

# Designing the right environment for broiler chickens during the rearing phase

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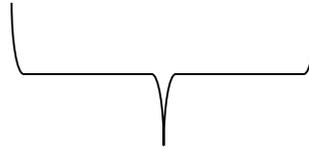
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# Broiler production systems



# Natural motivations are still there...



- e.g.
  - Perching
  - Exploring/foraging
  - Dustbathing
  - Playing



...We just need to facilitate them as much as possible

# Light - EU Directive 2007/43/EC

*“All buildings shall have lighting with an intensity of at least 20 lux during the lighting periods, measured at bird eye level and illuminating at least 80 % of the useable area.”*

*“Within seven days from the time when the chickens are placed in the building and until three days before the foreseen time of slaughter, the lighting must follow a 24-hour rhythm and include periods of darkness in total, with at least one uninterrupted period of darkness of at least four hours lasting at least six hours, excluding dimming periods.”*

Trials conducted under experimental conditions suggest that darkness periods of 7-8 hours are optimal<sup>1,2</sup>, but more research is needed.

Should also consider **quality** of light provided to poultry.



<sup>1</sup>Schwean-Lardner et al. (2012) *Applied Animal Behaviour Science*, 137: 43-52

<sup>2</sup>Schwean-Lardner et al. (2013) *Poultry Science*, 92: 1-11

# Providing natural light to broilers



	Natural light	No natural light
Light intensity (lux)	85.2	11.4
UV levels (mW/cm <sup>2</sup> )	3.37	0

- Increases bird activity levels<sup>1,2</sup>
- Improves leg health<sup>1</sup>
- Improves litter quality<sup>1</sup>
- No adverse effects on performance<sup>1</sup>

<sup>1</sup>Bailie et al. (2013) *Animal*, 7: 618-626

<sup>2</sup>de Jong and Gunnink (2019) *Animal*, 13: 384-391

# Stocking density - EU Directive 2007/43/EC

*“Member States shall ensure that the maximum stocking density in a holding or a house of a holding does not at any time exceed 33 kg/m<sup>2</sup>”*

*“Member States shall ensure that, when a derogation is granted under paragraph 3, the maximum stocking density in a holding or a house of a holding does not at any time exceed 39 kg/m<sup>2</sup>”*

*“When the criteria set out in Annex V are fulfilled, Member States may allow that the maximum stocking density referred to in paragraph 4 be increased by a maximum of 3 kg/m<sup>2</sup>”*

Therefore broiler chickens can be stocked up to 42kg/m<sup>2</sup> provided certain conditions are met

Key ways in which high stocking densities may impact welfare include: difficulty dissipating heat, reduced litter quality and physical restriction of movement.



# Providing additional space to broilers

	Target stocking density (kg/m <sup>2</sup> )				
	30	34	38	42	46
Gait score 0 (%)	80.8	74.2	76.1	68.0	61.1
Jostling (no./min)	0.32	0.43	0.46	0.57	0.62
Growth rate (g/day)	50.3	49.9	49.7	48.8	47.7

(Dawkins et al. (2004) *Nature*, 427: 342-344)

Other research investigating target stocking densities of 30, 32, 34 or 36 kg/m<sup>2</sup> on commercial farms showed an increase in severity of digital dermatitis lesions with increasing stocking density<sup>(1)</sup>

<sup>1</sup>Baillie et al. (2018) *Poultry Science*, 97: 1503-1510

# Environmental enrichment items

Key to enabling housed broilers to perform more natural, species-specific behaviour (which is important to consumers)

Not mentioned in Directive 2007/43/EC (unlike Directive 2008/120/EC for pigs) but often included as part of industry initiatives

Scientific evidence base shows significant welfare benefits associated with providing items such as perches, foraging/exploratory items and dustbaths

# Perches

Preference tests show us that platform perches are preferred to bars by fast-growing broilers<sup>1</sup>

Platform perches are used at high levels on commercial farms, e.g average levels of 11.5 birds/m<sup>2(2)</sup> to 12.6 birds/m<sup>2(1)</sup> have been shown

Platform perches have been shown to lead to reduced avoidance behaviour<sup>2</sup> (indicative of fear), to improvements in leg health<sup>3</sup> and to promote comfort behaviour<sup>4</sup>



<sup>1</sup>Baillie et al. (2018) *Applied Animal Behaviour Science*, 200: 114-122

<sup>2</sup>Baxter et al. (2020) *Applied Animal Behaviour Science*, 225: 104967

<sup>3</sup>Kaukonen et al. (2017) *Animal*, 11: 864-871.

<sup>4</sup>Bach et al. (2019) *Applied Animal Behaviour Science*, 219: 104840

# Foraging/exploratory items

Pecking objects (see top picture) appear to be used at quite a high level<sup>1</sup> but strong, consistent effects on activity levels or leg health not yet shown

Broilers dismantle straw bales effectively on commercial farms suggesting they engage well with this type of enrichment

They also cluster around straw bales suggesting they offer perceived shelter/protection<sup>2</sup>

Bales are sometimes used as perches and can also help to maintain litter quality – hence multiple benefits



<sup>1</sup>Baxter and O'Connell (2019) *Applied Animal Behaviour Science*, 210: 52-59

<sup>2</sup>Baxter et al. (2018) *Applied Animal Behaviour Science*, 200: pp 78-85

# Dustbathing material

Broilers engage very well with appropriate dustbathing material

They express preferences for different types of dustbathing material when provided in commercial houses<sup>1</sup>

This type of behaviour actually increases as the birds get older<sup>2</sup>

Providing appropriate dustbathing material in commercial broiler houses was also shown to improve gait score at the end of the production cycle<sup>2</sup>



<sup>1</sup>Baxter et al. (2018) *Animal*, 12: 1933-1941

<sup>2</sup>Baxter et al. (2018) *Applied Animal Behaviour Science*, 200: 78-85

# Overall conclusions

- Chickens are naturally active and inquisitive, and opportunities to express these traits should be maximised during rearing.
- Evidence shows that the welfare of broilers in housed systems is affected not only by the *amount* of space provided but also by the *quality* of that space
- Access to natural light and presence of appropriate environmental enrichment items have been scientifically demonstrated to improve the welfare of broilers without compromising performance in commercial systems