Lighting Program for Laying Hens

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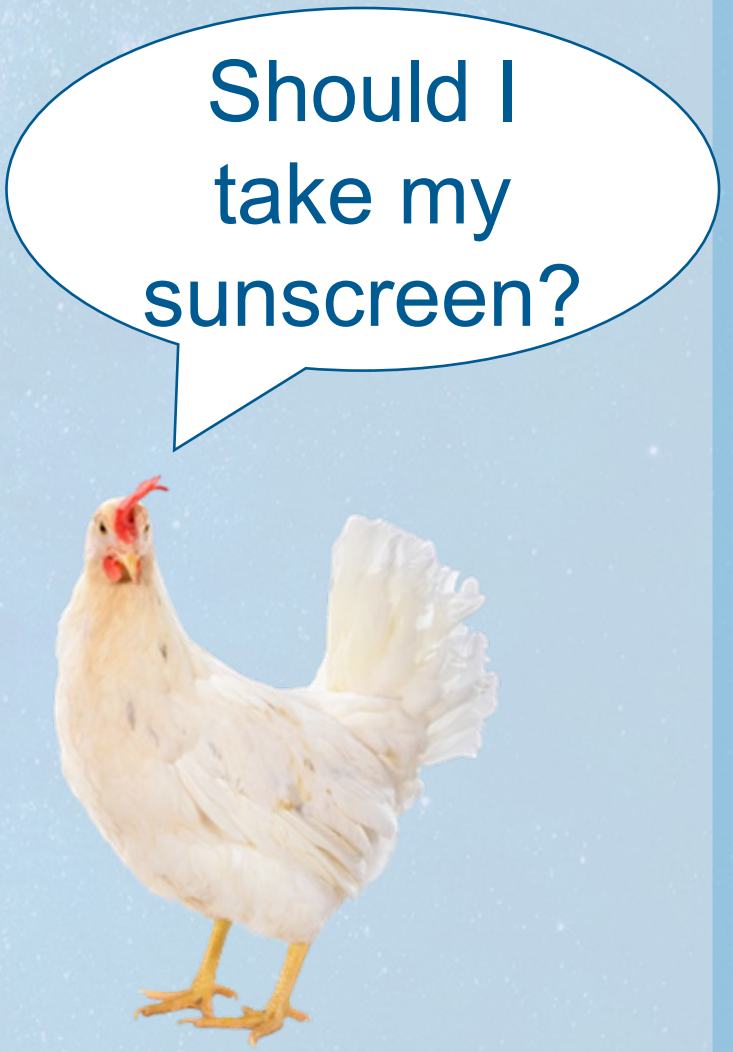
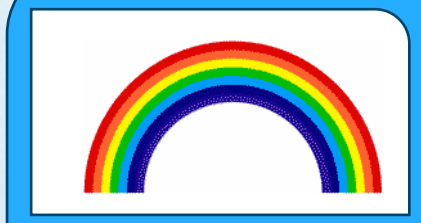
This is about

- ✓ 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



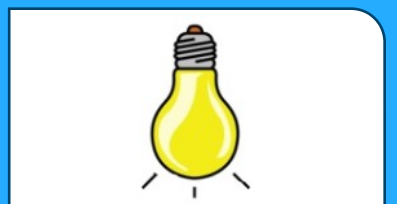
4 Aspects of light and how they affect layers



Light color

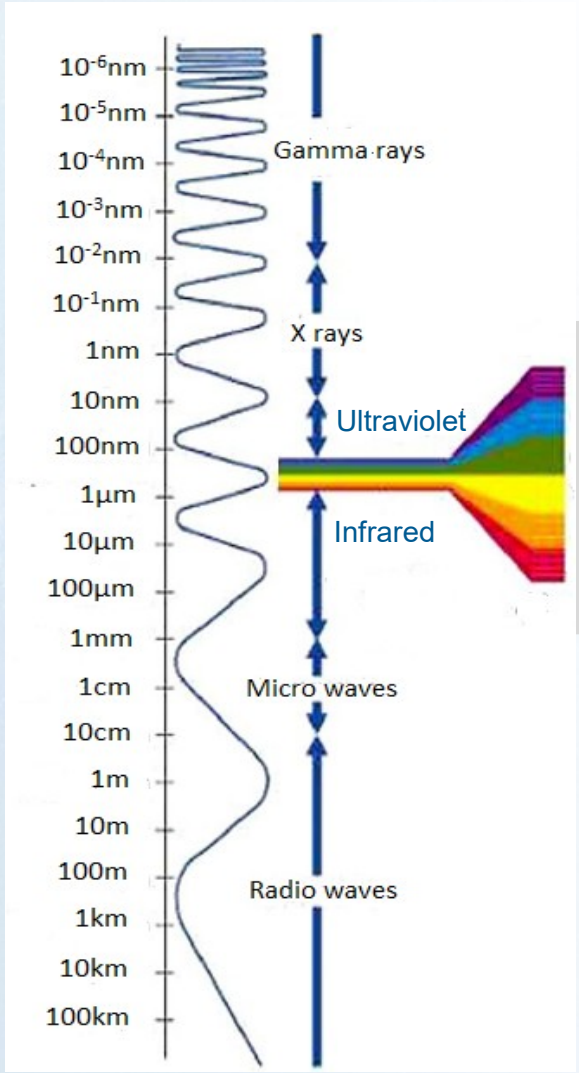
Frequency

Photoperiod

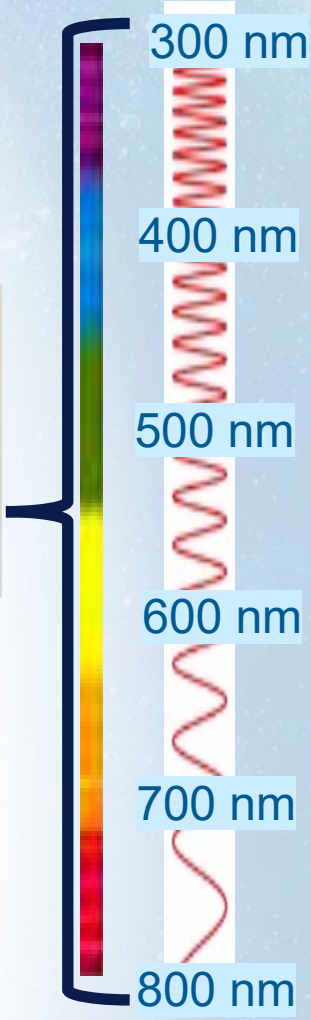


Intensity

4 Aspects of light



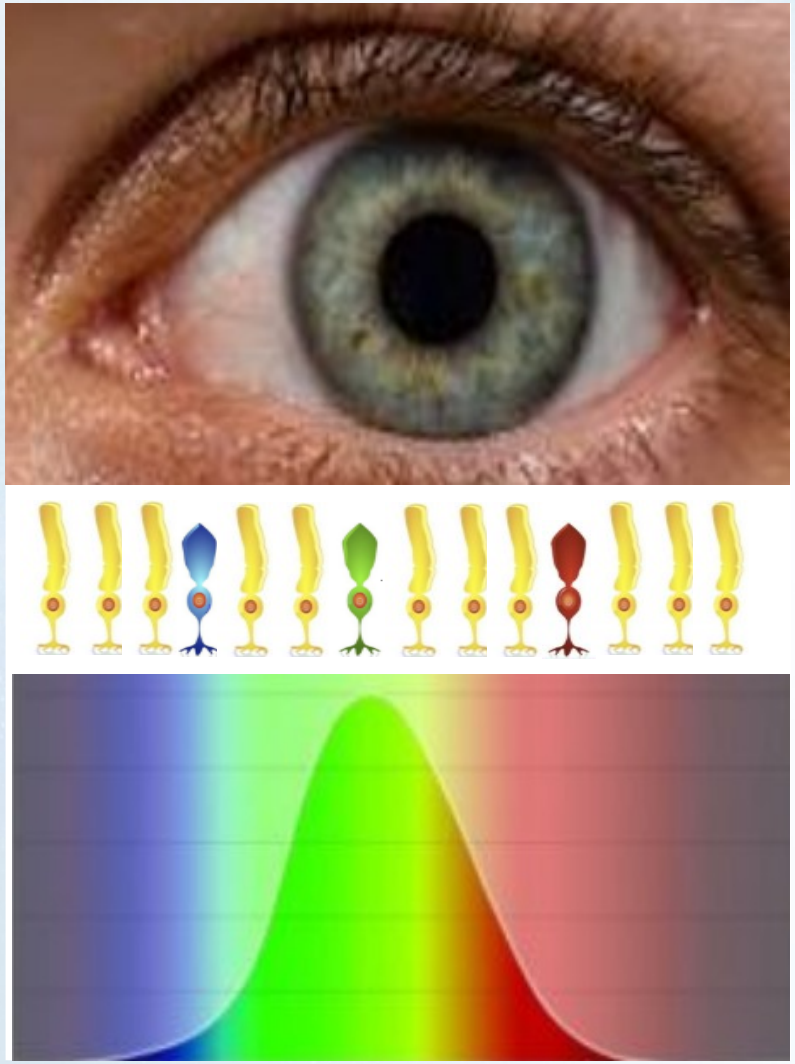
Light = perceivable portion of electromagnetic radiation

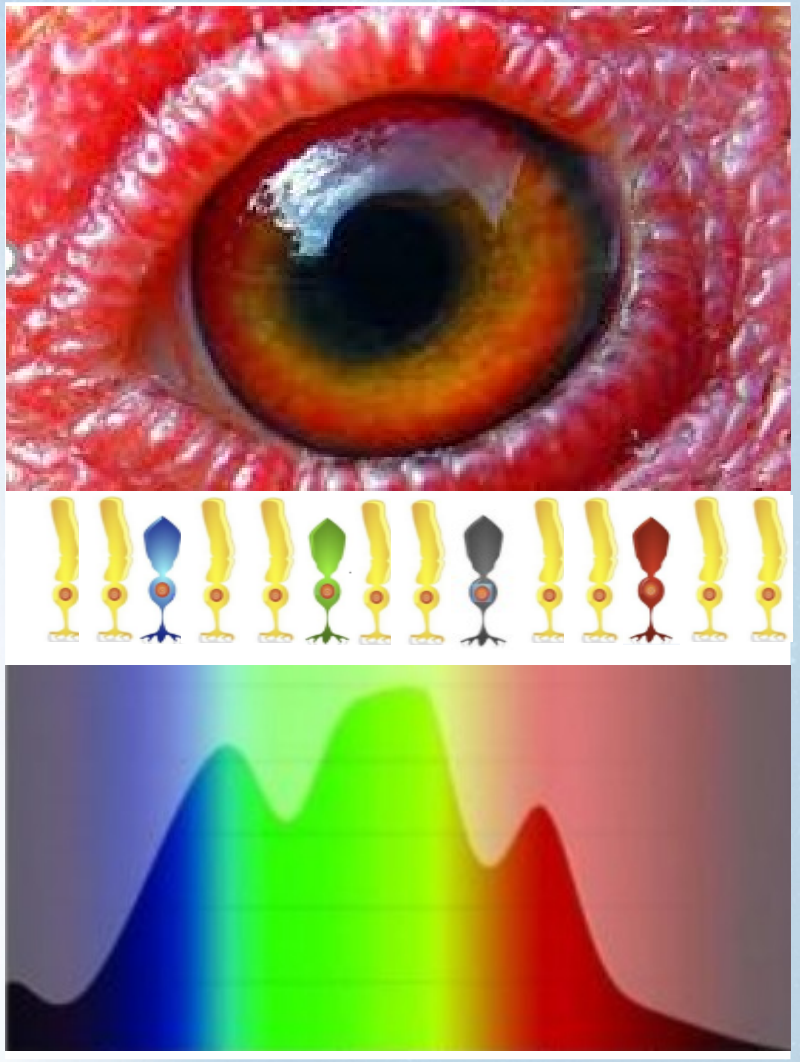


The color of light depends on the radiation wavelength

BUT it is noted in Kelvin

The photopic vision spectrum

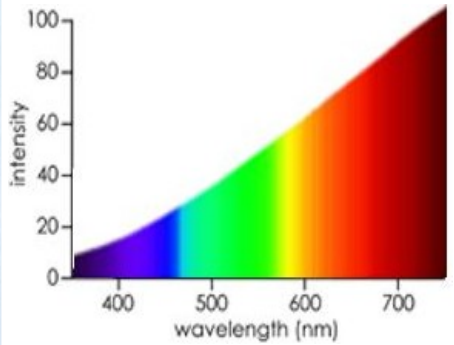




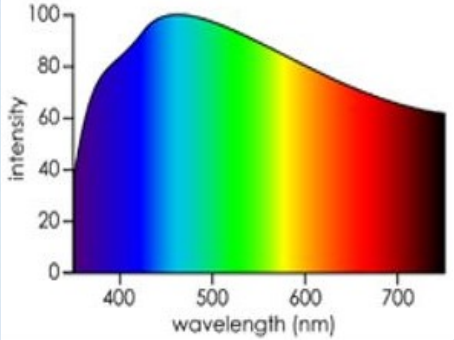
Emitted light color by different sources

SUNLIGHT

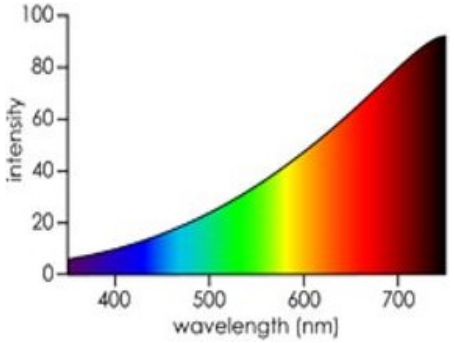
Sunset



Noon

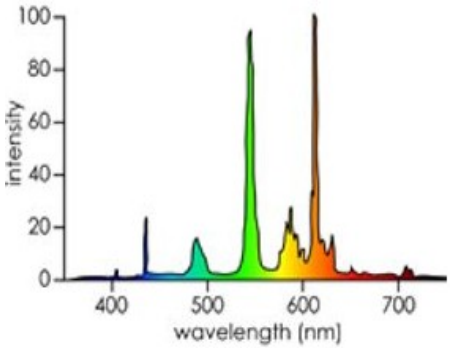


INCANDESCENT

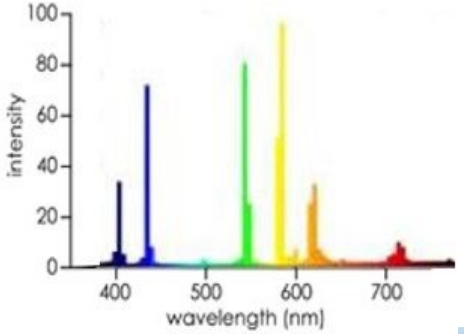


FLUORESCENT

Warm

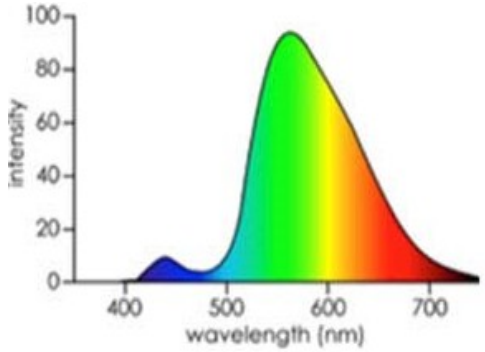


Cool

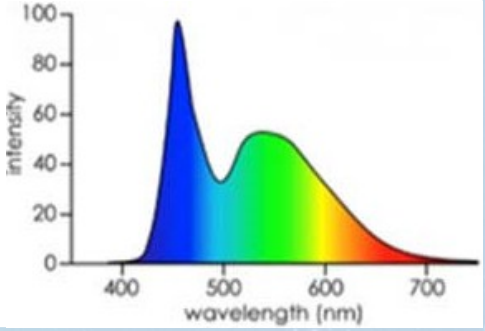


LED

Warm

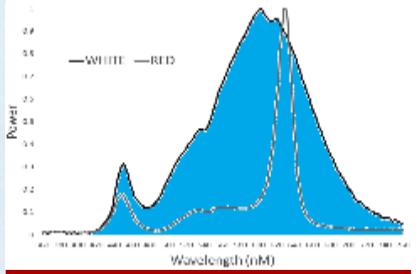


Cool

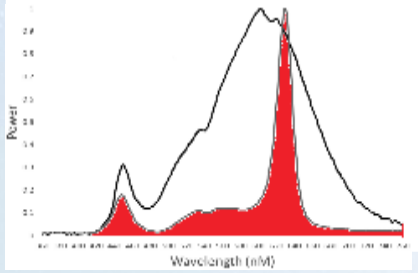


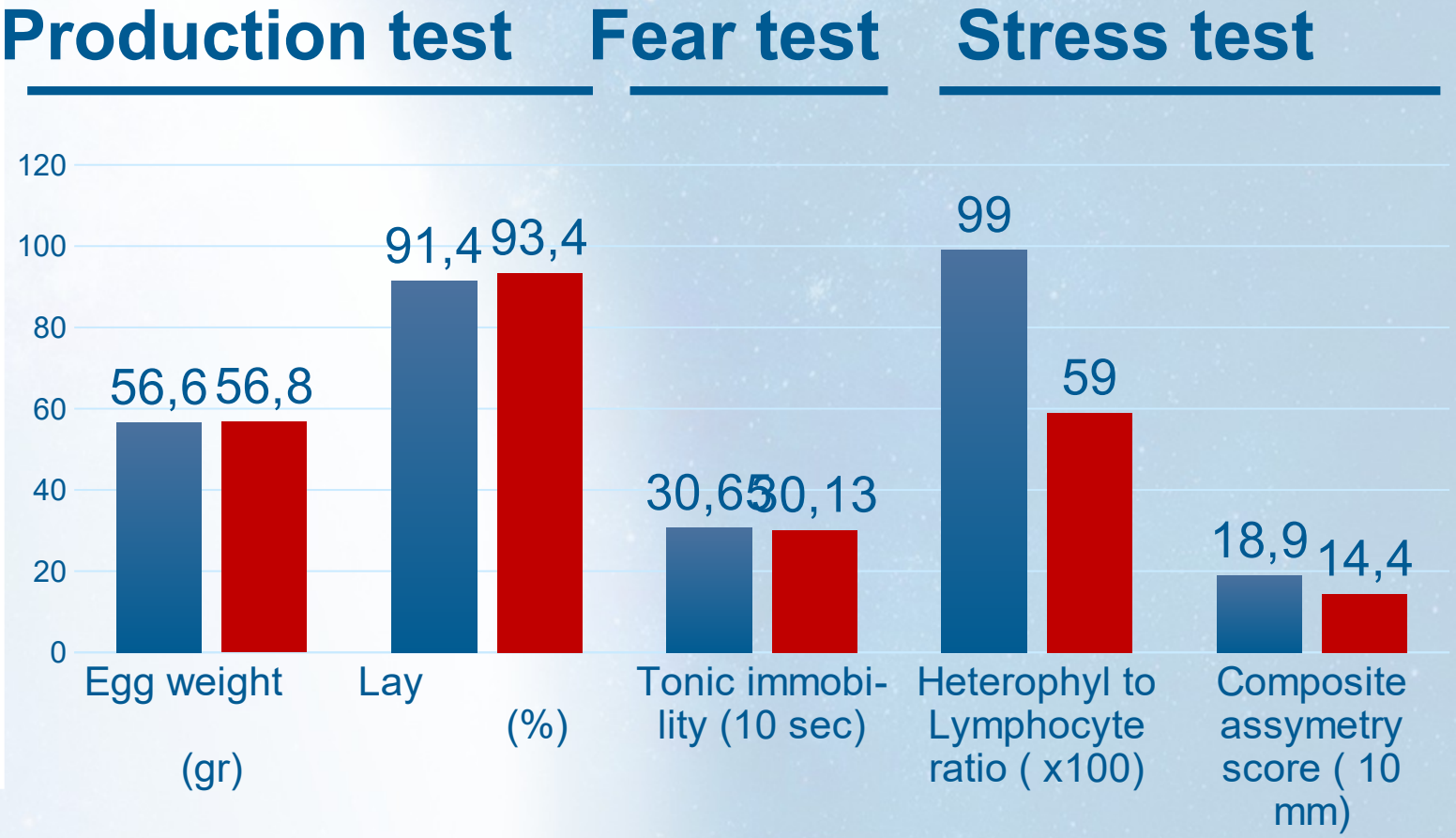
White hens exposed to different light color between 17 and 72 weeks of life

WHITE LED



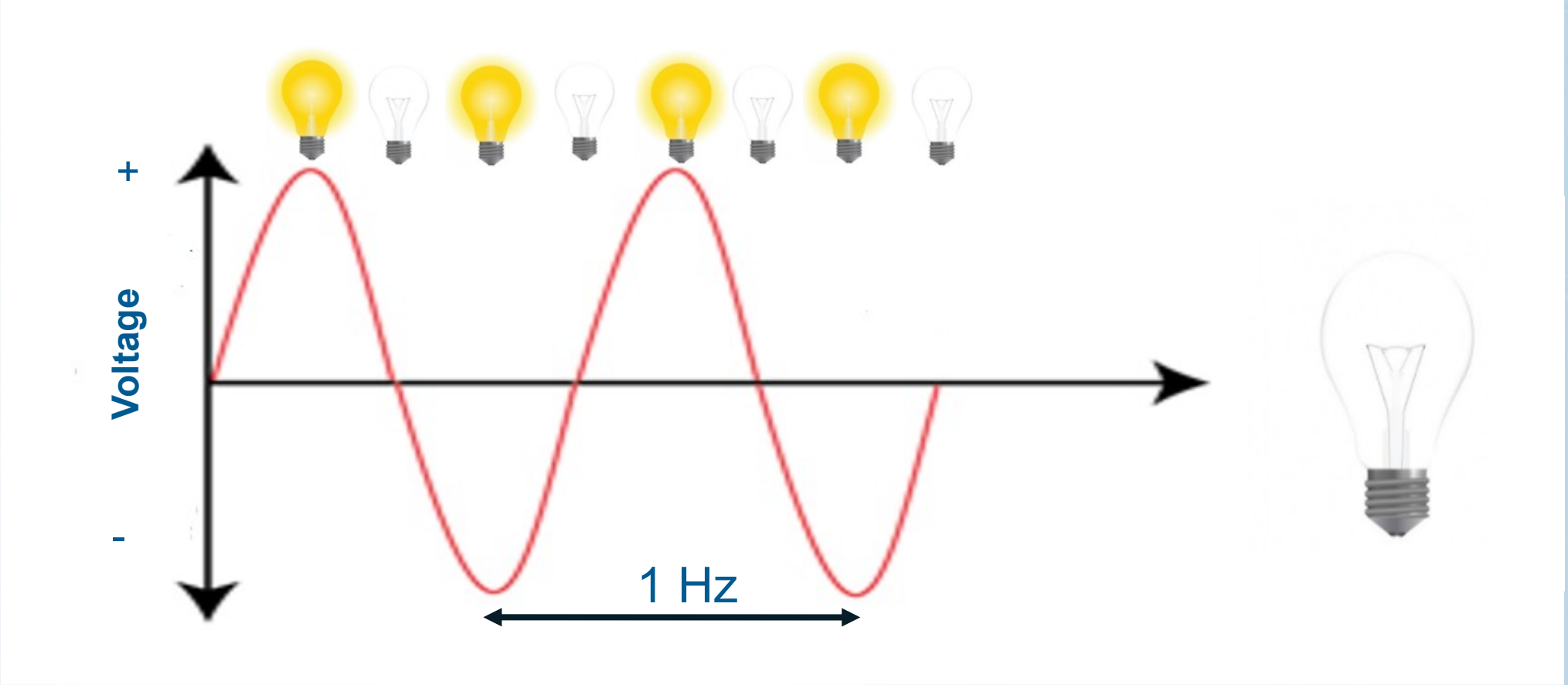
RED LED





Source:
Archer 2019

Light frequency



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

Vision Frequency and Retine Captation/s

24 -30 images per second

150 -220 images per second

Stress caused by flickering effect

24 -30 images per second

150 -220 images per second

Emitted light color by different sources

SUNLIGHT

INCANDESCENT

FLUORESCENT

LED

Constant

(60Hz)
Constant

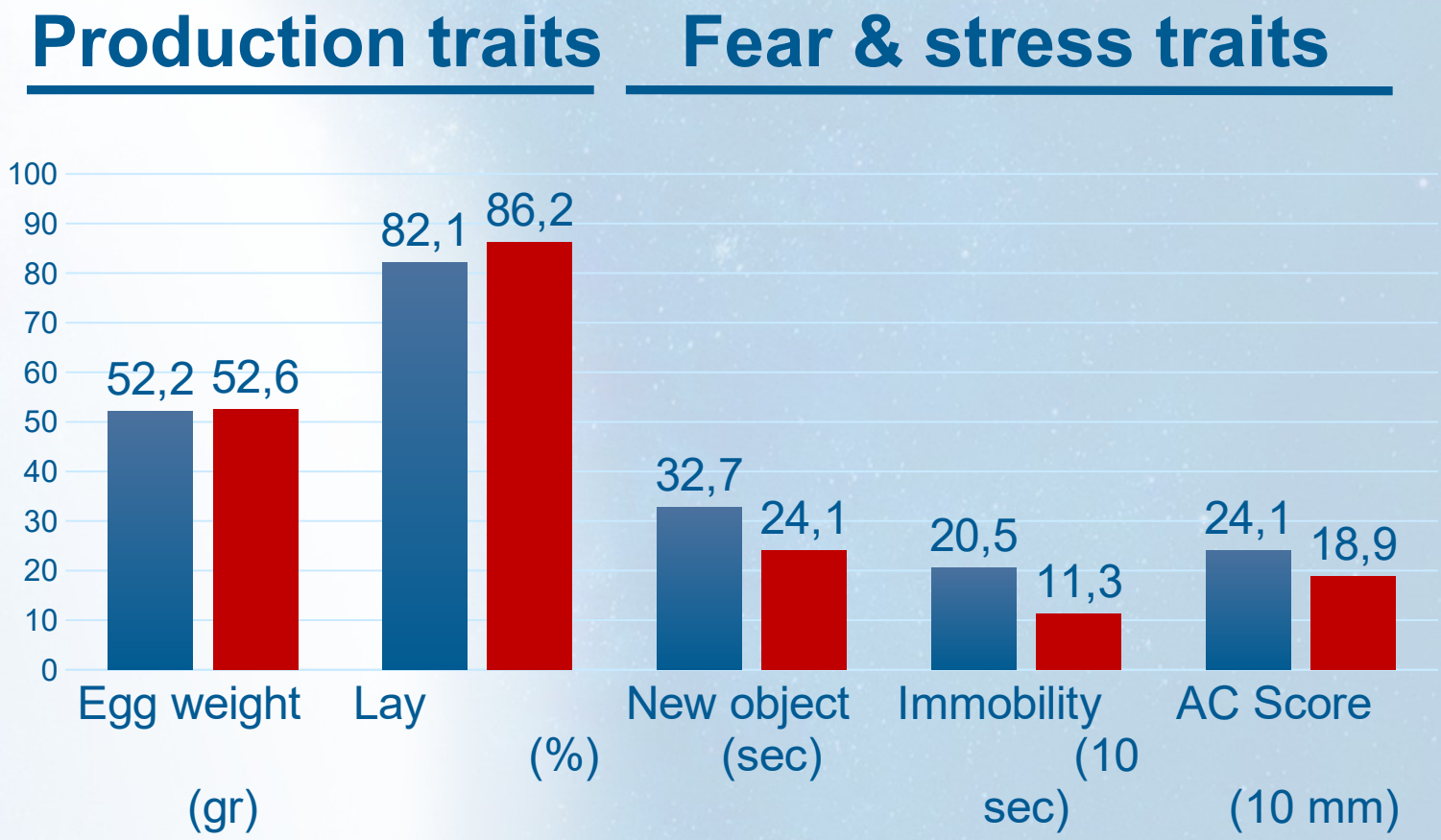
60 Hz –
2000 Hz

60Hz –
Constant

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

LED 3000K

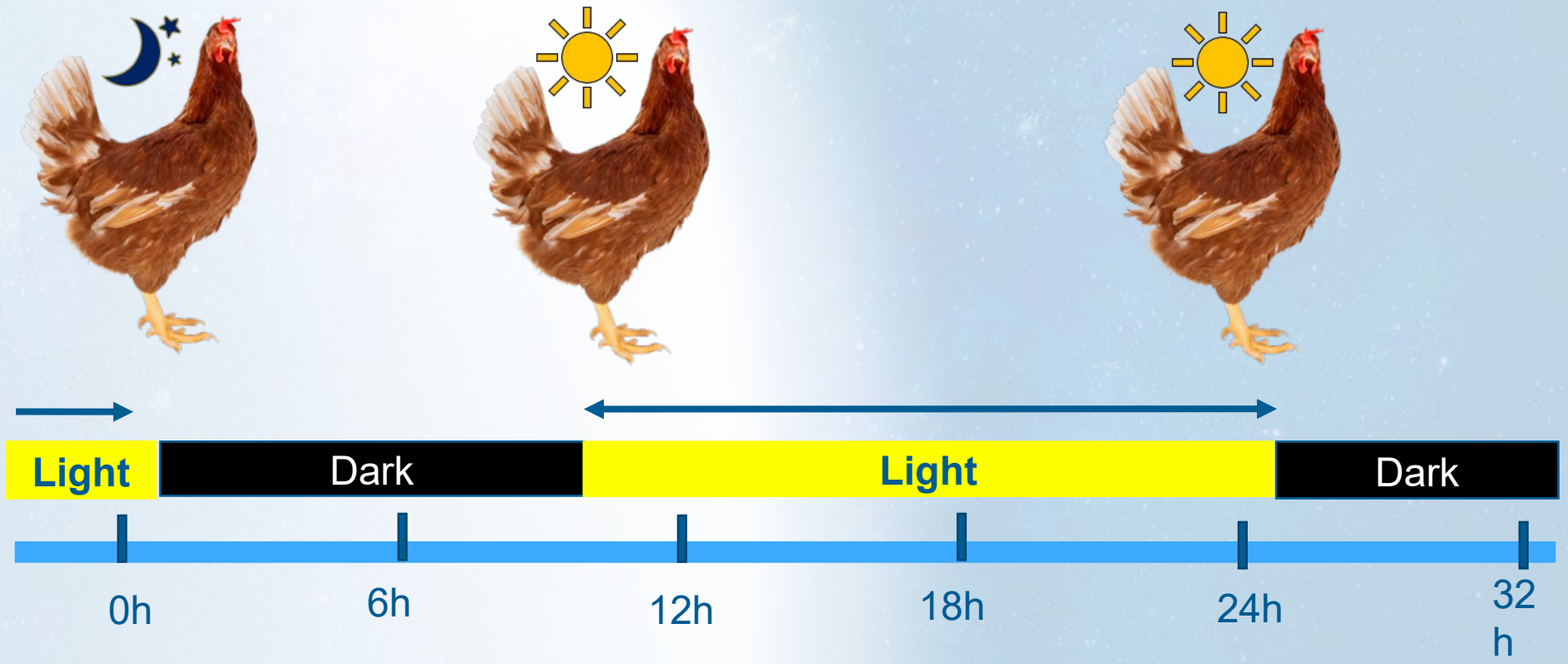
CFL 2700K



Source: Archer 2017

The Photoperiod:

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



In Nature Laying is seasonal

When there will be food available for my chicks?

In spring and summer!

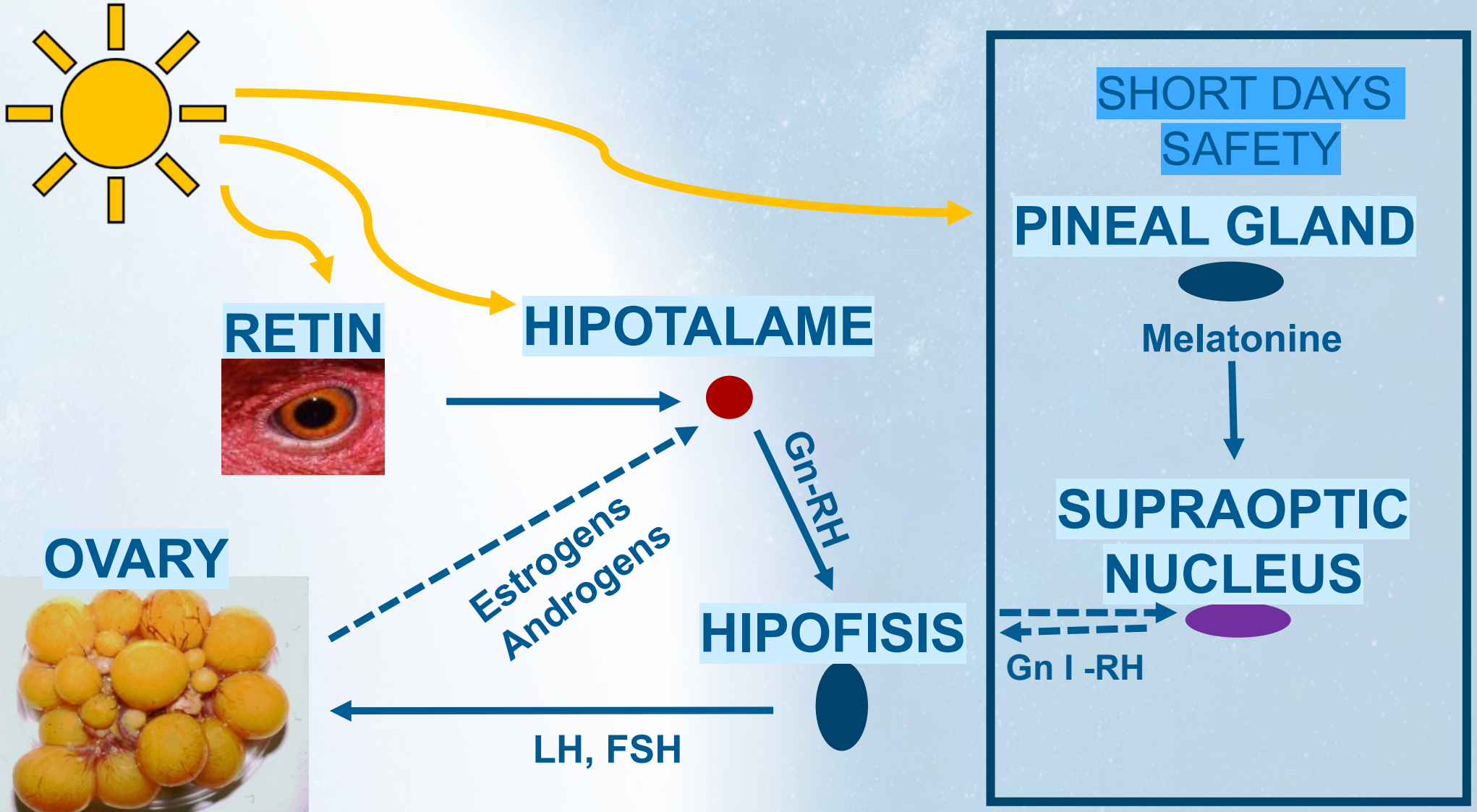
INCREASING PHOTOPERIOD
Stimulation for laying

DECREASING PHOTOPERIOD
No laying

In Farms: production is programmed

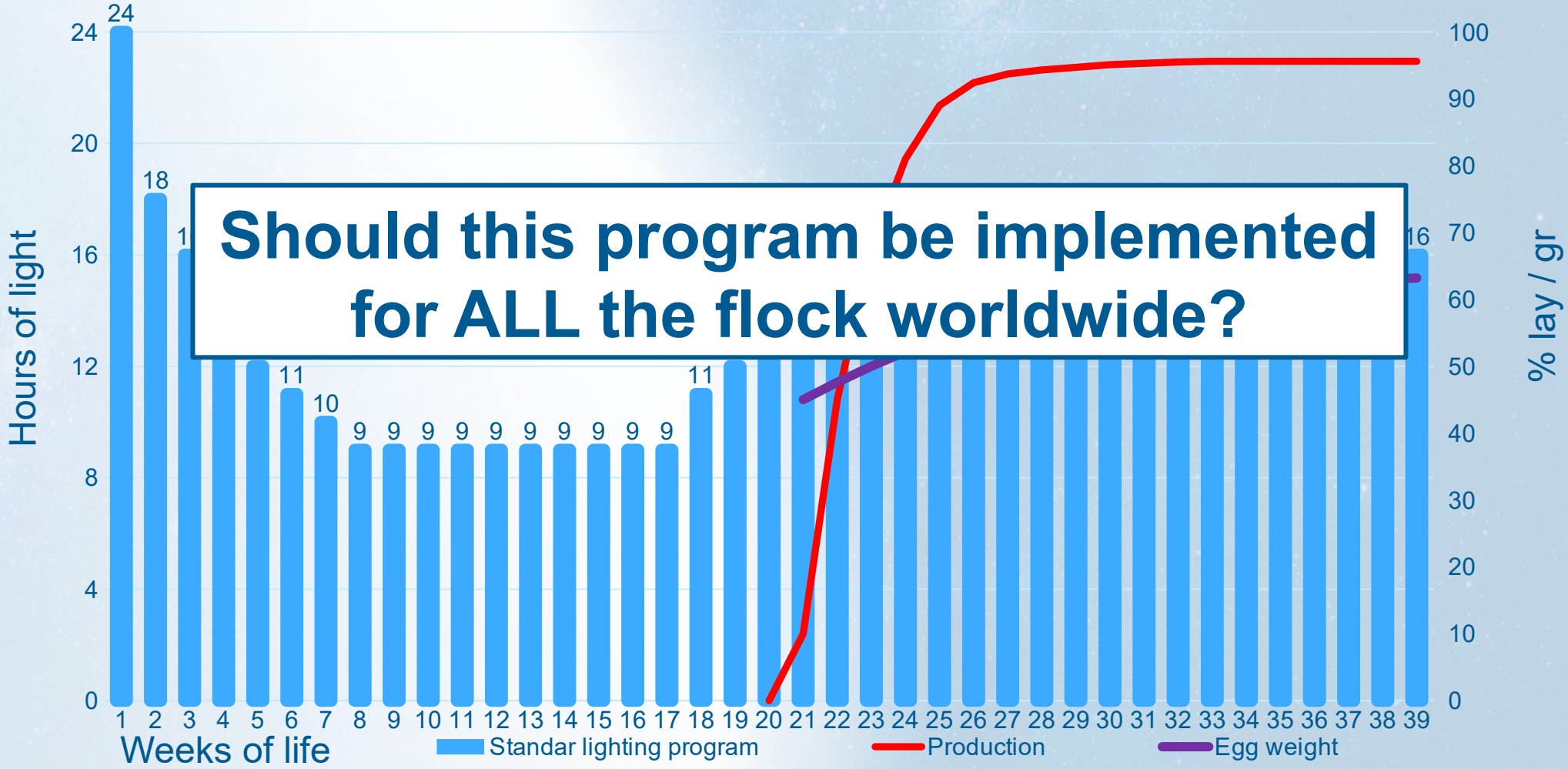
Lighting programs → **De-seasonalize** egg production

From light to hormones



Recommended lighting programs

Photoperiod

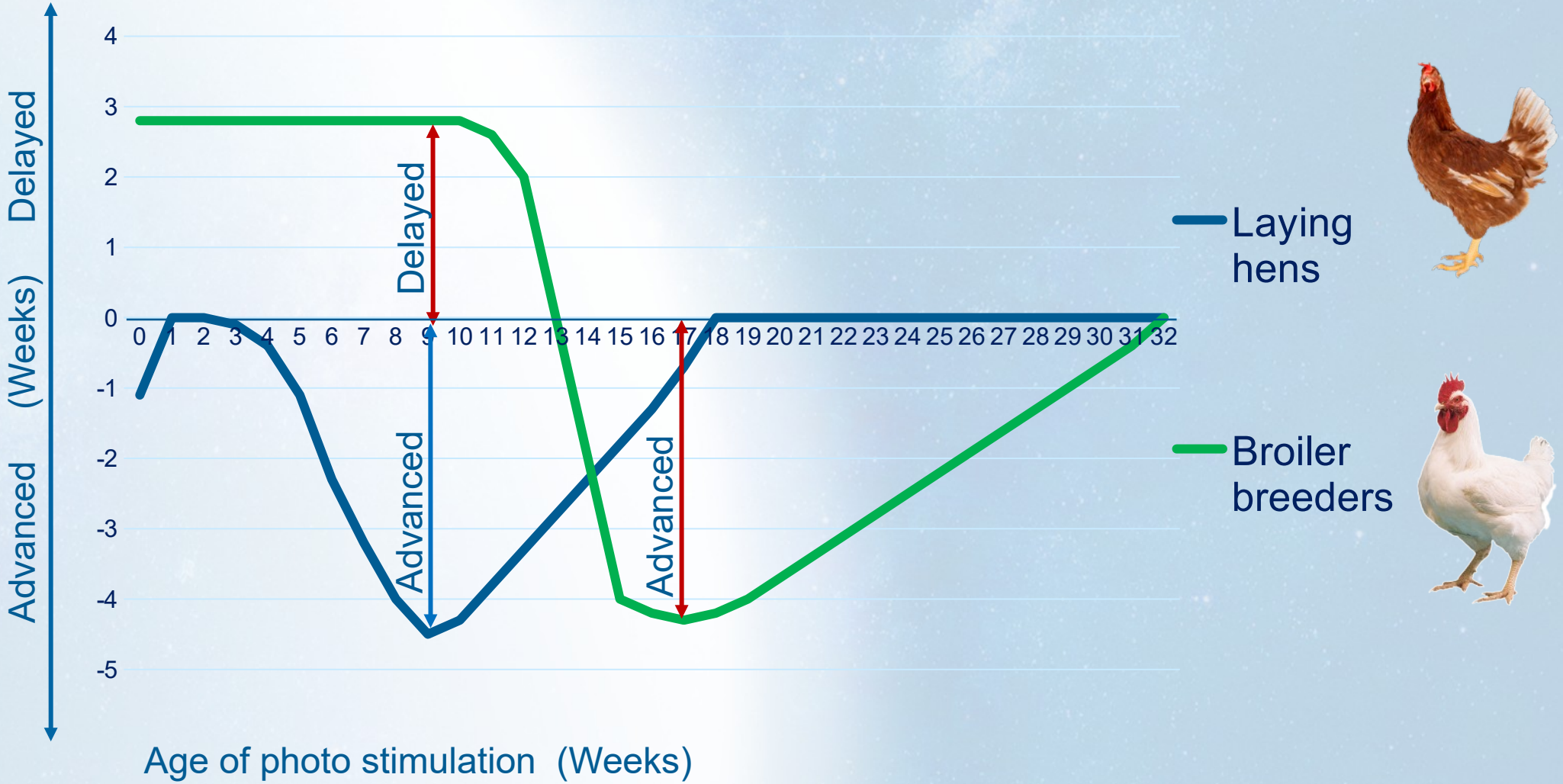


The same lighting program cannot be used worldwide

1. Effect of the natural light

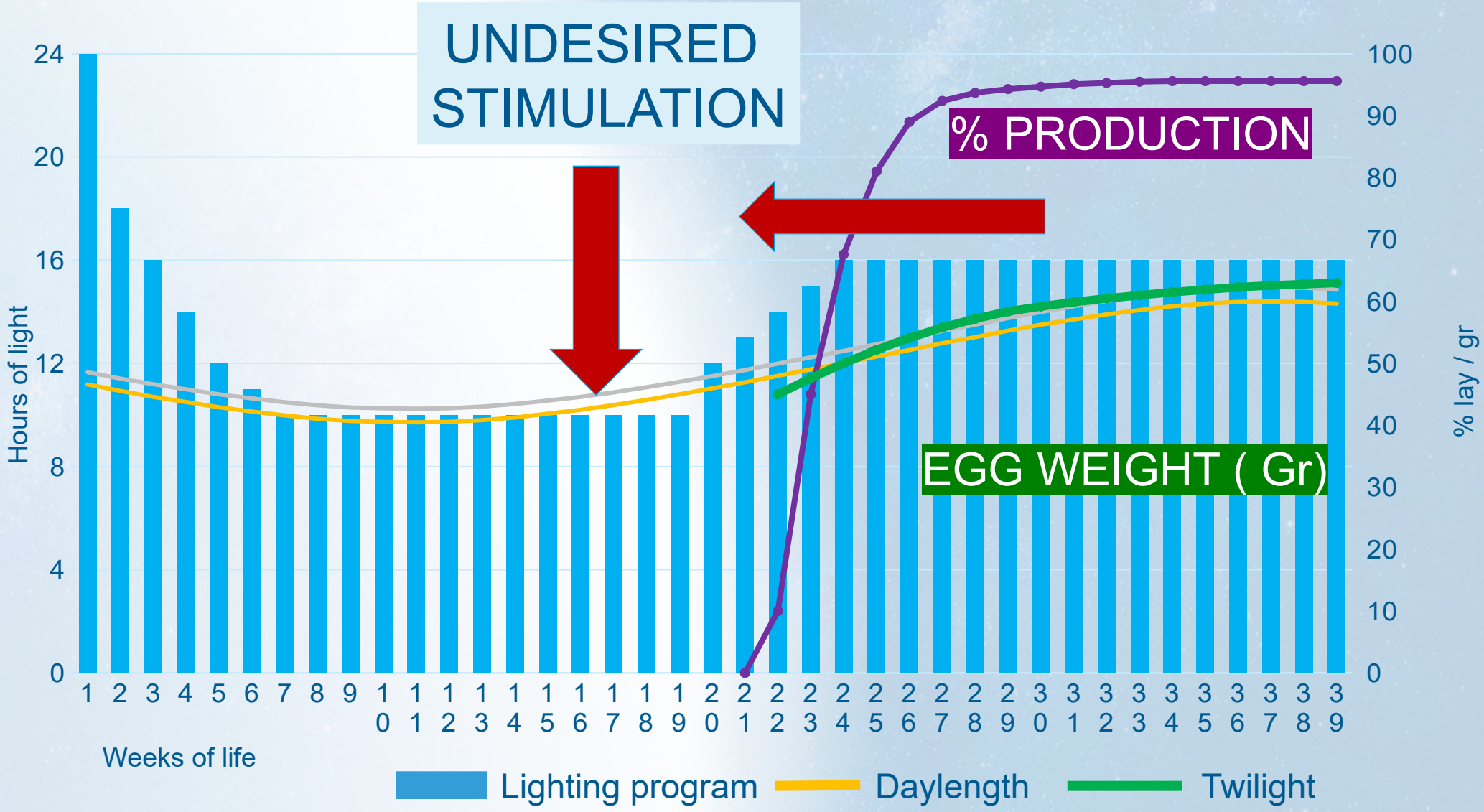
2. Possibility to adapt egg weight to different market demands by using the lighting program

Effect of photo stimulation during rearing



Source:
P. Lewis 2011

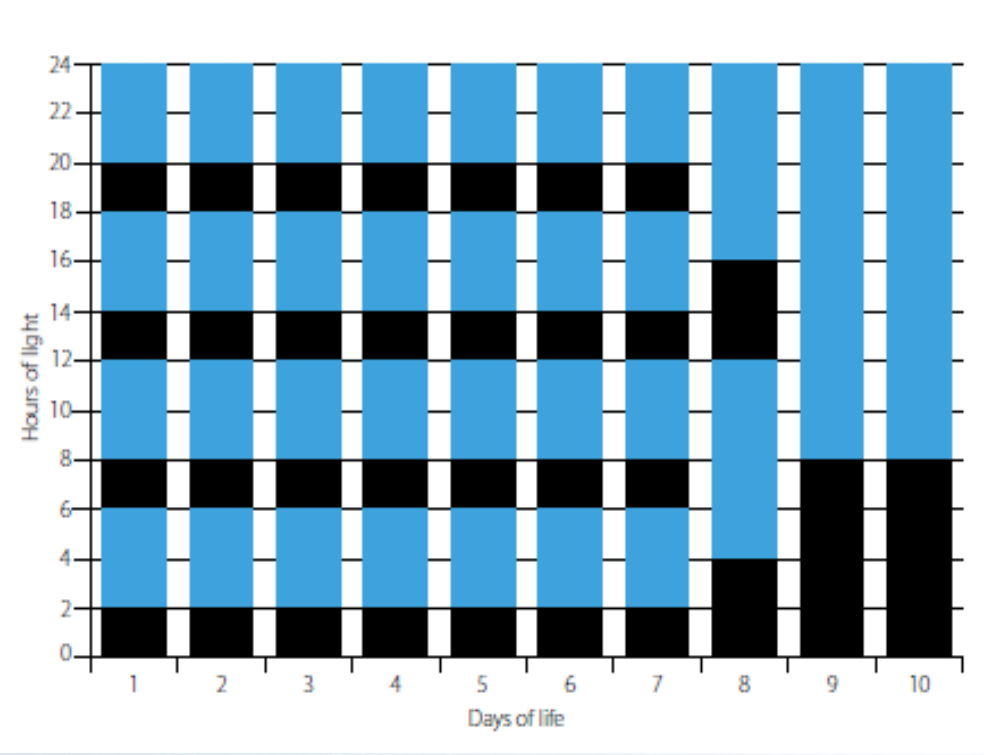
Natural Light Interferences



First, start correctly

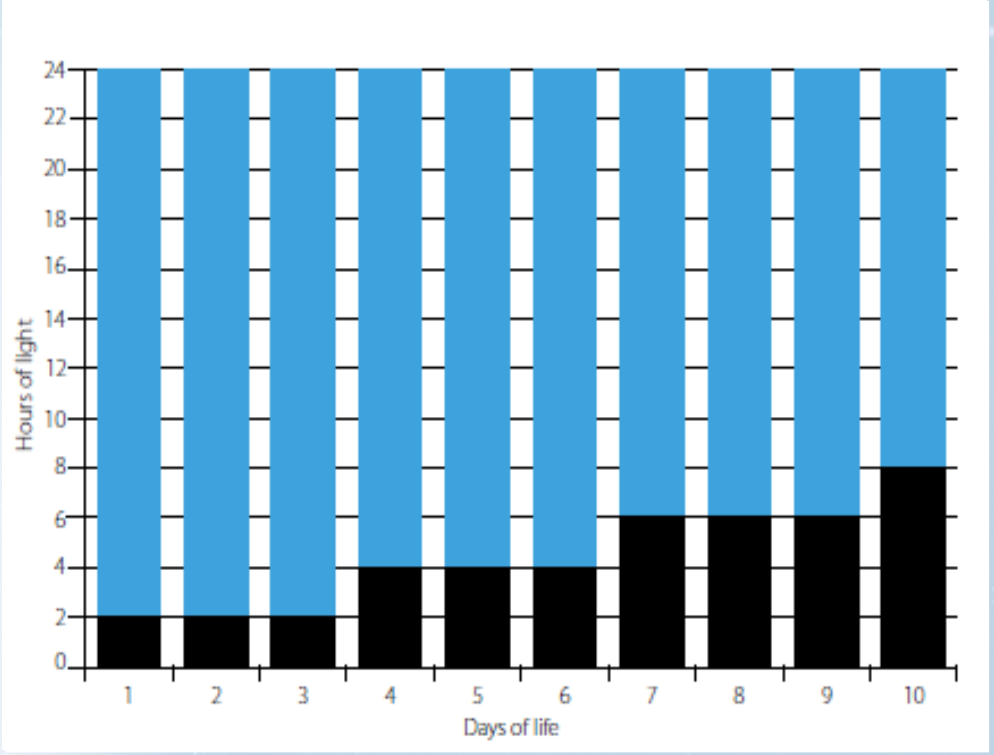
INTERMITTENT PROGRAM

- Better chick activity timing
- Better flock visualization



NON-INTERMITTENT PROGRAM

- Applicable in open houses
- No Interruption in staff work



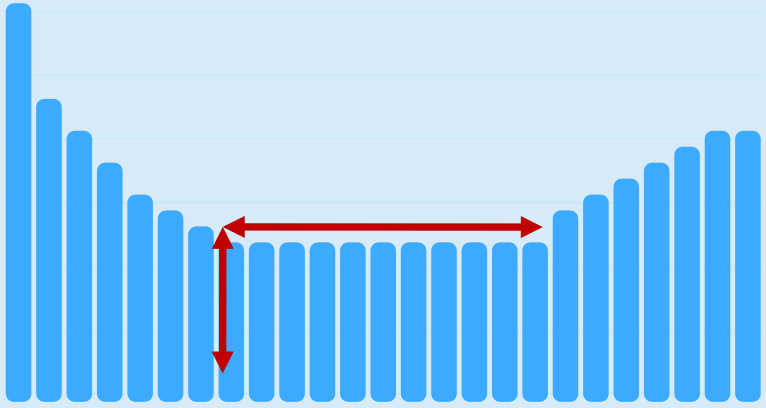
Then, set a right rearing light programm

1. Determine if your houses are light proof

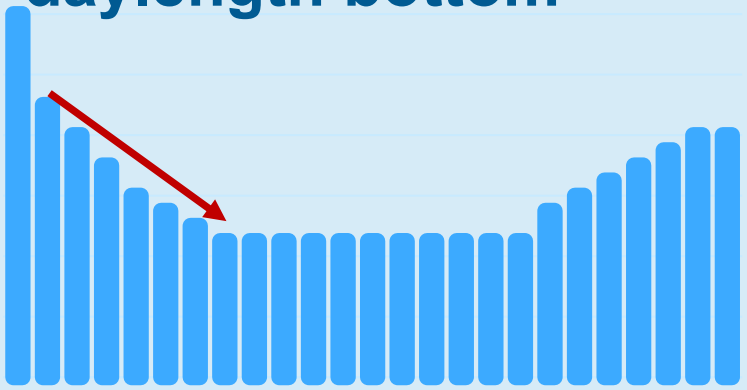
Or

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

3. Set the daylength bottom



4. Set the stepdown to the daylength bottom



1. Determine if your houses are light proof

Source: H&N International

Source: H&N International

Source: H&N International

And this ?

Source: H&N International

And now?

Inside house view

Lights off

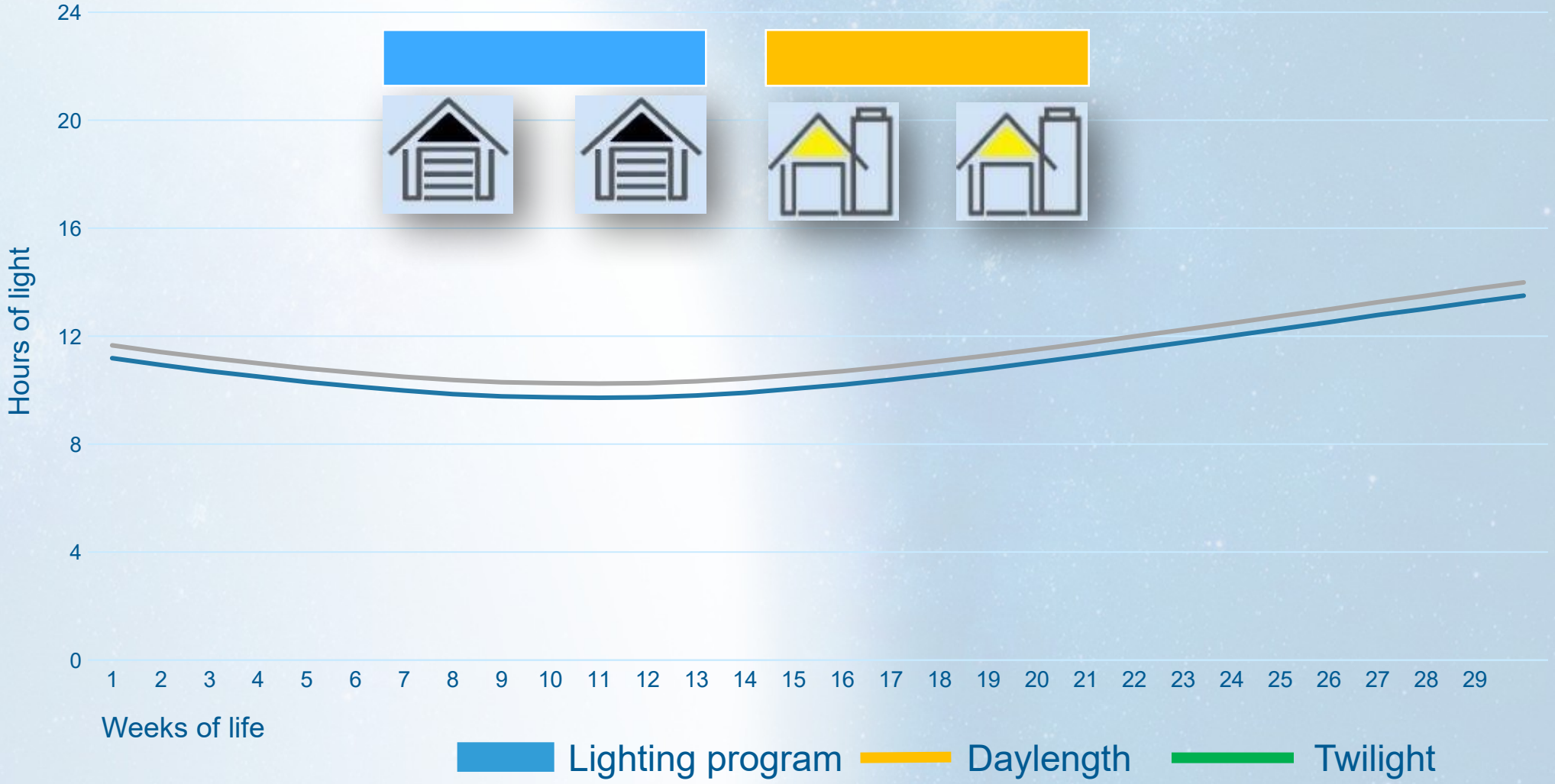
Less than 3 lux

Ventilation on

2. Limitation due to type of housing

REARING	PRODUCTION	LIMITATION
		None
		Lighting program photoperiod at transfer should match with natural daylength
		Lighting program bottom = o > than the maximum natural daylength at the programmed stimulation week
		

Example of a lighting program bottom during increasing natural daylength



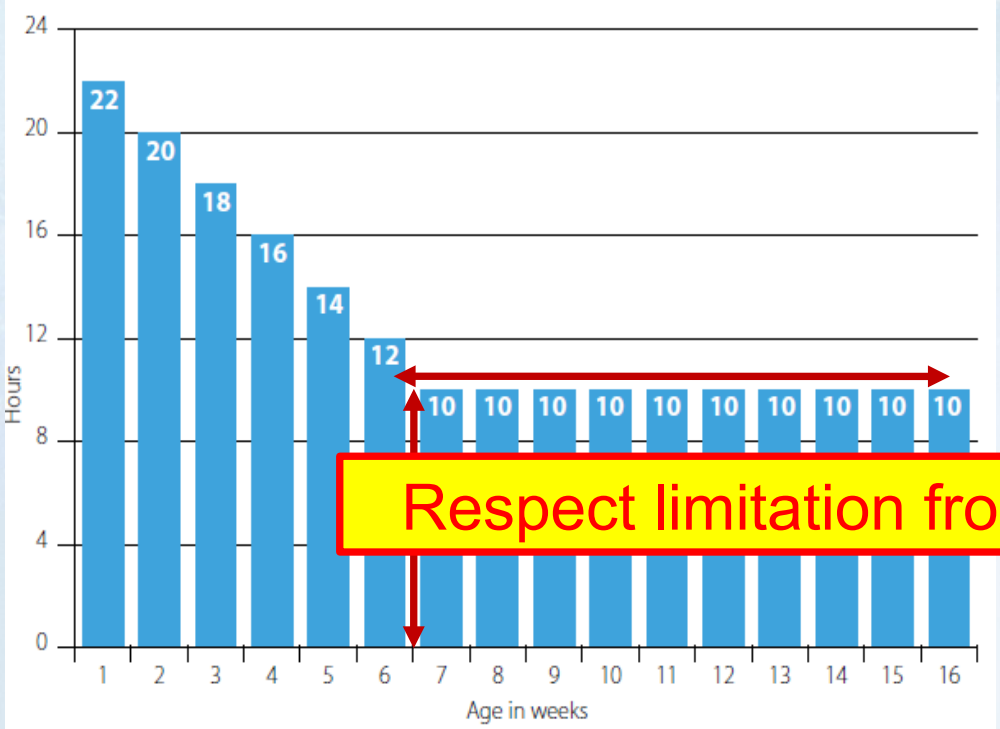
3. Set the daylength bottom

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

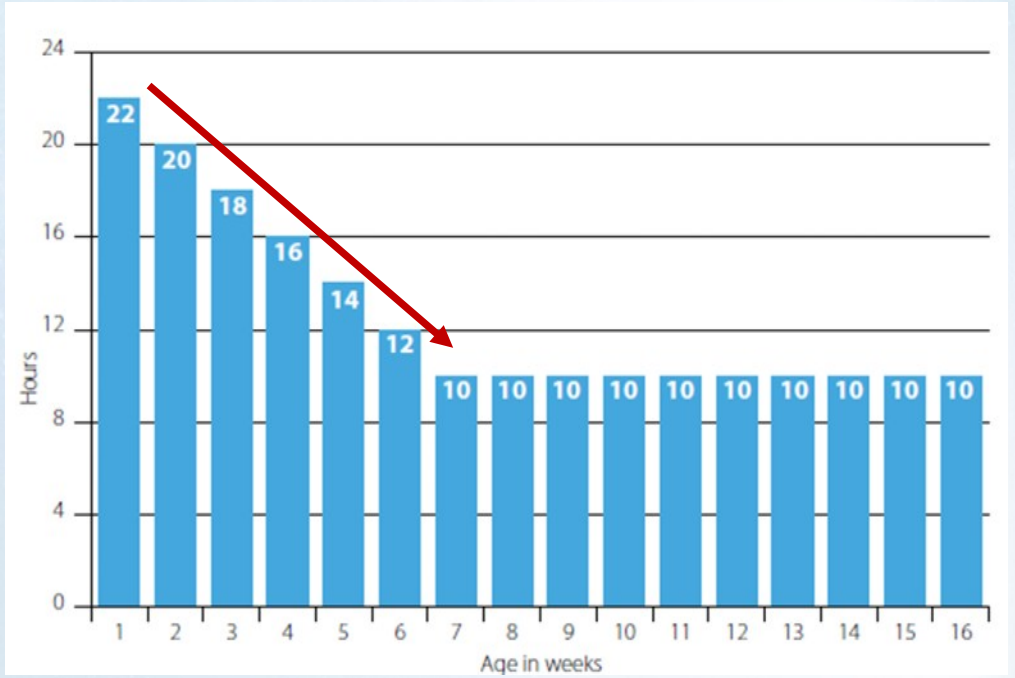
4. Set the stepdown to daylength bottom

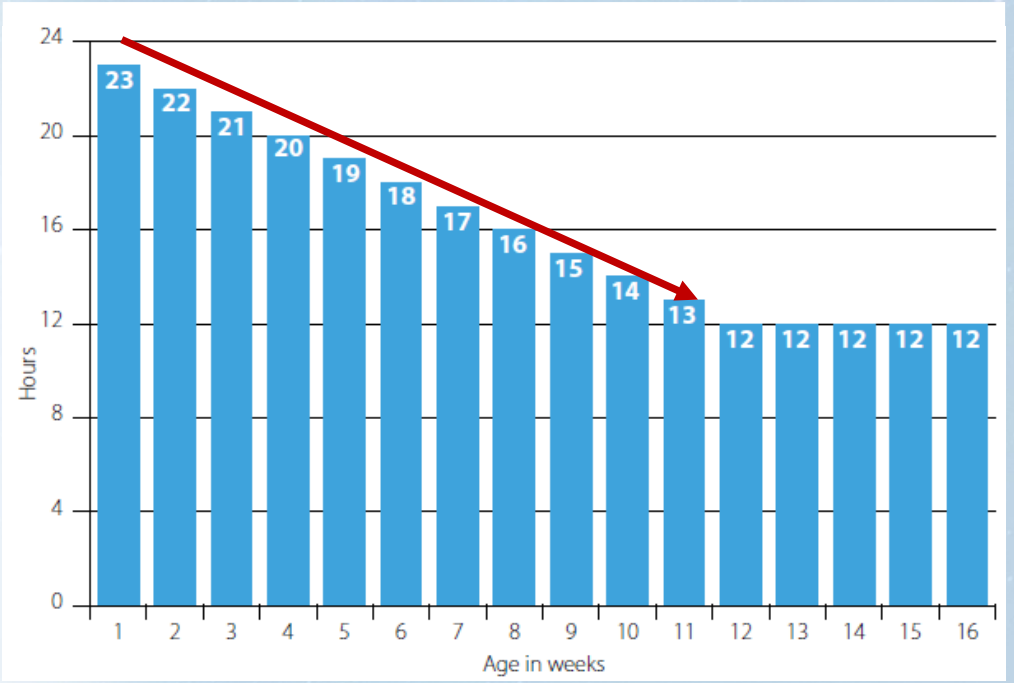
FAST STEPBACK (-2 Hours /w)

- Higher sensitivity to light
- Faster start in production

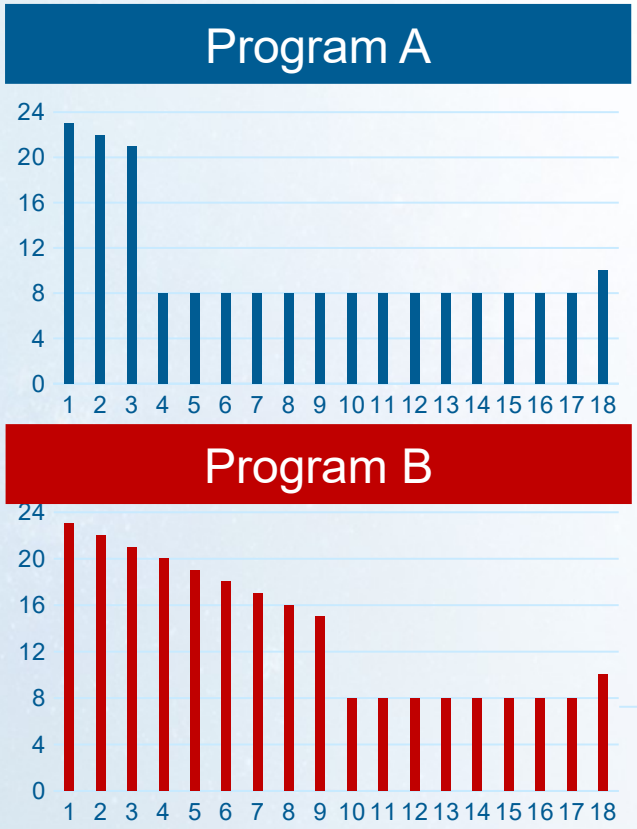
SLOW STEPBACK (-1 Hours /w)

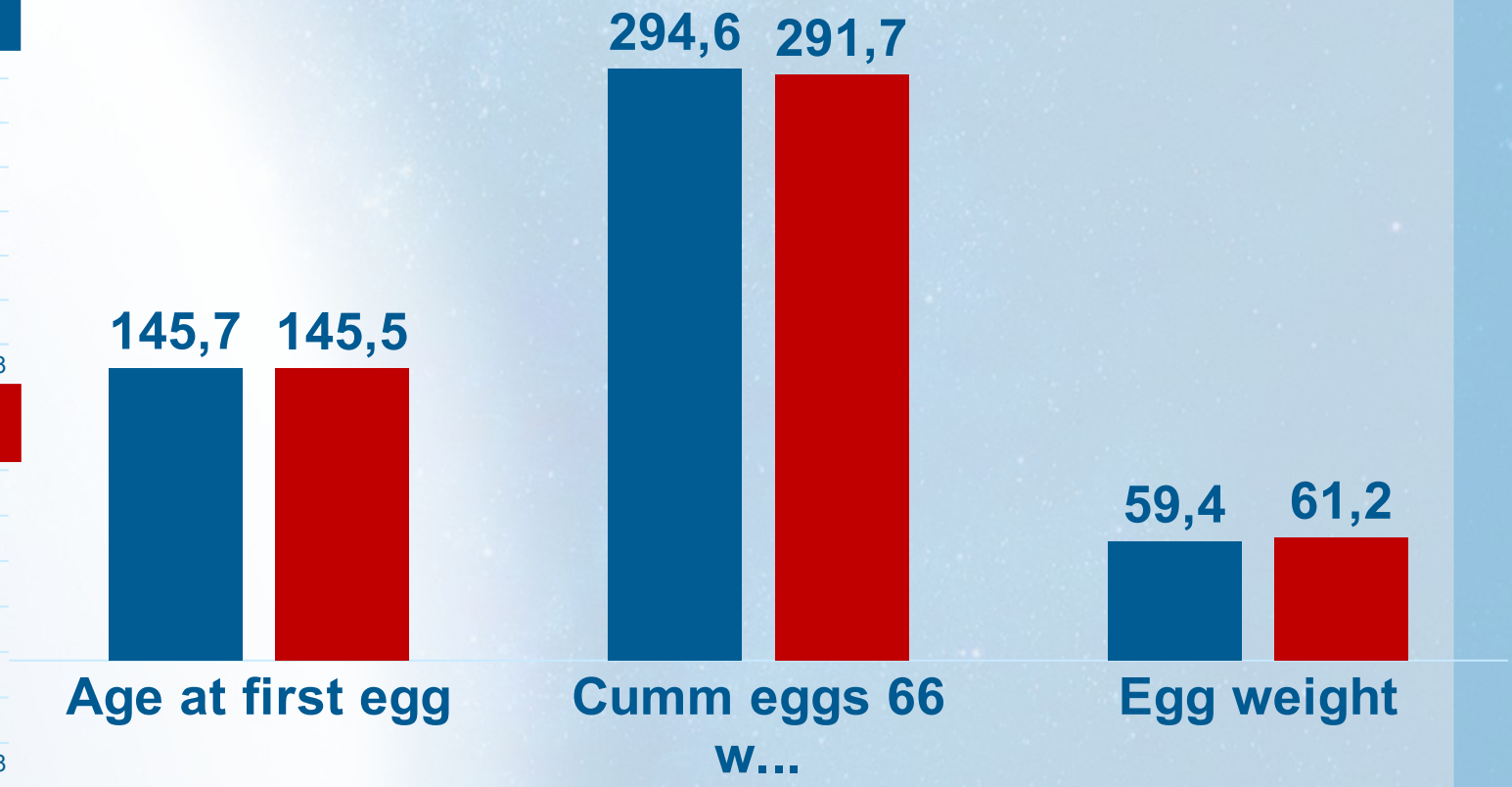
- Bigger egg size in production
- More time for feed intake





White hens receiving different light drop programs in rearing





Soruce:
Leeson 2005

What stimulates the hens to start laying?

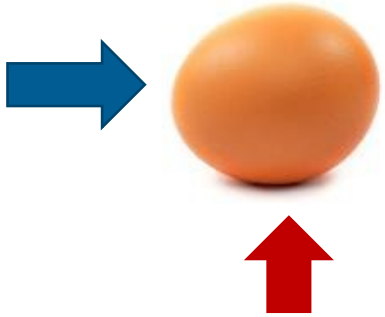
Birds are exposed to an increasing photoperiod

Birds reach appropriate body weight

Setting the right stimulation program

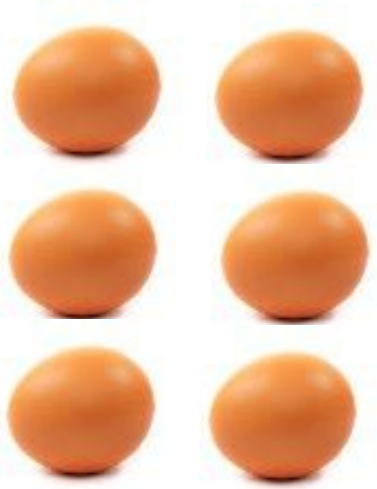
Egg mass

= Eggs number
x average egg weight



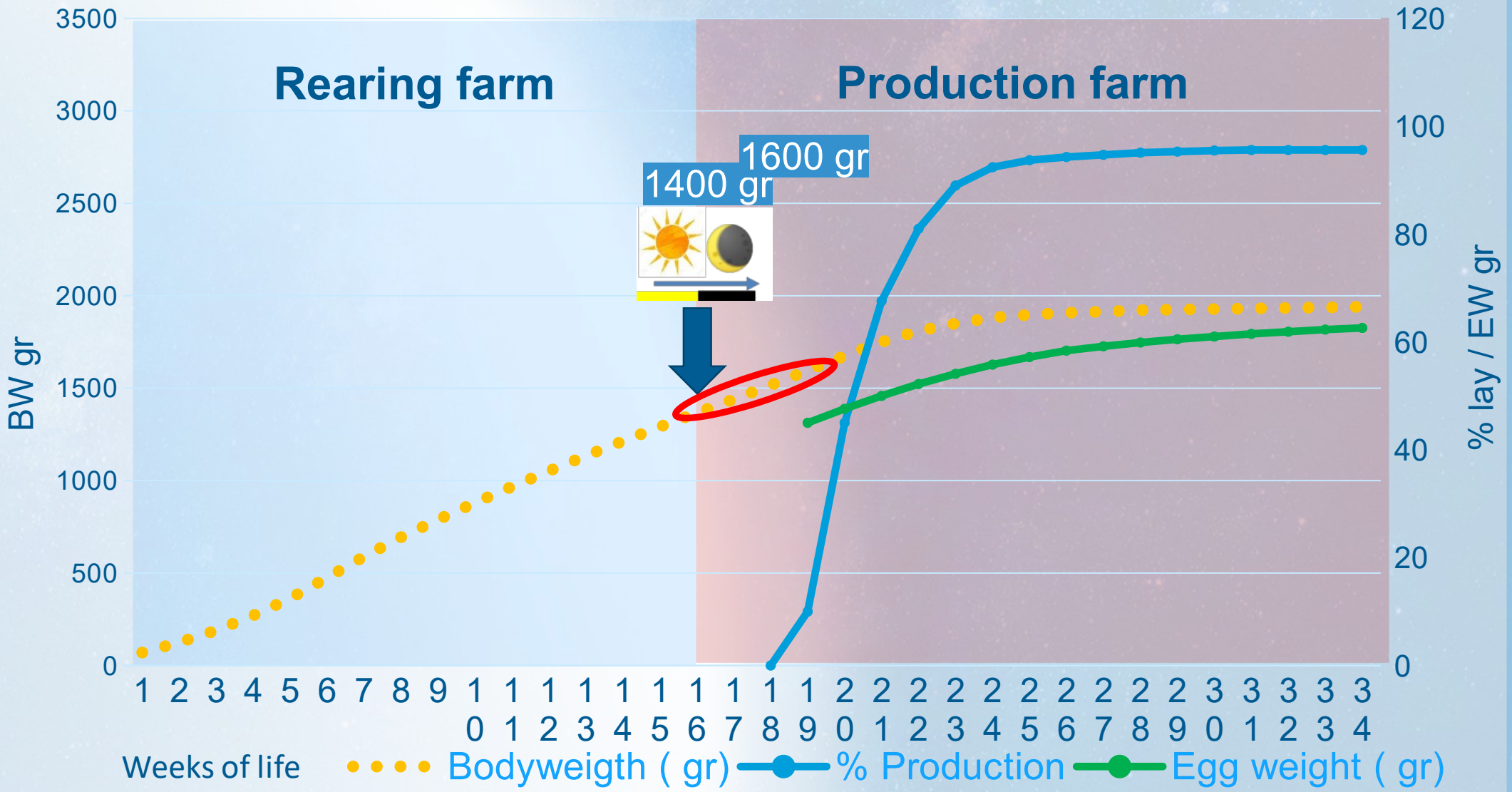
Age at stimulation
Weight at stimulation

Egg number

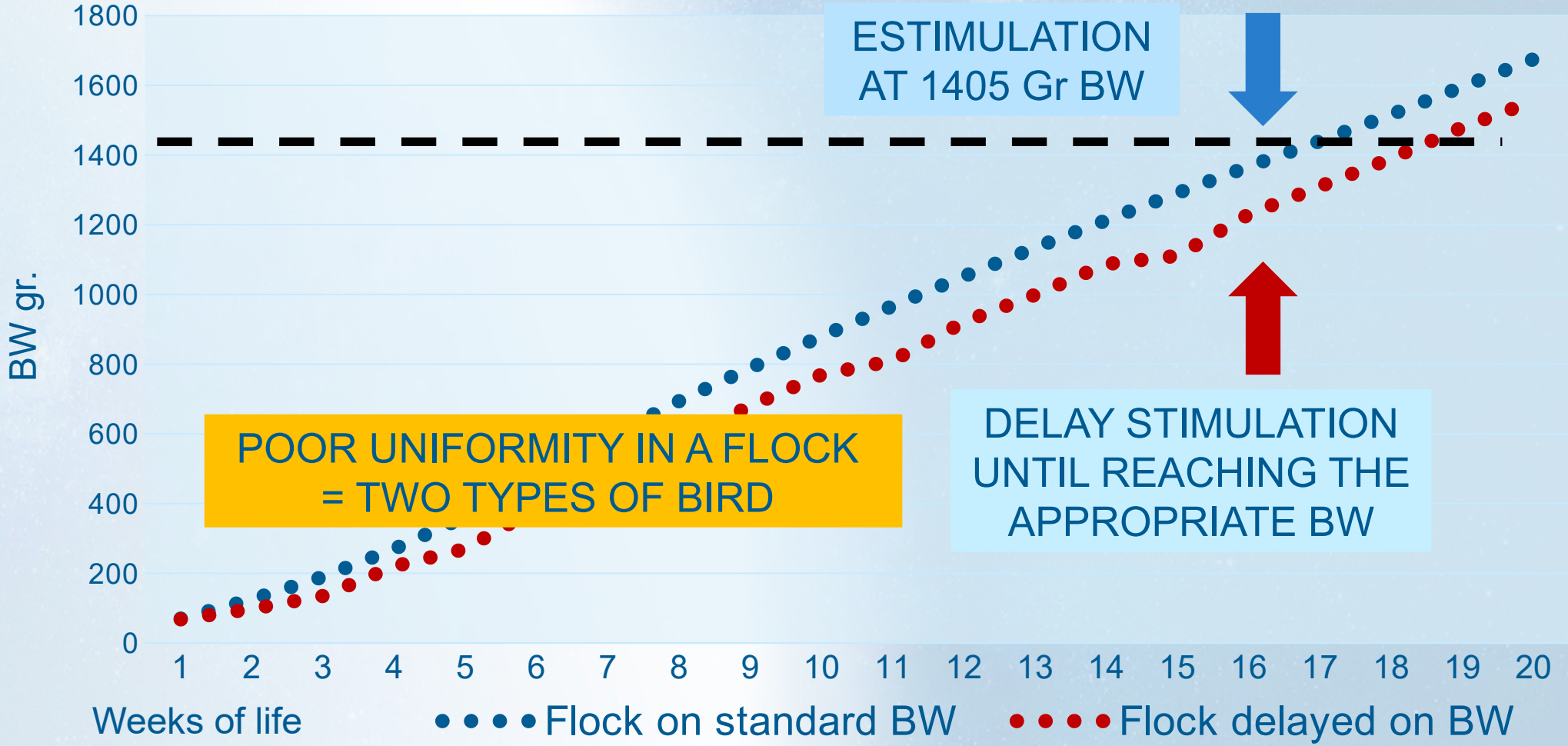


Egg weight

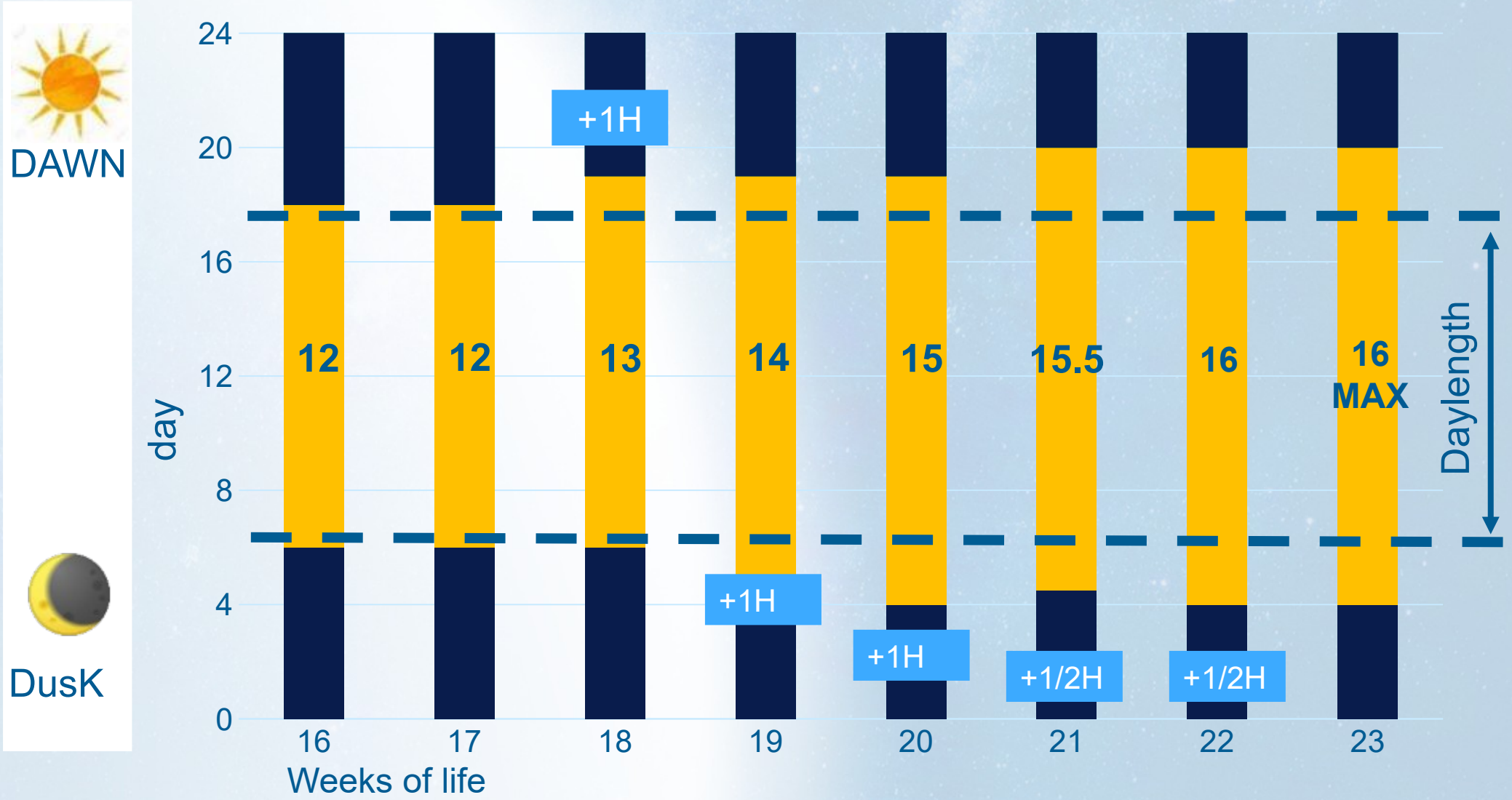
What really matters: WHEN?



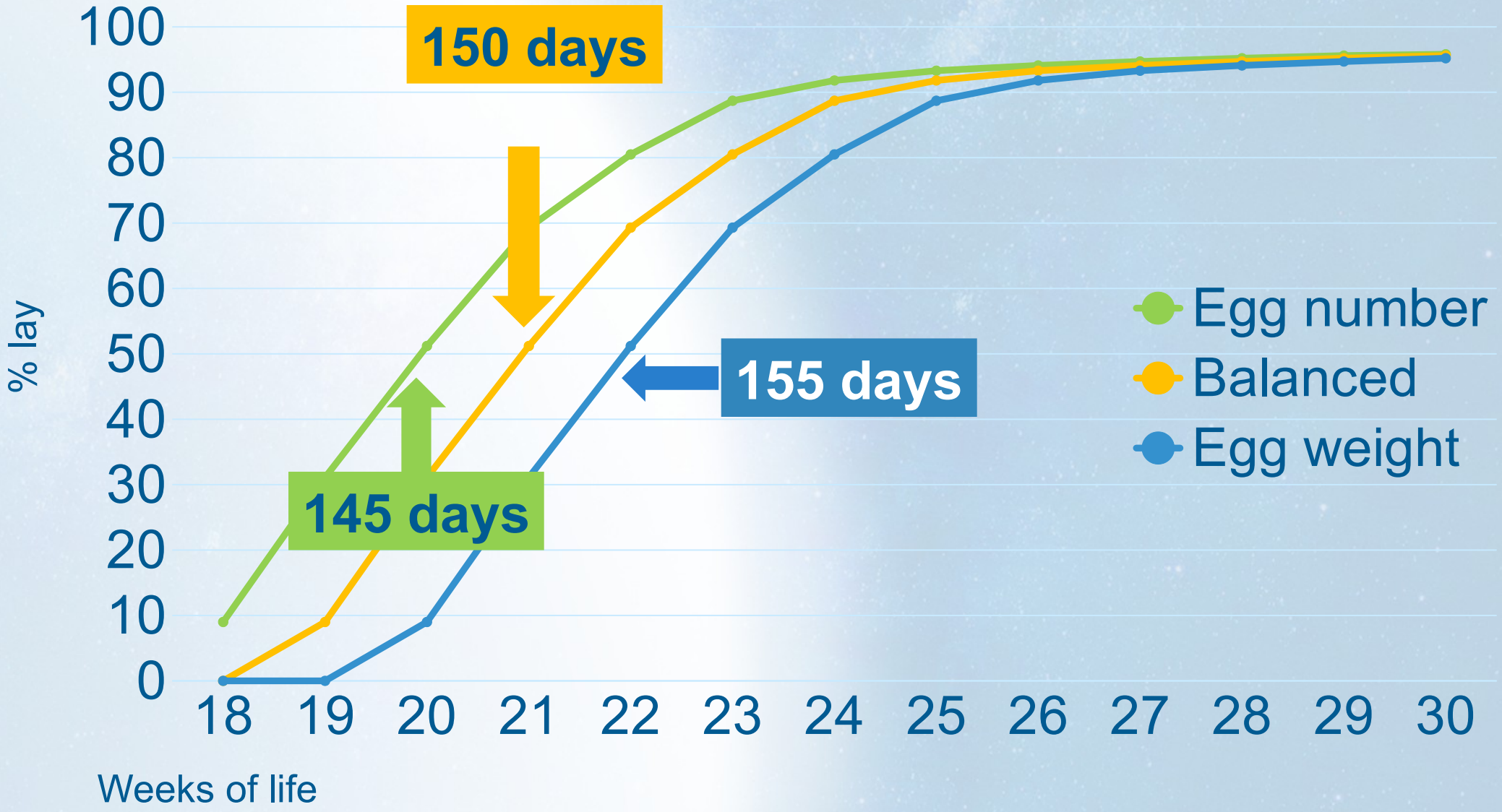
Stimulation by body weight



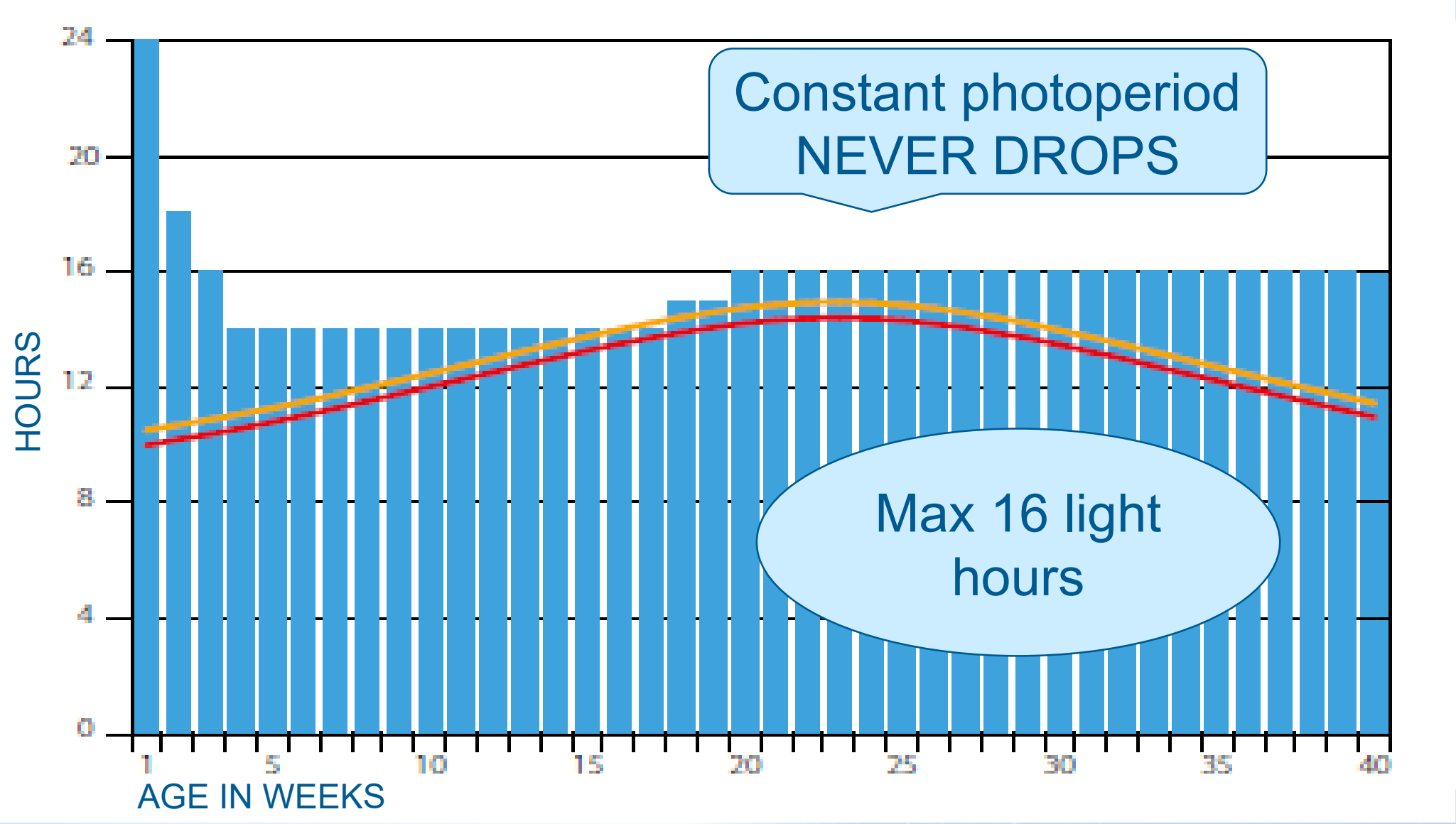
How to do a daylight stimulation



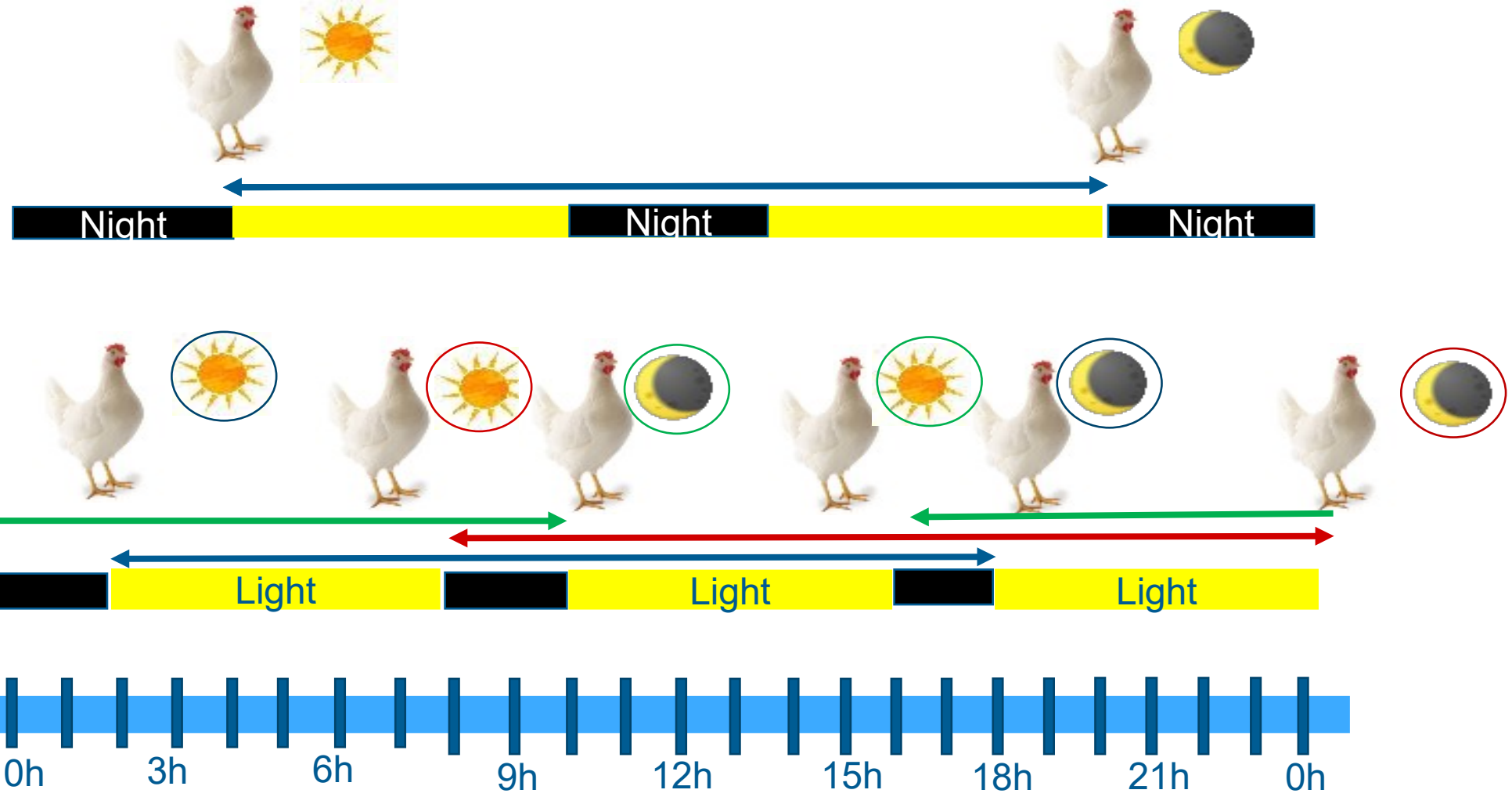
Checking your stimulation: Age at 50%production



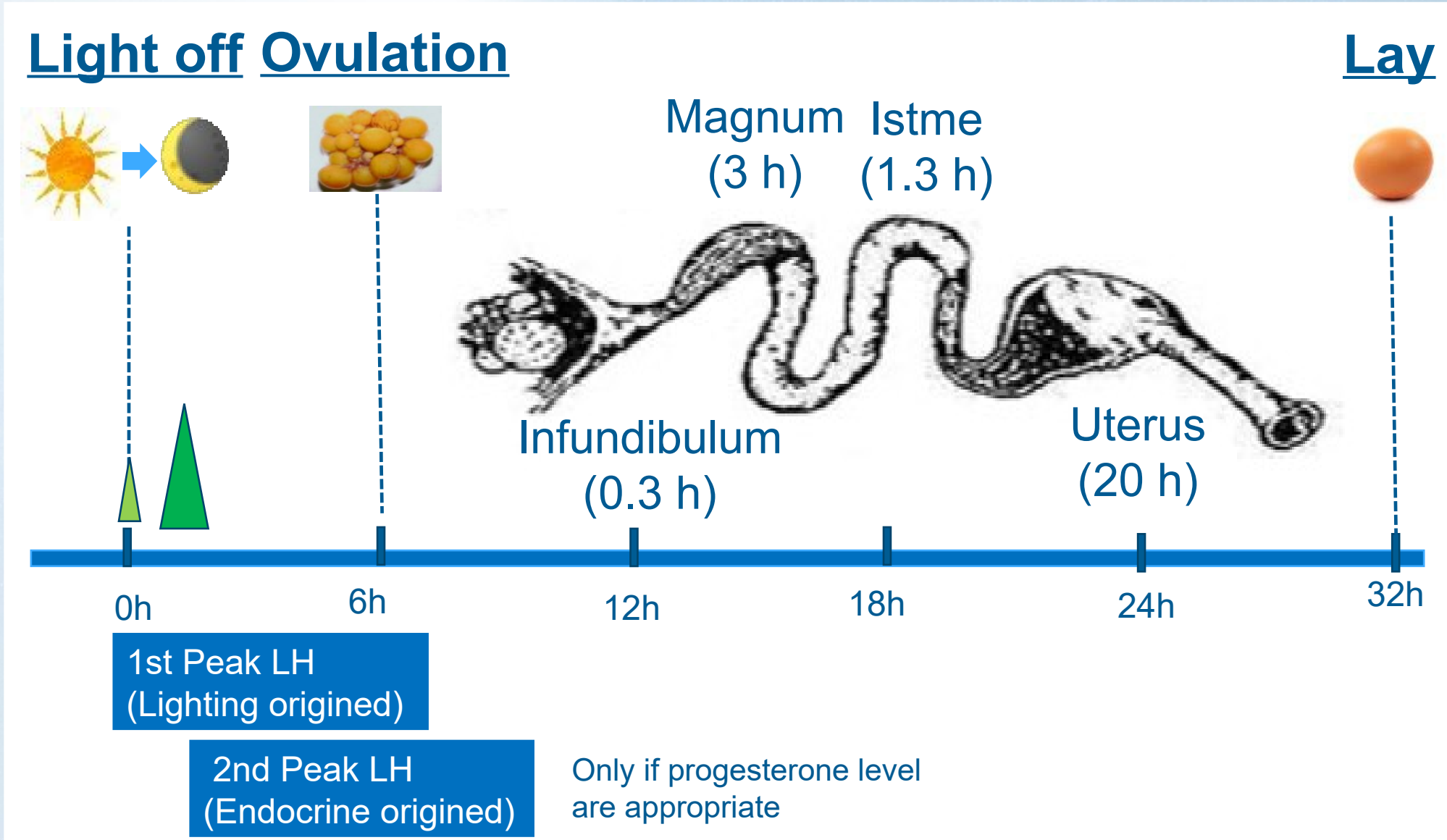
Lighting programs in production



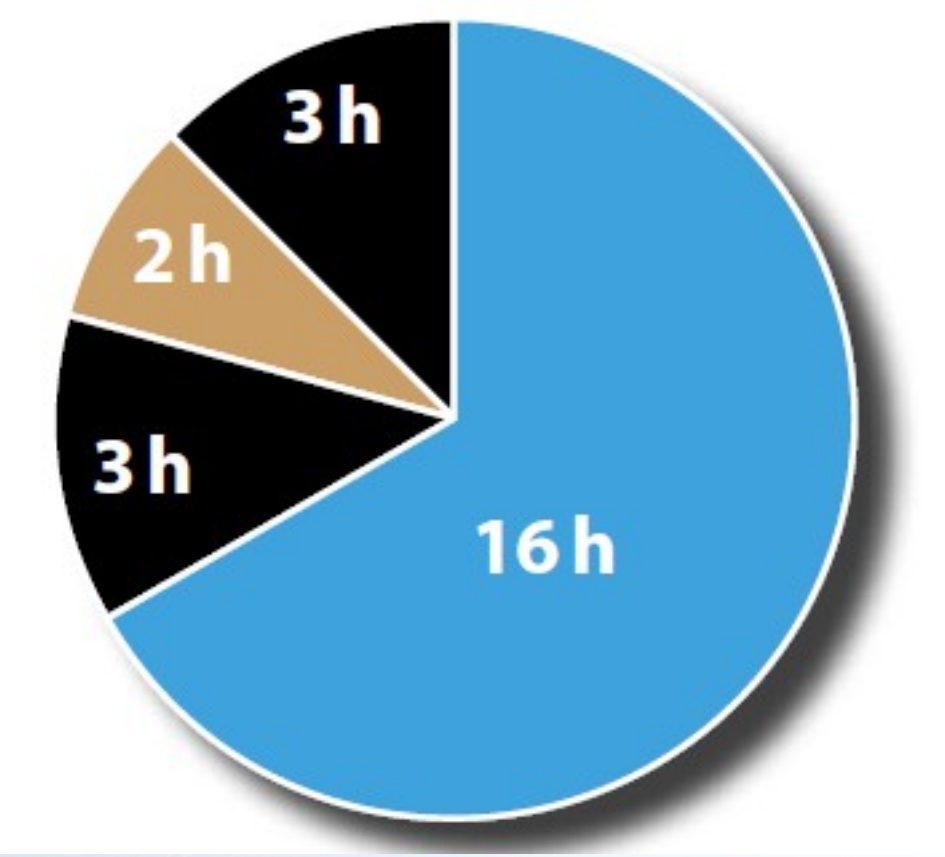
Subjective day in laying hens



Night Fall & Ovulation



Midnight snack



ADVANTAGES

- Higher feed intake
- Improvement in shell quality
- Decreases bone decalcification

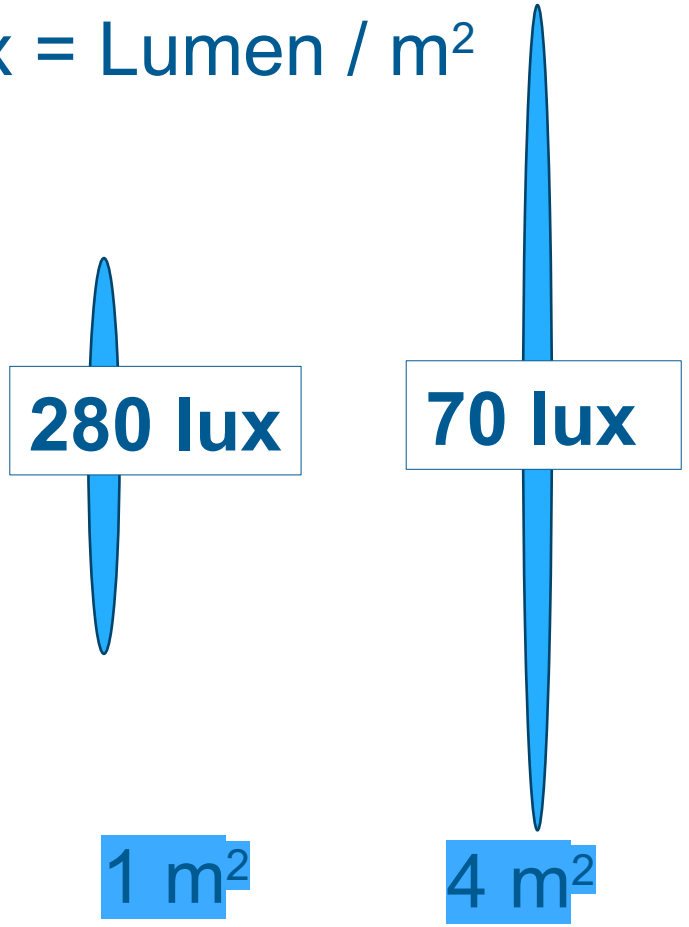
Light intensity definition

LIGHT INTENSITY

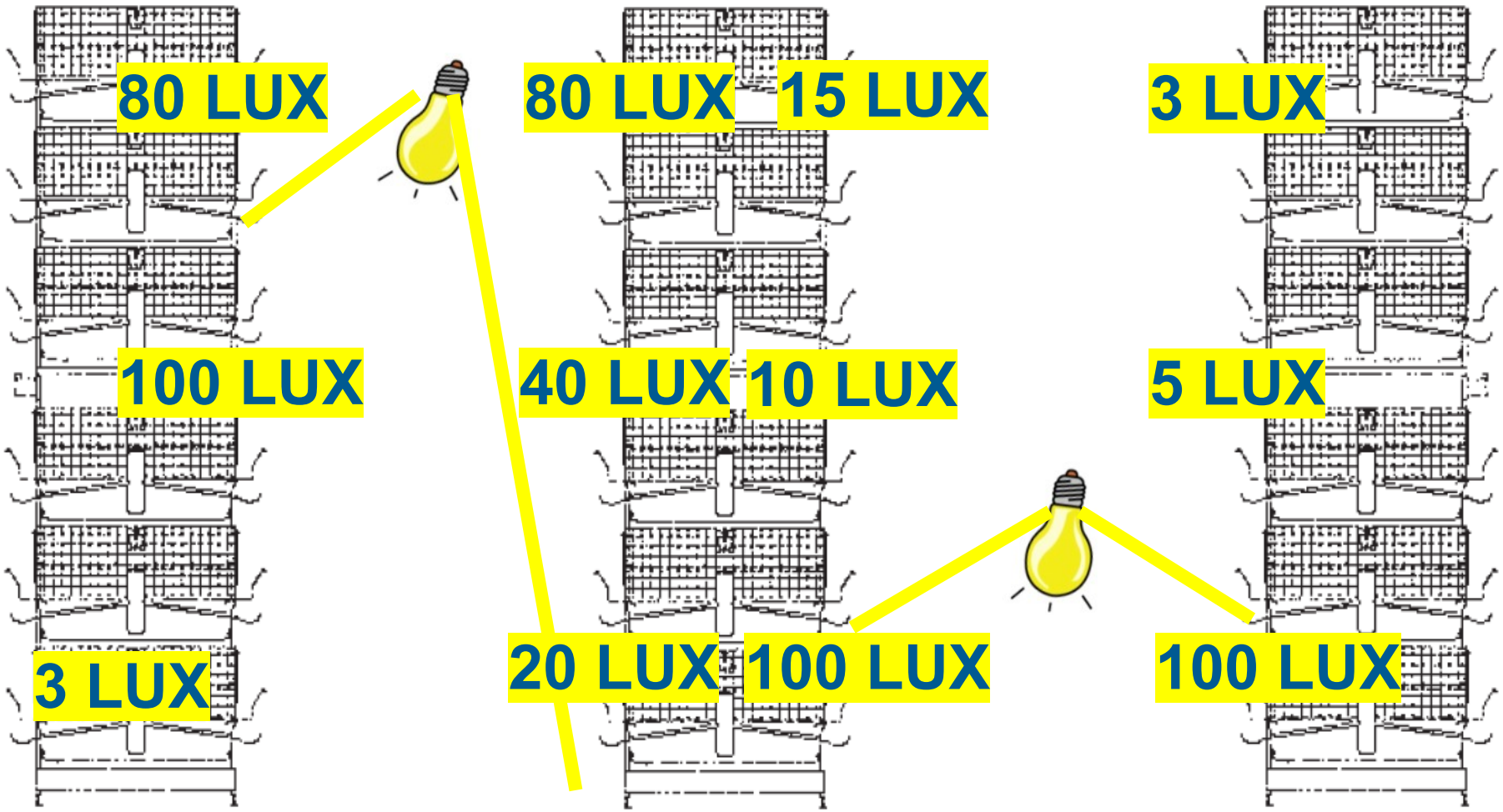
Lumen

ILUMINATION

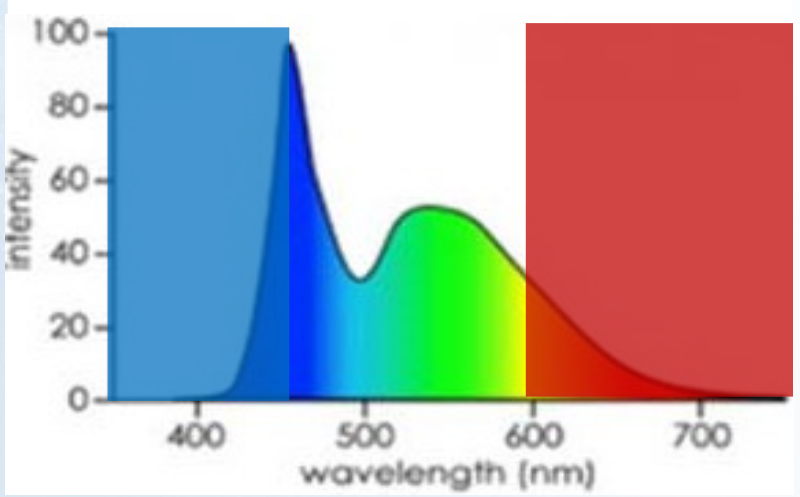
Lux = Lumen / m^2



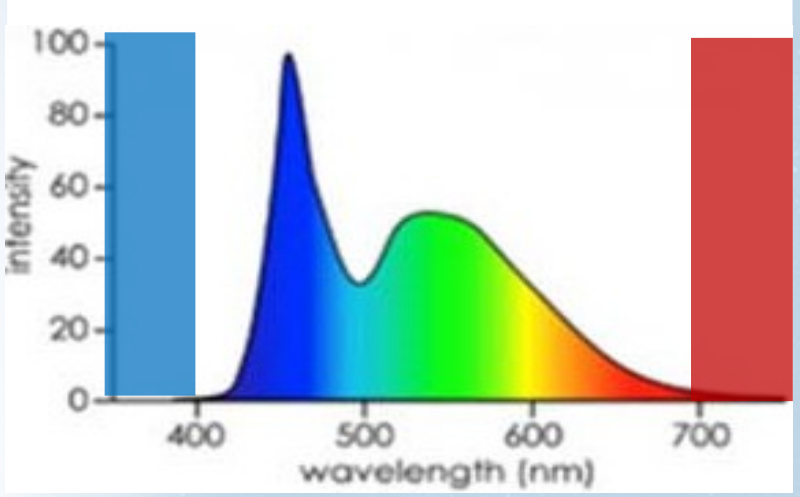
Light intensity often is not homogenous



The photopic vision spectrum



Lux

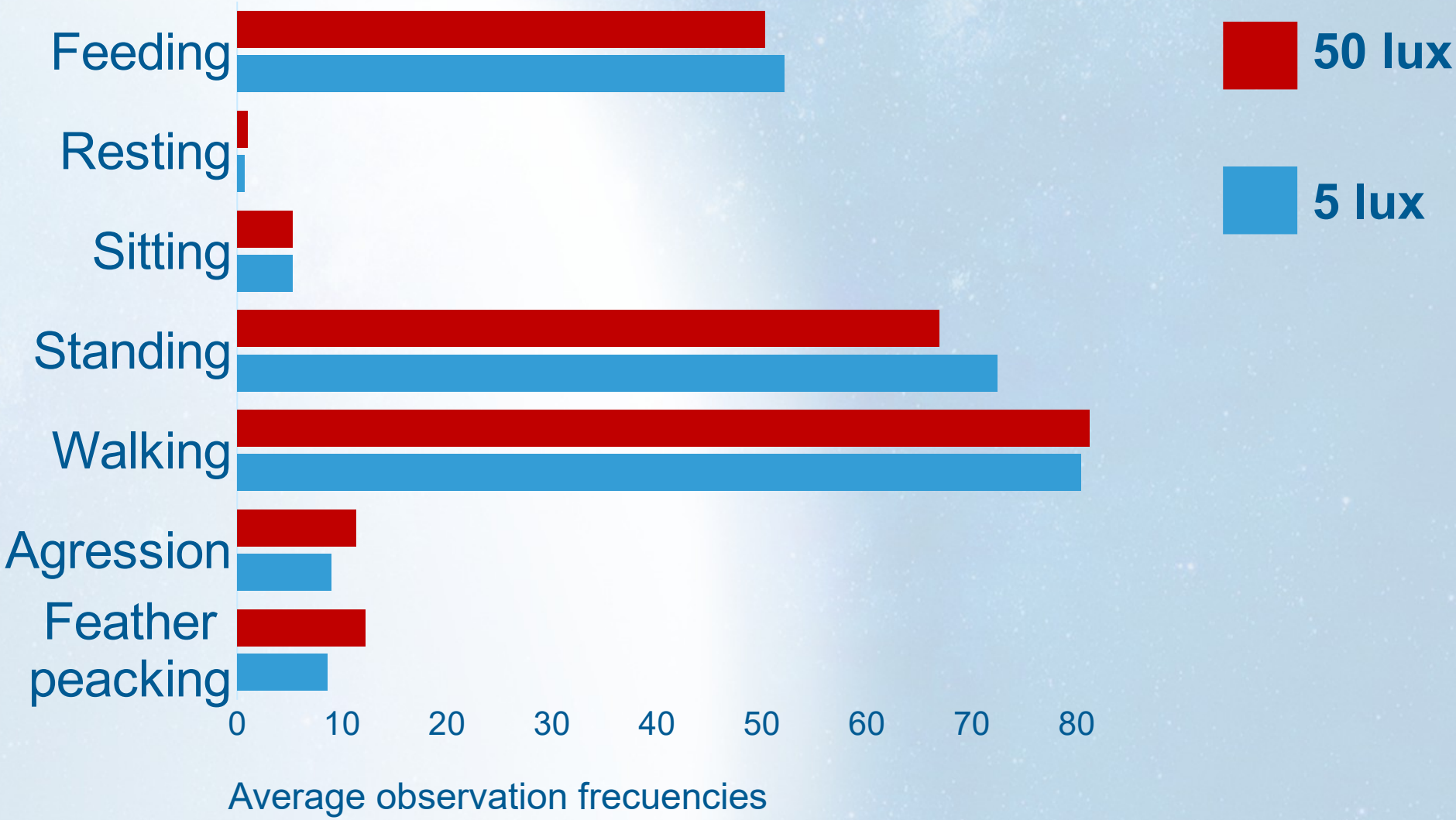


C-Lux

Light intensity & hens activity

Light intensity acts as the volume control for bird activity

Frequency of behaviors observation in brown hens in cages



Source:
Mohammed 2009

Intensity of different lighting sources

20000 -100000 lux

200 -10000 lux

? Lux
Distance & Source lumens

Dealing with natural light intensity

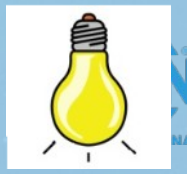
Source: H&N International

Sun rays directly entering the house

Source: H&N International

Irregular sunlight distribution in the house

Controlling light intensity



Light Intensity

STEP 1: move to brown or black houses

Shades

Source: H&N International

Light traps

Source: H&N International

Be able of decide on the light intensity inside the house

Controlling lighting intensity

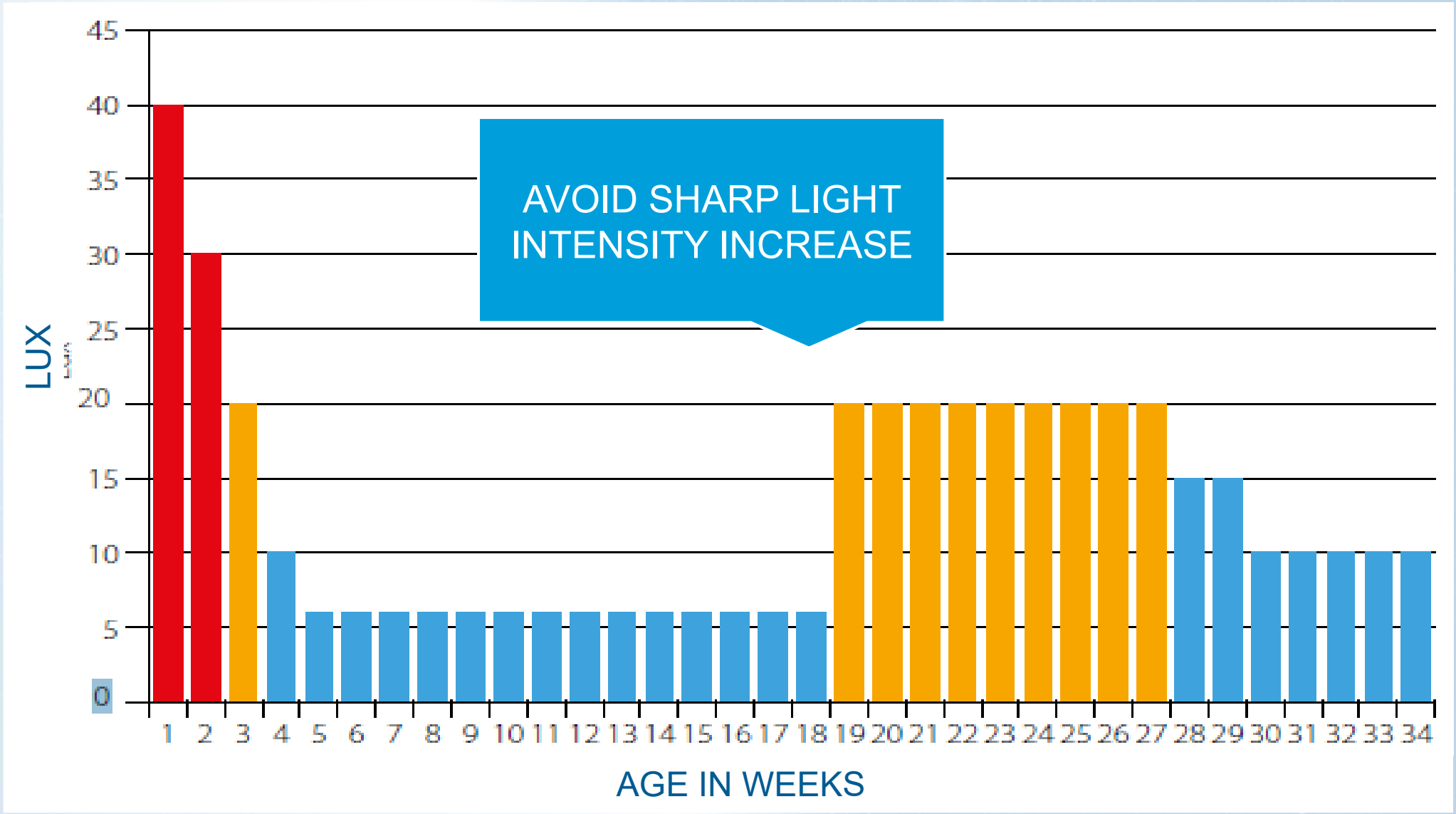
STEP 2: be able to measure the light intensity

Source: H&N International

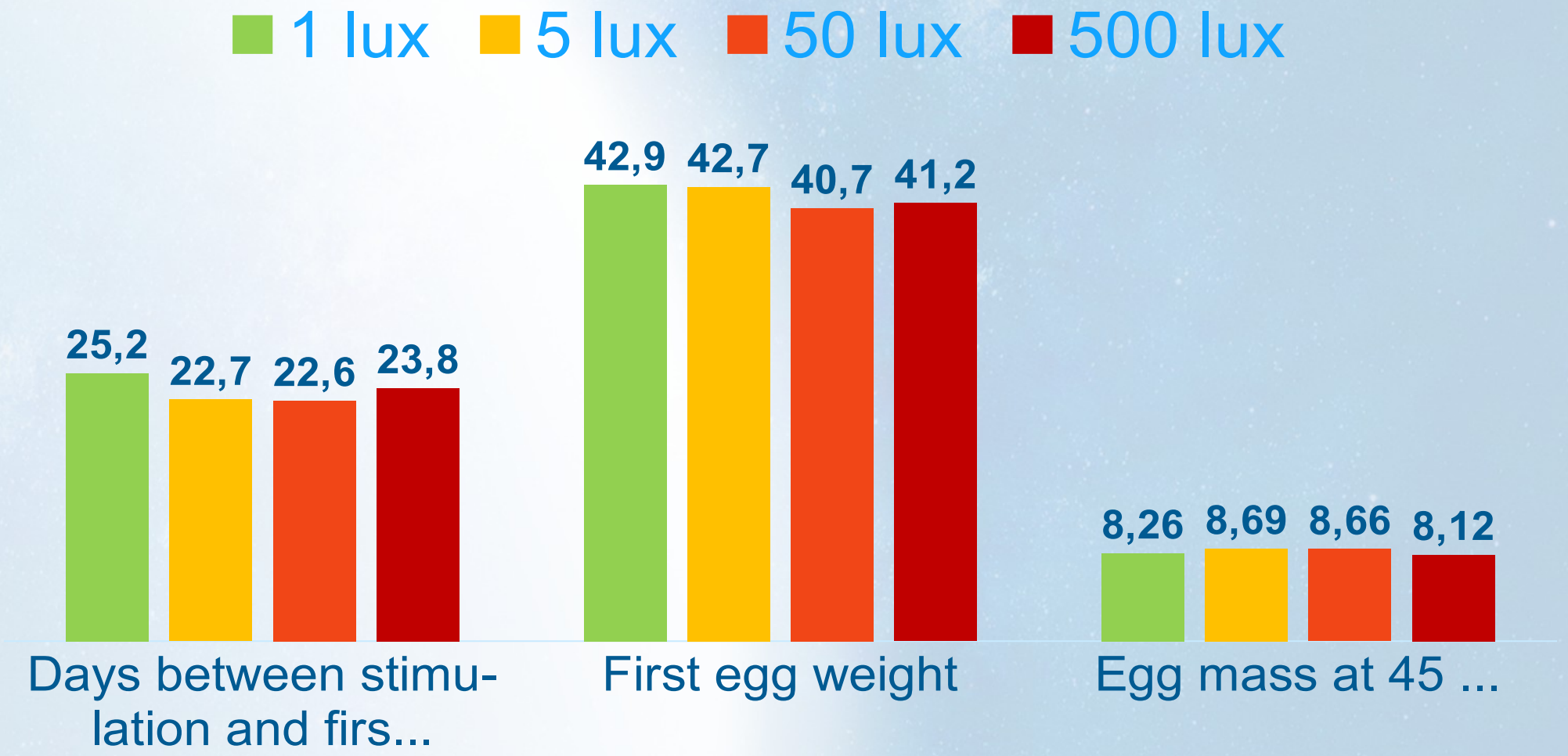
Source: H&N International

Measure intensity at feeder levels without shadows interference

Ideal lighting intensity for layers in cages

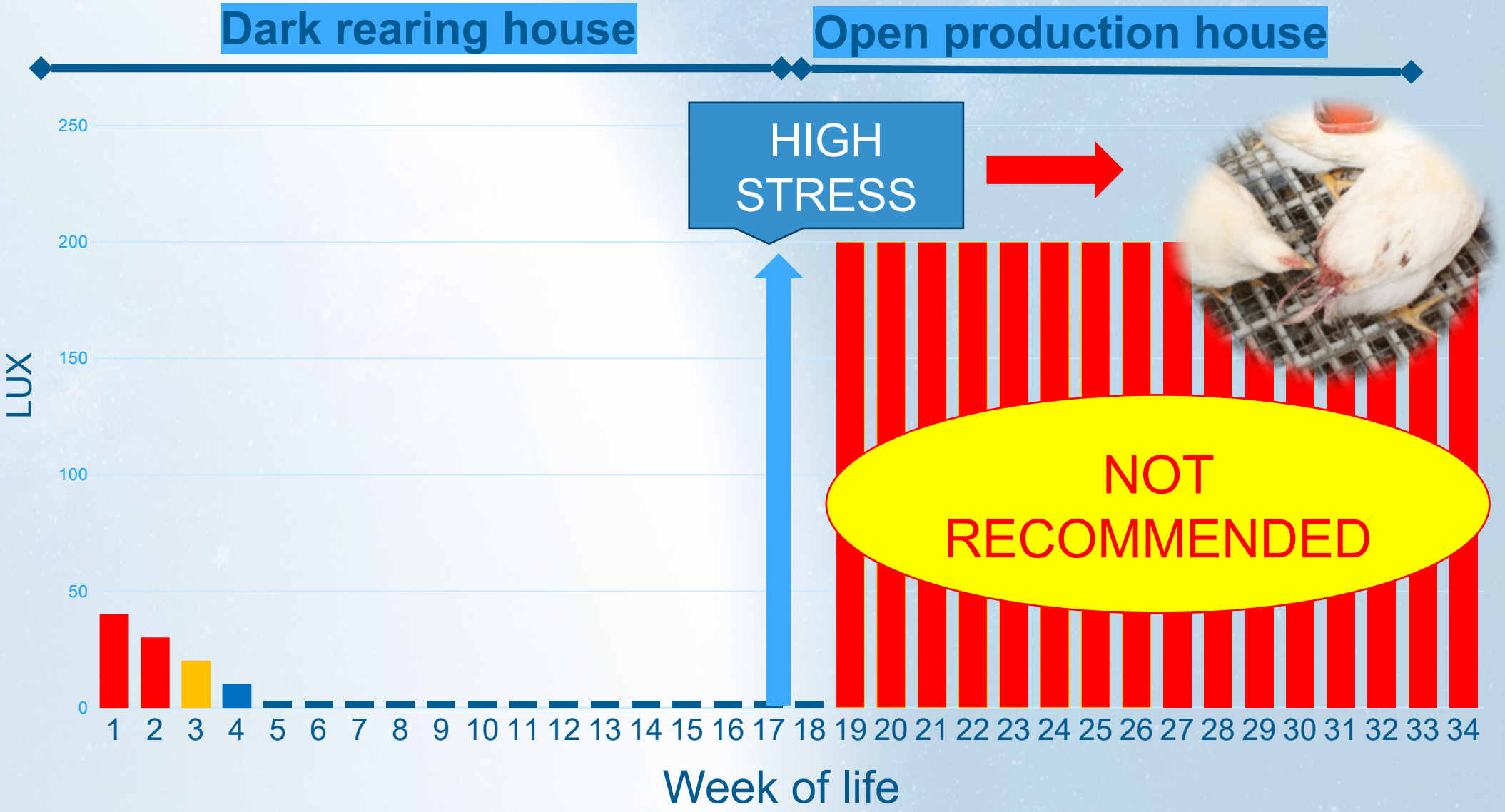


4 different layer breeds stimulated at different light intensity

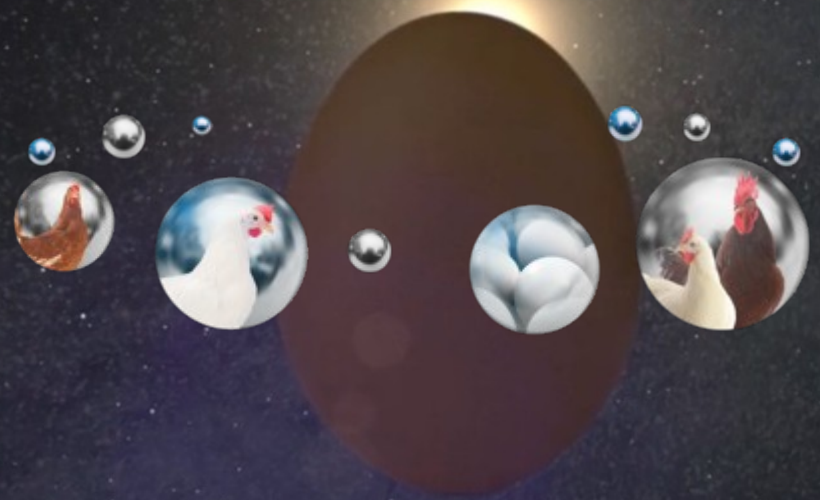


Source
Remena 2001

Sharp increase in light intensity



Thank you for your attention



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