

Equine reproduction

The male parent of a horse, a stallion, is commonly known as the *sire* and the female parent, the mare, is called the *dam*.

Both are genetically important, as each parent provides half of the genetic makeup of the ensuing offspring, called a foal. (**Foaling**: name of birth in mare).

Estrous cycle of the mare

The estrous cycle generally occurs during the spring and summer months, , and is controlled by the photoperiod (long day breeder), the cycle first triggered when the days begin to lengthen.

The estrous cycle lasts about 19–22 days, with the average being 21 days. As the days shorten, the mare returns to a period when she is not sexually receptive, known as an estrus.

This cycle contains 2 phases:

- Follicular phase: (involved pro-estrus and estrus) 7-9 days in length, estrus occur when the mare is sexually receptive to a stallion and the Ovulation occurs in the final 24–48 hours of estrus.
- Luteal phase: (involved met-estrus and di-estrus) 14–15 days in length, the mare is not sexually receptive to the stallion.

Effects on the reproductive system during the estrous cycle

Changes in hormone levels can have great effects on the physical characteristics of the reproductive organs of the mare, thereby preparing, or preventing, her from conceiving.

- **Uterus**: increased levels of estrogen during estrus cause edema within the uterus, making it feel heavier, and the uterus loses its tone. This edema decreases following ovulation, and the muscular tone increases. High levels of progesterone do not cause edema within the uterus.
- **Cervix**: the cervix starts to relax right before estrus occurs, with maximal relaxation around the time of ovulation. The secretions of the cervix increase. High progesterone levels (during diestrus) cause the cervix to close and become toned.
- **Vagina**: the portion of the vagina near the cervix becomes engorged with blood right before estrus. The vagina becomes relaxed and secretions increase.
- **Vulva**: relaxes right before estrus begins. Becomes dry, and closes more tightly, during diestrus.

Hormones involved in the estrous cycle, during foaling, and after birth

The cycle is controlled by several hormones which regulate the estrous cycle, the mare's behavior, and the reproductive system of the mare. The cycle begins

when the increased day length causes the pineal gland to reduce the levels of melatonin, thereby allowing the hypothalamus to secrete GnRH.

GnRH (Gonadotropin releasing hormone): secreted by the hypothalamus, causes the pituitary to release two gonadotrophins: LH and FSH.

FSH (Follicle-stimulating hormone): secreted by the pituitary, causes the ovarian follicle to develop.

LH (Luteinizing hormone): Stimulates maturation of the follicle, which then in turn increase secretes estrogen lead to ovulation and then CL development.

Estrogen: secreted by the developing follicle, it causes the pituitary gland to secrete more LH. Additionally, it causes behavioral changes in the mare, making her more receptive toward the stallion, and causes physical changes in the cervix, uterus, and vagina to prepare the mare for conception.

Inhibin: secreted by the developed follicle right before ovulation, "turns off" FSH, which is no longer needed now that the follicle is larger.

Progesterone: prevents conception dead and decreases sexual perceptibility of the mare to the stallion.

Prostaglandin: secreted by the endometrium 13–15 days following ovulation, causes luteolysis and prevents the corpus luteum from secreting progesterone

eCG - equine chorionic gonadotropin - (also called PMSG (pregnant mare serum gonadotropin)): chorionic gonadotropins secreted if the mare conceives. First secreted by the endometrial cups around the 36th day of gestation, peaking around day 60, and decreasing after about 120 days of gestation. Also help to stimulate the growth of the accessory corpus luteum.

Breeding and gestation

horses in the wild mate and foal in mid to late spring.

Mares signal estrus and ovulation by urination in the presence of a stallion, raising the tail and revealing the vulva. A stallion, approaching with a high head, will usually nicker, nip and nudge the mare, as well as sniff her urine to determine her readiness for mating.

The gestation period lasts for about eleven months, or about 340 days (normal average range 320–370 days). During the early days of pregnancy, the conceptus is mobile, moving about in the uterus until about day 16 when "fixation" occurs and these movement thought to be the signals to maternal recognition of pregnancy in mare.

Reproduction in camel

Camel is a **seasonal breeder**, Both the dromedary and Bactrian are regarded as seasonal breeders, with a relatively short breeding season,

The terminology used in case of males is “Thoot”, “Rutt” or “Musth”. Usually the heat period is from November to March.

Puberty:

The female camel matures at an age of **3-4 years** while males at the age of **4-5 years**.

During heat period the male emits a black pigment from his pole gland (skin gland) which helps him to attract the females.

The male camel has a specialized inflatable diverticulum of the soft palate called as ‘**gula**’. When the animal is angry or displaying this structure protrudes out from the mouth.

The gestation period in camels is 390 days.

Mating occurs in winters, but peaks in the rainy season. Dromedaries are induced ovulators. If mating does not occur, the follicle, which grows during estrus, usually regresses within a few days.

The duration of estrus cycle varies from 16-22 days and the duration of heat is for 4-6 days.

Ovulation occurs after mating at about 24 to 48 hr. (Induced ovulation).

Camels generally do not come in heat in the summer season.

The **symptoms of estrus** in camel are as follows:

- Excitement
- Bleating
- Want of male
- Swollen Vulva with slimy discharge
- Tries to smell urine and external genitalia of male and raises the tail.
- May show homosexual tendencies, also comes near the male and allows him to mount.

Rutting in camel :

Rutt is commonly known as MUSTH.

The male dromedary becomes increasingly aggressive towards other males, and sometimes even towards people, during the breeding season.

Sexual behaviour is also characterized by exteriorization of the soft palate, known as the **dulah** (**gula**) but this has only been described in dromedaries not Bactrian camels. The protrusion of the soft palate occurs all day long at intervals of 15 - 30 minutes and is accompanied by loud gurgling and roaring sounds. The protrusions become more frequent with increased excitement such as the presence of other males and females.



The poll gland secretions are light brown/amber in colour when first excreted but become tarry and dark after a few minutes. It can easily be seen dribbling down the neck of the male and has a very strong foetid smell.