

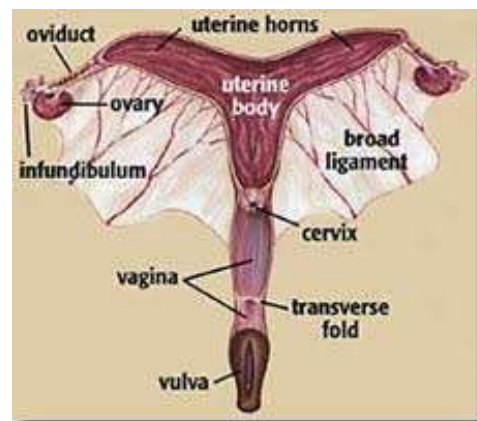
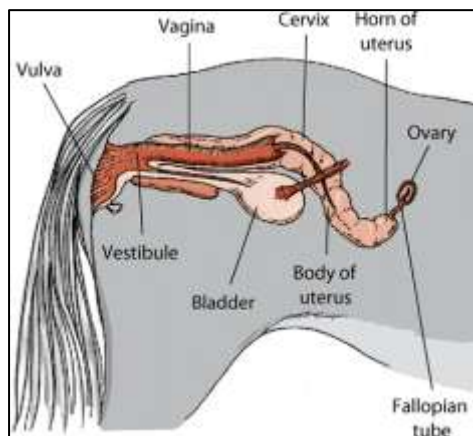
A brief overview of the mare's reproductive anatomy and physiology

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A fundamental understanding of the mare's reproductive anatomy and physiology is essential for any horse breeder wanting to maximise reproductive performance.

ANATOMY

The mare's reproductive tract starts at the vulva and extends horizontally to the vagina, cervix, uterus fallopian tubes and ovaries, and is situated within the pelvic and abdominal cavity.



The Vulva is the external opening to the reproductive tract and its main function is to exclude air and foreign materials. The vulval labia should be vertical and tightly closed. Poor confirmation, such as a sunken anus, trauma from previous foaling or Caslick procedures, can result in the labia to remaining separated. This increases the risk of faecal contamination and drying of the vagina and hence infection (vaginitis)

The vagina, an elastic muscular tube, connects the vulva to the cervix.

Trauma or infection, as a result of previous matings or births can lead to scarring, adhesions and urine pooling, all of which will can reduce fertility.

The cervix is a powerful muscular ring serving as the portal to the uterus.

It is under the influence of hormones, with oestrogen stimulating it to relax and produce thin watery mucous during oestrous (heat) thus aiding the mating process. During pregnancy, under the control of progesterone, it is tightly closed and covered with thick tacky mucous, forming an effective barrier against contamination and infection.

Again, trauma to the cervix during breeding or foaling can lead to constrictions and fibrosis (loss of elasticity), increasing the risk of uterine infections, abortions and foaling problems.

The uterus is a “Y” shaped hollow muscular structure, suspended from the roof of the abdominal cavity by two ligaments. With its complex multi-layered structure, its main function is to protect, nourish and ultimately expel the foetus.

Sagging of the ligaments due to age, trauma or just multiple pregnancies can alter the orientation, resulting in pooling of fluid or mucous, adversely affecting fertility.

The oviducts connect the tip of the uterus to the ovaries, and this is where fertilisation takes place.

The ovaries are kidney bean shaped and the size of a tennis ball during the breeding season.

During the breeding season, multiple follicles start to mature simultaneously, under the influence of different hormones. At each cycle, one follicle becomes the dominant, thus suppressing all others, while it matures and ultimately ruptures, releasing the ovum (ovulation).

These follicles are easily detected using Ultrasound. Being able to measure their size, knowing daily growth rates and pre-ovulatory size, allow for an accurate prediction of ovulation.

It is worth noting that, Clydesdales have much larger follicles than Thoroughbreds and light horses, in some cases up to twice the size. Whereas Thoroughbreds generally ovulate at 35-40mm, most Clydesdales don't start displaying behavioural oestrous or stand for the stallion until their follicles have reached 50mm in diameter.

Under optimal conditions, follicles grow roughly 3mm/day up to 50mm diameter, 5mm/day from 50 up to 60mm and 10mm/day until ovulation at about 70-80mm.



Immature follicles

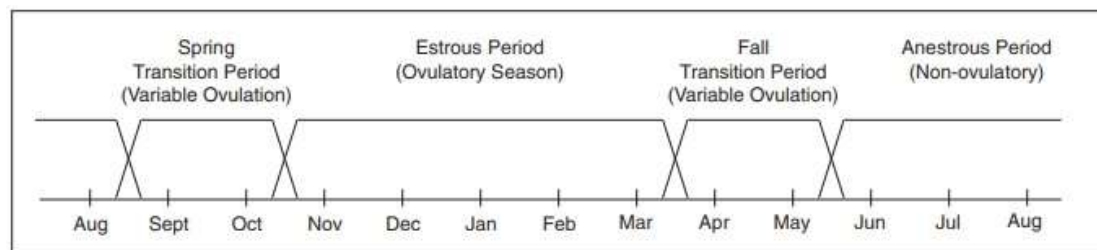


Pre-ovulatory follicle

Reproductive Physiology.

Mares are 'long day breeders'. Seasonal oestrous activity is stimulated by increasing day light hours, gradually transitioning from being anoestrous (inactive) during the winter to normal ovarian activity over about 60-80 days, typically once day light hours reach >12hrs. This transition period is often associated with erratic oestrous behaviour and infertile heats. Similarly, towards the end of the breeding season as days shorten to < 12hrs, ovarian activity gradually decreases.

Thoroughbred studs commonly use exposure to artificial light to hasten the onset of the breeding season.



Other factors affecting onset of ovarian activity include climate, age, body condition and nutrition.

Typical oestrous behaviour in the mare is under the influence of oestrogen secreted by the dominant follicle and includes seeking out the stallion, squatting, raising the tail, urinating small amounts frequently and 'winking' of the vulva. This behaviour ceases within 24-48 hours after ovulation as the mare enters the next phase (dioestrous) of the cycle, which is marked by the formation of a corpus luteum (CL) in place of the follicle. Progesterone secreted by the CL, in turn alters behavioural signs when exposed to a stallion, now resulting in tail swishing, ears back, squealing, striking, kicking and biting.

If conception has failed the uterus will secrete prostaglandin, resulting in the regression of the CL, allowing another crop of follicles to grow. And so it starts all over again.

However, if fertilisation is successful, the presence of an embryo in the uterus by day 14 signals the ovaries to stop oestrous activity and the corpus luteum remains to continue maintaining the pregnancy.

By day 35, a phenomenon unique to equines occurs, the formation of endometrial cups in placenta. These structures secrete a hormone to stimulate the growth of several accessory CL's which help maintain pregnancy through to about 120 days.

This is the reason why embryonic loss or the use of Prostaglandin after day 35 of pregnancy, will not result in the mare returning to oestrous.

This is an important fact to consider in the breeding management of horses.

Facts to consider for optimal reproductive performance of the mare

- *Selection of mares suitable for breeding-* i.e. good health and body condition, 3-14 years of age, from a line of horses with good fertility
- *Timing-* breeding as closely to “the longest day” as possible and avoiding the transition periods.
- *Physical examination-* A thorough examination of the entire reproductive tract, from vulva to ovaries, well before planned start of breeding so any problems may be resolved well before the breeding season.
- *Oestrous detection-* accurate teasing with a stallion or ultrasound examination of the uterus and ovaries.
- *Mating strategy-* Breeding every 48 hours, starting on day three of the heat, ensuring the mare is bred at no less than 36 hours before the end of oestrus to ensure cover at the time of ovulation
- *Manipulation of the oestrous cycle-* the use of Prostaglandin is useful shortening the cycle or simply predicting the onset of the next cycle
- *Human chorionic Gonadotrophin-* useful when the exact ovulation time is unknown, given at the time of mating to stimulate ovulation within 48 hrs.
- *Pregnancy detection-* early scanning at 12-14 days not only allows confirmation of a pregnancy, thus optimising her management, but just as importantly enables the detection of unsuccessful mating's, allowing a well-planned approach for the second round. In addition, detection of twins before day 16, means one of the twins can be crushed or both can be aborted and the mare can be bred again. As the majority of twin pregnancies result in embryonic loss or abortion of both foeti, most undetected twin pregnancies result in an ‘empty’ mare for that season.
- *Stallion fertility-* Good body condition and health are vital for good semen production and male fertility. In an unproven stallion, it is advisable to check a semen sample to assess the quality. If the stallion is run with the mares observation of the actual mating process is recommended to make sure the stallion can complete the job.