Effects of Three Lighting Programs During Grow on the Performance of Commercial Egg Laying Varieties.

2. Laying Period Egg Production

J. Arango, P. Settar, S. Saxena, J. Arthur, and N.P. O’Sullivan

Hy-Line International

Dallas Center, Iowa
Management:

- Birds were wing banded at hatch.
- Pullets were reared in floor pens during the growing period and transferred to the layer house at 17wk of age.
- Hen were housed individually in 25.4 x 35.6 x 40.6 cm cages for individual egg recording.
- Each cage was equipped with one drip nipple.
- A phase feeding program was used according to Hy-Line Commercial Management Guides.
- Corn-Soybean meal based crumbled diets were fed during growing and mash diet were fed during laying.
Beginning at 17wk of age, all pullets are subjected to an identical photoperiod of 10h with gradual increases in the photoperiod at weekly intervals until 16h photoperiod at 30 wk of age.

The 16h photoperiod was maintained for all hens until the end of experiment.
Three Rearing Light Programs

Hours of Light

- Slow
- Rapid
- Moderate

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Light intensity was the same for the three lighting regimes.

1\textsuperscript{st} week; all chicks were exposed to 30 lux light intensity

2\textsuperscript{nd}-5\textsuperscript{th} weeks; intensity decreased 5 lux/week

6\textsuperscript{th}-17\textsuperscript{th} weeks; all pullets received 7 lux of light intensity

After 17\textsuperscript{th} week; light intensity was increased to 30 lux
Traits (individual):

- Weekly body weight
- Age at sexual maturity
- Daily egg production
- Egg weight (first-3 and 26, 36, 46, 56 and 66 wk)
RESULTS
Light Test #1, W98 Body Weight 18-58wks

Body Weight, g

- Orange: Slow
- Black: Moderate
- Pink: Rapid
Light Test #2, W98 Body Weight 18-58wks

Body Weight, g

Slow  Moderate  Rapid
Light Test #2, HYB Body Weight 18-58wks

Body Weight, g

- **Slow**
- **Moderate**
- **Rapid**
Trial #1: Sexual Maturity by Line and Lighting Program

Day

W36

W98

Slow
Moderate
Rapid

125
130
135
140
145
150
155
Trial #2: Sexual Maturity by Line and Lighting Program

- HYB
  - Slow
  - Moderate
  - Rapid

- W98
  - Slow
  - Moderate
  - Rapid

Bar chart showing the number of days for sexual maturity by line and lighting program. The chart includes comparisons of HYB and W98 lines under different lighting programs.
Trial #1: Egg Numbers by Line and Lighting Program

- W36
  - Slow: 100
  - Moderate: 150
  - Rapid: 200

- W98
  - Slow: 250
  - Moderate: 300
  - Rapid: 200

Legend:
- Slow
- Moderate
- Rapid
Trial #2: Egg Numbers by Line and Lighting Program

Egg Numbers

HYB

W98

Slow
Moderate
Rapid

b ab a
b b a

100 125 150 175 200 225 250

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Trial 1. W36 Production by Treatment

Age (wk)

HH (%)
Trial 1. W98 Production by Treatment

- HH (%)

- Age (wk)

- M
- R
- S
Trial 2. HYB Production by Treatment

HH (%) vs. Age (wk)

- M
- R
- S
Trial 2. W98 Production by Treatment

HH (%) vs Age (wk)

M
R
S
Light Test #1; W98 Egg Weights, g

Egg Weight, g

First 3 26wk 36wk 46wk 56wk 66wk

Slow Moderate Rapid

3.1 1.0 1.1 0.8 0.4 0.8

a b c a ab b ab a b ab a b
Light Test #2; HYB Egg Weights, g

<table>
<thead>
<tr>
<th>Time</th>
<th>Slow</th>
<th>Moderate</th>
<th>Rapid</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 3</td>
<td></td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>26wk</td>
<td>a b</td>
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<td>0.9</td>
</tr>
<tr>
<td>36wk</td>
<td>a b</td>
<td>a b b</td>
<td>1.3</td>
</tr>
<tr>
<td>46wk</td>
<td>a b</td>
<td>a b b</td>
<td>0.8</td>
</tr>
<tr>
<td>56wk</td>
<td>a b</td>
<td>a b b</td>
<td>1.4</td>
</tr>
<tr>
<td>66wk</td>
<td>a b</td>
<td>a b b</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Conclusions

- Differences in growth rate due to lighting program tended to continue during the lay period as a residual effect.
- In general, birds from the rapid step down lighting program tended to reach sexual maturity earlier, to attain peak production earlier, and to produce more eggs than those faster growing & heavier birds of the slow program.
- Most of the differences in egg production were due to differences in age at sexual maturity and seem to confirm an antagonism between growth and onset of reproduction ability.
Differences in egg weight were consistent, with heavier birds (S) producing heavier eggs along the trajectory. Differences were largest at the beginning of the lay period (first 3-eggs). Final conclusions are pending evaluation of differences between treatments for others traits such as egg mass, egg quality, and bone structure, which are ongoing.
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