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FACULTY OF AGRICULTURAL SCIENCES**

**DEPARTMENT OF
ANIMAL SCIENCE AND FISHERIES**

FPY/SIWES PRACTICAL GUIDE MANUAL

**ANP401
ANIMAL HUSBANDRY TECHNIQUES
(RUMINANTS)**

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FATTENING OF SHEEP AND GOATS

1.0 INTRODUCTION

Fattening/Finishing involves intensive feeding of sheep and goats to slaughter weight with adequate finish (fat deposit) in feedlots. This targets the local market that has high demand for fat animals. The operation of large feedlots by export slaughter houses and independent feedlot operators (on-farm feedlots) is becoming feasible. The principal functions of such feedlot operations are to assemble large numbers of sheep and goats, often coming from different genetic and management backgrounds, and produce a product of acceptable standard. The following guidelines will serve these operations and also small farmers that want to fatten smaller numbers of sheep and goats. This will be the subject of this particular technical bulletin.

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

1. Student should be able to fatten sheep or goat using the different methods practiced during the FPY/SIWES.
2. State the systems of fattening and explain which is simpler cheaper.

Advantages of fattening

Fattening is a strategic feeding option that can have the following advantages under Ethiopian conditions:

- Technically, it is quite simple and within the capabilities of small farmers to implement; moreover, the results are highly visible. This helps farmers to have confidence in the technique. Other techniques such as feeding to boost reproductive performance are less convincing because the farmer may be unsure that the extra feed resulted in any benefit.
- Benefits can be realized within a short period of time unlike other animal production activities.
- Fattening generates cash income that is eagerly sought by farmers.
- Fattening is generally profitable because the value per kilogram of live weight increases as both weight and condition increase.

Fattening systems

Intensive feeding of sheep and goats before slaughter in Ethiopia can be categorized into two systems:

- **Traditional systems:** This system generally depends on grazing natural or planted pastures with variable degrees of supplementation. Animals require a long period of time to attain market weight and condition. It is also associated with huge fluctuations in the weights and conditions of the animals depending on feed availability. This system can be improved to supply animals of acceptable condition to slaughterhouses for ultimate export.



Fig. 1 Traditional system of goat fattening

- **Agro-industrial byproduct based fattening:** Fattening of sheep based on agro-industrial byproducts is also practiced in Nigeria. This system can be promoted to similar areas where agro-industrial byproducts are available. Fattening using agro-industrial byproducts like sugar processing byproducts is feasible in places for instance in parts of Adamawa where valuable feed resources such as molasses (from the Savanna sugar factory) and corn (grain and residue) are widely available. Protein sources like oilseed cakes can be purchased from nearby processing plants and/or forage legumes can be grown in the area. Brewery byproducts are also used. The following table shows examples of rations where byproducts form the feed base. Local equivalents of the weights indicated can be used whenever scales are not available.

Table I: Molasses based rations

Ingredient	Ration I	Ration II	Ration III
Straw	Ad lib	Ad lib	Ad lib
Molasses	350 g	250 g	200g
Oilseed cake	125g	100 g	---
Brewers dried grain	---	---	200 g
Urea	10 g	---	---
Molasses urea block	----	Free choice	Free choice

HOW TO FATTENED SHEEP AND GOATS

Consider the following when selecting sheep and goats for intensive fattening:

- **Condition:** Select animals that are healthy and have no visible physical defects. Target animals with medium body condition. Body condition scores of 2.25-3.0).
- **Skeletal frame:** The animals should have a large skeletal frame and good body condition.
- **Castration:** Castration influences the fattening process.
- **Breed:** Identify breeds with greatest potential for growth and fattening. Early maturing breeds start depositing fat at an earlier age and can be ready for market at a lower weight.
- **Sex:** Females are earlier maturing than males. Males can do well in feedlots, but often cause problems by fighting. Females can do well in feedlots, but often have lower growth rates partly because they reach carcass finish at an earlier age.
- **Weight of animals:** Weight of animals at the start of the feeding operation governs the duration of feeding and the types and amounts of feedstuffs needed. Lightweight (15-20 kg) animals can use more roughage, whereas heavier lambs (>25 kg) require more concentrates and a shorter feeding period.
- **Age:** Animals can be placed on intensive feeding at any age, usually after weaning. Avoid animals that are too old. Check that the teeth are sound. This has implications on feed utilization. It is advisable to select sheep/goats between 2 and 4 years of age for fattening;

Management of finishing sheep and goats

- The fattening program should be started after the necessary feed supplies are secured. Underfeeding and incorrect timing are the most common causes of failures in fattening activities.
- The objective in a fattening operation is to convert as much of the feed to body tissue as possible. It is, thus, necessary to minimize the movement of animals during the fattening period. They should be allowed only limited exercise.
- The success of a finishing operation depends on the first two weeks after arrival of animals. They may have traveled long distances and will be stressed, hungry, and thirsty. They are generally gathered, sorted; often stand for a long time without feed and water. It is recommended that the following guidelines be followed under such circumstances:
- Rest the animals for a few hours in a dry, clean, sheltered area with access to fresh water after arrival. Then offer grass hay or mixed grass-legume hay.

- Hand feed salt during the first two weeks; then provide trace mineral salt in a separate feeder. Afterwards, these supplements can be mixed in the complete diet, but salt should continue to be provided *ad libitum* (free choice).
- Animals should have feed available at all times including evenings. If there is no feed left in the morning, feed supply should be increased for the following day.
- Adjust the animals to the fattening concentrate diet over a two week period by feeding the concentrate **after the animals have consumed enough roughage** to provide bulk. Gradually increase the intake of the concentrate every two days, while providing free access to the basal roughage diet.
- Sort the animals by weight/size/sex and feed in uniform weight/sex groups. Large animals tend to bully smaller animals and keep them away from feed troughs.
- Cull non-performing animals. Some animals do not adapt to intensive feeding irrespective of breed, sex or age. It is best to cull these animals as soon as possible. They can be identified by their poor performance in the initial stages of feeding.
- Feed for 90 to 120 days. The length of the feeding period depends upon the desired animal condition and the type of ration fed. What is desired for the export market may just be conditioning without the amount of fat desired by the local market. Thus, animals for export can be sold at a time when the desired condition is attained.
- Water should be available at all times. Inadequate water supply will affect their performance.
- The animals should have shelters that protect them from adverse environments. The shelter need not be expensive. Any building material will do, depending on availability and financing. The shelter can be constructed from locally available materials such as bamboo or mud with thatched roof. Space required is about 2 m² per animal. Shelter should normally be open on one side. Walls up to 1.2 meters on the other three, with a gap of 0.5-0.8 meters between the walls and roof, to provide sufficient ventilation without draft. Muddy feedlots reduce feed efficiency drastically; it is thus necessary to keep the premises dry. Flooring should be included and elevated at least about 15 degrees to facilitate cleaning and drainage. Feeding racks (silage, water, mineral and concentrate) should be accessible to both goats and caretaker, preferably in the front of the aisle. A feeding space of 20 linear centimeters should be provided per animal.
- Socio-economic considerations: Sheep and goats for fattening need to be purchased when prices are low and sold at times of peak demand when prices are high. Feeds should also be purchased when prices are lowest and stored. These measures are important in increasing the profit margin of the fattening operation.

Health of fattening sheep and goats

It is best to use own animals for the fattening operation if available. The second option is purchasing from the immediate village. Purchase from the market should be taken as the last option. The incidence of especially *pestes des petits ruminants* (PPR) is rampant in many areas whenever sheep and goats from different sources are gathered in the local markets.

Drench for internal parasites and treat for external parasites with broad spectrum anthelmintics and acaricides respectively before the start of the feeding operation.

Feeding finishing sheep and goats

Finishing can be accomplished with rations containing different proportions of roughages and concentrates. The proportion depends on the type of feeds available, the desired length of feeding and the types of animals to be finished. Higher proportions of concentrate feeding shorten the time required for fattening.

- **Concentrates:**

- High-energy concentrates are fed for energy. Grains and grain products commonly fed are shelled corn, sorghum and wheat. Liquid feedstuffs, such as molasses, can also be used as a source of dietary energy. Alternative energy sources, such as fodder beet and sweet potato can be fed to growing and finishing sheep and goats, but in most situations performance will not equal that obtained from grains and grain byproducts. High-protein concentrate sources most commonly fed are cottonseed cake, sunflower cake, brewer's grains, distiller's grains and other similar feeds.

- **Roughages:**

- A wide variety of roughages can be fed to growing and finishing lambs. The amount of roughage to feed depends on the objective of feeding the roughage.

The rations used for fattening can be classified into three categories: starter, intermediate and finishing.

- **Starter:** contains higher levels of roughage, 14% crude protein. The ration is hand-fed in order to control feed consumption and identify any sick animals or animals going off-feed. This ration is generally fed

for one week. For animals that have been transported long distances, it is advisable to increase this phase to two weeks.

- **Intermediate:** The animals are gradually changed to the intermediate ration containing a lower proportion of roughage to the total ration, 13% crude protein. Is hand-fed for one week.
- **Finishing ration:** Animals are gradually changed from the intermediate to the finishing ration, which contains even less roughage, with protein content initially of 13%, declining to 12% when successful adjustment on the rations has been achieved. Finishing rations are self-fed. The finishing ration should contain about 10% roughage which is fed in a separate feeding trough, concentrates being self-fed. Heavy lambs must be finished more rapidly with a high concentrate ration, while lighter lambs can be fed rations containing more roughage.

Table 2. Sample feeding programs for finishing sheep and goats in feed lot

Ingredient	Diet I (%)			Diet II (%)			Diet III (%)		
	Weight (kg)			Weight (kg)			Weight (kg)		
	To 30	30-40	40 to market	To 30	30-40	40 to market	To 30	30-40	40 to market
Ground corn	52	62	72	49	59	69	60.5	60.5	59.5
Ground corn cobs	20	10	-	--	--	--	--	--	--
Chopped grass hay				33	23	13	--	--	--
Oilseed cake	11	11	11	11	11	11	10	10	11
Dried legume hay	10	10	10	--	--	--	23	23	23
Liquid molasses	5	5	5	5	5	5	5	5	5
Dicalcium phosphate	1	1	1	1	1	1	1	1	1
Trace mineral salt	1	1	1	1	1	1	1.5	1.5	1.5

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Provision of facilities (stock, feeds etc) is necessary so as to facilitate learning.
- 2 The condition under which practical is done vary from institution to institution

- 3 The teachers differ in their mode of teaching so also the students.
- 4 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 State the advantages and disadvantages of each of the methods used in fattening.
- 2 Identify the animals used during the fattening period?
- 3 Which of the breed responds to fattening better.

SHEEP PRODUCTION

1.0 INTRODUCTION

Careful management of the pregnant, parturient and lactating ewes will have a marked influence on the percentage of lambs dropped and reared successfully. So, the following steps may be taken to afford proper attention to these animals.

2.0 OBJECTIVE

Instruction in this lesson should result in students achieving the following objectives:

- 1 Student should be able to understand different management technique of class of sheep (ewe, lamb) etc.
- 2 Students should be able carry out the management practice of each class of sheep.

Management of ewe

- Do not handle the pregnant ewes too frequently.
- Separate the advanced pregnant ewes from the main flock and take effective care in their feeding and management.
- Extra feed during the latter part of pregnancy (3-4 weeks before parturition) will be beneficial for the condition of the pre-parturient ewes which will help in improving milk production of ewes, birth weight and growth of lambs.
- Inadequate and poor nutrition may result in pregnancy, toxemia, abortions and premature births of weak lambs.
- Bring lambing ewes into lambing corals 4-6 days before parturition and provide maximum comfort. If possible, provide soft, clean bedding and individual lambing pens.
- Watch gestation length, which ranges from 142 to over 150 days. Early maturing breeds have slightly shorter gestation period.
- Save parturient ewes from cold and chilly weather.

Management of lamb

- Care of lamb from birth to slaughter age
- Average gestation period is about – 150 days
- About a week to lambing the following are observed
- Production of milk from mammary gland
- Ewe becomes nervous and excited
- Few hours to parturition, there's expulsion of the bag containing a fluid
- It is not uncommon to have twin birth in ewe

Steps

- The lamb should be able to suckle the dam 15-20mins after birth, if this does not happened the lamb has to be assisted by placing the ewe's teat into the lamb's mouth.
- Keep the ewe and lamb in a confinement for at least 24hours, this is done in other to allow the ewe and the lamb get use to each other.
- The livestock man should monitor closely the health of the ewe and lamb.
- Provide for the ewe water, good quality hay, silage or freshly cut silage.

Pre weaning management of lamb

This covers about 2-5 months

Steps

- Take care of the navel by dipping it in 7% solution of iodine to avoid injection
- Take data of the lamb (see farm records)
- Provide creep feeding under intensive condition when ewes are milking
- The feeding is separate from that of the mother

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 The facilitator/teacher should ensure students take part in all demonstrations/practicals.
- 2 The facilitator/teacher should teach in a simple way for easy understanding by the students.
- 3 Adjustment can be made where necessary.

5.0 PRACTICAL ASSIGNMENT

1 What are the problems likely t be encountered during pre-weaning management.

2 How can you improve lamb management in tropical environment?

3 How can ram production be improve through management?

GOAT PRODUCTION

1.0 INTRODUCTION

The domestic goat is a subspecies of the wild goat of southwest Asia and Eastern Europe. It is a member of the bovine family, and is closely related to the sheep, both being in the "goat antelope" group. Domestic goats are one of the oldest domesticated species. For thousands of years, they have been used for their milk, meat, hair, and skins all over the world. In the last century they have also gained some popularity as pets.

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

- 1 Student should be able to understand different management technique of class of goat (buck, doe, kid) etc.
- 2 Students should be able carry out the management practice of each class of sheep.

3.0 STEPS

Management of breeding goat stock

Steps

- Bucks intended for breeding should be kept in good condition.
- Provide adequate amount of food because poorly fed goat are sluggish and tend to have reduce libido (the keenness to mate).
- Reduce high phosphorus diet because it reduces fertility in terms of sperm quality.
- Avoid Vitamin A and iodine deficiency (deficiency cause reduce libido)
- Exercise yard should be provided
- Dehorned bucks regularly and the hooves should be trimmed to reduced limpness.
- Provided good pasture.
- In absence of pasture provide concentrate up to 0.75kg / day/buck.
- Two (2) weeks before and during breeding season, increase the level of concentrate by 0.45 to 0.9kg.
- To achieve good breeding efficiency mating should be 1:50 (hand mating).
- 1:40 (pasture mating)

Management of breeding does

The Management of breeding does is related to Physiological phases:

- The dry period
- Pregnancy period
- Lactation period

Dry period

This is the period when the does is last productive

Place the does on high level of nutrition (flushing) usually done for dairy goats).

- Provide exercise yard
- Nanny kids (yet to reproduce should not be bred too fat). Age of puberty is between 6-7 months.
- Pregnancy period
- During the last 6-8 weeks of pregnancy, the doe should be placed on high level of nutrition (steaming up).
- Provide enough water and mineral lick
- At last week of pregnancy, concentrate of about 0.3 to 0.5kg should be given.
- Uneasiness, restlessness, sitting down and getting up, smelling the ground, appearance of water bag are the signs of parturition.
- Watch the doe closely during kidding which should be completed in 2 to 3 hours which may be longer in cases where the doe produce more than 1 kid.
- Observe the doe carefully in case (Dystocia) and also size of the foetus can also pose difficulty during kidding.

Lactation period

- Provide enough pasture and concentrate to the lactating doe.

Management of kids

- Immediately after birth, clean the air passages if the kid is not breathing
- Use straws and tickle the nostril or tongue of the kid to stimulate respiration
- If it still doesn't breathe take it by its hind leg and turn it upside down for some time or pour cold water on the kid or give it a kiss of life (mouth to mouth respiration)
- After all these and it still doesn't breathe then it may die or survive and be very weak
- Take care of the navel by dipping it in 7% iodine solution to prevent infections.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 The facilitator/teacher should ensure students take part in all demonstrations/practicals as students readiness to learning vary
- 2 The facilitator/teacher should teach in a simple way for easy understanding by the students.
- 3 Adjustment can be made where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 What are the problems likely to be encountered during pre-weaning management?
- 2 How can you improve kid management in tropical environment?
- 3 How can buck production be improve through management?

PASTURE PRODUCTION AND MANAGEMENT

1.0 INTRODUCTION

The rate of growth of forages in a pasture is directly related to how well the pasture has been managed, not only in recent grazing periods, but also during the previous winter and back through the prior grazing season. Pastures that were managed poorly during the prior year will not respond as quickly and will not produce the optimum quantity of forage during the current year. All other factors being equal, the better a pasture is managed the more forage it will produce, up to the capability of the soils and the site conditions.

In addition to better pasture production, the soil, water, and wildlife resources will be greatly enhanced by a managed grazing system. A greater percentage of rainfall will infiltrate into the soil instead of leaving the pasture as runoff. Any runoff that does occur will be cleaner, carrying little, if any, sediment. Soil erosion will be greatly reduced and you may have a net building of the soil. Habitat for wildlife, especially song birds, will be enhanced through diversification of cover type, height, and stage of maturity.

The management strategies discussed below can be tailored to your pasture situation, relating directly to the forages that are currently growing and to those desired in the future, and considering the kind and class of livestock utilizing the pastures.

2.0 OBJECTIVES

By the end of this exercise the student should be able to.

- Understand production of pasture.
- Management strategies of pasture.

3.0 PROCEDURE

Identify and Manage Sensitive Areas

Many pastures are used for grazing because there are severe environmental limitations precluding the use of the area for cropland. Some of these limitations include wetness, droughtiness, steep slope, stoniness, and south/southwest slope exposure.

The following sensitive areas are commonly found and delineated:

- Wooded areas, including savannas
- Native prairie remnants
- Steep slopes
- Shallow or thin soils

- Organic soils
- Springs or seeps
- Riparian areas
- Wetlands, ponds, lakes
- Streams, rivers
- Areas that commonly flood
- Conservation structures
- Areas with threatened or endangered species
- Areas with archeological significance.

Subdividing Pastures

The most important step to take in improving the yield of pastures is to subdivide the pasture into several paddocks. This has the effect of allowing for a rest period for the forages on the majority of the pasture, while improving the efficiency of harvest for the area being grazed.

Two common methods of subdividing pastures are “strip grazing”, and “set paddocks”.

When to terminate grazing

Grazing below a specified residual stubble height (4 inches for tall cool season grasses, and 2 inches for short cool season grasses) will remove active growing points, which will cause the grasses to regrow from buds on the roots. This requires an extra 7-10 days of growing time and weakens the root by drawing upon stored food reserves for this regrowth.

Management Prior to a Killing Frost

- Allowing the forages to regrow some prior to a killing frost is an extremely important pasture management strategy.
- New buds, which will be next years’ grass shoot, are developed during the fall of the year.
- Pastures that are allowed to rest for 30 days prior to a killing frost will emerge from dry season dormancy 7-10 days earlier in the rainy. This represents a significant extension of the grazing season.

Sacrificial Paddock Use and Management

A sacrificial paddock is a portion of one of the paddocks that will intentionally be utilized for a holding area while the remainder of the paddocks rest. This takes place when soil conditions are very wet, very dry, or when the forage production has diminished and no paddock is ready to graze.

Sacrificial paddocks should be selected with care. Sensitive areas should not be used for sacrificial paddocks, nor should areas that are prone to erosion, areas that would be very difficult to rejuvenate, or areas that are difficult to get to with feed equipment. In addition, water for the livestock needs to be available.

Managing Forage Balance

The most difficult aspect of managing grazing systems is dealing with the variable rate of forage growth.

To even out the forage balance on a monthly basis, the following strategies are often used:

- Using a rotational grazing system will reduce the depth of the midsummers lump, and it will delay the onset of the slump in forage production.
- Utilize warm season grasses to fill in the slump that normally occurs in midsummer for cool season forage based systems.
- Use an annually seeded crop as forage during the summer.
- Hay fields that have been harvested for the first crop can be used for grazing instead of taking a second crop.
- Some of the paddocks can be harvested as hay in the spring during the time of rapid forage growth.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Provision of bag of land for pasture demonstration is necessary so as to facilitate learning.
- 2 The condition under which practical is done vary from institution to institution
- 3 The teachers differ in their mode of teaching so also the students as regards to level of understating.
- 4 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 Differentiate between production and management.
- 2 State the advantages and disadvantages of pasture production.
- 3 Cultivate pasture and harvest during FPY/SIWES.

ESTIMATING OF AGE USING DENTITION

1.0 INTRODUCTION

Both sheep and goats have a total of 32 teeth. They do not have any upper incisors. The dental formula for sheep and goats is as follows:

0/4 incisors, 3/3 pre-molars, 3/3 molars. The first number in each formula represents how many sets of teeth are on the upper jaw; the second number indicates how many sets of teeth are on the lower jaw. For example, the 0/4 means that sheep/goats have no upper incisors, but have 4 sets of lower incisors (8 lower incisors in all). Most of the time the dental formula looks like this 2 (0/4 incisors, 3/3 pre-molars, 3/3 molars) = 32. All baby sheep and goats are born with deciduous teeth (teeth that will fall out). Deciduous teeth are much smaller than permanent teeth. The deciduous teeth are replaced with permanent teeth as the animal ages.

2.0 OBJECTIVES

When you have worked through this material you should be able to:

- carry out dentition in farm animal.
- discuss the main reasons why dentition is done in farm animals.
- describe the different types of teeth.

3.0 PROCEDURE

Table 3: sheep and goat dentition

Permanent Tooth Eruption in Sheep and Goats	
Permanent tooth	Age at Eruption
Incisor (I ₁)	1-1.5 years
Incisor (I ₂)	1.5-2 years
Incisor (I ₃)	2.5-3 years
Incisor (I ₄)	3.5-4 years
Premolars	1.5-2 years
Molar (M ₁)	3 months
Molar (M ₂)	9-12 months
Molar (M ₃)	1.5-2 years

Sheep Dentition



Fig. 2 Dentition of an aged goat (about 10 years old).



Fig. 3 Dentition of a yearling sheep. Two incisors are permanent (black arrows). All the incisors are permanent and worn.

The black arrow shows where this goat is missing an incisor tooth.



Fig. 4 Dentition of a 2 year old sheep.

Four incisors are permanent (black arrows). (black



Fig. 5 Dentition of a 2 year old sheep.

Four incisors are permanent (arrows).



Fig. 6 Dentition of a 6-8 year old sheep. extremely
Notice the wide spacing between the teeth. frequently referred to as a
this ewe has severely
receding gum lines



Fig. 7 Dentition of an aged sheep (from 8-12 years of age), "broken mouth." Notice how worn or missing teeth, with

Goat Dentition



Fig. 8 Dentition of a goat 2 weeks of age. goat 10 months of age. All the teeth are baby or deciduous teeth. baby or deciduous teeth.



Fig. 9 Dentition of a All the teeth are



Fig. 10
Dentition at 1.5-2 years of age.
old goat.
Four incisors are permanent (black arrows).
permanent (black arrows).



Fig. 11
Dentition of a 3 year
Six incisors are



Fig. 12
Dentition of an aged goat (about 10
years old).
All the incisors are permanent and
worn.
The black arrow shows where this
goat is missing an incisor tooth.

Table 4: Cattle Dentition			
		Cattle age at occurrence	
Teeth	Eruption	Full development	Wear
Incisors			
Pinchers	18 to 24 months	24 months	Leveled at 5 to 6 years, noticeable wear at 7 to 8 years
1 st intermediate pair	24 to 30 months	36 months	Leveled at 6 to 7 years, noticeable wear at 8 to 9 years
2 nd intermediate pair	36 months	48 months	Leveled at 7 to 8 years, noticeable wear at 8 to 9 years
Corners	42 to 48 months	60 months	Leveled 9 years, noticeable wear at 10 years
Premolars			
1 st cheek tooth pair	24 to 30 months		
2 nd cheek tooth pair	18 to 30 months		
3 rd cheek tooth pair	30 to 36 months		
Molars			
4 th cheek tooth pair	5 to 6 months		
5 th cheek tooth pair	12 to 18 months		
6 th cheek tooth pair	24 to 30 months		

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Students should be able to determine the age of an animal using dentition.
- 2 The condition under which practical is done vary from institution to institution.
- 3 Students should actively practice the skills learned.

4 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 Differentiate between in cattle and small ruminants.
- 2 Which of the methods is more suitable for young animals?
- 3 State the difficulties encountered during dentition.

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DETERMINATION OF BODY WEIGHT

1.0 INTRODUCTION

Proper measurement of live body weight, which often is hard in the village settings due to lack of weighing scales, is a prerequisite for achieving so many lofty goals that are always associated with either medical or economic status of the animals. Knowing the live bodyweight of small and large ruminants is important for a number of reasons, such as for breeding, correct feeding and health (Slippers *et al.*, 2000). Apart from taking live weight of meat animals, researchers also use other parameters such as body length, width of pelvis, height at withers and chest girths in order to adequately evaluate live animals (Atta *et al.*, 2004). Under standard conditions properly calibrated livestock scales are the most accurate and consistent method for determining body weight. Under farm conditions however, where scales and records may be absent, it may be difficult to know the weight of sheep and goats (Abegaz and Awgichew, 2009). Some of these standard weighing scales coupled with their shortcomings are too expensive for most of small farmers (Mahieu, 2011). This has forced many farmers to rely on estimates of body weights using certain number of body characteristics which can be measured readily (Aladeet *al.*, 2008).

2.0 OBJECTIVES

When you have worked through this material you will be able to:

- weigh farm animal.
- discuss the main reasons why weigh is done in farm animals.
- describe the different types of weighing facility.

3.0 PROCEDURES FOR ESTIMATING WEIGHT OF SMALL RUMINANTS

- **Weight band:**
 - Briefly, the weight band is wrapped directly behind the shoulder blade, down the fore-ribs, under the body behind the elbow and all the way around to the point behind the shoulder blade.
 - The ends of the weight band are overlapped on top, on the goat's spine. Lastly, the resultant weight measurement is read off the weight band in kilograms.
- **Visual appraisal:** Visual determination of the weight of animals is often faced by errors like using the same estimate for more than one breed of a particular species (Otoikhian, 2008). Body structure can be deceptive when estimating weight (Slippers *et al.*, 2000). For instance, Red Sokoto goats appear lighter than

they actually are because of their light bones. Apart from bones and body structure problem in estimating weight, a white animal always looks bigger than it is (Otoikhian, 2008).

- **Body Linear Measurements:** There are a number of linear dimensions which can be used to quantify the size of an animal and to estimate weight. The most widely used body linear measurements include height at withers, heart girth, chest depth, body length, fore cannon bone, rump height, distance between eyes, ear length, ear width, paunch girth and tail length. Heart girth and cannon bone length are least affected by the posture of the animal. Abegaz and Awgichew (2009) described the linear measurement as follows:
- **Height at Withers (HAW).** This measures the distance from the surface of a platform on which the animal stands to the withers. The measurement is best made with a special measuring stick made with two arms one which is held vertical and the other at right angles to it sliding firmly up and down to record height. The sheep or goat should stand squarely on all four legs. The legs should be equally spaced, and carry equal portions of its weight. The vertical arm of the measuring device is placed on the ground and ensures it is at a right angle to the platform. Then the other shorter arm is slide down until it just touches the shoulder at the desired point. The vertical measuring device is withdrawn and the distance is measured with a measuring tape. Alternatively, the vertical arm could have the measuring scale inscribed onto it and height read directly. This method can be used alone or in combination with the other linear measurements to get more accurate results.
- **Heart Girth (HG) or Chest circumference:** Heart girth is a circumferential measure taken around the chest just behind the front legs and withers. The measurement should be taken to the nearest 0.5 cm. HG is a highly repeatable measure though it does vary somewhat with extremes of posture and perhaps as the animal breaths.
- **Body Length (BDL):** Body length refers to the distance from the base of the ear to the base of the tail (where it joins the body). It can also be measured as the distance from base of tail to the base of the neck (first thoracic vertebrae), or to front of the chest or to tip of the nose. Extreme care is needed to ensure that the backbone is straight in both vertical and horizontal planes.

- **Hip Width (Pin Bone Width) (HW):** Hip width is the distance between the outer edges of the major hip bones on the right and left side. The hipbones are easily located and the distance between them easily measured with a pair of large, half round or oval shaped callipers.
- **Rump Height (RH):** Rump height is the distance from the surface of a platform to the rump using a measuring stick as described for height at withers.
- **Fore Cannon Bone Length (CB):** This is the length of the lower part of the leg extending from the hock to the fetlock in hoofed mammals. It is a well-established fact that linear development of different bones in the body is strongly related.
- **Chest Depth (CD).** Chest depth measures the distance from the backbone at the shoulder (standardize on one of the vertical processes of the thoracic vertebrae) to the brisket between the front legs.

a Precautions while taking body linear measurements

Since the animal body movement and body posture can introduce errors into measurements and estimated weights, Abegaz and Awgichew (2009) suggested the following precautions to be taken in order to counteract these effects:

- i. When possible, choose measurements that are little affected by the animal's posture
- ii. Standardize the position of all animals that are to be compared
- iii. Be patient and wait for an animal to stand correctly.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Provision of weighing facilities is necessary so as to facilitate learning.
- 2 The condition under which practical is done vary from institution to institution
- 3 The teachers differ in their mode of teaching so also the students.
- 4 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 Select different class of sheep and goat and determine their weight.
- 2 Which of the methods is more suitable for young animals.

3 State the advantages and disadvantages of each method used.

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CASTRATION

1.0 INTRODUCTION

Castration is an important management practice for sheep and goat farmers to maintain control of their breeding program and successfully carry out breed improvement. Castration is the removal or destruction of the testes, epididymis and a portion of each spermatic cord from a ram/buck. In most cases, non-breeding males and males not slaughtered at a young age should be castrated. Traditionally, farmers do not castrate animals and both males and females are allowed to run together. The result is that inferior males mate with females passing on undesirable traits and the young stock produced are not very productive. There are also other reasons for castrating sheep and goats:

2.0 OBJECTIVES

When you have worked through this material you will:

- be aware of the extent of castration practices in farm animal.
- the main reasons why animals are castrated.
- be able to describe the process of animal castration and its consequences.

3.0 METHODS OF CASTRATION

There are three commonly used methods of castration for sheep/goats: the Burdizzo method, the banding or elastrator method and the knife (surgical) method.

The different methods are more suitable for different sizes and age of animals, e.g., the elastrator method being more suitable to very young animals. It is good to match castration method to size and age of animal.

a. THE BURDIZZO EMASCULATOME (METHOD)



Fig 13. The whole instrument



Fig 14. Head of the burdizzo

The following step wise procedures and figures show the castration of sheep/goats using the burdizzo.



Step 1. 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 (Fig 15).



Step 2. 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 (Fig 16).



Step 3. Clamp 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 or the time it takes to count from one to 25. 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. You can tug on the cord to see if it feels ruptured (Fig 17).



Step 4. 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 (Fig 18).



Step 5. 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 (Fig 19).



Step 6. When you are done, you may see a mark on each side of the scrotum. 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 (Fig 20).

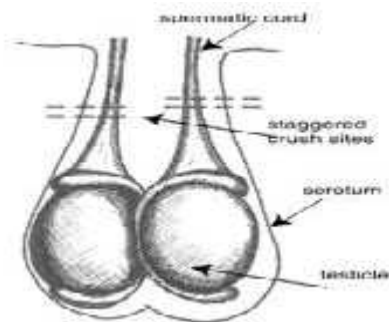


Fig.21. Crush sites for burdizzo castration



Fig.22. Post castration changes: uncastrated buck (left); buck castrated 5 weeks earlier (right)

b. THE BANDING OR ELASTRATOR METHOD

- This method involves cutting off the blood supply to the testicles with a heavy-duty rubber band or ring.
- Materials needed include an elastrator and castrating bands. An elastrator is a special applicator that stretches a heavy-duty rubber band and applies it to the neck of the scrotum.
- The scrotum and testes will fall off in two to 4 weeks, depending on the size of the testicles.



Fig.23. Elastrator tool used to apply rubber rings



Fig.24. Elastrator band (ring)



Fig.25. Inserting an elastrator ring onto the scrotum.

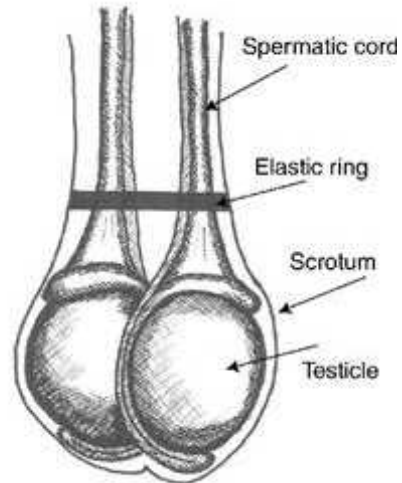


Fig.26. Proper placement of the rings.

This method causes some stress to the animal due to the pain and discomfort experienced by the constricting band, especially for 10 to 15 minutes after the elastrator band is applied. Follow these procedures to castrate lambs/kids using the elastrator method:

PROCEDURE

- Do not use rings older than 12 months to avoid breakage and to assure a tight fit. The rings must be strong enough to cut off blood flow in the arteries as well as the veins. If not, the scrotum will swell.
- Restrain the animal as described above.
- Place a rubber ring over the prongs of the elastrator. Hold the elastrator with the prongs facing up. Close the handles to open the band. The scrotum and testicles are then passed through the expanded

hole of the band. Position it as close to the animal's body as possible, with care taken not to place the band over the rudimentary teats or involve the penis.

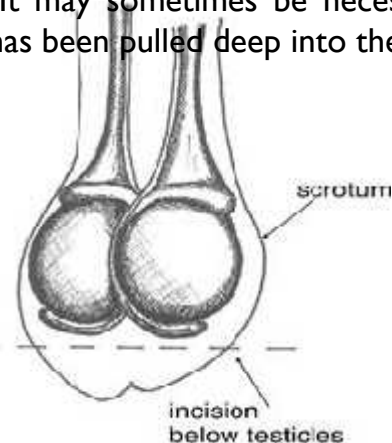
- Release the elastrators displacing the ring from the prongs, thereby positioning the band. The band will return to its original shape cutting off circulation to the testicles and eventually causing all of the tissue below the band to die and fall off.
- Check to be sure both testicles are still in the tip of the scrotum and that the ring is placed properly (Figure 8). If not, cut the ring with scissors and repeat the procedure.
- Administer an injection of tetanus antitoxin. Even though this is a bloodless procedure, the tetanus organism can gain entry through the irritated tissue around the rubber ring.
- Check daily to be sure that the rubber band is still around the neck of the scrotum and for signs of infection.

c. THE KNIFE METHOD

- The testicles may be surgically removed.
- Materials needed include a clean and sterile sharp knife, a one-sided razor blade or a scalpel, warm water; disinfectant (iodine can be used), syringes, tetanus antitoxin and a fly control spray designed to be sprayed on open wounds.
- Bucks and rams older than 6 months may need to be sedated prior to castration using a knife.

To perform a knife castration, follow these procedures after the animal is restrained by the assistant. Begin by washing your hands and instruments (knife or scalpel) thoroughly with soap and water and then disinfectant. Next, wash the scrotum thoroughly and disinfect it. Do not excite the lambs, kids or calves before or immediately after castration. This will increase bleeding.

- Push the testicles high up into the scrotum. Cut off the bottom one-third of the scrotal sac with a cut parallel to the ground. The testes should now be visible. Manipulate each testis separately to the open end of the scrotum. It may sometimes be necessary to push on the abdomen if a testicle has been pulled deep into the abdomen.



4.0 CONCLUSION

This lesson has attempted to discuss the different methods of castration in farm animals.

- 1 Students should be able to identify the different equipment for castration.
- 2 Student's level of understanding of the subject matter vary.
- 3 Teaching should be made simple for the students.
- 4 Adjustment should be where necessary

5.0 PRACTICAL ASSIGNMENT

1. Identify the types of castration methods used in your FPY/SIWES research institute/organization or farm.
2. State the advantages and disadvantages of each method of castration practiced during the FPY/SIWES.
3. What are the limitation in the use and practice of castration in Nigeria? Discuss

IDENTIFICATION

1.0 INTRODUCTION

Animal identification is a process done to identify and track specific animals. It is done for a variety of reasons including verification of ownership, biosecurity control, and tracking for research or agricultural purposes.

Proper identification of sheep and goats is essential for the maintenance of systematic farm records, feeding of required quantity of nutrients, better management practices and individual care of the animals. It is also an essential requirement for the registration of pure-bred animals and to make selections of breeding stock and sale animals.

A number of systems can be used for identification. Some, such as stencils, are temporary and are meant to be used until more permanent methods are instituted; others, such as tattooing, are permanent.

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

- 1 Identify animals using different method of identification.
- 2 Should be able to use the equipment for identification.
- 3 Should be able to use identified animals to establish a systematic farm record.

3.0 METHODS OF IDENTIFICATION

a. Tattoo

Animals can be tattooed on any part of their skin that can be seen but the ear is the may be used in leather production. Marking ears avoids damaging the skin which may be used in leather production. The process involves making a series of pierced marks through the ear rubbing in Indian ink. The equipment required is:

- Lettering
- Indian ink
- Methylated spirits
- Tattooing pliers
- Records

Procedure

- 1 Place the letters of figures in the tattooing pliers and test on paper.
- 2 An assistant holds the animal in standing position.
- 3 Clean the ear of ax and dirt with methylated spirits.
- 4 Smear ink on the inside of the ear.
- 5 Line up pliers between ear blood vessels in middle of ear

- 6 Squeeze pliers with quick firm movement to penetrate skin (assistant restraining the animal)
- 7 Remove pliers and rub more ink into holes using a stiff brush.

b. Ear tagging

Procedure

- 1 Dip the tags and applicator in disinfectant.
- 2 Write the number on the tag before tagging.
- 3 Restrain the animal in standing position.
- 4 Clean ear with methylated spirits.
- 5 Clip tag into ear with applicator, avoiding ear veins.
- 6 The tag is best placed as near to the head as possible to reduce the chances of ripping.

c. Ear Notching

Many purebred breeders do not like to use ear notches because it detracts from the appearance of the animal. A simple system of notching that can be read and interpreted easily should be used. For example, notches in the top of the left ear (1), bottom of the left ear (10), end of the left ear (100), centre of the left ear (1000), top of the right ear (3), bottom of the right ear (30), end of the right ear (300), and centre of the right ear (3000).

Procedure

2. Hold the animal by the head and use a pair of ear notchers to remove a V-shaped piece of tissue from the edge of the ear to notch the correct numbers.
3. Apply some antiseptic to the notches.

4.0 CONCLUSION

The following conclusions should serve as guidelines for the facilitator/teachers;

- 1 Most of the farms do not have all the equipment for identification
- 2 Student's level of understanding of the subject matter vary.
- 3 Teaching should be made simple for the students.
- 4 Adjustment should be where necessary

5.0 PRACTICAL ASSIGNMENT

- 1 Identify animals using any of the identification methods.
- 2 State the advantages and disadvantages of the method used above
- 3 Which of the method will be acceptable by the local farmers?

CATCHING AND HOLDING OF SHEEP AND GOATS EASILY

SHEEP

Catching a sheep the right way should be easy. Doing it the wrong way is stressful both for the shepherd and for the sheep.

If the sheep that need to be caught is not placid or familiar with human contact, and cannot be approached directly, it should be walked together with few other sheep into a corner or small pen. The sheep can then be caught and in the following way.

- 1) Grasp the sheep by the neck or upper part of a back leg.
- 2) Put one hand (your right) on its muzzle and turn its head slowly but firmly sideways (to its left). The sheep will fall to the ground.
- 3) Take hold of the top of the front legs. One in each hand, and tilt the sheep into a sitting position, with it leaning slightly backwards against your legs.
- 4) The sheep is now relaxed and you can trim its hoofs or examine its udder.

NB: Some shepherd use a crook to catch sheep. A crook is a strong pole, about 1.5m long, with a hooked end. A neck crook has a large hook to fit around the neck of a sheep. A leg crook has a small hook to fit around.

GOATS

Catching and restraining a goat

The easiest way to catch a goat is to bribe it with food! If this fails a group of goat can be herded into a pen or enclosure from where individual animals can be caught. Approaching from the side and catching the horns, leg or neck usually succeed. The goat can be manhandled to sitting position by:

1. First reaching under the belly and gently pulling the two furthest legs towards you.
2. With the goats now on its side lean over to catch both front legs, back up the goat towards you so that it sits on its bottom.

An alternative method is to up one hand of the shoulder and one under the neck and carefully twist the goat into the sitting position. Mind the horns! Feet can now be examined and hooves trimmed.

ARTIFICIAL INSEMINATION TECHNIQUE

Insemination in different animals has different techniques especially the timing because animals at different time relative to the onset of estrus. There are basically 2 major methods (rector-cervical and older speculum method).

A THE SPECULUM METHOD PROCEDURE

- With the speculum method semen usually can be deposited only 1-3cm into the external uterine OS or posterior Portion of the cervical canal.
- The equipment consist of a glass or metal speculum, and inseminating tube and a light source.
- A sterile lubricated speculum is inserted into the vagina and cervix located by the aid of a light.
- The inseminating tube is the inserted through the speculum and into the external uterine OS or posterior part of the cervical canal as far as possible after which the semen is expel or deposited.
- Here there is no manipulation of the cervix to allow for deeper deposition of the semen into the body of the uterus.
- Due to some obvious reason, the fertility rate is low.
- In an investigation it was found that fertility is about 9.7% lower in this method than in recto-vaginal technique.

B THE RECTO-VAGINAL TECHNIQUE

In this method the equipment consist of an inseminating tube or catheter which is 5-6mm outside diameter, 40-45cm long and a syringe. The inseminating tubes are single service or disposable connected directly to plastic tubes.

The principal steps for carrying out insemination are:

- Put on clean rubber or disposable plastic gloves and sleeves.
- Connect sterile inseminating tubes to syringe or inseminating tubes and drawn in 1 ml of diluted semen.
- Place the load tube in horizontal position with portion near the syringe end in the mouth.
- Lubricate glove and sleeves.
- Carefully insert the hand and arm into the rectum and remove faeces if necessary.
- Clean the exterior of the vulva with cotton or paper toweling and inside edge of the lips of the vulva with fresh cotton.
- Insert inseminating tubes into the vulva as far as possible without touching the inside surfaces.
- Pass the tube along the roof of the vagina, thus avoiding the urethra and it reaches the cervix.

- With the hand in the rectum, press downward in the rectal wall grasp the cervix and guide tube into external uterine OS with the aid of thumb and a little finger around the posterior end of the cervix
- Combine gentle the forward pressure on the tube and manipulation of the cervix by rotatory movement from wrist until the desired extent of penetration is achieved.

ARTIFICIAL INSEMINATION

1.0 INTRODUCTION

AI is the preferred method of introducing superior genes from individuals free of specific disease and thereby improving the production of offspring. AI is also useful for breeding animal outside of their natural breeding, after oestrus has been induced and synchronized by manipulation of the photoperiod or the use of hormones. It permits the production of adequate quantities of milk and equalized the need for labour through the year. Semen used for out of season breeding can be frozen-thawed or liquid-stored if collected from ducks, rams and cattle held under artificial light in order to simulate the short days of the natural breeding season. Although higher pregnancy rates may be obtained with trans-abdominal insemination than with cervical insemination the former method may be prohibited due to ethical consideration.

2.0 OBJECTIVES

By the end of this exercise, you should be able to.

- Discuss semen collection techniques through live animal's practices.
- properly handle, thaw and prepare semen for insemination.

3.0 PROCEDURE FOR SEMEN COLLECTION

A THE USE ARTIFICIAL VAGINA

- The preparation for the artificial collection is important. The normal pattern of service routine should be adhered to procedure for semen collection
- Estrus cows should be put into the service yard.
- Bull is retrain as usual and lead up to the estrus cow. This is to lease the bull by allowing it to see and smell the cow and the lead it away so that it does not mount immediately
- This usually cause complete erection and libido become sub-hormones.
- AU the usual technique of collection is to have the bull lead up to the cow and operator stand to the right of the cows laid quarter.
- The bull noses the cow's perinium, depresses its back and makes a precaution pumping movement during which there is prostration of the penis and discharge of accessory secretion.
- Mounting then occurs and the bull makes some poking movement of the penis.
- At the point the operator grape the sheath of the bull with his left hand and direct it to the right of the cow's lined quarter so that the defected penis enters into the Artificial vagina (AV) which is held in the operators right hand.

- Usually when the penis makes contact with the woman lubricated surface of the AV, a vigorous ejaculation, thrust occur.
- The AV which is held horizontally is now held upright so that the ejaculation flows into the graduated tube.
- In case where the bull fertility is being investigated, attempt should be made to collect at least 3 semen samples.
- Bull should not be shouted at or beaten during semen collection.
- All things should be done quietly.

B THE USE OF ELECTRO EJACULATOR

- It is commonly used in practice to collect semen from young bull for semen evaluation on at AI centers.
- Electric current from a car battery or from main supplies or transistor is suitably modified to a 30 or 50 frequency cycle and carried by means of electrode set into a metal probe which are passed into the bull rectum. The probe are held over the ampullae and stimulations are applied increasing waves by varying the resistance
- At first low voltage and latter voltage of 15-20v and then semen drips would be seen from the protruded penis.
- The drip sample from the electrical stimulation gives a greater value of ejaculation

C RECTAL MASSAGE

- The technique involves the introduction of the lubricated hand and arm into the bull's rectum to locate the seminal vesicle.
- Struck the seminal vesicle against the penis.
- This cause accessory fluid to drip from the sheath hairs
- The ampullas are then found if possible between fingers and thumb.
- If this becomes a failure struck toward the urethra may be done
- A disadvantage of the message method is that samples obtained are not representative of the true ejaculate.

Advantages of AI

AI is used several reasons. There include:

- i. It spread more widely the merits of a top quality sire i.e. more females can be inseminated in a wide area with semen from a proven sire without the sire moving from one place to another.
- ii. AI allows for the elimination of the cost and risk of maintaining a sire for a small herd or flock.
- iii. This permits the use of a desirable but proven quality sire.
- iv. Prevents the spread of certain reproductive disease.
- v. Permits the easier use of exotic breed bulls which is otherwise difficult to maintain in a harsh environment.
- vi. Improve record keeping for performance testing since exact dates of conception can be known.

- vii. It allows for a good co-ordination with estrus synchronization program.
- viii. It helps in eliminating size differences between sire and dams.
- ix. Permits the use semen from sire several year's even they might have been dead. And this can help in various research programs.
- x. Sterility in bull can be easily be detected.
- xi. It saves time to carry out AI than under natural mating.

Disadvantages of AI

- i. It requires a trained personal
- ii. The equipment to be used be costly or even unable to the local famers
- iii. The behaviors of indigenous animals especially cattle makes it difficult to practice AI. Heat detection is difficult and it is not easy for the indigenous bulls to mount or ejaculate by means of artificial vagina.
- iv. The poor infrastructural facilities available makes it difficult to supply or perform AI.
- v. The extensive use of AI tends to reduce the market for bulls.
- vi. When poor or dirty equipment are used can be a source of disease or infections injuries to the dams.
- vii. If a female is inseminated wrongly when it is not in estrus, this can lead to permanent sterility or lead to disease called matritis or if pregnant can lead to abortion, foetal death or maternal illness.
- viii. In the event of dilatrous trial in a bull being used for AI, such a trait becomes widely spread, which will take time for climate.

Preparation of slide for estimating sperm mortality

All surface that will come into contact with semen should be clean and sterile this include the glass slide, the cover glass and the glass rod.

STEPS

- i. The first step to take is to warm the slide but this should be should be done carefully not to get hot.
- ii. Place one drop of warm (38⁰C physiological saline 0.9g NaCl in 100mls distilled water) or sodium citrate buffer (Na₃C₆H₇.2H₂O) on the pre warm slide.
- iii. Invert tube of raw semen gently 2 or 3 times of place a very small amount of semen in saline or citrate buffer. If semen has been diluted, there will be no need for the use of this saline or citrate buffer.

Diluents or Extenders for liquid semen

If desired or required, fresh semen can be successfully used for insemination within 24 hours of collection without dilution phial containing it is corked and stored in a beaker of water at temperature before transferring it to refrigerator at about 4⁰C for satisfactorily used in AI however, semen must be diluted at least 4 times its volume of diluents or extenders and its fertility must be retained at least 4 days.

For this purpose special diluent or extenders has been device in addition to dilution provides a buffer to maintained a constant P^H and nutrient and antibiotics with sulphonamides. The diluent which have more extensively used are:

A Egg Yolk citrate diluent

Procedure

- 1) Dissolve 2.9g of crystalline sodium citrate dehydrated in 180 double distilled water over glass.
- 2) Wash fresh eggs obtained from a disease free flock, sack them in 70% alcohol you 5 minute and then dry them before braking shall.
- 3) Using a septic precaution, separate the egg yolk from albumen as completely as possible puncture the yolk membrane and collect the yolk from a stainless glass container.
- 4) To mix 100mls of diluents mix 20mls of egg yolk and 80mls of sodium citrate buffer solution.

Some workers use higher proportion of yolk to citrate than the 1:4 proportion up to equal parts of the 2 ingredients.

B Boiled skimmed milk diluent

Procedure

- a) It requires adequate heating of milk to destroy a factor known as lactanin which is toxic to sperm.
- b) It is done by first obtaining fresh homogenized pasteurised milk or fresh pasteurised milk (skimmed) from a reliable creamery of dairy plants.
- c) You should avoid fresh skimmed milk fortified with milk solid. Homogenized milk containing vitamin D or activated ergosterol is however, satisfactorily.
- d) Using an accurate thermometer heat the milk to 92⁰ - 95⁰C and hold it this temperature for 10mins in the top portion of covered glass double boilers or in a covered vessels placed directly on a heated plate.
- e) Cool the milk to room temperature and add required level of antibiotics and store at 5⁰C until ready for use. It is usually prepared a day before use.

B Milk glycerol diluent:

Procedure

- a) Diluent the semen to one half the final disease perm concentration with fresh previously heated and cooled skim milk or homogenized milk containing antibiotics.
- b) Cooled partially diluted semen slowly to 5⁰C over a period of 4 hours.
- c) Add an equal volume of cooled milk diluent containing 20% glycerol by volume for best sperm availability, the milk glycerol fraction must be added gradually. You can do the addition as follows:-
 - i. Add step wise 20,30 and 50% of the milk at 10min interval

- ii. You can add in 3 equal volume in 10min interval
- iii. Add drop wise from a separatory funnel continuously over a period of 30min.
- iv. The final concentration of glycerol is now 10% and diluent is ready for pouring into test tubes and packaging for shipment. You do not need to wait for equilibration.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Provision of the necessary facility to facilitate teaching.
- 2 Teaching should be simple since level of understanding amongst students vary.
- 3 Students should demonstrate the practical skills learned.
- 4 Adjustment can be made where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 State the advantages and disadvantages of each of the extenders used.
- 2 Among the methods of semen collection practiced, which is the best and why?
- 3 Which of the diluents is easier and safer to prepare and why?



Fig. 28. Bull mounting a dummy for semen collection

Techniques of heat detection/gadgets

Different signs are studied carefully for detection of heat. Heat detection aids are very important tools for efficient reproductive management if used in combination with expert eye. Cows with detector combination with expert eye. Cows with detector (KaMaR) plus CHALK marking on tail were more efficient than detector alone. Visual observation with tail paint is 98 % efficient as compared to heat watch alone i.e. 91 %.

The secondary signs of heat include;

- Frequent urination, chin resting, back rubbing, walking along fences, loss of appetite and sudden drop in milk production. Other supportive sign include licking, sniffing, head lift up, lip curling, and flehman's reaction (up curling of lips by female or male after touching the genitalia of raged animal).
- Willingness to amount other cows, even though neither cows may be willing to stand for the mount
- Roughened tail head or mud on the rump, which is evidence that other animals have tried to mount her.
- Restlessness which may be indicative of a cow about to exhibit heat (cows in pre-heat may bawl more than usual, head-butt the face, sniff or lick other cattle)
- Clear stringy mucus discharge which may be hanging from the vulva or meared on the pin-bones or rump of a cow about to have estrus or one already in estrus. Bloody mucus often appears 2-3 days after entrus has occurred and should be recorded in order to closely watch for heat in 17-21 days.

Physical sign of estrus include

- The tumefaction of vulva,
- reddening of vulva (bright cherry pink color),
- excess mucus discharge and tone in uterus.
- Closeness in animals coming into heat usually congregates and form small groups of three to five animals called sexually active group (SAG). It is easy to detect heat if sexually active group exist in herd.

Heat detection gadgets

- 1 Vaginal pH
- 2 Vaginal smear
- 3 Measurement of vaginal conductivity using probe
- 4 Fern pattern of cervical mucus discharge
- 5 Endometrial biopsy
- 6 Cervical mucus glucose content:
- 7 Uterine tone

- 8 Change in parlor behavior
- 9 Milk yield fluctuation
- 10 Temperature measurement
- 11 Heat expectancy charts
- 12 Tail painting
- 13 Use of androgenized cow
- 14 Chin ball device
- 15 Heat expectancy charts
- 16 Gomer bulls
- 17 Bio stimulation
- 18 Pressure sensitive KaMaR or BeaCon heat detector
- 19 Electronic heat mount detector
- 20 Heat patch with visible colour change
- 21 Pedometer and activity meters
- 22 Video camera and recording using CCTV
- 23 Electronic odour detector
- 24 Milk progesterone Detection
- 25 Heat detection by 17 β -estradiol and P₄ in milk
- 26 Infra red spectroscopy and magnetic resonance spectra
- 27 Synchronization of estrus

OESTRUS SYNCHRONIZATION

1.0 INTRODUCTION

Estrous synchronization gives many beef cattle producers the opportunity to capture the economic benefits of artificial insemination (AI). Because AI involves a substantial investment of labor and time, most commercial farms or ranches will not utilize this technology unless this investment can be confined to a period of less than 5 to 7 days. To make the labor requirements of AI compatible with modern beef cattle breeding, the estrous cycle must be synchronized so that a high percentage of treated females show a fertile, closely synchronized estrus.

There are three primary methods of estrous synchronization available for beef producers who breed cattle artificially or who wish to synchronize estrus for natural breeding:

- prostaglandin injections
- “progesterone-like” ear implants and estradiol/progesterone injections
- a combination of an orally active progesterone (MGA) and prostaglandin

2.0 OBJECTIVES

Instruction in this lesson should result in your achieving the following objective:

- synchronize female animals.

3.0 PROCEDURE

Table 5. Examples of Work Schedules for Synchronization.

Using Prostaglandin only: Scheme 1.					
May 1 Heat detected and breed purchase prostaglandin from veterinarian	May 5 Inject all others not previously detected in heat	May 5-11 Continue to heat detect breed for 6 days	May 12 Turn in Clean up bulls		
scheme 2 April 10 Purchase prostaglandin from	April 18 Inject all eligible females	April 29 Inject all eligible females	April 30-May 5 Heat detect and breed	May 6 Turn in Cleanup bulls	

veterinarian					
Scheme 3 April 25 Purchase prostaglandin	April 28 Inject all eligible	April 29 Heat detect and breed females	May 9 Inject all females not previously detected in heat. Continue to breed on detected heat	May 16 Turn in Clean up bulls	
Using “synchro- mate B”					
April 17 Purchase Implants and injections	April 20 Put implants in and give injection	April 29 Remove implants; Separate calves from cows. Begin heat detection and inseminatio n	May 1 Breed by appointment, return calves to cow	May 5 Turn in clean up bulls	
Using MGA and prostaglandin s					
Scheme 1 March 15 Order feed with MGA	March 28 Start feeding MGA to all eligible cows and heifers	April 11 Remove MGA from feed	April 28 Inject all cows and heifers with prostaglandin . Heat detect and breed for 6 days	May 6 Turn in clean up bulls	
Scheme 2. March 15 Order feed with MGA	March 28 Start feeding MGA to	April 11 Remove MGA from feed and	April 28 Inject all cows and heifers with	May 1 Breed all females not previously	May 6 Turn in

	all eligible cows	heifers	prostaglandin . Heat detect and breed for 72hrs	inseminated	clean up bulls
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4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 5 The facilitator/teacher should provide the facility to facilitate learning.
- 6 Teachers differ in their mode of teaching so also the students.
- 7 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 Carry out synchronization using any of the methods studied.
- 2 How do you manage animals for synchronization?
- 3 State the advantages and disadvantages of synchronization of heat.

6.0 REFERENCES

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MILKING UTENSILS

1.0 INTRODUCTION

The milk secreted from cow's udder is usually sterile. It invariably becomes contaminated during and after milking by the milker, milking equipment's, utensils, cooling , storage and while processing. Milk is a good medium for bacteria, yeasts and moulds that are the common contaminants. The contamination of milk from improperly cleaned utensils/ cans is about 60%, accounting for highest level of contributor. Dairy farmers/producers have responsibility of producing milk under clean and hygienic conditions, protected from contamination by dirt at all times, employing appropriate techniques to clean and disinfect the milking equipment, Utensils and storage cans. The ability of raw milk to retain its quality under storage, and the safety of the product for the consumer, can both be directly related to the bacterial content of the milk. Good quality milk is essential for production of good quality dairy products. In most countries, bacterial content is one of the factors considered in determining the payment for milk.

2.0 OBJECTIVES

Instruction in this lesson should result in your achieving the following objectives:

- be able to sanitize utensils.
- be able to identify quality milking utensils.

3.0 SAMPLES OF MILKING UTENSILS



Fig. 29



Fig. 30



Stainless Steel Milk Pails

Fig. 31



Steel Buckets

Fig. 32



Stainless Steel Milk Bucket

Fig. 33



Stainless Steel Pails

Fig. 34



Bulk Milk Coolers

Fig. 35

Procedure for cleaning the milking utensils

1. Pre-rinsing with Water: Pre-rinsing with cold or lukewarm water should always be carried out immediately upon emptying the vessels. Otherwise, the milk residues will dry and stick to the surfaces, making them harder to clean. If there are dried milk residues on the surface, it may be disadvantageous to soak the equipment, to soften the dirt and making cleaning more efficient.
2. After rinsing scrub utensils/pails thoroughly with a suitable brush, using hot water and efficient dairy cleaner. About 15 g of the mixture will be required for cleaning a utensils of 10 litre capacity.
3. Follow the washing up on scrubbing with hot water. The temperature water should be more than 50°C.
4. Wash the utensil again with enough cold water (tepid water in cold season)to remove traces of detergent.
5. Sanitise the cleaned utensils with acceptable sanitizing agent (iodophors/chlorine solutions (50-200ppm of active compound))to kill/disinfect the utensils.
6. Properly cleaned vessels should be placed in inverted position for the complete drainage of water, so as to avoid contamination from air, insects, rodents, reptiles etc.
7. Dry cleaned utensils should be stored in dust, dirt and other contamination protected area.
8. Hot water sterilization-the temperature should be as near the boiling point as possible and never below 85°C. The utensils should be immersed for 20min, but where it is not possible, boiling water should be poured over the milk-contact surfaces till they are too hot to touch.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- Provision of different types of milking utensils is necessary so as to facilitate learning.
- Teachers differ in their mode of teaching so also the students.
- Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

1. List the different types of milking utensils used in your place of FPY/SIWES
2. identify the best product to be used in the milk industry to avoid cases of rusting.
3. Identify milking utensils and their uses.

METHODS OF MILKING

1.0 INTRODUCTION

The milk process requires several important steps. The purpose of these steps is to elicit optimal milk letdown, minimize the chances of a cow contacting mastitis organisms during milking, and efficient milk removal.

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

- a. Student should be able to differentiate between hand and machine milking.
- b. Student be able to identify quality milking utensils.

3.0 METHODS OF MILKING

A Hand Milking

- Cows are milked from left side. after let down of milk, the milker starts milking teats either cross wise or fore quarters together and then hind quarters together or teats appearing most distended milked first few streams of fore milk from each teat be let on to a strip cup.
- This removes any dirt from the teat canal and gives the operator a chance to detect mastitis.
- Milking is done either by stripping or by full hand method. Stripping is done by firmly holding the teat between the thumb and fore finger and drawing it down the length of the teat and at the same time pressing it to cause the milk to flow down in a stream.
- Grasping the teat with all the five fingers and pressing it against

B Machine Milking

Modern milking machines are capable of milking cows quickly and efficiently, without injuring the udder, if they are properly installed, maintained in excellent operating conditions, and used properly. The milking machine performs two basic functions.

- It opens the streak canal through the use of a partial vacuum, allowing the milk to flow out of the teat cistern through a line to a receiving container.
- It massages the teat, which prevents congestion of blood and lymph in the teat.

Advantages

- The advantages of this milking machine are manifold. It is easy to operate, costs low, saves time as it milks 1.5 litre to 2 litres per minute.
- It is also very hygienic and energy-conserving as electricity is not required.
- All the milk from the udder can be removed.
- The machine is also easily adaptable and gives a suckling feeling to the cow and avoids pain in the udder as well as leakage of milk.



Fig. 36

4.0

CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Students should be shown different types of milking machines.
- 2 Students should learn to operate milking machines.
- 3 Students should also practice hand milking.
- 4 Adjustment is allowed where necessary.

5.0

PRACTICAL ASSIGNMENT

- 1 Differentiate between hand machine milking.
- 2 State the disadvantages of machine milking.
- 3 How do you handle milk after milking?

DRENCHING

1.0 INTRODUCTION

Deworming (sometimes known as worming or **drenching**) is the giving of an anthelmintic drug (a wormer, dewormer, or **drench**) to a human or **animal** to rid them of helminths parasites, such as roundworm, flukes and tapeworm.

2.0 OBJECTIVES

Instruction in this lesson should result in your achieving the following objectives:

- be able to understand drenching technique
- be able carry out drenching procedure with minimal assistance

3.0 METHODS

Procedure

- 1) Put the liquid into a bottle with a long neck, or put a short piece of plastic or rubber tubing over the neck of a bottle. The best type of bottle for drenching is a long-necked wine bottle. A Coca-Cola bottle is a good alternative.
- 2) Hold the sheep in a standing position with its head slightly up.
- 3) Put the end of the bottle or tube into the back of the mouth above the tongue
- 4) Tip the bottle so that the liquid run slowly out into the mouth and is swallowed.

A pill or bolus can sometimes be given by placing it, with the fingers, at the back of the sheep's mouth and pushing it down the esophagus. An easier method, if treating many sheep, is to use a commercial balling gun.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 The facilitator/teacher should make sure the students themselves demonstrate the use of drenching gun.
- 2 The facilitator/teacher should properly supervise the students during demonstration.
- 3 Students should also learn the construction of drenching gun using local materials.

5.0 PRACTICAL ASSIGNMENT

- 1 What are the short comings observe in the use f coca cola bottle for drenching?
- 2 Discuss the side effects of drenching.
- 3 When is the best time to drench an animal and why?

HOOF TRIMMING

1.0 INTRODUCTION

Keeping hooves short and in good condition is very important because lame goat will be lose condition. Where animals travel across hard or stony ground their hooves tend to wear and require no trimming.

Hoof trimming is an essential part of sheep and goat management.

Flocks should be checked on a regular basis for hoof growth. Overgrown hooves may make walking painful, predispose the animal to other foot and leg problems, and competing for feed difficult. This may cause sheep and goats to stop eating and exercising. Animals with overgrown hooves are also very susceptible to joint and tendon problems and arthritis. Also, breeding animals use their hind legs during mating; mating and reproductive performance of a flock may seriously be affected if hooves of breeding males are not trimmed.

2.0 OBJECTIVES

Instruction in this lesson should result in your achieving the following objectives:

- 1 be able to carry out hoof trimming.
- 2 know when to dehoof and animal on the farm.
- 3 Students level understanding vary hence teaching should be made simple by facilitators/teachers.

3.0 PROCEDURE

Hooves are trimmed with sharp knife or foot clippers as follows

1. Restrain the goat in either sitting or standing position
2. Take one leg and clean the soil and any loose material from under and between the hoof.
3. Clip or slice away the excess nail on the outside of the hoof until it is the same height as the inside. Cut thin slice until confident enough to avoid cutting the soft tissue because bleeding and discomfort to the goat.
4. The heel should also be trimmed to the same height.
5. If the hoof is very long it will not be possible to trim it to an ideal shape at one trimming session. Where the hoof is peeling away at the side, remove any loose materials but do not clip up side to expose the soft tissue.
6. After trimming treat the feet with either
(a) Iodine; (b). Antibiotic spray (c) 10% solution of formalin or copper sulphate.

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 2 Provision of dehoofing equipment is necessary so as to facilitate learning.
- 3 The condition under which practical is done vary from institution to institution
- 4 The teachers differ in their mode of teaching so also the students.

5.0 PRACTICAL ASSIGNMENT

- 1 Discuss safety measure to be taken during hoof trimming.
- 2 State the procedure of handling a particular specie of animal for hoof trimming.
- 3 When is the best time to carry out hoof trimming and why?

DEHORNING

1.0 INTRODUCTION

Dehorning/disbudding: Horns on animals can and do cause bruises and other injuries to animals. Horns can also be a hazard to people and equipment. Dehorning/disbudding is the practice of removing an animal's horns or horn buds, depending on the age of the animal and the stage of horn growth. Dehorning/disbudding should be done between 7-10 days of age for goats and prior to 3 months of age for cattle. It should be pointed out that perhaps the most simple and effective method of dehorning is to select polled breeding stock (not always possible within some breeds and species).

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

- Students should be able differentiate between disbudding and dehorning.
- Should be able to carry out dehorning/disbudding

3.0 METHODS OF DEHORNING

A. Chemical Method

- Involves the use of alkalis e.g. CaOH, KOH, NaOH etc can be applied. Usually the chemicals are applied in the form of paste.

Procedure

- Clip the hair around the horn bud, this is done in order to expose the bud
- Apply petroleum jelly e.g. Vaseline around the bud to prevent chemical from touching other areas e.g. the eyes.
- Rub the paste on the horn bud until a little bit of blood occurs.
- It should be applied on calves of 3-10 days old

B. The hot iron method (Electric cauterizer)

Procedure

- In this method the iron is electrically heated until red hot usually above 500°C and a caplike end is pressed firmly on the bud until the matrix cells are destroyed and not more than 10 seconds.
- Care must be taken so that the iron should not go deeper to the head.
- This method is carried out on cattle that are over 3 months and below.
- It requires more time and it's painful

C. The use of clippers and saws

Procedure

- It's is carried out on cattle that are over 3 months of age
- It is a bloody operation
- It involves the use of clippers or saws to saw off the horn
- It should be done in cold weather so as to avoid pain

D. Cosmetics dehorning

- It involves the use lidocaine along the base of the horn
- Stich the skin around the bud before applying

4.0 CONCLUSION

The following conclusions should serve as guidelines for the facilitators/teachers;

- 1 Care should be taken during dehorning/disbudding exercise
- 2 Students vary in understanding the subject matter taught
- 3 Teaching should be made simple for the students
- 4 Adjustment should be made where necessary

5.0 PRACTICAL ASSIGNMENT

1. Carry out dehorning/disbudding exercise using any of the methods.
2. State the advantages and disadvantages of dehorning/disbudding
3. When is the best age to dehorn/disbud?

RANGE FENCING

1.0 INTRODUCTION

The most effective and long lasting fences are planned with correct layout and built with appropriate material and construction. The cost of a properly built fence often returns its value in a short time. It is most important to be aware of any regulations and zoning ordinances that pertain to the type of fence being built. When fences are built near property borders it is essential to know the exact location of the boundary lines.

2.0 OBJECTIVES

By the end of this exercise the student should be able to.

- Identify the different types of livestock fencing.
- Student should be able to construct simple fence among the ones studied.

3.0 TYPE OF FENCES

A Fence Post Options

Fence posts can be simple or they can be fancy. From metal t-posts to wooden locust posts, each option has its pros and cons. Here are a few of the options to consider when purchasing fence posts.

1 Metal T-posts:

T-posts come in a variety of sizes from 4 ft to 8ft. They usually come in bunches of 5 and are easy to find at your local farm store.

Pros:

- T-posts are easy and quick to install. And require only a t-post driver or even just a sledge hammer.
- Often less expensive than wood posts
- Reusable, moveable and long lasting

Cons:

- Not as aesthetically pleasing as wood posts
- They require the additional purchase of clips or insulators in order to attach your fencing.

2 Store Bought/Treated Wood Posts:

Treated wood fence posts are usually round posts that come in sizes ranging from 6-8ft. They are easily found at your local farm supply or home improvement store.

Pros:

- Uniform shape and size
- Posts are resistant to rot, which increases their lifespan

Cons:

- Most posts are treated with chemicals that are not healthy for people or the soil

- Heavy and cumbersome to carry
- Requires digging 1-2 foot holes in order to support the posts
- More expensive than t-posts

3 Locust Posts:

Split locust fence posts are a way to get wooden fence posts without the chemical treatment. You can usually find them locally ranging from 6-8 ft and sometimes longer.

Pros:

- Locust posts are naturally resistant to rot and require no chemical treatment
- Posts have a long lifespan
- They have a very natural, rustic look

Cons:

- Locust posts are not uniform in shape, size or looks. Depending on your personality, this can either be a good or bad thing
- They are harder to find
- The cost is usually higher than metal posts, but usually less than treated, store bought posts
- Like other wood posts they are heavy and require a deep hole to secure them in the ground

4 Step-in Posts:

Steeps-in post light-weight posts used primarily for temporary pastures. They are most often made of fiberglass or polypropylene.

Report this ad

Pros:

- Inexpensive with no extra materials required to secure your wire to the posts
- Very quick to install, using nothing more than your foot to push them into the ground
- Good for dividing pastures

Cons:

- Due to their lightweight nature they cannot be used for large animals or animals that will test a fence
- Shorter lifespan
- Can only be used with electric wire, tape or netting

B Fence Wire Options:

Just like with your posts, you have a lot of different choices when it comes to wire. This is where you need to decide the purpose of your fence- what do you want to keep in our out? Not all wire is created equal and knowing the answer can help you decided what is best for your farm needs.

1 Welded Wire

About:

Welded wire fencing is constructed by welding the connections between the horizontal and vertical wires of the fence. It can be purchased in a variety of gauges and most commonly comes with 2 x4 mesh openings in heights between 3 ft and 5ft.

Use:

Welded wire fencing is not quite as strong as its woven wire counterpart, so it is best used with animals who will not lean or stand on the fence. It is a great option for a chicken run or garden fence as well as used as a guard to protect trees from deer or livestock.

2 Woven Wire

About:

Woven wire fencing is constructed with a wire knot at the junctions of the horizontal and vertical wires. It comes in lengths from 50ft to 330 ft and in a variety of mesh opening sizes and heights.

Use:

Woven wire fence is a durable, long lasting fencing option for livestock. Depending on your needs, you can choose “goat fence” with smaller openings and strong construction to prevent animals from putting their heads through and to withstand impact from the animal leaning or standing on the fence. Larger animals or those who don’t stress a fence can have wider openings.

3 Field Fence

About:

Field fence is a specific type of woven wire fence. It typically comes in rolls of about 330ft and is much less expensive than other types of woven wire fences. The mesh spacing is variable, ranging from 3 inches to 7 inches, with the bottom spaces being closer together and the top farther apart.

Use:

Field fence is best for low impact animals or if you need a secure, full fence for a large area. It is great for keeping deer out of a garden or for fencing a dog run.

4 Barbed Wire

About:

Barbed wire fencing consists of 2 strands of wire that have been twisted together, with barbs placed every 3-5 inches throughout the length of the fence.

Use:

Barbed wire fencing is best used for large animals such as cattle or bison. It cannot be used safely with animals such as goats, sheep, llamas or alpacas. It can also be used as a perimeter fence for your property or

in conjunction with a woven or welded wire fence. Most barbed wire fences are made up of 5 strands of wire.

5 Electric Wire

About:

An electric fence is made up of multiple strands of high tensile wire. It requires the additional use of a fence charger, grounding rods and insulators. Most electric fences consist of 4-5 strands of wire.

Use:

Electric fencing is a durable, long lasting and flexible way to build a fence. It is a good option for goats, sheep, pigs, cattle, horses and llama. They are a good deterrent for keeping predators out as well as your livestock in. Keep in mind that, an electric fence is only a psychological barrier and may not be the best option for very head strong animals- such as a buck in rut. Electric fencing can be used as a permanent fence, temporary fence, or to divide pasture.

4.0 CONCLUSION

The following conclusions should serve as guidelines for the facilitators/teachers;

- 1 Students should be shown the different types of fences studied.
- 2 Students vary in understanding the subject matter taught.
- 3 Teaching should be made simple for the students
- 4 Adjustment should be made where necessary

5.0 PRACTICAL ASSIGNMENT

1. Identify fence suitable for young and older animals.
2. State the advantages and disadvantages of the different fencing systems.
3. Draw sketches of the fence studied.

BODY CONDITION SCORE

CATTLE

1.0 INTRODUCTION

Body condition scoring serves as a useful, easy-to-use management tool to determine the nutritional needs of a cow herd. Using a numeric scoring system from 1-5 for sheep and goat, 1 to 9 for cattle, livestock man can evaluate animals in the field to estimate body energy reserves. This information can be used to adjust feeding strategies to reach optimal BCS. Since body condition greatly affects reproductive performance as well as feeding efficiency, monitoring body condition using BCS can greatly influence a producer's bottom line.

Body condition scores are also important in establishing selection tools provided by the American Angus Association. Along with yearling data and cow weight, which should be taken 45 days before and 45 days after a calf's weaning measure date, BCS are essential in calculating improved mature cow expected progeny differences (EPDs) in the National Cattle Evaluation (NCE). These EPDs will then be used in the Weaned Calf Index (\$W), which was released in the spring 2005 NCE. Cow weights submitted without BCS will not be used to calculate mature size EPDs.

2.0 OBJECTIVES

By the end of this exercise the student should be able to.

- The different types of body condition score of farm animals.
- Students should know the significant of body condition scoring in livestock production.

3.0 PROCEDURE FOR IDENTIFYING BODY CONDITION SCORE

Body condition of cattle

BCS 1

No photos available.

Bone structure of shoulder, ribs, back, hooks and pins is sharp to the touch and easily visible. Little evidence of fat deposits or muscling.

BCS 2

No photos available.

Little evidence of fat deposition but some muscling in the hindquarters. The spinous processes feel sharp to the touch and are easily seen with space between them.



BCS 3

Beginning of fat cover over the loin, back and foreribs. The backbone is still highly visible. Processes of the spine can be identified individually by touch and may still be visible. Spaces between the processes are less pronounced.



BCS 4

Foreribs are not noticeable but the 12th and 13th ribs are still noticeable to the eye, particularly cattle with a big spring of rib and width between ribs. The transverse spinous processes can be identified only by palpation (with slight pressure) and feel rounded rather than sharp. Full, but straight muscling in the hindquarters.



BCS 5

The 12th and 13th ribs are not visible to the eye unless the animal has been shrunk. The transverse spinous processes can only be felt with firm pressure and feel rounded but are not noticeable to the eye. Spaces between the processes are not visible and are only distinguishable with firm pressure. Areas on each side of the tail head are well filled but not mounded.



BCS 6

Ribs are fully covered and are not noticeable to the eye. Hindquarters are plump and full. Noticeable sponginess over the foreribs and on each side of the tail head. Firm pressure is now required to feel the transverse processes.



BCS 7

Ends of the spinous processes can only be felt with firm pressure. Spaces between processes can barely be distinguished. Abundant fat cover on either side of the head with evident patchiness.



BCS 8

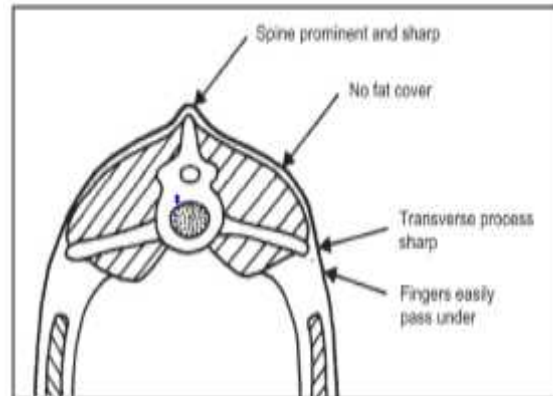
Animal takes on a smooth, blocky appearance. Bone structure disappears from sight. Fat cover is thick and spongy and patchiness is likely.



BCS 9

Bone structure is not seen or easily felt. The tail head is buried in fat. The animal's mobility may actually be impaired by excessive fat.

Body condition score of sheep



BCS 1 (Emaciated) – The spinal processes are prominent and sharp. Your fingers can pass easily under the ends of the horizontal processes and you can feel between each one. The loin eye areas are shallow with no fat cover.

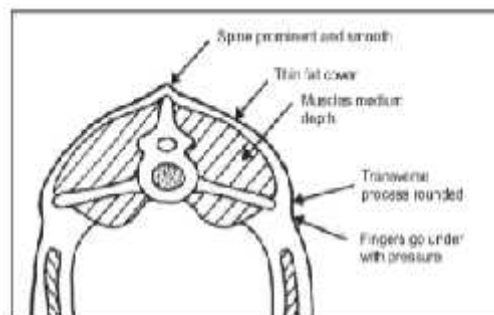


Figure 2
BCS 2 (Thin) – The spinal processes still feel prominent, but smooth, and individual processes can be felt as ripples beneath some cover. The horizontal processes are smooth and rounded. You can still pass your fingers under the ends with a little pressure. The loin eye areas are of moderate depth, but have little fat cover. A ewe in BCS 2 will have spinal processes that feel similar to the second joint of your fingers (Figure 2).

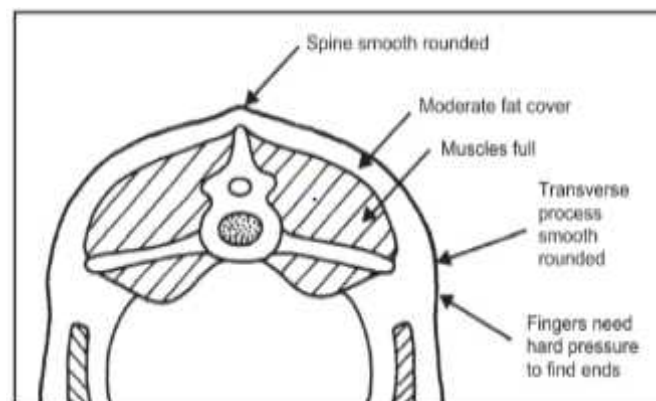


Figure 3
BCS 3 (Average) – The spinal processes can only be felt as smooth and rounded elevations. Individual bones can be felt only with pressure. The horizontal processes are smooth and well covered, and firm pressure is required to feel over the ends. The loin eye areas are full and have a moderate degree of fat cover. An ewe in BCS 3 will have spinal processes that feel similar to your palm just below the fingers (Figure 3)

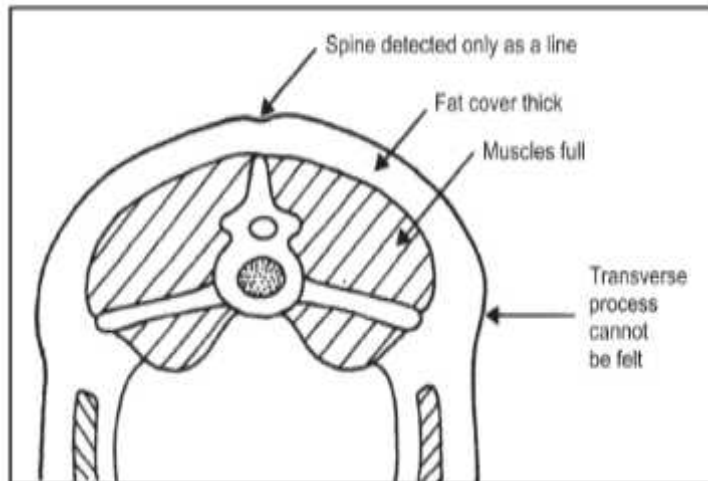


Figure 4
 BCS 4 (Fat) – The spinal processes can just be detected, with pressure, as a hard line between the fat-covered muscle areas. The ends of the horizontal processes cannot be felt. The loin eye areas are full and have a thick covering of fat.

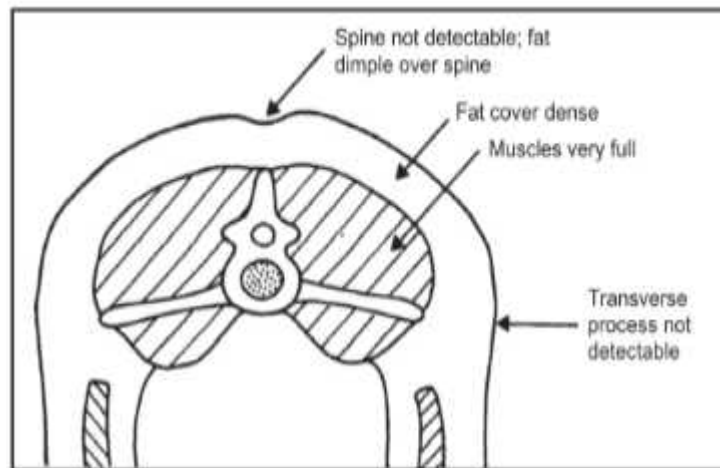


Figure 5
 BCS 5 (Obese) – The spinal processes cannot be detected even with firm pressure, and there is a dip between the layers of fat in the position where the spinal processes would normally be felt. The horizontal processes cannot be detected. The loin eye areas are very full with very thick fat cover. There may be large deposits of fat over the rump and tail. A ewe in BCS 5 will have spinal processes that feel similar to the meaty part of your palm below the thumb.

Body condition score of goat



Figure 1

Visual aspect of the goat: Emaciated and weak animal, the backbone is highly visible and forms a continuous ridge. The flank is hollow. Ribs are clearly visible. There is no fat cover and fingers easily penetrate into intercostal spaces (between ribs). The spinous process of the lumbar vertebrae can be grasped easily between the thumb and forefinger; the spinous process is rough, prominent, and distinct giving a saw-tooth appearance. Very little muscle and no fat can be felt between the skin and bone. There is a deep depression in the transition from the spinous to transverse process.





Figure 5

Visual aspect of the goat: The backbone is buried in fat. Ribs are not visible. The rib cage is covered with excessive fat. The thickness of the muscle and fat is so great that reference marks on the spinous process are lost.

The spinous process forms a depression along the backbone and there is a bulging transition from the spinous to transverse process.

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FORAGE CONSERVATION

HAY

1.0 INTRODUCTION

Forages can be conserved to feed livestock during periods of shortage caused by limited pasture growth or inadequate pasture conditions, or fed as a supplement. Conserved forages can take the form of hay, haylage, and silage. Although several methods have been proven as efficient ways to store and preserve forages, it is important, to keep this fact in mind: *At best, conserved forages can rarely match the nutritive value of fresh forage because some losses of highly digestible nutrients (sugar, protein, and fat) are unavoidable during conservation and storage.* Our goal in forage conservation is to focus on minimizing losses, which start immediately after cutting.

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

- 2 Student should be able to understand forage conservation technique.
- 3 Students should be able carry out the process of hay production.
- 4 Differentiate between hay and silage.

4.0 PROCEDURE

Basic method of hay making

- Forage is cut before it is fully mature (long before it has seeded), to maximize its nutritive value. Although cutting hay early will result in lower total volume, the increase in nutritive value will more than compensate for reduced yields.
- Leaves are more nutritious than the stems, and so when cutting forage, it is important that it is cut with as much leaf and as little stem as possible.
- Do not leave cut forage to dry in a moist environment, as this will encourage the growth of moulds. These can be extremely harmful to livestock and to people handling it.
- The cut forage is laid out in the sun in as thin a layer as possible, and raked a few times and turned regularly to hasten drying.
- Chopping forage into small pieces after drying will hasten the drying process.
- The drying process may take between 2 to 3 days.
- Hay should not be over dried as it may start to ferment and also become a fire hazard.
- The dried hay should ideally be stored in form of bales when the moisture content is low, ideally less than 15%. This helps storage and requires less space.

Storage of hay

- Hay must be stored in a dry environment.
- Hay can be baled and stored under cover or can also be stored by creating hay stacks. Stacks may be covered by plastic sheets to keep out rain and prevent from exposure to excessive sun.

Problem with hay making

- If hay is dried in a moist environment, for example during heavy rains season, mould may grow on the hay. These moulds can be extremely toxic to animals as well as the people handling it.
- In such cases it is advisable to wait till the end of the rainy season before cutting the forage. This may lead to lower nutritional content in the hay, but this is better than toxic hay. The resultant may be supplemented with other feeds.
- On the other hand, drying the hay too fast may lead to shattering of the delicate parts of the plant, causing a subsequent loss of nutrients.
- To avoid this, drying can be done in barns by passing hot air through the forage. Although artificial drying produces hay of good quality, it is expensive, but can be attempted on a community basis in areas where there is a need, and the necessary facilities. (NR International, Livestock Production Programme)

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Provision of hay making facility is necessary so as to facilitate learning.
- 2 The condition under which practical is done vary from institution to institution
- 3 The teachers differ in their mode of teaching so also the students.
- 4 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 Differentiate between silage and haylage.
- 2 State the advantages and disadvantages of hay making.
- 3 State the precautionary measures to be taken during hay production.

SILAGE

1.0 INTRODUCTION

Silage is the final product when forage of sufficient moisture (> ~50%) is conserved and stored anaerobically (oxygen-free), under conditions that encourage fermentation of sugars to organic acids. The acidity generated by the organic acids (mainly lactic acid, but also acetic and propionic acids) and the lack of oxygen prevent the development of spoilage microorganisms. Three of the most critical factors for silage production are (1) rapid removal of air, (2) rapid production of lactic acid that results in a quick lowering of the pH (this is the result of adequate fermentation processes), and (3) rapid feedout once the silo is opened and exposed to air to avoid heating and spoilage.

2.0 OBJECTIVES

Instruction in this lesson should result in students achieving the following objectives:

- 5 Student should be able to prepare silage using the technique learned during the FPY/SIWES.
- 6 Students should be able construct a local silo.
- 7 State the advantages and disadvantages of silage.

3.0 PROCEDURE

Phases of silage fermentation

An overview of the four phases of the silage production process.

The phases are as follows:

1. **Aerobic:** This phase usually lasts for approximately one day. During this period, plant cells and microbes will metabolize sugars and starch in the presence of oxygen, generating heat in the process. Silage temperature is elevated to about 90°F, and water may be lost (as seepage) because of respiration and compaction. If anaerobic conditions are not achieved quickly, high temperatures (>120°F) and prolonged heating will occur due to the growth of unwanted aerobic bacteria, yeast, and molds that compete with beneficial bacteria for substrate. Therefore, it is critical to ensure good compaction, proper moisture, and good sealing, all of which lead to a rapid transition to anaerobic conditions.
2. **Fermentation:** Once anaerobic conditions are achieved, lactic acid bacteria and other anaerobes start to ferment sugars into lactic acid, mainly, and other organic acids to a lesser extent (such as acetic and propionic) that will drop the silage pH from about 6.0 to a range of 3.8 – 5. Alcohols such as ethanol will be generated too, but with no contribution to the acidification process. Rapid decrease in pH prevents breakdown of plant proteins and helps inhibit growth of spoilage

microbes. Consequently, lactic acid production is preferred to ensure a low silo shrink. The fermentation phase usually lasts from one week to more than a month, depending on crop and ensiling conditions.

3. **Stable:** As long as anaerobic conditions are maintained, silage can be stable for months and up to years. However, under practical conditions, silage should be used within a year of its production. Slow entry of air through areas that were not properly sealed can slowly deteriorate material, thus silos should be constantly checked and maintained to avoid any potential break of seal integrity.
4. **Feedout:** Once a silo or bale is opened, it should be used as quickly as possible to avoid aerobic deterioration of the material. When oxygen becomes available in the ensiled material, yeasts metabolize the organic acids, which in turn cause the pH to increase, and further restarts the aerobic activity (such as molds), causing greater silage spoilage. The design of a typical silo face should allow for the daily removal of approximately 6 inches of face material (for reference, each 6-inch daily removal is equivalent to one week of exposure to air). Silo opening should occur only after the fermentation phase has been completed (that is, after three to six weeks). The suggested approach is to wait approximately two to three months before opening a silo.

Differences between Silage and Haylage

The main difference between silage and haylage is the initial dry matter (DM) concentration level at which the forage is clipped and packed to achieve optimum anaerobic and fermentation conditions. Three different moisture levels can be achieved: high-moisture silage ($\leq 30\%$ DM), medium-moisture silage (30% to 40% DM), and low-moisture (wilted) silage (40% to 60% DM). Low-moisture silage is referred to as haylage. When baled and wrapped, haylage is referred to as baleage. High-moisture silages are more prone to potential seepage losses (that is, effluent or leachate from the silo), undesirable secondary fermentation (resulting in butyric acid, which results in a rancid smell), and high dry matter losses (silo shrink). On the other hand, preservation as haylage depends more on achieving adequate packing (high density) to maintain anaerobic conditions. Achieving high density at packing is more difficult in drier forage. Nevertheless, high density is critical in haylage to maintain anaerobic conditions because microbes are less active and fermentation is lower in haylage than in higher moisture silage.

Management Practices for Making Better Silage

Crop factors

An ideal crop to be ensiled should have an adequate level of sugars (measured as water-soluble carbohydrates) to be fermented, low buffering capacity (that is, the resistance to changes in pH), and a stand with a dry matter concentration above 20% (McDonald et al., 1991).

Moisture

Moisture concentration affects the rate and extent of fermentation. Forages should not be ensiled with more than 70% moisture (or less than 30% DM concentration) due to potential seepage losses and growth of undesirable bacteria (such as clostridia), which results in undesirable fermentation. Wilting is needed in most cases when ensiling grasses and legumes.

Particle size

The optimal particle chop length is a balance between the particle size needed to achieve good compaction in the silo and the effective fiber requirements of ruminant livestock, especially lactating animals. The recommended theoretical length of cut (TLC) is 3/8 to 1/2 inch for unprocessed corn and legume silages, and 3/4 inch for kernel-processed corn silage (Muck and Kung, 2007). Sorghum silage should have a similar TLC to corn silage and grasses, and cereal silages should have a similar TLC to legume silages. Kernel processing is highly recommended when making corn silage to improve starch digestibility. Kernel processing should not be done, however, if whole plant DM concentration is less than 30% due to risk of increased seepage losses.

Packing density

Attaining a high density in a silo is important because it determines the porosity at which air moves into the silo and subsequently the amount of spoilage that occurs during storage and feedout. Silage density is influenced by DM concentration, TLC, and packing intensity.

Sealing

Good sealing with plastic sheets and concrete barriers will keep the carbon dioxide in and prevent oxygen from entering the silo. Care must be taken to seal any holes with UV-resistant tapes, especially in low-moisture silages where porosity is greater.

Additives

Several types of additives are available that can be used for silage making. Additives can help in every phase of silage making. Nevertheless, good harvesting practices are the main drivers of silage quality. In general, additives can be classified as stimulants or inhibitors of fermentation, and nutrient sources (Kung et al., 2003). Specific effects of additives include the following:

- Provide fermentable carbohydrates
- Inhibit undesirable types of bacteria and promote desirable bacteria
- Furnish additional acids (such as propionic acid) directly to decrease pH

- Modify moisture (Table 4)
- Extend aerobic stability during feed out (bunk life)

4.0 CONCLUSION

The following conclusion should serve as a guide to the facilitator/teacher;

- 1 Provision of silage production facilities (silo) is necessary so as to facilitate learning.
- 2 The condition under which practical is done vary from institution to institution
- 3 The teachers differ in their mode of teaching so also the students.
- 4 Adjustment is allowed where necessary.

5.0 PRACTICAL ASSIGNMENT

- 1 Differentiate between silage and haylage.
- 2 Prepare silage and determine the pH and colour.
- 3 How do you control the acidity during silage production?

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