Lighting Considerations for Commercial Broilers

Written By: Brendan Graaf, Broiler Specialist – Cobb Europe

Introduction

Successful broiler production is often characterized by providing a stable environment from hatch to processing so that the full genetic potential for growth, yield and feed conversion can be realized. Environmental conditions include those associated with temperature, humidity, airflow as well as nutrition and feed form. Often taken for granted, lighting conditions are another environmental factor that can influence broiler flock performance. In this article, we will review some of the best practices associated with broiler lighting programs and their effect on bird health and overall flock productivity. Lighting programs are more often associated with breeder flock management but can play a significant role in maximizing broiler performance and welfare considerations.

Brendan Graaf, Broiler Specialist at Cobb Europe, confirms that there are many different lighting programs that can be used for broiler rearing. *"Many recommendations for lighting programs when rearing broilers, are region specific and not relevant to other areas of the world. When deciding on a lighting program, broiler producers need to consider their environmental conditions, housing type and overall production objectives".* Light as an environmental factor for broilers consists of three main parameters: intensity, duration (photoperiod) and wavelength (colour).

Broiler producers will understand that it is essential for broiler chicks to start well by achieving free access to feed and water during the first 5 – 7 days post-hatch. Providing the correct light duration, intensity and distribution during this period will help promote bird activity thus allowing for optimal feed and water consumption, digestive, skeletal and immune system development which all contribute to a healthy flock demonstrating ideal welfare outcomes.

"In our standard lighting program (Table 1) we recommend providing chicks with 24 hours of light on the day of placement to ensure the newly placed chicks locate feed and water and maximize intake by encouraging chick activity." , continues Mr Graaf. A period of darkness is a natural requirement for all animals, however, longer periods of darkness early post-placement have been shown to prevent regular access to feed, resulting in reduced intakes and limiting growth. *"We would recommend introducing 1 hour of rest (dark) from day 1 until the chicks reach a bodyweight of 130 – 180 g or 7 days of age. This will allow adequate nutrient intake and growth during brooding, while the short rest period will help improve feed conversion, reduce mortality and skeletal defects as well as increase melatonin production which aids immune system development,"* adds Mr Graaf. It is important to note that once the off-time for the lights has been set, this must never change for the life of the birds. They soon get used to when the off-time is approaching and will 'crop-up' and drink prior to the lights being turned off. Any lighting program adjustments should only be made to the on-time.

In terms of light intensity during this period it has been shown that brighter light promotes activity and chicks prefer the brighter light. *"We recommend a minimum intensity of 25 lux in the darkest part of the brooding area as measured at chick height,"* says Mr Graaf. *"The intensity also needs to be as uniform across this area as possible in order to maintain good flock uniformity. Light intensity at floor level should not vary by more than 20% from the brightest to the darkest areas in the barn. Chicks tend to migrate towards the brightest areas and if intensity varies more than 20%, the chicks will not be evenly and uniformly distributed within the house."*

It was once believed that subjecting broilers to a continuous or near continuous light period for the life of the flock would maximize their growth performance. However, broilers reared under an adequate period of darkness often have better growth rates, lower feed conversion fewer skeletal defects and improved immune function, compared to birds reared under continuous light. *"After chicks reach 130 – 180 g or 7 days of age, we recommend introducing a single 6-hour block of darkness by adjusting the on-time of the lights. The off-time must remain the same as set on day 1 and this change should be done as one change not gradually. During the same period you can begin to gradually (over 5 - 7 days) reduce the light intensity down to 5 – 10 lux for the remainder of the grow period, unless local legislation prohibits this reduction, for example, EU directive requires a minimum of 20 lux throughout the cycle,"* explains Mr Graaf.

The 6 hour dark period should be continued until the final week before processing. Nearing the final days of production, 5 days prior to processing, reduce the dark period by one hour per day (subject to local legislation) to allow for additional gains as well as helping to reduce flightiness during catching if, as is often the case, this is performed during the day . This practice works especially well in hot climate countries since it has been shown birds are more heat-stressed during the dark period, therefore reducing the dark period will result in less heat-stressed birds during the final few days.

In terms of wavelength/colour of lights used, there is some evidence that broilers reared under shorter wavelength light (green & blue) showed improved performance compared to using traditional white lights. The use of poultry specific LED lighting has been shown to have a benefit on broiler performance as well as a long term financial benefit for the producer.

"There are many aspects to lighting programs and there are many different lighting programs which can be implemented with great success", concludes Mr Graaf. *"Optimize your lighting program based on your operation and local conditions and following local regulations. An optimal program will promote the full genetic potential and health of your flock and also produce excellent welfare outcomes."*

Table 1. An example of a standard lighting program for broiler production in the UK

Age	Hours of dark*	Hours of light*	Change in hours of dark
0 days-old	0	0	0
1 day-old	1	23	+1
130 to 180 grams or 7 days-old	6	18	+5
Rearing	6	18	0
Five days before processing	5	19	-1
Four days before processing	4	20	-1
Three days before processing	3	21	-1
Two days before processing	2	22	-1
One day before processing	1	23	-1

* Refer to local regulations for lighting program compliance with minimum and maximum hours of light and dark per 24 hour period.

Figure 1. Uniform light intensity across the broiler house during brooding can promote feed and water intake as well as promote health and welfare.