



# *Poultry Extension Collaborative newsletter*

A collaboration between Purdue University, University of Maryland,  
North Carolina State University and Virginia Tech

## **Modifications to broiler chicken housing to improve animal welfare**

Conventional housing of broiler chickens raises concern for their welfare. High stocking densities and barren environments have the potential to contribute to lameness, skin lesions (i.e., hock burns, breast burns, footpad dermatitis\*), heat stress, and increased fear that, in turn, can result in piling up and mortality.

Environmental enrichment can mitigate these welfare concerns by increasing activity levels and allowing for opportunities to perform species-specific behaviors which are important to ensure good welfare.

*"Environmental enrichment refers to modifications to an environment with the aim to improve biological functioning of captive animals" - Ruth Newberry, 1995*

Studies investigating different types of enrichments have found a positive effect on broiler welfare due to a more varied behavioral repertoire and decreased laying time.

Some effective enrichments included in this newsletter are:

**elevated platforms, panels or barriers, straw bales, sand or roughage, and novel objects.**



Leonie Jacobs

*Novel objects such as wire balls with hay can be very attractive to broilers*

### Effective enrichment strategies for broilers

- Elevated platforms
- Panels/barriers
- Straw bales
- Sand/roughage
- Novel objects

\* Hock burns, breast burns and footpad dermatitis are brown/black skin lesions (necrosis) due to prolonged contact with litter

## Key characteristics of successful enrichments

- Increase species-specific (natural) behaviors
- Maintain or improve levels of health
- Improve economics of the production system
- Practical to employ
- Add environmental complexity

Van de Weerd and Day, 2009  
Lay et al., 2011

## Elevated platforms

Even after years of strong genetic selection, domestic chickens are motivated to exhibit certain species-specific behaviors, including resting on elevated surfaces.

One way of fulfilling this need is to provide an elevated platform, often consisting of raised plastic slatted areas accessible by ramps. Broilers have shown a preference for raised platforms over perches, probably because platforms are easier to access and balance on compared to perches.



Broilers will use elevated platforms for resting. Image from Helsinki University.

However, use of these structures largely depends on stocking density, design, accessibility, bird age, and their physical condition. It is important to keep in mind that birds are motivated to show perching behavior, but might not be able to do so.

Elevated platforms as environmental enrichment for broilers				
<b>Advantages</b>	Improved leg health as seen through better gait and lower occurrences of tibial dyschondroplasia <sup>1</sup>	Increased prevalence of perching behavior <sup>4</sup>	Decreased disturbances and restlessness for sleeping birds <sup>2</sup>	Long-term use (cost-efficient)
<b>Disadvantages</b>	Risk of breast blisters (swelling of the sternal bursa) from repeated pressure <sup>3*</sup>		Must disinfect after each flock	

<sup>1</sup> Kaukonen et al., 2006

<sup>2</sup> Ventura et al., 2012

<sup>3</sup> Neilson, 2004; Bokkers and Koene, 2003

<sup>4</sup> Baillie and O'Connell, 2016

\*Genotype and sex have a greater impact on these issues than perch use

## Panels or barriers

Broilers commonly rest along the walls of the house, possibly to seek protection while sleeping. This can be an issue, as an uneven distribution of birds in the house can lead to reduced litter quality in those heavily-used areas (increased moisture and noxious chemicals), which can lead to contact dermatitis.

Additionally, when birds kept at high stocking densities gather to rest in a localized part of the house, you can expect an increase in disturbances of resting birds from those who attempt to move to another location.

Therefore, a more evenly distributed flock can be achieved by providing panels or barriers in the middle of the house.

Panels or barriers as environmental enrichment for broilers		
	Panels	Barriers
Advantages	More even distribution <sup>1</sup>	Increased activity <sup>3</sup>
	Reduced disturbances while resting <sup>2</sup>	Decreased occurrences of aggression <sup>4</sup>
		No negative effects on broiler performance (feed conversion, growth, body weight, mortality) <sup>3,4</sup>
Disadvantages	Increased laying time and decreased foraging behavior, possibly due to a higher valued resting place and reduced disturbances <sup>1</sup>	
	Must disinfect after each flock	
	Weaker birds in the flock must work harder to access feed and water	

1 Cornetto and Estevez, 2001a,b  
 2 Cornetto et al., 2002  
 3 Bizeray et al., 2002a  
 4 Ventura et al., 2010



Young pullets utilizing a hay bale

Leonie Jacobs

## Straw bales

Bales of substrate, such as straw or even bundles of wood shavings, can be used to stimulate activity and exploratory behavior in addition to providing a sense of protection while resting.

Straw bales as environmental enrichment for broilers				
Advantages	Decreased time spent resting and sitting <sup>1</sup>	Increased time spent standing and walking <sup>1</sup>	Decreased prevalence of lameness <sup>2</sup>	No effect on slaughter weight, mortality, or number of birds culled <sup>2,3</sup>
Disadvantages	Bales must be replaced with each flock/cost of replacement		Potential to harbor pathogens <sup>4</sup>	

1 Kells et al., 2001  
 2 Baillie et al., 2013  
 3 Baillie and O'Connell, 2014  
 4 Riber et al., 2018

## Sand or roughage

Two important natural (species-specific) behaviors of broiler chickens are foraging and dustbathing. Providing sand or other substrates (like peat, oat husks, or roughage) have been proven to increase time spent on these behaviors. It is possible to provide these substrates within a shallow wooden box or metal rings distributed evenly throughout the house.

## Novel objects

Increasing the complexity of the environment reduces fear in poultry, thus improves animal welfare. This can be achieved by the provision of novel objects, such as colored plastic balls, plastic bottles, mirrors, hanging bundles of string, or other colorful items. The purpose of a novel object is to stimulate exploratory behavior and activity, and possibly inducing play behavior. Broilers will be less fearful towards humans when they have had access to a variety of novel objects.

Providing sand or other substrates as enrichment for broilers		
<b>Advantages</b>	Increased foraging behavior found with sand + bedding with wood shavings <sup>1</sup>	Increased activity level <sup>1,2</sup>
<b>Disadvantages</b>	Continuous cost of replacement	

<sup>1</sup> Arnould et al., 2004

<sup>2</sup> Baxter and O'Connell, 2016

Providing novel objects as enrichment for broilers		
<b>Advantages</b>	Decreased fear of acute stressors <sup>1</sup>	No effect on feed conversion or mortality <sup>1</sup>
<b>Disadvantages</b>	Must disinfect after each flock	Labor to replace objects during grow-out to maintain novelty of objects

<sup>1</sup> Altan et al., 2013

## Final notes

In summary, providing environmental enrichment has many benefits for broiler health. In addition, these enrichments have the potential to increase species-specific behaviors, therefore improving welfare.

However, much is unknown about how stocking density impacts the positive effect of enrichment. Location and number of enrichments is an important factor to consider, as too few enrichments could result in crowding, competition over resources, or may only benefit a small number of birds.

While the mentioned enrichments are shown to have beneficial effects on broiler chicken welfare, it is important to note that research is ongoing to determine effects of specific enrichments on certain aspects of broiler health and productivity.

**Major source for the content of this newsletter, and recommended reading:**

Riber, A. B., H. A. van de Weerd, I. C. de Jong, and S. Steinfeldt. 2018. Review of environmental enrichment for broiler chickens. *Poult. Sci.* 97:378–396. Available at <http://academic.oup.com/ps/article/97/2/378/4683676>

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