AGA 4511
Beef and Small Ruminant Production

Components of this course

1. Beef Production
2. Small ruminants (Sheep and Goat) Production
3. Animal Draft Power

About the course!

Duration: 15 weeks

- 3 Lecture hours per week
- 3 Laboratory hours per week

Assessment

- Continuous assessment (Tests, Assignments, Quizzes, Reports) **40%**
- Final Examination **60%**
- **Test 1 on 11th April, 2024**
- **Test 2 on 29 April, 2024**

BEEF PRODUCTION

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Beef Production: An Overview

"Understanding the Journey from Farm to the Dinning Table"

Terminologies

- **Cow**:a mature female bovine that has given birth to at least one or two calves
- **Bull**:a mature, intact (testicles present and not removed) male bovine used for breeding purposes
- **Heifer:**a female bovine (often immature, but beyond the "calf" stage) less than 1 to 2 years of age that has never calved.

- **Calf**:(plural: *Calves*): an immature bovine (male and female) that is reliant on milk from its dam or from a bottle in order to survive and grow
- **Weaner**: an immature bovine after it stops suckling.
- **Yearling**:a cattle of either sex that is 1 to 2 years of age
- **Sire**: the male parent.

- **In-calf**: pregnant
- **Gestation period**: pregnancy period
- **Calving**: giving birth in cattle
- ***Ox*** (plural: *Oxen*)**:** a bovine that is trained for draft work (pulling carts, wagons, plows, etc.)This is a term that primarily refers to a male bovine that has been castrated after maturity

- Free-Marten - a female born with a male twin, usually infertile
- **Dam**: the female parent
- **Steer:** a male bovine (or bull) that has been castrated before reaching sexual maturity and is primarily used for beef.
- **Open or Empty**-A term commonly used to indicate a non-pregnant female

What is beef production?

- Refers to the process of raising cattle for the primary purpose of obtaining meat for human consumption.
- It involves various stages, from breeding and raising cattle to the processing and distribution of beef products.

Benefits of cattle rearing

- Provide Food, fertilizer, and fuel.
- Provide an income through the sale of animals and their products.
- Draught power for smallholder operations and transportation
- Serve as savings account and a symbol of family wealth.

- Can be a good source of high quality protein especially for vulnerable groups (children, the aged, HIV/AIDS patients).
- May serve as a buffer against crop failure and other risks.
- Provide environmental services – as a renewable source of fuel, reduces pressure on fossil fuels and forests.

- Creates jobs by providing raw material for the agro-based industries.
- As medium to settle disputes between aggrieved parties.

What are the key components?

1. Breeding and Genetics:

- Selection of breeding stock based on desired traits such as growth rate, carcass quality, and disease resistance.
- Implementation of breeding programs, which may include artificial insemination or natural mating

2. Calf Rearing:

- Care and management of calves from birth until weaning.
- Nutrition, health monitoring, and vaccination programs to ensure healthy and robust calves.

3. Grazing and Feeding:

- Cattle are typically raised on pasture, where they graze on natural forage.
- In some systems, cattle may be fed supplemental feed, which can include grains, forages, and other nutritional supplements, to promote growth and meet market specifications.

4. Growth and Development:

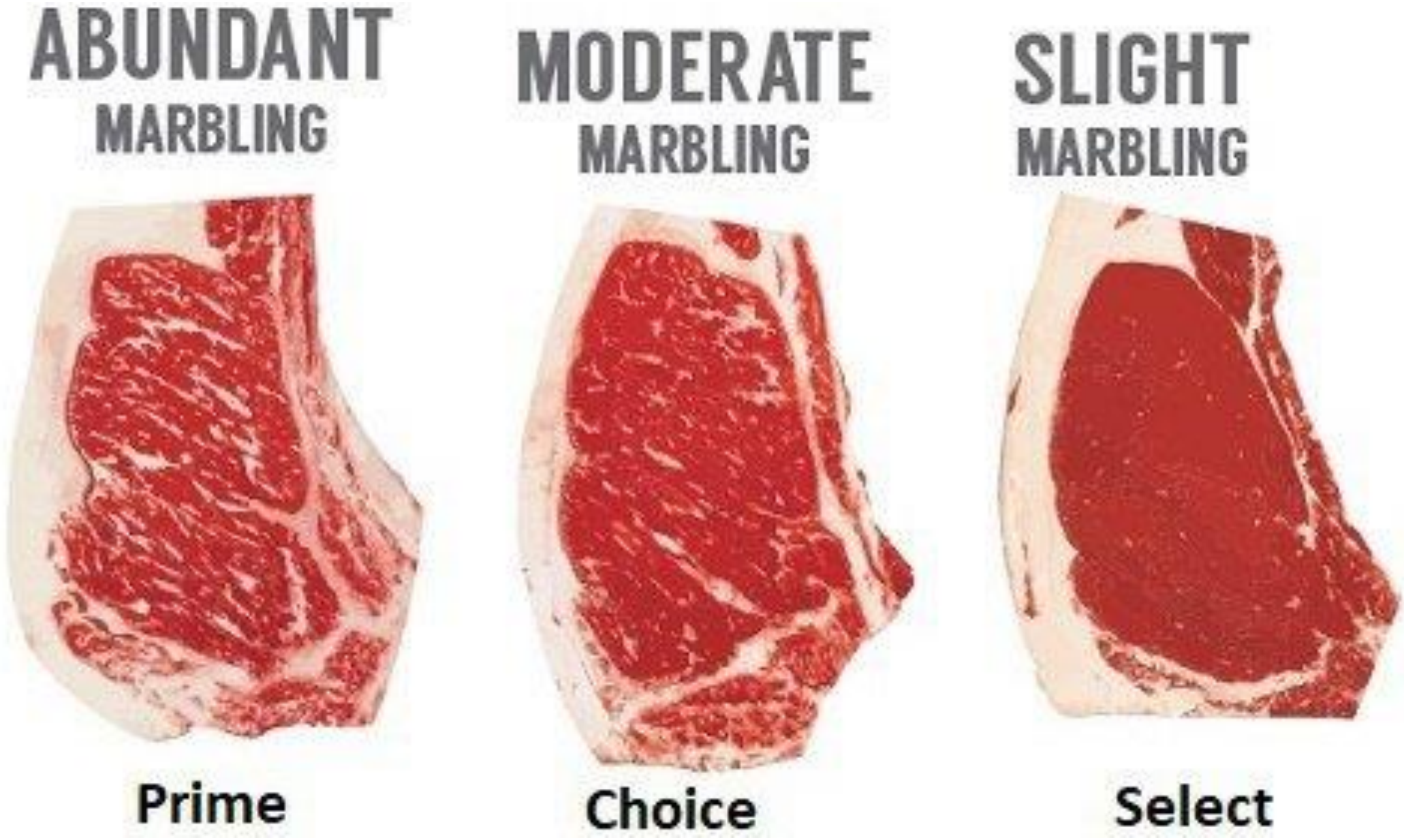
- Monitoring and managing the growth of cattle to achieve desired weights and muscle development.
- Ensuring proper nutrition and healthcare to optimize growth rates.

5. Health and Disease Management:

- Implementing vaccination programs and preventive measures to maintain the health of the herd.
- Treating and managing diseases and parasites to prevent negative impacts on growth and overall well-being.

6. Finishing:

- In some beef production systems, cattle may go through a finishing phase where they are fed a higher-energy diet to enhance marbling and improve meat quality.
- The finishing phase prepares cattle for market and ensures they meet market specifications.


ABUNDANT
MARBLING
MODERATE
MARBLING
SLIGHT
MARBLING
Prime
Choice
Select

7. Harvesting and Processing:

- Slaughtering and processing of cattle to obtain beef products.
- Processing includes various stages such as carcass dressing, meat cutting, and packaging.

8. Distribution and Marketing:

- Distribution of beef products to retailers, wholesalers, and consumers.
- Marketing strategies to promote beef products and meet consumer demands.

9. Quality Control and Assurance:

- Implementation of quality control measures to ensure the safety, quality, and traceability of beef products.
- Adherence to industry standards and regulations.

In summary;

- Beef production systems can vary globally, ranging from extensive grazing systems to more intensive feedlot operations.
- Sustainable and ethical practices are increasingly emphasized in modern beef production to address environmental and animal welfare concerns.

Beef cattle and Zambian agriculture

- The Zambian economy is witnessed increased growth in many economic sectors, including livestock
- Currently, livestock sector contributes 3.2% to the national GDP, and 42% to agriculture GDP
- It has the potential to deliver both agricultural led growth and socio-economic transformation as aspired in the 8NDP.

- Demand for livestock and livestock products is high due to population growth and the regional and international markets demands.
- MOFL is mandated to develop and manage the fisheries and livestock subsector to contribute to sustainable food, nutritional security and income generation.

- To fulfil this mandate, MOFL programmes that are being implemented include;
  a) Livestock stocking and restocking using improved livestock breeds,
  b) Promotion of forage and fodder production and utilization,
  c) Improved livestock infrastructure and livestock disease control.

- As by 2022, the cattle population had grown to 4.7 million (MOFL, 2022), as compared to 2.6million in 2005
- More than 60% of these cattle are in the traditional sector and are mainly of local breeds or crosses between local breeds and exotic.
- The traditional cattle sector is largely confined to Southern, Western, Eastern and Central Provinces.

Number of Cattle Raised by Households and Establishments as at 30th April 2022

Province	Number of cattle raised by households and establishments by province				
	Households		Establishments		Total Cattle Raised
	Number	%	Number	%	
Central	689,117	15.6	97,725	34.0	786,842
Copperbelt	50,625	1.1	27,198	9.5	77,823
Eastern	713,297	16.2	3,071	1.1	716,368
Luapula	10,560	0.2	3,512	1.2	14,072
Lusaka	130,862	3.0	15,966	5.6	146,828
Muchinga	83,528	1.9	4,749	1.7	88,277
Northern	102,821	2.3	1,939	0.7	104,760
North-western	57,909	1.3	6,988	2.4	64,897
Southern	2,096,084	47.5	119,992	41.8	2,216,076
Western	476,847	10.8	6,183	2.2	483,030
Zambia	**4,411,650**	**100.0**	**287,323**	**100.0**	**4,698,973**

Cattle Herd Structure for households

Province	Cattle Category Raised (Percent)							
	Total Cattle	Cows	Heifers	Bulls	Untrained oxen	Trained Oxen	Tollies/ Steers	Calves
Central	689,117	231,005	114,667	38,099	54,451	143,226	41,509	66,160
Copperbelt	50,625	17,596	4,792	8,806	907	9,478	2,306	6,740
Eastern	713,297	257,067	71,981	37,944	21,549	185,979	33,008	105,769
Luapula	10,560	4,435	1,216	1,619	256	.	602	2,432
Lusaka	130,862	57,368	17,526	6,375	4,503	19,466	7,411	18,213
Muchinga	83,528	47,555	6,016	8,516	3,212	3,843	2,336	12,050
Northern	102,821	37,809	9,172	12,820	2,167	24,203	3,677	12,973
North-Western	57,909	28,987	3,675	4,782	541	14,390	813	4,721
Southern	2,096,084	777,724	330,986	98,340	154,638	290,742	165,871	277,783
Western	476,847	200,107	51,520	39,837	17,094	96,571	25,519	46,199
Number	4,411,650	1,659,653	611,551	257,138	259,318	787,898	283,052	553,040
Percentage	100	37.6	13.9	5.8	5.9	17.9	6.4	12.5

Potential for Industry Growth

1. Vast grazing lands.
2. All of the country's agro-ecological zones have rainfall levels that are well suited for raising livestock.
3. Favorable market prospects, due to rising incomes, urbanization, and changing consumption patterns.

What would it take for the beef industry to achieve it's potential?

1. Better availability and affordability of breeding stock
2. Better availability and affordability of feeding inputs
3. Better disease prevention systems and lower cost drugs and veterinary care.

4. Easier access to and lower cost of finance;
5. A better regulatory environment could increase investment in the beef and dairy industries and enhance their performance.
6. Better infrastructure could lower the costs of doing business.
7. Improved farming practices and business acumen of traditional farmers.

8. Improved market access.
9. Product Processing.
10. Greater specialization along the beef processing chain could help to address Zambia’s uncompetitive dressed weight prices.

Beef Cattle Management Systems

1. Traditional system
2. Extensive system
3. Intensive system

1. Traditional system

Characteristics	Advantages	Disadvantages
1. Beef cattle grazed on natural pasture. 2. Grazing lands are communally owned 3. Cattle usually drink water from natural sources.	1. Relatively low start-up capital 2. Low maintenance costs 3. Relatively low labour requirement	1. Levels of productivity tend to be fairly low and characterized by: a. - high mortality rates (over 15% in some areas), b. - slow growth rates c. - low reproductive efficiency

Characteristics	Advantages	Disadvantages
4. Unrestricted breeding 5. Usually herded during the day and secured in kraals at night		d- weight losses during the dry season due to lack of supplementary feeding e. high disease incidences and parasite infestations. 2. over grazing can lead to land degradation

2. Extensive system

Characteristics	Advantages	Disadvantages
1. Controlled grazing by paddock fencing 2. Watering, feeding and handling facilities are provided 3. Cattle given feed supplements 4. Controlled breeding 5. Improved disease control methods	1. Economic returns tend to be large compared to traditional system; 2. Fairly low financial investment required compared to the intensive system, 3. Minimum/no weight losses during the dry season due to supplementary feeding	1. Require fairly high capital investment compared to the traditional system 2. High labour requirements compared to the traditional system.

3. Intensive system

Characteristics	Advantages	Disadvantages
1. Cattle confined in relatively smaller area to minimize movements (e.g., feedlot and bull stud) 2. Feed and drinking water is brought to the animals 3. Controlled or no breeding 4. High capital and labour investment	1. High returns to investments 2. High quality products 3. Easy to monitor the animals. 4. Enhances cattle manure harvest	1. High capital investment costs 2. High operational and maintenance costs 3. Labour intensive. 4. High managerial skills

Where to start from?

1. **Growing and feeding systems**
   - Calves/weaners are raised or purchased and then fed (fattened for slaughter).
2. **Breeding herds**
   - A breeding herd consists of cows and bulls that are used to produce calves for sale as breeders or feeder

3. **Combinations of growing, feeding, and breeding herds**
   - Success of each of these depends on adapting a strategy that fits your needs and capabilities.

- Which entry point to use depends on the financial muscle

Beef breeds available in Zambia

- Major local breeds that are even kept by the small-scale farmers are;
  - ✓ The Barotse
  - ✓ The Angoni.
  - ✓ The Tonga

- Other breeds found, but not very common among smallholder farms but on commercial farms are
  - ✓ Brahman
  - ✓ Boran
  - ✓ Hereford,
  - ✓ Simmental (dual purpose),
  - ✓ Angus,
  - ✓ Sussex, etc.

The Barotse breed

- Found mostly in Western province of Zambia
- Various colors, Black and brown, fawn to grey mixed with white and dark red
- Mature bulls weigh 580kg while cows weigh 400kg.
- Dew lap well developed in males
- Multi-purpose breed providing meat, milk manure and draught power.

Long wide span horns pointing backwards

The Tonga breed

- Commonly found in Southern Zambia
- Various colors; Red, black, red and white or black and white
- Has short horns and hump is situated on neck and chest (Small in males and missing in females).
- Mature bulls weigh 560kg while cows weigh 360kg
- Has long legs and is a multi-purpose breed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Baila Breed

- Mainly found in Namwala district of Southern province
- Various coat colours: red (roan), black, red and white or black and white
- hump situated between the neck and chest
- Small dewlap long legs
- Horns long wide forward/upward pointing
- Mature weight: bulls 550kgs; Cows 380 kgs

Baila Breed Crossing the kafue river to the flood plains

Crossing the kafue river to the flood plains

Productive and performance characteristics

Cattle Breed	Angoni	Tonga	Barotse
Calving percentage (%)	82.5	74.4	78.1
Birth weight (kg)	22.9	25.7	19.8
Weaning weight (kg)	147.3	140.8	167.0
Calf mortality (%)	2.7	4.6	5.3
Weight at 18 months (kg)	207.7	200.0	235.0
Weight at 3 years (kg)	283.3	210.3	255.3
Dress weight (kg)	182.4	145.7	185.5
Milk yield/lactation (kg)	990	850	1160

The Angoni breed

- Predominantly in Eastern Province, but also found in north-eastern and central Zambia
- Various colors. Black, red, white and grey.
- Mature bulls weigh 725kg while cows weigh 475kg
- Short and stout horns, and hump and dew lap well developed in both sexes

Survival Threats of Local Breeds

- Diseases,
- Inter breeding
- Migration
- Droughts

Diseases,

- Contagious Bovine Pleural Pneumonia (BBPP) that affects cattle of Western Province
- East Coast Fever in Southern Province and eastern province
- Foot and mouth disease

Inter breeding

- The crossbreeding threat is exacerbated by the breed being surrounded by large-scale commercial farmers who mostly own exotic breeds, which local people would like to cross with their local cows.
- However, efforts are currently underway to conserve the breed through on-station establishment of breeding herds such as the ones at Mazabuka Research Station and the National Institute for Scientific and Industrial Research (NISIR) in Chilanga

- The Angoni is relatively stable in terms of natural threats to its existence.
- The only potential threat to the Angoni is the continued outbreaks of East Coast Fever although the disease is currently kept under check through dipping and vaccination of animals.
- In terms of breed contamination, the Angoni is protected by the government ban that restricts animal movement from either side crossing the Luangwa River.

Migration

- The Tonga breed is no longer exclusively limited to the Southern Province as it has continued to migrate northwards as the Tonga people move in search of new farming areas.
- This has become a major threat for the breed as animals tend to interbreed with other cattle found in their new locations

The Boran

- Originally from East Africa & occurs in Variable colours, but Grey is the commonest
- Extensive skin and wrinkled around the neck & mature bulls weigh 680kg while cows weigh 490kg
- Small head with straight face, short horns and plenty meat on upper leg and loin & good in the feedlot
- Used for Crossing breeding, good as work oxen and is hardy animal, but has light bones

Boran cow


FARMING
PLAN

- Large size: Boran cattle are typically large animals with muscular bodies, sturdy legs, and strong frames.
- Humped back: They have a distinct hump on their back, which is characteristic of many zebu cattle breeds.
- Short coat: Their coat is short and smooth, usually in colors ranging from red to brown or black.
- Horns: Boran cattle have long, curved horns that extend outward and upward from the sides of their heads..

- The shape and size of the horns can vary between individuals.
- Loose skin: They often have loose, dewlap-like skin under their necks and chests, which helps them dissipate heat in hot climates.
- Adaptability: Boran cattle are well-adapted to arid and semi-arid environments, where they can thrive on sparse vegetation and limited water resources

- Disease resistance: Boran cattle exhibit natural resistance to many common cattle diseases prevalent in their native regions.
- This resilience reduces the need for extensive medical interventions and makes them cost-effective to raise.
- Heat tolerance: With their loose skin and ability to regulate body temperature effectively, Boran cattle are well-adapted to high temperatures.

- Their humped back and sweat glands aid in dissipating excess heat, enabling them to withstand hot climates.
- Fertility: Boran cattle are known for their reproductive efficiency, with cows exhibiting good maternal instincts and high fertility rates. This characteristic is advantageous for breeding programs aimed at improving cattle populations.

- Drought tolerance: Boran cattle can efficiently utilize limited water and forage resources, making them suitable for extensive grazing systems common in arid regions.
- Their ability to maintain condition and produce offspring under drought conditions is highly valued in such environments.
- Longevity: Boran cattle typically have a longer productive lifespan compared to some other breeds.

- Their ability to thrive under harsh conditions often translates to longevity and continued productivity, providing economic benefits to livestock producers.
- Meat quality: While primarily kept for their adaptability and resilience, Boran cattle also produce meat of good quality. Their meat is lean, flavorful, and well-marbled, making it desirable for both local consumption and export markets.

- Overall, the Boran breed's combination of hardiness, disease resistance, fertility, and adaptability makes it a valuable asset for livestock farmers in regions with challenging environmental conditions.
- Additionally, ongoing efforts to improve the breed through selective breeding and management practices aim to enhance its performance and contribute to sustainable agriculture in diverse landscapes.

The Brahman

- Originally from India, but improved in USA
- Light grey or red to black & produce quality meat
- Loose saggy skin, with sweat glands
- Long droopy ears with good mothering ability
- Mature bulls weigh 980kg while cows weigh 630kg
- Thrive where others survive, but are excellent in feedlot with good conformation
- Unpredictable temperament


showchampions

Brahman Cow


showchampions

- Hump: Perhaps the most recognizable feature of Brahman cattle is their large, muscular hump over the shoulders.
- This hump is well-developed and serves as a reservoir of fat and energy, allowing Brahman cattle to endure periods of scarcity and adapt to hot climates.
- Loose skin: Brahman cattle have loose, droopy skin with folds along their bodies.


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- This loose skin helps them dissipate heat, making them well-adapted to hot and humid environments.
- The skin also provides some protection against biting insects and parasites.
- Elongated ears: Brahman cattle have distinctively long, pendulous ears that often extend beyond their noses.
- These large ears provide additional surface area for heat dissipation and help regulate body temperature in hot climates.

- Prominent dewlap: Brahman cattle typically have a pronounced dewlap, or loose flap of skin, hanging from their necks.
- Light coat color: Brahman cattle commonly have light-colored or "light red" coats, although they can also be gray or even black.
- The light coloration helps reflect sunlight and reduces heat absorption, further

- High heat tolerance: Brahman cattle are renowned for their ability to thrive in hot and humid environments.
- Their heat tolerance is attributed to their physical features, including the hump, loose skin, and large ears, which enable efficient heat dissipation and help them regulate body temperature.
- Disease resistance: Brahman cattle exhibit good resistance to various diseases and parasites commonly found in tropical climates.

- Their hardiness and resilience contribute to their suitability for extensive grazing systems and low-input farming practices.
- Adaptability: Brahman cattle are adaptable to a wide range of environmental conditions, including tropical and subtropical regions with challenging climates.
- They can thrive in areas with limited forage availability and fluctuating water sources.

- Docile temperament: Brahman cattle are generally known for their gentle and docile temperament, making them easier to handle and manage compared to some other cattle breeds.
- Reproductive efficiency: Brahman cattle typically exhibit good reproductive performance, with cows known for their maternal instincts and fertility.
- This characteristic is advantageous for breeding programs aimed at improving cattle productivity and profitability.

In summary;

- The Brahman breed's combination of physical features, including the hump, loose skin, and heat tolerance, along with its adaptability and disease resistance, makes it a valuable breed for beef production in tropical and subtropical regions around the world.

The Africander

- Originally from South Africa (RSA) with Light brown to dark yellow.
- Mature bulls weigh 900kg while cows weigh 490kg
- Have developed dewlap, hump, loin and thigh with small ears that do not droop
- Lean and strong legs & horns taper downwards and backwards


André Pretorius
Fotografie
WWW.VASTRAPBORAN.COM

- Color: Afrikaner cattle typically have a red or reddish-brown coat.
- Some may have shades of lighter red or tan.
- Horns: They have large, upward-curving horns that are usually symmetrical.
- The horns are an important characteristic of the breed and can be quite impressive in size.
- Body: Afrikaner cattle have a robust and muscular build.


Afrikander

- They are well-adapted to the harsh African climates and are known for their resilience and hardiness.
- Adaptability: Afrikaner cattle are well-adapted to hot, arid climates and can thrive in harsh environments with limited water and forage resources.
- They have a strong resistance to diseases and parasites common in their native regions.

- Temperament: They are known to be docile and easy to handle, which makes them suitable for extensive grazing systems.
- Maternal traits: Afrikaner cows are known for their good maternal instincts and high fertility rates.
- They are excellent mothers, providing good care to their calves.

- Foraging Ability: Afrikaner cattle have a good ability to graze on low-quality forage and are efficient converters of grass into meat.
- Longevity: They are known for their longevity and can thrive in extensive production systems with minimal inputs.

- Overall, Afrikaner cattle are a valuable breed known for their adaptability to harsh environments, good maternal traits, and efficient conversion of forage into meat.
- They play an important role in the beef cattle industry, particularly in regions with challenging climates

The Bonsmara

- Originates from RSA and very fertile
- Breeds small calves but wean heavy calves
- Suitable for cross breeding
- Produce high quality meat.

- Color: Bonsmara cattle typically have a reddish-brown coat with a white marking on the underline, which extends from the chest to the hindquarters.
- The white marking may vary in size and shape but is a distinctive feature of the breed.
- Horns: Bonsmara cattle are polled, meaning they do not have horns.

- This trait was selected for during the breeding process to reduce the risk of injury to other animals and handlers.
- Body: They have a medium to large frame with a muscular build.
- Bonsmara cattle are well-proportioned with a deep chest and broad hindquarters.
- They have a sleek coat and a strong skeletal structure.

- Size: Bulls typically weigh between 800 to 1,000Kg, while cows weigh between 500-700 kg
- These weights can vary depending on factors such as nutrition and management practices.
- Adaptability: Bonsmara cattle are known for their adaptability to a variety of environmental conditions.
- They are well-suited to both extensive and intensive production systems and can thrive in hot climates with limited forage availability.

- Temperament: Bonsmara cattle are generally docile and easy to handle.
- They have a calm temperament, which makes them suitable for handling in various management settings.
- Maternal traits: Bonsmara cows are known for their excellent maternal instincts and high fertility rates.
- They are good mothers, providing attentive care to their calves, which contributes to the breed's reputation for strong maternal traits.

- Foraging Ability: Bonsmara cattle have a good ability to graze on a wide range of forage types, including low-quality vegetation.
- They are efficient converters of grass into meat and are known for their good feed efficiency.
- Disease Resistance: Bonsmara cattle exhibit a degree of resistance to common diseases and parasites found in their native regions.
- This resilience is a desirable trait in areas where veterinary services may be limited

- Overall, Bonsmara cattle are a valuable breed known for their adaptability, good maternal traits, and efficient meat production.
- They are widely used in commercial beef production systems in South Africa and other parts of the world with similar environmental conditions.

The Herefold

- Originally from UK and has white faces and red bodies with belly and legs also being white
- Excellent beef conformation and grows very fast.
- Prolific and is widely used as beef breed in the world
- However, in the tropics it suffers from pink eye disease


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- Color: Hereford cattle are known for their distinctive red body color with white markings.
- The white markings typically appear on the face, lower legs, belly, and sometimes along the back.
- The color pattern is one of the breed's most recognizable features.

- Head: Herefords have a broad, short head with a wide forehead and a straight or slightly dished face.
- They usually have a white face with a red or dark-colored muzzle.
- Horns: Historically, Hereford cattle were horned, but through selective breeding, they are polled

- Polled Herefords are preferred in many modern production systems due to safety and ease of handling.
- Body: Herefords have a sturdy and well-muscled body with a deep chest and broad shoulders.
- They have a medium to large frame and a balanced conformation.

- Size: Bulls typically weigh between 1,100-1,600 kg, while cows weigh between 700-1,100 kg.
- These weights can vary based on factors such as genetics, nutrition, and management practices.
- Adaptability: Hereford cattle are known for their adaptability to various climates and management systems.
- They perform well in both pasture-based and feedlot production systems.

- Their ability to thrive in different environments contributes to their popularity worldwide.
- Temperament: Herefords are generally docile and easy to handle, making them suitable for a range of management practices.
- Their calm demeanor makes them well-suited to intensive handling systems such as feedlots.

- Maternal traits: Hereford cows are known for their strong maternal instincts and excellent mothering abilities.
- They typically have good fertility rates, calve easily, and provide attentive care to their calves.
- Foraging Ability: Hereford cattle are efficient grazers and have the ability to thrive on grass and forage-based diets.
- They are known for their ability to convert forage into high-quality beef efficiently

- Longevity: Hereford cattle are known for their longevity and durability.
- They have a reputation for being hardy and resilient, with many individuals remaining productive well into their teenage years.

- Overall, Hereford cattle are valued for their distinctive appearance, adaptability, docile temperament, and efficient meat production.
- They are one of the most popular beef cattle breeds worldwide and are used in various production systems, including commercial ranching, grass-fed operations, and crossbreeding programs.

Sussex

- The Sussex breed of cattle, originating from England, is known for its distinct physical features and characteristics, which contribute to its popularity in beef production.

- Color: Sussex cattle are typically solid red in color, although some individuals may have variations in shades from light to dark red.
- The coat is often rich and glossy, adding to their aesthetic appeal.
- White Face: One of the most distinguishing features of Sussex cattle is their white face, which contrasts sharply with their red body.

- The white face usually extends from the forehead to the lower jaw, sometimes with white markings on the muzzle.
- Horns: Historically, Sussex cattle were horned, but many modern strains have been selectively bred to be polled (hornless).
- Polled Sussex cattle are increasingly common due to their ease of handling and reduced risk of injury.

- Body: Sussex cattle have a medium to large frame with a well-muscled body.
- They have a deep chest, broad shoulders, and a straight back, giving them a sturdy and robust appearance.
- Size: Bulls typically weigh between 1,000-1,500 kg, while cows weigh between 600-900 kg.
- These weights may vary based on factors such as genetics and management practices

- Adaptability: Sussex cattle are renowned for their adaptability to various environmental conditions.
- They thrive in both pasture-based and intensive production systems and are well-suited to a range of climates.
- Temperament: Sussex cattle are known for their calm and docile temperament, making them easy to handle and manage.

- Their gentle disposition makes them suitable for both small-scale and commercial farming operations.
- Maternal Traits: Sussex cows exhibit strong maternal instincts and excellent mothering abilities.
- They are typically good mothers, providing attentive care to their calves and ensuring their well-being.

- Foraging Ability: Sussex cattle are efficient grazers and have a high feed conversion efficiency, meaning they can convert grass and forage into meat effectively.
- They are well-suited to grazing-based production systems and can thrive on pasture alone.
- Longevity: Sussex cattle are known for their longevity and durability.

- With proper care and management, they can remain productive for many years, making them a valuable investment for beef producers.
- Overall, Sussex cattle are valued for their distinctive appearance, gentle temperament, adaptability, and efficient meat production.
- They are a versatile breed that has made significant contributions to the beef industry worldwide.

The Angus

- Originates from Scotland with Solid black color, with smooth hair coat.
- Produces high quality carcass and performs well in the feedlot.
- Has good mothering ability and matures early
- Resistant to hard weather conditions and can be genetically dehorn others

Breeding management

- In order to ensure that breeding only takes place between suitable animals the first thing is to keep only the best bulls and cows in the herd.
- A mature bull is normally able to serve 30-40 cows in a breeding season and calves produced are expected to have at least all the good qualities of this bull
- Thus, “The bull is half the herd." therefore, selection of really good bulls for breeding is vital.

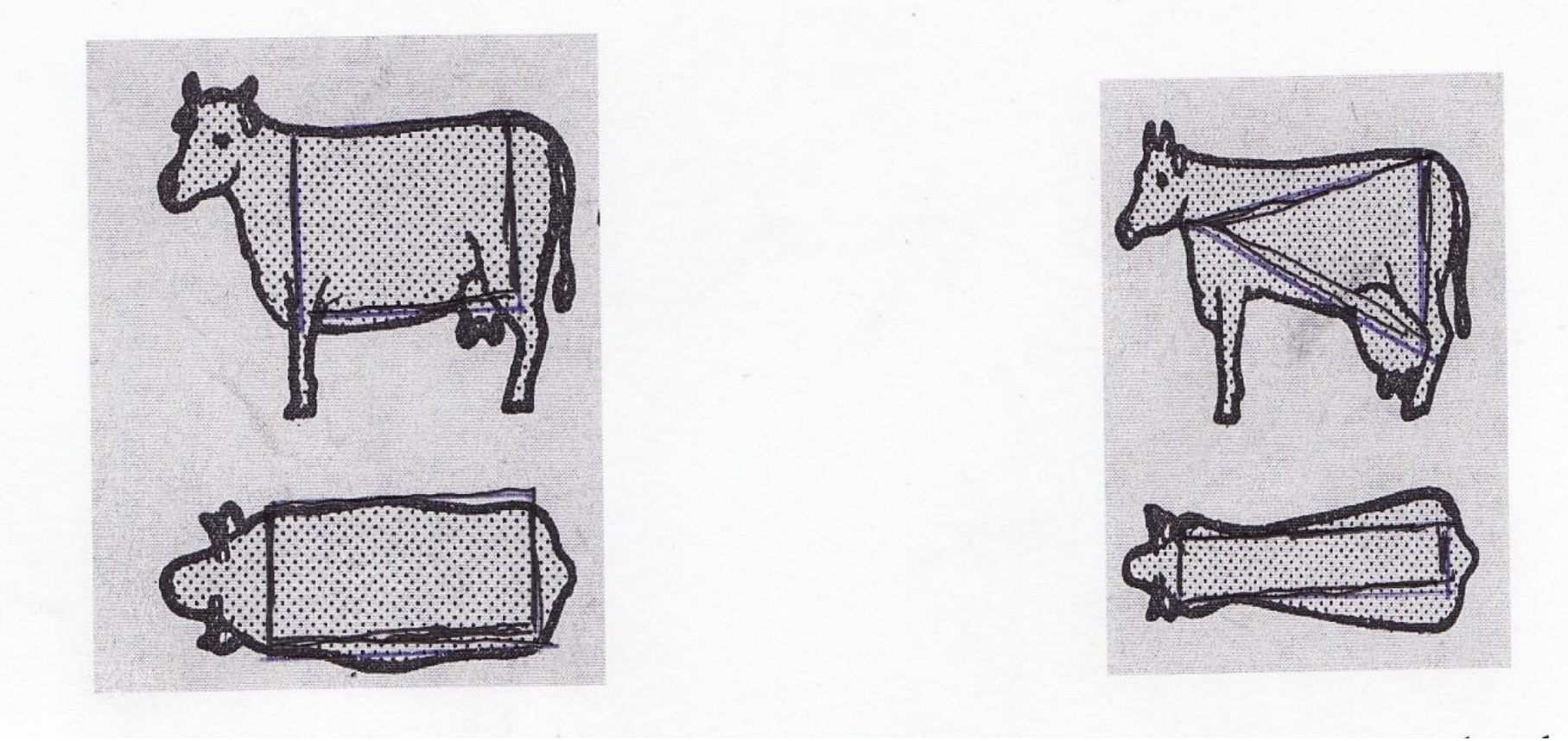
Selection of a bull

- Off spring of a cow with good mothering abilities.
- Should not be related directly to any of the cows in his herd to avoid in-breeding.
- Should have high growth rate and be fertile (two descended large testicles, no hanging sheath).
- Should have good conformation.(blocky and masculine)

Comformational differences between beef and dairy animals

- Beef animal

Dairy animal



Selection of a heifer

- Great care is also necessary in selecting heifers for the herd and the following guiding principles should be followed:-
  - Offspring of a cow with good mothering abilities, high milk production and longevity.
  - A well developed udder with four functional well developed teats.
  - Should be selected from a cow known to calve regularly (annually), docile and easy to handle and with high growth rate

- Should have good conformation (blocky, feminine and wide hip bones for ease of calving)
- Should have strong hooves and legs, and free from any deformity and lameness
- Should be healthy.

Breeding systems

- Profitable beef/dairy management starts with controlled breeding where animals mate within a specified period of time.
- The major advantages of controlled breeding are:
  - It ensures that calves are born at the time when chances of survival are greatest (less diseases)
  - I

- it allows farmers to have calves of similar age. This enables routine management practices to be carried out at the same time.
- It makes management easier to organise and plan.

Methods of mating or breeding beef cattle;

1. Hand Mating

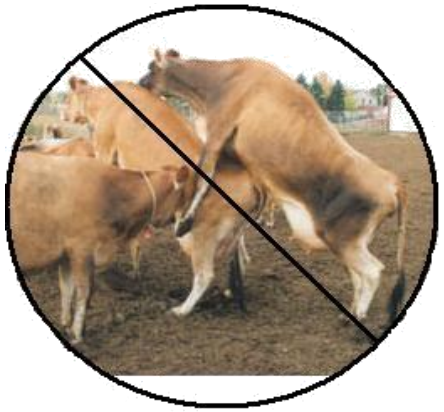
- This is the system where the male animal is kept separately from females at all times except when the female comes on heat and is brought to it for service.

- This has the following advantages;
  - It allows the farmer to check if the bull is making the cows pregnant.
  - The bull is allowed to exercise in the paddocks.
- Artificial insemination is also a form of hand mating.

Artificial Insemination (AI)

- The deposition of spermatozoa into the female's reproductive tract using artificial means for the purpose of impregnating it.

Not this



But this

- Can be done in all domesticated animals, though it has problems of evaluation, processing semen, low fertility in certain species.

Advantages of AI

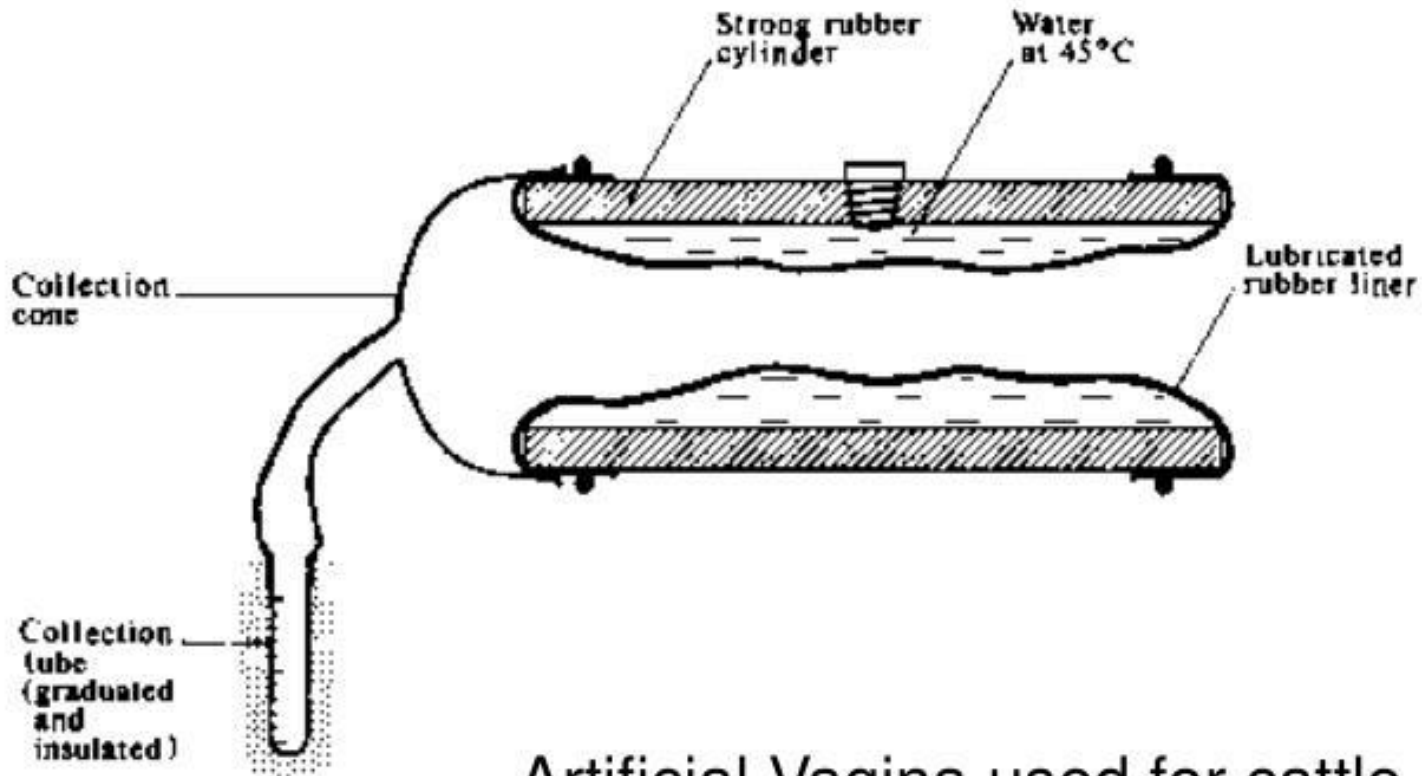
- ✓Gives genetic improvement to the livestock industry because of use of outstanding males.
- ✓You can cheaply and easily introduce new genetic material into the herd by importing semen which is easier than importing a male.
- ✓You can control sexually transmitted diseases (e.g. contagious abortion) because bulls are tested before use and semen collected is thoroughly screened.
- ✓It is economical because from one ejaculate you can inseminate a lot of females.

- ✓Can synchronize estrus, therefore, impregnate all females at the same time, which is not possible with natural mating
- ✓It is an easier and quick tool for investigating reproductive problems in males and females
- ✓It is possible to use superior males that are dead, lame or too heavy, which may not be accomplished through natural mating.

Disadvantages of AI

- ✓It is difficult for most farmers (especially in developing countries) to properly detect heat.
- ✓The delivery system, especially in developing countries, is poor such that semen may be received later than the day you request it.
- ✓Requires very accurate breeding record system to know when the female is expected to be on heat.
- ✓Some bulls are very dangerous and aggressive and can cause harm to handlers during semen collection.

Collection of Semen (cont.)



Artificial Vagina used for cattle.

When to inseminate?

Signs of heat;

- Standing when mounted by other animals.
- Nervousness and frequent urination
- Vulva will swell
- Inflammation and discharge of mucus from the vulva
- Trying to mount other animals (not a conclusive indicator as animals not on heat will still do this)

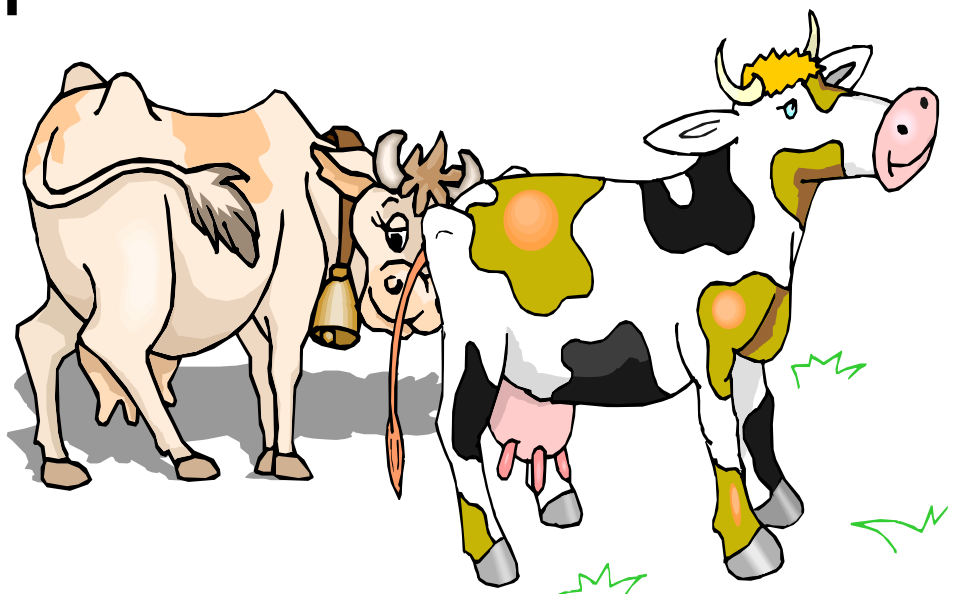
Cow activity and behavior

Before heat (6-10 h)

Smells other cows

Attempts to ride other cows

Vulva moist, red slightly swollen



Standing heat (18 h)

Stand to be ridden

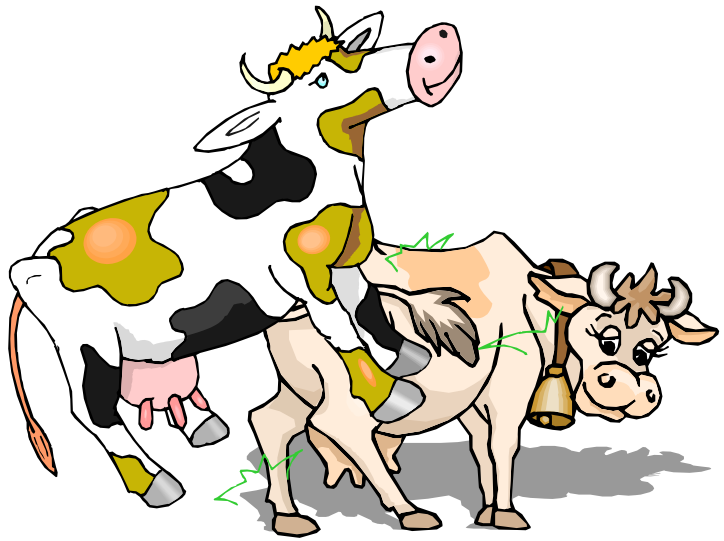
Bawls frequently

Nervous & excitable off feed and milk

Vulva moist and red

Clear mucous discharge

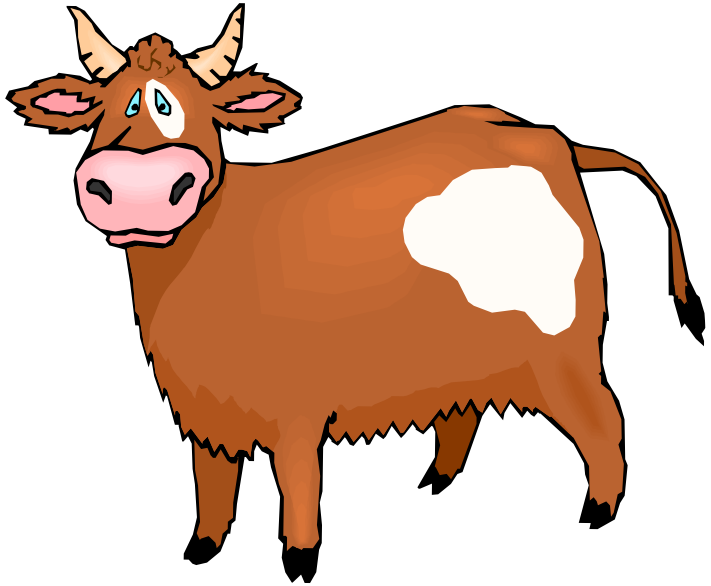
Eye pupil dilated

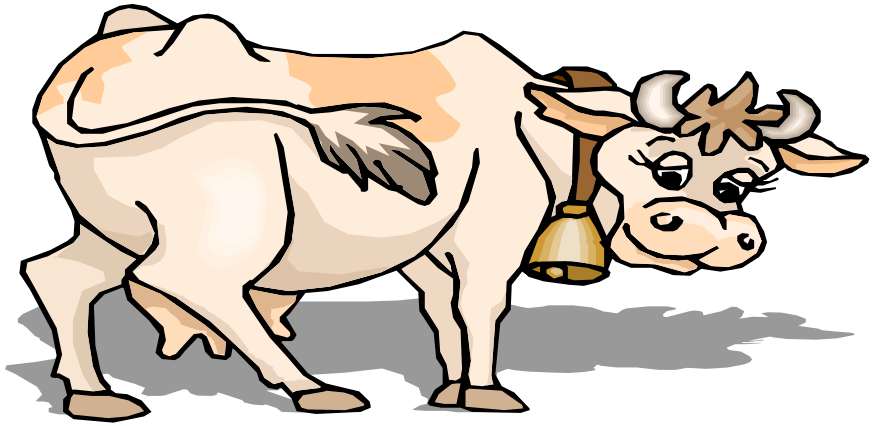


After heat (10 h)

Will not stand

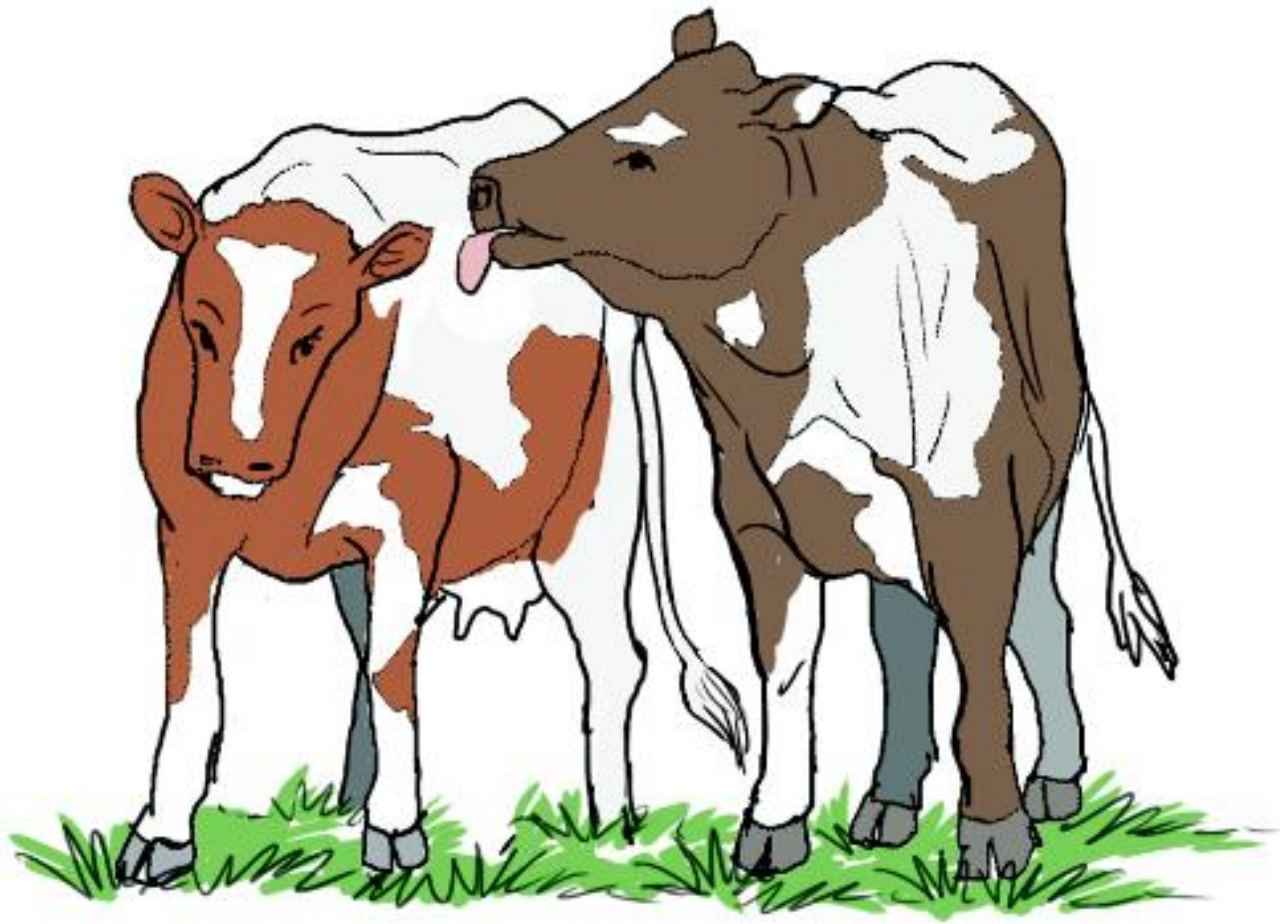
Clear mucous discharge from vulva



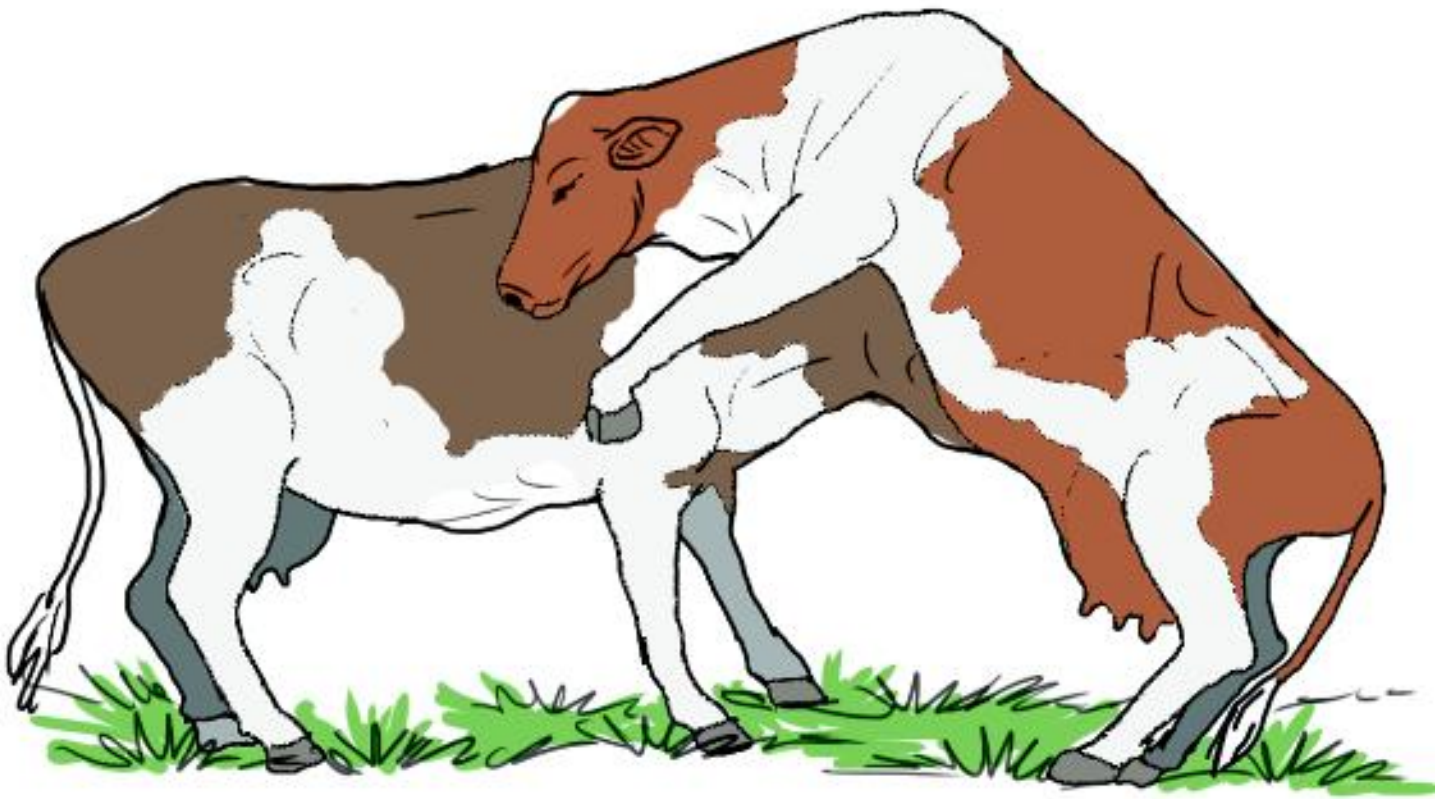


- ***Standing to be mounted:***
  The positive sign of heat is standing to be mounted. The cow in heat stands to be mounted and does not move away

Licking: Both cows may be in heat



Mounting head to head: The cow mounting is in heat

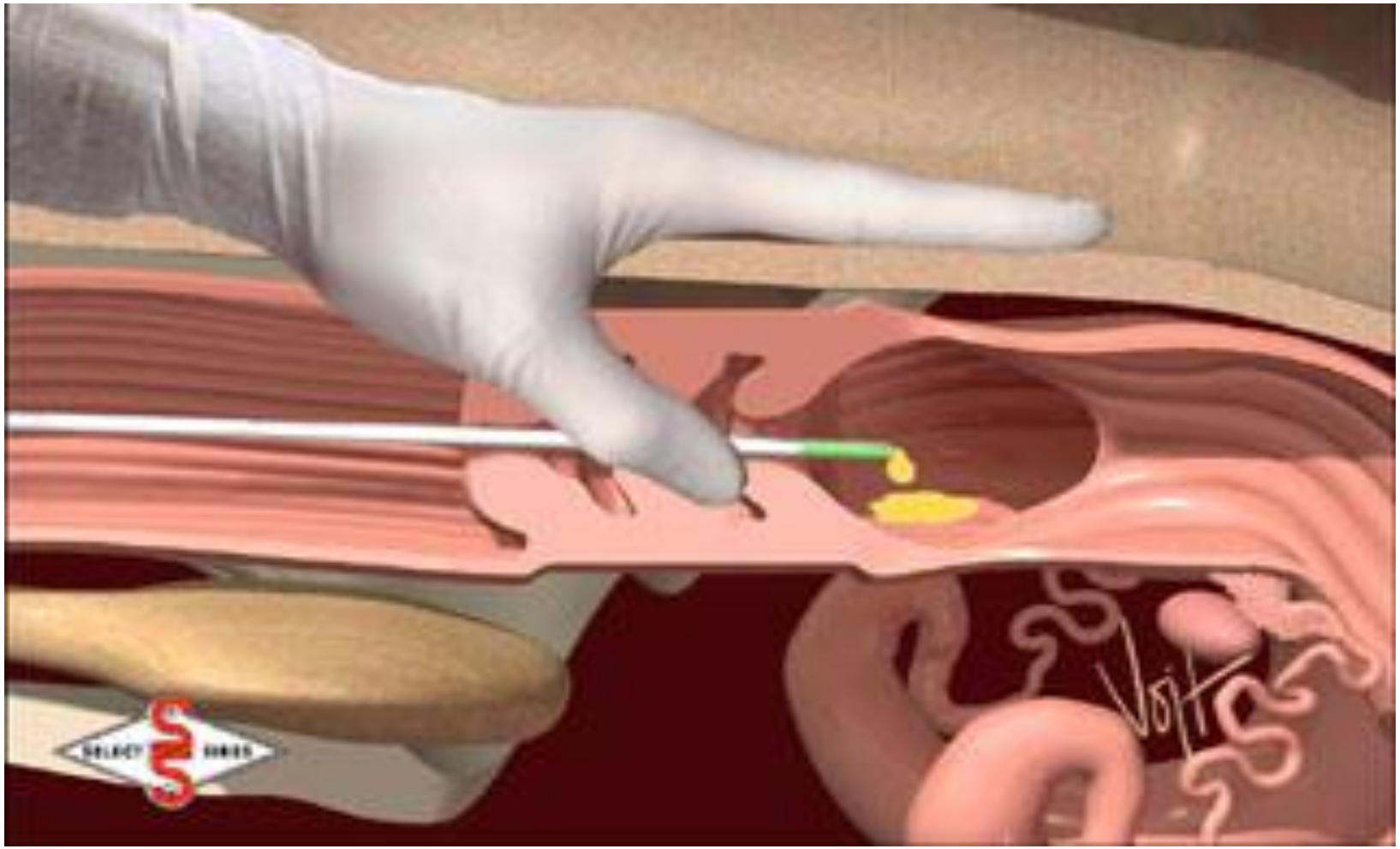


Heat Period

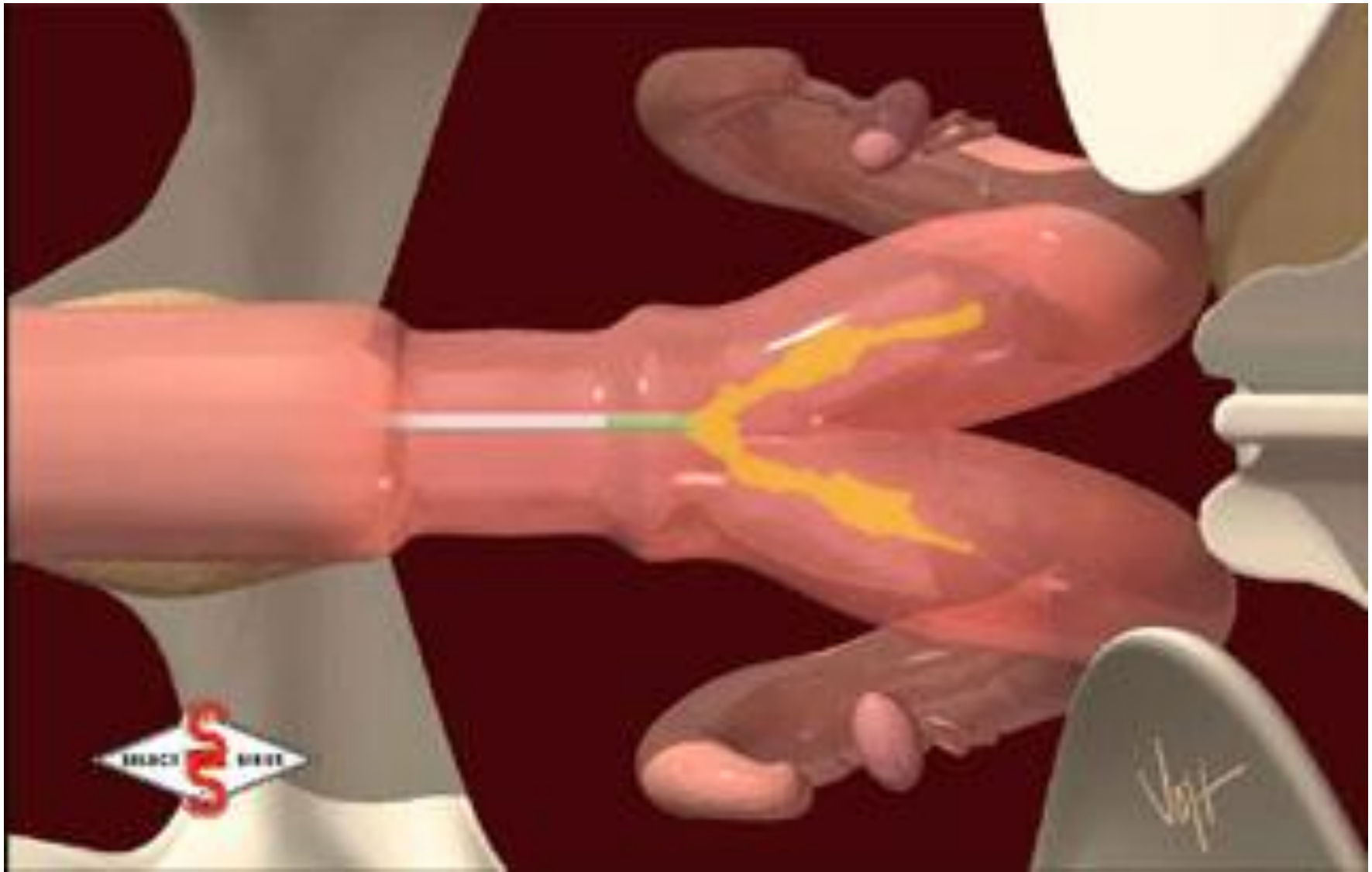
Early heat	Standing heat	After heat
• Increased nervousness/ restlessness • Mounting other cows • Swollen vulva • Licking other cows • Sniffing other cows and being sniffed • Reduced feed intake	• Standing to be mounted • Clear mucus discharge • Sharp decline in milk production • Tail bent away from the vulva • The animal may stop eating	• Dried mucus on the tail • Roughened tail head • The animal refuses to be mounted • Streaks of saliva or signs of leaking on her flanks
Early signs: Watch the cow closely	Best signs: Take the cow for service	Late signs: Keep record

Where to deposit semen?

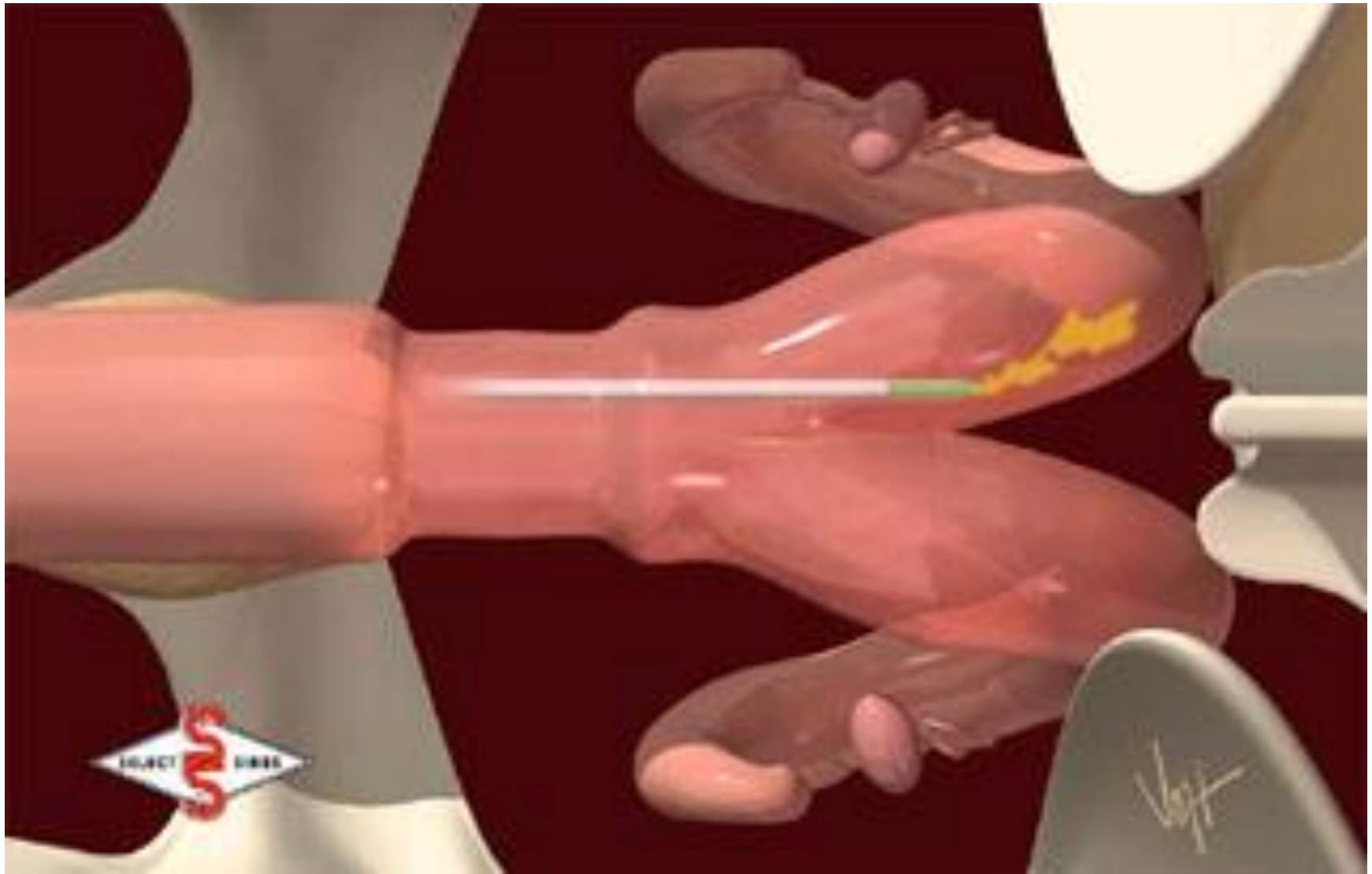
- Preferable just after the cervix



- Sometimes in the uterus



- Sometimes in the uterus horn



Disadvantages of depositing in uterus

- May introduce dirt in the uterus
- May injure the uterine wall and cause metritis
- May disturb an existing pregnancy

2. Pasture Mating

- Bull is turned out with cows and allowed to naturally service them for usually 3 months to ensure cows are bred.
- It is less labor intensive, but one must own or lease the bull
- Under this system, there are two major systems used;
  - All year breeding season in which the bull is allowed to run with the cows all year round.
  - Restricted breeding which may be in summer or in winter, or both.

1. All year round breeding

- It is mainly used by the traditional livestock farmers. In this system the bull is allowed to run with cows throughout the year.

- Advantages are:
  - Requires fewer bulls
  - Most calving still takes place during the dry season
  - The conception rates are high. .

2. Restricted breeding

- This involves the use of the summer or winter breeding season or a combination of both.
- The major advantages of restricted breeding are:
  - It ensures that calves are born at the time when chances of survival are greatest (less diseases)

- It makes management easier to organise and plan.
- It allows farmers to have calves of similar age. This enables routine management practices to be carried out at the same time.

I Summer bullying

- This occurs from 15th Dec- 31st March.
- Advantages of the bullying season are;
  - ✓Calving is between Sept-Dec, when weather is warm, thus. Calves do not go through a lot of weather related stresses and will be quite strong before the onset of rains.
  - ✓During Sept and Dec, external and internal parasites are at the lowest level of infestation, giving calves chance to build up natural resistance

- ✓ The availability of grass increases with the growth of calves and production of milk by the cows thereby ensuring sufficient food supply for the calves.
- ✓ Between 15th Dec and 31st March, the breeding animals are in their best body condition which improves conception rate
- ✓ There is uniformity in the herd because calves will be born within a definite period

- ✓Makes the carrying out of many management practices such as dehorning, castration, ear tagging, etc, and planning easy for the farmer.

- ✓Over three months the cows have 3-4 chances of coming on heat

- ✓The cows are expected to calve down from the beginning of September to the end of November when it is warm and dry.
- ✓The cows also tend to produce more milk during the rainy season and calves are big enough to consume all the milk produced by their dams.

- ✓Ruminal fixation in calves develop after six weeks of age and will then consume high quantity pastures during the rainy season until they are weaned.

II. Winter bullying season

- This takes place between May and August.
- Disadvantages

✓ Cows and bulls are on a low plain of nutrition.

✓Pregnant cows will also require supplementation

✓The conception rates are lower.

✓The cows are expected to calve down from the beginning of February and March when its wet more disease hazards.

III. Combination of both seasons

- This is a system whereby the two breeding system are combined.
- Advantages

✓Gives chance to cows that did not conceive in the main summer breeding season to be rebred in winter (May-August)

✓The farmer will also have to two sets of calf crops.

- Disadvantage

✓The cows that are rebred in winter will have a calving interval longer than 12 months up to 18 months.

At what age should heifers be bred?

- Generally, heifers should be served for the first time when they are about 2.5 years old.
- Serve heifers when they are at least 75% of their expected adult weight. E.g. Tonga cows weighing 360kg at maturity, breed it when it is at least 270kg.
-

Disadvantages of breeding too early are;

- Heifers do not reach maturity weight.
- Heifers calve down too small calves which are difficulty to raise.
- Heifers do not produce many calves in their lifetime.
- There are high incidences of dystocia.

Breeding calendar