Things you need to know about breeding livestock.

**Reproductive processes in beef cattle**

Beef cattle, like all mammals, give birth to live offspring. These offspring are nourished with their mother’s milk. A cow’s ability to conceive, give birth to and nourish a healthy calf is an important aspect of beef cattle production.

** KNOW ABOUT THE REPRODUCTIVE CYCLE **

The cow’s role in the reproductive process involves:

- Producing **ova**, or eggs
- Providing housing and nourishment for the developing embryo, which becomes a fetus
- Giving birth to the fetus
- Producing milk for nourishment of the young calf.

Mature male cattle are called **bulls**. Mature female cattle that have had one or more calves are called **cows**. A **heifer** is a female that has not calved yet. A **steer** is a castrated male. When a female calves, it gives birth to a **calf**.

The cow’s reproductive tract includes the **vulva**, **vagina**, **cervix**, fallopian tube, uterus and ovaries.

- The **vulva** is the external opening of the urogenital tract. It is part of the birth canal and the area where urine is voided.
- The **vagina** is also part of the birth canal and is where semen is deposited.
- The **cervix** is approximately 10 cm in length and lies between the vagina and the uterus. It relaxes when the cow is in heat and closes when she is not or when she is pregnant.
- The **oviduct**, also called fallopian tubes, transport sperm and ova, or egg, to the site of fertilization, which occurs in the upper one-third of the fallopian tube. The fertilized ovum is then transported to the uterus.
- The **uterus**, or womb, is where the major development and nourishment takes place. The uterus consists of two separate uterine horns.
- The **ovary** is the primary sex organ of the cow. The ovary produces the ovum to be fertilized and produces the estrogen and progesterone hormones.

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A cow’s reproductive activity is polyestrus, which means she has reproductive and non-reproductive seasons throughout the year.

KNOW ABOUT THE ESTROUS CYCLE

Once a cow reaches puberty, she has an estrous cycle of about 21 days, plus or minus 3 days. The cycle is composed of the estrous period, which means she is in heat and producing ova, and the diestrous period, which means she is out of heat. The estrous period lasts for an average of 12 to 24 hours, with an average of 18 hours. It ends when the cow ovulates and releases the ovum into the oviduct. Ovulation occurs 24 to 36 hours after the onset of heat. The normal diestrous period lasts 13 days.

Hormones are substances produced by a ductless gland and transmitted via the bloodstream to another organ, where they trigger a physiological response.

1. **The estrous cycle is controlled by hormones.** A follicle stimulating hormone (FSH) and luteinizing hormone (LH) are produced by the pituitary gland.

2. FSH is released into the bloodstream and travels to the ovaries to cause the development of a follicle that contains an ovum.

3. Estrogens are then released into the bloodstream.

4. Estrogens in the blood cause LH to be released and act on the brain to put the cow into the physical state of being in estrus, or having an estrous cycle. Estrogens also act on the fallopian tube, uterus and cervix to prepare the reproductive tract for pregnancy.

5. The LH hormone helps the maturation and ovulation of the egg-bearing follicle. Ovulation occurs when the mature egg leaves the follicle and begins its trip into the uterus.

6. After ovulation, the level of estrogen drops and what’s left of the ovulated follicle are converted to form a corpus luteum (CL), which is a temporary glandular mass, also called yellow body. Cells in the CL secrete the progesterone hormone. This hormone shuts down the estrous hormones and sets the stage for a pregnancy.

7. If the cow is pregnant, progesterone will maintain the pregnancy by suppressing other hormonal activity.

8. If the cow does not become pregnant, she will come back into heat.

The estrous cycle is characterized mainly by the cow’s behaviour. Since estrus lasts a very short period of time, an average of 18 hours, it is important to observe cattle twice a day. The cow will show behavioural signs such as:

- Restless and nervous movements
- Isolation or increased interaction from the rest of the herd
- Elevated tail
- Perked ears
- Frequent bellows
- Mounting of other members of the herd.

Additionally, the vulva may be reddened and swollen, with mucous discharge. Not all behavioural signs appear in an individual during a single estrus.
Know about the male’s role in reproduction

The bull’s role in the reproductive process involves:

- Producing reproductive cells known as sperm or spermatozoa and the male sex hormone testosterone
- Introducing sperm into the female reproductive tract to fertilize the egg and produce a calf.

The bull’s reproductive organs include the testes or testicles and the penis.

- The bull has two testes or testicles suspended by a spermatic cord that extends from the abdomen to its attachment on the testicle. The testicles are ovoid, which means they are shaped like an egg, and are housed in the scrotum, which is an out-pouching of skin.
- The bull’s testicles are formed within the abdominal cavity and descend into the scrotum when the fetus is in mid-pregnancy.
- The scrotum is made up of two scrotal sacs, which are separated by a septum. The scrotal sacs are located on either side and in back of the penis.
- The penis is the male organ of copulation and has three parts. The root attaches the penis to the pelvis with two strong ligaments and a pair of muscles. The body or shaft is the main portion of the penis. The glans penis is the enlarged front end of the penis.
- The urethra, a tube the length of the penis, conducts urine and semen to the outside.
- The body of the penis is formed by the corpus cavernosa, which are sponge-like columns of erectile tissue that become engorged with blood during erection.
- The epididymis stores sperm as it matures, and transports sperm from the testis to the deferent duct. The deferent ducts transport sperm from the epididymis to the area of the sex glands. The vesicular glands are sex glands and add gel to the ejaculate. The bulbourethral, vesicular and prostate glands add fluids to the ejaculate.
- The retractor penis muscle keeps the placid penis in the sheath and relaxes during erection.

The reproductive performance of a bull is affected by its structural soundness, reproductive organ capability, quality of semen and nutritional health.
DO YOU KNOW

What does the Code of Practice for the Care & Handling of Beef Cattle say about reproduction and calving management?

Proper nutrition is necessary for good reproductive performance. Balanced amounts of protein and energy are required for sperm production and the physical activity associated with breeding. Adequate amounts of vitamins and minerals are also important in reproduction.

During the breeding season, bulls tend to eat less feed than is required to maintain their body weight. At this time they use body fat for energy and may lose up to 68 kg, or 150 lbs. Supplying a grain mix to bulls on pasture is not always effective. Proper pre-breeding nutrition is essential to ensure the bull has adequate reserves for a successful breeding season.


KNOW ABOUT PREGNANCY & BIRTH

The average length of gestation for cattle is 280 days, with a normal range of 273 to 296 days. A twin pregnancy can average 3 to 6 days less.

The birth process can be divided into three general stages: preparation for birth, expulsion of the calf and expulsion of the placenta or afterbirth. The timing of each stage varies among types and breeds of cattle as well as among individual cows of the same breed.

1st stage of labour
- Lasts 3 to 72 hours
- Pelvic ligaments relax
- Cervical mucous plug released
- Cow is restless and may separate from herd
- Tail elevated
- Sniffs ground, may turn head toward flank
- May begin straining.

2nd stage of labour
- Begins with appearance of “water bag”
- Ends with expulsion of calf
- Should last 0.5 to 3 hours.

3rd stage of labour
- Expulsion of placenta
- Usually expelled by 8 to 12 hours after birth.

The majority of beef cows calve without assistance. However, careful monitoring of calving cows ensures that assistance, when needed, can be provided in a timely fashion. Knowing when and how to provide calving assistance is an important management skill that will protect both the cow and calf in the event of problems.

Calving is divided into three stages of labour:

“Need To Know: Reproductive processes in beef cattle”
The following requirements are identified in the Code of Practice.

Calving cattle must be monitored to identify calving difficulties and ensure prompt assistance when required.

Monitor and promptly assist calves and recently calved cows showing signs of distress.

Caesarean sections must be conducted by a veterinarian or qualified trained personnel using accepted surgical techniques and appropriate local anesthesia and post-operative pain control.

Spaying must be carried out by a veterinarian or qualified trained personnel. Consult your veterinarian on pain control when spaying heifers.

These recommended practices are also provided in the Code of Practice.

a. Plan a breeding period to assist in implementing other herd management practices, such as vaccination and nutrition programs.

b. Select sires carefully on the basis of predicted calving ease or the bull’s birth weight to reduce the likelihood of calving difficulties. Sire selection should also take into account the breed, size, age, and previous calving record of the females.

c. Time the first breeding of heifers according to their overall physical development in order to prevent calving difficulties (dystocia) and other health problems. It is recommended that heifers be at least two-thirds of estimated mature body weight at first breeding, and 85% of mature body weight by calving.

d. Ensure that cows and heifers are in suitable body condition at the time of calving (suggested targets: heifers 3; cows 2.5).

e. Ensure proper use of equipment designed for pulling calves.

f. Observe young calves regularly (preferably daily) to ensure that they are adequately nourished and are healthy.

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The process for the development of updated Codes can be accessed through the National Farm Animal Care Council at www.nfacc.ca/codes-of-practice.