

FACT SHEET



Department of Animal Science,
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Effective Horse Management – Horse Management Series

Lighting and Your Horse

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At a meeting I attended, Dr. Barbara Murphy from University College in Dublin, Ireland spoke about circadian and circannual regulation in the horse: internal timing in an equine athlete. A circadian rhythm lasts approximately 24 hours and exists under constant conditions. It can be synchronized by external signals (light/dark are the most important) and is endogenously (within the body) generated. It is unaffected by changes in temperature. Feeding and exercise schedules are secondary cues that help synchronize circadian rhythms. Nearly half of all genes are turned on and off rhythmically in a circadian manner somewhere in the body. A circannual rhythm lasts approximately 365 days and also persists under constant conditions. It can be synchronized by external signals like light. Weather conditions have a secondary impact, as does higher levels of nutrition.

Natural daylight contains a lot of blue light. Incandescent bulbs are primarily orange/yellow light while fluorescent bulbs have very little blue light. For a long time we have put mares under lights to simulate a longer day length to induce earlier ovulations and also assist

with hair coat shedding, Dr. Murphy developed the Equilume light mask which emits blue light into just one eye and found it worked just as well as bright 200 watt barn lighting at influencing hormone rhythms in the horse. Her research showed mares that wore light masks during the last 100 days of pregnancy had shorter gestation lengths, and delivered foals that were 8.4 lb heavier, stood 15 minutes faster, and had shorter, finer hair coats. All of these benefits were attributed to the mare's experiencing a longer day length prior to foaling that mimics the longer days of spring.

To maintain a summer coat in a show horse, horse owners can start using blue light therapy before July 21 according to Dr. Murphy's research findings. This extends the long summer days for the horse. Blue light therapy can also be used to shed out a winter coat earlier in the year. Keep in mind that it takes 6 weeks for an animal to respond to a change in lighting. . In addition to lighting better coat condition is linked to warm stables where horses are fed well.

The benefit of using red light in horse barns when doing nighttime chores was another interesting finding of Dr. Murphy's studies. Unlike white light, red light does not disrupt sleep rhythms such as those for melatonin. Horses are prey animals that react to threat and when we turn on bright lights after dark, it makes them more reactive. Using red light yields less intrusive nighttime interactions and facilitates a better appetite and more rest overnight.

Another finding Dr. Murphy discussed was that exercise is a known synchronizer of circadian rhythms. Exercise synchronizes gene expression in equine skeletal muscle and regulates muscle metabolism. It was found that, when training routinely occurs at a specific hour of the day, the horse's circadian rhythm becomes set to yield optimal muscle performance at that precise time of training. Given that, could competing or performing strenuous exercise at a time that disagrees with the normal training time, increase the risk of injury? The answer to that question is still being researched. However, Dr. Murphy's research did find that when traveling with horses to areas with a very different day length from where your horse lives, they will perform better at the destination if they perform as soon as they arrive or 3-4 weeks after arrival. Many give a horse one week to acclimate to the new place, but Dr. Murphy's finding suggest that is not optimal for performance as circadian rhythms need time to shift to the new light-dark cycle. Human travelers experience this issue as jet lag.

With the use of blue light therapy you can reduce the number of short winter days a horse experiences, but it does need to "see" typical winter day length at some point. Because of the horse's internal circannual rhythm, allowing the horse to see winter will reboot the horse's body clock so it will again physiologically respond well to the longer days of spring and summer. Therefore, owners should NOT expose their horses to artificially created summertime day length all winter long.

Every day, new discoveries are made that benefit the equine industry. Your equine extension specialists, professors and researchers are constantly working to improve horse health and well-being. I hope that you will reflect on this article and perhaps make a donation to an area of equine research, teaching, or outreach you find beneficial. Feel free to email with any questions you have at jenifer.nadeau@uconn.edu. Also, check out my web site <http://animalscience.uconn.edu/equine/extension/extensionIndex.php> for more information on upcoming horse specialist events and information. Thanks, and have fun with your horses!

References

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Murphy BA, Walsh CM, Woodward EM, Prendergast RL, Ryle JP, Fallon LH, et al. Blue light from individual light masks directed at a single eye advances the breeding season in mares. *Equine Veterinary Journal* 46 (2014): 23, 448-500.

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