



RED DEER IN A FARM SYSTEM

Reproduction

Reproductive productivity of the breeding herd is central to productivity to deer farming. Reproductive performance has been limiting potential on many farms for many years. The following topics will help you assess the components of reproductive productivity and performance

Effect of photoperiod (day length) on breeding

What is photoperiod?

Seasonality in deer is regulated by daylength, technically known as 'photoperiod'. Photoperiod is the relative amount of light to dark (day to night) in a 24-hour period. The photoperiod observed for a particular place is not constant during the year, but the pattern of change over the year is constant.

Why does photoperiod change?

As the earth orbits the sun on a particular trajectory, it spins daily on its axis. That trajectory and angle of the axis change the amount of exposure a particular place has to the sun throughout the period of orbit (365 ¼ days).

What are the effects?

At the equator, photoperiod changes very little during the year, but with increasing latitude from the equator, photoperiod changes dramatically between seasons. Daylight intervals are longest at the summer solstice and shortest at the winter solstice. The most dramatic differences occur at the poles, where there is virtually no darkness in summer and no daylight in winter. In the UK the amount of daylight in a day changes from 16-18 hours at the summer solstice to 6-8 hours at the winter solstice. However, for any particular place, the photoperiod changes that occur during the year are the same every year. This is a very important factor to bear in mind when considering the seasonal life patterns of all deer located at that place.

Deer synchronise their annual patterns of reproduction, growth, coat moult, antler growth and other aspects of physiology to photoperiod.

How do deer respond to changes in photoperiod?

The animal perceives changes in the daylight:nighttime ratio through its eyes, via the optic nerve to the brain. The pineal gland in the brain produces and secretes a hormone called melatonin during the hours of darkness. As the length of night increases during late summer through to winter, the total duration of melatonin secretion ... and therefore volume of melatonin produced ... increases. The amount of melatonin produced controls the rate of production of other hormones involved in processes such as reproduction.

What is the effect of photoperiod on breeding?

As the day length decreases going from summer into winter, the increase in melatonin production cues the development of reproductive function in both the ovaries of hinds and the testes of stags, leading to the mating season (rut) in autumn. This is why red deer are often referred to as 'short-day breeders'. Thus, photoperiod controls the timing of conceptions in hinds.

Why is photoperiod important in deer breeding?

Offspring survival is key to evolutionary success. Calf survival is optimised if calving occurs during the most clement weather. As gestation is approximately 234 days (roughly 8 months), deer require a reliable early predictor of summer to ensure their future calves have the best chance of survival. Using weather patterns alone to cue the mating season would be problematic as weather patterns are notoriously unpredictable and variable between years at any given locality. However, photoperiod patterns show no variation at any given locality and accurately mark the changing seasons. Deer achieve calving at the optimum time by using photoperiod as a predictor of future weather patterns and time conception to fit in with that.

Can we control photoperiod?

Unfortunately we cannot change daylight patterns on the planet. Artificially, we could change the way deer perceive photoperiod by the use of melatonin or artificial lighting systems. However, these interventions find little favour in an industry that prides itself on, and seeks to maintain, its reputation in the marketplace as a producer of deer from natural farming systems.

It is more important to understand how photoperiod influences venison production systems and to manage deer within the constraints of the animals' natural physiology. For example, photoperiod influences voluntary feed intake of red deer and feeding management needs to take this into account