Kvæg PLUS

How light affects your cows - see recommended amount of light in the barn

The length of the day does not matter for the cows' performance and reproductive capacity. Good lighting conditions can cause the performance to increase approx. 5 percent in the milking cows and up to 3.5 kg of milk per day at the barren cows. While good light conditions in the heifers result in earlier oestrus and shorter gestation length.

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LED in a cattle shed. Photo: Archive photo

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Light affects the cows' hormones, both natural and artificial light. When the cow's eye does not detect light, is released

the hormone melatonin in the cow, whereby the concentration of the hormone increases.

Melatonin is called the hormone of darkness, as high melatonin concentration tells the cow that it is night.
Melatonin affects a number of hormones such as prolactin and GnRH. GnRH stimulates the secretion of follicle stimulating hormone (FSH) and luteinizing hormone (LH).

Increased amount of light results in lower melatonin concentration, which stimulates the secretion of FSH. The increased FSH concentration stimulates egg development and increases secretion of the female sex hormone estrogen. Estrogen gives signs of estrus.

It is these mechanisms that cause heifers exposed to 12 hours of light daily to come into heat 4.8 days earlier, compared to heifers exposed to natural day length throughout the winter. Thus, good light conditions can contribute to lowering the calving age by a little over a week.

The study also found that longer day period in the heifers resulted in 6.6 days shorter gestation length. The hormone prolactin probably has an influence on the fact that calving took place earlier.

Prolactin is inhibited by melatonin, thus the prolactin concentration is the opposite of the melatonin concentration. So, with increased day length, the melatonin concentration decreases and the prolactin concentration increases.

The increased amount of prolactin increases the amount of the pregnancy hormone progesterone. Progesterone prepares the foal to form a connection with the fertilized egg(s) so that it can develop into one or more calves.
In addition, progesterone is also responsible for maintaining the pregnancy.

GOLDEN COWS NEED MORE REST

Prolactin also has an influence on the cows' performance, because prolactin stimulates both udder development and milk production itself.

This can partly explain why a Danish study showed that performance in dairy cows increased by approx. 5 percent at 16 hours of light versus the natural day length in the winter.

The opposite effect has been found in barren cows. The Gold cows' performance after calving increased up to 3.5 kg of milk per day at 8 hours of light compared to 16 hours of light in the fallow period. During this period, the cow responds better to 8 hours of light rather than 16 hours of light, unlike the milking cows.

This shows that barren cows have a greater need for rest than milking cows, as daylight (approx. 200 lux) can create unwanted restlessness, especially during the night period.

The increased day length increases the appetite, which activates the digestive hormones, which in turn affect the reproductive hormones. Therefore, it probably also has an influence on the earlier heat and shorter gestation length, as a study showed in RDM heifers.

Likewise, the increased appetite and thus increased feed intake also has an impact on performance.

RECOMMENDED LIGHT AMOUNTS

Based on the above, it is recommended that a daylight length of approx. 200 lux is 14-16 hours in milking cows, 8 hours in barren cows and 12-16 hours in heifers.

Daylight is also called working light. Working lights in the evening and night can create unwanted unrest in the barn.

Therefore, it is recommended to use orientation lights with 25 lux in the late evening and night period, if there is reduced feeding space in the barn and for AMS herds. Otherwise, night lighting with 5 lux is recommended during the night period, which will ensure the cows sleep at night and safe movement in the barn.

Seges has made a tabular overview of the brightness in cattle sheds, see the table below.

Table 1. Recommendations for light in cattle sheds, lux*

Staldafsnit	Arbejdslys, lux	Orienteringslys, lux	Natbelysning, lux
Fodergang	100	25	5
Hvileareal	100	25	5
Opsamlingsplads	100	-	-
Malkestald og malkerum/tankrum	200	-	-
Kælvningsafdeling	200	25	5
Behandlingsafdeling	200	25	5
AMS	200	25	5
Slagtekalvestald	100	25	5
Kalvestald	100	25	5
Kødkvægstald	100	25	5
**Lysstyrkemålinger skal følge Dansk Standard (www.ds.dk).*			

FACT BOX

3 good tips

- Check the brightness of your farm and take action from there. It can improve your performance and reproduction.
- Remember that soiled barn furniture and lighting fixtures reduce the effect of the lighting and light reflection in the barn.
- LED fixtures can provide more creepage than old-fashioned fluorescent tubes. This can affect the queues negatively, so that the desired effect is not achieved with an increased amount of light.