AgriLux™
Spectrum LED for Poultry

Grégoy Bédécarrats
Associate Professor, Animal Biosciences, University of Guelph

Alex Thies
President, Thies Electrical Distributing Cambridge, ON
Importance of Light Spectrum as researched by Universities

- **Red light (University of Guelph):**
  - Faster sexual maturity, longer egg laying cycle

- **Green and blue light (Various institutions):**
  - Stimulate muscle growth (both *in ovo* and in chicks)
  - Calmer, less active birds (broilers)
What does a producer need?

- The right light for the right application
  - Spectrum
  - Dimming ability (dawn to dusk programs)
  - Stable output (handle power fluctuations; dirty power)

- Durability
  - Reliable product that can be used from one flock to the next
  - Withstand harsh barn environments (dust, humidity, ammonia)
  - Withstand repeated cleaning and disinfection cycles (pressure wash, harsh corrosive agents)
Initial Commercial Pilot Trial

- New barn with enrichable colony cages (45,000 hens capacity)
- Equipped with our first prototype (6 Watt LED Red Spectrum bulbs)
- Lohmann LSL–Lite hens
- Lohmann’s management directives
Positive Results

- Peak production 97.5–98% at 22 woa
- Still over 90% when shipped out (72 woa)
- Flock average: 365 days = 342.5 eggs/hen
- Feed consumption 104 g/day
- Electricity consumption reduced by 90%
How did the Bulbs hold up?

- Dust caked between the fins of the heatsink
- Dust and water infiltration inside the bulbs

Need to go back to the drawing board for construction!
AgriLux™

LED Red Spectrum Lamp

THIES ELECTRICAL DISTRIBUTING COMPANY INC.
Features of AgriLux™ LED Spectrum Lamp

- Retrofit A19 Type, E26 Med. Base.
- Custom designed to withstand barn environment.
- Durable construction shatterproof, dustproof and waterproof (IP66 rated).
- Illuminates instantly to 100% brightness.
- Linear dimmable function from 100% to less than 5% without flickering, shutting off or loss of spectrum.
Thorough Follow-up Commercial Trials

- Layer Farm with 45,000 Lohmann LSL– Lite hens
- 22,000 Sq.ft.
- 280 LED Red Spectrum Lamps installed
Average Egg Production with AgriLux™ PLR–10–1 Lamp

- **Lohmann Flock Average**: 89.3%
- **Flock 1 Average**: 94.3%
- **Flock 2 Average**: 94.6%
Positive Impact and Gains

- **Improved Egg Production**, minimum of 2–3% as compared to Lohmann Avg.
- Promotes **longer and higher peak** (reached over 99 %)
- Hens were **calm** (better welfare).
- **Feed consumption was reduced** with no significant impact on body weight avg.
- **No side effects** on egg quality, hens behaviour, health and welfare.

**NOTE:** Farm management plays a key part in achieving positive results.
Increase in production of 2 % (conservative value)

Example: flock of 40,000 hens

Lohmann Avg. of 335 eggs per hen, 2% Increase would equal to 341.7 egg per hen over 52 weeks = 268,000 total more eggs (22,333 dozen).

At the current producer price of $1.90 per dozen, this will provide potential return of $42,433. per year!
## Energy Consumption /Savings for 280 LED Light bulbs

<table>
<thead>
<tr>
<th>Bulb Type</th>
<th>Power Output</th>
<th>Kw used (14h/d)</th>
<th>Total (kW/Yr)</th>
<th>Approx. Cost/ Yr. ($0.117 per kWh for ON., excl. HST)</th>
<th>Potential $$ Savings/ Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incandescent</td>
<td>60w</td>
<td>235.2</td>
<td>85,848</td>
<td>$10,044.</td>
<td></td>
</tr>
<tr>
<td>CFL (Compact Fluorescent)</td>
<td>14w</td>
<td>54.9</td>
<td>20,031</td>
<td>$2,344.</td>
<td>$7,700.</td>
</tr>
<tr>
<td>LED</td>
<td>10w</td>
<td>43.1</td>
<td>15,739</td>
<td>$1,674.</td>
<td>$8,370.</td>
</tr>
</tbody>
</table>
## Canadian Poultry Farms with AgriLux LED Spectrum Bulbs installed

<table>
<thead>
<tr>
<th>Provinces</th>
<th># of Farms</th>
<th>Farm type</th>
<th>Farm Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td>6</td>
<td>4- Layers 1-Pullet 1-Turkey brooder</td>
<td>500 up to 45,000 hens</td>
</tr>
<tr>
<td>Alberta</td>
<td>2</td>
<td>Layers</td>
<td>2,000 and 15,000 hens</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>2</td>
<td>Layers</td>
<td>3,000 and 25,000 hens</td>
</tr>
</tbody>
</table>

- Agreements in place with 2 distributors in Western Canada
FUTURE CHALLENGES

- Meeting the criteria or categories for “Energy Star” and “Design Light Consortium”.
- Highlight the return on investment to farmers:
  - LED lighting not a business expense but an investment.
- Continue momentum of R&D efforts at the University of Guelph.
  - Currently completing trials for Broiler Breeder and Pullets.
- Finding commercial farms that will participate in pilot trials for Broilers, Broiler Breeder and Pullets.
Special Thanks to:

- Agencies for Funding R&D:
  - OMAFRA, PIC, CPRC, NSERC, AAFC
- Students at Univ. of Guelph:
  - Mikayla Baxter
  - Brandi Sparling
  - Adriana Rodriguez
  - Charlene Hanlon
- Arkel Research Farm Staff
- Len Zoller (Consultant for Thies Electrical Distributing)
- Douglas Dykstra (Owner of Dykstra’s Poultry Farm)
- Gord Surgeoner, Past President (OAFT, Ontario Agri-Food Technologies)
- Tyler Whale, President OAFT