AAAP
Animal Welfare Committee
Poultry Lighting White Paper

USAHA – October 30, 2019 Providence, RI

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Pilgrim’s, Director of Veterinary Services, Central

AAAP will be the premier organization that advances science-based knowledge, expertise, and education on poultry health, welfare, and food safety to provide member value and stakeholder trust.
American Association of Avian Pathologist, Inc.

AAAP facilitates member collaboration to advance science-based knowledge, expertise, and education on poultry health, welfare, and food safety.
Poultry welfare and humane poultry husbandry are integral to responsible avian veterinary practice. Members of the AAAP, whether involved in research, teaching or active veterinary practice, support compassionate animal care and will not accept any inhumane treatment of poultry. We design and implement best industry practices for poultry welfare, including the development of welfare training and auditing systems. We continue to refine and develop our industry practice standards based upon new data verified by scientific method.

The Animal Welfare Committee of the AAAP actively reviews basic and applied animal welfare research. The AAAP, through the Welfare Committee, encourages the adoption of new management, production and processing technology that can demonstrate a measurable improvement in the welfare of poultry flocks. AAAP members working within the poultry industry implement the new technology, refining the best industry practices to reflect the most current research.
AAAP AWC
Scientific, Outcome Based measures

PERFORMANCE SUMMARY 50 days

<table>
<thead>
<tr>
<th></th>
<th>Avg BW</th>
<th>FCR</th>
<th>ADJ FCR (to 6.5lbs)</th>
<th>Mortality</th>
<th>% Condemnation</th>
<th>BM Yield % to 6.5lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL (1-8)</td>
<td>6.61</td>
<td>1.88</td>
<td>1.87</td>
<td>5.10%</td>
<td>0.21%</td>
<td>24.14%</td>
</tr>
<tr>
<td>TRIAL LIGHTING (9-16)</td>
<td>6.68</td>
<td>1.89</td>
<td>1.87</td>
<td>4.28%</td>
<td>0.24%</td>
<td>24.04%</td>
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<tr>
<td>Difference</td>
<td>0.07</td>
<td>-0.01</td>
<td>0</td>
<td>-0.82</td>
<td>0.03</td>
<td>-0.10</td>
</tr>
</tbody>
</table>

MORTALITY 7d 8 to 14 15 to 21 22 to 28 29 to 35 36 to 42 43 to 50 TOTAL W/O 7d

<table>
<thead>
<tr>
<th></th>
<th>7d</th>
<th>8 to 14</th>
<th>15 to 21</th>
<th>22 to 28</th>
<th>29 to 35</th>
<th>36 to 42</th>
<th>43 to 50</th>
<th>TOTAL</th>
<th>W/O 7d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.58</td>
<td>0.76</td>
<td>0.51</td>
<td>0.47</td>
<td>0.36</td>
<td>0.52</td>
<td>0.52</td>
<td>4.72</td>
<td>4.47</td>
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<tr>
<td>Treated</td>
<td>1.33</td>
<td>0.51</td>
<td>0.38</td>
<td>0.36</td>
<td>0.28</td>
<td>0.4</td>
<td>0.69</td>
<td>3.95</td>
<td>3.95</td>
</tr>
<tr>
<td>Difference</td>
<td>-0.25</td>
<td>-0.25</td>
<td>-0.13</td>
<td>-0.11</td>
<td>-0.08</td>
<td>-0.12</td>
<td>0.17</td>
<td>-0.77</td>
<td>-0.52</td>
</tr>
</tbody>
</table>
Regime of 23 h of light in a day decreased immune response and welfare

Mortality and culls due to skeletal defects

Results – mortality and culls
% of placed
Historical Broiler Lighting in Field

- Brood lights minimum 3 FC through 7d, with 23-24 hours light
- At day 8, light is reduced to 4, 6 or 8 hours dark period per day until 2 weeks prior to processing, then full light
- Bird size, sex
- Genetic Breed
Founded in 1957, AAAP will be the premier organization that advances science-based knowledge, expertise, and education on poultry health, welfare, and food safety to provide member value and stakeholder trust.
Current Status on Poultry Lighting

- Various animal welfare audits and certification programs require different intensities and durations:
  - National Chicken Council (NCC) Broiler Audit – PAACO Certified
  - OIE
  - American Humane (FACTA) – PAACO Certified
  - GAP
  - Red Tractor, etc.

- Most certification programs reference non-US literature.
  - Tend to brighter intensity and longer duration than US commercial practice.
History of NCC Broiler Lighting Requirements

2005:

► Lighting programs of increasing or decreasing intensities and periods are utilized to slow early growth in broilers.

► When continuous or near-continuous lighting is used, lighting should be subdued for most of period in which the lights are on.

► Except for the first week and the last two weeks of grow-out, the flock should be provided with at least four hours of darkness in every 24, in which illumination at bird level does not exceed 50 percent of the light level in the remaining hours.

► the four hours of darkness may be provided in increments of one, two or four hours.
History of NCC Broiler Lighting Requirements

2010:

► Except for the first week and last week of grow-out, birds are provided with a minimum of four hours of darkness in every 24 hour period.

► During the period of darkness, the illumination at bird level does not exceed 50 percent of the light level in the remaining hours.

► The four hours of darkness may be provided in increments of one, two or four hours.
History of NCC Lighting Requirements

2015:

- Except for the first week and last week of grow-out
- Minimum four hours of darkness every 24 hours.
- During the period(s) of darkness, *illumination at bird height must not exceed 10 percent* of the illumination during the period(s) of light.
- During the period(s) of light, *light must be minimum 0.50 foot-candle at bird height.*
- Four hours of darkness may be provided in increments of one, two, or four hours
The grow-out operation must have a written plan for expected..., lighting programs, and... within the house appropriate to bird age, size, and activity level.

Except for the first week and last week of grow-out, birds have a minimum 4 hours of darkness every 24 hours.

During the period(s) of darkness, light levels at bird height must not exceed 10 percent of the light level during the period(s) of light.

Light period 5 lux (0.50 FC), then < 0.50 lux (0.005 FC) dark period
National Chicken Council – Appendix 3, 2017

- Birds are sensitive to light levels, displaying behavioral and physiologic responses.
- Lighting programs have also been developed to help manage broiler flocks by reducing behavioral problems, controlling growth, and improving musculoskeletal development.
- Lighting programs may need to be adjusted to account for strain differences, disease conditions, or environmental changes.
- Lighting programs will vary depending on the size of the broiler when it is taken to market.
The lighting program will also depend on whether natural light (open-sided house) or artificial light (solid or dark-curtain walled house), or some combination of the two are used.

Continuous or near-continuous lighting has detrimental effects on broiler health and behavior and must not be used.

There must also be sufficient contrast in light intensity between the day and night periods. While there are numerous lighting programs available, NCC does not currently recommend any specific program, only that the overall welfare of the flock is addressed.
“Recognizing that there is not an optimum light intensity that may be uniformly applied to all broiler chicken strains, house types, lighting sources, or grow-out programs, a written lighting program must be available for auditor review and must be adhered to. Consultation with a veterinarian or poultry welfare professional is required for the design of a flock lighting program.”

NCC does not currently recommend any specific program, only that the overall welfare of the flock is addressed.
NCC Broiler Audit Points

► Ensure that birds are provided with a minimum of 4 hours of darkness every 24 hours.

► Verify that the flock lighting program has been designed in consultation with a veterinarian or poultry welfare professional, and is supported with internal data and/or scientific evidence of benefit to bird welfare.
OIE

Terrestrial Animal Health Code, 2019

**OIE**

- *Adequate* period of continuous light
- Light in intensity during light period should be *sufficient* and homogenously distributed to allow broilers to find feed and water, to stimulate activity and adequate inspection
- *Adequate* periods of darkness during each 24 hour period to allow broilers to rest, reduce stress and promote normal behavior, gait and good leg health

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American Human (FACTA) – PAACO Certified

- Must have lighting contrast between day and night periods
- Access to at least 8 hours constant light/day
  - Intensity maintained at 0.5 FC and confirmed
  - If less than 0.50 FC written veterinary consulting documentation with recommendation
  - FACTA can remove points if auditor feels veterinarians findings are not adequate to suggest animal welfare is not compromised by low light intensity
- Take into account natural lighting and age of flock
- Auditor will observe animals to ensure welfare has not been compromised due to lighting program
Global Animal Partnership (GAP) Lighting

- 5-step Animal Welfare rating standards for chickens raised for meat, April 2018 v3.1

- Step 1 and 2 (Minimum program)
  - By day 3 after placement, (except when raised under natural lighting and dark periods are shorter)
    - 8 hours of continuous light
    - Bright barns (minimum 50 lux or 4.6 FC)
    - At least 6 hours of continuous dark
    - <1 lux or <0.10 FC
Global Animal Partnership (GAP) Lighting

► Step 3 and 4
  ▪ By day 3 after placement, (except when raised under natural lighting and dark periods are shorter)
     ■ 8 hours of continuous light
     ■ Bright barns (minimum 50 lux or 5 FC)
     ■ At least 8 hours of continuous dark
     ■ <1 lux or <0.10 FC

► Step 5 and 5+
  ▪ From placement, (except when raised under natural lighting and dark periods are shorter), must be provided a daily minimum of 8 hours darkness
Global Animal Partnership (GAP) Lighting

By January 1, 2022, Steps 2-5+, all chickens housed continuously, seasonally, or during brooding must be provided with *natural light through insulated windows, ... so that the combined area through which natural light enters is equal or greater than 1% of the total floor space.*

- Curtain barns qualify
- Operations must have had written transition plans in place detailing changes by September 30, 2018
- October 1, 2018 must start implementing changes
Food Service – McDonalds, etc.

► Providing a minimum of 20 lux (~2 FC) light intensity during photoperiods

► Minimum of 6 hours of darkness (4 hours to be continuous) during a 24 hour period, reflecting scientific evidence from poultry experts

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Current Status on Poultry Lighting

► Previous producer reported comparisons
  - Commercial programs either same or better welfare outcomes than non-US based programs.

► Current publications from USDA-ARS, Miss State.
  - No impact over wide range in intensity and duration.
Lighting in Poultry Housing: A Review of Production and Welfare Aspects

► AAAP Lighting Review White Paper
  ▪ “Lighting in Poultry Housing: A Review of Production and Welfare Aspects”

► Tom Tabler, Ph.D., Mississippi State University Extension Service, Poultry Science Department

► Broilers, Broiler Breeders, Leghorns, Turkeys

► >180 Scientific references

► In review by AAAP Animal Welfare Core Committee, entire AAAP Animal Welfare Committee, then AAAP Board- Second Quarter 2020
Light and Importance

► Assist chicks to get on feed and water
► Necessary for reproductive maturity, sexual behavior and egg production (red light)
► Color discrimination
► Bird can be blind and detect daylength
► Activity level relation
► Poultry more sensitive and perception different than humans
Lighting Review

Goal of paper is review of aspects of lighting in chickens for use to make outcome based parameters, animal welfare requirements

Physiological aspects of lighting
Duration Research vs Intensity

► Age of birds and type of housing
► Light allows poultry to establish rhythmicity and synchronize many essential functions
► Different types of lighting
  ▪ Sunlight versus incandescent versus LED, etc.
  ▪ Photoperiod length under artificial lighting may vary greatly from that encountered naturally
  ▪ Benefits and shortcomings
► Darkness as relates to health and mortality
► Minimal Studies on intensity and welfare/behavior
Intensity

► Is Intensity more important than photoperiod on welfare and behavior?
  ▪ Need more research

► Is photoperiod more important?

► Broiler chickens appear to have different light preferences at different ages
Summary

► Lighting is important in poultry production for both optimum welfare and behavior

► Many studies on daylength, but minimal on intensity

► White Paper to site and make better parameters for broiler lighting
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