

## Let there be light

It is common knowledge that exposing dry mares to artificial lights advances the breeding season, but how does this work and are the gains worthwhile?

Mares are long day, seasonal breeders. Meaning their regular oestrous cycle occurs in response to increasing day length.

Over the winter (increased periods of darkness) the pineal gland in the brain releases the hormone melatonin. At the same time the mare secretes less gonadotrophin-releasing hormone (GnRH) and luteinising hormone (LH). The change in these hormones results in a period of anoestrus (stops cycling). As days lengthen, melatonin production decreases and GnRH secretion increases causing the anterior pituitary gland to release LH. These changes allow the mare to transition back to normal cyclicity.

The transitional period (between winter anoestrus and oestrus) can last 60-80 days. It is characterized by multiple waves of follicular growth and regression and can be associated with erratic oestrus behaviour. These transitional heats are not fertile and can be frustrating for broodmare managers and vets.

Factors other than day length, that affect duration of anestrus and onset of spring transition include; latitude, climate, age, body condition and nutrition. Mares in good body condition begin cycling on average a month earlier than mares in poor condition. Similarly, an increasing plane of nutrition or grazing green pasture is associated with earlier returns to cycling. Younger mares cycle earlier than older mares. Ambient temperature is also a factor.

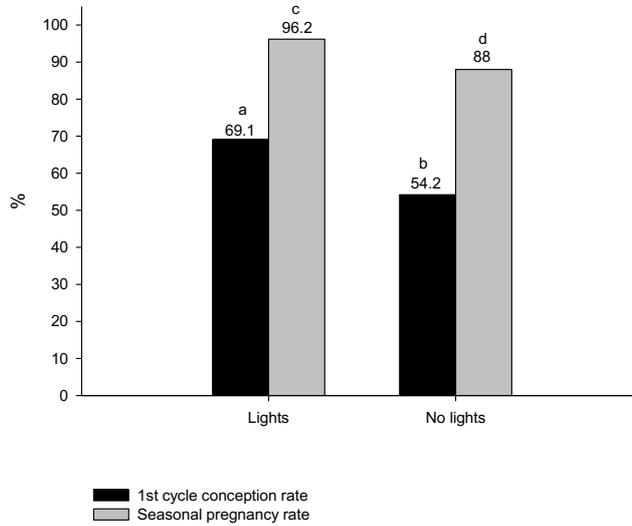
A New Zealand study looking at reproductive performance of Thoroughbred mares in the Waikato region, showed light exposure significantly increased the odds of dry mares conceiving by the end of the season. This occurred due to a combination of an increased first cycle pregnancy rate and increased number of service opportunities in a season. The start of mating to conception interval was also shorter in dry mares under lights.

### Effect of light exposure - dry mares

	Lights <sup>a</sup>	No lights <sup>b</sup>
Number	209	393
Mares served in Sept. (%)	98.6	39.5
Mean days to 1 <sup>st</sup> service	8.8	38.5
Median days to conception	19	51
PR to 1 <sup>st</sup> service (%)	69.1	54.2
Twins at 15 days (%)	14.6	9.6
Seasonal pregnancy rate (%)	96.2	88.0

<sup>a,b</sup> All values within the same row are significantly different P<0.05

Effect of light exposure on reproductive performance



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Hanlon DW, Stevenson M, Evans MJ, Firth EC. Reproductive performance of Thoroughbred mares in the Waikato region of New Zealand: 2. Multivariable analyses and sources of variation at the mare, stallion and stud farm level. *New Zealand Veterinary Journal* 60(6), 335-343, 2012.

### Light protocol

An artificial light protocol should begin 60 days prior to the start of the breeding season as mares still need to transition. It is generally agreed that a minimum of 14.5 hours of continuous light, at an intensity of 107 lux (the equivalent of a 100-watt bulb in a 3x3m stable) is required.

A common regime is to extend light exposure at the end of the day giving 15-16 hours of light followed by 8-9 hours of dark. This is easily implemented by housing or yarding mares in the evening with lights coming on before dusk and with a timer to turn them off a few hours later.

Providing artificial light to simulate increased day length before the start of breeding in dry mares is relatively easy and can significantly improve reproductive performance.

**A filly that starts her breeding career under lights and is placed under lights when dry (not in foal) has on average 3 more foals over the span of her breeding career.**

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