

Episode

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INNOVATION

SHOWCASE

November 3, 2021 11AM MT

The colour in the barn! Does wavelength affect broiler production and welfare?

Featuring Dr. Karen Schwean-Lardner, Associate Professor, University of Saskatchewan



VISION

Did you know that bird visual ability is better than yours? Vision is likely the most important of the five senses for birds! And yes – it is better than what humans experience! Birds see in colour, as do humans. However, they actually see more colours than we do – into the ultraviolet spectrum. Their optic system has numerous differences as compared to the human optic system, including numerous differences in the number and types of cones (responsible for vision in bright light). Light impacts humans by reaching the brain through our eyes. That also occurs in poultry, but in addition, light can penetrate through the skull to reach the brain! And interestingly, wavelengths (which correspond to different

light colours; Figure 1) penetrate at different levels, leading to the possibility that different light colours (or wavelengths) could have different effects on birds!

A quick scan through the literature available on the subject of wavelength and broilers demonstrates conflicting results. Much of the literature suggests that blue and/or green light can improve broiler growth. However other research says yellow can do that; still others says white light improves production, while other research suggests there is little impact overall!

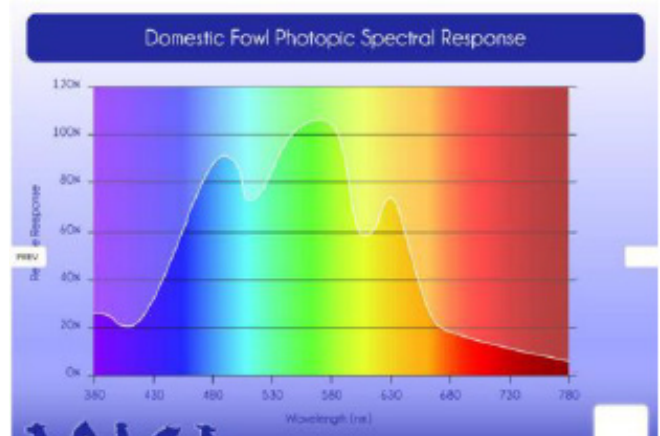


Figure 1. The visible light spectrum.
<https://0.rc.xiniu.com/g2/M00/34/97/CgAGe1oGI8CAD-j0vAAHZyhkMJpg965.png>

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Summary prepared by Bruna Franco and Dr. Karen Schwean-Lardner

“Corrected Lux or ‘Clux’ is what birds actually see

W A V E L E N G T H A N D I N T E N S I T Y

While there could be multiple reasons for these different results, it is important to remember those different visual systems mentioned above. Birds see the intensity of light differently than we do, and wavelength changes that.

“Lux” is the measure of intensity typically used for white light, and it is based on human visual abilities. However, when we compare different wavelengths, the intensity of light is different, and lux is no longer applicable for a comparison across light colors. Rather, “corrected lux” or “clux” should be used, as it is based on what birds actually see. The majority of previous literature has used lux in their works, which means that not only wavelength differs, but so does intensity! This confounds those works, and doesn’t give a clear answer of the effect of light wavelength.

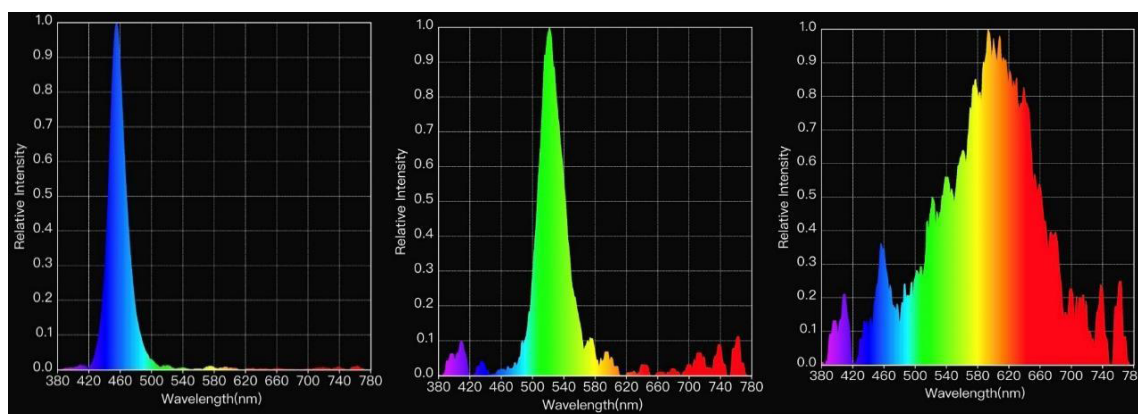


Figure 2. Measurements of light spectrum respectively studied at the University of Saskatchewan, including blue, green and white lighting, respectively.

U N I V E R S I T Y O F S A S K A T C H E W A N W O R K

With this knowledge in mind, Dr. Bruna Franco, a PhD student working with Dr. Schwean-Lardner at the University of Saskatchewan, set out to study the effect of 3 light colors on broiler production and welfare. Equipment was purchased to allow balancing the light intensity using clux, so that light intensity was the same across all three treatments, based on bird visual abilities. Bruna tested blue light (peak intensity 455 nm), green light (peak intensity 510 nm), and white light, which is a combination of different wavelengths (Figure 2). The experiment was repeated, to ensure confidence in these data, and a wide range of measures were taken to ensure we understand these treatments. This included growth, feed efficiency, health, behaviour, footpad lesions, fear and stress, and meat yield.

The results obtained from this study were interesting (and slightly surprising)! We look forward to sharing what we have learned with you!

The Innovation Showcase is presented monthly by the Poultry Innovation Partnership and hosted by Brenda Reimer & Valerie Carney. Learn more at: poultryinnovationpartnership.ca/innovation-showcase

