University of Mosul
Lecture No.: 4
College of Veterinary Medicine
Date: 2024-2025
Unit of Scientific Affairs
Website:

Lecture title: Estrous Cycle in animals

Lecturer Affiliation: University of Mosul\ veterinary medicine

Summary:

- **The estrous cycle**: is the time between two periods of estrus or heat. The estrus cycle length varies from 18-24 days, with the average about 21days for cows.
- **Estrous period**: it is period of sexual receptivity commonly referred to as " heat ". It period of sexual activity, female permit mating.

➢ **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:**

a. **Follicles:**

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

b. Corpus luteum :

a hard yellow structure produces hormone "progesterone " which is responsible for maintenance of pregnancy.

The Estrous Cycle has 4 Stages:

- Proestrus
- Estrus
- Metestrus
- Diestrus

- Follicular Phase = Proestrus and estrus
- Luteal Phase = Metestrus and diestrus

Proestrus

- Proestrus is the period between regression of the corpus Iuteum of the previous cycle and estrus.
- It is the period of follicular development.
- endometrial glands begin to grow.
- estrogen levels peak.

Cow: 3-4 days , **Ewe:** 2-3 days, **Mare:** 2-3 days, **Bitch:** 9 days, **Queen:**1-2 days

Estrus

Estrous : period of sexual receptivity commonly referred to as " heat ". It period of sexual activity, female permit mating.

- occur Final maturation of the egg and follicle.
- 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:** 4-9 days, **bitch:** 9 days, **queen:**4-10 days
- ➢ Ovulation normally occurs **10 to 12 hours** after the end of estrus.

❖ **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 F2α from the uterus.

Cow: 10-14 days

Ewe: 10-12 days

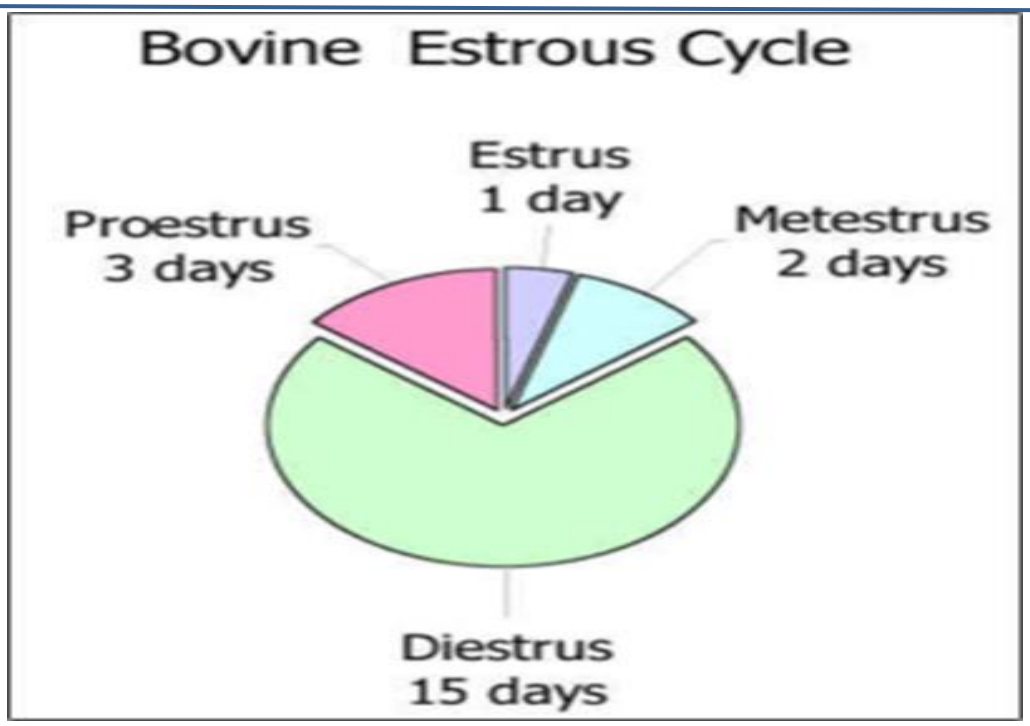
Mare: 10-12 days

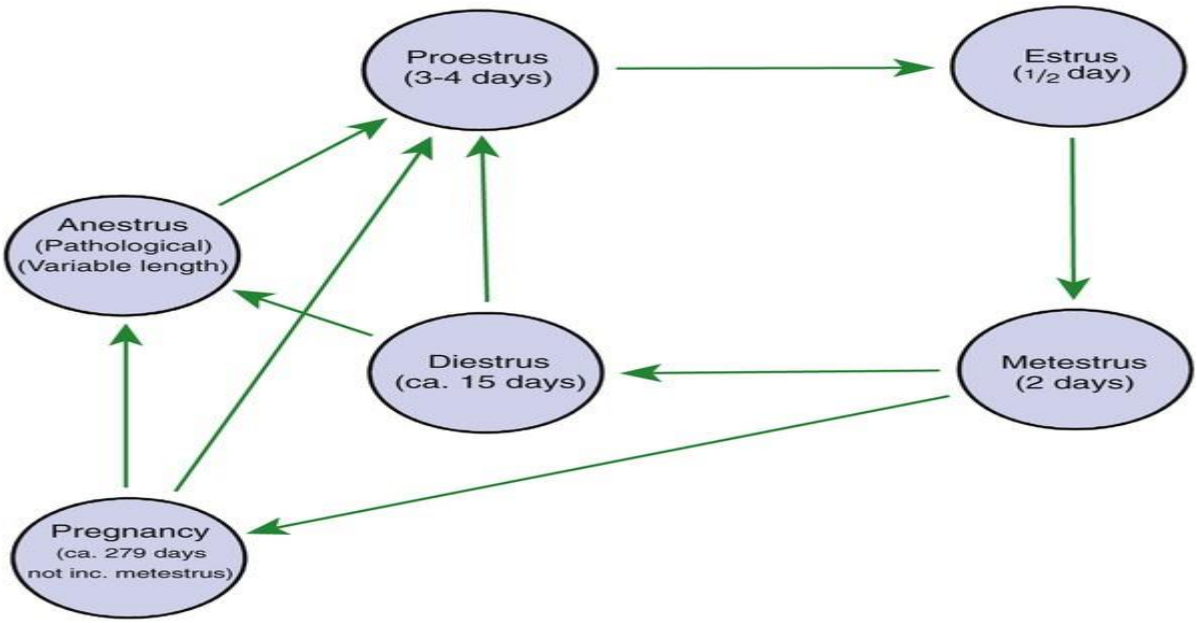
Bitch& queen: 40 -60 days

Species	Cycle length	Duration of oestrus	Time of ovulation
Cattle	21 (18–24) days[1]	4–24 hours	12 (10–15) hours after end of oestrus
Horse	21 (18–24) days[2]	3–9 days	24–48 hours before end of oestrus
Swine	21 (18–24) days[1]	2–3 days	38–48 hours after onset of oestrus
Sheep	17 (14–19) days[2]	18–72 hours	18–20 hours after onset of oestrus
Goat	19–21 days[2]	22–60 hours	Near the end of oestrus
Dog	Monocyclic (up to 2 months)	9 days	1–2 days after onset of oestrus
Cat	14–21 days[2]	4–10 days[3]	Induced ovulation

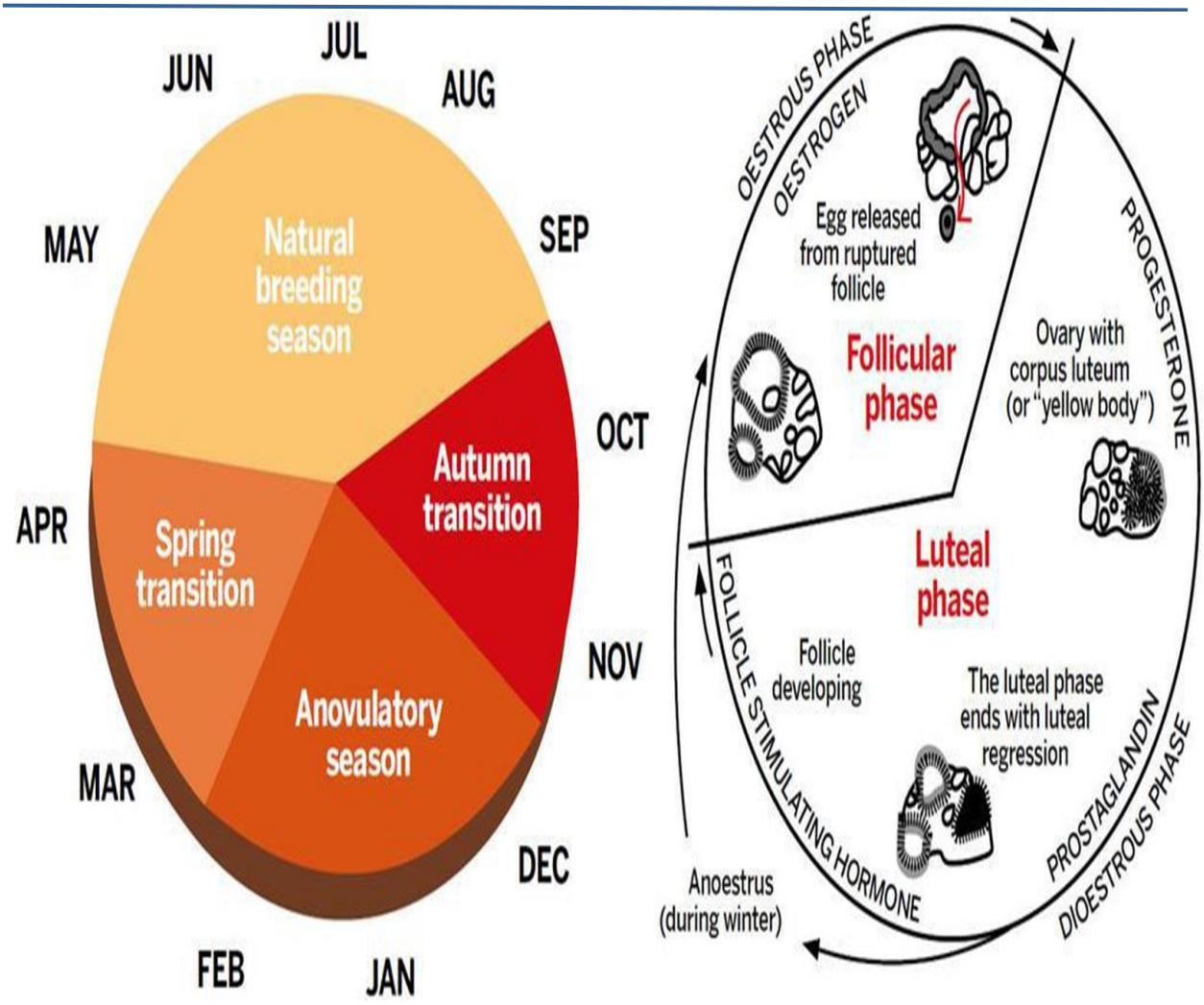
❖ **Types of estrous cycle**

1. poly estrous; cow ,sow
2. Seasonal poly estrous; ewe , doe, mare , queen
3. Mono estrous; bitch , wild animals

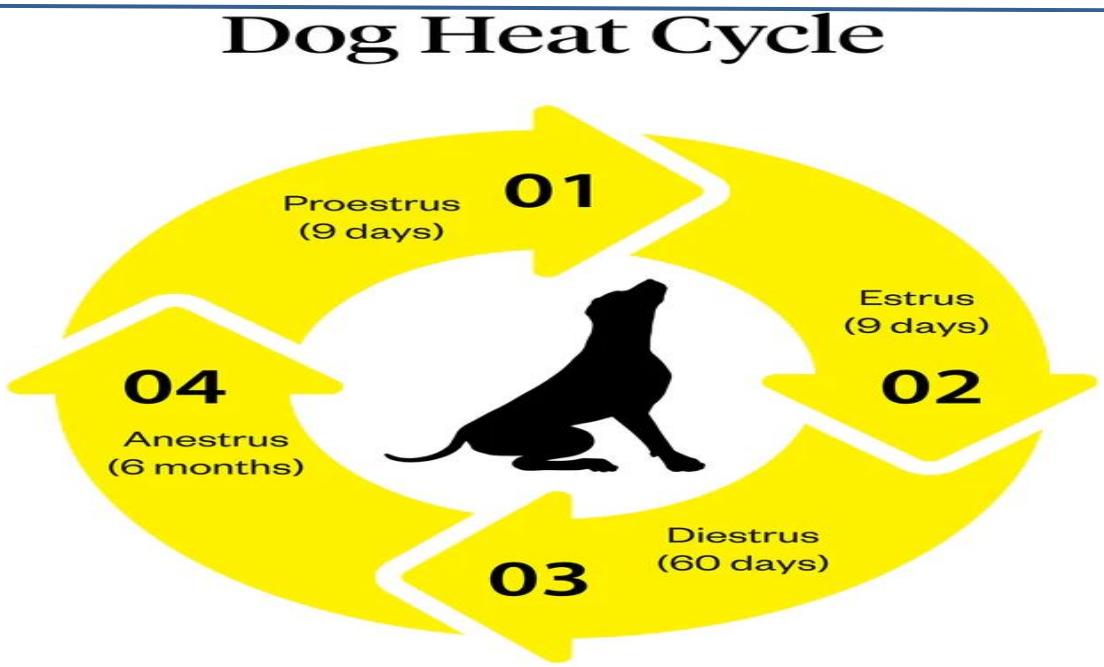


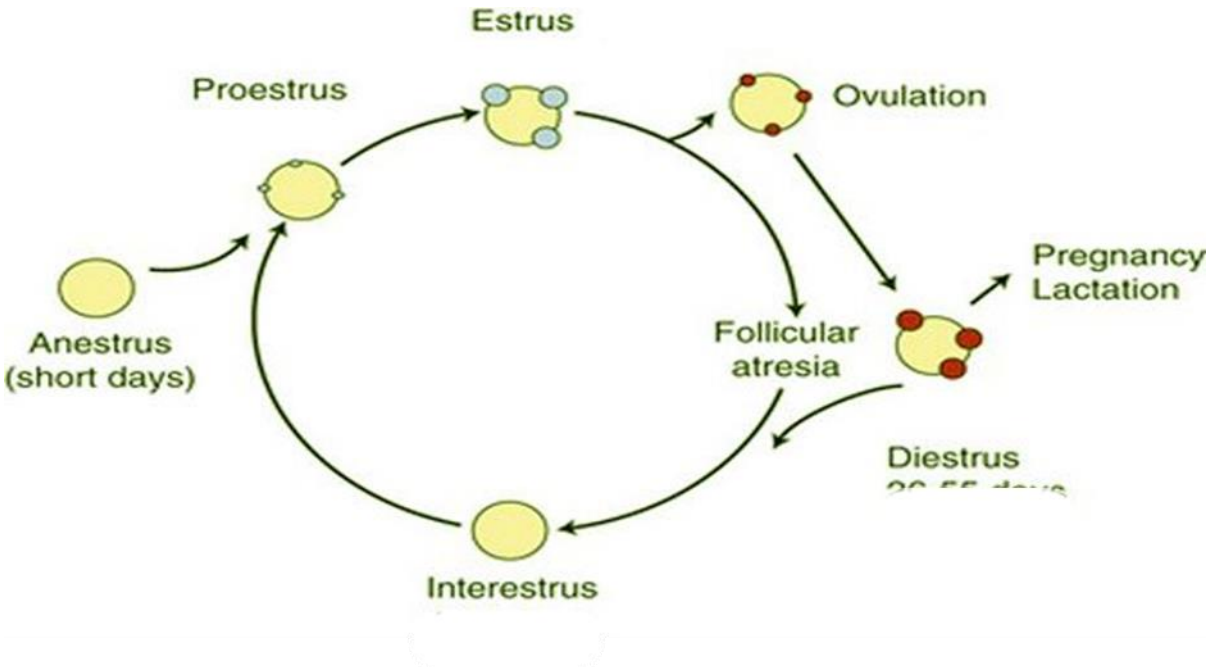


Estrus cycle in ewe



Estrus cycle in mare

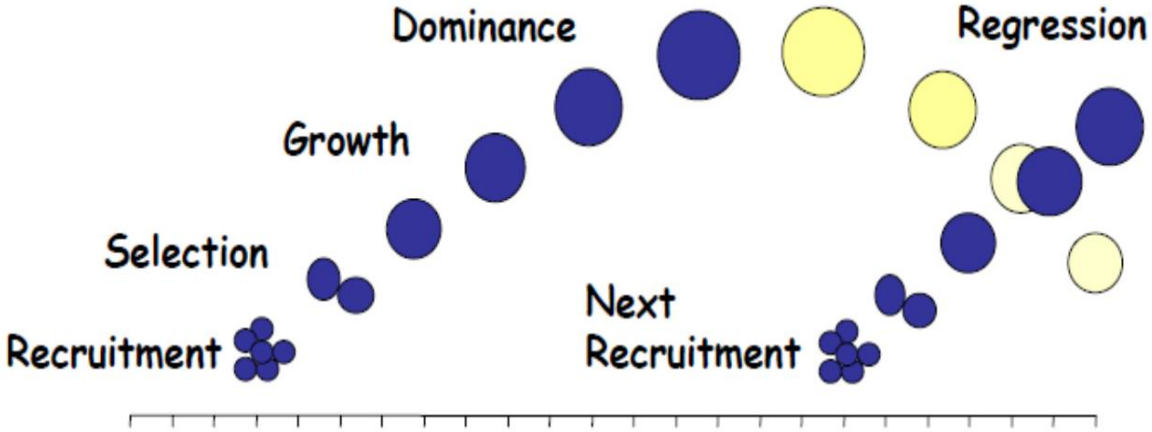




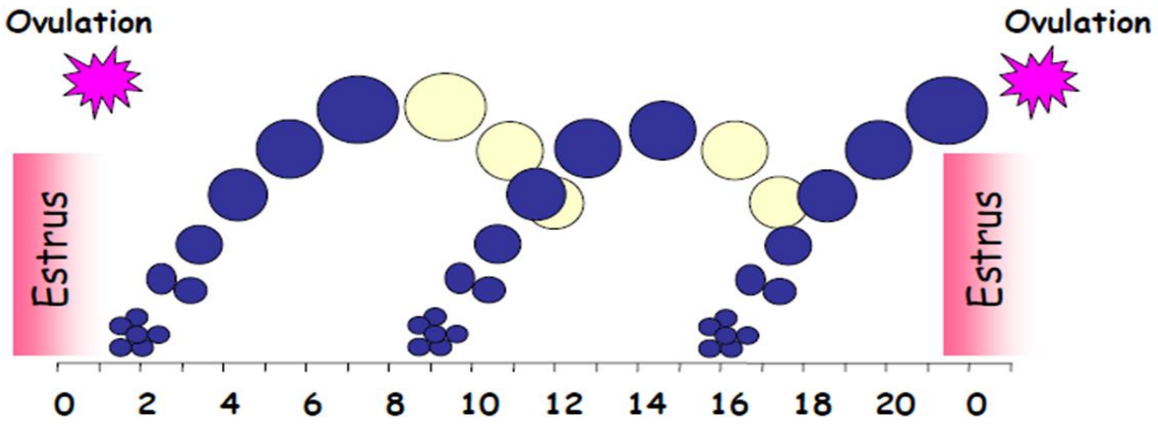
Estrus cycle in cat

❖ Follicular Wave

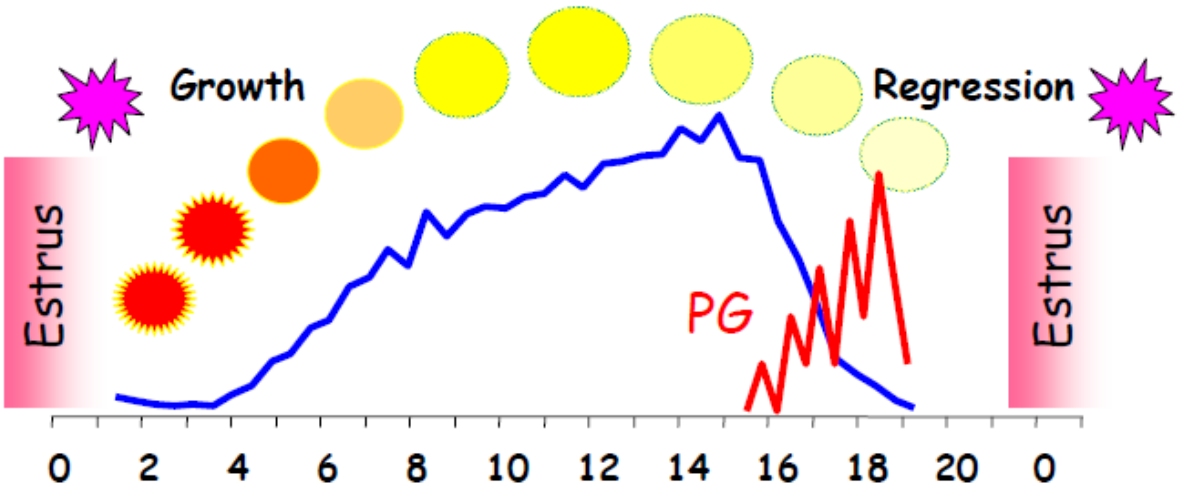
- Follicle development occurs as a wave-like pattern consisting of: Recruitment, Selection, Growth, Dominance, Regression phases. Usually 2 to 4 follicular waves occur during the estrous cycle in cattle.



- FSH precedes recruitment of follicles (causes follicles to start growing).
- LH promotes further follicle growth and maturation of follicles& egg.
- follicle produces high levels of estrogen.
- High levels of estrogen, in turn, cause estrus and surge release of LH that triggers ovulation.
- Length of the estrous cycle in cattle with 3 follicular waves is typically 20 to 24 days.



- Length of the estrous cycle in cattle with 2 follicular waves is typically 18 to 20 days, slightly shorter than the estrous cycle with 3 follicular waves.
- Corpus luteum develops from the ovulated follicle and takes approximately 10 days to reach mature size.
- Corpus luteum produces progesterone
- Progesterone is responsible for maintenance of pregnancy after conception occurs.
- Late in the estrous cycle, uterus produces PGF2α which causes regression of corpus luteum.



- Presence of embryo blocks uterus to produce PG late in the estrous cycle which causes maintenance of corpus luteum and production of progesterone for pregnancy.