Suppressing Reproductive Activity

The onset of puberty and gonadal function in male and female farm animals is regulated by a complex interaction of hypothalamic, pituitary and gonadal hormones. There may be some circumstances, particularly in cattle and horses, when it may be desirable to suppress normal reproductive activity by endocrine or other forms of intervention. It may not necessarily be a permanent suppression of reproductive function that is sought; some practical needs may be covered satisfactorily by temporary forms of suppression. One of the best known means of inhibiting sexual activity and the ability to reproduce is by castration, practiced by the ancients on man and beast over many centuries. In cattle country, spaying, the surgical removal of the ovaries, was the female equivalent of castration; animal welfare considerations make the practice no longer acceptable.

Advantages of Technology:

The usual reasons why farm livestock are castrated include:

(i) management difficulties;

(ii) to reduce aggressive and sexual behavior; and

(iii) to improve meat and carcass quality.
Methods of reproductive suppression iv male:

1- **surgical or physical castration**
2- **immunocastration**: where animals are immunized to control gonadotrophin-releasing hormone (GnRH) secretion, effectively suppressing gonadotrophin release and generating a temporary castration-like effect.

3- **Cryptorchid male**

**Cattle Bulls:**

Cattle Bulls have an advantage over castrated steers in being capable of producing 15% more carcass gain and 15% more lean meat, while eating 10% less feed per unit gain. Having a bull showing such characteristics without its male aggression and sexual behaviour has obvious commercial attractions.

**Cryptorchid bulls**: Artificial manipulation of the scrotum has been used in the USA and elsewhere as a means of sterilizing bulls. In this, the scrotum is artificially shortened to hold the testes close to the body, resulting in elevated testicular temperature and causing significantly reduced spermatogenesis.

A bull subjected to such treatment is referred to as a ‘short-scrotum’ bull, and is effectively an artificial cryptorchid. The testes are artificially forced into the dorsal region of the scrotum by placing a rubber ring around the lower portion of the scrotum. In 3-4 weeks, the empty scrotal sac sloughs at the juncture of the rubber band because of restricted circulation. As might be expected, the weight of the testes in these bulls is less than in normal bulls, reaching only about one half the

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weight of the intact animal. **These males, although sterile, appear to maintain normal testosterone levels and a high rate of growth.** Such animals have increased growth efficiency and have leaner carcasses in comparison with steers.

This procedure shows the importance of testicular cooling for normal fertility and the importance of androgens for growth and leanness.

**Hormonally castrated goats:** Studies in Australia tested the usefulness of immunizing goats against GnRH by way of a commercially available vaccine (Vaxtrate) which suppresses gonadotrophin secretion, steroidogenesis, sperm production, the production of male odour and agonistic behaviour between males; in 90% of the immunized bucks, the testes remained small for > 1 year after primary vaccination and a 2-week interval was as effective as a 4-week interval between primary and booster immunizations.

GnRH is the key hypothalamic hormone in the regulation of the pituitary-testicular axis and therefore exerts a profound effect on functions such as spermatogenesis and sexual activity.

**Methods of reproductive suppression in female:**

1- **Surgical methods (ovariectomy)**

2- **Hormonal approach**

   a- **Progesterone:** Cattle Work in the mid-1960s with melengestrol acetate (MGA) administered orally was the first to show that a progestogen can have a growth promoting action over and above its oestrus-inhibiting ability.
A comprehensive evaluation of MGA at the time in beef heifers showed that the agent resulted in an average 11% improvement in daily rate of gain and a 7.6% improvement in feed conversion efficiency over untreated controls. It was believed that MGA exerted its growth-promoting action indirectly by permitting substantial oestrogen production in the ovaries of the oestrus-suppressed animals. In non-European Union (EU) countries, where beef heifers may be at pasture rather than in feedlots, implantation may be the method of choice. Work in Ireland at one time showed that a single MGA implant would hold heifers out of oestrus for about 4 months, with a useful growth-promoting effect being evident during this period.

b- GnRH agonist implants

Studies reported from Australia have examined the use of GnRH agonist implants for long-term suppression of fertility in heifers and cows. D’ Occhio et al. (2002) showed that, in most heifers and cows treated with the GnRH agonist implants, ovarian follicular growth was restricted to early antral follicles (2–4 mm); it was concluded that such implants have considerable potential as a practical technology to suppress ovarian activity and control reproduction in cattle kept under extensive range land environments; the same technology may have wider applications in cattle production systems.