


Lighting in Housing for Small and Backyard Poultry Flocks

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Light is an important but often overlooked part of an animal's environment. Aside from allowing animals to see their environment, light affects growth, reproduction, and behavior.

Understanding How Light Affects Birds

To devise an effective lighting plan for your poultry house, it's important to understand how birds perceive and respond to light.

Light is part of the electromagnetic spectrum, which is made up of electromagnetic radiation of varying wavelengths. Parts of the electromagnetic spectrum include radio waves, microwaves, infrared light, visible light, ultraviolet light, x-rays, and gamma rays. Visible light is electromagnetic radiation at wavelengths humans can see. We see visible light as colors, with each color determined by wavelength.

Three factors affect an animal's response to light. These factors are wavelength, intensity, and duration. As mentioned, wavelength determines the color of light. The order of the colors of visible light from the shortest wavelength to the longest wavelength is violet, blue, green, yellow, orange, and red. Intensity is the brightness of light. Duration is the number of hours of light an animal is exposed to in a day. Birds are sensitive to wavelengths outside the human visible light spectrum. While we may perceive two different light sources as the same, chickens are able to see wavelengths of light that we may not be able to see. As a result, the behavior of the chickens may be different under the two light sources.

Birds detect light in two ways—through the eyes (retinal receptors) and through photosensitive cells in the brain (extraretinal receptors). For the extraretinal receptors to detect light, the light must pass through the skin and skull of the bird. Long wavelengths (toward the red end of the spectrum) penetrate the skin and skull more efficiently than short wavelengths. Different wavelengths affect birds in different ways. Short wavelengths detected by the retinal receptors affect growth and behavior. In contrast, reproduction is linked to the extraretinal receptors and thus long wavelengths. Also, it has been reported that blue light has a calming effect on birds and that red light can reduce feather pecking and cannibalism. Blue-green light has been shown to stimulate growth, whereas orange-red light stimulates reproduction.

Devising a Lighting Plan

When devising a lighting plan for your poultry house, you should consider lamp type, number of lamps, and placement of lamps.

The most common type of lamp used in poultry houses is the incandescent bulb (shown in Figure 1). Incandescent bulbs produce light by passing an electrical current through a thin tungsten filament, causing the filament to heat and glow. (This glowing due to high temperature is referred to as

incandescence, thus the name for the bulb.) The light produced covers the entire visible light spectrum. Much of the energy produced from the electrical current is converted to heat energy, making the incandescent bulb very energy inefficient.

Fig. 1. Incandescent light bulb. Source: Doug Overhults, University of Kentucky.

Because of increasing energy costs, alternative light sources have become popular for use in poultry houses. The most common of these alternatives is the fluorescent lamp (shown in Figure 2).

Fluorescent lamps produce light by passing an electrical current through a low-pressure vapor or gas contained within the bulb.

The ultraviolet radiation given off is absorbed by a phosphor material that coats the inside of the lamp. The phosphor material then fluoresces, or emits electromagnetic radiation at wavelengths that can be seen as visible light. The wavelengths given off depend on the type of coating used. Fluorescent lamps cost more but have a longer life and use less electrical energy than incandescent bulbs. If you are considering using fluorescent bulbs, keep in mind the following important factors:

- Many fluorescent lamps are not dimmable, so the light in the poultry house cannot be dimmed if cannibalism becomes an issue.
- Fluorescent lamps do not work well, and sometimes do not work at all, in very cold weather.
- The type of fluorescent lamp is important. Hens need warm-white fluorescent lamps to receive the correct spectral output (more orange and red) to maintain production. Chicks benefit from cool-white lamps, which are concentrated in the blue-green wavelengths.

Fig. 2. Compact fluorescent light bulbs without a cover (left) and with a cover (right). Source: Doug Overhults, University of Kentucky.

You should choose the correct number and placement of lamps to produce even light intensity throughout your poultry house. When setting the light intensity it is important to know that fluorescent bulbs lose up to 20 percent of their original light output during their life. If you are using fluorescent lamps, consider this factor when determining light placement. Also, dirty lamps give off decreased light intensity, so you should clean all lamps on a regular basis.



For More Information

[Lighting for Small-Scale Flocks](#), Robert Hawes, University of Maine

[Proper Light Management of Your Home Laying Flock](#), Chad Zadina and Sheila Scheideler, University of Nebraska

[The Science of Poultry Lighting: A Bird's Eye View](#), Once Innovations

