H&N INTERNATIONAL

The key to your profit!

Lighting Program for Layer Hens: Enlightenment ahead

Fernando Carrasquer

This is about

- ✓ Using light to direct your egg production to meet your market demands
- ✓ Setting your lighting system to keep your hens happy and calm
- ✓ Choosing the right equipment for lighting your flocks

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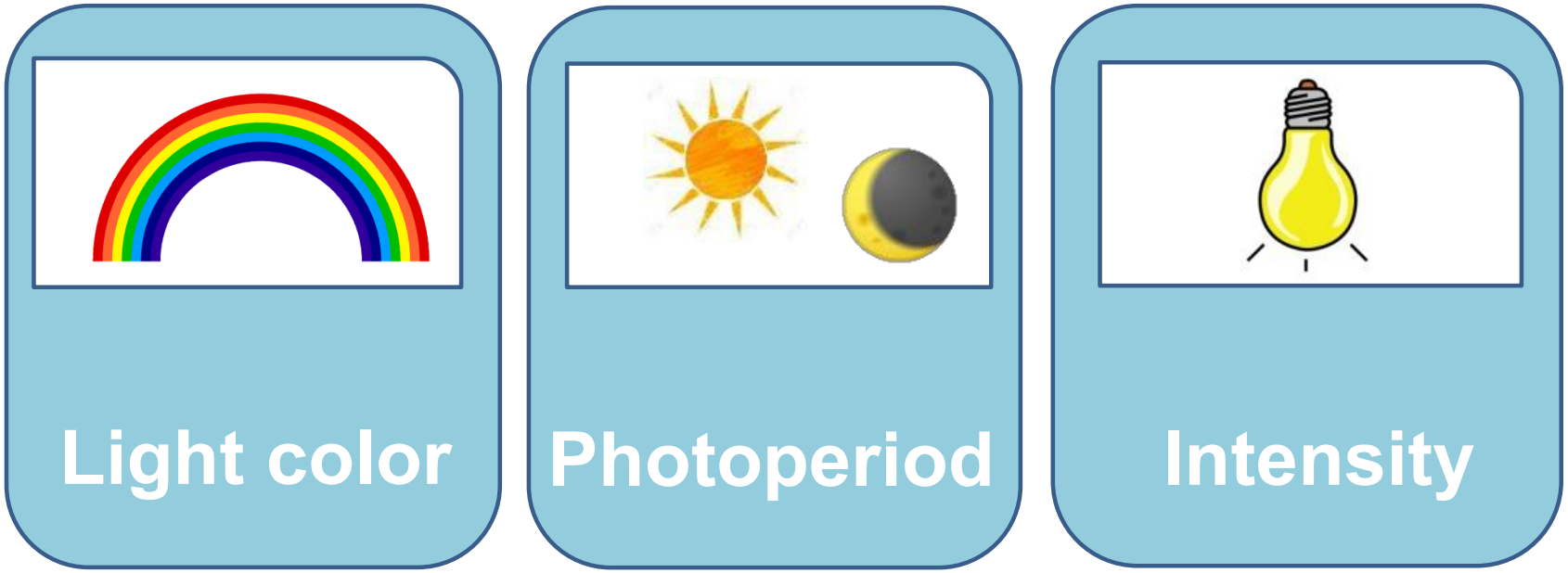
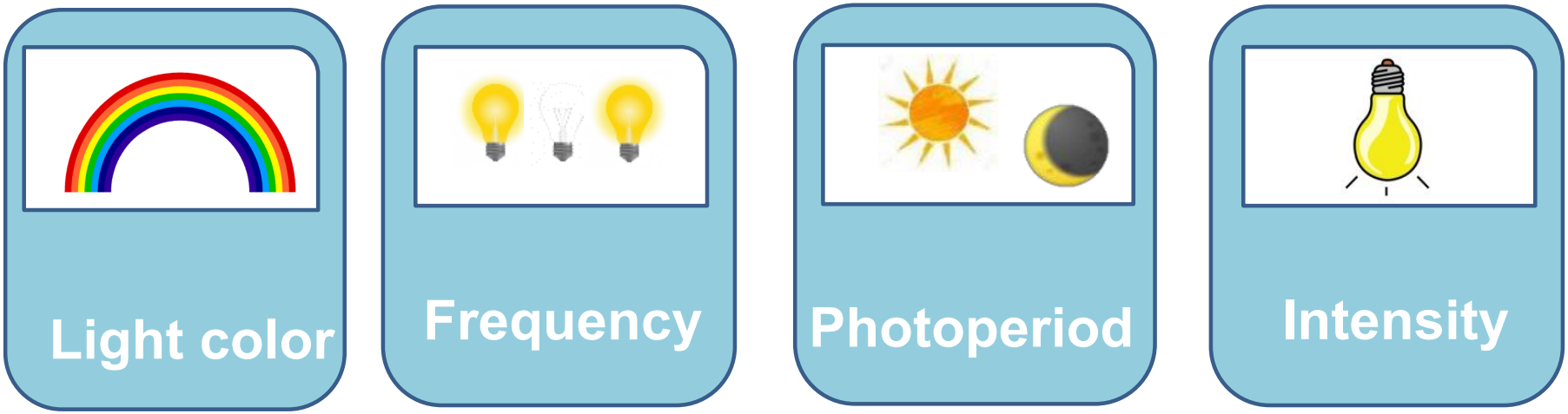
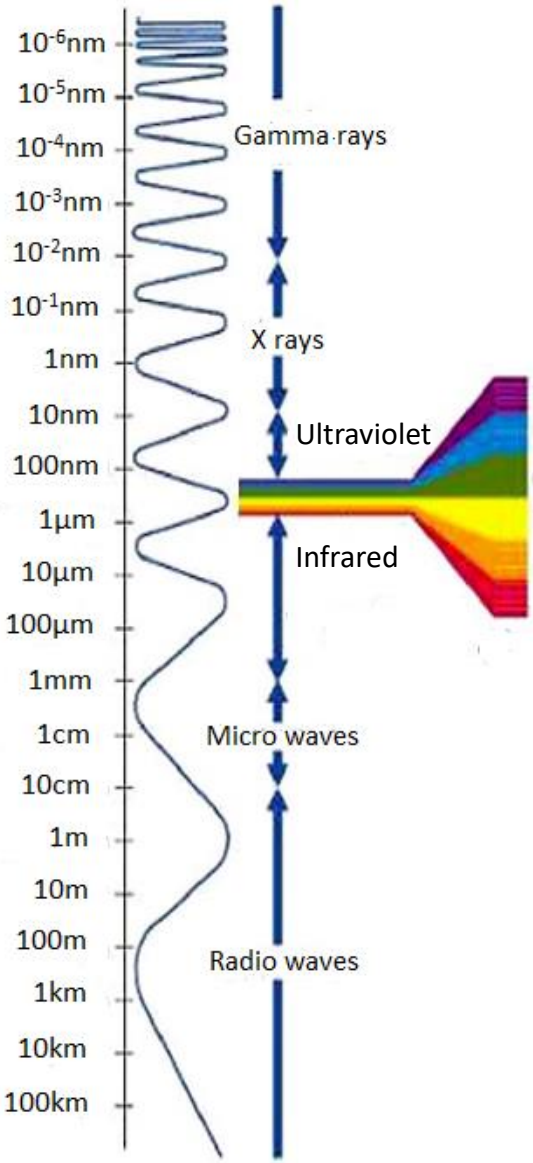
3 Aspects of light and how they affect layers

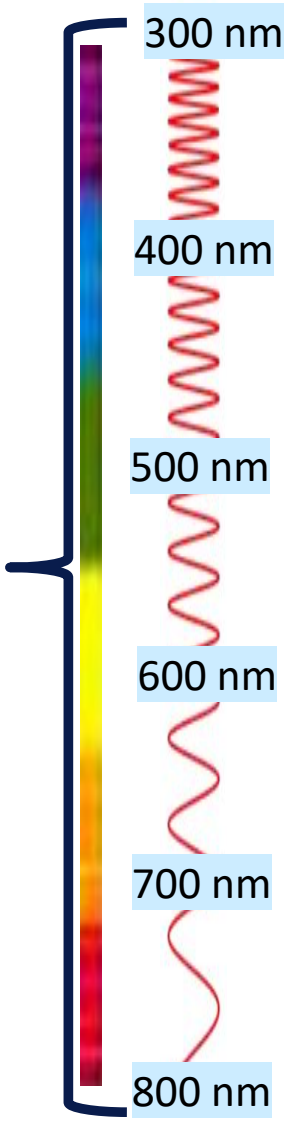


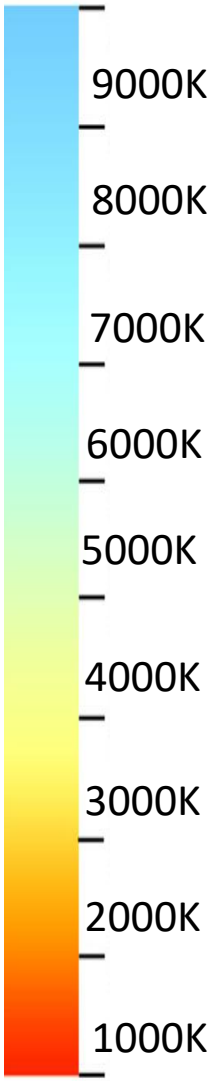
3 Aspects of light and how they affect layers





Light = perceivable portion of electromagnetic radiation





Light colour

The color of light depends on the radiation wavelength

BUT it is noted in Kelvin

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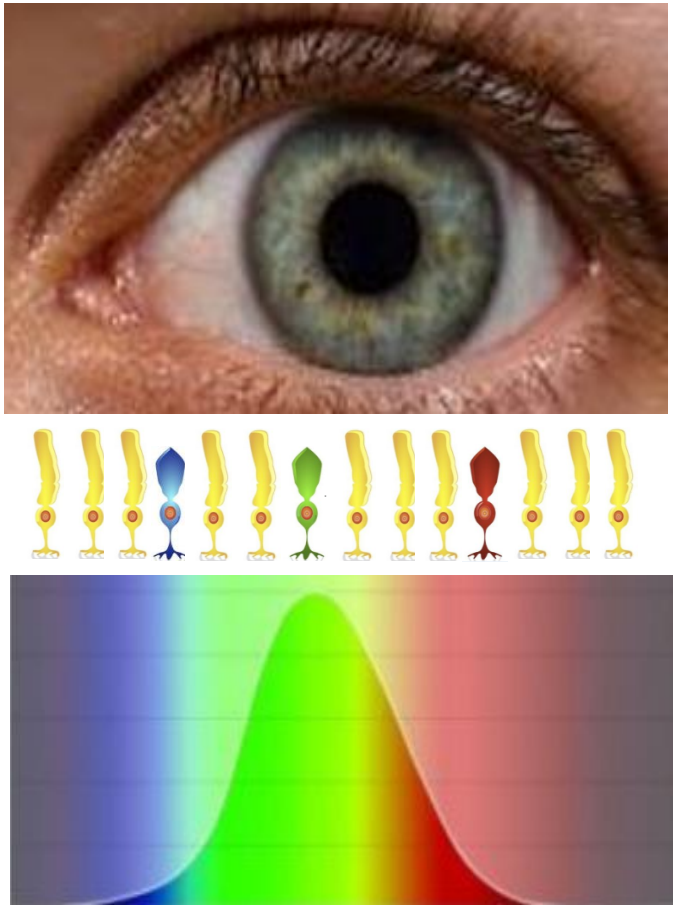
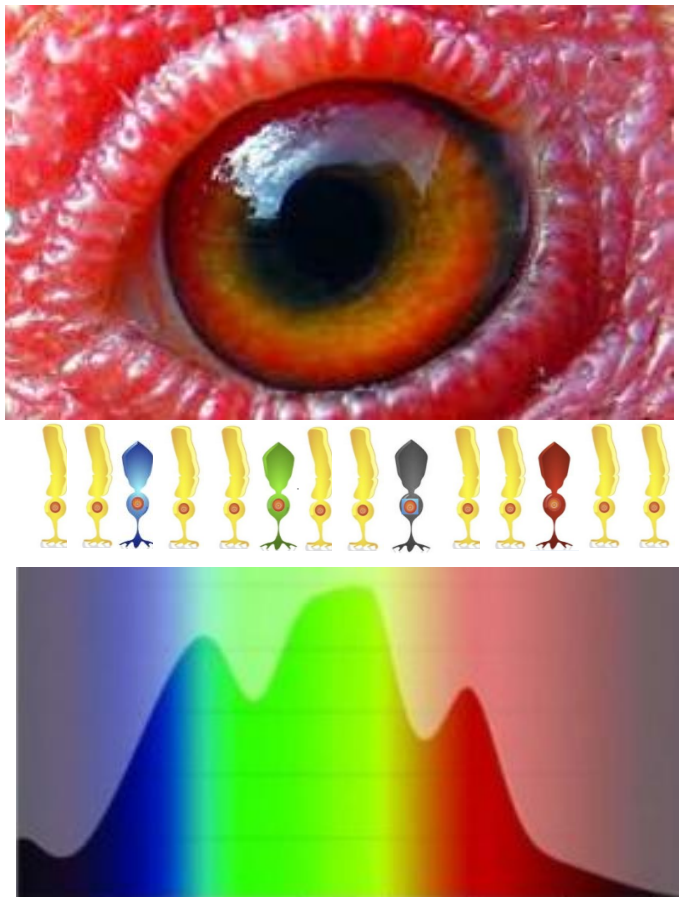
The photopic vision spectrum

Light colour





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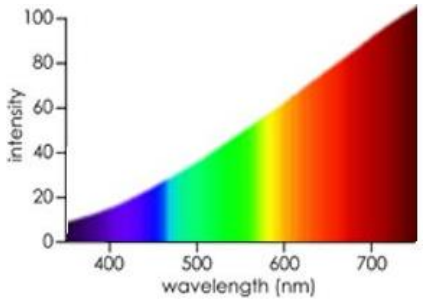
Emitted light color by different sources

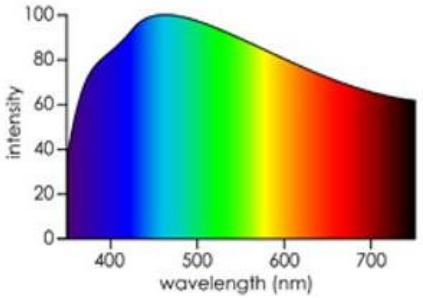
Light colour

SUNLIGHT

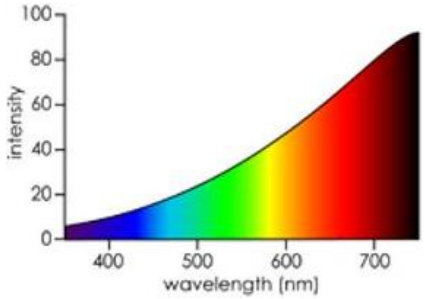
Sunset



Noon

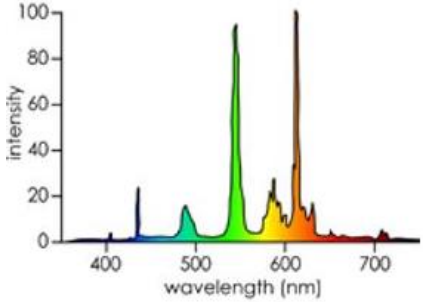


INCANDESCENT

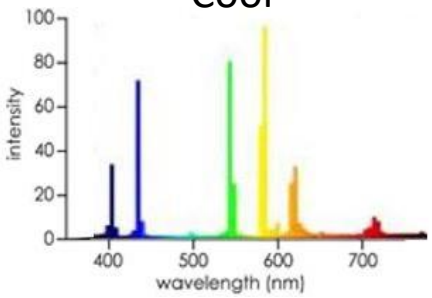


FLUORESCENT

Warm

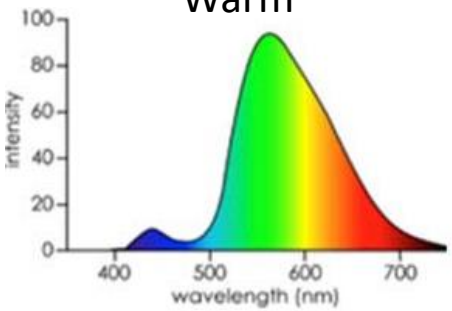


Cool

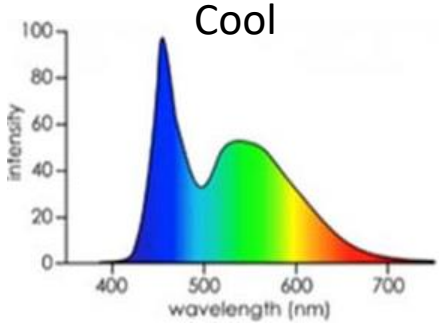


LED

Warm



Cool



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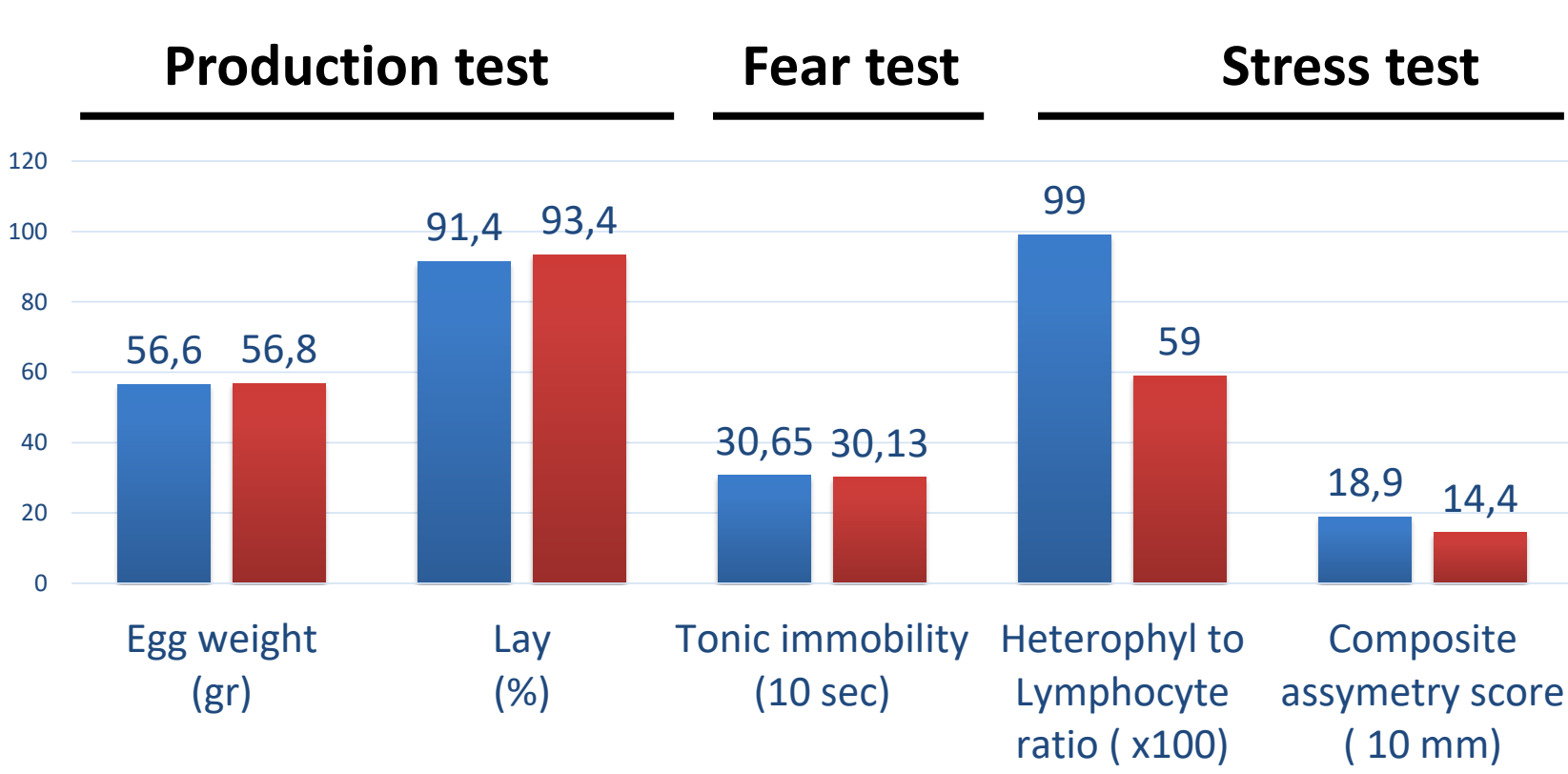
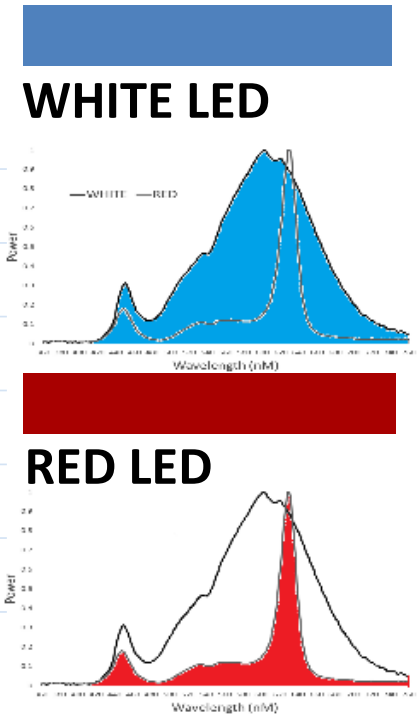
White hens exposed to different light color between 17 and 72 weeks of life

Light colour





Source: Archer 2019

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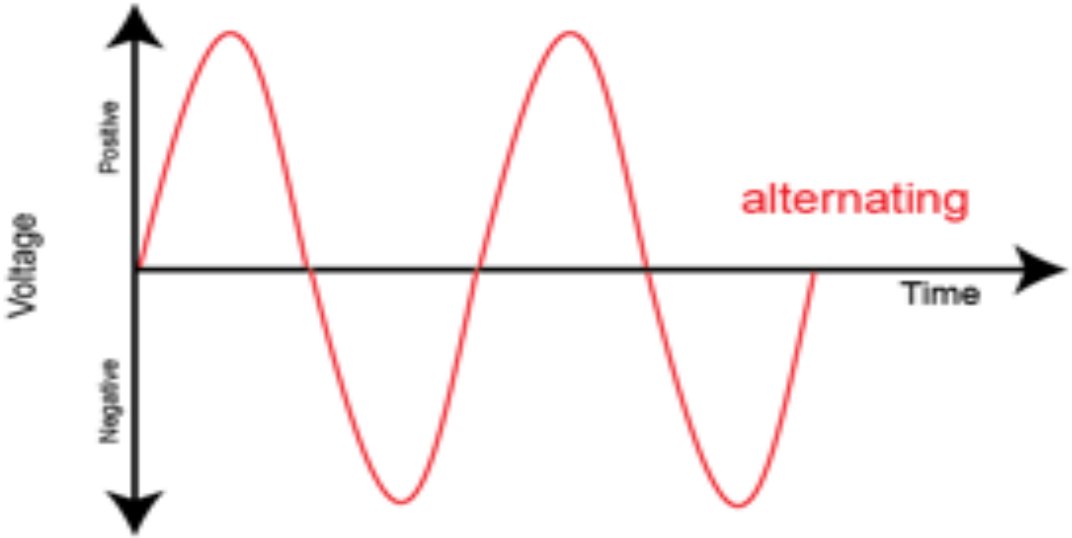
FLICKERING LIGHTS



Due to Alternating current, light bulbs are not producing constant light but discontinuously

Vision Frequency and Retine Captation/s

Light colour

24 -30 images per second

150 -220 images per second

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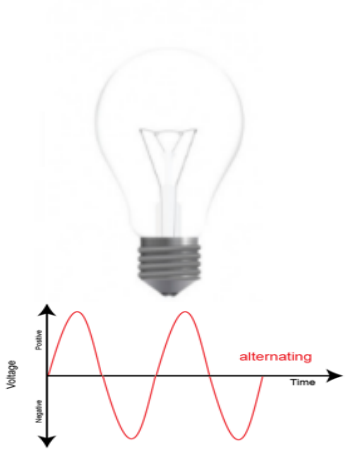
Stress caused by flickering effect

Light colour

24 -30 images per second



150 -220 images per second

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Emitted light by different sources

Light colour

SUNLIGHT

Constant

INCANDESCENT

(60Hz)
Constant

FLUORESCENT

60 Hz –
2000 Hz

LED

60Hz –
Constant

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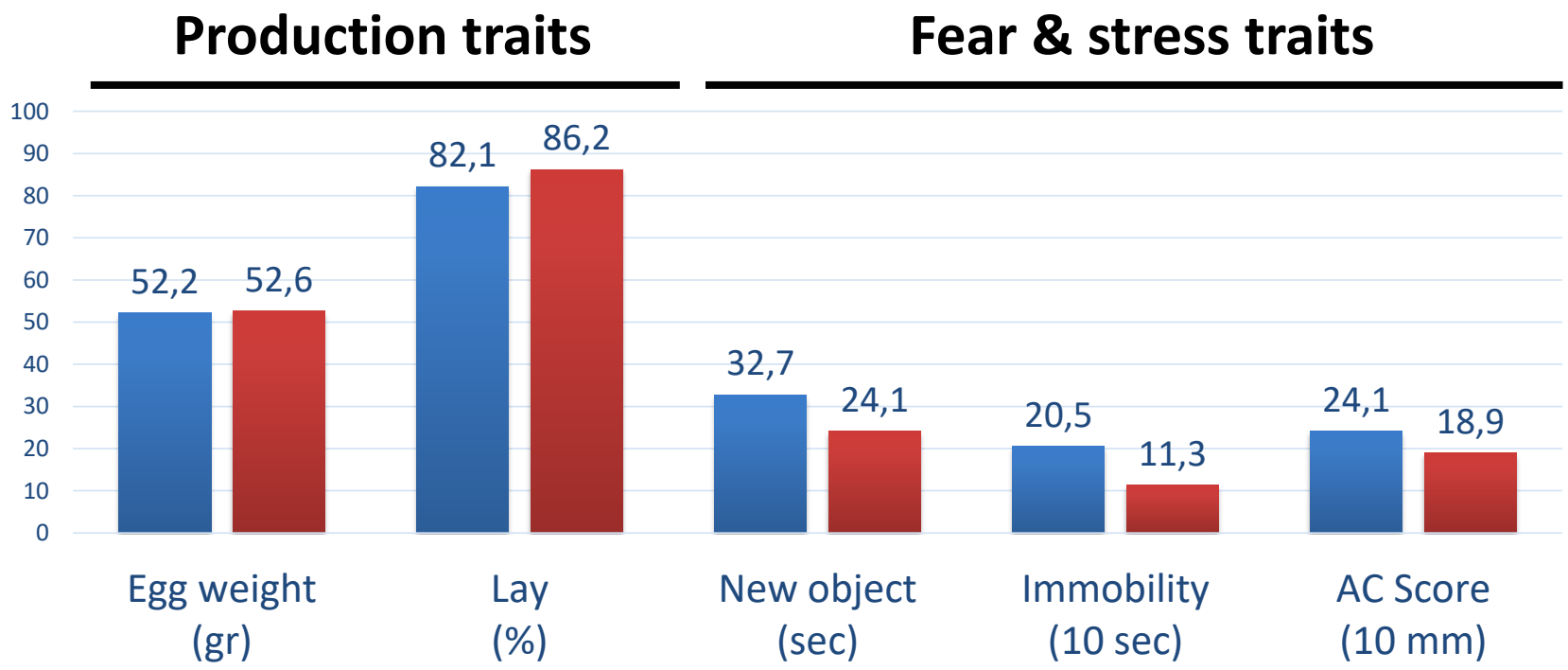
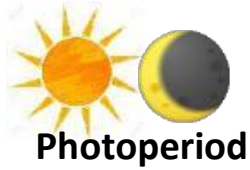
White hens exposed to different light sources between 21 and 31 weeks of life

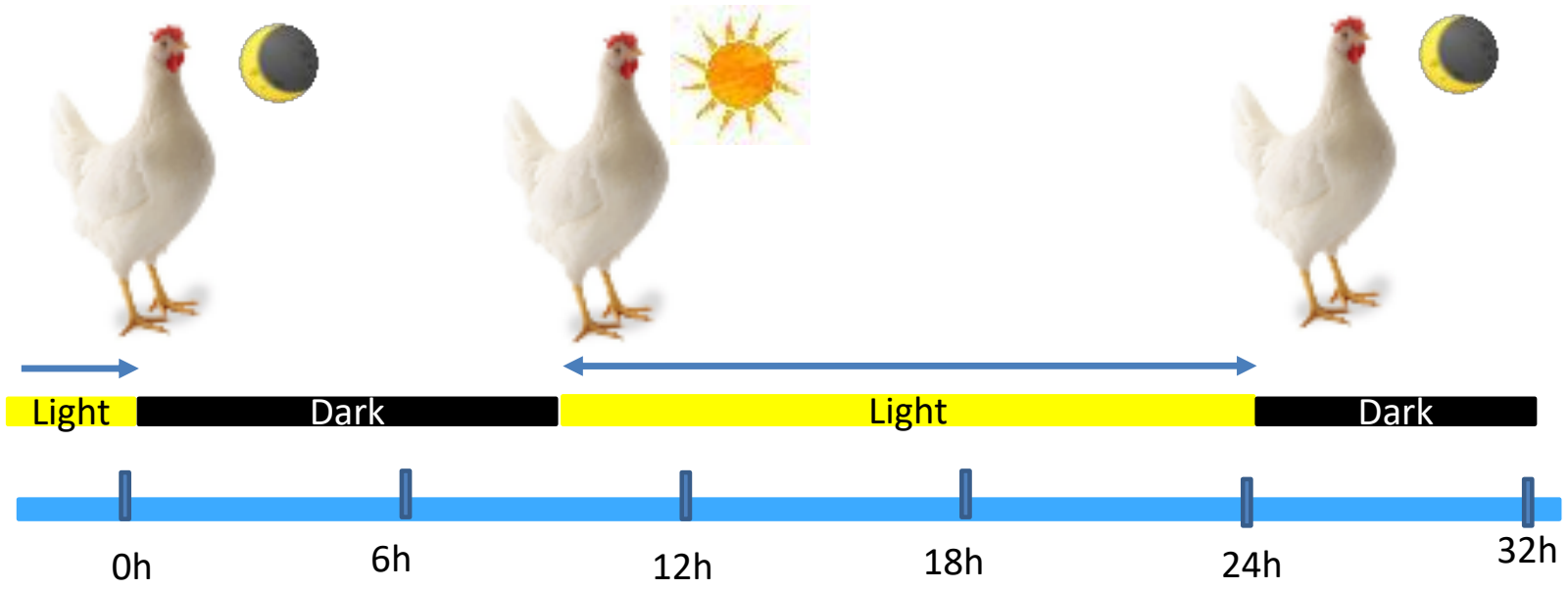


Source: Archer 2017

The Photoperiod:



Splitting up of the day between periods of light and darkness AND its progression

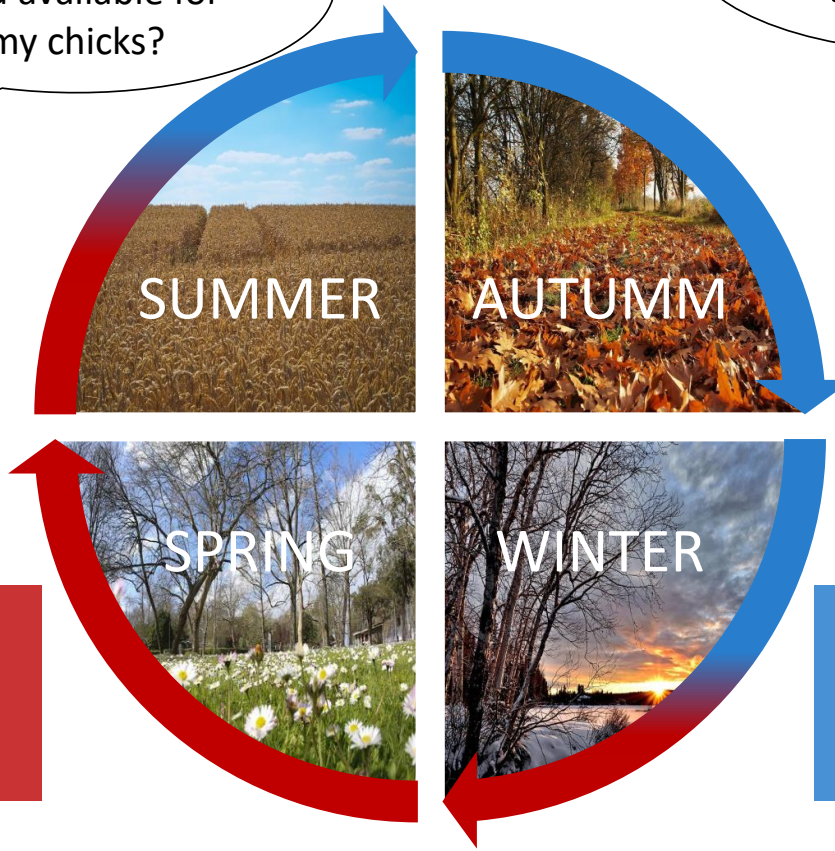


In Nature Laying is seasonal

Photoperiod

When there will be food available for my chicks?

In spring and summer!



INCREASING PHOTOPERIOD
Stimulation for laying

DECREASING PHOTOPERIOD
No laying

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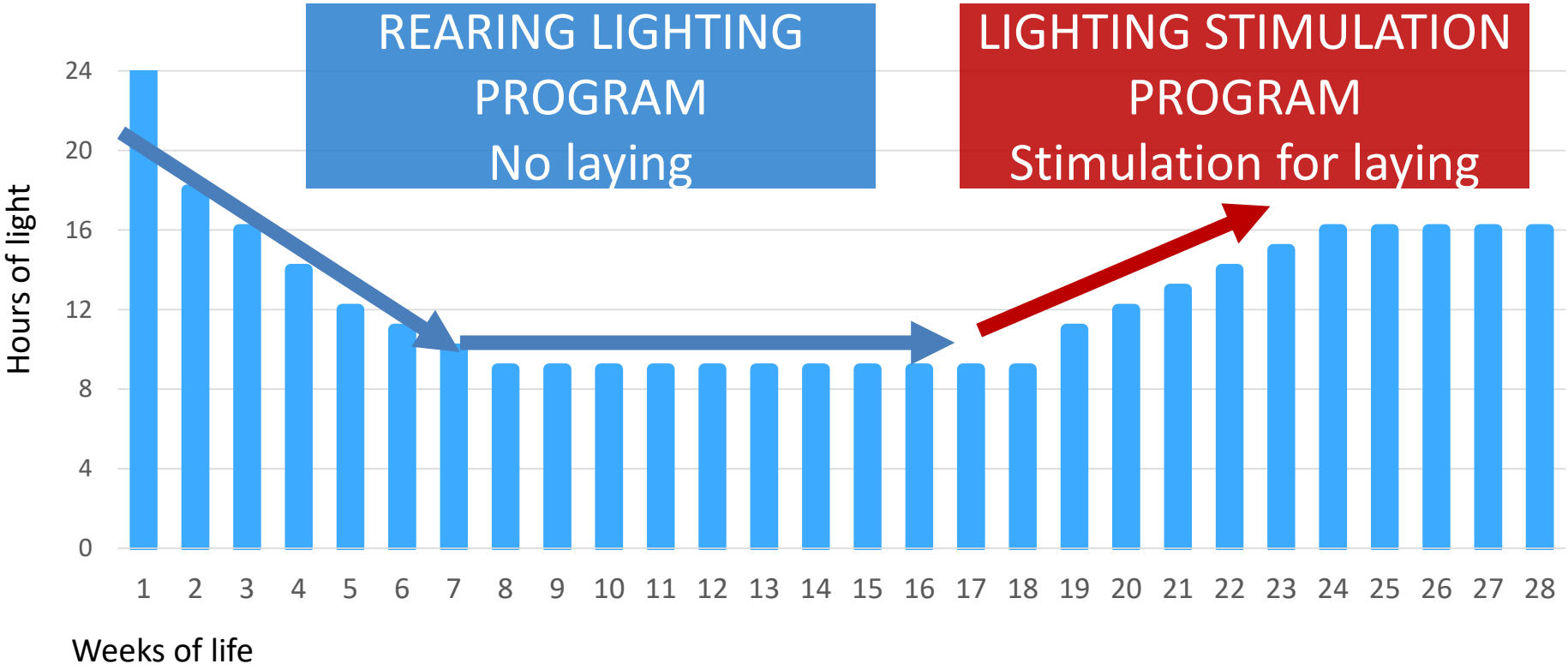
In Farms: production is programmed

Photoperiod

Lighting programs → **De-seasonalize** egg production



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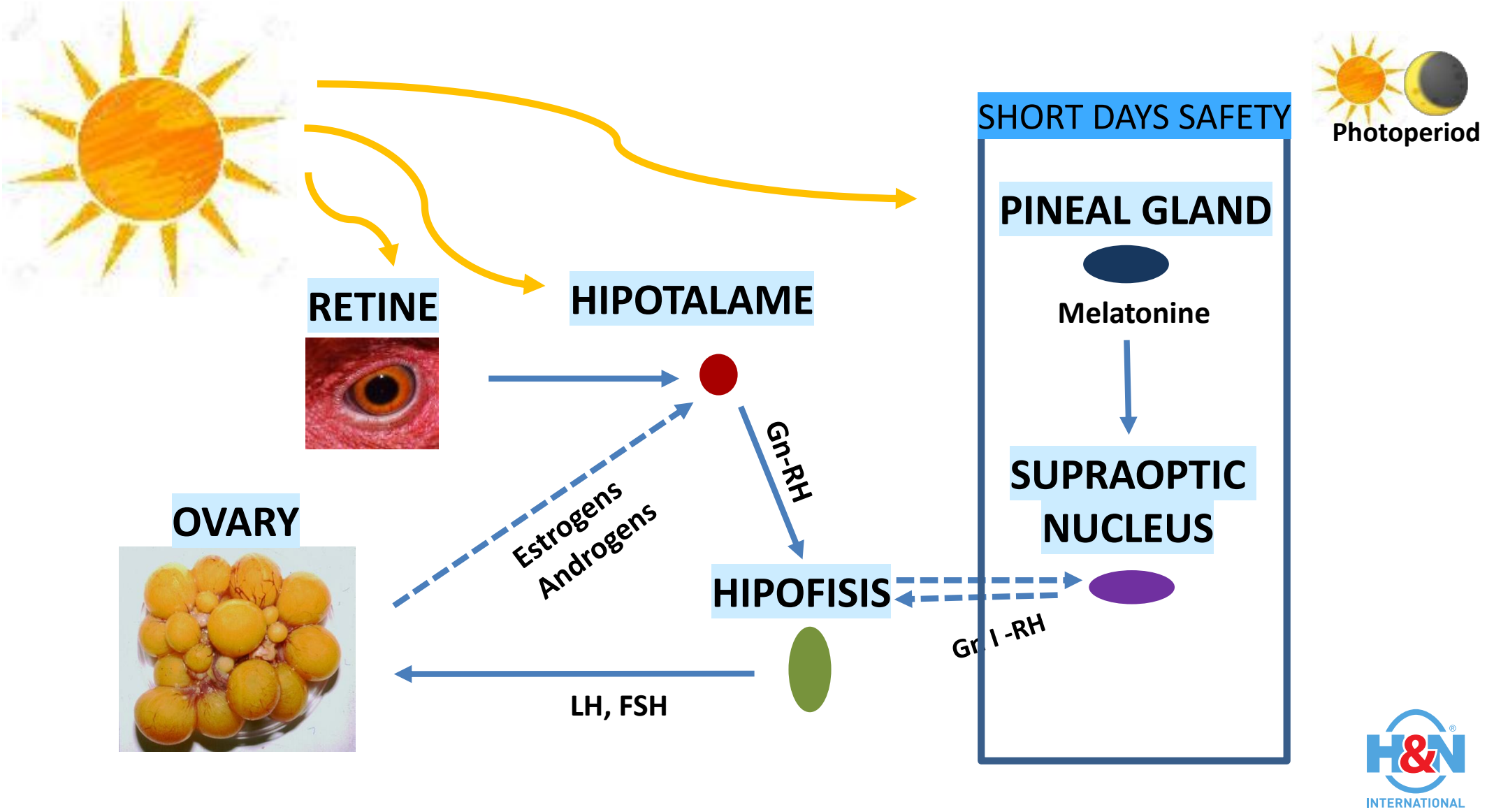
SHORT DAYS SAFETY
Photoperiod
PINEAL GLAND
Melatonine
SUPRAOPTIC NUCLEUS
RETINE
HIPOTALAME
Gn-RH
Estrogens
Androgens
OVARY
HIPOFISIS
Gn I -RH
LH, FSH
H&N
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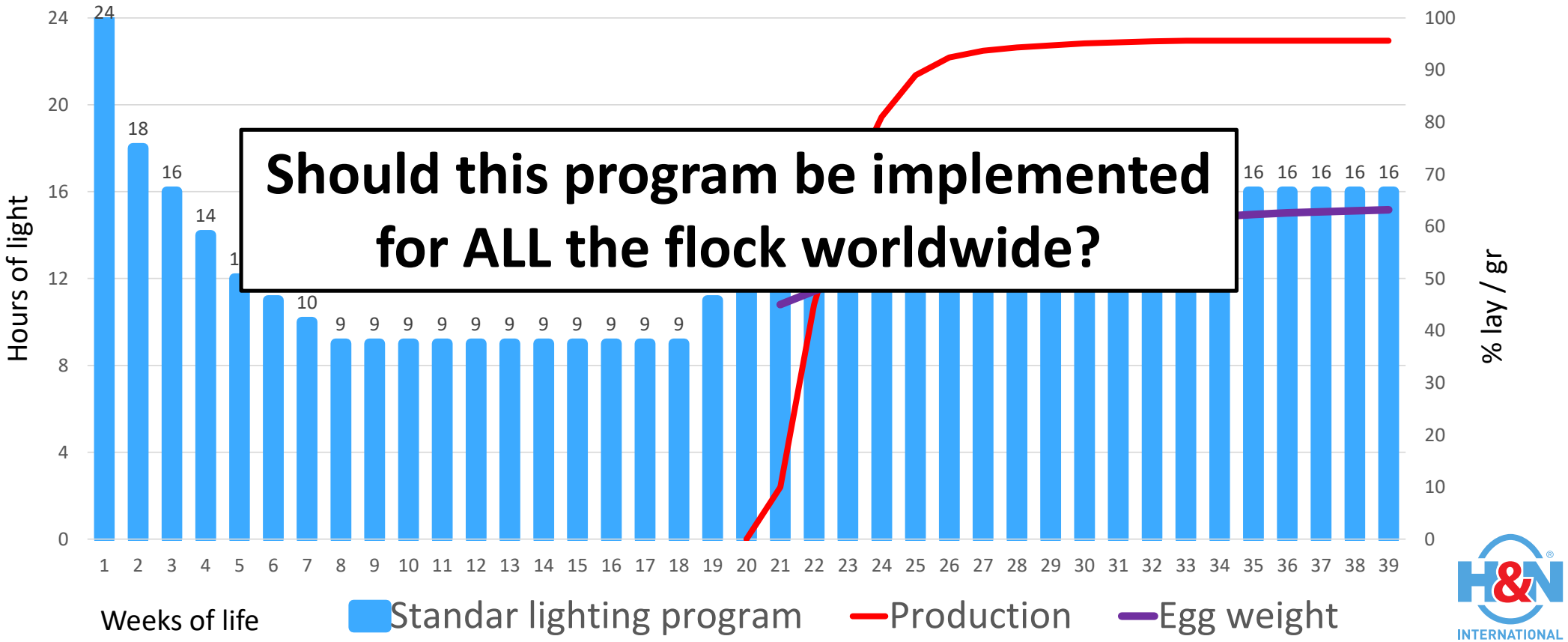
Recommended lighting programs

Photoperiod



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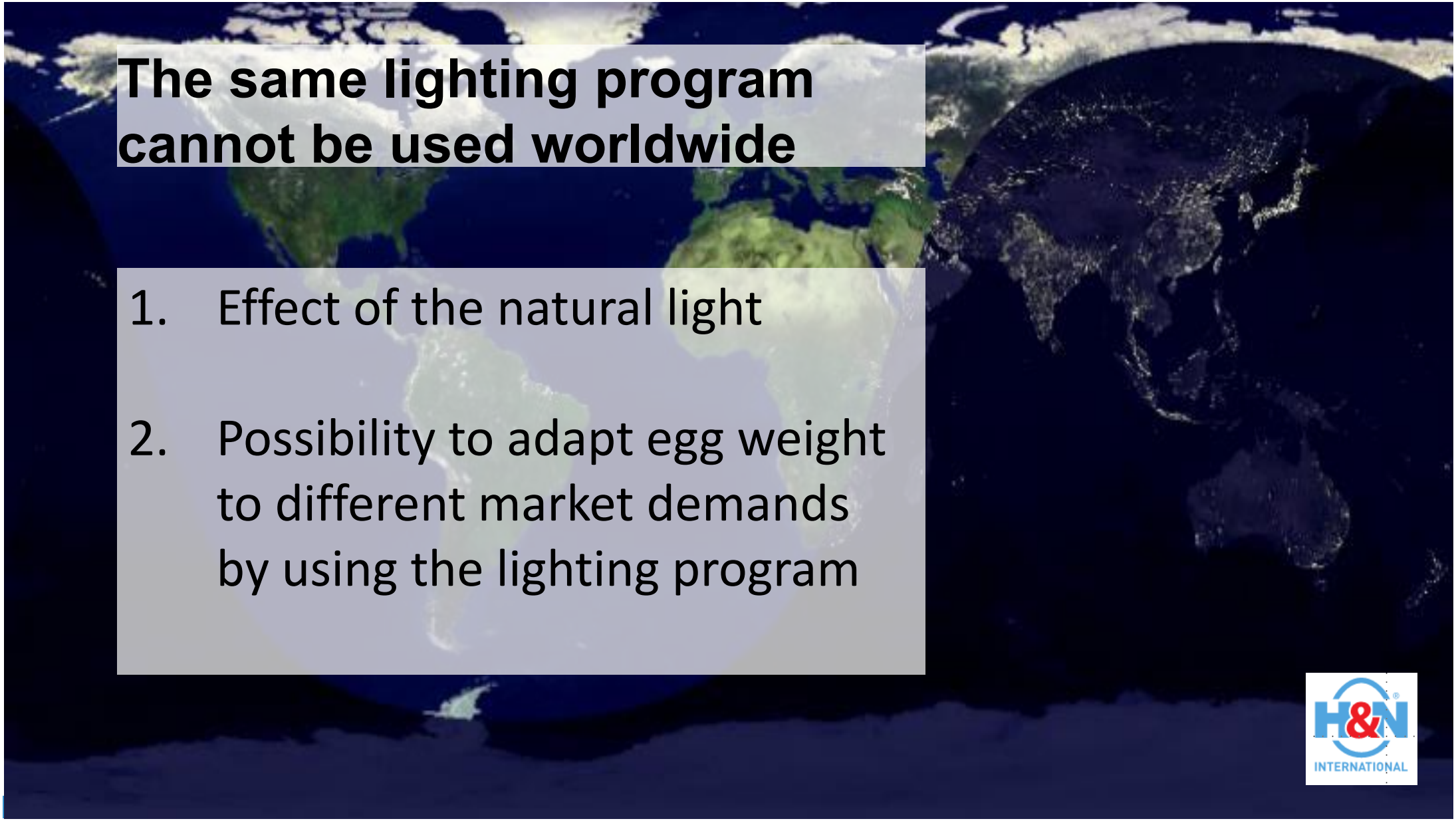
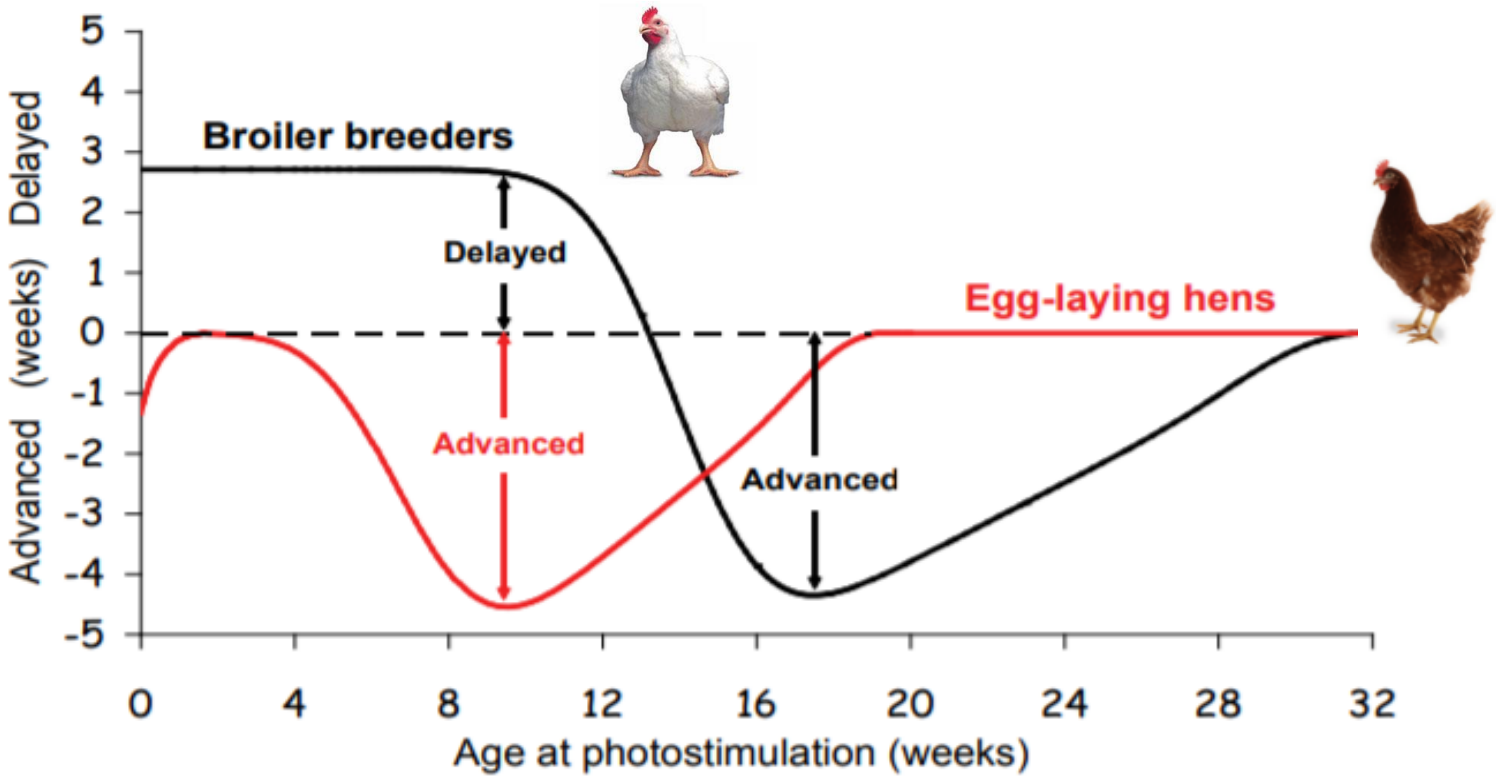


The same lighting program cannot be used worldwide

1. Effect of the natural light

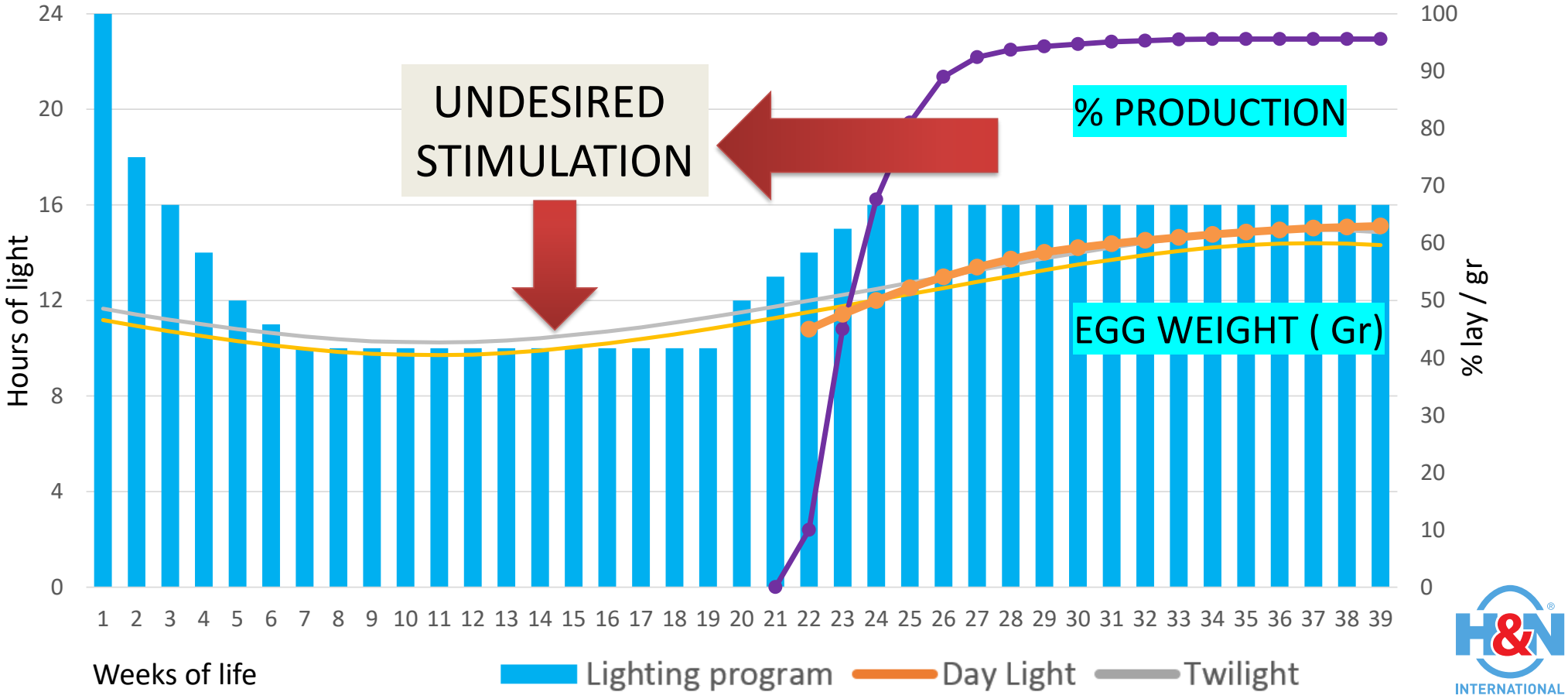
2. Possibility to adapt egg weight to different market demands by using the lighting program

EFFECT OF PHOTO STIMULATION DURING REARING



Source: P. Lewis

Natural Light Interferences



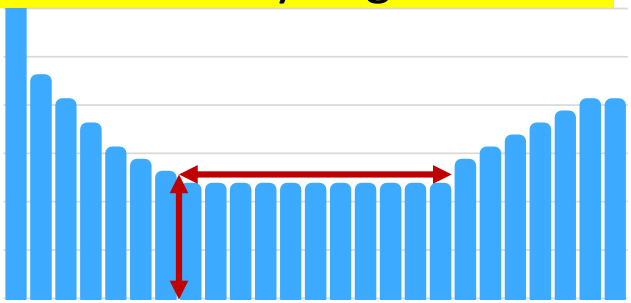
Setting a right rearing light programm

1. Determine if your houses are light proof

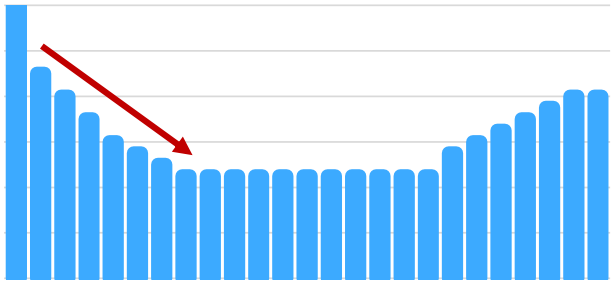
Or

2. Consider the limitation on the lighting program due the house

3. Set the daylength bottom



4. Set the stepdown to the daylength bottom



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1. Determine if your houses are light proof

Source: H&N International

Photoperiod

H&N INTERNATIONAL

Photoperiod

Source: H&N International

H&N INTERNATIONAL

Photoperiod

Source: H&N International

H&N INTERNATIONAL

And this ?

Photoperiod

Source: H&N International

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And now?

Inside house view

Lights off

Less than 3 lux

Ventilation on

2. Limitation due to type of housing

Photoperiod

REARING	PRODUCTION	LIMITATION
		None
		No limitation during rearing period but Lighting program photoperiod at transfer should match with natural daylength
		Lighting program bottom = o > than the maximum natural daylength at the programmed stimulation week
		

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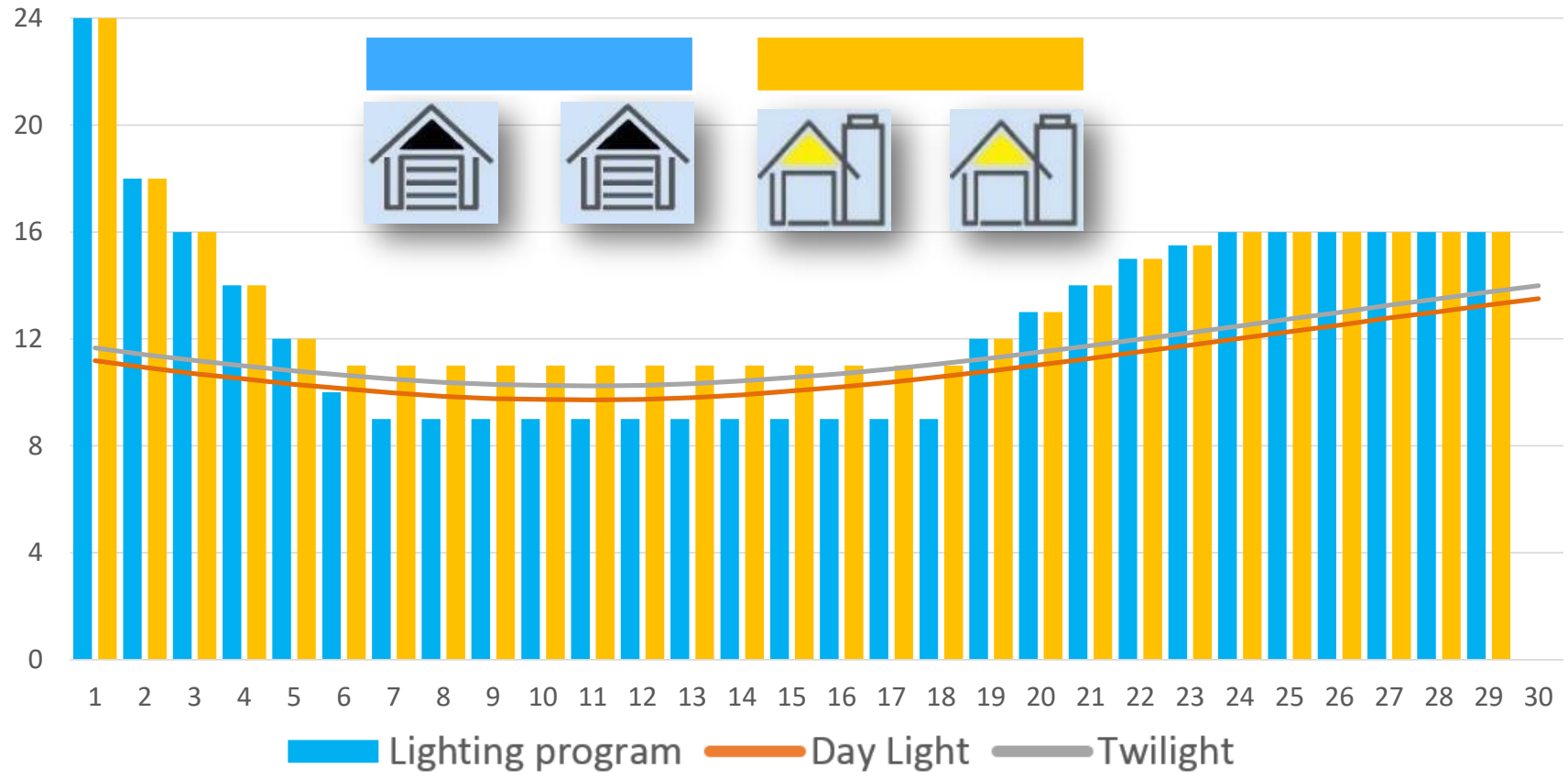
Example of a lighting program bottom during increasing natural daylength

Photoperiod



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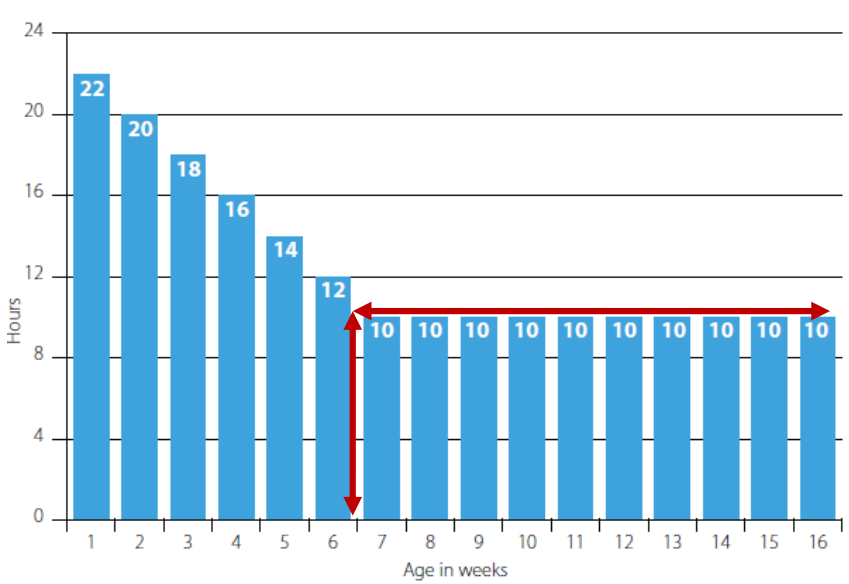
3. Set the daylength bottom

Photoperiod

SHORT PROGRAM (9-11 hours)

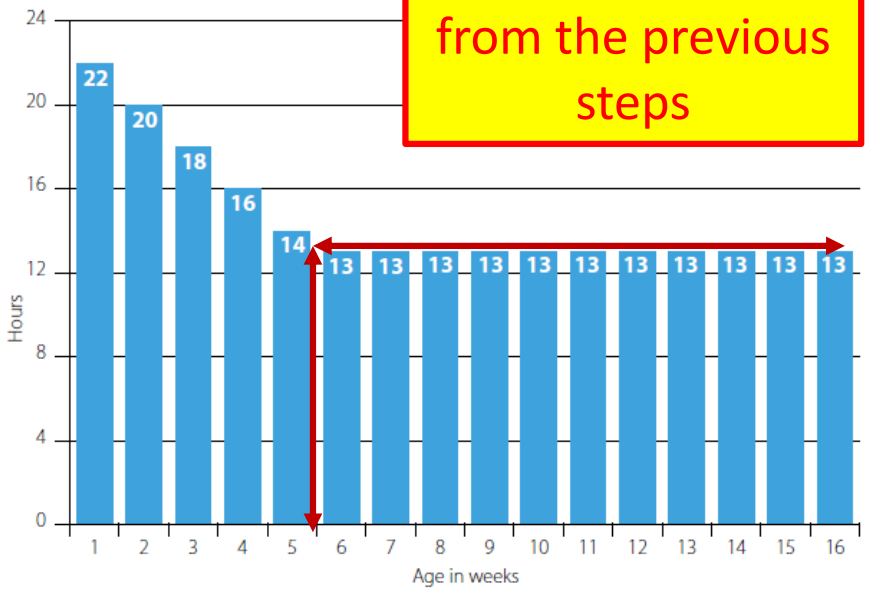
- Easier stimulation program
- Concentrate feed intake



LONG PROGRAM (12-14 hours)

- More time for feed intake

Respect limitation from the previous steps



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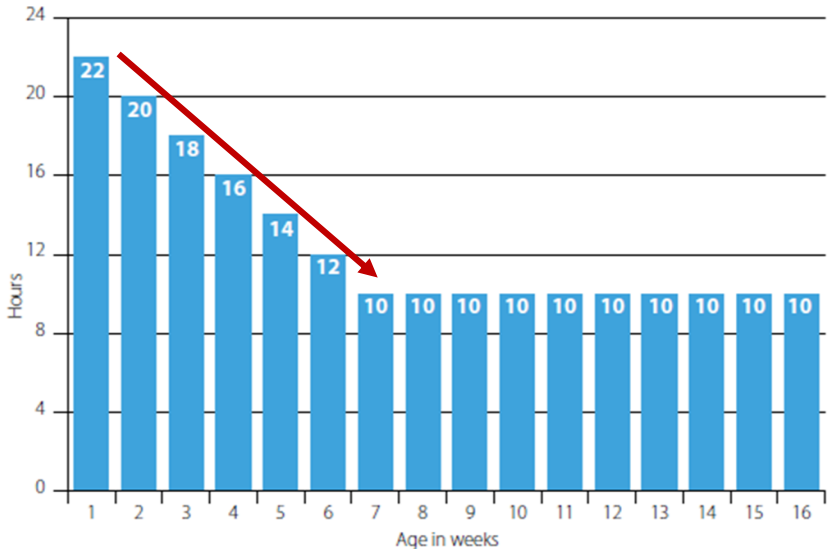
4. Set the stepdown to daylength bottom

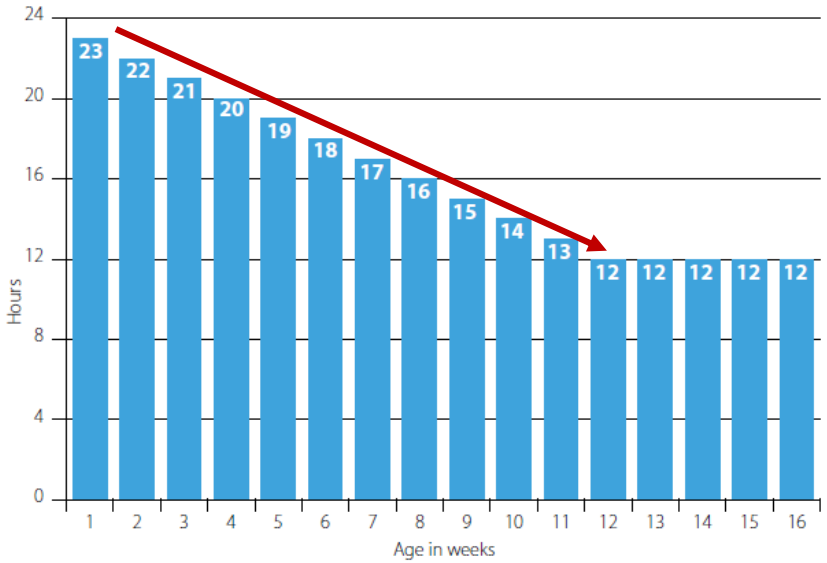
FAST STEPBACK (-2 Hours /w)

- Higher sensitivity to light
- Faster start in production
- Market:



SLOW STEPBACK (-1 Hours /w)

- Bigger egg size in production
- More time for feed intake
- Market:



Setting the right stimulation program

Photoperiod

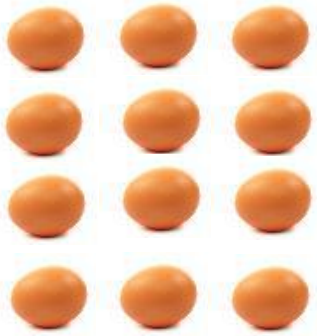
Egg mass

= Eggs number

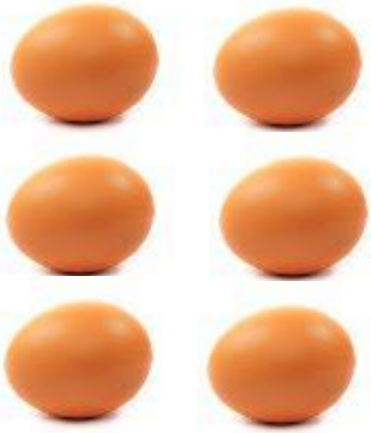
x average egg weight

Age at stimulation

Weight at stimulation



Egg number



Egg weight

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What stimulates the hens to start laying?

Photoperiod

Birds are exposed to an increasing photoperiod

Birds reach appropriate body weight

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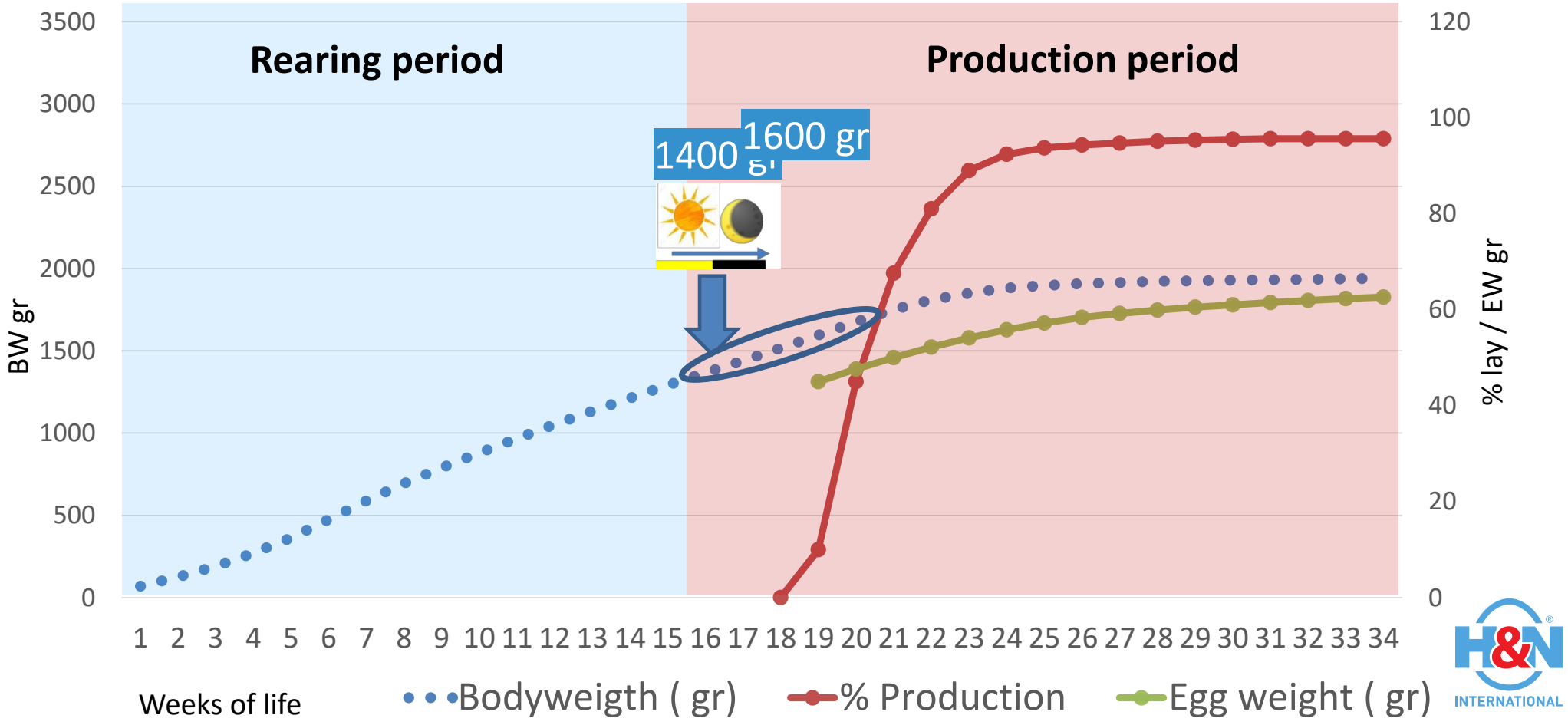
What really matters: WHEN?

Photoperiod



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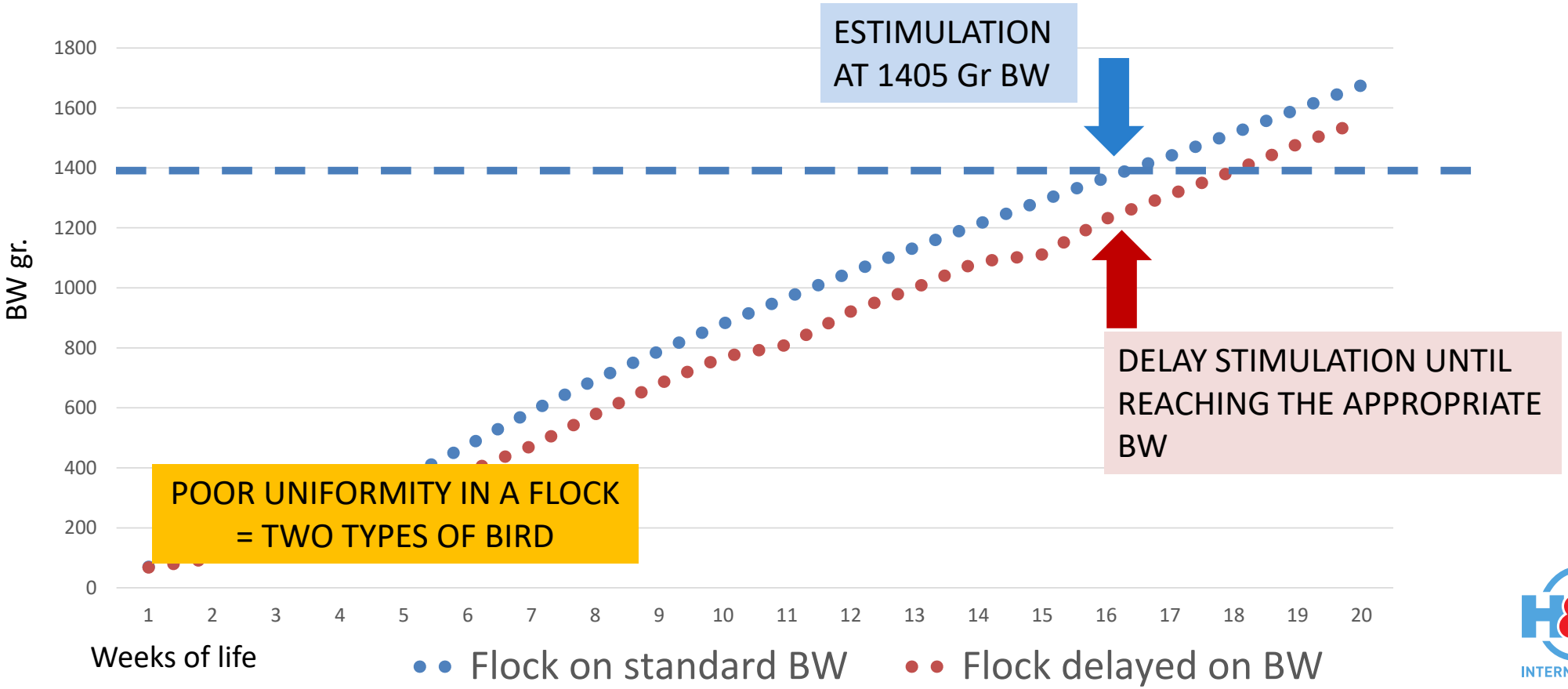
Stimulation by body weight

Photoperiod



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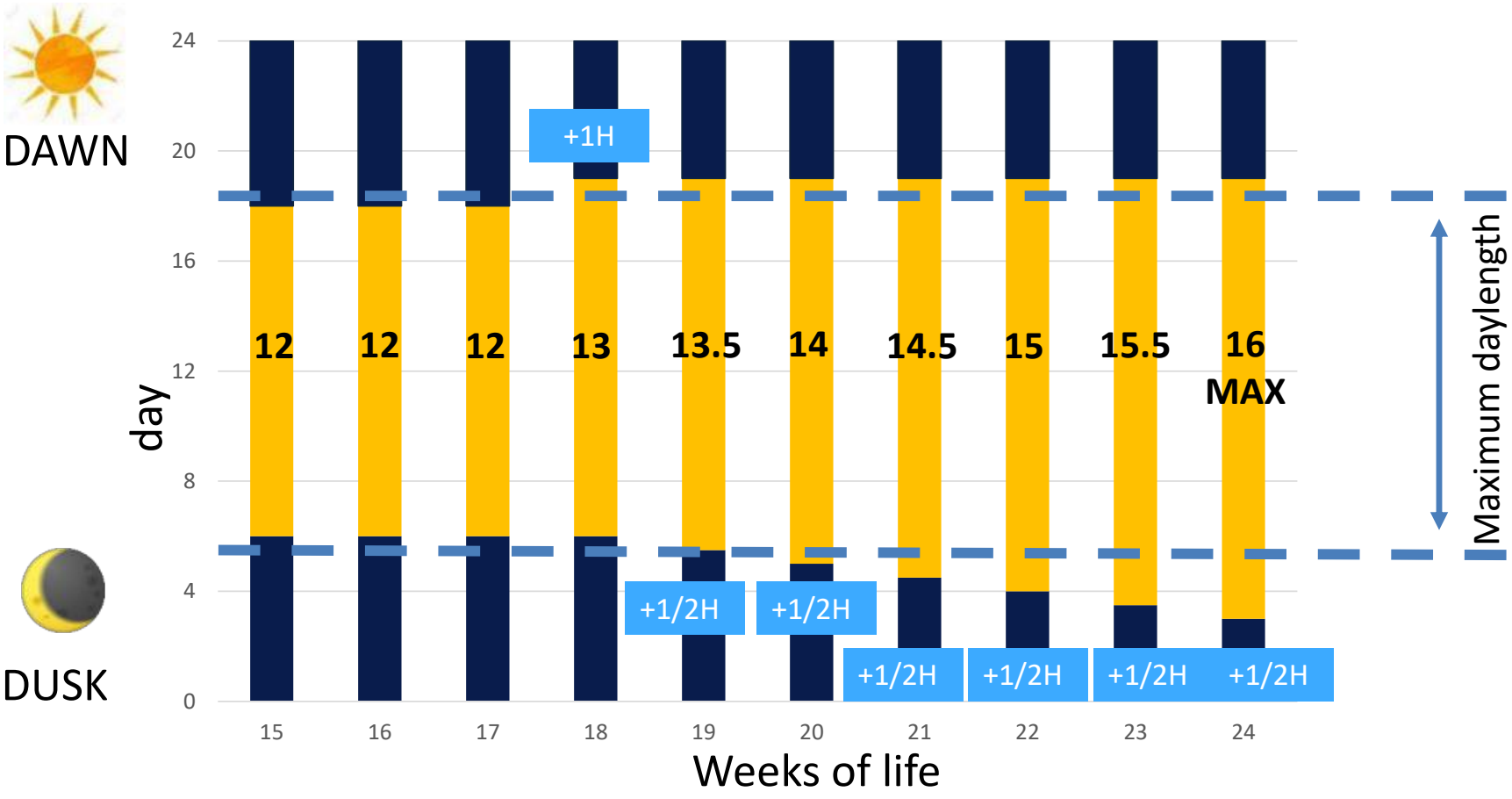
How to do a daylight stimulation

Photoperiod



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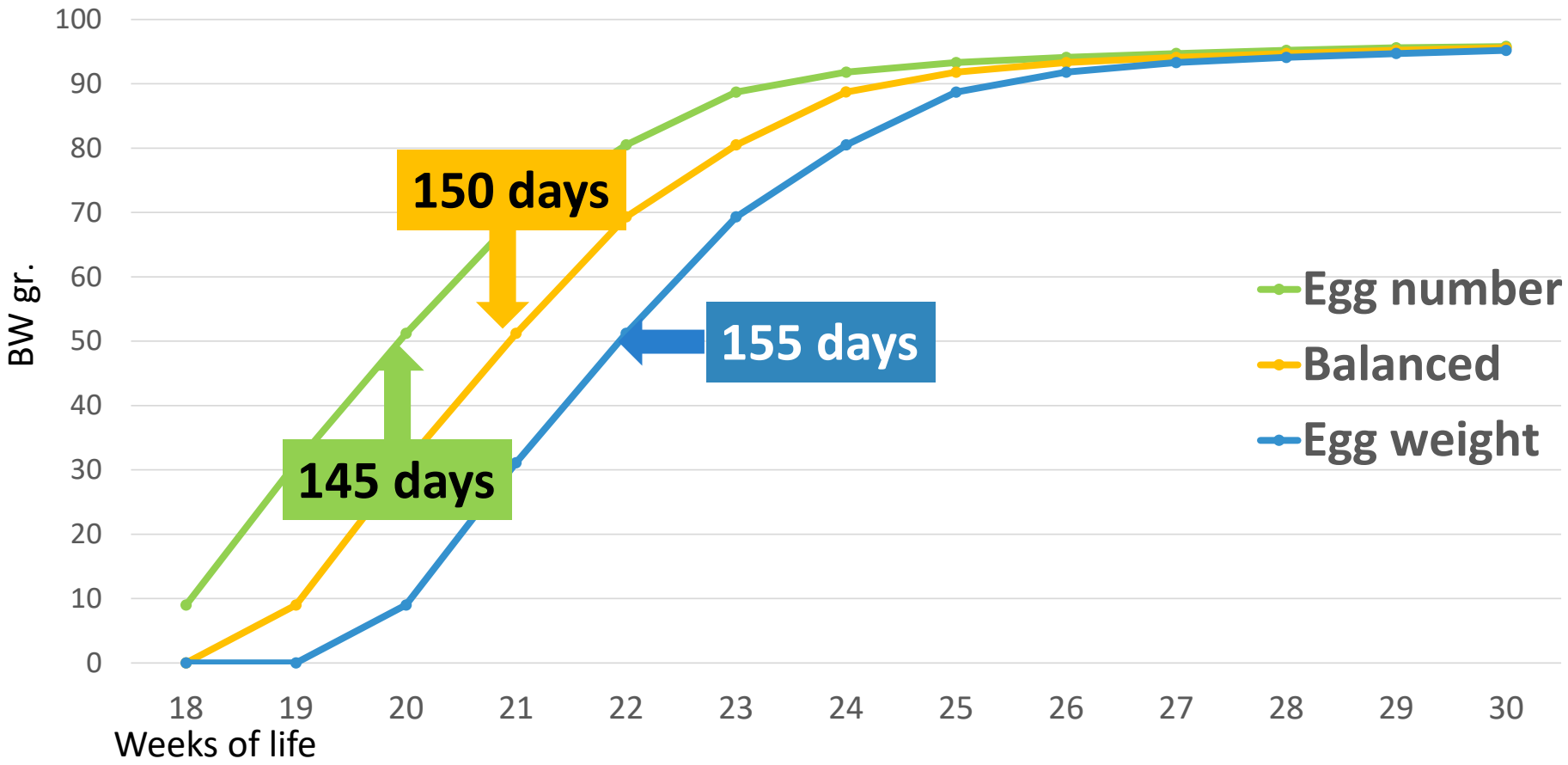
Checking your stimulation: Age at 50% production

Photoperiod



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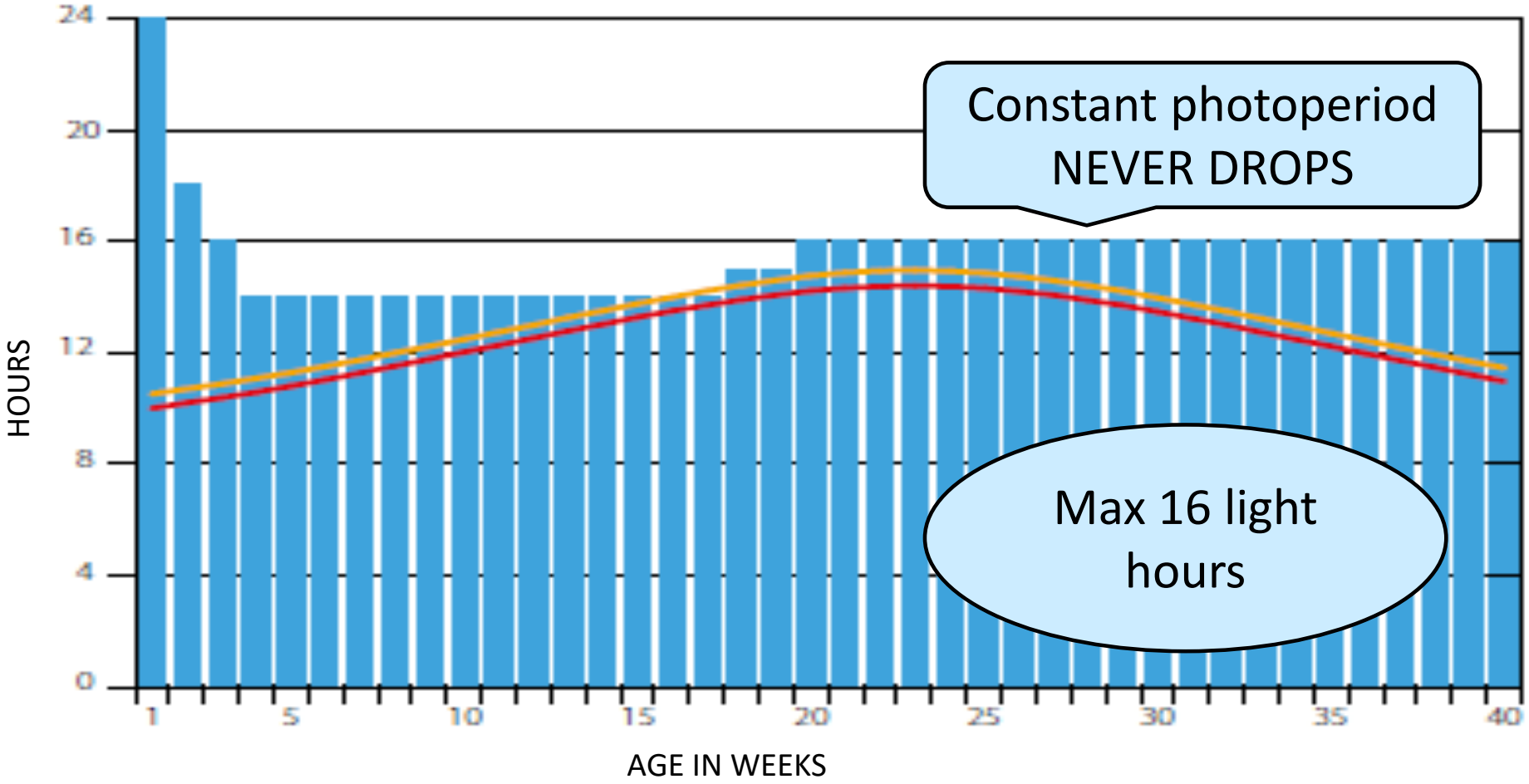
Lighting programs in production

Photoperiod



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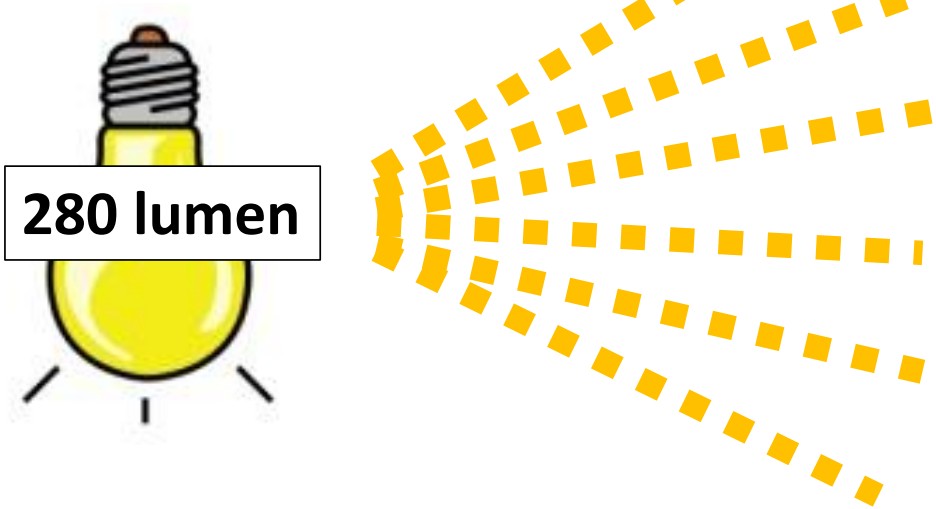
Light intensity definition

Light Intensity

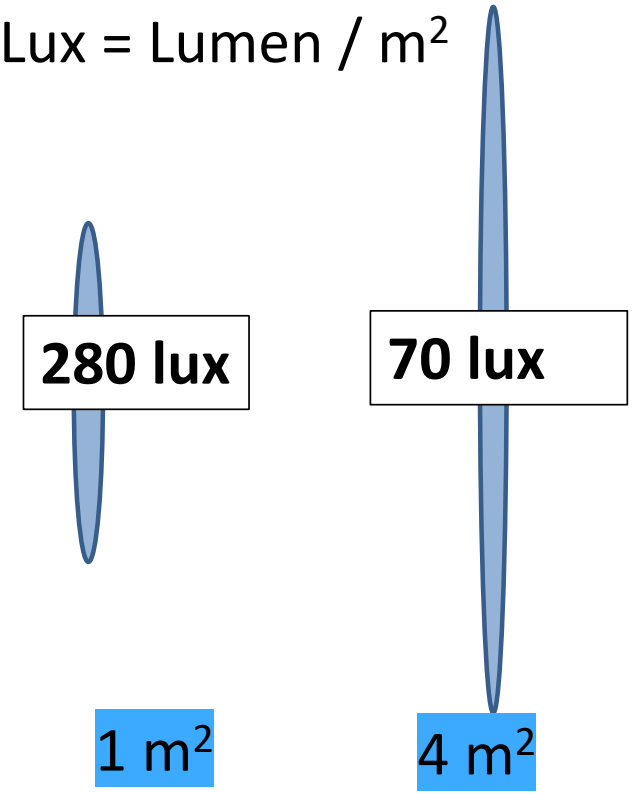
LIGHT INTENSITY

Lumen



ILUMINATION

Lux = Lumen / m^2



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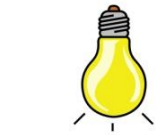
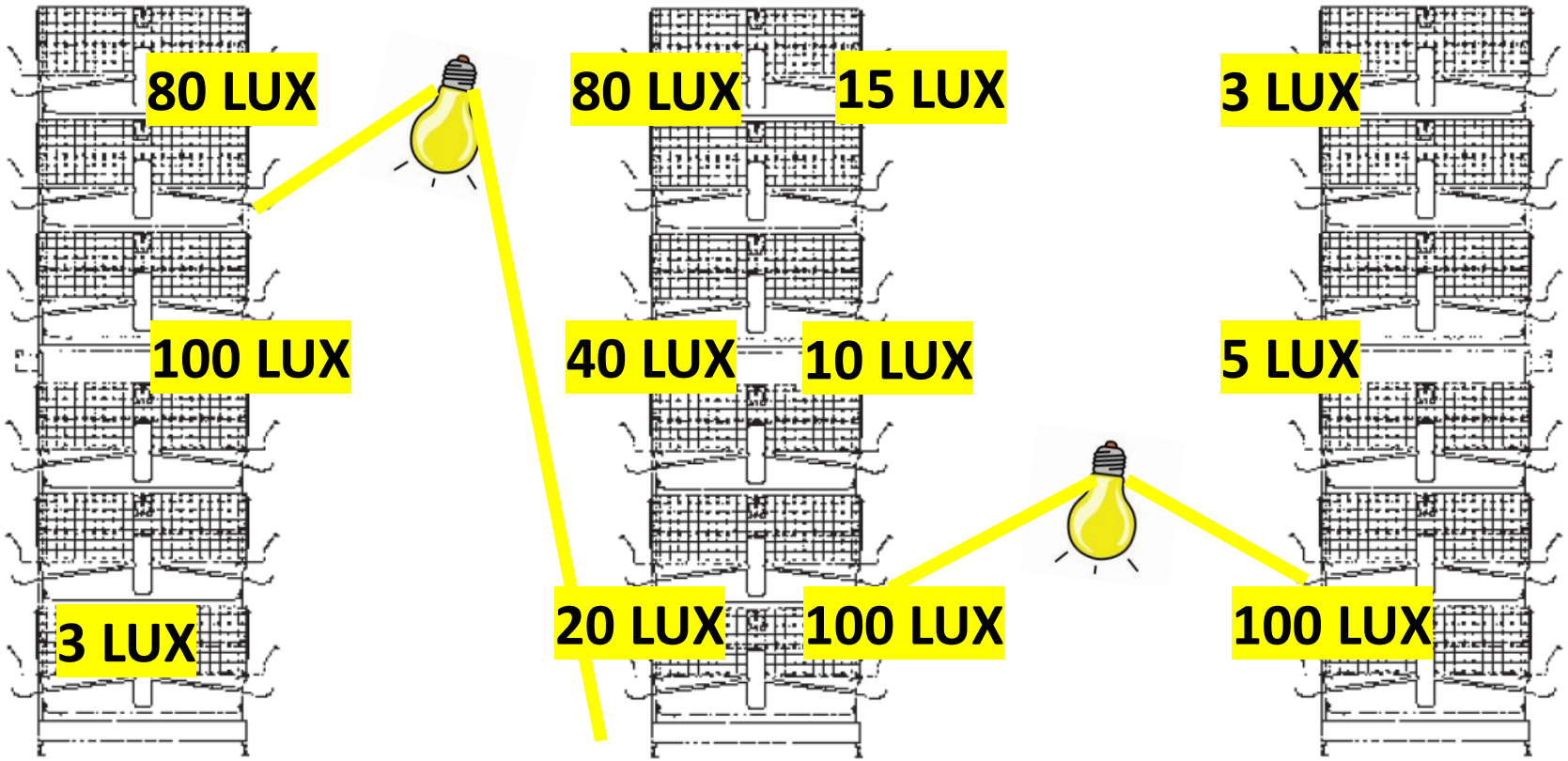
Light intensity often is not homogenous





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Vision Frequency and Retine Captation/s

Light colour

24 -30 images per second

150 -220 images per second

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LIGTH INTENSITY & HENS ACTIVITY

Light intensity acts as the
volume control for bird activity

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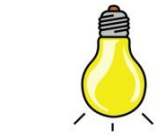
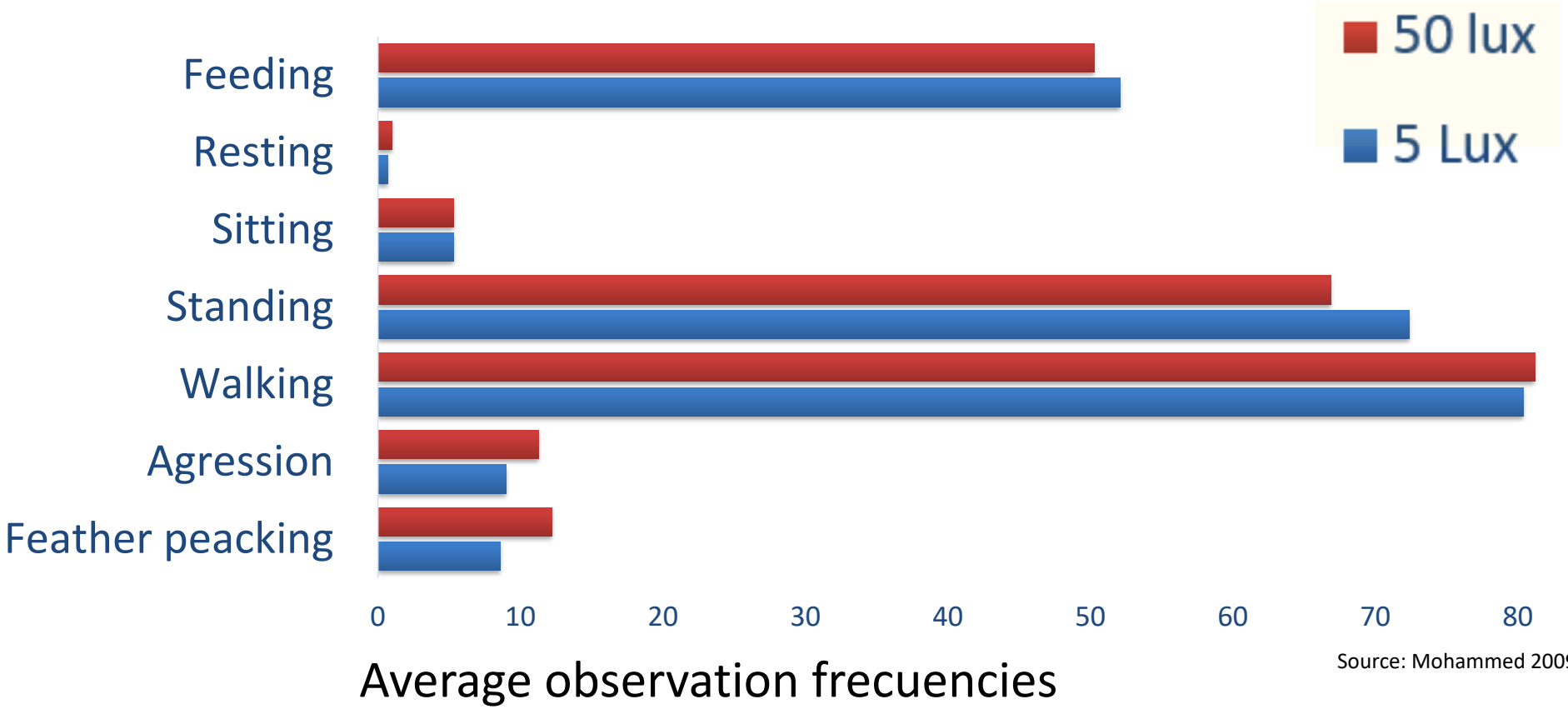
Frequency of behaviors observation in brown hens in cages



Light Intensity



Source: Mohammed 2009

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Intensity of different lighting sources

Light Intensity

20000 -100000 lux

200 -10000 lux

? Lux

Distance & Source lumens

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Dealing with natural light intensity:
The most common pitfall

Light Intensity

Source: H&N International

Sun rays directly entering the house

Source: H&N International

Irregular sunlight distribution in the house

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Controlling light intensity

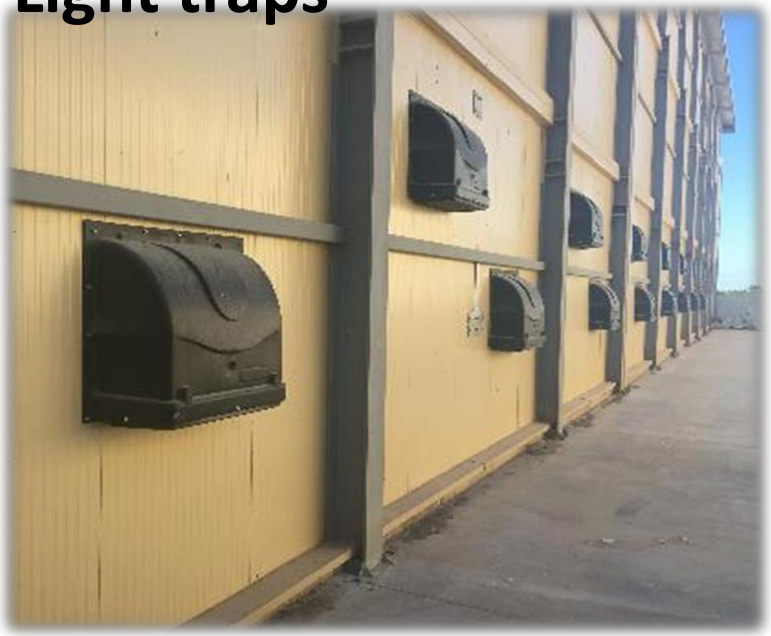
Light Intensity

STEP 1: move to brown or black houses

Shadow

Source: H&N International

Light traps



Source: H&N International

Be able of decide on the light intensity inside the house

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Controlling light intensity

Light Intensity

STEP 2: be able to measure the light intensity

Source: H&N International

Source: H&N International

Measure intensity at feeder levels
without shadows interference

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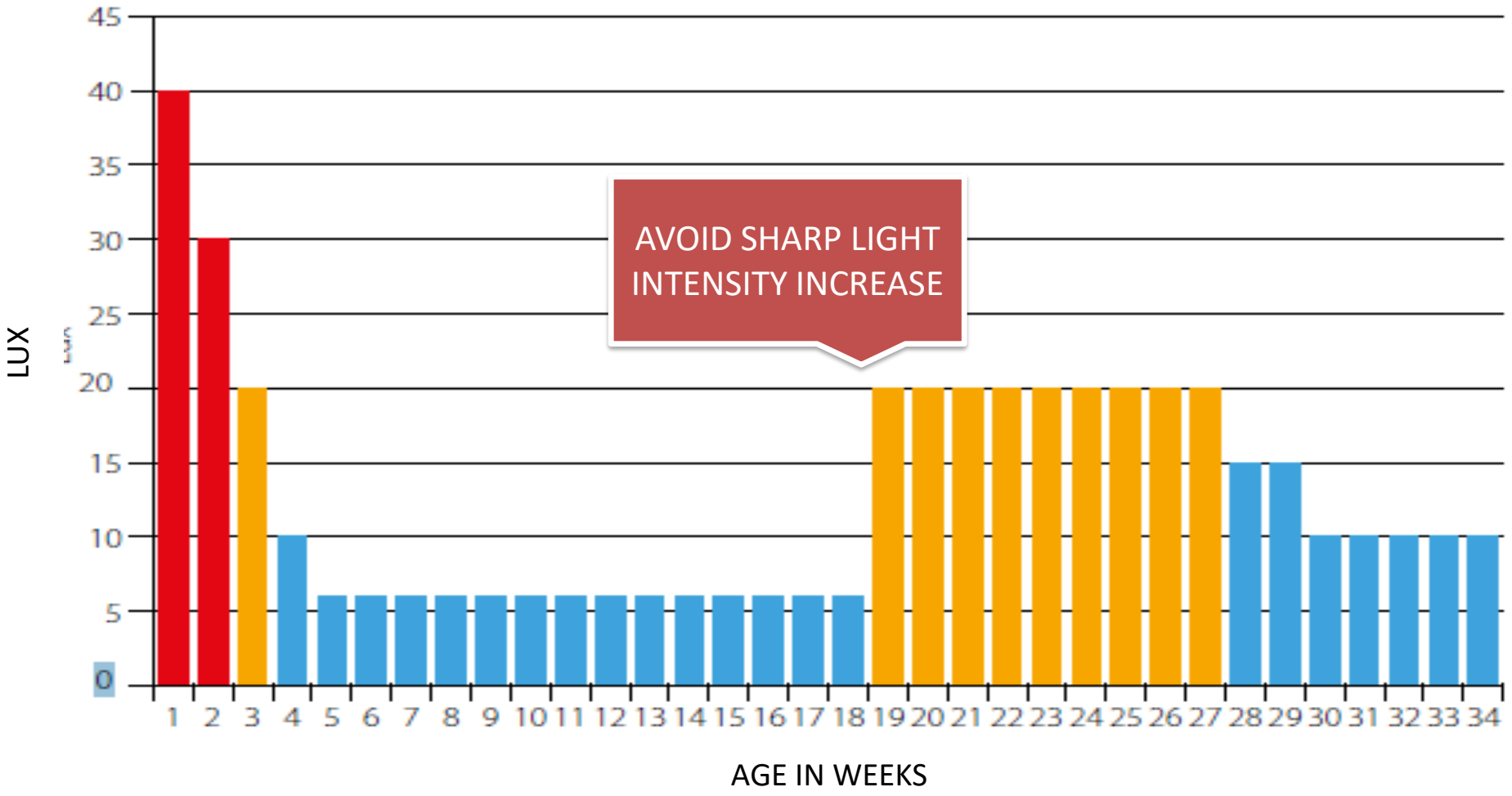
Ideal lighting intensity for layers in cages



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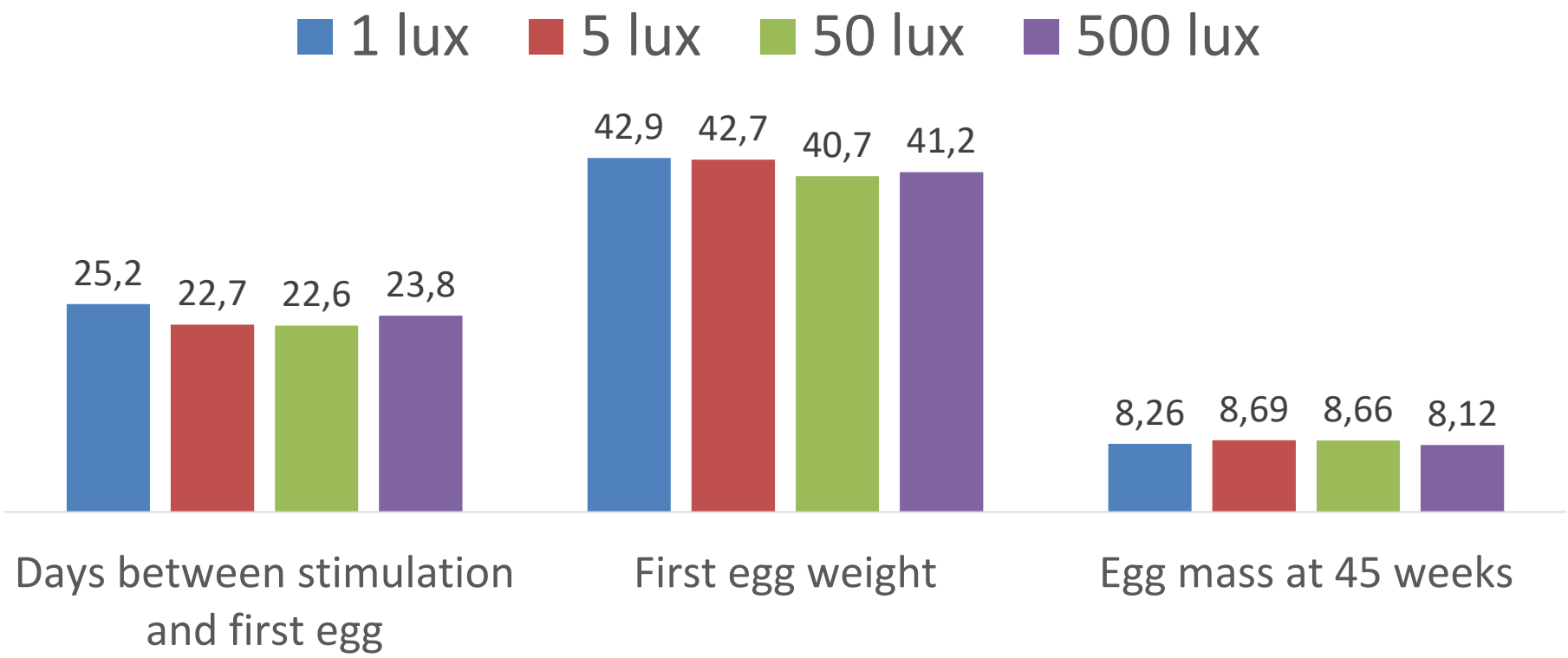
4 different layer breeds stimulated at different light intensity

Light Intensity



Fuente: Remena 2001

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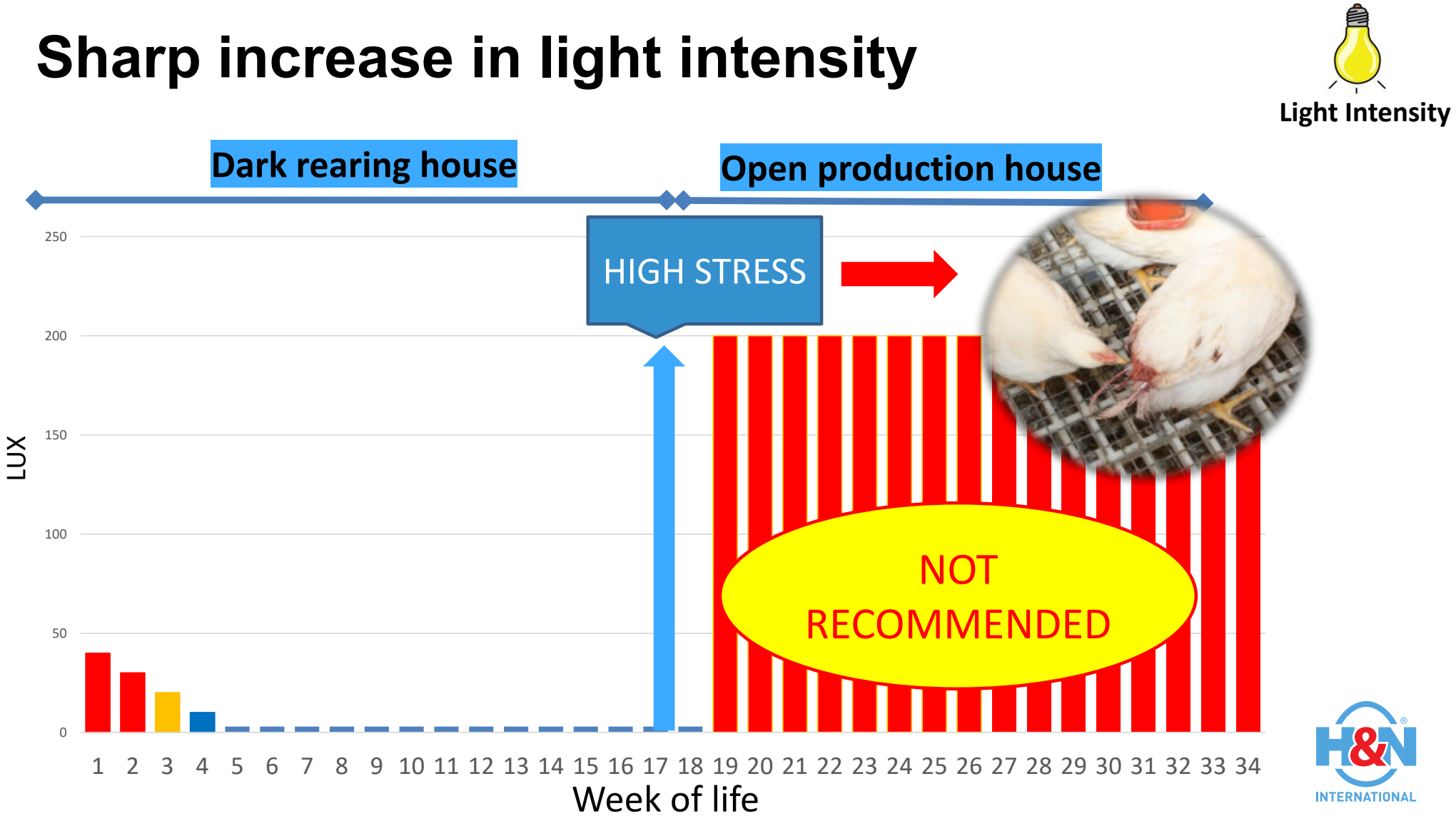
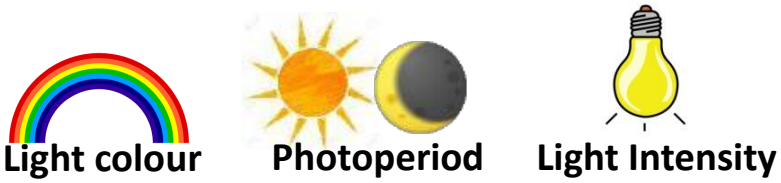
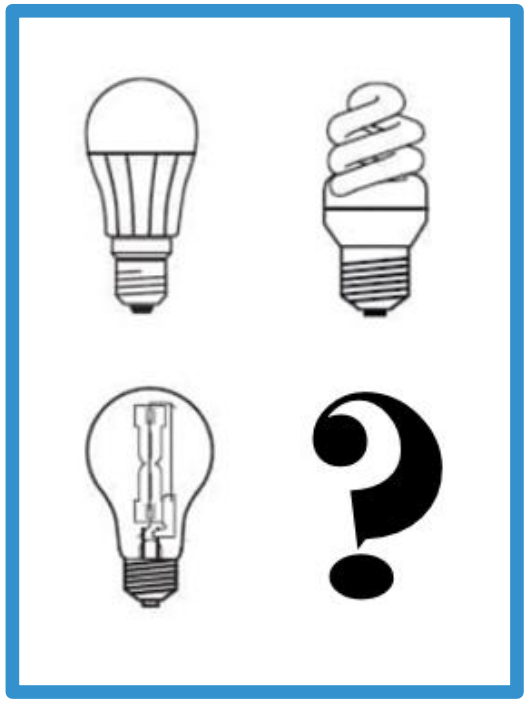
Sharp increase in light intensity



Take Aways



- Birds perceive color and frequency of light differently than humans
- Wrong color and frequency can be behind stress issues in birds
- Lighting program is the only way to tell hens when to start production
- Light intensity increases hen activity and should therefore be kept low in productior
- Avoid sharp increase in light intensity



What kind of lamps I should use?

- More than one option is available and right but:
- Warm ligth (2700 K)
- No flickering (> 200 Hz or constant)