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Male Fertility - Theoretical lecture

Male Puberty and Maturity

Puberty

The ability to accomplish reproduction successfully.

Puberty is:

- Age when behavioral traits are expressed.
- Age at first ejaculation.
- Age when sperm first appear in the ejaculate.

- In general, puberty in the bull occurs when the bull calf first produces sufficient sperm to successfully impregnate a female.
- This has been more pragmatically defined as the time when a bull first produces an ejaculate containing 50 million sperm of which more than 10% are motile.
- The pubertal period is associated with rapid testicular growth, changes in the LH release pattern, an increase in blood plasma testosterone concentrations and the initiation of spermatogenesis.

Average Age of Puberty (Range)

Animal	Age of puberty	Range
Bovine	11 mo	(7-18)
Ovine	7 mo	(6-9)
Porcine	7 mo	(5-8)
Equine	14 mo	(10-24)
	18 mo	(12-19)
Canine	9 mo	(5 - 12)
	12 mo	(6 - 24)
Feline	9 mo	(8 - 10)
	8 mo	(4 -12)

Maturity:

After puberty, the testicles of the bulls continue to grow and the number of spermatozoa in the ejaculate increases until 24 months of age, when they reach sexual maturity.

At this time:

There is an increase in seminal volume, progressive sperm motility, vigor and total sperm concentration, and a decrease in some sperm abnormalities.

Descent of the Testicles

- Testicular development includes its descent from the abdominal cavity to the scrotal pocket through the inguinal ring.
- The descent of the testicles to the scrotum is preceded by the formation of the vaginal process from the peritoneum that internally coats the scrotum.
- At 140 days of gestation, the testicles of the bovine fetus are already housed inside the scrotum and completing the cellular differentiation.

Factors influence the age of puberty

1. Hormonal
2. Genetic
3. Environment
4. Nutritional

Hormonal

Prepubertal period

- minimal GnRH release
- FSH and LH low
- minimal to no folliculargenesis or spermatogenesis.

Puberty

- increase in the pulse frequency and amplitude of GnRH release.
- increase in FSH and LH pulses.
- folliculargenesis and spermatogenesis occur.

Genetic (Breed)

Influence of Breed on Age of Puberty

Species	Age at puberty (Months)
Holstein	9
Brown Swiss	8.8
Angus	9.8
Hereford	10.8
Brahman	17

Environment

- In general, any factor which slows growth rate, thus preventing expression of full genetic potential, will delay puberty.
- High environmental temperature delays puberty.
- Age at puberty in sheep and goats is affected by months of birth because it affects their age at the onset of their breeding season.

Nutrition

- Optimum nutritional status accelerates the onset of puberty by few months.
- Low nutrition results in retarded growth of the body system.
- Low body weight gain leading to delayed puberty for a much longer time.