

# Let there be light

There's no foolproof method of encouraging mares to cycle early in the breeding season but the use of artificial light can be of huge benefit, as well as good nutrition and the use of rugs in maiden mares, but it must be remembered that what works for some will not necessarily work for others

Any time after January 1 we welcome the first foals of the new northern hemisphere breeding season. The days are getting longer but it is still cold, wet and muddy and that is not the environment that nature intended for our equine babies. Left to their own devices, most thoroughbred mares wouldn't foal before March and foaling would continue until much later in the year.

The beginning and end of the thoroughbred breeding seasons have been 'decided' by humans, not dictated by nature, and there are economic pressures to produce foals early in the year. Certainly, as two-year olds, there seems to be an advantage on the racecourse for those horses born earlier in the year and this has a knock-on effect on their value at sale as foals and yearlings.

However, this pressure to have foals born early in the year means we are working against the mare's normal physiology. Mares are 'seasonally polyoestrous' which means that they come into season (oestrus) at regular intervals during part of the year – essentially spring and summer – and then normally have a period of a few months (anoestrus) during which they do not cycle. This period of anoestrus is usually around November to January but might persist into March or April in some mares.

There is no sudden switch from being anoestrus to having regular, fertile oestrus cycles. Instead there is a transitional period (the vernal transition) during which a fairly predictable series of events occurs. During anoestrus the ovaries are inactive and on rectal palpation and ultrasound examination will look and feel small and firm. The anoestrus mare might display rather confusing behavioural signs, being either indifferent or aggressive towards a



Figure 1 A mare and foal in the snow – not what nature intended

stallion.

During the transitional phase, production of gonadotrophin-releasing hormone (GnRH) by the hypothalamus begins and this prompts the release of follicle-stimulating hormone (FSH) from the pituitary gland. FSH acts on the ovaries to stimulate the development of follicles. In the early transitional stages, the follicles will grow in size but do not ovulate. Later, the production of luteinising hormone (LH) also by the pituitary gland, results in the first ovulation of the season.

One of the known triggers for production of GnRH is increasing day length acting via receptors in the eye. However, although the days start getting longer in late December, GnRH production is not detected until February, around six weeks later. According to work done in the USA, the mean date for the first ovulation of the

year is April 7, plus or minus nine days, and there might be almost 60 days between first detection of follicular development and the first ovulation of the season. In total, between December 21, when the days start getting longer, and the mare's first ovulation could be around 100 days under natural conditions. Obviously, some mares will fall outside this 'average' and either cycle and ovulate sooner or later than this.

Transitional mares might show oestrus behaviour for much longer periods than their normal five-ish days. Additionally, it is not possible to differentiate between early follicles that will ovulate and those that won't. Having repeatedly to check these mares either by manual rectal palpation and/or ultrasound to try to predict their first ovulation can become expensive and time-consuming. Blood samples

to check progesterone levels can be useful as progesterone only increases after ovulation. After the first ovulation of the season, most mares will fall into a more regular and predictable pattern.

Pregnant mares are also subject to the same hormonal changes brought about by the increasing day length, but obviously they don't start cycling or ovulating until after they have foaled. They might enter a period of lactational anoestrus after foaling which can delay or even prevent their return to normal reproductive activity.

## The options

Breeders can choose to leave mares and wait for them to pass through the transitional period and start cycling normally. This might necessitate regular vet examinations or teasing to detect changes in the mare's status or simply delaying the first gynaecological examination until late March or early April. The advantage of doing this is that it keeps veterinary costs down but it might mean accepting that foals won't be born until, at the earliest, March or April the following year.

The other alternative is to 'interfere' and try to encourage the mare to cycle earlier in the year. There are a few methods that can be attempted but it is important to appreciate that many of the 'schemes' used to try to stimulate early onset of the breeding season do not provide convincing or repeatable results and no method is 100% effective in any one mare or group of mares. It can also be expensive and time-consuming to monitor mares, either by repeated examinations or blood tests, when trying to determine if they are responding to the method being used.

Breeders must not underestimate the value of teasing mares to help determine what stage they are in their breeding cycle. Knowing a mare is not demonstrating oestrus behaviour to a teaser can mean she doesn't need to be checked by the vet. Not using an equine teaser often means that your vet might have to perform frequent examinations to monitor her ovarian activity and this can become expensive and frustrating in a transitional mare. Exposure to stallion pheromones might also help to stimulate regularity in a mare's cycle.

## The power of light

One of the most reliable ways to stimulate early onset of regular cycling in mares is the use of artificial light.



Figure 2 Some of the prescription-only medicines that might be used to encourage mares to cycle early

A minimum of 35 days of more than 16 hours of light per day (or more precisely, the absence of more than eight hours of darkness) is the best stimulus to early season cycling.

The transitional period is not shortened by the use of light but it is brought forward. Therefore to be effective and advance the timing of the first ovulation to mid-February, the use of artificial light must begin no later than December 1. I know many breeders wait until after the end of the December sales, just because that fits in better with their other commitments and that works for them. Little more than 10 lux is required so sufficient light can be provided by a 100-watt bulb in a stable or the use of flood lights in a small paddock. A commercially available mask (Equilume®) provides blue light reflected into one eye and there is some evidence to indicate that this is effective in a percentage of mares. (Murphy et al EVJ).

## Body condition

Body score (condition) is another effective tool to improve cyclic activity. Well-fed mares often cycle all year round or have a relatively short anoestrus period. Supplementary feed and providing rugs for maiden mares can be a useful aid to getting these mares to cycle. I am always horrified to see many fillies sent home from training yards either at the end of the racing season or after the sales and being turned out in fit, lean condition without a rug – and often having been clipped not long before hand. These fillies have very low fat reserves and need additional feed just to keep warm. As a result, they can be very slow to start cycling. Mares should not be overweight, but should be in good condition and not allowed to lose weight through the colder months. The concept of 'flushing', ie keeping a barren mare thin and then significantly

increasing her feed in the early part of the year, has somewhat gone out of fashion but is still favoured by some breeders.

## Hormonal 'treatments'

Pure pituitary extract and GnRH are expensive and not available commercially. The nearest alternative is to administer a GnRH analogue either as a subcutaneous implant or as a daily or twice-daily injection. This is usually given for a period of up to 10 days. This regime may or may not be effective in anoestrus mares and in some cases, while follicular development occurs, ovulation does not follow. It can be an expensive option and frequent teasing and checking of treated mares will be necessary as time to response, when it does occur, is unpredictable.

If a mare is transitional and is producing follicles which fail to ovulate, using a progesterone medication such as oral altrenogest (eg Regumate) for a period of 10 to 14 days will often advance the onset of an ovulation and also appears to increase the sensitivity of the first subsequent large follicle to ovulatory agents such as human chorionic gonadotrophin (hCG). Progesterone can also be administered via a progesterone impregnated intravaginal device (PRID) or using depo injections weekly. It is important to tease and/or check mares within 48 hours of coming off progesterone as some will ovulate quite quickly.

Others might have ovulated 'silently' and will need an injection of prostaglandin (PG) to bring them into season. It is best to check their blood progesterone level before administering PG if there is any doubt otherwise it is easy to 'lose track' of what the mare's reproductive tract might be doing or attempting to do. Altrenogest is very useful for 'holding' mares that are known to have ovulated before the start of the covering season so that they can be synchronised with the start of the covering season.

In theory, using dopamine antagonists such as domperidone and sulpiride (5mg/kg per day) should facilitate the development and/or ovulation of follicles but results are very variable. In one study, administering domperidone orally at 1.1 mg/kg bodyweight daily for 10 days stimulated follicular development within 10 days and brought forward the mean date of ovulation. At current prices, these medicines might be a cheaper option for breeders who want to 'try

» something' but who don't want to use the more expensive treatments.

## Combinations of treatments

Because of variable response to hormonal manipulation during the transitional phase, some researchers (Wolfsdorf et al) have tried combining a lighting protocol of 16 hours of artificial light per day for a minimum of two weeks followed by daily intramuscular injections of buserelin (a synthetic GnRH analogue). The mares were examined via transrectal ultrasound starting a few days after initiation of treatment and were given an ovulation agent once a 3.5-4 cm follicle was detected. They found that just over 90% of transitional mares ovulated using this regime compared to around 60% of anoestrus mares and average length of treatment was 10.4 days.

There might be other regimes and interventions used either on the back of a breeder's own experience or on the recommendation of their own vet that have not been mentioned here. Cost and practicality are important considerations when trying to decide

whether or not to try to get a mare to cycle early in the breeding season but it is also worth remembering that mares are not machines and don't read text books. While a majority of mares might respond to a particular treatment or programme, there will always be those that don't.

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