(ANIMAL PRODUCTION)

NTQF Level - II

Learning Guide #-12

Unit of Competence: - Assisting Basic Husbandry Practice of Ruminants

Module Title: - Assisting Basic Husbandry Practice of Ruminants

LG Code: AGR APR2 M04 LO2-LG-12

TTLM Code: AGR APR2 M04 TTLM 0919-v1

LO 2: Undertake raising ruminant work

Instruction Sheet	Learning Guide #-12

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

2.1. Providing and clarifying instructions and directions

2.2. Undertaking raising activities

2.2.1. Applying ruminants restraining techniques

2.2.2. Providing feed and water

2.2.3. Preventing and treating of bloating problems

2.2.4. Mating animals

2.2.5. Assisting animal in normal parturition

2.2.6. Rearing new born animals

2.2.7. Undertaking Castration

2.2.8. Undertaking Dehorning

2.2.9. Undertaking hoof trimming

2.2.10. Operating Shearing activities

2.2.11. Applying Identifications

2.2.12. Handling and transporting ruminant animals

2.3. Carrying out age estimation of ruminants

2.4. Following enterprise policies and procedures in handling and disposal of materials

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Providing and clarifying instructions and directions
- Undertaking raising activities
- Carrying out age estimation of ruminants
- Following enterprise policies and procedures in handling and disposal of materials

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 7.

3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” **in page 4, 49, 55 and 57**respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2, Operation Sheet 3, Operation Sheet 4, Operation Sheet 5 and Operation Sheet 6 ” **in page -58, 59, 60, 61, 63 and 65 respectively.**
6. Do the “LAP test” **in page – 67** (if you are ready).
7. Then processed to the next learning guide.

Information Sheet # 1	Providing and clarifying instructions and directions

Any employee who works in industry which raises ruminant or any farmer who raise his own stock must follow the following instruction and direction:-

- Enterprise policies and procedures
- Manufacturer instructions
- Material Safety Data Sheets (MSDS)
- OHS standards and procedures
- Specifications for tools, equipment and materials
- Standard Operating Procedures (SOP)
- Verbal directions from manager or supervisor
- Work instructions and standards
- Work notes.

While, instructions are defined as:

- ✓ The act or practice of instructing or teaching; education.
- ✓ Knowledge or information imparted.
- ✓ An item of such knowledge or information.
- ✓ Usually, instructions, orders or directions: The instructions are on the back of the box.
- ✓ The act of furnishing with authoritative directions.
- ✓ Computers. A command given to a computer to carry out a particular operation.

Both, directions and instruction act as guidelines. They often appear as a series of steps or stages one must complete one after the other. However, they do differ in some manners. The main difference between the two is the fact that instructions are mainly associated with instruction or teaching. Hence, instructions are given to teach somebody something. For example: instructions for milking, instructions for honey harvesting , instructions for castration, instructions for completing a project, instructions for writing a report, etc.

Directions, on the other hand, are in the form of guidelines. They are mainly utilized while guiding somebody into a particular direction. Directions are mainly associated with driving directions, which aim to get somebody from point A to point B. However, they can be associated with anything that may lead somebody somewhere, especially in a particular direction. For example: Directions for setting up a federal program at a state level, directions for a successful career, a director directs players on stage, the managing director directs the company onto a good position in the market, the company is headed in a good direction, a musician directs the orchestra, etc.

Self-Check # 1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided next to the question:

1. What do you think on the consequence that if the worker don't follow the instruction of supervisor during working? (3pts)

2. What is the difference between instruction and direction? (3pts)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

2._____

_____

Information Sheet # 2	Undertaking raising activities

2.2.1. Applying ruminants Restraining techniques

In order to successfully manage animals, especially when that management requires direct contact, it is necessary to understand the responses of animals to frightening or disturbing situations. Animals will often have difficulties in coping with contact from humans and their responses will frequently be similar to a dangerous predator. Previous experience of a situation therefore plays an extremely important role in determining what the effect of human contact on an animal will be, and, as already demonstrated on laboratory, companion and farm animals, an animal will be substantially easier to restrain if it has previously been treated well and handled carefully.

Restraining: is the restriction of an animal's activity by verbal, physical and chemical means so that the animal is prevented from injuring itself or others. Animals are restrained and handled by humans for many reasons, including for medicinal administrations and treatments, examinations, health checks, grooming, castration, hove trimming, docking, bathing etc.

The main objective of restraint is to handle an animal in such a way that a procedure can be done without injuring the animal and without causing any injury to the humans involved in the procedure.

Some animals are aggressive while some others are docile or calm when trying to be handled them. Proper follow up of procedures in approaching and handling animals would enable one to avoid unnecessary danger. When approaching the animal, follow the instructions below.

1. Approach it as gently as possible.
2. Try to not have a stick in hand as it causes fear and excitement
   * You may use a stick with extremely nervous animals.
3. Approach it from the rear side at an angle of approximately 45^0.

4. Approaching should be accompanied by a gentle pat on the back of the cattle while at the same time talking to the animal.
5. Be confident while at the same time firm and careful with the animal

After approaching the animal, you have to restrain it strongly to perform any thing /operation on its body correctly and safely.

Importance/ purpose/of restraining

Restraining is performed for:

1. The safety of the animal
2. The safety of the operator
3. For fast and accurate performing of certain painful operations and other minor operations.
4. Labor saving

Types of restraining

There are three types of restraining:

1. **Moral /Psychological / verbal restraining: -** is the least restrictive type of restraint and would be used in combination with other types of restraint. It is the simplest type of restraining and involves talking to the animal. Sometimes it might need to talk to the animals to perform certain activities. In fact, it requires some training of the animal.

2. **Chemical restraining**- is accompanied by the use of chemicals such as aneasthetics and tranquilizers. Chemical restraint can be extremely useful as an aid to diagnostic or minor surgical procedures or in the control of animals which have a potentially dangerous temperament. Selection of appropriate combinations and doses of drugs to provide ideal restraint for the spectrum of patients and procedures encountered in clinical practice requires experience of a wide range of agents and their effects in different circumstances. A suitable combination for a particular individual may be completely ineffective in another animal of similar breed and size, but different temperament, undergoing the same procedure. The administration of chemical restraint is therefore a much more difficult skill to acquire than that of general anaesthesia. By the same token it can be one of the more satisfying areas of veterinary anaesthesia.

3. **Physical restraining**: is the primary method of restraining an animal and involves using the handler's hands or body along with muzzles, ropes, crush, chute or other equipment. It is commonly used type of restraining for some daily routine activities.

The type of restraining to be used on the animal varies according to:

1. Species of animals such as sheep, goat, horse, cattle etc.
2. Age of the animal. E.g. Cow and calf
3. Sex of the animal. E.g. Cow and Ox /Bull
4. Breed - e.g. Holstein cows are docile while zebus are wild
5. Individual character of the animal
6. Purpose of the restraint such as examining the face, working on the hoof of the animal, etc.

Physical Restraining Operation can be classified into two:

1. **Mass operations:** Vaccination, separating animals, spraying and others activities could be performed by mass. Such operation can be carried with the help of crush. If individually done, it would be time consuming and very difficult.

2. **Individual operations:** Diagnosis and treatment of sick animals, P.D test, hoof trimming, castration, dehorning, branding and others are carried with the help of chute by restraining the individual animal. Where chute is not available different techniques of restraining can be applied. Some of the techniques would be mentioned below.

Haltering: is the first and most important physical restraining method. Haltering animals is of practical importance in handling and guiding an animal to the place where we want to take it.

Method to make halter: Follow the procedures listed below to make temporary halters.

1. Take 2m length rope
2. Make a small loop at one end
3. Make another loop at a distance of 15-20 cm
4. Pass the standing part of the rope through the first loop.

5. Again pass the standing part through the second loop.
6. Place the noseband on the bridge of the nose and pass the headstall over the poll and place behind the ears.
7. Then tighten the loops and halter.

Note. When haltering an animal, the proper position is that the headstall should be behind the ears with the lead shank pulling the nose lead tightened from under the jaw.

Restraint That Divert Attention

A- Ear twitch: This method can be applied by hand or with the aid of a rope. The squeezing of the ear causes pain and the animal diverts its attention to its ear only. Therefore, other operation can be carried on other parts of the animal body.

B. **Nose lead** .The animal can be restrained by grasping its nasal septum with the use of material called Nose lead. As a result it causes pain around its nose. This also can be done by using our fingers. Therefore, other operation can be carried on other parts of the animal body.

C. Tail restraint: This method is accomplished by grasping the tail at its base with one or both hand and bending the tail to the back to cause pain. Then the animal will be forced to divert it attention around its tail. Therefore, other operation can be carried on other parts of the animal body.

Calf Restraining: For every young calves the following methods can-be applied.

A- Put the calf between your knees

B- Put the thumb inside the mouth in the open space b/n the incisor and the premolar.

Be very careful not to put your fingers between the teeth of the animal.

Casting It means placing the animal on the ground.

Time of Casting: All animals that are to be casted should be fasted at least for 12 hours. If the animal is not fasted, there is a possibility that the intestine would burst

when the animal hits or dash the ground hardly. It is advisable not to cast a lactating cow unless it is extremely necessary. When it is necessary, lactating cows should be casted after milking not before milking. Casting the cow before milking would excite the animal and causes decrease in milk production. In casting an animal it is usually good to do it in the morning.

A. Reuff Method: - When casting the animal using this method. The loop on the neck should be tied with a bowline or the non-slip knot. The rope is then passed around the heart girth, passed back and looped around the animal just anterior to the hipbones. A steady pull of the free end will cause the animal to collapse slowly.

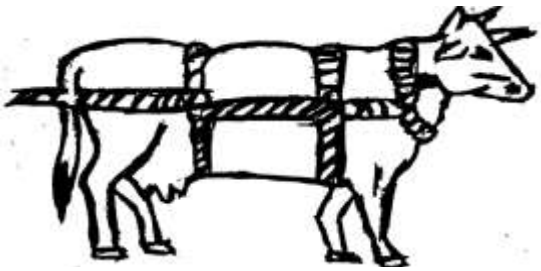


Fig1. **Reuff method of casting**

B. Cris-cross method of casting: In this method, the middle of the rope is placed over the neck and the ends passed between the front legs. They cross under the brisket and are then passed upward and crossed over the back and then down wards past the flank and between the hind legs. Traction on the free ends will cause the animal to collapse. The ropes must cross under the briskest (Not on the throat) or the animal will not go down.

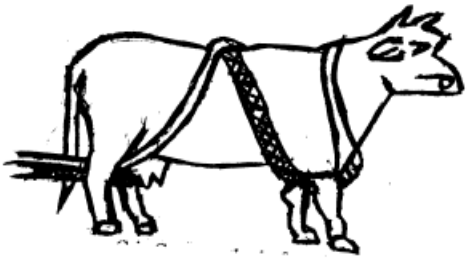


Fig2. Cris-Cross method of casting

Casting Calves

Calves can also be cast using a rope but this is a rather slow and inefficient method for handling small- animal since they can be easily cast by hand without rope.

To Cast a calf: Stand close by the side of the calf with your face to the side of the calf and try to reach the inner two legs of the calf i.e. the front leg and hind leg close to you.

- Bend over the back of the calf and try to reach the legs mentioned and hold firmly.
- Pull the leg out ward while at the same time supporting the calf with your knee.
- Place the calf on the ground.
- Place one of your knee on the shoulder and the other knee on the hindquarter and press firmly so that the calf will not arise. Never get loose.
- If tie is required, take 2 meters long rope; fold the rope into two equal parts. A loop is formed at the center of the rope. Place the center of the rope between the hind legs. The two ends of the rope are brought on the outside of the two legs and passed through loop. One on the outside of each leg, the end is again passed through the front leg and tied around the neck of the calf.

Restraint using cattle crush

A cattle crush or squeeze chute is a strongly built stall for holding cattle safely. It is used to enable easy access for examination of different size animals. Crushes are used to minimize the risk of injury. There are different types of cattle crushes with different features. Typical features of the cattle crush include: push – pull lever, dual locking system, side gates (with slam gate latches), needle gates, inspection gates, bottom gate, and walk through vet compartment.

Fig3. Features of a cattle crush

To restrain cattle in a cattle crush, you have to:

1. Direct cattle into the open crush. Use the principles of the flight zone. Two people might be needed, one who makes the cow move and one who is ready to close the crush. But don't have too many people around the crush, as it might make the cow nervous.
2. Close the dual head gate on the cow's neck in front of the shoulders. This is done by moving the lever on the side of the crush down.
3. Close the rear sliding gate for optimal animal control. By using your foot to manoeuvre the gate you avoid being in reach of the cattle, should it kick in defense.
4. Operate the side squeeze in order to position the cattle squeezing the animal in the crush actually calms it down and does not hurt it.
5. A head holder can be applied for better control.

Fig4. Cattle restrained in the crush. The head will be outside the gate.

2.2.2. Providing feed and water

In order to get the most out of livestock you must always give animals enough good feed and clean water. Good feed is high in nutrients and provides everything that the body needs in order for the animal to grow and reproduce.

Ruminants have the ability to consume and digest coarse, fibrous feedstuffs that form the major feed base in Ethiopia. The digestive tract of ruminants is unique in structure and function, allowing them to digest the fibrous feeds they consume.

The following are some of the unique features of the ruminant digestive tract compared to monogastric animals (animals with a simple stomach such as swine, dogs, cats, human, etc.):

- ⇒ Ability to digest carbohydrate sources not digested by monogastric.
- ⇒ Ability to use sources of non-protein nitrogen (NPN) to satisfy part of their protein needs.
- ⇒ Large stomach volume to accommodate and utilize bulky feeds.
- ⇒ Mouth and teeth well adapted for prehension and grinding of fibrous feeds.
- ⇒ Well-developed salivary glands for production of large volumes of saliva.

What an animal needs in its feed?

- ✓ All animals and humans need the nutrients called carbohydrates, proteins, fats, vitamins and minerals in their feed in order to stay healthy, have energy, grow and reproduce.
- ✓ Carbohydrates such as sugar and starch are burned in the body to give energy. Fats are broken down in the body to give carbohydrates and water. Animals and humans store carbohydrates as fat in the body.
- ✓ Protein forms the building blocks of the body. It is needed to produce the muscles.
- ✓ Minerals such as copper and calcium are needed to form the bones, brain, nerves and blood. Plants take in minerals from the soil (A silo is a structure or container used to store silage).
- ✓ Vitamins are essential for a healthy body and all plants contain several vitamins. Lack of essential vitamins can cause problems such as blindness and swollen joints.

- ✓ If animals do not get enough of any nutrient they will become less productive and may die from a condition called a deficiency disease.
- ✓ If an animal does not get enough fat, protein or carbohydrate in its feed it cannot grow properly, loses weight, milk production drops and production of young is affected.
- ✓ Lack of minerals results in such problems as failing to come into heat, poor bone growth and loss of hair or wool.

Types of feed

A good, rich feed contains more energy than a poor feed and a cow gets as much energy from 1 kg of sorghum, barley or corn as it does from 6 kg of grass. Some feeds are very poor and of little use to the animal. For example, old straw contains little energy, most of it cannot be digested and passes out of the animal as dung.

Roughage is bulky and low in energy-giving carbohydrates. Examples of such feeds are grasses, maize stalks and sweet potato tops.

Concentrates are feeds which are rich in proteins and carbohydrates, e.g. grain crops.

The large stomach of the ruminant with its four compartments means that it can live mainly on roughage. Animals with single stomachs need more concentrates than ruminants.

Rations

A daily ration is the amount of feed an animal needs every day. A good ration will contain all of the nutrients. Some nutrients are found in large amounts in some plants:

Nutrient	Plants
Carbohydrate	maize, sorghum, wheat, oats, rice, grass
Protein	Lucerne (alfalfa), clovers, beans, grass
Fats	cotton seed, sunflower seeds, grass, groundnuts

An example of a good ration which can be given to animals not on pasture is 3 parts of maize, part sunflowers and 1 part unshelled groundnuts. The ration is fed at the rate of 2 - 3% of body weight each day. Green growing grass contains all the nutrients but in the dry season grass contains little protein and vitamins. It is necessary to give additional feeds at this time in order to prevent weight loss, maintain high milk production, growth and reproduction. It may also become necessary to give minerals to the animal.

Feed for the dry season

In the dry season grass becomes scarce and is low in nutrients. When grass is plentiful in the wet growing season you can cut grass, and store it until it is needed in the dry season. The grass can be kept as hay or silage.

Hay is dried grasses. The best hay is prepared from young grasses. Cut the grass and leave it to dry in the sun for several days turning it over to make sure it is completely dry when it can be stored until needed. Do not try to make hay in the rainy season.

Silage is grass or other plants which are cut while green and stored without air.

Fodder trees

In some communities' people traditionally cut tree branches to feed their animals. We now know that some trees are better than others for feed. The best trees are leguminous trees (Leucaena).The leaves and branches of the trees can be cut through the year and used as animal feed.

Using these trees for feed is beneficial because:

- The leaves of the trees provide good feed for animals all through the year.
- The rotting leaves provide mineral rich mulch (natural fertilizer) for other crops.
- The trees provide fuel wood, timber and shelter from the wind.
- The trees stop soil erosion and improve the fertility of the soil. To know more, ask your agriculture officer or veterinarian about using fodder trees.

Supplementary feeds

Supplementary feeds are given when the grass is poor and dry or when an animal is pregnant, giving milk or is a working animal. The best supplementary feed is cake. The

cheapest of which is the waste material from the processing of coconuts, groundnuts, cottonseed and palm oil. You can use whatever is available locally.

Water

Animals need plenty of fresh clean water every day. Always give water before feeding animals and allow them to drink at least three times a day. Ruminants on pastures can be watered every 2 - 3 days. Do not allow animals to stand in the water at the drinking place. This can cause disease to spread. Water needs will vary according to the feed they eat and the weather. A pinch of salt can be added to the drinking water to provide minerals.

Points to remember

Take care not to spread disease through feed and water. Keep water and feed troughs clean and do not allow animals to eat old or musty feed. Change feeds slowly. Take special care when introducing fresh green feed so that bloat is avoided.

Several methods of feeding animals have been developed such as the following:

⇒ Feeding urea-treated straw: Straw is a low nutrient feed for ruminants but if it is wetted with urea and covered for a week it becomes more nutritious.

⇒ Molasses-urea-mineral blocks: Blocks made of molasses, mineral salts and urea are a good supplement for ruminants which lick the block and take in the nutrients.

2.2.3. Preventing and treating of bloating problems

Bloat is a form of indigestion marked by excessive accumulation of gas in the rumen. Immediately after cattle consume a meal, the digestive process creates gases in the rumen. Most of the gases are eliminated by eructation (belching). Any interruption of this normal gas elimination results in gas accumulation or bloat.

Bloat can be caused by:

⇒ A condition secondary to acidosis indigestion

⇒ Certain proteins in forage

⇒ The amount, rate of intake, and coarseness of the roughage

⇒ Rate of digestion of grains as a result of processing (grinding too fine)

⇒ Host-parasite reaction following grub treatment choking

⇒ Enlargement of the lymph nodes between the lungs, which can compress the esophagus or interfere with the function of the vagus nerves

⇒ An inherited tendency for bloat

There are three categories of bloat:

i. Frothy bloat which occurs when diets that lead to the formation of a stable froth or foam in the rumen are fed.
ii. Free gas bloat caused by diets that lead to excessive gas production.
iii. Free gas bloat caused by failure to eructate rumen gases leading to accumulation (e.g. esophageal obstruction). When bloat occurs, gases cannot escape and they continue to build up causing severe distention of the abdomen, compression of the heart and lungs, and eventually death.

Predisposing factors

Bloat is a risk when animals are grazing young, lush pasture, particularly if the pasture has high legume content (clover or lucerne). Ruminant animals produce large volumes of gas during the normal process of digestion which is either belched or passes through the gastrointestinal tract. If anything interferes with the gas escape from the rumen, bloat occurs. Natural foaming agents in legumes and some rapidly growing grasses cause a stable foam to form in the rumen. Gas is trapped in small bubbles in this foam in the rumen and the animal cannot belch up the gas. Pressure builds up in the rumen causing an obvious swelling on the left side of the body.

Signs of Bloat

i. Animal stops grazing and is reluctant to walk
ii. The left side of abdomen is distended
iii. The animal strains to urinate and defecate
iv. Rapid breathing — mouth may be open with tongue protruding
v. Staggering

Fig.5: Staggering; a sign of bloat in a cow from the rear, left side distended indicating bloat

Figure 6. Bloated calf, viewing the calf

Prevention of Bloat

***Pasture management*:** Legumes should be introduced into the diet gradually over several days. Avoid cows gorging on new pastures by feeding them on other feeds before letting them out to graze. Silage, hay or more mature pasture can be used to reduce the cow's appetite. Initially, cows should only be allowed access to the pasture for short periods (one hour or so) and monitored closely during grazing and immediately after removal. Cutting and wilting the pasture for 2 - 3 hours prior to feeding reduces the risk of bloat.

Preventative medication: Detergents and anti-foaming agents can be drenched prior to grazing.

Treatment: A sharp knife can be used to puncture the rumen on the left side of the animal (at the farm level as an emergency). Puncturing the rumen with the standard trocar and cannula is a quickest way to release the gas which cannot be expelled with a stomach tube. The trocar is used to puncture while the cannula is left in place to release the gas.

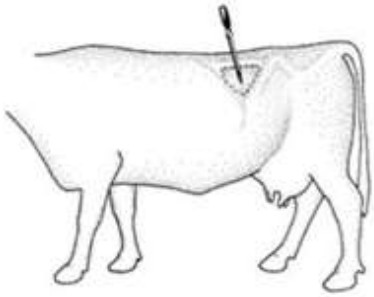


Fig7. Insertion point for needle or trocar fitted with a cannula.

Dotted triangle is the left paralumbar fossa where “hollow “of the flank is found

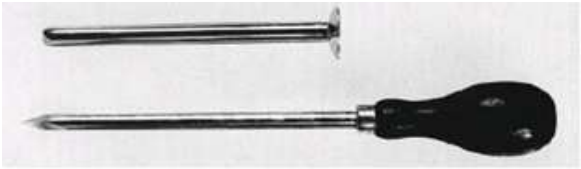


Fig8. Trocar (bottom) and cannula

2.2.3. Mating animals

1. Heat detection

Estrus or “heat” is a period during the reproductive cycle when female animals become sexually receptive, signaling they are ready for mating. In most cases, this can also be referred to as “standing heat” because the female will stand to be mated by the male.

Heat detection is an extremely important exercise as a missed heat translates into a wasted 21 days while efficient heat detection makes it possible to serve the animal at the right time. The average heat interval is 21 days with a range of 18 to 24 days. Duration of heat is 24 to 36 hours in exotic and crossbred cows.

Signs of heat in ruminants

Heat or oestrus is the period when the female will accept the male and mate. There are signs which mark oestrus in all ruminants. Recognizing when the female is on heat means you will know when to put her with the male or use artificial insemination. The best time to look for signs that the female is in heat is early morning or in the evening. Take care not to disturb the animals but just watch the animals for the signs.

Ruminants can be kept on pasture or they may be stabled or tied up for most of the time.

It is therefore necessary to consider this when looking for signs of heat:

Signs of Heat in Free Animals (At Pasture):

- Most females in heat will allow other animals to mount them.
- Cows in heat will mount one another, from the rear or from the front. However, the cow on top may not be on heat.
- The vulva becomes swollen and the area around the tail becomes wet and dirty.
- If cows sniff each other's' vulva and urine they may both come into heat.
- Cows can be coming into heat if they stand resting the chin on the back of another or are seen to lick or gently butt each other.
- Restlessness and calling loudly can also mean the female is coming into heat. Goats in particular become very noisy.

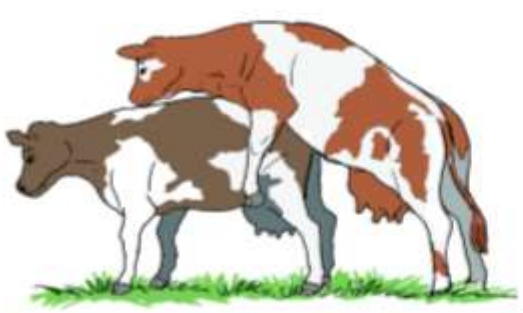
Signs of Heat in the stabled or tied animal:

The animals should be allowed out twice a day when they can be watched for signs of heat. If the female is not allowed out then the following will show that she is in heat:

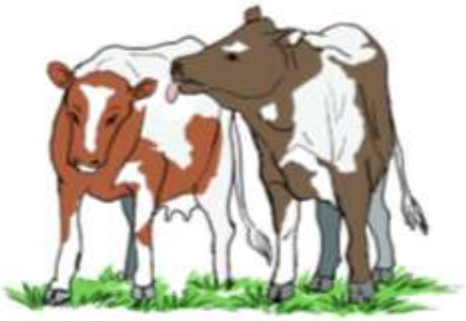
- Swollen vulva.
- The animal is active, there is a loss of appetite and she calls loudly.
- In milking animals the amount of milk produced suddenly drops.
- A jelly-like mucous can be found on the floor with the dung.
- You will need to be able to recognize the differences between signs of heat and signs of ill health in the animal which is tied up.

Several methods are used to detect heat. The most commonly used by farmers are behavioral signs and physical changes.

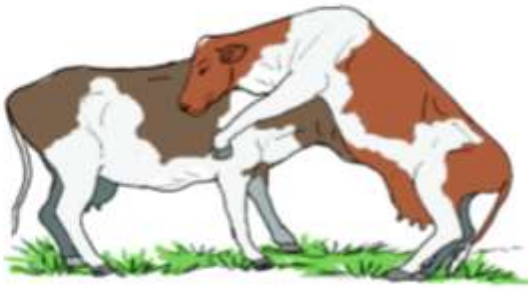
Early heat	Standing heat	After heat
• Increased nervousness/ restlessness • Mounting other cows • Swollen vulva • Licking other cows • Sniffing other cows and being sniffed • Reduced feed intake	• Standing to be mounted • Clear mucus discharge • Sharp decline in milk production • Tail bent away from 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



(a) 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



(b) Licking: Both cows may be in heat



(c) Mounting head to head: The cow mounting is in heat

Fig. 19 (a) to (c): Behavioral signs of heat in cows

Fig. 9 behavioral signs of heat in cows

When do animals come into heat for the first time?

- ✓ Animals come into heat when they reach puberty. This occurs at different ages in the different ruminants:
- ✓ Well-fed cows and buffalo come into first heat at 10 - 20 months of age.
- ✓ Sheep and goats come into first heat between 6 - 12 months of age.

How long does heat last?

- ⇒ The duration of heat is very short.
- ⇒ In cows and buffalo, it lasts for less than a day.
- ⇒ In goats heat lasts for 1 - 3 days.
- ⇒ In sheep heat lasts for 1 - 2 days.

A healthy animal which was not mounted by a male or given artificial insemination will come back into heat. Cattle and buffalo cows will come into heat after 3 weeks (give or take a day or two), and female goats and sheep will come back into heat after 17 days (give or take a day or two).

Reasons for female not showing signs of heat

The female may not show signs of heat because she is too old, or she may have been mated without the owner knowing. Sometimes animals come into heat without showing any signs. This is called a "silent heat" and is common in buffalo cows.

If the feed is not sufficient or there is a lack of protein, salts or water, the animal can fail to come into heat. You will need to improve the female's feed to bring it into heat.

Anoestrus & sub-estrus clinical signs

- Animals not showing regular signs of heat, repeat breeding and early embryonic mortality.
- At times heat signs, not visible properly.
- **Reason -** Nutritional deficiencies, management disorders, hormonal deficiency and uterine disorders.

2. Mating system

Once heat has been detected, cows should be mated. Mating of good quality animals to produce highly productive and suitable animals for enhancement of overall performance in the subsequent generations and to augment production and profitability is termed animal breeding.

There are two types of mating of animals for production of the progenies. These are

1. **Natural mating:** Mating of animals by natural means.

This is where the cow is taken to a bull and left for some time for the bull to serve.

The advantages of this method are:

a) The cow has an opportunity to be served more than once; this increase the chance of conception.
b) The semen is fresh and of good quality since there is no handling.
c) Where the farmer does not own a bull, cost of service is lower compared to A.I.

Natural service has the following disadvantages:

a) Rearing a bull is not economical especially to a small holder farmer
b) There is risk of spreading breeding diseases.
c) There is risk of inbreeding if the bull is not changed frequently
d) There is no opportunity to select the type of bull the farmer wants.

Increasing the chances of conception through natural service:

- ✓ Take the cow to the bull as soon as it is detected to be in heat and leave it for at least twelve hours.
- ✓ Young inexperienced heifers should be mated with old experienced bulls.
- ✓ Young inexperienced bulls should be given to old experienced cows.
- ✓ The bull should be kept fit and in good health particularly the legs and feet.

Natural mating can be done in two ways:

Free/pasture mating - This method of mating is practiced by farmers who own bulls which run full time with the cows. One bull can serve 20-25 cows. It has the advantage no heat detection required and disadvantage of lack of accurate records and possibility of transmission of reproductive diseases e.g. brucellosis.

Hand mating- The bull is enclosed in its pen and the cows are brought in when they show signs of heat. Most small-scale farmers will practice this method since bulls are owned by few farmers and others bring their cows for service at an agreed fee.

The advantage is keeping accurate records while the disadvantage is the farmer has to detect heat.

2. Artificial insemination (AI): Mating is done through artificial means by collecting semen from male and the inseminating the females. This method helps in use of outstanding males for mating of a large number of females thereby production of large number of highly productive and performing progenies.

The process of artificial insemination starts with a healthy bull, that is disease free and producing ample quantities of high quality semen. The fertility of the cow is also important, the competency of the inseminator and a clean environment. Farmers are encouraged to use semen from proven bulls which is obtained from AI centers and registered service providers.

Benefits of Artificial Insemination

1. Prevention of venereal diseases

2. Indefinite preservation of genetic materials of low cost enabling wide testing and selection of bulls

3. enhances genetic progress as best bulls are used widely nationally and internationally

4. Small scale farmers through AI can access good bulls cheaply
5. One is able to select the bull of interest.
6. When handled properly, there is no chance of spread of breeding diseases.
7. It is easy to control inbreeding.
8. A.I. is the best method of improving the genetic make-up of local breeds because it enables semen from the very best bulls to be widely available.
9. It is cost effective since the farmer does not have to rear a bull.

Disadvantages of AI

1. It requires very accurate heat detection and proper timing of insemination for greater chances of conception.
2. The inseminator must be trained on the technique.
3. It requires high investment in equipment.

3. Selection of Breeding Stock

Selection is used as a tool for livestock improvement. A breeding stock is a group of males and females which act as parents of future generations. Selection is the process of allowing certain animals to be parents of future generations while culling others. Culling is the removal of animals which do not perform to the desired level, from the herd. The animals retained have certain desirable characteristics which make them produce more.

Selected animals make up the breeding stock. The breeding stock should pass the good qualities to their offspring's for better performance, to improve the livestock. Selection process repeated for many generations increases chances of formation of desirable qualities in an animal. Selection helps improve characteristics which are highly heritable.

Heritability means the likelihood of a particular trait to be transmitted to the offspring and they are strongly inherited. A character like milk yield is lowly heritable, i.e. it is weakly inherited and a bigger percentage of the character is affected by the environment.

- ✓ The degree to which selection affects a character depends on the following factors;

  The heritability of the character,
- ✓ The intensity with which the selection is done and the interval between generations and kind of selection being practiced.

Factors to be consider when selecting Breeding Stock.

- Age
- Level of performance
- Physical Fitness
- Health
- Body Conformation
- Temperament or Behavior
- Quality of products
- Mothering Ability
- Adaptability
- Prolificacy

Age

- Young animals,
- Those that have not parturated for more than 3-times should be selected.
- They have a longer productive life.
- Old animals are poor breeders and low producers.
- Production and breeding efficiency decline with age.

Level of performance

- Animals with highest production level selected.
- Performance best indicated by records.

Good performance of animal indicated by;

- High milk, wool and egg production,

- Good mothering ability
- High prepotency which is the ability of a parent to pass good qualities to their offspring's.
- The animals with poor performance should be culled.
- Good records kept and used by the farmer for this purpose.

Physical Fitness

Animals selected should be free from any physical defect e.g.

- mono-eyed,
- limping,
- irregular number of teats,
- scrotal hernia,
- defective and weak backline

Health

- Sick animals do not breed well and are expensive to keep.
- Animals that are resistant to diseases pass these characteristics to their offspring

Body Conformation

- Animals for breeding to be selected according to proper body conformation.
- A dairy cow should be wedge-shaped with a large udder, thin legs, long neck.

Temperament or Behavior

- Animals with bad behaviors should be culled. e.g. Cannibalism, egg eating, aggressiveness, kicking

Quality of products

- Select animals that give products of high quality such as meat, wool, eggs, milk.

Mothering Ability

- Animals selected should have a good mothering ability,

- That is animals with good natural instinct towards their young ones.
- This will enable them to rear the young ones up to weaning.

Adaptability

Animals selected should be well adapted to the prevailing climatic condition in the area e.g. Arid and semi arid areas.

Prolificacy

- Animals selected should be highly prolific.
- That is, animals with the ability to give birth to many offspring's at a time(larger litter).
- This is a quality that should be considered when selecting pigs and rabbits.
- The ancestry records assist to choose the prolific breeds for mating

2.2.5. Assisting animal in normal parturition

Parturition or Calving in Cattle

Parturition is giving birth to the young calf. Two months before the expected calving date (the parturition), so 7 months after service, the cow should get plenty of rest, because the growth of the calf takes up a lot of the cow's energy. This means that 2 months before the expected calving date, a milking cow should be dried off (i.e. you should stop milking her) and a cow you keep for traction should stop working. At about the 272 days of pregnancy, an in-cow is ready to calve. It must be taken to the calving or maternity pen some few days to end of pregnancy which can be calculated from the records kept by the stockman. If calving must be done on pasture, a clean, quite secluded place must be prepared for it while the stockman watches, in case assistance is required. Towards calving, the udder becomes bigger, the vulva also swells and the ligaments around the tail head drops. Hormones such as oxytocin are released which helps in the contraction of the uterus.

Parturition can be divided into three stages:

1. The water bags come through the birth canal. This may take 2 to 6 hours.

2. In the second stage the actual delivery of the calf occurs. First the front legs come out, then the head, and after that the whole body comes out. Once the front legs are out the calf must be out within an hour. Otherwise the calf might suffocate. The normal birth position (presentation) is with the front legs first and with the nose between the front legs (see figure 10). If the calf presents differently the parturition is much more difficult. In that case you will see the cow really working to deliver the calf, but nothing comes out. If it takes more than 8 hours, get veterinary help. If you help the cow with the delivery of the calf, you should pull at the two legs. Always pull to the side of the legs and udder of the cow and never towards the tail side. If you pull, then only do so with a maximum of 2 people and pull only at moments when the cow is pushing herself.

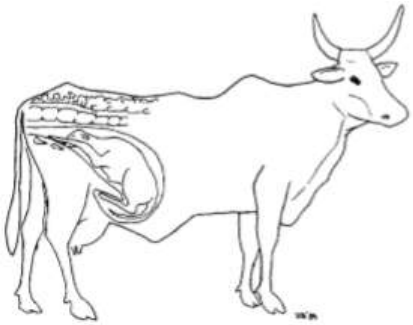


Figure 10: Normal presentation of the calf.

3. The third stage consists of the parturition of the placenta (afterbirth), which normally follows the calf almost immediately. If, however, the placenta has not come out within 12 hours, you should contact a veterinarian.

If two calves are born from one cow at the same time, you have to be aware of possible infertility. If these calves are both male or both female there is no problem. If the calves have different sexes, the female calf may be a barren cow. This means that the young calf is infertile; she cannot be used for reproduction or milk production. Soon after birth, calves must be identified by tagging, tattooing, branding or ear notching.

Lambing or Kidding

The gestation period of ewe is 140 to 150 days (21 to 22 weeks) which is similar to that of a doe. On the average the gestation period in sheep and goat is about 5 months.

With this, it is possible for ewe or doe to give birth at least once a year or three in two years. The act of giving birth in sheep is called “lambing” while it is “kidding” in goats.

Ewes and does demonstrate essentially the same characteristics when giving birth. Towards the end of pregnancy, the udder of the animal swells and becomes larger. The ewe or doe becomes restless, bleats and there is a hollow appearance on the flank region of the loin. Some watery discharge that is opaque and yellowish is observed from the vulva and the animals choose a secluded place to give birth. Parturition process is completed within two hours. The animal could be assisted if in distress or invite a veterinarian especially if the foetus position is abnormal. The normal position is when the lamb or kid comes out with head rested on the fore leg coming out first from the vagina. The dam cleans up the lamb or kid by licking the mucus from the body and stimulates the lungs to respire in some cases. The young animal after some time begin to show signs of hunger and thereafter sucks the dam.

Fig11. The sequential process of kidding

2.2.6. Rearing new born animals

Rearing of Calf after Parturition

The calf rearing period, which is the period from birth until 6 months after weaning (weaning is changing of the young’s feed from milk to solid feedstuff), is a period with many risks. The highest mortality rates occur in this period. The newly born calf is very

weak and susceptible to diseases. During this period it needs extra care, with particular attention to good feeding, health, hygiene and housing.

Feeding of the calf

The primary concern in rearing the newborn calf is to ensure it remains healthy. Feeding management should also be directed at addressing nutrient requirements and encouraging rumen development. A calf needs its mother's milk in order to start a healthy and productive life. Milk contains all the necessary nutrients. It is full of energy, protein, minerals and vitamins. It is very important for the calf to drink a sufficient quantity of the first milk, called colostrum, during the first 48 hours. This milk contains antibodies, which give the calf resistance to the prevalent diseases. The calf needs 10 % of its live weight in milk each day in order to grow 1 p% in live weight per day. So a calf that weighs 30 kg needs 3 kg milk daily. Too little milk will weaken the calf, make it more susceptible to disease or the calf might die because of malnutrition.

Phases of Calf Feeding

Phase	Feed
Colostrum phase (1 - 4 days)	Colostrum
Pre-ruminant phase (5 days to 20 - 30 days)	Milk
Transition stage (Liquids & dry feeds)	Milk replacer and calf starter
Post-weaning stage (dry feeds)	Calf starter

Table1. Four phases of the calf feeding program

The aim should be to switch young calves to cheaper feeds as early as possible so that more milk can be available for sale. However, the diet must be able to promote health and growth.

Calf Feeding Methods

After the first week during which the calf is left with the dam, several methods can be used for feeding depending on ease and convenience.

1. Single suckling

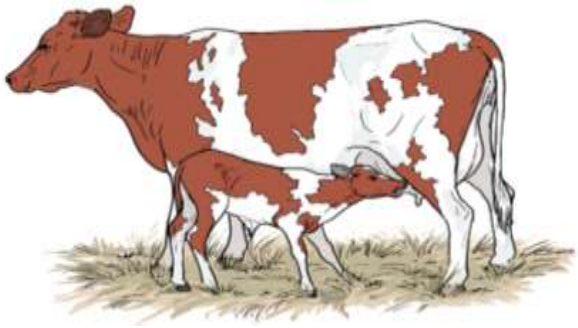


Fig. 12: A calf suckling

The calf is separated with the mother but during milking it is brought to suckle. The amount of milk the calf consumes is difficult to quantify. Some farmers will allow the calf to suckle one quarter. This method is rarely used in commercial dairies. The disadvantage is that if the calf is not present, then the cow may not let down all the milk. This method is the best in terms of hygiene as the calf gets clean milk at body temperature.

1. Foster mother or multiple suckling

In farms where several cows give birth at the same time, one cow can be assigned to a number of calves depending on milk production. The calves suckle in turns ensuring that each calf only suckles the designated quarter. This method is not practical in small scale farms.

Nipple suckling: - A plastic nipple is attached to a clean bottle filled with milk and the calf is trained on how to suckle. An alternative is to attach a nipple on a short plastic hose pipe and insert the same into a bucket. The calf is then trained on how to suckle.

Fig.13. Calf being Fed in Bucket with a Nipple

Bottle feeding: - The milk is placed in a clean bottle and the calf is fed directly from the bottle. This method is tedious and slow if many calves are to be fed. There is a high likelihood of milk going to the lungs via trachea.

Bucket feeding:

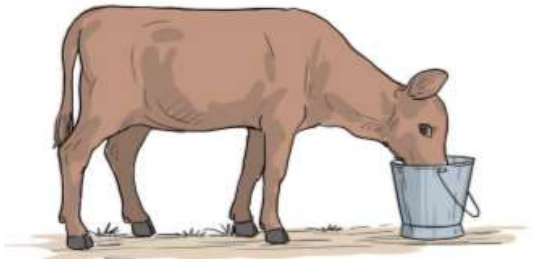


Fig14. A calf bucket feeding

This is the most commonly used method and milk is placed into a bucket and the calf is trained to drink (place finger in the milk and as calf suckles your finger it takes in milk). Stainless steel buckets, where available, should be used for hygienic reasons as plastic buckets are difficult to clean. Whatever method is used, clean equipment should be used at all times. Sick calves should always be fed last to minimize cross contamination. Attempts should be made to feed milk at body temperature especially during the cold season.

Calf Housing

Housing of calves is an important aspect of calf management. Claves are housed for several reasons, the most important being protection from adverse weather conditions and predators, avoid internal and external parasites and control feeding and management.

A calf pen should be constructed where possible from locally available materials. It should be constructed to:

ii) Allow approximately 2 m^2 (1.2 X 1.5m) space per calf
iii) Be well drained or bedded
iv) Be well lighted (artificial or natural)
v) Be well ventilated

vi) Strong to stand predator invasion

Calves can be housed permanently indoor until weaning time when they are turned to pasture or semi-indoor where they housed only at night. The calf house can be permanent or temporary and movable. Permanent houses should be constructed such that they are easy to clean when a new calf is introduced. Temporary houses are moved from one location to another when new calf moves in.

Fig. 15: A movable calf pen.

Fig. 16: Feeding the calf

Management of Lamb/ Kid

The dam should be allowed to suckle kid/lamb immediately after birth. This is because at this time the dam's milk contains colostrums. Colostrum contains antibodies which help to confer initial immunity to the kid/lamb; it also stimulates the alimentary system. Colostrum production ceases around the third or fourth day after parturition. It is important to check the test of the female to ensure that milk is available for the kid/lamb. If the dam's milk supply is low, the kid may have to be fed with alternative milker replaces or placed with a foster mother.

Weaning can be done between 4 weeks to 3months depending on age breed and purpose. However, weaning below the age of 3 month is not advisable for tropical sheep and goats. Weaning can be encouraged by the provision of creep feed. The young animal normally begins to nibble at solid food such as leaves. Grasses should be starting to eat at 2-3 weeks of age. Where a dam dies immediately after parturition artificial colostrums should be provided.

Artificial Colostrum is made up of:

- 0.61 litter of cow's milk
- 1 teaspoon of castor oil
- 1 teaspoon cod liver oil
- 125mg of broad spectrum antibiotics.

Normally a quarter (1/4) to 1litre of artificial colostrums is given per day for four days.

Under the extensive management, the dam (i.e. the female parent) and the baby (lamb or kid) are allowed to run together and penned together. The lamb or kid depend on the dam's milk for the early part of its life and begin to nib on grasses or forage as from about 3 weeks of age which help stimulate the rumen. The lamb or kids are weaned at about 6 to 8 weeks after birth. Weaning at about 6 weeks is called early weaning. At this stage, the animals are separated. Those for breeding are separated from those for fattening or and maintained as growers.

2.2.7. Undertaking Castration

Castration is the act of removing the testicles of a male animal to render them ineffective. This operation is carried out on all unwanted males in ruminant production. This management operation prevents unwanted breeding and improves the carcass quality of the animal. In addition, castrated males are easier to handle. It can be carried out by surgically operation or bloodlessly by the use of a burdizzo or rubber ring elastrator after the animal must have been haltered. Surgical operation is done within the first week of the animal's life while the bloodless one could be done within the first two weeks of life. Castration can be done by using an elastrator ring, burdizzo or open castration using a knife.

Knife castration: is the only completely safe method to sterilize male animals and can be done at any age by a qualified veterinarian. With this method of castration there is always a danger that the wound can become infected and the necessary precautions must be taken.

Elastrator rings: The rubber ring is applied around the neck of the scrotal sack using the special instrument designed for this purpose. The testicles must be in the scrotal sack distal (away from the body of the calf) to the elastrator ring. To minimize pain when using the rubber ring method of castration, they must be applied within three days of birth.

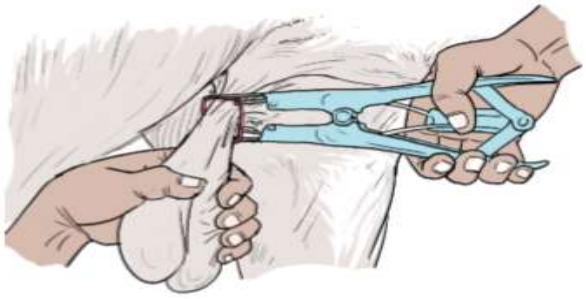


Fig. 17: Elastrator method of castration

Fig.18. Proper placement of the rings

A strong rubber ring is placed around the top of the testicles thus cutting off blood supply. The testicles die off slowly.

The burdizzo: A burdizzo is a pair of pincers used to squeeze and crush the spermatic cords. After application, the testicles degenerate and are absorbed but the external surface of the scrotum is not damaged. Castration with this method can be done at any time; but when done at a later age, it may bring about a shock in growth. The best time

to apply the burdizzo is three to four weeks after birth when the spermatic cords can be felt.

The burdizzo is applied to each spermatic cord separately (Figure) in such a way that the blood supply to the testicles is damaged, while circulation to the scrotal sack remains intact. Gangrene can set in where blood circulation to the scrotum is lost. To achieve these objectives, the burdizzo is applied to the individual spermatic cords at opposite sides of the scrotum, leaving a central area free for blood to circulate or applying the burdizzo at different levels on opposite sides of the scrotum.

Fig. 19: Burdizzo method of castration

The equipment is used to clamp and crush the top of the testicles.

- Castrating is important for the following purposes since have good Carcass composition and weight development
- Castrated animals are good for fattening purpose
- Prevent breeding of related individuals (inbreeding) that can result in genetic defects, poor growth rate, and other problems
- Avoid unwanted pregnancies and the mating of young females before they are of adequate size and age for pregnancy and parturition.
- Enhance on-farm safety for animals, producers and employees. Castrated animals are usually less aggressive and easier to manage.

2.2.8. Undertaking Dehorning

Dehorning or disbudding is the process of removing horn of the animal and it mainly applied for cattle, sheep and goat. The age to dehorn calves depends on the condition and the method used. The sooner it can be done the less inconvenience is suffered by the calf. Generally the calves that are 3 to 10 days old can be dehorned more easily,

because the horn button does not become attached to the skull until the calf pass 10 days of age.

Debudding is the act of removing the horn at its budding stage in cattle, sheep and goats. Most breeds of these animals carry horn which when fully grown may become source of injury to the other animals in the flock/herd. This operation is carried out at about age 3 to 4 weeks of age on any of the animals. Dehorning can be done by several methods.

Hot iron: Electric, gas or fire-heated iron is the most common in calves (4 to 6 weeks). The young ruminant is haltered (i.e. using a rope to restrain it) to a pole, held down by the stockman and the base of the horn is felt with bare hand of the operator. The hair around it is shaved and local anesthesia is injected at the base of the eyelid or forehead to minimize pain. A hot iron cuter is then plugged into electricity. The hotness of the iron is determined by its ability to burn a piece of dry wood. The hot iron is then applied to the horn bud and carefully twisted to remove the bud. A scar is then left over the tissue at this point. This operation is commonly done in ruminant production especially in the temperate region and most local experimental stations. Hot iron dehorning can be done with ease up to the age 3 months (while the dehorning iron still fits over the bud comfortably), thereafter horn growth is fairly rapid, making surgical removal necessary.

Fig. 20: Hot iron dehorning

Surgical method: use of saw or cutting wire: In older animals, surgical procedures must be used, especially if horns have grown to a length of 2 cm or more. The removal of larger horns causes a great deal of pain and anaesthetics should be used with dehorning and steps taken to prevent bleeding. Blood attracts flies and blow-fly strike causes serious problems in open wounds. Once horns have grown very large, removal of the horns exposes the hollows in the skull and these must be closed to prevent infection.

Chemical method of dehorning

The horn button may be prevented from growing by burning with chemicals. This method is most successful if done before the calf is10 days old. The chemical that are most commonly are caustic potash or caustic soda. Dehorning should be done during the cool weather of spring and autumn. It is the best method.

Clippers and saws

This method is mainly used when old ruminant animals are to be dehorned.

Advantages of dehorning include:

- Dehorned cattle are quiet & less aggressive and thus easy to handle
- Need lees space at feeding troughs and yards.
- Improves the animal looks (sight)
- Reduce injury of people working with them
- Reduce damage to hides & skin

2.2.9. Undertaking hoof trimming

This carried out by the use of hoof trimming knife. Overgrown hooves are trimmed to ensure it does nor harbor germs or disease and allow the animal to walk well. The debris in the hoof must be removed before carefully cutting the hoof in slices to ensure the tissue is not cut.

Hooves trimming: - is the process of cutting abnormally grown hooves of the animal. Most of the time abnormally grown hooves are difficult for walking and also they are carrier of disease causing organism.

In management systems where sheep and goats are mostly confined and do not walk daily on hard groundcover or climb rocks, abrasion of the hoof is not balanced with hoof growth. This will affect mobility and could lead to reduced intake from grazing. It may additionally lead to diseases such as foot rot. To avoid these problems, hooves need to be examined regularly and trimmed as needed. A sharp knife or hoof shears can be used for hoof trimming.


Fig21. Hoof trimmer

Some benefits of hoof trimming:

- Reduces toe injuries.
- Reduces lameness.
- Helps prevent diseases like laminitis and foot rot.
- Increases lifespan.
- Increases milk production.
- Makes it easier to stand, eat and drink.
- Higher breed back.

2.2.10. Operating Shearing activities

Sheep shearing is the process by which the woolen fleece of a sheep is cut off. The person who removes the sheep's wool is called a *shearer*. Typically each adult sheep is shorn once each year (a sheep may be said to have been "shorn" or "sheared", depending upon dialect). They can be hand and machine shears. Hand shears are recommended for flocks of 10 or less, hand machine (clippers) for flock of less than 150 and power machine for flocks above that number.

Wool shearing practices vary in different regions. However, shearing is mostly practiced twice a year in spring and autumn seasons. Sheep are washed at least two days before shearing in order to remove dirt, suint and grease which hinder shearing. Machine shearing is more efficient than manual shearing with scissors as it saves time, avoids injury to the sheep and “second-cuts” of staples. Some producers prefer to shear pregnant ewes before lambing. If ewes cannot be completely shorn before lambing, they should be “crotched out” by shearing the wool from the udder and dock area and

from the head and eyes of those breeds with wool on the face. This will make lambing and nursing easier. Shearing before breeding in summer season tends to increase the heat loss from the body and cools the ewe and ram, thus inducing estrus in the ewe and stimulating spermatogenesis in the ram.

- Shearing can be done with a knife, scissors, wool shears or electrically-powered clippers.
- Common mistakes are cutting the skin and to cut some distance away from the skin. Sheep should be shorn when the fleece is dry.
    - Newly-shorn sheep should not be exposed to a wet season nor a very hot season;
    - In highland areas, sheep should have a long fleece to keep warm in the cold season;
    - Where grass seeds are a problem, sheep should be shorn before the seeds are ripe;
    - Finally, ewes should not be shorn in late pregnancy.

2.2.11. Applying Identifications

Identification is necessary for efficient production of animals.

Animal identification is divided into two:-

1. Temporary identification 2. Permanent identification

1. Temporary identification
    - Lasts for short period of time
    - Not stay throughout animal life. E.g.
        - cutting brush of animal tail
        - Color Marks like pain
        - mud and charcoal
2. Permanent identification: Stays throughout animal life. E.g.
    - Ear notching
    - Ear tagging
    - Tattooing

- branding

Branding Hot iron - brand for a short time on the legs so as not to spoil skin. This is permanent but not common in dairy cattle.

Ear marking

a) Ear notching - cutting the ears in a particular shape and coding the shape. It involves the use of razor or scissors to cut a “V” shape on the tip of the pina. The position of the cut indicates numbers. If it is at the top of the pina it denotes 1, if at the tip, 5 and if under, it is 3. The right ear represent tens while the left represent units. The two is added to give the animal an identification number in the herd.

b) Ear tattooing - difficult to read and does not work in dark animals.

c) Ear tagging - use an applicator, easy to read but expensive. The animal is haltered and the tag is placed in the applicator then clamped to the pina of the ear. Caution must be taken not to damage the blood vessels on the pina of ear.

Fig.22. calf identification

2.2.12. Handling and transporting ruminant animals

The need to transport food animals occurs essentially in commercial agriculture and to a lesser extent in the rural or subsistence sector. These animals need to be moved for a number of reasons including marketing, slaughter, re-stocking, from drought areas to better grazing and change of ownership. Typically, methods used to move animals are on hoof, by road motor vehicle, by rail, on ship and by air.

Generally the majority of livestock in developing countries are moved by trekking on the hoof, by road and rail. Historically, livestock has been moved on foot, but with increasing urbanization of the population and commercialization of animal production, livestock transport by road and rail vehicles has surpassed this. Transport of livestock is undoubtedly the most stressful and injurious stage in the chain of operations between farm and slaughterhouse and contributes significantly to poor animal welfare and loss of production.

Effects of transport

Poor transportation can have serious deleterious effects on the welfare of livestock and can lead to significant loss of quality and production.

Effects of transport and movement include:

-Stress	-Bruising	-Trampling	-Suffocation	-Injuries
-Heart failure	-Heat stroke	-Sun burn	-Bloat	-Fighting
-Poisoning	-Predation	-Dehydration	-Exhaustion	

Methods of transport

Cattle

The most appropriate methods of moving cattle are on hoof, by road motor vehicle or by rail wagon. Moving cattle on the hoof (trekking) (Fig. 23) is suitable only where road and rail infrastructure does not exist, or when distances from farm to destination are short. This method is slow and fraught with risks to the welfare and value of the animals. Rail transport is useful for short-haul journeys where loading ramps are available at railheads and communication is direct to destination. Road motor transport is by far the most versatile, the method of first choice and the most users friendly.

The most satisfactory method of transporting cattle is by road motor vehicle. Moving by rail truck requires more careful management and trekking is satisfactory for well-planned distances.

Fig. 23: Moving cattle on the hoof Fig. 24: Road motor vehicle for transporting cattle

Sheep/goats

Of the food animals these are the easiest to transport and generally travel well on hoof, rail or road. Double-deck trucks are also suitable (Fig. 25).

Fig. 25: Double-deck truck for transporting sheep/goats

Types of vehicles

Any vehicle used for the transport of slaughter livestock should have adequate ventilation, have a non-slip floor with proper drainage and provide protection from the sun and rain, particularly for pigs. The surfaces of the sides should be smooth and there should be no protrusions or sharp edges. No vehicle should be totally enclosed.

Floor space- Livestock require sufficient floor space so that they can stand comfortably without being overcrowded. Overloading results in injuries or even death of livestock.

Fig. 26: Overloading truck with goats

Classes of stock	Floor area/animal (m^2)
Mature cattle	1.0 - 1.4*
Small calves	0.3
Sheep/goats	0.4

Table2. Approximate floor space for transporting different classes of animals

Pre-loading precautions

There are a number of simple procedures that can be implemented prior to the loading of livestock, which will considerably reduce the risk of injury and stress.

1. Pre-mixing of cattle or pigs leads to greater familiarity and these animals travel better than animals that are strangers. Cattle should be mixed in a pen 24 hours before loading. Victimized or wild animals can be weeded out during this period. Fighting amongst pigs that are strangers is common, resulting in skin damage, wounds and stress. Mix pigs from different pens together before loading, smearing pigs with litter or excreta from the same pen so that they smell similar.
2. Most animals can be fed and watered before transporting. This has a settling effect. However pigs should not be fed before transport as the feed ferments and the gas causes pressure on the heart in the thoracic cavity, leading to heart failure and death.
3. Do not mix horned and hornless animals in the vehicles as this cause bruising and injury. Different species should also not be mixed - sheep, goats and calves less than 6 months can be mixed and individual animals can be transported in a loose sack tied at the animal's neck. Feet should not be tied, and animals should be turned

every 30 minutes or so. Pigs should not travel with other species unless separated by a partition. Bulls should not be carried together with other stock unless separated by a strong partition.

4. Animals that are diseased, injured, emaciated or heavily pregnant should not be transported, and unfit, heavy, pen fed animals should not travel far as they cannot stand up to the rigours of transport.
5. Vehicles should be fitted with a portable ramp to facilitate emergency offloading in case of prolonged breakdowns.

Transport operations

A number of factors must be taken into account during the journey in order that the animals do not suffer, become injured or die.

1. ***Trekking-*** Only cattle, sheep and goats can be successfully moved on hoof, and here certain risks are involved. The journey should be planned, paying attention to the distance to be travelled, opportunities for grazing, watering and overnight rest.

Animals should be walked during the cooler times of the day and, if moving some distance to a railhead, they should arrive with sufficient time to be rested and watered before loading. The maximum distances that these animals should be trekked depend on various factors such as weather, body condition, age etc., but the distance given in Table 3 should not be exceeded when trekked.

Species	**One day journey**	**More than one day**	
		First day	**Subsequent days**
Cattle	30 km	24 km	22 km
Sheep/goats	24 km	24 km	16 km

Table3. Maximum distances for trekking

2. ***Time of the day-*** High environment temperatures will increase the risk of heat stress and mortality during transportation. It is important to transport animals in vehicles during

the cooler mornings and evenings or even at night. This is particularly important for pigs. Wetting pigs with water will help keep them cool.

3. Duration of journey- Where possible, journeys should be short and direct, without any stoppages. If the vehicle stops, pigs will tend to fight. Cattle and sheep/goats should not travel for more than 36 hours and should be offloaded after 24h for feed and water, if the journey is to take longer than that. Pigs should have access to frequent drinks of water during long journeys, particularly in hot and humid conditions.

4. Driving- Vehicles should be driven smoothly, without jerks or sudden stops. Corners should be taken slowly and gently. The second person should be in attendance to spot downer animals so that the vehicle can be stopped and the animal lifted. Train drivers should avoid “fly shunting” of trucks with livestock.

5. Wind chill- Wind blowing on wet animals being transported in cold weather causes a wind chill factor, where the body temperature is considerably reduced, resulting in severe stress or deaths.

Key things to remember during transportation:

- The size and design of the transport vehicle should be compatible with the number of stock being transported.
- The transport vehicle should be in good repair to ensure cattle arrive at their destination with least injury and in the shortest possible time.
- The stock crate should be well designed so as to minimize bruising. A well designed stock crate will have a large smooth contact surface without projections on which animals can bruise.
- Pens should be approximately 3 meters’ in length (pens should not be longer than 4 meters’) to provide more support to animals during travel and thus reduce stress and allow them to adapt to transport more readily.

It is recommended that the following classes be transported or penned separately:

⇒ polled & dehorned cattle;
⇒ young calves;
⇒ a cow with a suckling calf;
⇒ adult bulls;
⇒ cattle greatly different in size;
⇒ females in advanced stages of pregnancy

Special requirements for transporting bobby calves:

- ♣ A livestock transport trailer/truck is the preferred method.
- ♣ Front of trailer should be solid to protect calves from the wind.
- ♣ All bobby calves should be fed on the farm within 6 hours of transportation for sale.
- ♣ Where possible bobby calves should be transported by the shortest route.
- ♣ Transport operators should check calves en route at least once every three hours.
- ♣ Bobby calves should be loaded at a density so as to allow all calves to lie down while being transported.
- ♣ Bobby calves shall be transported in separate compartments from other classes of stock.

Do Not:

- ✓ Transport calves in a car boot, sealed container or anything that restricts airflow.
- ✓ Tie the legs of the calves in order to restrain them.
- ✓ Overload the transport vehicle – you may need to make two trips or find a bigger transport vehicle.
- ✓ Speak to your stock agent if transport is required for your new purchase.

Handling facilities

It is important to make sure you have adequate facilities to unload the cattle when you get them back to your property. A set of yards or a small paddock to confine the cattle for the first couple of days is essential. Holding the cattle in a small paddock or set of yards for the first couple of days will help to settle and calm them. It may also help prevent the spread of weeds and disease to your property. This initial step is important for the bio-security of your property.

Feed and water requirements on arrival

The holding paddock or yard must have a supply of water that is accessible to all animals. It would also be a good place to introduce your cattle to some hay, in order to settle them after the transport. When you finally introduce your cattle to the larger paddock, it is best to continue giving hay for at least the first 2 days, so that their rumen (stomach) has time to adjust gradually to the pasture feed.

Water: Ensure safe water is always available. Generally the water requirements for cattle are:

- Dry cows
    - 70 litters/day
- Lactating cows (cow with calf at foot)
    - 90 litters/day
- Weaned calf (animal removed from its mother)
    - 55 litters/day

These values will vary with weather conditions, and it is not unusual for a pregnant cow with calf at foot to drink over 150 liters of water per day. As summer progresses, dams start to shrink and evaporation can account for up to a meter of water loss from a dam each day.

Self-Check # 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided next to the questions:

1. Define animal retraining? (2pts)
2. Mention methods of animal identification? (2pts)
3. What is the importance of performing heat detection? (2pts)
4. Write the importance of hoof trimming? (2pts)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

2._____

_____

3._____

_____

4._____

_____

Information Sheet # 3	Carrying out age estimation of ruminants

The age of ruminant animal is determined chiefly by examination of the teeth, and less perfectly by the horn rings or the length of the tail brush; however due to bang-tailing, which is the act of cutting the long hairs at the tip of the tail short to identify the animal after management practices, the latter is least reliable.

Age estimation of cattle

Dental (teeth) method

Cattle are placed in a cattle crush in order to restrain them prior inspecting the mouth and amount of teeth that each animal has. The temporary teeth are in part erupted at birth, and all the incisors are erupted in twenty days; the first, second and third pairs of temporary molars are erupted in thirty days; the teeth have grown large enough to touch each other by the sixth month. Temporary incisors or "milk" teeth are smaller than the permanent incisors.

Cattle have thirty-two teeth, including six incisors or biting teeth and two canines in the front on the bottom jaw. The canine teeth are not pointed but look like incisors. The incisor teeth meet with the thick hard dental pad of the upper jaw. Cattle have six premolars and six molars on both top and bottom jaws for a total of twenty-four molars. The teeth of cattle are designed primarily for grinding, and they use their rough tongues to grasp grass and then nip it off between their incisors and the dental pad.

There is controversy on the reliability of attempting to tell the age of cattle by their teeth, as rate of wear can be affected by the forage that is grazed. Drought or grazing on sandy country will also affect rate of wear.

The following is a guide:

1. Under two years old (No permanent teeth)
2. Two years three months (2 permanent teeth)
3. Three years old (4 permanent teeth)
4. Three years six months (6 permanent teeth)

5. Four years (8 permanent teeth)
6. Old animal, over four years old

How to hold cattle and buffalo to check their teeth

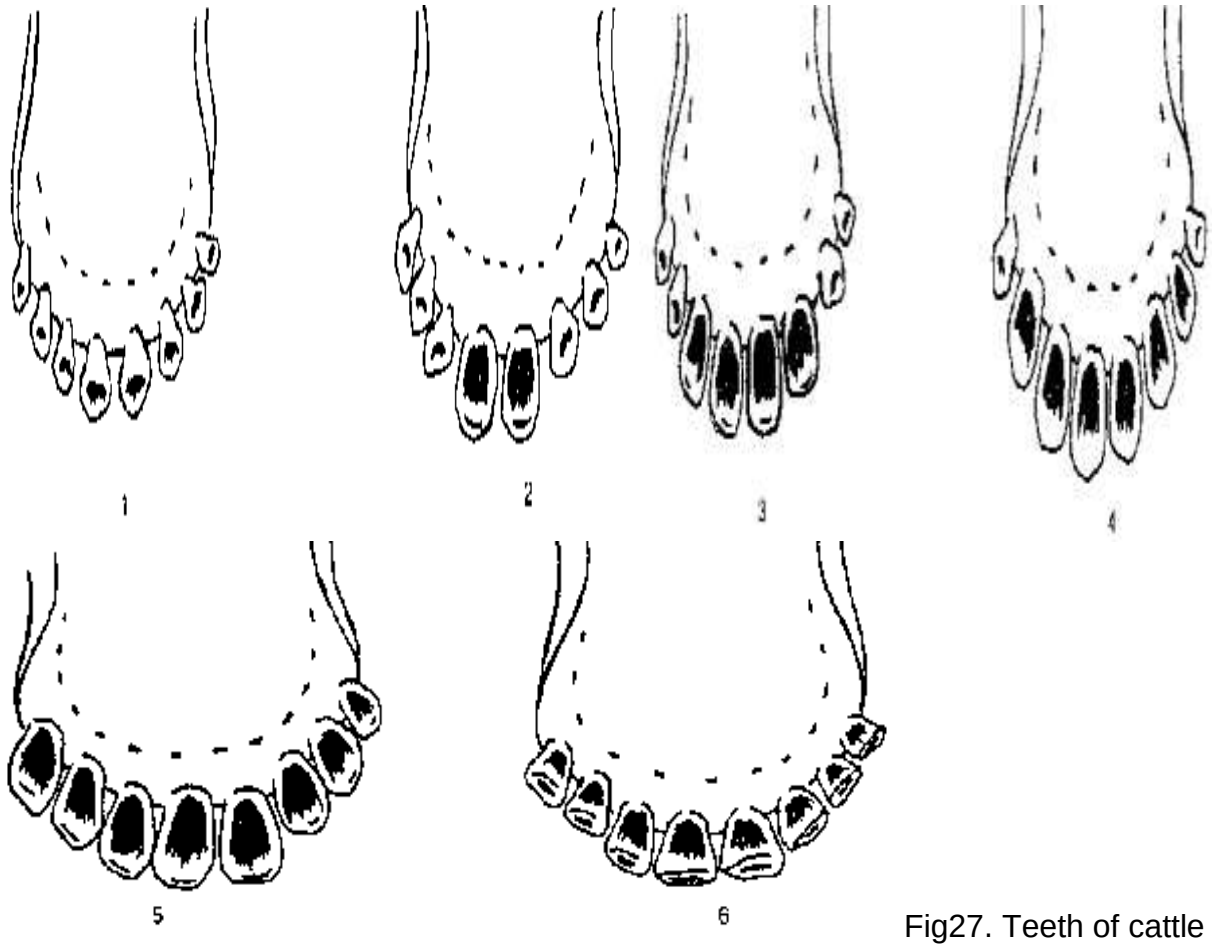


Fig27. Teeth of cattle

Horn method

The rings on the horns are less useful as guides. At ten or twelve months the first ring appears; at twenty months to two years the second; at thirty to thirty-two months the third ring, at forty to forty-six months the fourth ring, at fifty four to sixty months the fifth ring, and so on. But, at the fifth year, the three first rings are indistinguishable, and at the eighth year all the rings.

Tail brush method

The brush of the tail is only useful as a guide when assessing small, stunted or young cattle. A brush that is about fetlock length or longer is an indication that the beast is twelve months old or older. This method cannot be used on cattle which have been bang-tailed. Bang tailing is the act of cutting the long hairs at the tip of the tail short to act as a simple identifier of animals and is commonly used after a procedure has been performed on an individual animal that belongs to a large mob e.g. the mob is run through a race and each animal is vaccinated - immediately after being vaccinated the animal is bang-tailed so they are identified as vaccinated and will not be given a second dose of vaccine. This is useful when large numbers of animals are being processed by a group of individuals.

Other methods

Cattle age in a carcass is determined checking the physiological skeletal maturity (ossification) (red) of the tips or “buttons” of the thoracic vertebrae. The size and shape of the rib bones are important considerations as well as the colour and texture of the flesh. The use of number (year) branding, tattoos or ear tags with numbers or different colors are good methods of identifying the age of cattle, if they are used according to standards.

Age Determination of Sheep and Goats by Dentition

Why is it important?

Indirect ways of determining approximate age of sheep and goats are vital in systems where production records are unavailable. For instance, if the flock structure has to be

determined, age of animals needs to be estimated. Application of drugs also requires knowledge of age and/or weight of the animal. A few days after birth, lambs/kids will have milk teeth, also known as temporary incisors, arranged in four pairs in the lower jaw. These are replaced by larger permanent teeth as the age of the animal increases. There is a range of ages at which particular teeth appear because the speed of teeth growth will vary according to health and nutrition of sheep and goats.

The central pair of temporary incisor teeth is shed and replaced by the permanent teeth at approximately 14 months of age. At approximately 20 months, the second pair of milk teeth is replaced by a pair of permanent incisors. At 3 and 4 years, the third and fourth pairs of permanent teeth appear. At 4 years of age the sheep has a "full mouth." When a ewe/doe loses some of her incisor teeth, she is called a "broken mouth."

a. A 10 month old doeling b. A 32-month old doe c. Broken mouth

Figure28. Teeth of goats of different age

Note that the doe ling Figure 28b has her milk teeth fully grown and spread out. The doe in Figure 28b has had three pairs of teeth replaced.

Older sheep and goats that have worn teeth have difficulty in eating and will lose condition, become more prone to diseases and breed less than younger animals. Inspecting the teeth can be a very useful way of deciding when to cull.

Age of goats and sheep

1. Animal under one year old (no permanent teeth)
2. One year old (2 permanent teeth)
3. Two years old (4 permanent teeth)
4. Three years old (6 permanent teeth)

5. Four years old (8 permanent teeth)
6. Old animal, more than four years old

How to hold sheep and goat to check their teeth

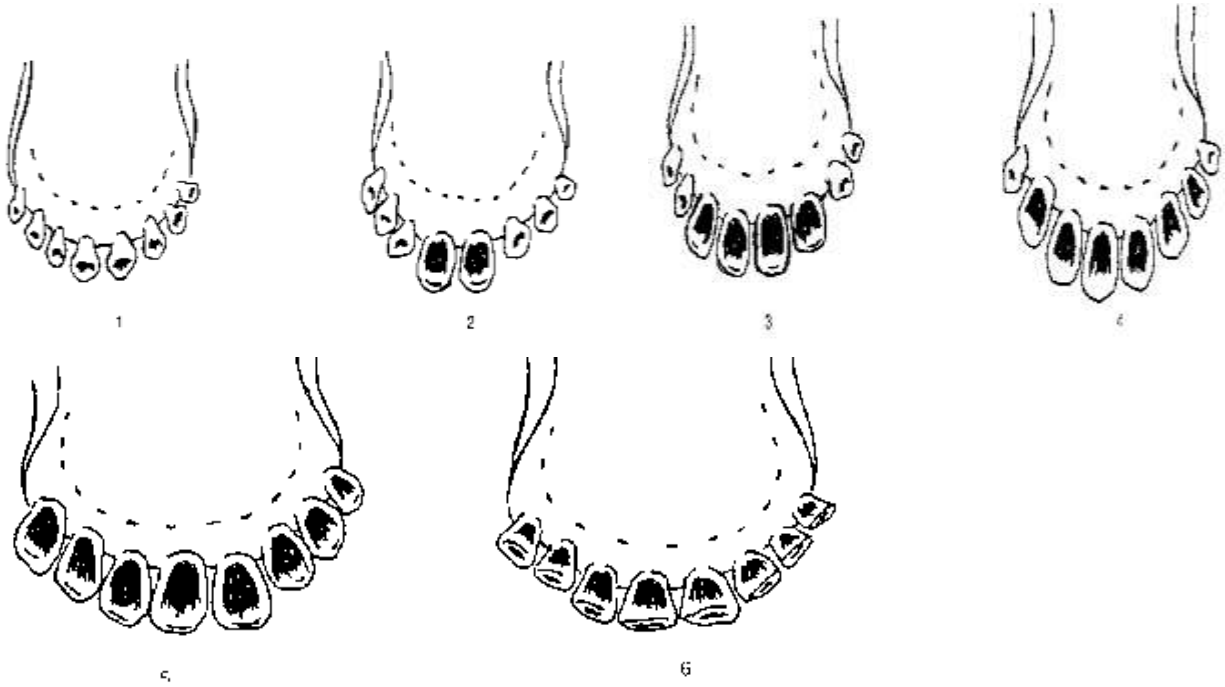


Fig.29. teeth of shoat

Self-Check # 3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided next to the questions:

1. What is the advantage of knowing the age of animal? (2pts)
2. Mention methods of age estimation? (2pts)
3. Discus the advantage and disadvantage of dental age estimation? (3pts)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

2._____

_____

3._____

_____

4._____

_____

Information Sheet # 4	Following enterprise policies and procedures in handling and disposal of materials

Enterprise policies and procedures in relation to workplace practices in the handling and disposal of materials should be observed. During handling and disposing of materials the worker should be observe work place policies and procedures.

Before handling a carcass and waste materials, consider the diseases that can be passed to humans (anthrax, brucellosis, rabies, ringworm and mange are the most common ones). If the animal died unexpectedly, a post-mortem will reveal the cause of death and guide the means of disposal. Post-mortems should be performed by qualified veterinarian. If anthrax is suspected the carcass should be burned and no post-mortem should be carried out.

How to burn a carcass and waste material

1. Dig two trenches (2 m long, 40 cm wide and 40 cm deep) in the form of a cross. The trenches will provide oxygen to the fire.
2. Place two iron bars so they lie across one of the trenches.
3. Place strong wooden posts across the bars.
4. Place the carcass and a heap of fuel (wood and straw soaked in waste oil) on the wooden posts.
5. Light the fire and burn the carcass.

Disposal by burying

1. Dig a hole 2 m long by 1.5 m wide and 2 m deep.
2. Put the carcass in the hole and cover with soil and logs or large stones to stop wild animals or dogs digging it up again.

Self-Check # 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided next to the questions:

1. Discus the advantage of following enterprise policy and procedures during disposing of waste materials? (3pts)

2. How do you handle and dispose carcass and waste material? (3pts)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

2._____

_____

Operation Sheet # 1	Assisting dairy cows in delivery

Procedures for assisting dairy cows in delivery

Step1- Assist only when absolutely necessary. Many times, birthing a cow requires no human intervention. If the mother or calf appears distressed, obtain professional help if you can. If you cannot find help in a dire situation, you must give calving assistance yourself.

Step2- Wash your hands and the cow's backside with soap and water. Put on a new pair of rubber gloves if you can. You must keep the area as sanitary as possible to prevent infection. If the cow is still standing, try to lead her to a manure-free area, or freshly cleaned stall.

Step 3- Wait until the mother has entered the second stage of labor before assisting further. In this stage, she delivers the water bag and begins straining abdominal muscles. Do not break the water bag, as this often slows down the birth of a calf.

Step 4- Lubricate your hands and arms if possible. Very gently reach inside and lightly pinch the calf. This process is easier if the cow is still standing. Feel for movement to indicate that the calf is alive.

Step 5- Determine which way the calf is facing. Gently find a leg. You can feel two joints between elbow and hoof on forelegs, one joint between hock and hoof on back legs. Birthing a cow in a posterior (rear facing) position is more dangerous for both mother and calf.

Step 6- Make small, mild adjustments to the calf's position if necessary once the cow is constantly straining. Ensure the legs (and head if front facing) are in the birth canal, and not hung up on the pubic bone. Do not attempt to move a rear-facing calf into a forward-facing position. The attempt is likely to harm both animals.

Step 7- Help the cow dilate further by placing freshly washed hands and arms on either side of the calf's head and working them in and out of the birth canal for about five minutes.

Step 8- Watch for signs of distress. As soon as the forelegs and nose appear, lightly pinch the calf's tongue. If the tongue retracts, the calf is likely doing fine. If there is no response, and the tongue appears dark between contractions (a dark tongue during contractions is normal) the calf is in distress. Another sign of a problem is a calf with a yellowish appearance. If no distress signs are apparent, let the cow finish her work. If the calf is in distress, you must try to speed delivery. Try again to dilate the mother. Reach around the calf and pull during contractions in a steady motion. You can pull hard, but do not "yank" on the calf. If at all possible, avoid pulling on the calf's head. Continue to assist until the calf is born.

Operation Sheet # 2	**Perform Burdizo castration of ruminant animal**

Important equipments

- Burdizo
- Rope
- Antiseptic like alcohol and iodine solution
- PPE

Techniques for Burdizo castration

Step 1. Wear appropriate PPE

Step 2. The animal should be properly restrained by the assistant. The operator grasps the scrotum in one hand and manipulates the testes down into the scrotum. He then locates the two spermatic cords between the fingers and pushes one cord over to one side of the scrotum. This is the first cord to be crushed.

Step3. Place the jaws of the burdizzo onto the upper scrotum, leaving the rudimentary teats above the crushing point. Do not crush the septum or tissue between the testicles. Rather, do one side of the scrotum at a time.

Step4. Press together the burdizzo over the cord on the side of the scrotum you are doing first. You can generally hear a clicking sound as the cord is crushed. Leave the instrument closed for 20 to 25 seconds. The spermatic cord is very elusive when you try to crush it. Be sure that you feel it within the jaws of the burdizzo before and after the jaws are closed.

Step5. Release the Burdizzo, move it lower to a new site about 1 cm closer to the testicles and close it again to be doubly sure that the cord is crushed. A site below the first crush is chosen to minimize acute pain from a second crush.

Step6. Locate the cord on the other side of the scrotum and position the burdizzo over it. Close the burdizzo and repeat what you did with the first cord.

Step7. When you are done, you may see a mark on each side of the scrotum and release the animal.

The animal may be sore and move slowly for about a day. Be sure to encourage it to move around. At first the scrotum will swell up a little, but the testicles will gradually shrink over the next few weeks leaving a small scrotal sac.

If the skin is broken, apply an antiseptic like alcohol. Also give an injection of tetanus antitoxin if available.

Operation Sheet # 3	**Performing dehorning**

Procedure of Trimming horns (Dehorning)

1. Restrain the calf
2. Clip the hair around the base of the horn button as close as possible with a scissors are electric clippers
3. Clip off the end of the horn button with a sharp pocket knife so that the dehorning chemical can penetrate the horn and destroy the modified skin tissues that produce the horn.
4. Apply the ring of petroleum jelly or Vaseline around the base of the horn bottom.
5. Apply the dehorning chemical. The caustic stick must be applied exactly according to label direction. Apply the caustic stick in a circular motion on top of the horn button and the area immediately around the horn. Care should be taken to minimize skin contact. If paste is used, apply it to the horn until it is approximately the thickness of a dime over the top of the horn button
6. Release the animal

Operation Sheet # 4	Hoof trimming of shoat

Objective/ Purpose:

- To reduce the exposure/predispose of sheep and goat to other foot problems such as foot root
- To minimize susceptibility of the animals to joint/tendon problems, and arthritis
- To reduce competing of feeds

Equipment, Tools and Materials:

Hoof cutter, Sharp knife

Automatic squeeze table Hoof scatter Disinfect ant



Trimming tools

Conditions:

- Trim hoof immediately after rain or heavy dew, because the hoof wall will be much softer and easier to trim.
- Animals can be allowed to stand in a wet area for 2 to 3 hours before trimming.

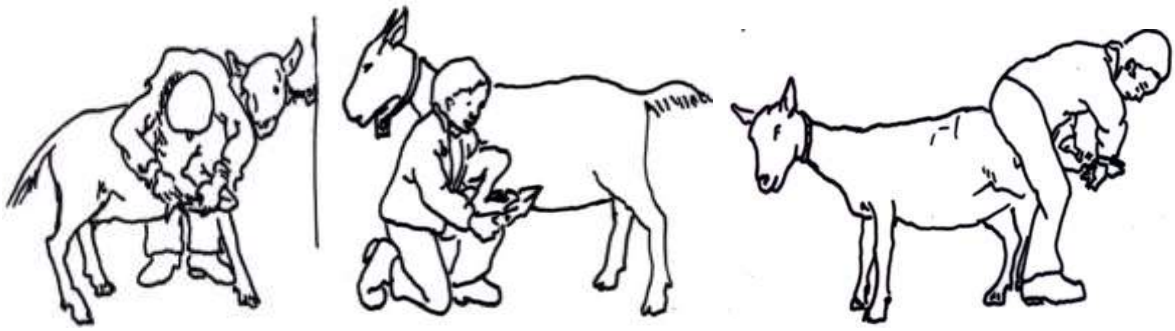
Procedure for hoof trimming:

1. Properly restrain the animal.

Sheep: For small number of sheep, it is usually enough to tip the animal, and sit it on its rump, a position normally used for shearing

Step1 step2 step3 step4

Goats: Goats can be trimmed while in a standing position. Hoof trimming is best done in a squeeze chute or by positioning or tying the animal next to a wall or fence and trim the hooves.



Opetion.1 opetion.2 opetion.3

Options for restraining a goat in a position to trim front (1 and 2) and back hooves (3)

2. Observe the color and check the smell of the hoof. A rotten smell is usually indicative of foot rot and appropriate treatment should be given.

3. The next thing to do is to clean any mud, manure, small stones, etc., from between the walls of the hoof.

4. The ends of the dewclaws can be the starting place for trimming. The tips of the dewclaws should be removed. It is important to remove small bits at frequent intervals to avoid bleeding as a result of cutting too short.

Cutting the ends of the dew claws

5. It is always advisable to begin by removing very small pieces of hoof wall and toe. The toe and outside hoof wall are trimmed down to where fresh sole can be seen (stop when the sole looks pink) and the bottom of the foot is parallel to the line where the hair stops known as the coronary band.

6: The inside wall of the foot should normally be trimmed a little bit lower than the outside.

This allows most of the animal's weight to be on the outside hoof wall where it should be placed naturally.

Operation Sheet # 5	**Performing Identification of ruminant animal**

Procedure of Identification of ruminant animal

1. Ear notching

Procedures for Identification by ear notching

Step1. Prepare appropriate PPE

Step2. Restrain the animal properly

Step3. Have ear notching equipment

Step4. Apply safely and humanely

Step5. Apply antiseptic

Step6. Release the animal

2. Ear tagging

Equipments

- ♣ Ears tag applicator
- ♣ Plastic materials
- ♣ Crush
- ♣ PPE

Procedures to follows

- ➢ Wear PPE
- ➢ Restrain the animal
- ➢ Prepare ear tagging equipment
- ➢ Apply ear tag quickly and humanely
- ➢ Release the animal

3. Tattooing

- important equipment
  - ♣ Pliers
  - ♣ ink (color)
  - ♣ crush
  - ♣ PPE
- Procedures for tattooing
  - ➢ Put on PPE
  - ➢ Restrain the animal
  - ➢ Apply pliers(needle)on recommended area
  - ➢ Apply(rub) ink on pierced area
  - ➢ Complete and release the animal

4. Branding

1. Hot branding

Important equipments

- ➢ iron
- ➢ Crush

- PPE

Procedures for hot branding

- Put on PPE
- Restrain the animal
- Prepare hot iron
- Select appropriate place for branding considering the quality hide
- Put hot iron on skin for 3 sec
- Apply antiseptic
- Release the animals

2. Freeze branding

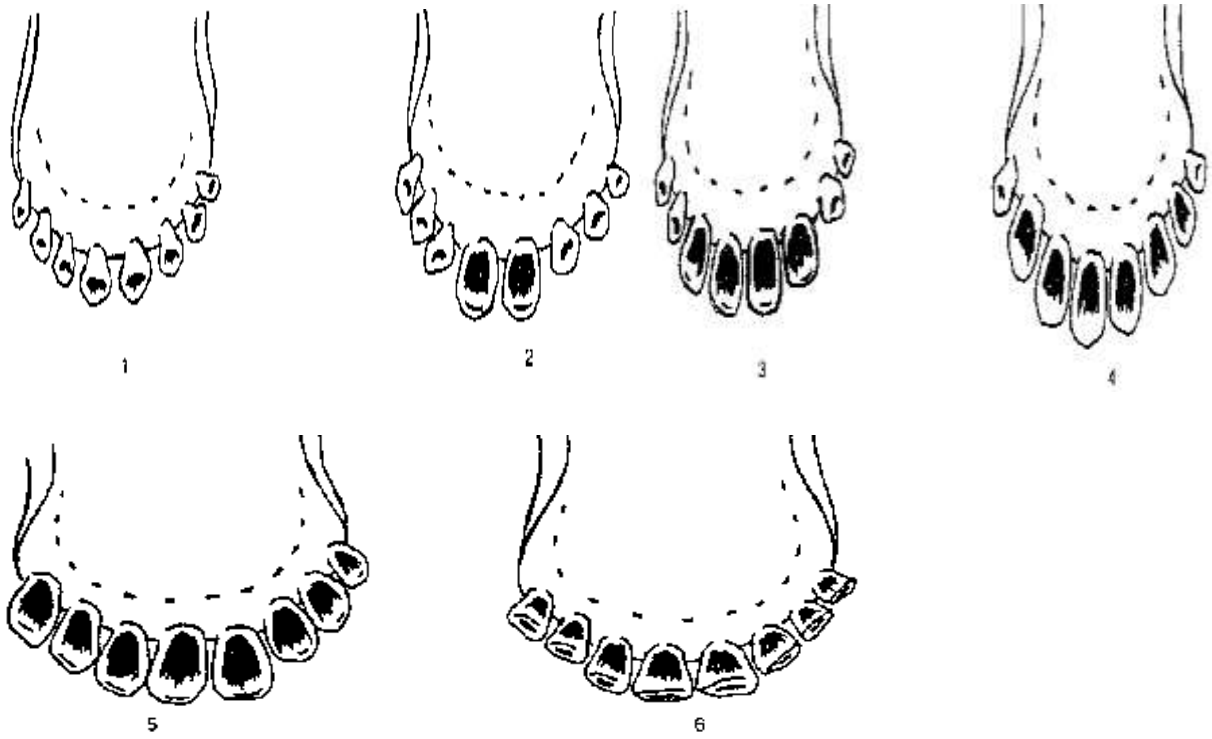
- Using freeze iron for animal identification
- Procedures of freeze branding
  - Put on PPE
  - prepare liquid coolant with -106^{oc} or -157
  - Immerse copper iron in liquid coolant for 20min
  - Restrain the animal
  - Clip hair from branding area
  - Soak clipped area with the same solvent of liquid coolant
  - Re-soak and apply branding iron firmly for 30-35sec(based on animal age)
  - release the animal

Operation Sheet # 6	**Determine age of cattle by teeth**

Procedure of cattle age determination by teeth

1. Wear appropriate PPE before starting the operation
2. Properly restrain the animal
3. Properly hold the animal

4. observe number of permanent teeth



5. Release the animal
6. Estimate the age of cattle

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within -5- hour.

Task1. Identify, cheek and maintain materials tools and equipment

Task2. Follow instructions and directions during ruminant animal husbandry

Task3. Apply ruminants restraining techniques

Task4. Provide feed and water

Task5. Prevent and treat of bloating problems

Task6. Undertake natural Mating of animals

Task7. Assist animal in normal parturition

Task8. Undertake Castration of small ruminant

Task9. Undertake Dehorning of bull

Task10. Undertake hoof trimming

Task11. Operate Shearing activities

Task12. Apply Identifications

Task13. Carry out dental age estimation of ruminants

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