

## Understanding and Overcoming Repeat Breeding Challenges in Livestock

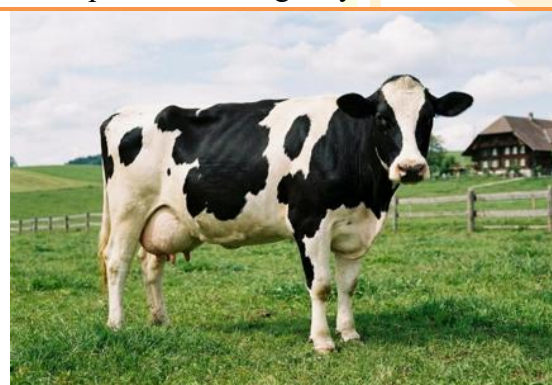
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**R**epeat breeding is one of the most common reproductive disorders affecting dairy animals worldwide. It significantly reduces the productivity and profitability of dairy farms by increasing calving intervals, lowering lifetime milk production, and escalating veterinary and breeding costs. Addressing this problem is essential for improving reproductive efficiency, maximizing farm income, and ensuring the sustainability of dairy enterprises. A repeat breeder is generally defined as a clinically healthy cow or heifer that fails to conceive after three or more consecutive inseminations with fertile semen despite exhibiting normal estrus cycles and having no apparent reproductive abnormalities. Understanding underlying causes and adopting appropriate management strategies are crucial for improving conception rates.

### Incidence

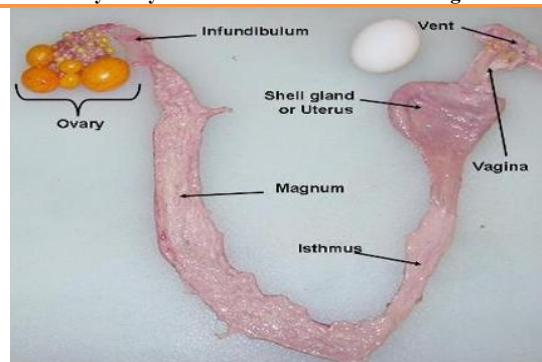
Repeat breeding is a major concern in dairy farming, with reported incidence ranging from 10% to 30%, depending on breed, management practices, nutritional status, and environmental conditions. The incidence is generally lower in heifers than in adult cows and is more common in high-producing dairy animals than in low-producing ones. Besides causing substantial economic losses, prolonged infertility also compromises animal welfare and reproductive longevity.



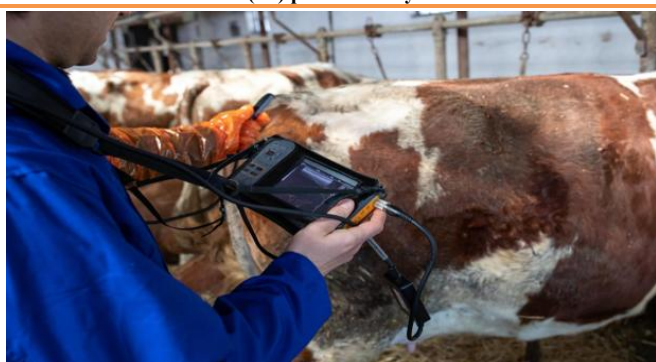
Healthy dairy cow under scientific herd management



Artificial insemination (AI) performed by a trained veterinarian



Female reproductive tract of a cow showing the ovaries, uterus and cervix



Ultrasonographic examination for diagnosis of reproductive disorders

## Causes of Repeat Breeding

### Causes of Female Origin

#### 1. Fertilization Failure

Failure of fertilization occurs when the ovum does not unite with the spermatozoon, resulting in the absence of zygote formation. Major causes include:

- Anovulation
- Delayed ovulation
- Defective or aged ova
- Improper timing of artificial insemination, particularly very early insemination

#### 2. Early Embryonic Death

A significant proportion of embryonic losses occur between the **8th and 19th day after breeding**. Most embryonic deaths occur before maternal recognition of pregnancy, causing the cow to return to estrus within the normal cycle (18–24 days). Infectious diseases such as **trichomoniasis, campylobacteriosis (vibriosis), and occasionally brucellosis** may contribute to embryonic mortality, leading to repeat breeding.

#### 3. Hormonal Dysfunction

In some animals, the corpus luteum (CL) fails to produce adequate progesterone. Insufficient progesterone levels prevent proper maintenance of pregnancy, resulting in failure of conception or early embryonic loss.

#### 4. Nutritional Deficiencies

Deficiencies of energy, protein, essential minerals (particularly phosphorus, copper, zinc, selenium), and vitamins (A, D, and E) adversely affect ovarian function, estrous expression, fertilization, and embryo survival.

#### 5. Poor Reproductive Tract Health

Uterine infections such as metritis and endometritis, reproductive tract injuries, congenital abnormalities, or chronic inflammation create an unfavorable uterine environment for embryo implantation and development.

#### 6. Stress

Heat stress, overcrowding, transportation, poor housing, and sudden changes in management can disrupt hormonal balance, reduce estrus expression, and lower conception rates.

#### 7. Genetic Factors

Congenital abnormalities such as aplasia or hypoplasia of the reproductive tract may impair fertility and contribute to repeat breeding.

### Causes of Male Origin

The male contributes to conception through viable and fertile spermatozoa. Poor semen quality, congenital sperm abnormalities, reduced sperm motility, abnormal sperm morphology, improper semen handling, or the use of low-fertility bulls can all contribute to repeat breeding.

### Human Factors

Management-related factors play a significant role in repeat breeding. These include:

- Poor detection of estrus (heat)
- Incorrect timing of artificial insemination
- Faulty insemination techniques
- Inadequate semen handling and storage
- Lack of skill or experience of the inseminator

## Treatment and Management

**Estrus Synchronization:** Estrus synchronization protocols (GnRH, PGF<sub>2</sub> $\alpha$ , progesterone-based protocols) help ensure insemination at the optimal time, thereby improving conception rates and reproductive efficiency.

**Reproductive Tract Health Management:** Regular veterinary examinations, timely diagnosis, and treatment of uterine infections or reproductive abnormalities are essential for restoring fertility.

**Nutritional Management:** Providing a balanced diet that meets the animal's requirements for energy, protein, minerals, and vitamins supports normal reproductive function and improves conception rates.

**Hormonal Therapy:** In selected cases, hormonal treatments such as GnRH, hCG, or progesterone supplementation may be recommended by veterinarians to correct ovulatory or luteal dysfunction.

**Stress Reduction** Improving housing, maintaining proper ventilation, ensuring adequate water availability, and minimizing heat stress and overcrowding help improve reproductive performance.

### Prevention

- Implement well-planned breeding and estrus synchronization programs.
- Detect estrus accurately and perform artificial insemination at the correct time.
- Use high-quality semen and follow proper semen handling procedures.
- Ensure insemination is performed by trained personnel.
- Provide balanced nutrition with adequate mineral and vitamin supplementation.
- Conduct routine reproductive health examinations and treat infections promptly.
- Maintain good housing, hygiene, and biosecurity practices.
- Reduce environmental and management-related stress.

### Conclusion

Repeat breeding remains a major reproductive challenge in dairy animals, causing considerable economic losses and reducing herd productivity. Since its causes are multifactorial, successful management requires a comprehensive approach that includes accurate estrus detection, proper timing of artificial insemination, balanced nutrition, effective reproductive health management, and stress reduction. Regular veterinary monitoring, strategic breeding programs, and improved management practices can substantially reduce the incidence of repeat breeding, thereby enhancing fertility, farm profitability, and the long-term sustainability of dairy enterprises.