

BENEFITS FOR STALLIONS

THE HORSE: A LONG-DAY BREEDER

Horses are long-day seasonal breeders, with reproductive activity coinciding with the long days of spring and summer, while the non-breeding season is associated with the shorter days of autumn and winter. This circannual (yearly) rhythm ensures that after an approximate 11-month gestation period, environmental conditions such as temperature and grass growth are optimal for foals to thrive. While stallions, unlike mares, are capable of breeding all year round, there are significant improvements in reproductive performance associated with the spring and summer months.

LIGHT SIGNALS STIMULATE REPRODUCTIVE ACTIVITY

Nature conveys the signal for the breeding season to start through the gradual increases in daylength in spring. Daylight synchronizes the horse's 'internal clock' – a complex control system that coordinates all physiological functions to a 24-hour (circadian) or 365-day (circannual) rhythm. Light suppresses the production of melatonin, a hormone also known as the hormone of darkness, which in turn regulates the release of hormones involved in reproduction and fertility.

As days get longer, a reduction in melatonin is associated with a rise in testosterone levels in stallions. Similar hormonal changes in response to daylength occur in mares, which makes the daily duration of light key to getting the breeding season underway. As daylength shortens in the autumn and the duration of melatonin production increases, reproductive activity in both stallions and mares is suppressed and they enter the non-breeding season.



"We started using the Equilume Stable Lights to increase early season fertility and have seen them work to great effect. Our stallions are seeing a higher percentage of mares get in foal earlier in the year than before we installed the Equilume system, which is great for the stallions and also for our breeders."

"As well as increasing early season fertility the stallions look fantastic under these Lights, they're dappled out and their coats are in great condition."

Larry Walton, Stallion Manager, Hill 'n' Dale, USA

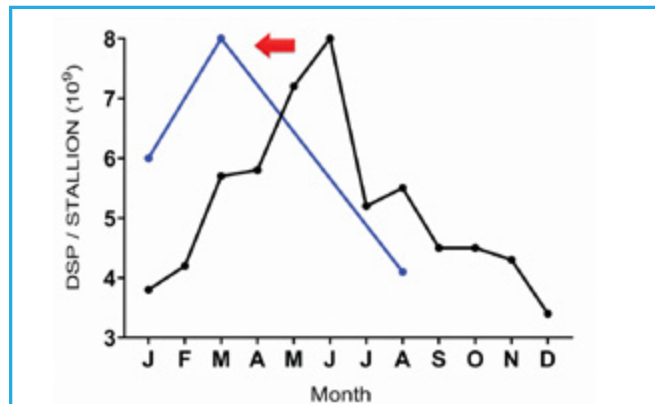
ADVANCING THE SEASON OF OPTIMUM FERTILITY

Exposing mares and stallions to longer hours of light during winter advances the perceived timing of spring and therefore the onset of reproductive activity. However, it is not only the duration of light exposure, but also the quality and consistency of light and the elimination of white light pollution at night that matters. Natural light has a high amount of blue wavelength light. In contrast, ordinary indoor lighting is low in the stimulating blue wavelengths of light. It is also important that horses experience at least 6 hours of darkness of red light at night.

Dim red light has been shown in scientific studies to permit the nightly rise of melatonin in horses, ensuring that rest and recovery is optimised (Murphy et al., 2019). By providing the optimal light spectrum and duration, incorporating biological effective blue light, Equilume Performance Lighting advances and extends the season of optimum fertility for stallions, in addition to many other health benefits.

Long day lighting (16h L: 8h D) commencing in December will advance the timing of peak stallion fertility (blue line). A doubling in Daily Sperm Production (DSP) was previously observed between January and June. This increase in DSP can be timed to occur earlier using light. (Data reproduced from Pickett et al., 1989 and Clay et al., 1987).

PERFORMANCE LIGHT

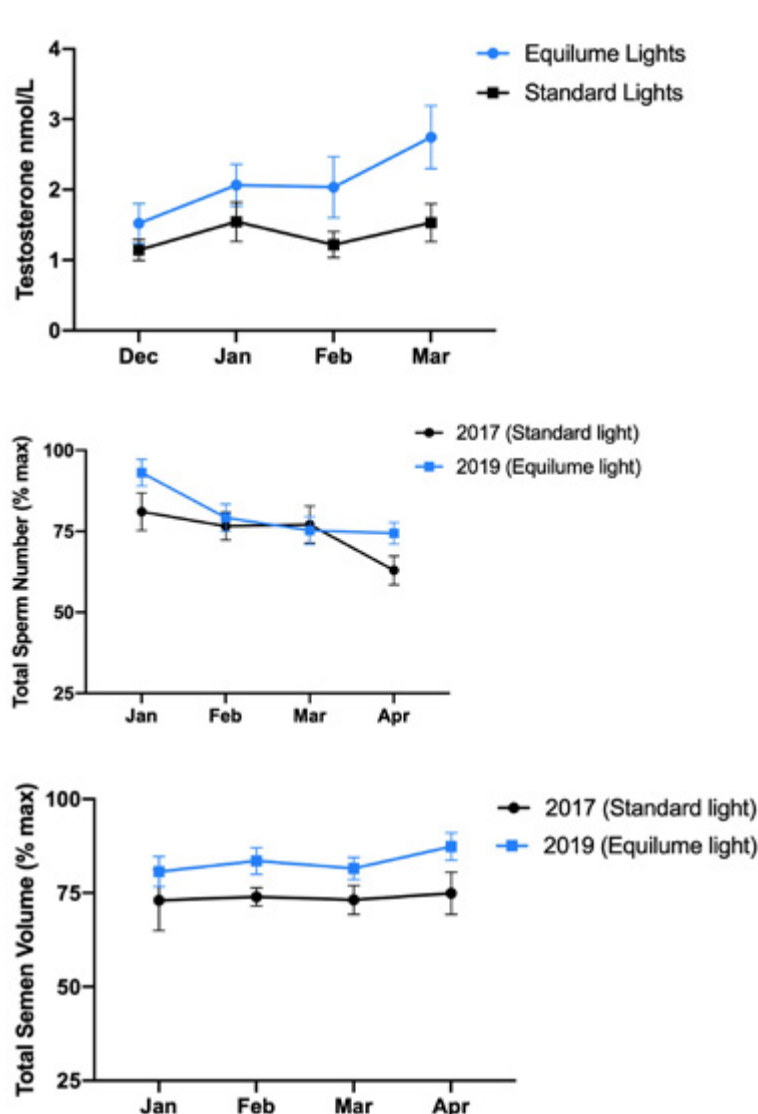


SCIENTIFICALLY PROVEN RESULTS

Levels of the hormone testosterone are an indicator of stallion fertility and libido. A 2019 study evaluating the effect of optimum lighting on testosterone levels and additional semen parameters in 24 Sport Horse stallions was conducted over a six-month period at a prestigious stud in Germany. Beginning in late autumn, 12 stallions were maintained under the Equilume Stable Light 'Long Day' lighting programme (Group 1) which provided 17.5 hours of blue-enriched polychromatic fluorescent light daily, gradual transitions at dawn and dusk and red light at night.

The remaining 12 stallions were maintained under approx. 12 hours of light using standard fluorescent lights (Group 2). Blood samples were taken at the beginning of Dec, Jan, Feb, Mar and Apr. Statistical analysis revealed a significant effect ($P < 0.05$) of light treatment on testosterone levels. Stallions under the Equilume Stable Lights (Group 1) had consistently higher testosterone levels than stallions under standard fluorescent lights (Group 2). In addition, Total Semen Volume was increased throughout the season and Total Sperm Production was higher in Jan and in Apr when compared to data from the same stallions in 2017.

Staff at the yard also reported shorter, sleeker coats in the stallions under the Equilume Stable Lights. Figure: Testosterone levels in stallions under the Equilume Stable Light (Group 1) and under Standard stable light (Group 2) between December and April. Also graphed are the Total Sperm Number and Total Semen Volume for the same 12 stallions in 2017 (Standard lights) and in 2019 (Equilume Lights).



"After consultation with our vets Cambridge Equine Hospital and, in particular, Dr. Robert Hitchcock, we decided to install Equilume lighting in our new stallion barn, built during 2019. Dr. Hitchcock said the results of testing from the Equilume lighting systems had been very positive and we had four stallions under these lights last year."

"We were very pleased with the returns from all stallions, but particularly our French shuttle stallion Almanzor and first season sire Embellish, both of whom covered books in excess of 140 mares and achieved pregnancy rates in the low 90's after all testing was complete."

Henry Plumptre, CEO, Cambridge Stud, NZ

**CAMBRIDGE
STUD**

ADDITIONAL BENEFITS

Equilume Performance Lighting regulates the daily (circadian) and seasonal (circannual) rhythms in behaviour, reproduction, coat condition and performance. In addition, blue-enriched light boosts activity, metabolism, alertness and appetite and acts as a natural air sanitizer by reducing growth of microbes. The benefits of Equilume Performance Lighting are summarized here:

HEALTH

- Strengthen immune system
- Enhance mood and alertness
- Accelerate wound healing

PERFORMANCE

- Increases muscle mass
- Improve appetite
- Maintain top-line
- Advance season of peak performance

COAT CONDITION

- Accelerate winter shedding
- Maintain summer coat condition
- Reduce or eliminate clipping

