



**ECVET Units as Initial or Additional Training to the European Veterinary Assistant Diploma
No. 2016-1-LV01-KA202-022652**

Artificial Insemination

Reproductive cycle

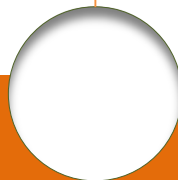


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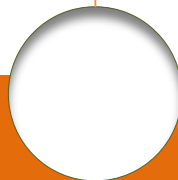
Reproductive cycle

- **Begins in puberty (sexual maturity) and ends with termination of sexual activity**
- **Periodic changes of the reproductive organs**
- **Periodic optimal conditions for fertilizing eggs and for the development of the zygotes**
- **The rhythm of the cycle is different in different species**



ESTRUS - HEAT

- **MONOESTRIC** – wild animals, the heat shows in the time so the fetus can be born in spring
- **DIESTRIC** – two times in a year
- **POLYESTRIC** – sexual activity repeats regularly in short intervals during the whole/part of the year (seasonal polyestrics)



4 stages of the reproductive cycle

1. **Preparing – proestrus – follicle maturing, uterine mucose swelling, increased blood supply, increased secretion of the uterine glands**
2. **Heat – estrus – maximal secretion, hyperemic both external and internal sex organs, vulvar swelling, clear (glassy) secret from vulva, contains the feromones irritating the males + OVULATION in the end of the estrus**

4 stages of the reproductive cycle - Ovulation and changes

- **The ovulation is independent on coitus in Rum, Sus, Eq, Ca**
- **Fe, Cu, wildlife – ovulation appears only after coitus**
- **During estrus you can find differences in blood assays, amount and quality of the milk and in behavior (females are more active, restless, hard to handle, dangerous), willing to mate (later in estrus), when close to the male they shortly urinate and contract the outer lips (Eq)**

4 stages of the reproductive cycle

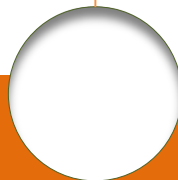
3. **After estrus – metestrus – developing CL, secretion and hyperemia ends, the endometrium prepares for nidation**
4. **Resting – diestrus – only if the oocyte was not fertilized, slow termination of CL**
 - **Anestrus is the long period of no sexual activity**

The heat detection in species

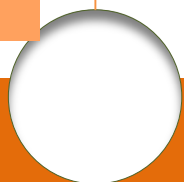
- **Fe – willing to mating, looking for the males, very friendly, needs contact, vocalization, usually in the spring**
- **Ca – proestrus – bleeding from vagina, attractive for males, vulval swelling, the best time to mate is 12th - 17th day, vaginal cytology, progesterone level in blood**
- **Eq – contracts outer vulval lips, willing to mating, not easy to handle, USG – follicle 5 cms in diameter**

The heat detection in species

- **Sus – standing reflex – when pressing the lumbal area the sow won't move**
- **Bo – more active, increased body temperature, increased milk conductivity, clear secret from vulva, jumping on other heating cows/heifers**
- **Cap – vocalization, tail moving, vulval swelling**



species	Age at puberty	Cycle type	Cycle length	Duration of estrus	Best time to breed	First estrus after parturition	Comments
cattle	4-18 mo, first bred in 15 th mo	Polyestrous all year	21 days	18 hrs	Midestrus until 6 hrs after estrus	Varies, best to breed at 60-90days	Uterine bleeding 24-48 hrs after estrus
sheep	7-12 mo	Seasonally polyestrous, fall to winter	14-20 days	24-48 hrs	18-20 hr after onset of estrus	Next fall	Ovulation near end of estrus
goat	4-8 mo	Seasonally polyestrous, fall to winter	18-21 days	2-3days	Daily during estrus	Next fall	Many intersexes born in hornless
pig	4-9 mo	Polyestrous all year	16-24 days	2-3 days	24 hr after onset of estrus	4-10 days after weaning	Ovulation in 40 hr after estrus onset
horse	10-24 mo	Sesonally polyestric, spring and summer	19-26 days	2-10 days	Last few days of estrus, 2-days intervals	4-14 days	20% double ovulation
dog	5-24 mo	monoestrous	3,5 -13 mo	2-21 days	From day 2 of estrus until end	Few months	Proestrous bleeding 7-10 days. Ovulation 1-3 days after first acceptance
cat	4-12 mo	Induced ovulation, seasonally polyestrous, spring, fall	14-21 days	6-7 days	Daily from day 2 of estrus	4-6 wk	Infertile matings prolong onset of next cycle in 45 days



Mating

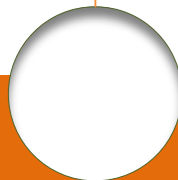
- **Coitus, breeding, copulation**
- **Complex reflex process – conditioned, unconditioned reflexes**
- **Erected penis inserts to the female vagina and ejaculates**
- **Breeding – chosen animals, controlled mating**

Mating reflexes – lumbosacral centers

- **Searching different sex - senses**
- **Erection of the pennis**
- **Jumping on female**
- **Imision – inserting the pennis to the vagina**
- **Friction – typical movements, gland irritation**
- **Ejaculation – transferring semen to the female vagina, on the cervix (Bo – seconds, Eq – 30 sec, Sus – 10 min, Ca – 45 min), the general excitement - orgasmus**

Arteficial insemination - AI

- **Transferring the semen by the special tools to the female**
- **Artificial vagina with a plastic bag for the semen collection**
- **Insemination pipets**
- **Hormonal stimulation of the female**



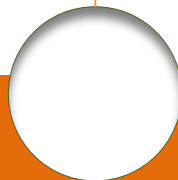
Artificial insemination - AI

PROS

- One bull can fertilize large amount of females
- No animal transport
- The quality animal
- Breeding programme

CONS

- Lower fertility index
- Heat detection



Bibliography

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