

PUBERTY AND MATURITY

Sexual puberty is defined as the age or time at which the reproductive organs become functional.

- In the male: puberty is indicated by the ability to copulate and produce sperms
- In females: puberty is characterized by the appearance of estrous and ovulation.

Sexual maturity: The female becomes capable of pregnancy and the male becomes capable of copulation and insemination.

Mechanisms of Puberty onset:

- Puberty includes the transition from the an-ovular state to regular ovulation.
- Various physiological factors like nutrition, environment, photoperiod, and endocrine factors like GH are important in the induction of puberty.
- The low levels of estrogens before puberty inhibit the surge center of the hypothalamus and the tonic release of FSH and LH is not sufficient for the maturation of follicles and ovulation.
- The positive feedback effect of increasing levels of estrogens produced by the growing follicles on the hypothalamus occurs at the pubertal onset which stimulates the LH surge centers triggering follicular maturation.
- Puberty occurs when these gonadotropins are produced at high levels to initiate follicular growth, maturation, and ovulation in females or sperm production in males.
- As puberty approaches, GnRH increase in frequency resulting in more frequent pulses of gonadotropins that provide greater ovarian stimulation.

Factors affecting puberty:

1. Nutrition:

Nutrition affects the synthesis and release of GnRH, FSH, LH, and GH due to its action on the hypothalamus and anterior pituitary respectively.

2. Genetics and Breed:

- The age of puberty is moderately heritable.
- Crossbreeding with some breeds results in a decrease in age at puberty.
- Generally, breeds of a larger size at maturity are older and heavier when reaching puberty.

Breed	Age (Month)
Jersey	8-12
Holstein	11-12
Beef cows (European)	10-15
Zebu	17-24

3. Environment:

- Pubertal onset in beef heifers was dependent on the birth time.
- Heifers born in autumn attain puberty earlier compared to spring-born heifers.
- Autumn and winter environments during the first six months of life hasten the pubertal onset while the same conditions after six months delay it.

- A similar effect on the environment has been observed in sheep, goats, and other species.
- Interaction among season and other environmental factors affecting puberty include environmental temperatures, rainfall, humidity, etc.
- The season may affect puberty in cattle by affecting the levels of LH, prolactin, or growth rate. Such effects are more profound in seasonally breeding species such as sheep, buffalo, camel.

4. Age and body weight:

The effect of age and weight at puberty onset differs among various breeds of cattle, buffalo, and other species. It is generally considered that heifers attain puberty when they attain 55 to 60 % of adult weight.

5. Photoperiod:

Photoperiod has a profound effect on puberty in the seasonal species however it has some role in the non-seasonal species also.

6. Male effect:

In ewe, gilts, and possibly in heifers, the presence of males has a stimulatory on the onset of puberty. Gilts exposed to boar reach puberty at a younger age.

Enhancement of Puberty:

1. Improved nutrition.
2. Growth promoting implants and Use of progestins (synchronization).

HUSSEIN