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Management for Good Nesting Behavior

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H&N Academy 2019

Outline

- Introduction.
- Nesting Behavior.
- Factors influencing floor eggs
- Rearing - Perches
- Nests
- Lighting

- Conclusions

Introduction

- The egg industry alway[illegible]rove laying hens production,
- Pressure or[illegible]omers.
- In countries[illegible]
- Alternative/[illegible]
- Feather pec[illegible]feather quality, smothering[illegible]**outside the nest boxes.**
- Problematic behaviors[illegible]or problematic for the person reporting the behavior (Mills, 2003).
- **Eggs laid outside the nest boxes** increase the labor cost for the farmer and increase downgraded eggs.
- **Mainly a problem for the producer.**

Introduction

- Floor (system) eggs is multifactorial
- Could be a big problem.

a) Economic: downgraded eggs.
b) Labor increases.
c) Health: Cloacal cannibalism (Savory, 1995).

- Onset of production – Big Challenge.

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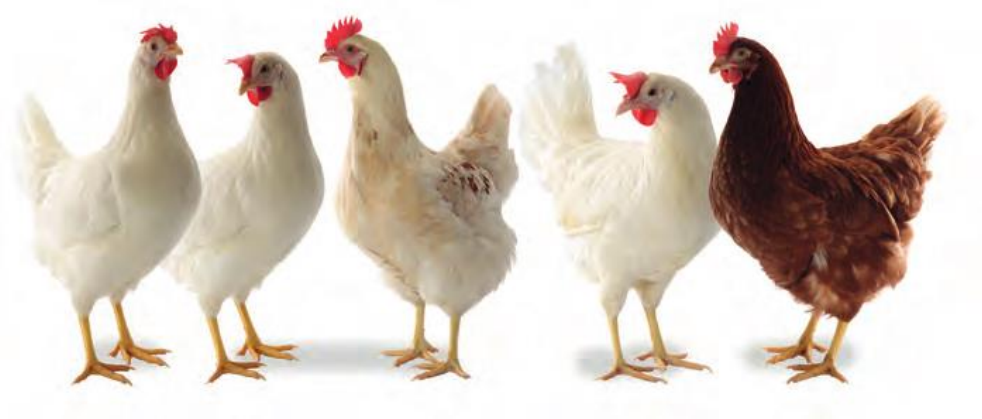

Nesting Behavior

Nesting behavior

- Understanding behaviors are important in management: for both efficient utilization of **beneficial aspects and control harmful.**
- **Nesting behavior is important in both aspects**.
- Complex interaction: **environment, hormonal and neural stimuli** from within the bird (Wood-Gush, 1975).
- Commercial laying hens do not show incubation or brooding behavior.
- Genetic selection – breed out.

Nesting Behavior: Pre-laying

1. When domestic hens are in **feral conditions,** an individual about to lay an egg will leave the flock and **find a comfortable place in which to nest** (McBride *et al.,* 1969; Duncan *et al.,* 1978).
2. In cage free conditions there is a corresponding period of **restlessness** prior to laying: looking for potential nest sites (Wood-Gush, 1969).
3. **Examines a number of nests by inserting her head** (Wood-Gush, 1963) and by **entering them** (Turpin, 1918).
4. When one **site is selected**, the bird settles and makes a simple nest by **rotating and drawing in nesting material** (Wood-Gush, 1975).

- **Oviposition usually follows**.
- Pre-laying behavior usually extends over 1.5 to 4 hours (Wood-Gush, 1963).
- Shorter as hen ages.
- **IMPORTANT** at the beginning of Production

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Control of Nesting Behavior

- Triggered by ovulation, approximately 24 hr earlier (Wood-Gush and Gilbert, 1964).
- **Estrogen and progesterone** from the post-ovulating follicle act on the **central nervous system** (Wood-Gush *et al.,* 1977)(Wood-Gush and Gilbert, 1973).
- Egg is developing and oviposition is normally synchronized with nesting behavior.
- If ovum is resorbed internally, nesting behavior still occurs at the expected time but without an egg to be laid (Wood-Gush, 1963).
- Once nesting behavior has been triggered, various aspects of its expression are **affected by the environment**.

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In commercial conditions the environment is largely under human control: **MANAGEMENT**

Timing of Nesting Behavior

- Nesting behavior can only occur during a certain period.
- However, **oviposition is sometimes delayed** beyond this period.

1. Social Inference: nest are occupied.
2. Human disturbance
3. Management: feeding- running during peak production or limited feeding among others.

- Egg on the floor not-nest eggs

Location of Nests

- Features of nest boxes that are supposed to be **attractive** include darkness and seclusion (Robinson, 1948; Winter and Funk, 1951; Card and Nesheim,1966).
- Most nest boxes in commercial conditions are **raised off the ground** so that birds must perch to gain access to them.
- **Train young birds simply by providing perches during rearing**. (Appleby *et al.,*1983b).

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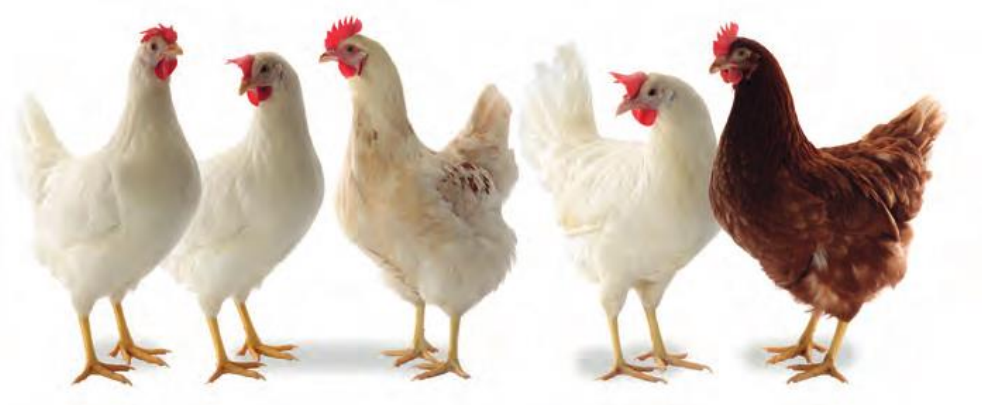

Factors influencing Floor Eggs

Factor influencing Floor eggs

1. Inability to reach nest (Appleby, 1984; Emous and Fiks - van Niekerk. 2003)
2. Mismatch between nest characteristics and hens preferences (Zupean et al, 2008)
3. Presence of other eggs on the floor (Emous and Fiks – van Niekerk, 2003).

- MANAGEMENT

Solutions

1. **Rearing: Appropriate training (imprinting) of the birds**
2. **Nest**
3. **Lighting Program**

- Less than 1%
- **MANAGEMENT**

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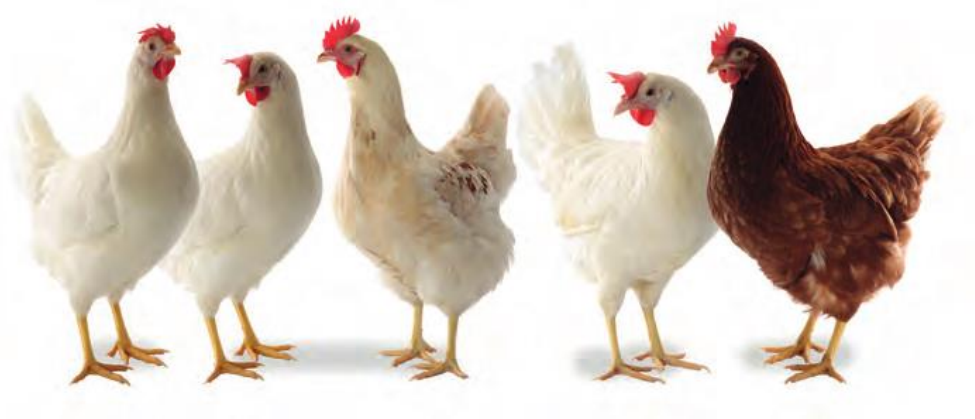

Rearing: training

Rearing

- Environments with simple rearing systems are **not cognitively stimulating or spatially complex** enough to adapt pullets to navigate in aviary or outdoor laying systems.
- Good navigation of elevated tiers requires well-developed spatial skills, acquired **during early rearing experience with perches** (Gunnarsson et al., 2000).
- The **first 3 weeks post-hatch are critical** periods for hemispheric development in chickens and synapses continue to mature up to 8 to 10 wk post-hatch (Rogers, 1995).

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IMPRINTING

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Perches

- Perches in non-cage systems: **toes be able to wrap around the structure to enable a balanced**, **relaxed posture for an extended period of time** (United Egg Producers Guidelines, 2010; Schrader and Muller, 2009).
- Perching behavior in domestic laying chicks is observed to begin after 1 wk of age (Kozak et al., 2016).
- Chicks that perch earlier will also show **earlier use** of perches for **night-time roosting** (Heikkil et al., 2006) and **use more tiers during day.**
- **Early access to perches (3-4 weeks of age)** during the rearing period **reduced** both **cloacal cannibalism** and the **prevalence of floor eggs** during the production period (Applebay, 1986: Gunnarsson et al., 1999).
- **Perches use increase with age**, peaking at 12 week of age and maintained until the end of production (Enneking et al., 2012b).
- Too late in production.

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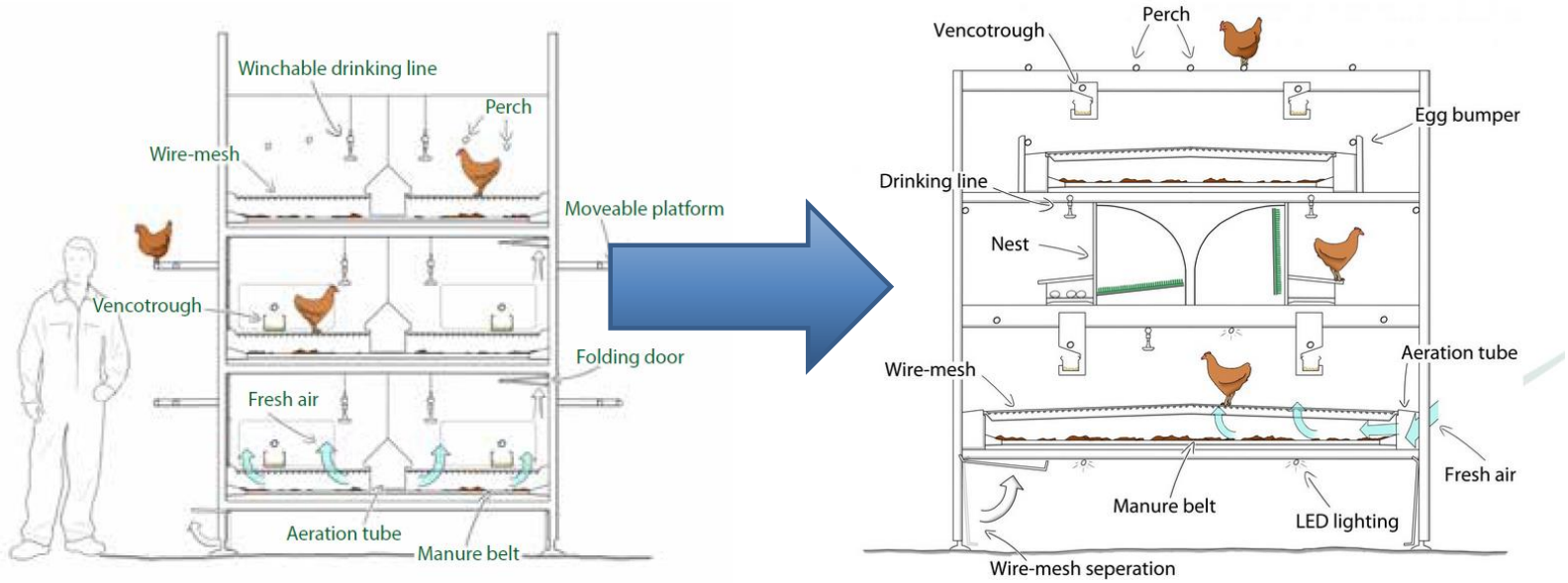
Aviary - Tiers

1. Imprint the Pullets to sleep in the system, start as early 4 weeks of age (depends on system).
2. **Management** = Every night walk through the system (very dim light period) + lighting program (sunset) + Pick up the pullets and place them up on the structure.
3. Could take 2-3 weeks.

Same equipment: rearing and Production - Complexity!



Rearing in aviary: Tips

- Start to make them go to bed as soon as the system is open.
- Open the aviary progressively
- Sunset program from first week.
- Fix the lights-off time ASAP (dark house).
- Shut off water or feed by tiers to do the training. Mobiles Slats between systems (water tables).

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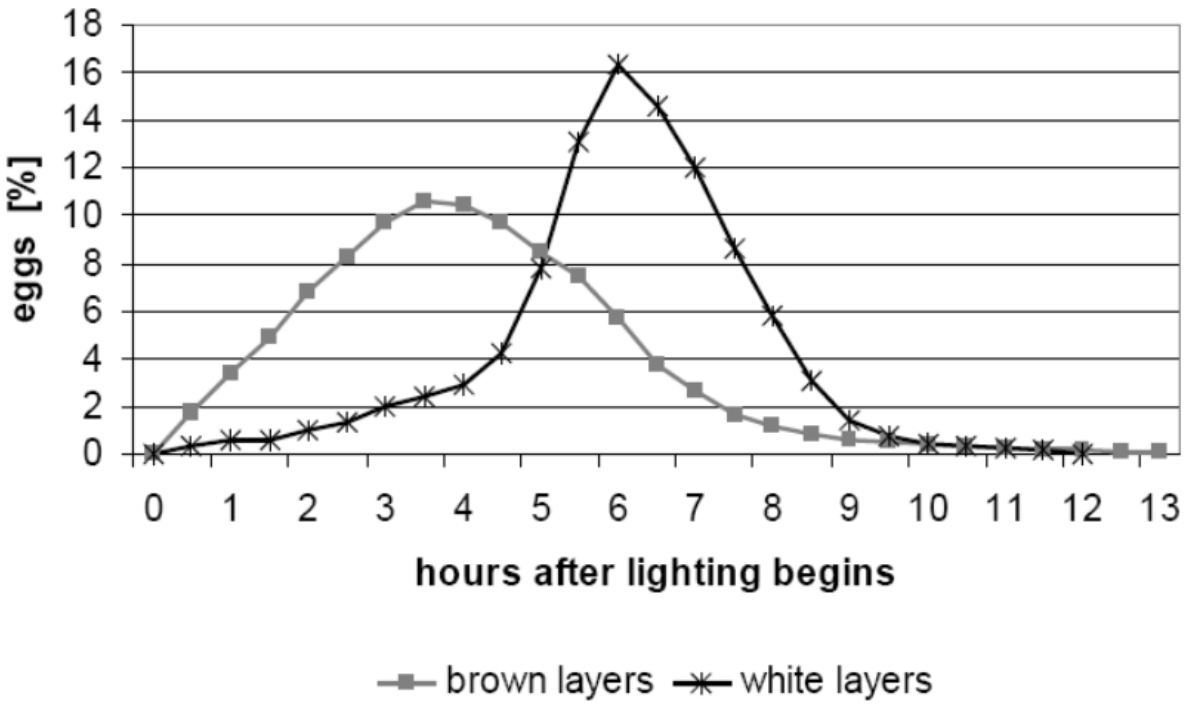
Nest

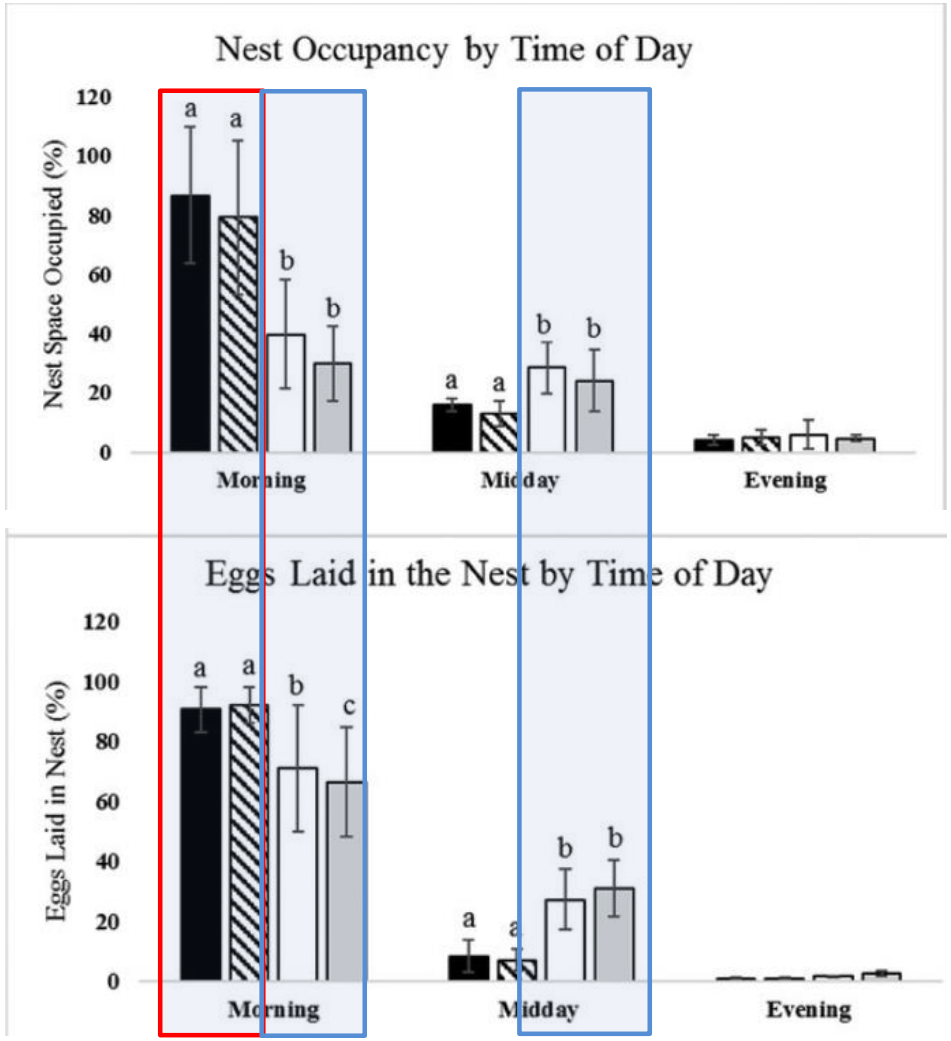
Nest

- Hens exhibit gregarious nesting (Appleby and Smith,1991; Riber 2010; 2012).
- Enough nest space.

1. Lay is in **morning hours** (Boz et al., 2014), can result in overcrowding.
2. Crowding in the nests may increase the **risk of welfare issues.**
3. Insufficient space for simultaneous use of the nest by all hens **may result in litter or non-nest laid eggs** by individuals unable to access the nest (Kruschwitz et al., 2008).

Comparison of oviposition time in different strains





Villanueva et al, 2017

Nest choice

- **High-placed nests** (Lundberg and Keeling, 1999) and **corner nests** are favored (Riber, 2010).
- The quality of the **nest floor,** the **nest color** , **illumination, and the privacy of the nest sites** (Appleby and McRae, 1986; Struelens et al., 2008; Buchwalder and Frohlich, 2011)
- The incidence of floor eggs has also been found to be affected by **nest material** (Daly *et al,* 1964).
- **Nesting place that allows rotation** of the body and scratching out with the feet is essential (Duncan and Kite, 1989).

Cage free

- Nest choice is typically limited to one type of **standardized rollaway group nest.**
- The **drinkers** are often placed in **front of nests**.
- **Nest platform is important (more than 30 cm in width)** (Lentfer et al, 2013)**.**
- **Unsuitable access platforms** may increase social interactions and aggression between hens and lead to unsettled pre-laying behavior → Floor eggs.
- Confinement type – after transfer. Could be an option

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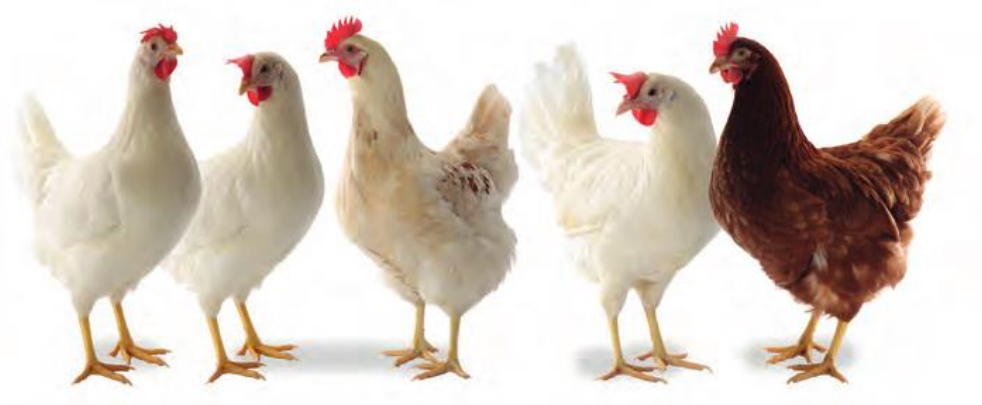


Lighting: important tool

Lighting

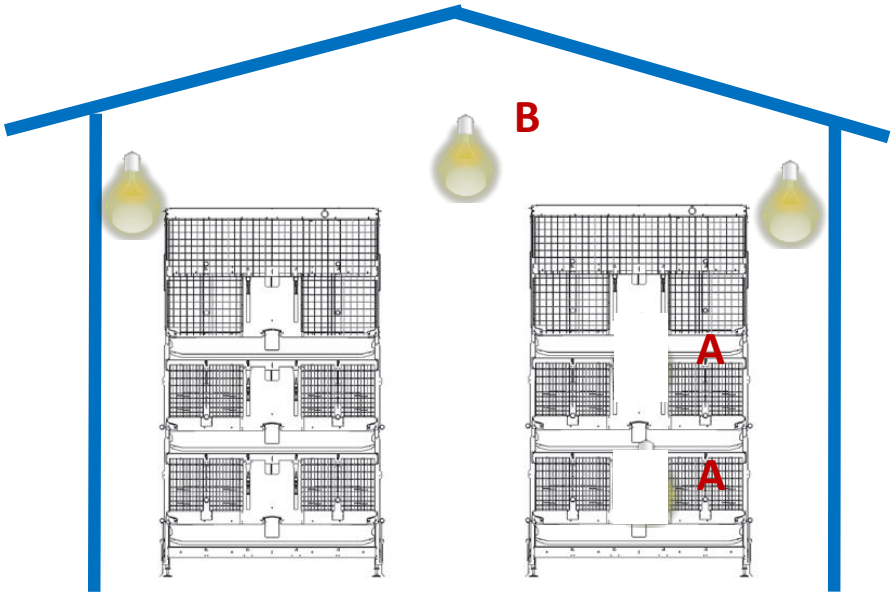
Rearing

- **Lighting program to make them sleep in the system. Sunset dimming program.**
- **Training:** Starts at 4-6 weeks of age. Could take 2-3 weeks. Every night put pullets back on the system.

Lighting: training in rearing

How to turn off light? Rearing

Aviary Systems: Block System
From 1st week of age



Always measure light intensity
20-25 lux

Example: Light 08.00h – 18:00h

- **Light A**: Off during day
- **Light A** : Progressively turn it on (5 min), ½ h before bed time.
- **Light B:** 17:45h dimming off in 15 min
- **Light A:** 18:00h Dimming off in 20 min
- Difference in 5 min lower LED y upper.

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Rearing

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Lighting: training after transfer

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Lighting

Production

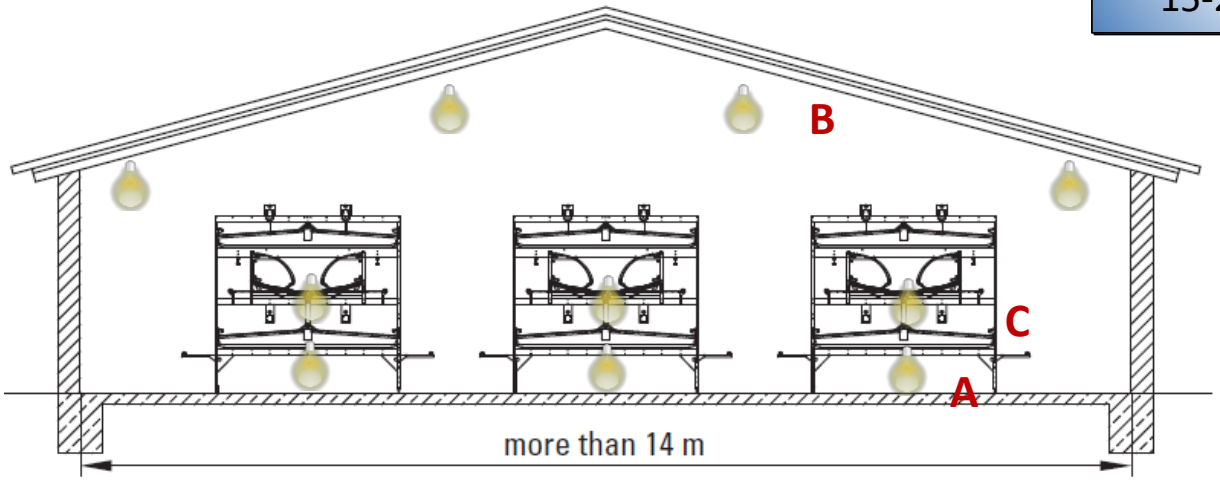
- **Ensure birds sleep in the system**
- Nest box lights. 15-30 minutes before turning on the house light. After successful use, lower intensity.
- No dark areas in litter.
- Light underneath the system (if they have access)
- No high intensity on the nest.

Lighting in Aviary system
Turn out the light

Objective: hens sleep in the system

¡Example!

- **Light A:** Turn off.
- **Light B** : Dimmig 15-20 min
- **Light C:** Dimming in 15-20min



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Picture: Raúl Rodríguez y Diego Cortés

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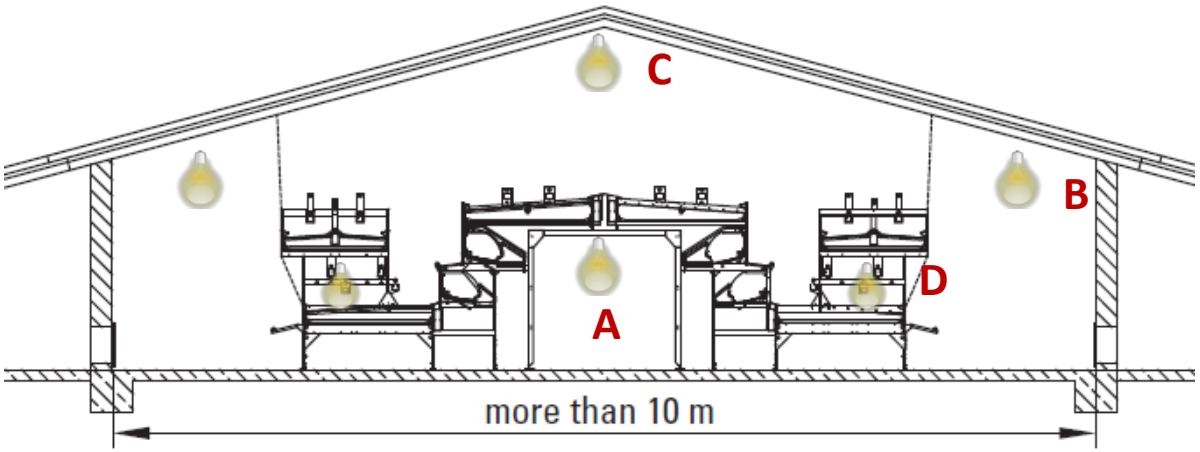
Aviary System: Open
How to turn off the lights

Objetive: hens sleep in the system



¡Example!

- **Light A:** Turn off.
- **Light B** : Dimming in 15min. 20 min after A.
- **Light C:** Dimming in 15min
- **Light D**: Dimming in 15 min or less.

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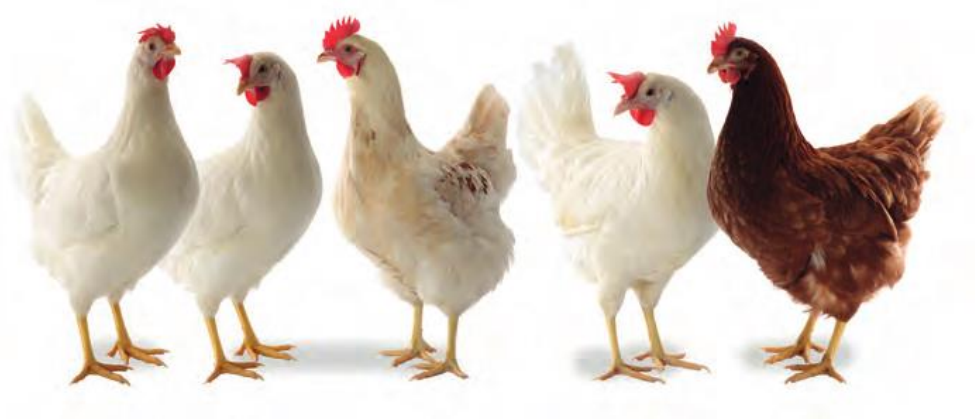


Tips to Control Floor Eggs

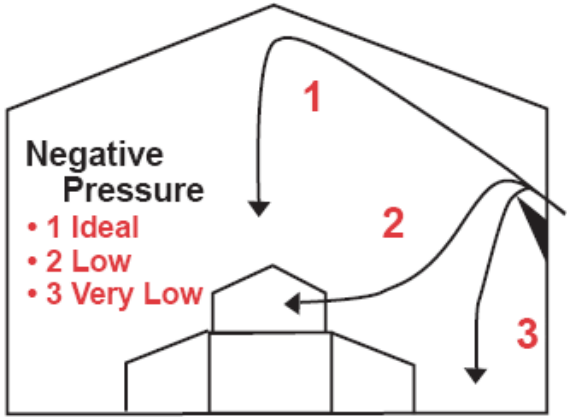
Possible Causes and Solutions

There are several items:

- Critical are: rearing, lighting, and equipment.
- Others

Ventilation

- Airflow patterns are another important factor.
- For example, **uneven ventilation** may cause birds to migrate to more comfortable areas of the house, thus creating an **“artificial” shortage** of nest space.
- Drafts.



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Feeding

- The time of feeding can also interfere with laying.
- When: **Right after lights on and then after production peak**.
- Try not to feed during production peak.
- Do no limited feed intake.
- Not appropriate feeder height could encourage the birds to lay underneath them.

Feeding times in Cage free housing (example).

Feeding Times

	LUZ			Agua		Alimentación					
Semana	de	a	hora	de:	a:		F1	F2	F3	F4	
17*	9:00	19:00	10:00	8:45	19:00	9:30	11:00	14:30	16:00		
18*	8:30	19:30	11:00	8:15	19:30	9:00	12:30	14:30	16:00		
19	8:30	19:30	11:00	8:15	19:30	9:00	12:30	13:30	15:30	17:30	18:30
20	8:00	20:00	12:00	7:45	20:00	8:30	13:00	14:00	16:00	18:00	19:00
21	7:30	20:30	13:00	7:15	20:30	8:00	12:30	13:30	15:30	17:30	19:30
22	7:30	21:00	14:00	6:45	21:00	7:30	13:00	14:00	16:00	18:00	20:00
23	7:30	22:00	15:00	6:45	22:00	7:30	13:00	14:00	16:00	18:00	21:00
24	6:30	21:30	15:00	6:15	21:30	7:00	12:30	13:30	15:30	17:30	20:30
25	6:30	22:30	16:00	6:15	22:30	7:00	12:30	13:30	15:30	17:30	21:30
26	6:00	22:00	16:00	5:45	22:00	6:30	12:00	13:00	15:00	17:00	21:00
27	6:00	22:00	16:00	5:45	22:00	6:30	12:00	13:00	15:00	17:00	21:00

Control BW and Uniformity!!!

1. **First Feeding**: ½ a 1h after lights on.
2. **Second Feeding** **4-5h after de lights on (after peak of nest use/production)**
3. **Third Feeding:** 1h after second.
4. **Next two** distributed afternoon.
5. **Last feeding** 1 hour before lights off.

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Water

- Drinker space, type, and flow rate are also important.
- If not adjusted properly, bell type drinkers can encourage hens to lay under them.
- **Nipple drinkers that are set too low** may cause a **physical barrier** to the bird movement to the nests.
- An **inadequate number of nipples or a low flow rate** can cause the hens to stay next to the drinker line a long time.

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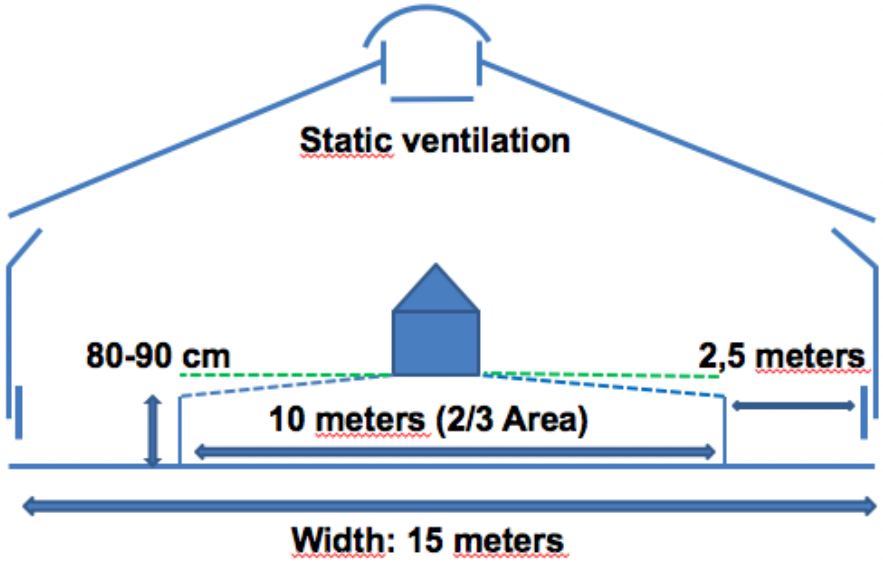
Nest

- **Constant management** → comfortable
- **Enough room** to turning around, and exiting the nest comfortably.
- Adequate space for hen movement just **outside the nest** opening: pre-lay behavior.
- There must be **adequate ventilation** inside the nest to keep the hen comfortable in hot weather and no draft.
- The nests should be located where the **hens do not have to range more than necessary** to find the proper place to lay.
- **Nest space** 4 to 7 hens/nest or 120 birds/m2
- **Cleanliness** of the nest pads and egg belt.

Slat

- In a slatted house, the slat design is important.
- **Not too high**. Use perches to jump from the litter on slat.
- The **angle of sloped** slats should also be considered when using community nest nests (**no more than 10 degrees**)



Health

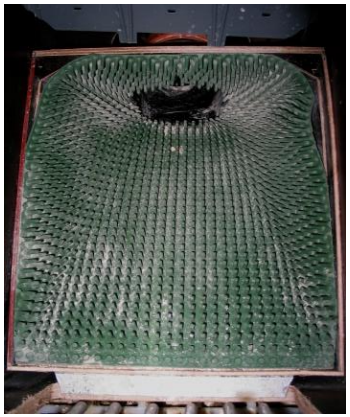
- Bird health should not be overlooked.
- Sick birds less active to use nest.
- Red Mite

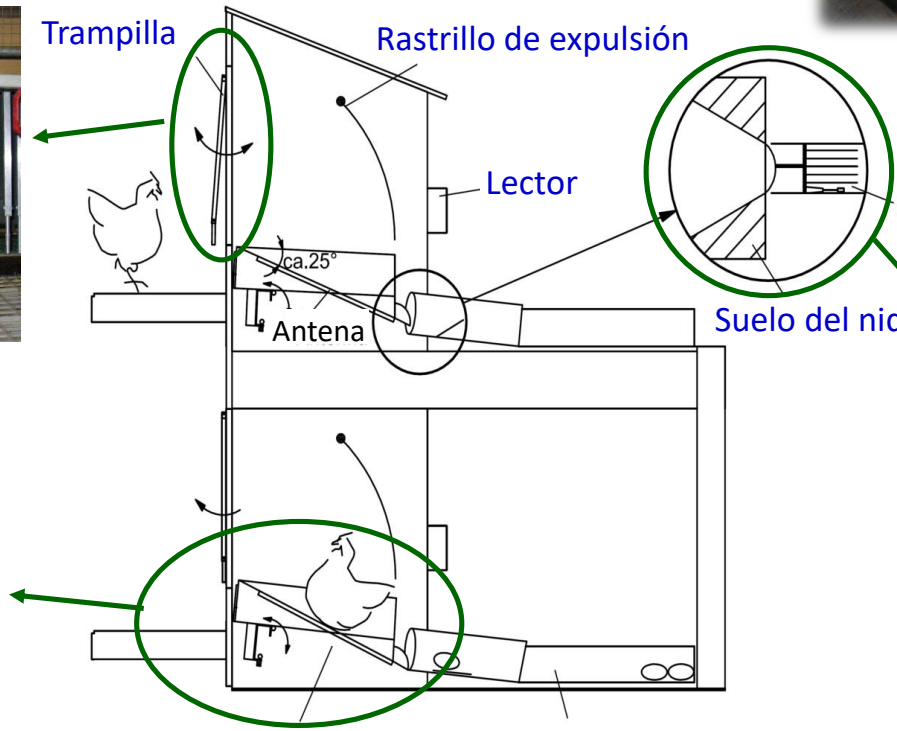
Genetic

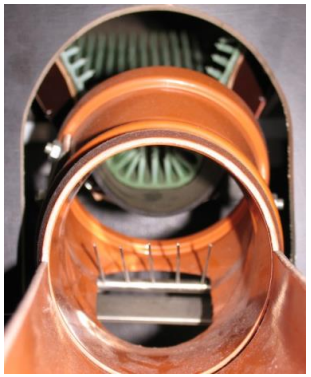
- Moderate heritability of good nesting behavior.
- Expected some progress
- BUT Management is the key factor!

Test on Floor:
Saleable eggs in the nest

Test on Floor







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New test - Free Range + 2 Feeds

New test - Free Range + 2 Feeds

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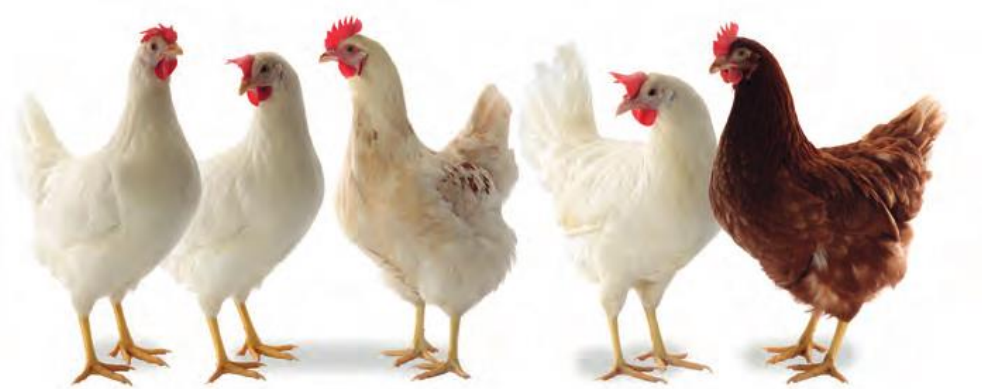

Conclusions

Conclusion

- Controlling floor eggs start in rearing
- By Imprinting
1. Perches
2. Lighting prog
- Continue after
- Management cs, feeding and training, etc).

MANAGEMENT
Be there with the hens

Real Cases

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