

Estrous Cycle

Physiology of the Estrous Cycle

- The estrous cycle is the time between two estrus or heat.
- The estrus cycle length varies from 18-24 days, with the average about 21 days for cows.

The estrous cycle has two major phases:

1. Follicular Phase.
2. Luteal Phase.

Different structures on the ovary are present during each phase and different hormones dominate the phase.

Major structures on the ovary are:

Follicles:

- a blister-like structure containing the egg.
- produces hormone “estrogen”.
- High amount of estrogen causes the estrous behavior.

Corpus luteum:

- a hard yellow structure.
- produces hormone “progesterone”.
- is responsible for maintenance of pregnancy.

The Estrous Cycle has 4 Stages:

- 1- Proestrus
- 2- Estrus
- 3- Metestrus
- 4- Diestrus

Follicular Phase = Proestrus and estrus

Luteal Phase = Metestrus and diestrus

Proestrus

- Proestrus is the period between regression of the corpus luteum of the previous cycle and estrus.
- It is the period of follicular development.
- follicle enlarges and estrogen increases
- vascularity of the female reproductive tract increases
- endometrial glands begin to grow
- estrogen levels peak

During this period the follicle destined to ovulate grows from a microscopic structure to a large fluid filled, blister-like structure 3/4 inch to 1 inch in diameter.

Cow: 3-4 days, Ewe: 2-3 days, Mare: 2-3 days

Estrus

- Estrus is the period of sexual receptivity.
- The female will stand to be mount by another cow or is receptive to be mated by the bull
- Final maturation of the egg and follicle also occurs.
- Continued estrogen production by the developing follicle results in a surge in the release of LH and FSH from the pituitary which stimulates maximum estrogen production by the follicle.
- The high levels of estrogen are responsible for behavioral signs of estrus.
- They also increase contractions of the reproductive tract to facilitate sperm and egg transport.
- Estrogen also influences the amount and type of fluid produced by the oviducts, uterus, cervix and vagina.
- The stringy, clear mucus discharge seen at estrus is secreted from the cervix and is thought to assist the migration of sperm through the cervix.

Cow: 8-24 hr, Ewe: 24-36 hr, Mare: 4-8 days

Ovulation normally occurs 10 to 12 hours after the end of estrus in cattle.

Metestrus

- Metestrus is the period immediately following estrus and ovulation.
- Ovulated eggs are picked up by the oviducts and transported to the uterine horns.
- estrogen low
- corpus hemorrhagicum present.
- uterus contractions subside
- endometrial glands continue to grow and become coiled

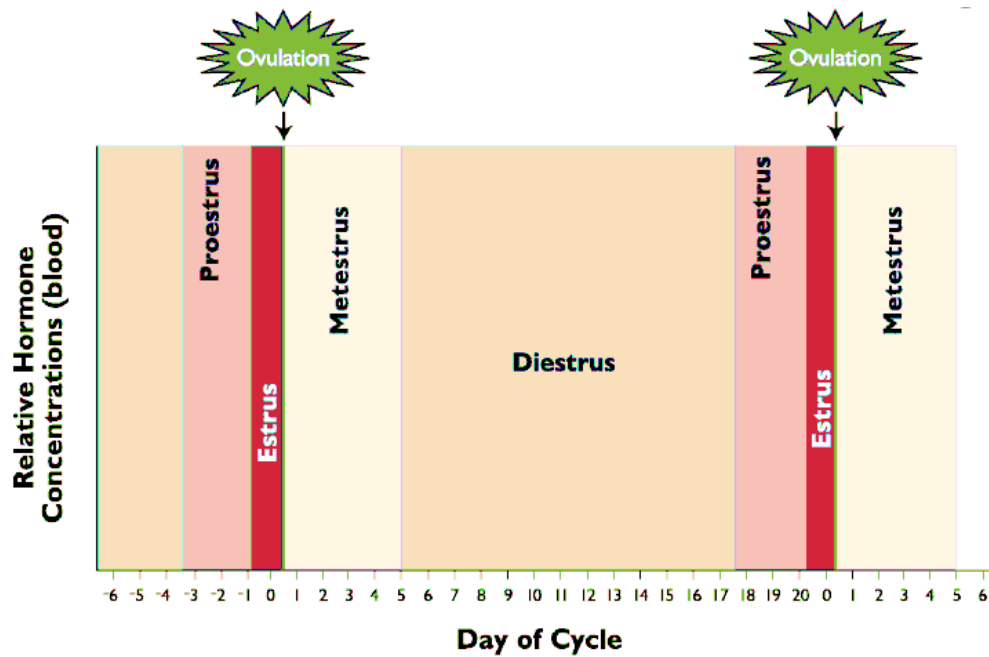
Cow: 3-4 days, Ewe and Mare: 2-3 days.

Diestrus

- Diestrus is the most lengthy period of the estrous cycle which is the period of corpus luteum function.
- The corpus luteum is the dominant structure on the ovary during diestrus.
- It develops mainly from the granulosa cells lining the walls of the collapsed follicle.

- The CL reaches maximum size 8-10 days after ovulation.
- The levels of progesterone in blood parallel the growth of the CL. Maximum levels are reached around day 10 and maintained until day 16-18 of the cycle.
- Days 16-18 of the cycle are critical to the maintenance of CL function. If the cow is not pregnant, the CL is induced to regress by the release of prostaglandin F2 α from the uterus.

Cow: 10-14 days, Ewe: 10-12 days, Mare: 10-12 days



	Cow	Ewe	Sow	Mare
Estrous cycle (d)	21	17	21	21
Proestrus (d)	3-4	2-3	3-4	2-3
Estrus (hr)	12-18	24-36	48-72	4-8
Metestrus (d)	3-4	2-3	2-3	2-3
Diestrus (d)	10-14	10-12	11-13	10-12