

**Breeding and Pregnancy;**  
**The details no one ever quite explains**  
**Dr. Scott Bailey**

**Reproductive Anatomy and Physiology of the Mare**

The mare has a bicornuate uterus and two ovaries suspended in the broad ligament. The ovaries are roughly kidney-bean shaped and have a palpable ovulation fossa. Follicles develop in the poles and must migrate to the fossa before ovulation can occur. The mare has a soft, muscular cervix, which is flaccid under the influence of estrogen and toned under the influence of progesterone. This represents the final barrier protecting the uterus (the vulvar lips and vestibulo-vaginal junction are the other two).

The mare is a seasonal breeder, with a long-day breeding season, lasting from around April to around September under naturally conditions. During the remainder of the year, the mare is in “transition” (spring and fall) or “deep anestrus”. Transition lasts for 50-60 days each, and is characterized by very unpredictable behavior and a failure to ovulate. Deep anestrus is characterized by a lack of ovarian activity and lack of hormonal activity.

During the breeding season, the mare has an 18-24 day cycle, with 14-15 days of diestrus (progesterone) and 3-7 days of estrus (estrogen). The mare generally ovulates 12-24 hours before the end of estrus. During estrus, a follicle grows to pre-ovulatory size (40-55 mm) and secretes estrogen. After ovulation, a Corpus Luteum is formed and secretes progesterone. If no pregnancy ensues, luteolysis will occur approximately 15 days after ovulation via endogenous release of prostaglandin from the endometrium.

**Reproductive Examination of the Mare**

Due to the size of the mare and pelvic location of most reproductive organs, examination is most commonly performed by rectal palpation and ultrasound. Uterine culture and cytology should be performed before breeding in most mares to ensure that there are no bacteria or other causes of inflammation in the uterus.

A complete breeding soundness exam, including endometrial biopsy should be performed for pre-purchase examinations and whenever a mare fails to become pregnant after three or more cycles bred. The biopsies are examined by a pathologist, and graded, with corresponding chances of the mare becoming pregnant and carrying a foal to term.

**Manipulation of Estrus**

It is common in reproductive practice, to manipulate the natural cycle in order to maximize reproductive potential, minimize usage of semen, and accommodate the schedule of the mare, owner and veterinarian.

Common techniques to manipulate the cycle include:

- 1) Artificial Lighting: Providing 100W (enough to read the newspaper in the corners of a stall) of light for 14-16h/day is the most common method of advancing the onset of the natural breeding season. The first ovulation will occur on average 2 months after onset of light-regimen, and it is most commonly initiated December 1<sup>st</sup> to prepare mares for February breeding.

- 2) Ovulation Induction: To optimize fertility, ovulation should occur 24-48 hours after breeding with fresh semen and the mare should be bred only once if possible. To achieve this goal, administration of “human chorionic gonadotropin” (hCG) or other similar products is useful. HCG imitates the hormonal surge of the mare and induces ovulation ~36 hours after administration. It is ONLY successful when given to mares that have a large follicle and are in true heat.
- 3) “Short-cycling”: It is common practice to short-cycle mares that were not bred. To do this, prostaglandin (Lutelyse® or Estrumate®) can be given >5 days after ovulation. At time prostaglandin is administered the mare should always be evaluated, as return to estrus depends on the size of the follicle, ranging from 2-10 days.

### **Breeding**

Breeding practices vary based on the breed and the availability of a stallion near-by as well as personal preference. Thoroughbreds must be bred by “live-cover” to be registered, whereas most other breed-registries allow artificial insemination with either cooled or frozen semen. Cooling and shipping of semen allows selection of stallions that are far away and frozen semen can be used when stallions are unavailable or many years after their death. To breed with cool-shipped semen, time must be allowed for the stallion to be collected and for the semen to arrive shortly before ovulation. The semen should be no more than 48 hours old (from time of collection) when the mare ovulates. When breeding with frozen semen, the semen is usually shipped before the mare is in heat, but the mare must be evaluated much more carefully and must be inseminated within 8-12 hours of ovulation.

### **Pregnancy**

The embryonic vesicle enters the uterus approximately 5-6 days after ovulation. Around this time (6-8 days), the embryo is just less than 1 mm in diameter and can be flushed out of the uterus and either “vitrified” (frozen) or transferred to a recipient mare that ovulated within 1 day of the donor. The vesicle has a thick capsule and maintains its spherical shape. Until day 16-17 post-ovulation, the vesicle is highly mobile and is moved throughout the entire uterus via uterine contractions. This is believed to be important for maternal recognition of pregnancy in the horse. After fixation, the vesicle begins to lose its spherical shape, and the embryo becomes visible around day 21. By day 25-28, the fetal heartbeat is visible.

The mare has a relatively wide range of normal pregnancy duration, ranging from 320-360 days, with some mares foaling normally as early as 300 days (ponies), and some mares foaling >365 days.