Lighting in Farrowing Rooms

Foreword

Research work at the University of Georgia in the USA has been carried out on the effect of lighting period on the performance of farrowing sows and has concluded that day-length is important in the production of the hormone prolactin which stimulates milk production.

In the tests, groups of sows were exposed to:

1. a daily lighting regime of 16 hours light and 8 hours dark.
2. a daily lighting regime of 8 hours light and 16 hours dark.

The lighting level was between 400 and 500 lux.

The groups of sows exposed to the 16 hours light period reared approximately one more piglet weaned than the sows with the 8 hours light period.

Light Level

The level of light was not changed in the experiment and no comment was made on the likely effect of different illuminances. However, for any pig farmer who is interested in duplicating, as far as possible, the conditions of the experiment, the following steps set out how to go about achieving a given lighting level in a typical farrowing room.

- Work out the floor area to be lit in square metres (m^2).
- Multiply the floor area by the lighting level to be achieved (lux). This will give the total amount of light required in *lumens*.

Example

For a 12 place room of dimensions 8 x 6m floor area = 48m^2

If the target light level is 400 lux then total illuminance is

400 x 48 = 19,200 lumens

- Because some of the light from lighting fittings is absorbed by the roof, walls, etc., and does not contribute to the lighting level at pig height, an efficiency factor called the coefficient of utilisation has to be applied. This factor depends on the physical dimensions and conditions in the room. In the case of a farrowing room of the size set out in the example, assuming that the internal surfaces are of low reflectivity, the coefficient has been taken as 35%. If the ceiling and walls were very reflective - painted white for instance - the coefficient might be in the order of 50%. It is recommended that, for rooms of significantly different dimensions the coefficeint of utilisation is checked (see References at the end).

With a coefficient of 35% total luminace is:

$$\frac{19,200}{0.35} = 54,900 \text{ lumens}$$

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- At lighting levels of around 400 lux, the most economical lighting source is the fluorescent tube. So, using the following information on the light output of fluorescent tubes, decide on the number of tubes to be used to satisfy the lighting requirement. Remember that a large number of small tubes will produce a more even light distribution than a small number of large tubes.

2ft	18W	1350 lumens
4ft	36W	3350 lumens
5ft	58W	5200 lumens
6ft	70W	6550 lumens
8ft	100W	9400 lumens

In the example using 6ft tubes:

$$\frac{54{,}900}{6550} = 8.38 \text{ tubes (say 8 tubes)}$$

Generally, lighting fittings should be positioned relative to pen walls and other obstructions such that shaded areas are minimised. As far as the light fittings themselves are concerned, it is recommended that these are of the splash-proof type and that wiring work is carried out to the standards laid down in the latest edition of the Institution of Electrical Engineers wiring regulations.

A 24-hour dial type time-switch with an easily accessible over-ride can be used to control the lighting circuit.

References

Light output of fluorescent tubes and coefficient of utilisation are from the Interior Lighting Design Handbook, published by the Lighting Industry Federation Ltd.

Mabry J W; Cunningham F L; Kraeling R R and Rampacet GB (1982). The effect of artificially extended photoperiod during lactation on maternal performance of the sow. Jrnl Anim Sci, 54 918-921.

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