIRON

Poultry Science Department, Louisiana Agricultural Experiment Station, Louisiana State Agricultural Center, Louisiana State University, Baton Rouge, Louisiana 70803

H. R. WILSON and F. B. MATHER

Poultry Science Department, University of Florida, Gainesville, Florida 32611

(Received for publication February 24, 1986)

ABSTRACT An 18-week experiment was conducted to investigate the effects of changing from incandescent to fluorescent lighting on egg production, egg weight, fertility, and hatchability of end of lay broiler breeders housed in an open-sided house. Forty-eight-week-old Cobb feather-sexed broiler breeders were housed, 30 females and 3 males per pen, in a total of 28 pens. Incandescent lights had been used previously, so pens were randomly assigned to either fluorescent or incandescent lights giving 20 lx of light at bird level. Lights used were 60 W incandescent and 22 W fluorescent cool-white circular. Body weight and egg production were measured weekly, and fertility, hatchability, and egg weight were determined monthly from 48 to 65 weeks of age. No significant treatment effects were observed on body weight, fertility, hatchability, or egg weight. A significant reduction in egg production was observed with fluorescent lighting from Weeks 58 to 65. The reduced egg production indicated it was detrimental to change from incandescent to cool-white fluorescent lighting.
(*Key words:* lighting, broiler breeder, fluorescent lighting, reproduction)

1987 Poultry Science 66:215–217

INTRODUCTION

Incandescent lamps remain the most common source of artificial light in the poultry industry. The introduction of screw-in fluorescent light fixtures and increased cost of electricity indicate a clear economic advantage of fluorescent lighting. A shift to such an alternative source of artificial light has been slow due partially to lack of sufficient information on the effect of fluorescent lighting on poultry.

Carson *et al.* (1957) reported satisfactory stimulation of the pituitary and subsequent egg production from cool-white fluorescent illumination. Payne and McDaniel (1958) compared favorably 15-W fluorescent tubes to 60-W incandescent light bulbs to stimulate the onset of egg production in Broad Breasted Bronze turkeys. Cool-white fluorescent light was determined to be superior to yellow fluorescent or incandescent light to stimulate semen production in breeder turkeys (Thurston *et al.*, 1982). Siopes and Wilson (1980) concluded that warm-white fluorescent lighting accelerated sexual maturity of chickens but provided less stimulation to egg production than incandescent lighting. Siopes (1984) reported that the reproductive performance of turkey breeder hens exposed to incandescent light or cool-white fluorescent light was similar in all aspects except that the hens given the fluorescent light had a reduced number of eggs after 20 weeks of production. Information on the responses to fluorescent light by broiler breeders is lacking.

The interest in fluorescent light has recently increased with the introduction of the screw-in fixture and increased cost of electricity. This experiment was conducted to determine the effect of changing from incandescent to cool-white fluorescent lighting on the reproductive performance of end of lay broiler breeders.

MATERIALS AND METHODS

Forty-eight-week-old Cobb feather-sexed broiler breeders were randomly housed 30 females and 3 males per pen in a total of 28 light-shielded pens for an 18-week experiment. Treatments consisted of either cool-white fluorescent or white-frosted incandescent lights giving a minimum 20 lx of light at bird level. Light intensity was determined across the diagonals of the pens at bird level by use of a light meter. Bulbs used were 60-W incandescent and 22-W cool-white circular fluorescent. Extra

males were housed in each treatment for replacement purposes. The diet fed during the experiment was based on the recommendations of Wilson and Harms (1984) for broiler breeders.

Females were weighed each week. Feed intake for the next week was based on these weights in order to maintain the body weight curve recommended by the breeder. Egg production was recorded daily as total eggs and the number of floor eggs. Every 4 weeks, eggs were collected for 5 days. Percent settable eggs, fertility, and hatchability were determined. Egg weight data were collected on 1 day's eggs every 4 weeks.

Data were analyzed by analysis of variance and means were separated by Duncan's multiple range test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Female body weights were essentially the same for both lighting treatments throughout the experiment. At Week 48, female body weight averaged approximately 3.75 kg, and during the experiment the weights increased approximately .2 to 3.97 kg. The lack of an effect of lighting treatment on body weight was expected because the breeders were fed to maintain body weight.

At the initiation of the experiment, percent hen-day egg production averaged approximately 60% for the fluorescent and the incandescent treatments (Fig. 1). Egg production for the two lighting treatments showed no signfiicant difference until Week 58. From Weeks 58 to 65, hens exposed to the fluorescent lighting treatment had significantly ($P<.05$) lower egg production. This decline occurred 10 weeks after initiation

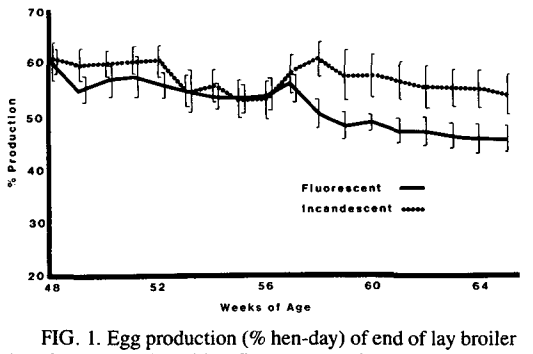

FIG. 1. Egg production (% hen-day) of end of lay broiler breeders exposed to either fluorescent or incandescent lighting of 20 lx. The treatments were significantly different ($P<.05$) from Weeks 58 to 65.

TABLE 1. *Settable eggs, fertility, hatchability of fertile eggs, total hatchability, and egg weight of end of lay broiler breeders exposed to either fluorescent or incandescent lighting of 20 lx*

Age	Settable eggs		Fertility		Hatch of fertiles		Total hatchability		Egg weight	
	Incandescent	Fluorescent	Incandescent	Fluorescent	Incandescent	Fluorescent	Incandescent	Fluorescent	Incandescent	Fluorescent
(weeks)	(%)								(g)	
48	88.6 ± 2.1	88.8 ± 2.4	83.7 ± 4.0	86.7 ± 1.7	87.0 ± 3.2	84.1 ± 3.1	73.1 ± 5.7	73.1 ± 2.8	69.3 ± .2	70.4 ± .3
52	84.8 ± 2.1	87.5 ± 1.6	86.6 ± 4.0	84.1 ± 2.9	84.2 ± 4.3	87.2 ± 3.2	73.3 ± 4.6	72.9 ± 3.2	70.3 ± .4	70.9 ± .3
56	88.1 ± 2.0	89.0 ± 1.5	88.1 ± 4.3	81.9 ± 3.9	80.4 ± 5.2	89.1 ± 4.8	68.2 ± 5.8	72.6 ± 4.3	71.6 ± .5	72.1 ± .4
60	88.9 ± 2.1	88.3 ± 1.4	86.6 ± 4.0	80.1 ± 4.0	86.2 ± 4.5	88.9 ± 3.3	75.3 ± 4.7	73.0 ± 3.3	71.6 ± .5	71.8 ± .4
64	88.0 ± 2.2	87.3 ± 1.5	83.7 ± 4.3	79.3 ± 4.2	88.0 ± 4.1	88.0 ± 3.1	73.8 ± 4.1	72.6 ± 2.9	72.0 ± .4	72.1 ± .5

of the treatments and is similar to the response that has been reported in turkey breeder hens (Siopes, 1984). Furthermore, Siopes (1984) showed no benefit of fluorescent lighting at 108 lx with turkey breeders. The observed decline in egg production occurred during increasing natural light and would seem unassociated with natural day length. The decline may be associated with the absence of light toward the red end of the spectrum in cool-white fluorescent lighting.

There was no effect of lighting treatment on the incidence of floor eggs. Both treatments averaged between 25 to 30% floor eggs. The cause of the high incidence of floor eggs for both treatments remains unclear.

Data for percent settable eggs, fertility, hatchability, and egg weight are given in Table 1. No significant differences in percent settable eggs were observed at any period during the experiment. At the initiation of the experiment, percent settable eggs averaged approximately 89% for both lighting treatments and remained relatively constant throughout the experiment. No signficant differences were observed in fertility, hatchability of fertile eggs, or total hatchability. Egg weights were essentially the same for both treatments throughout the experiment. They averaged approximately 70 g at 48 weeks and increased to 72 g by 64 weeks. The lack of a significant effect on fertility, hatchability, and egg weight is in agreement with the effects reported by Siopes (1984) with turkey breeder hens.

Based on the findings of this study, it would appear that although there was no significant effect of changing from incandescent to cool-white fluorescent lighting on settable eggs, fertility, hatchability or egg weight, there was an adverse effect on egg production of end of lay broiler breeders. Therefore, it appeared detrimental to change from incandescent to cool-white fluorescent lighting for end of lay broiler breeders.

REFERENCES

Carson, J. R., B. F. Bacon, and W. A. Junnila, 1957. Light quality and the stimulation of egg production. Poultry Sci. 36:1108. (Abstr.)

Payne, L. F., and G. R. McDaniel, 1958. Fluorescent lights for turkey breeders. Poultry Sci. 37:722–726.

Siopes, T. D., 1984. The effect of high and low intensity cool-white fluorescent lighting on the reproductive performance of turkey breeder hens. Poultry Sci. 63:920–926.

Siopes, T. D., and W. O. Wilson, 1980. The effect of incandescent and fluorescent lighting on the sexual development and egg production of chickens. Poultry Sci. 59:1572. (Abstr.)

Steel, R.G.D., and J. H. Torrie, 1980. Principles and Procedures of Statistics. McGraw-Hill Book Co., Inc., New York, NY.

Thurston, R. L., B. L. Hughes, and J. E. Jones, 1982. Effects of high intensity fluorescent versus low intensity incandescent light on semen production in large white breeder turkeys. Poultry Sci. 61:1556. (Abstr.)

Wilson, H. R., and R. H. Harms, 1984. Evaluation of nutrient specifications for broiler breeders. Poultry Sci. 63:1400–1406.