

## Reproduction in ewes and does

Domestic sheep and goats two distinct species in the family Bovidae. They were among the first to be domesticated: sheep for wool and meat, and the goat for milk, meat and fiber.

### Sexual season

In the temperate zone, both sheep and goats are seasonally polyestrous. The length of the sexual season varies with day length, breed, and nutrition. This seasonality is governed by photoperiodicity with estrus activity commencing during a period of decreasing day length. In the tropical zones, variation in day length less, indigenous sheep and goats tend to breed throughout the year. High environmental temperature and lack of feed may restrict sexual activity during some months of year in the tropics, but shortly after the onset of the rainy season, sexual activity increases.

### Puberty

Puberty occurs at 6 to 9 months in ewe, and at 5 to 7 months in does.

The onset of puberty in sheep is influenced by genetic and environmental factors such as breed and strain difference, the nutritional planes, and time of birth. First estrus occurs in ewe lambs at 30 to 50 kg body weight.

### Estrous cycle

#### Length of cycle

The length of the normal estrous cycle is 17 days for sheep and 21 days for goats, although there is considerable variation due to breed difference, stage of the breeding season, and environmental stress in both species. The abnormally short cycles that are observed in the ewe and the doe early in the breeding season may be associated with prematurely regressing corpus luteum.

#### Duration of estrus period

Estrus lasts 24 to 36 hours in the ewe and 24 to 48 hours in the doe. Breed, age, and presence of the male influence duration of estrus. Wool breeds have longer estrus periods than meat breeds. Estrus is of shorter duration in both species at the beginning and end of the breeding season, in the presence of the male, and in the first breeding season of young females.

### Signs of estrus

Signs of estrus are more conspicuous in does than in ewes.

A **doe** in estrus is restless, bleats frequently, and wags her tail constantly and rapidly; she may have a reduced appetite and a decreased milk production. Estrus in **ewe** is relatively inconspicuous and is not evident in the absence of the ram. The vulva may be edematous, and a mucous discharge from the vagina may be evident in both species.

A doe may occasionally exhibit homosexual behaviour but not the ewe. Ewes and does usually display a strong male-seeking behaviour and remain very close to the male. Without the presence of the male, however, estrus is difficult to detect in both the ewe and the doe.

## **Male influence on estrus**

The introduction of rams to ewes during transition from anestrus to the breeding season stimulates them to ovulate within 3 to 6 days, and estrous activity occurs 17 to 24 days later. The sexual behavior of ram is also important in initiating ovarian cycle activity. The response of anovular ewes to the ram is due to an androgen-dependent pheromone secreted by the sebaceous glands of the ram.

The introduction of a buck into a group of seasonally anestrus does not only may hasten the onset of the breeding season by several days but can also effectively synchronize them. Most seasonally anestrus does are detected in estrus within 6 days after introduction of the buck, and this is followed by ovulation and normal corpus luteum.

## **Ovulation**

Both ewes and does are spontaneous ovulators. The ewe normally ovulates near the end of estrus about 24 to 27 hours after the onset. Most goat breeds ovulate between 24 to 36 hours after onset of estrus. The sequence of hormonal events during estrous cycle is similar in both species, but the doe has a longer progesterone phase than the ewe.

## **Ovulation rate**

In many breeds of sheep and goat, two or more ova are shed during estrus. In both species, the ovulation rate increases with age and reaches a maximum at 3 to 6 years, then declines gradually. Significantly more ovulations occur on the right ovary than left ovary. Among the environmental factors influencing ovulation rate, season and level of nutrition are important. Generally, ovulation rates are higher early in the breeding season than later, but factors such as body size, weight, condition, and genotype may also contribute to the increase of ovulation rate.

## **Hormonal control of the estrus cycle**

- Estrus cycle is controlled by GnRH (Gonadotrophic Releasing Hormone) released by the hypothalamus.
- Just before the onset of estrus, the pituitary gland, under the control of the hypothalamus in the brain, releases an increasing amount of Luteinizing Hormone (LH) and Follicular Stimulating Hormone (FSH).
- Growth of follicles is regulated by pituitary hormones – FSH, LH.
- LH stimulates the final maturation of the follicle containing the eggs (oocytes) and stimulates the follicle to produce the hormone estrogen.
- Estrogen brings the ewe into behavioral estrus or 'heat.'
- The rising concentration of estrogen stimulates a surge in LH that stops further secretion of estrogen by the follicle.
- Once the egg has been released, LH transforms the follicle into a Corpus luteum (CL).
- CL produces progesterone, which in turn suppresses pituitary activity.

- If pregnancy does not occur, lysis (destruction) of the Corpus luteum occurs due to endogenous release of prostaglandin from the uterus, thus causing a fall in the progesterone level, and the cycle starts again.

### **Breeding and conception**

most of sheep and goats is managed under free grazing conditions where natural mating is widely practised. Both the ram and the buck ejaculate a small volume of semen with high concentration of spermatozoa. Rams may copulate two to three times in a few minutes when first turned with ewes in estrus. The number of matings per day varies with individual males, and with the climate and time when rams are introduced into breeding. Normally, one adult ram is assigned to 30 ewes and one buck for 50 does.

Copulation usually occurs before ovulation, and therefore spermatozoa are present in the oviduct by this time. Other spermatozoa are stored in the cervix ( up to 3 days) and are continually released into the uterus, where they survive for about 30 hours. Eggs may remain viable for 10 to 25 hours. In both species, eggs enter the uterus about 72 hours after ovulation.

### **Gestation period**

The normal gestation period length for both sheep and goats is 150 days; the length varies between breeds and individuals. Heredity plays an important role in determining gestation length. The genotype of the fetus accounts for almost two thirds of the variation in gestation length of sheep. Male lambs are carried longer than female lambs, and singles longer than twins. Gestation length also increases with age of the dam.

The CL of pregnancy persists throughout gestation, but the two species differ in the source of progesterone for pregnancy maintenance. The sheep is a placenta-dependent species, whereas the goat is a CL-dependent species. During the first trimester, both species depend on the CL. Later, the placenta becomes the primary source of progesterone in the sheep, whereas the CL continues as the major source in the goat. Hydrometra is the accumulation of fluid in the uterus that mimics pregnancy, but neither fetuses nor placental tissue is detected. Progesterone levels remain elevated. Hydrometra is more common in goat than sheep.