Current Trends in Poultry House Lighting

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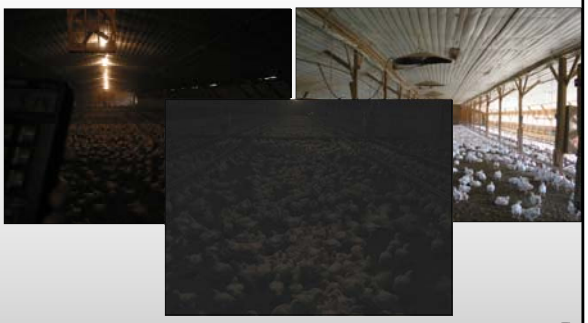
Intensity



Housing Improvements




Broiler Grow-out Phases

- Brooding


Features of Light

Broiler Production:

- Photoperiod (duration)
  - Photoperiod/scotoperiod in hours
- Intensity (brightness)
  - 1 foot candle = 10.76 lux
- Wavelength (color)


LED House

- *Light source (incandescent, fluorescent, cold cathode, LED)*

Broiler Grow-out Phases

- Grow-out - Full house


Uniformity

- Less than a 20% difference throughout the house

Light Related Terminology

- Lumen – measure of light output from bulb
- Wattage – power to produce light
- Efficiency- lumens/watt
- Foot candle – lumens per square foot
- Lux – lumens per square meter
  - 1 Foot candle = 10.76 lux

Is There an Incandescent Bulb Ban?

- Proposed to remove Inc. bulbs from market
  - Start with 100w and end with 40w bulbs
  - Start on January 1, 2012
- In December 2011, congress took away funding that would allow DOE to enforce the ban
- Delayed the implementation until October 2012

Light types

- LED
  - Light emitting diode
  - No Hg or filament
  - Dimmable
  - ~ $35-65
  - Lighting pattern traditionally has been very spotty.

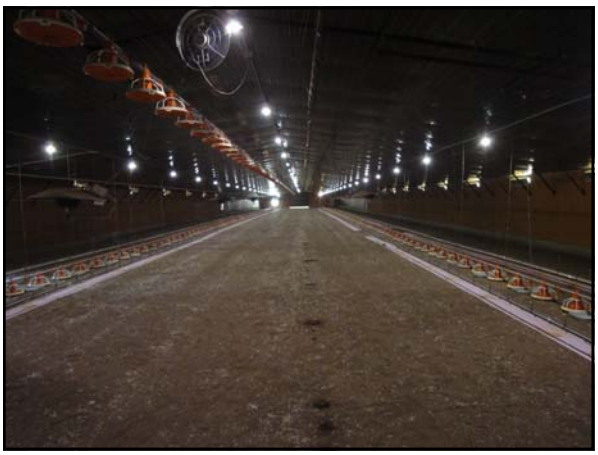
Light types

- Types:
  - Incandescent ~ $0.50
    - Have a filament that's heated to the point of glowing. The glowing filament produces the bulb's light.
  - Fluorescent ~ $7-9 (non dim - $3)
    - bulbs or tubes are filled with mercury vapor that emits ultraviolet light when electricity is applied. The bulbs/tubes have a coating inside that turns the ultraviolet rays into visible light.

Cold Cathode vs CFL

$ 8

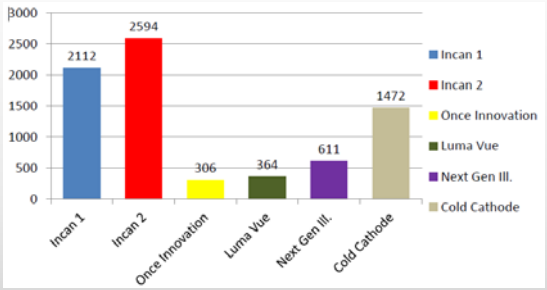
$ 7-9 – dimmable
$ 3 - non dimmable



Light types

- Types:
  - High Pressure Sodium
    - High-pressure sodium lamps operate by igniting sodium, mercury, and xenon gases within a sealed, ceramic arc tube. Sodium lamps emit light energy in the yellow/red/orange regions of the spectrum
  - Metal Halide
    - Metal halide lamps generally have a greater light output, white light and require special ballasts and fixtures for each specific lamp.

Energy Usage (KwH)



Lighting Source comparison

	INC	CF	LED	MH	HPS
Initial Cost	Low	Moderate	High	High	High
Operating Cost	High	Moderate	Low	Low	Low
Efficiency*	8-24	50-69	40-85	80	80
Rated Life (hrs)	500-2000	10,000+	30,000+	15,000+	24,000+
Color Temp (K)	2500	2700		3700-4000	2100

* Efficiency is measured as the rated lumens per watt.

Factors affecting Bulb Performance

Dirty bulbs

Dimmers

Fixtures

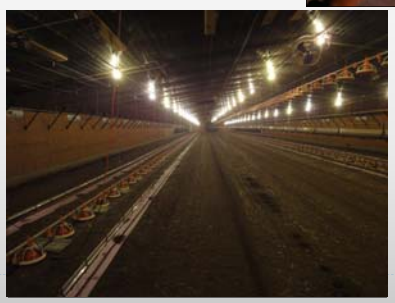
Pay attention to light bulbs

- Bulb lumen production varies

Incandescent Wattage	Average Lumens Produced	Lumen Range
40	408	320-495
60	695	500-890
75	1910	700-1210
100	1412	1075-1750

Current work..

Current Work

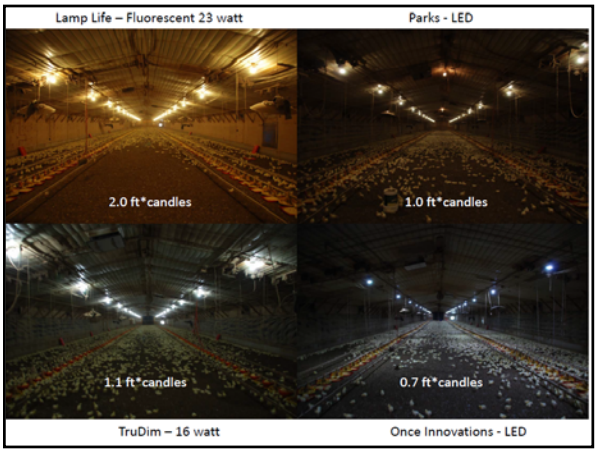


Current work..

Results

1 year (6 Flocks)			
House	Percent	Bulbs	Cost
Life Lamp	12	6	$54
T-Adaptor	0	0	$
Overdrive CFL	20	10	$75

To date (8 Flocks)			
	Percent	Bulbs	Cost
Life Lamp	16	8	$72
T-Adaptor	4	2	$6
Overdrive CFL	23	12	$90



LED/CFL Bulbs

Bulb	Wattage	Cost	Average Lumens	Efficiency (lumens/watt)

Light distribution differences

Future work..

Current Work

Key Points in Lighting Programs

- Provide 24 hours light on the first day of placement.
- Turn the lights off on the second night to establish when **off** time will be. Once set, this time must never change for the life of the birds.
- Use a single block of darkness in each 24-hour period.
- If partial house brooding is practiced, delay dimming until the full house is utilized.
- Allow the birds to feed ad libitum to ensure they go into the dark period full of feed and water and can eat and drink immediately when the lights turn back on. This helps prevent dehydration and reduces stress.

Research on lighting Programs…

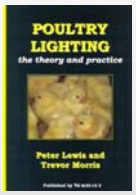
- A period of darkness is a natural requirement for all animals.
- Energy is conserved during resting, leading improved feed conversion.
- Mortality is reduced, and skeletal defects are reduced.
- The light/dark period increases melatonin production.
- Bird uniformity is improved.

Summary

- No questions about power savings
  - Lower wattage = lower power usage
- The questions are:
  - Light intensity at floor level
  - Uniformity of light at floor level
  - Bulb life in poultry house environment
- Bird performance?

Summary

- Light bulb influence on bird performance
  - Wavelength
- "It is therefore concluded that the choice of lighting will depend on capital outlay, running costs and ability to dim rather than on a lamps influence on performance or performance or health."



Summary

- Light bulb influence on bird performance
  - Intensity
  - Wavelength

www.poultryventilation.com

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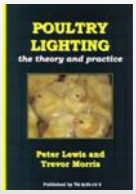
Summary

- Light bulb influence on bird performance
  - Wavelength
- "Commercial colored lamps are vigorously marketed around the world, but a producer should first enquire how monochromatic the lamps are, an secondly request evidence of their proven efficacy at improving growth, a clear case of *Caveat emptor* – buyer beware!"



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