FACT SHEET

Light Source and Positioning for Poultry

Poultry are a light sensitive species for both reproduction and growth. Poultry respond better reproductively in breeding and egg production under the red portion of the light spectrum while birds grow better under the blue-green portion of the light spectrum. Light from the sun covers the whole spectrum of ultraviolet to near ultraviolet (320-380nm) to visible light (380-770 nm), which has a spectrum of light of red through blue-green.

The light spectrum of incandescent lamps very closely mimics the light from the sun. In the visible portion of the incandescent light the radiant wavelengths are maximal in the red and minimal in the blue. Most fluorescent lighting emits wavelengths maximally in the yellow-green range. The introduction of the broader spectrum small, fluorescent fixture has provided the producer with an alternative light source to the incandescent bulb. The light wavelengths of these newer, fluorescent tubes range from the yellow-green through the red portion of the light spectrum. Research has shown that egg production is unaffected using small fluorescent fixtures.

The incandescent bulb emits a light range in excess of the red portion, which is given off as radiant heat. This production of radiant heat expends energy and makes the incandescent inefficient when compared to fluorescent tubes. One would conclude that the incandescent bulb should not be considered for poultry facilities, except that the incandescent light has the capability of being dimmed to very low levels. Using an energy efficient dimmer for incandescent lights reduces the expenditure of electrical energy. Recently dimmable small fluorescent u-tubes have been introduced to the market but the initial cost is a major concern.

Since bird behavior can be modified using low light intensity, the dimability of the incandescent bulb continues to make this light source quite viable in poultry facilities. Incandescent bulbs can be dimmed to less than 10% of the original intensity range of the lamp without any problems. As light intensity is lowered the birds become more docile and activity levels decrease drastically. Reduced activity reduces the birds' energy needs and in turn reduces feed intake. This of course means major bottom line dollar savings.

On the other hand, small fluorescent tubes are less expensive to run and last longer making them a viable alternative if the light intensity doesn't need to be below .5-1.0 foot-candle. The flickering or strobe like effect of fluorescent bulbs when dimmed to low levels limits their use in poultry.

LIGHT POSITIONING RULE: Lights are spaced 1.0-1.5 times the floor to light source height(S=1.5 x H).

Floor pen lighting is directly related to the pen area and the height of the light fixture.

Example: #Lights & Spacing with Pen size =150ft x 40ft x 10ft
Light spacing 1.5 x 10ft =15ft
Lights per row 150ft/15ft = 10
Rows = 40ft/15ft = 2.7 = 3
#Lights = 10 x 3 = 30
Row Spacing = 40ft/3 = 13.3ft
Side walls to light row = 13.3ft/2= 6.7ft

Three rows allows for even light distribution throughout the pen with no light and dark areas. The effect of the 1.5 ft. overlap between light rows is minimal as compared to a 2-row system where light at the wall area is usually far dimmer than under the light source. Proper light numbers insures an even light distribution in the pen, which will reduce bird migration due to light intensity differences.

In pens with cages, as ceiling height dictates the light spacing, the number of cage rows will also dictate light row numbers.

Example: Cage Pen Light #'s

15ft spacing = 10 lights per row
Light rows = # cage rows plus 1 = 4 plus 1 = 5
Alternate rows hang mid-way between = 1 less light/row is required
Lights = 3 rows with 10 & 2 with 9 = (10x3) (9x2) = 48 lights

Alternate positioning allows for light penetration through the cages and a better light distribution throughout the pen. Since cages are composed of several levels, alternate lights in a row will be lowered to be level with the top of the second cage. Since light intensity decreases the farther from the light source, this position allows light to penetrate more evenly into lower level cages. This gives birds on different levels similar light treatment. This procedure is imperative for equipment where waterers are at the back of the cage.

LIGHT REQUIRMENT RULE: Poultry require 2 lumens/ft2 floor area/foot candle of light.

The maximum lighting required by poultry in a pen will dictate the size or wattage of the light source used. The ability to reduce the light intensity will dictate the type of bulb to be used.

Example:
Lighting Required =2 fc max & .25 fc min
6,000ft2 x 2lumens = 12,000 lumens/fc @ 2 fc = 24000 lumens
30 lights/pen: lumens/light = 24000/30 = 800 lumens
48 lights/pen: lumens/light = 24000/48 = 500 lumens @ .25 fc = 6000 lumens
30 lights/pen: lumens/light= 6000/30 = 200 lumens
48 lights/pen: lumens/light = 6000/48 = 141 lumens

This pen could be lit using 60 and 100 watt incandescent bulbs that have an output of 810 and 1600 lumens, respectively. Dimming incandescent lamps would allow the lumens to be reduced to the appropriate light intensity for bird growth. Using 20 watt fluorescent lamps (15 ft spacing) would give the required light intensity, but the ability to dim to 10% of the original intensity as the bird grows is lost.

The incandescent bulb is also well suited for light programs that turn off and on lights for short periods. The life spans of other types of lamps are drastically reduced with this type of program.

References:
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