Hatchery Talks

The use of dynamic lighting systems for the optimization of cage-free system use in commercial laying hens

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Once applies science to agricultural lighting

Layer light recipe:

- Improving circadian rhythm
- Increase egg production up to 2%
- Improved longevity of layers

Salmon lighting:

- Reduce Maturation to 0%
- Increase growth by 12.8%
- Lower sealice infestations

Broiler light recipe:

- Reducing stress with broilers
- Increased growth up to 4%
- Improved FCR with 2%

Tomato lighting:

- Reduction of 50% in energy
- Boost quality and crop yield by 30% in dark winter times

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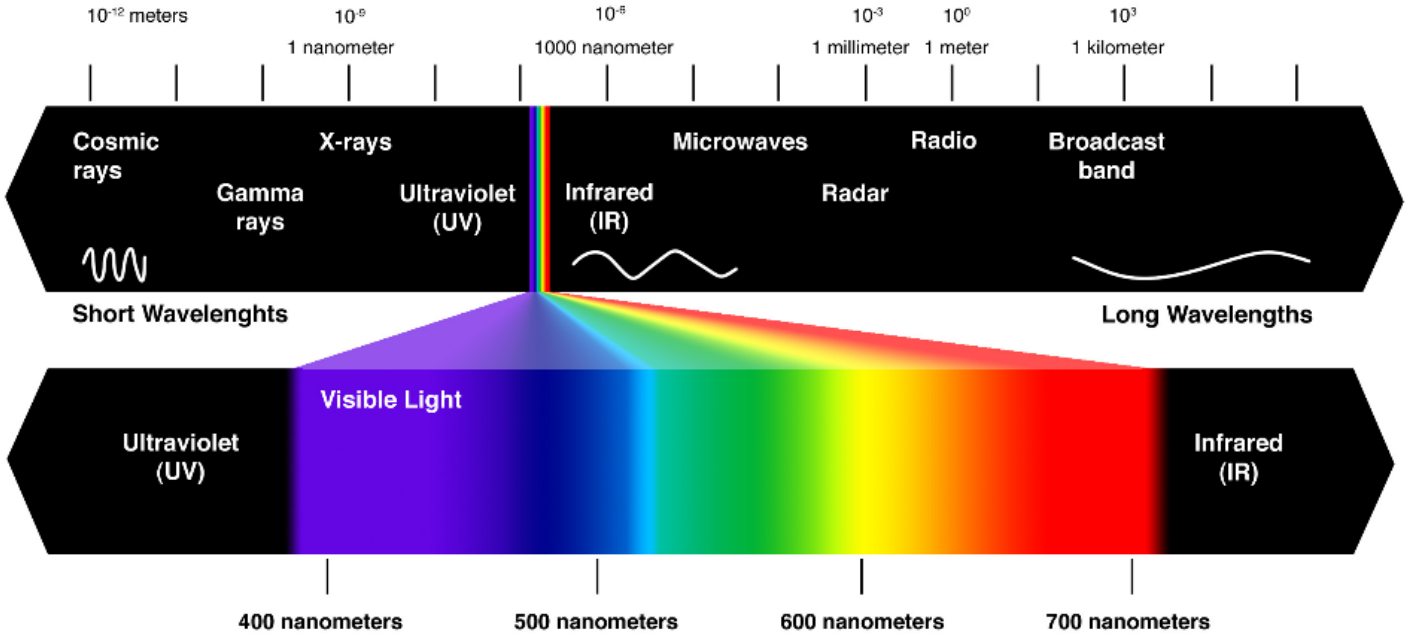
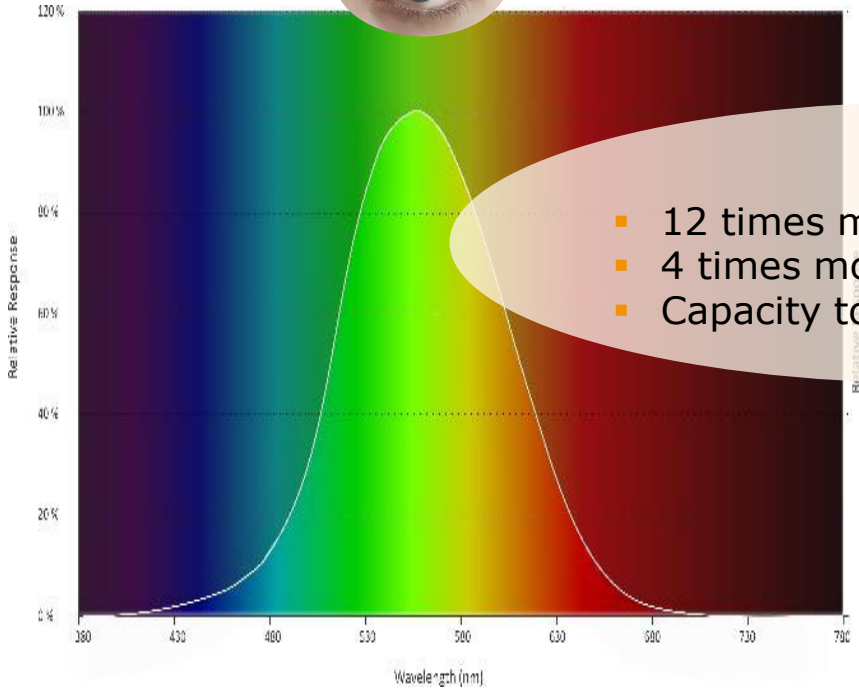
What is light?

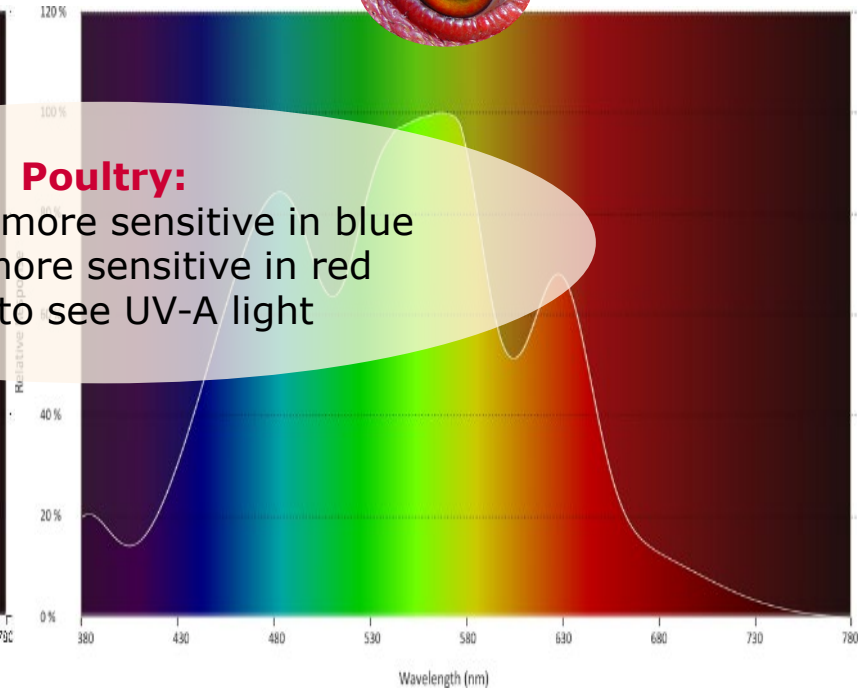


Poultry perceive light differently than humans

Human



Poultry



Poultry:

- 12 times more sensitive in blue
- 4 times more sensitive in red
- Capacity to see UV-A light

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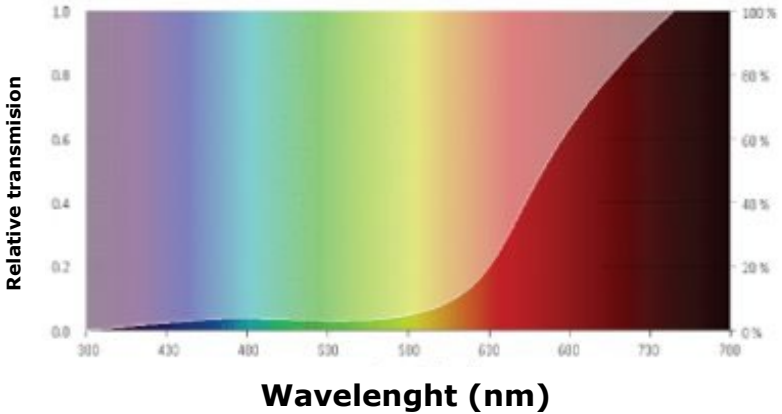
Light is perceived via visual and nonvisual pathways

- Visual registration via the eye
- Non-visual photoreception through the skull



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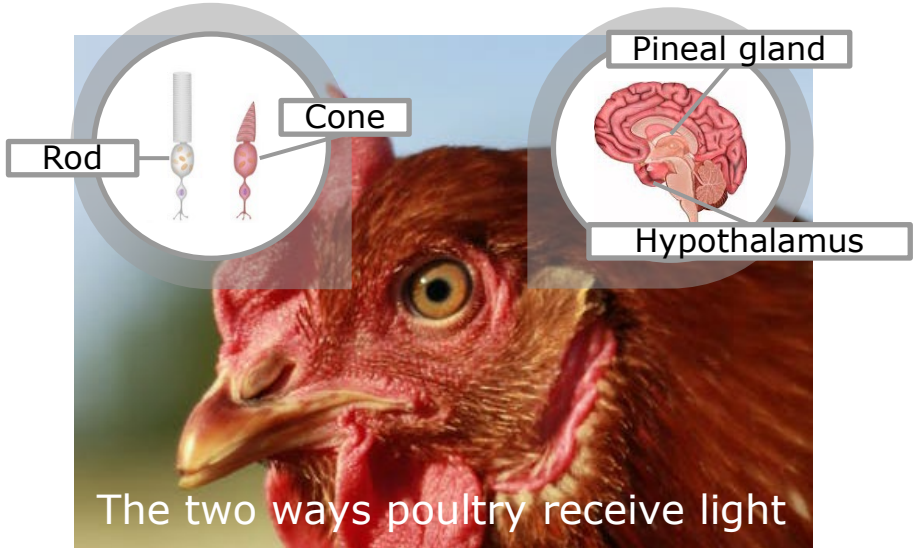

Hen performance can be improved with spectrum

Warm white/red spectrum

Preferred spectrum for egg laying

Cool white/blue spectrum

Unfavorable spectrum for egg laying

When different colors are applied in the layer house, preferred egg laying behavior can be stimulated.

Note: utilizing the color preference in egg laying is a patented concept by Once Innovations®

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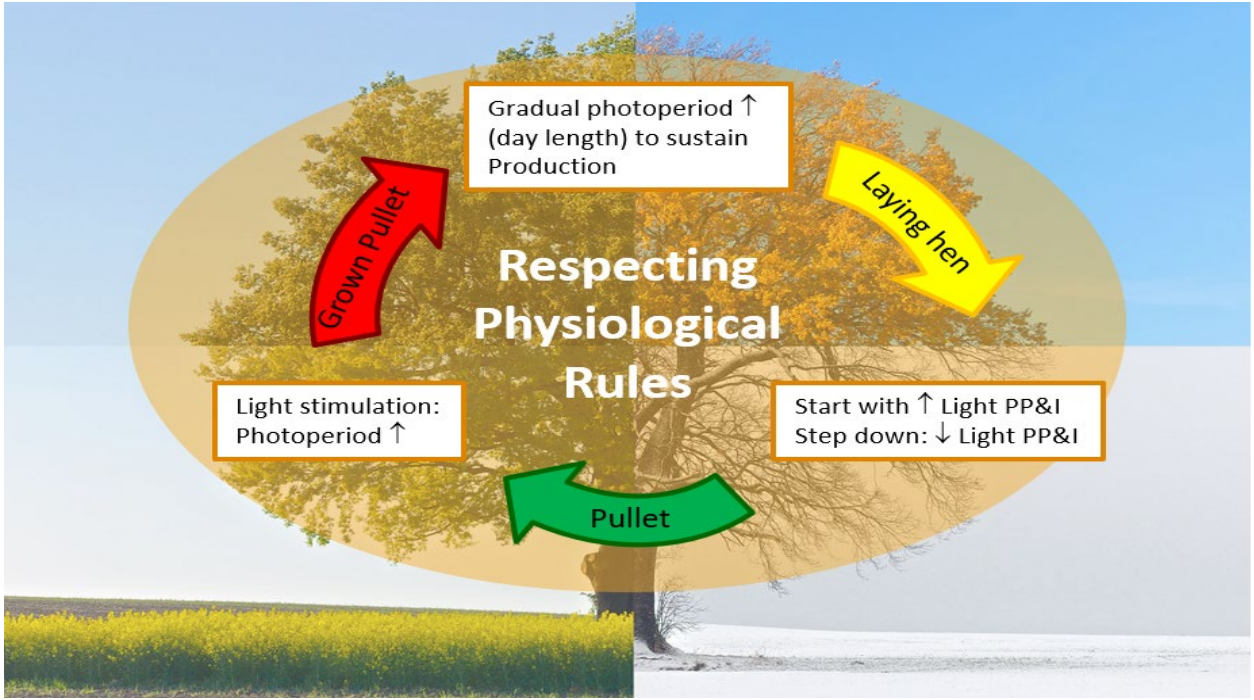
Light is responsible for wild birds seasonality

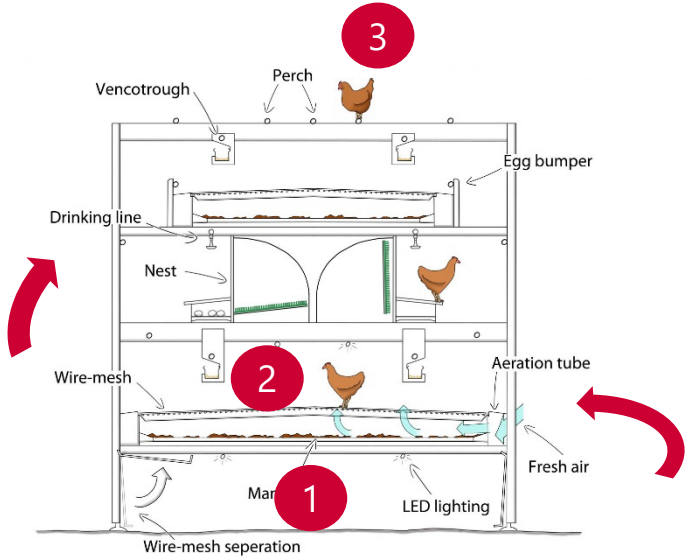


Dimming sequence affects bird flow

- Letting birds know the day has almost ended
- Stimulating birds to move in the system
- Dimming should take at least 30 mins
- Reduces stress after lights-off
- Dimming sequence adjusted to system
- Reduces incidence of floor eggs

Dimming sequence end of day:

1. Under-system
2. In-system
3. Roof lights (positioned above aviary system)



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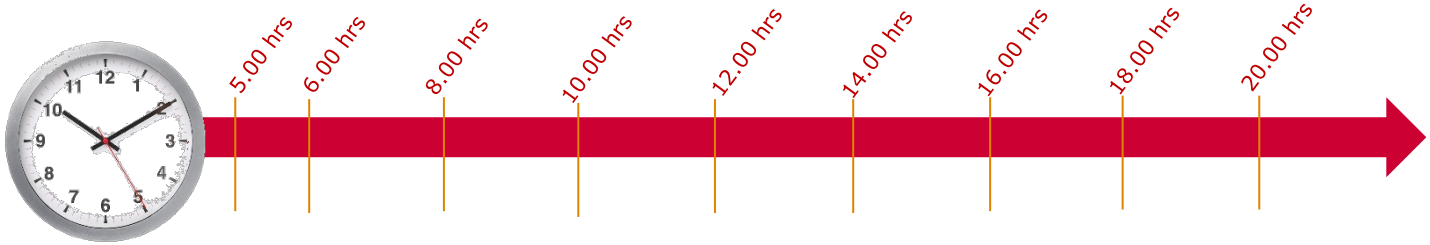
Hen behavior changes during the day



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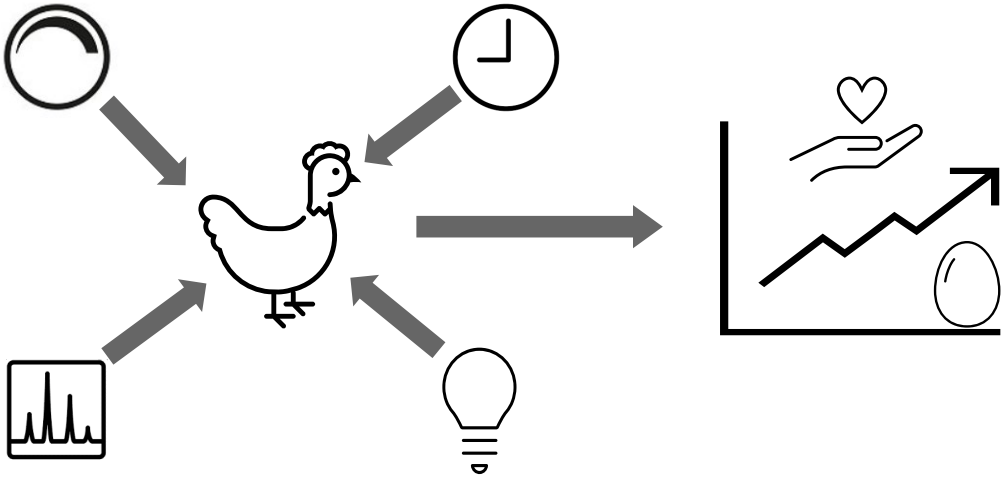
Aviaries present challenges

Challenges:

- Hen productivity and longevity
- Floor egg prevention
- Feather picking and aggression
- Keel bone damage
- Bird handling and vaccinations

How can lighting and hen preference be used as tools?



Dynamic lighting changes over time

$$\textbf{Dynamic Lighting} = \frac{\Delta\,(\text{Spectrum} \times \text{Intensity} \times \text{Distribution})}{\text{Schedule}}$$

Cage-free systems create environmental complexity:

- Multiple tiers
- Zones for various behaviors
    - Perching/resting
    - Feeding
    - Egg laying
    - Foraging

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Aisle and system lights cooperate

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Dynamic lighting can prevent floor eggs

1 Color, intensity and light distribution

- Prevent direct shadowing

2 Color preference and contrast

- Strengthens zoning capabilities

3 Scheduling and dimming time

- Mimic sunrise and sunset
- Prevent sudden changes in lighting – prevent stress and injury
- Ensure all birds are perching during night
- Adjust lighting settings to circadian rhythm

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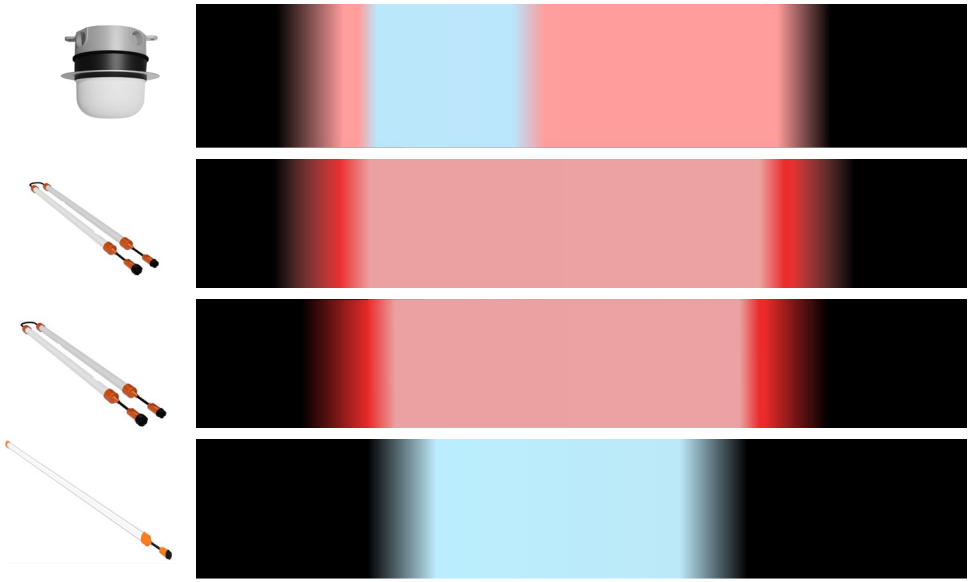
Dynamic recipe for floor egg prevention

Targeted warm and cool spectra

- To reduce problem behaviors and meet specific goals at various daily time points

Bright cool spectrum (AM)

- Minimize floor eggs
- Contrast between nesting areas and rest of system
- Reduce stress and flightiness
- Attract birds into system for egg laying



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Light overrides for bird management

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Dynamic lighting can optimize bird performance and welfare

Challenge	Light Conditions	Behavioral Control
Nest egg laying	Warm white/red Dim light intensity	Promote egg laying behavior
Performance, longevity	Warm white/red	Promote activity and effective photostimulation, reduce stress
Floor eggs	Cool white/Blue bright light intensity	Control egg laying behavior
Feather picking, aggression	Monochromatic red dim light intensity	Reduce aggressive behavior, promote wound healing
Bird handling, vaccinations	Monochromatic blue dim light intensity	Promote calm behaviors

Note: utilizing the color preference in egg laying is a patented concept by Once Innovations®

Conclusion

Switch on the best lighting solution for natural behaviour