

EFFECTS OF GROWING PERIOD LIGHTING PROGRAMS ON LAYING PERFORMANCE

Lighting programs are one of the key management tools in determining layer hen growth and laying performance. Light duration influences body weight profiles from hatch throughout the grow and until the hen reaches mature body weight in the lay period. Lighting programs also have a strong impact on the onset of sexual maturity, egg weight, and production performance.

In this study, we evaluated the impact of two common light applications on W-80 commercial bird growth and lay performances. The first treatment was the Hy-Line standard step-down (SD) lighting program starting with 20 hours of light during the first week; afterward, the light was decreased each week to reach 12 hours light at 7 weeks. The pullets were held at 12 hours light until 17 weeks of age. The second treatment (24/12) started with 24 hours of continuous light until 7 weeks of age. At 7 weeks the light was reduced to 12 hours and held until 17 weeks. The second application mimics common practice among Indian commercial layer farms. Parameters such as rearing period weekly body weight, age at sexual maturity, and production performance (hen-day %, hen-housed eggs, egg weight) were recorded and compared.

Results from the study indicate that the 24/12 lighting program reduces body weight, delays sexual maturity, limits production performances, and in general, limits genetic potential compared to the standard SD program.

TRIAL DESIGN

Hy-Line W-80 commercial strain was subjected to two different lighting practices: SD and 24/12.

- 600 chicks for each group were subject to experiment. Management practices followed the W-80 Commercial Guide for both groups.
- Birds were individually wing-banded at hatch for detailed data collection.
- Pullets were reared in floor-pens.
- No beak trimming was applied.
- During the growing period, bi-weekly body weight and mortality data was recorded.
- During the production period, body weights, mortality, production, and egg weight information was recorded.

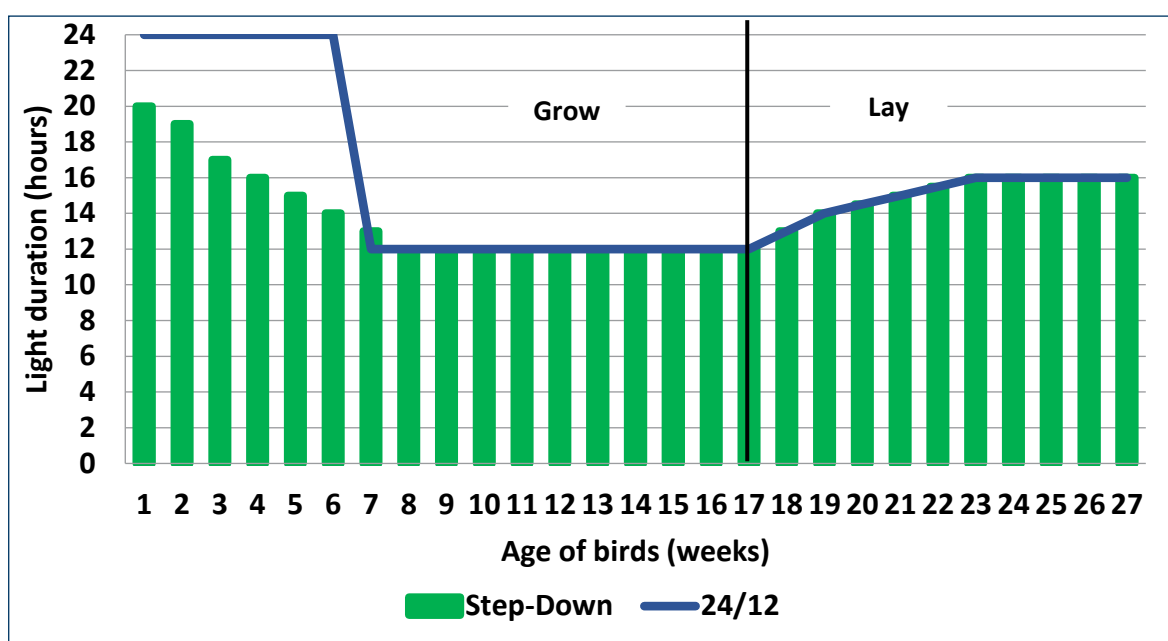


Figure 1. Lighting practices used in the study.

RESULTS

Growing Period Body Weights

- **24/12 lighting program:** Birds from this group showed a good start for body weights up to 4 weeks of age and after showed reduced weekly body weight gain.
- **Step-down lighting program:** The body weight gain in this group was steady and on target compared to W-80 standard throughout the rearing period. Body weights were 49 grams above the 24/12 lighting program birds at 18 weeks.

All results were tested at P<0.05 significance level.

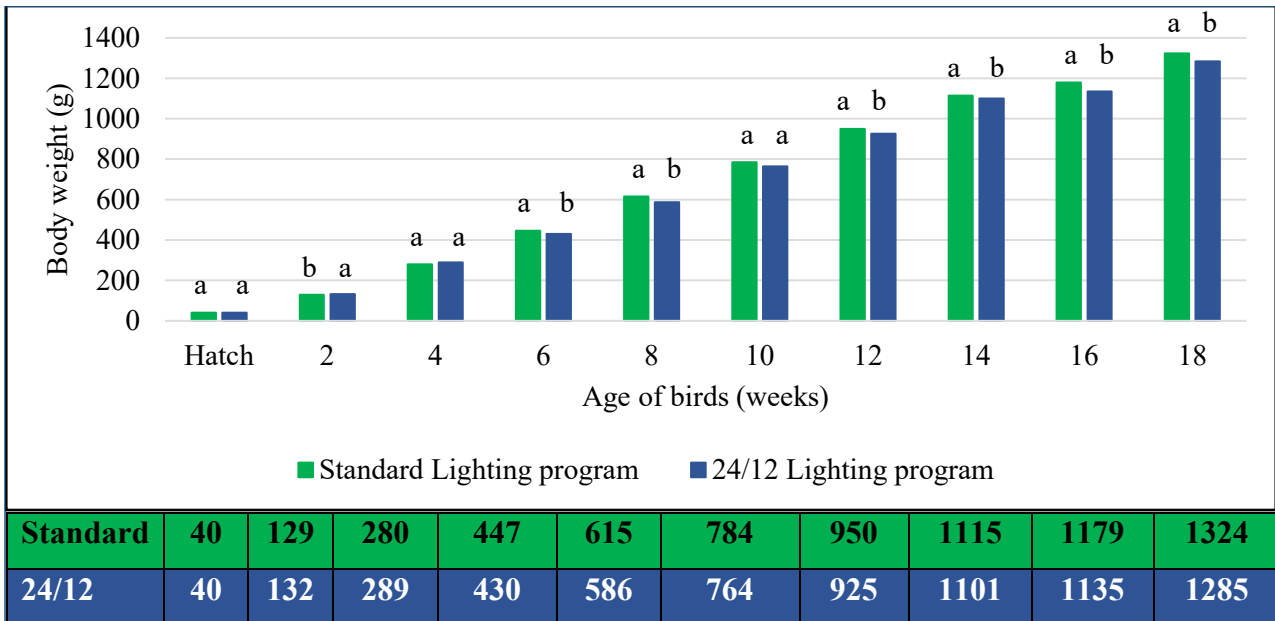


Figure 2. Comparison of body weight gain.

Sexual Maturity

Lighting programs had a significant impact on bird maturity. Birds under the step-down lighting program attained maturity 6 days earlier than 24/12 lighting program.

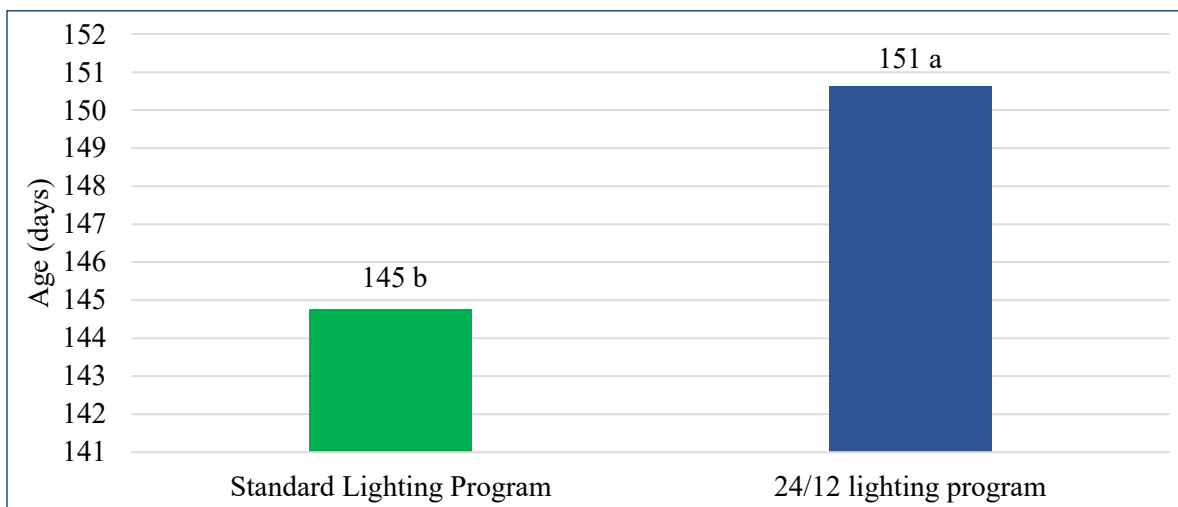


Figure 3. Comparison of sexual maturity.

PRODUCTION PERIOD RESULTS

Hen-Housed Eggs	18–30 weeks	40 weeks	60 weeks
24/12 lighting program	84 ^b	138 ^b	269 ^b
Step-down lighting program	95 ^a	149 ^a	281 ^a

Onset of lay was six days earlier for birds under the step-down lighting program. By 30 weeks of age, the step-down group had 11 more eggs compared to 24/12 program. At the end of 60 weeks, birds under the step-down lighting program laid 12 eggs more than birds under 24/12 lighting program group.

Egg Weight

Birds with the 24/12 lighting program had 1.3 to 0.5 g heavier egg weight profile starting from the first egg. In both groups, egg weights were higher than the W-80 breed standard.

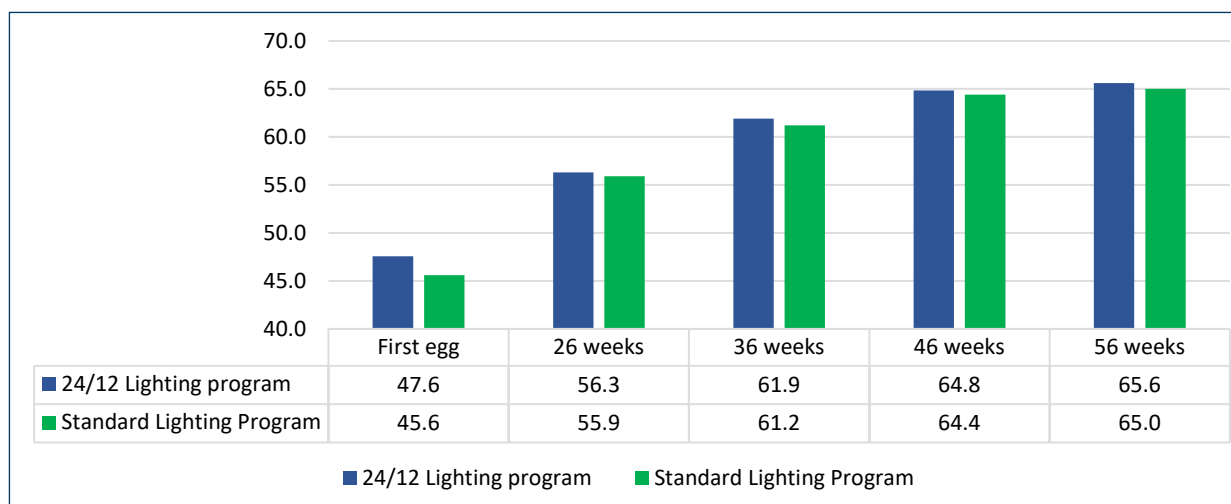


Figure 4. Comparison of egg weight.

SUMMARY

- This study shows that lighting programs in the growing period have a significant impact on body weight profiles during the rearing period, age of sexual maturity, number of eggs produced per bird, and egg weight throughout the hen's life.
- From the above study, step-down lighting program had good body weight development during rearing period. In the production period, the hens came into production 6 days earlier and by 60 weeks had 12 more saleable eggs than the birds of 24/12 hours lighting group. The heavier eggs with the 24/12 program are likely due to delayed maturity.
- The egg weight profile of the standard lighting program matches the Indian market.

CONCLUSION

Good production performances can be achieved by using the Hy-Line standard step-down lighting program during the rearing period. This program provides good resting time to the baby chicks to establish their circadian rhythm. Therefore, the supported hormone system gives a boost to muscle, bone, and intestinal development. Additionally, there is an energy-saving component by not using 24 hours of artificial light for 7 to 8 weeks. In this study, we kept birds at 12 hours of light to mimic day length; however, in an open-sided environment, we recommend no artificial light after 7 weeks, only daylight.

Recommended lighting program for Hy-Line W-80 birds in open-sided houses in India:

Growing Period		Stimulation and Laying Period	
Age in weeks	Light hours	Age in weeks	Light hours
1	20	17	BW=1100g with 85% Uniformity
2	19	18	+1 hr
3	17	19	+ 1hr
4	16	20	+1/2 hr
5	15	21	+1/2 hr
6	14	22	+1/2 hr
7	13	23	15–16
8 to stimulation	daylight	24	15–16

Day lengths vary seasonally (more than 12 hours in summer and less than 12 hours in winter). This seasonal variation may affect the onset of production. When the day length is more than 12 hours during the rearing period, it is recommended to keep the longest day length for the entire rearing period. Light stimulate the flocks once they have 1100 grams minimum body weight with 85% uniformity and only after moving the birds to production houses. In the case of uniformities less than 85%, light stimulate the flock after attaining 1200–1250g body weight.