



**COURSE
GUIDE**

**ANP 302
RUMINANT ANIMAL PRODUCTION**

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Printed 2011, 2018

ISBN:978-058-500-X

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INTRODUCTION

Ruminant Animal Production is a third year two unit course for the degree programme in Animal Science, Animal Production or Animal Production and Health. The course can also be offered by any other student of agriculture who may be interested in ruminant animal production.

Animal are categorised into two main types; RUMINANTS and NON-RUMINANTS. This division is based on some features exhibited in the anatomy and physiology of these animals.

This course is concerned with the husbandry and management of ruminant animals. This entails knowing the different local and some of the exotic breeds of cattle, sheep and goats in the tropics and their management principles.

This course, will therefore expose you to the knowledge and understanding with skill acquisition in the rearing of cattle, sheep and goats which are the common ruminants in Nigeria.

A closer look shows that this course offers you a thorough understanding of the group of animals that chew the cud. These set of animals are those that feed on plant materials and utilise them for the production of various products like meat, milk hides and skin and so many other agro-based products and by-products. The course teaches about the various breeds. A breed is a group or population of animals that shows the same features or characteristics which are genetically related.

Ruminant Animal Production offers the knowledge on the management of breeding animals i.e. those selected for mating and production of offspring for the farm. This is very important as it forms the foundation of many successful production amongst other things. The management of the weaners or the weaned animals to maturity and other production purposes in terms of their feeds and feeding, health care and housing based on the system of production. This course also prepares you for the advanced level concepts in courses such as Beef Production, Dairy Cattle Production and Sheep and Goat Production.

COURSE AIMS

Ruminant Animal Production is designed to provide you with a general concept and understanding of the husbandry and management principles of ruminant animals for production purposes.

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Course Aims

Ruminant Animal Production is designed to provide you with a general concept and understanding of the husbandry and management principles of ruminant animals for production purposes.

Course Objectives

On successful completion of the course, you should be able to:

- explain the management principles involved in the rearing of ruminant animals. The age at puberty, sexing ratio, care of the young ruminants etc
- Identify some of the local and exotic breed of ruminant animals
- compare the anatomical structure of the gastro-intestinal tract of ruminant animals
- differentiate the housing types for the different classes of ruminant animals.

These objectives can be used for check/self assessment in measuring what you understand from what has been presented to you.

Working through this Course

You are expected to read and understand the course materials provided. Each unit must be properly studied for good comprehension of the contents. By the end of each unit, you are expected to answer the questions therein and submit as appropriate when directed by the administration of the Open University. These questions are like continuous assessment. You are expected to sit for an examination on completion of the course. The duration shall take about 17 weeks of learning. Therefore, you must be able to organise your time to this effect successfully. Tutorial session will be available and it is advisable for you to attend in order to be able to assessed and compared yourself with your peers and clarify any area that are not properly understood.

The Course Material

Major components of the course are:

- The Course Guide
- Study Units

The References/Further Reading, that will be provided at the end of each unit are necessary as supplements to the course materials.

Study Units

Module 1 **Characteristics of Ruminant Animals**

- Unit 1 General Features of Ruminant Animals
- Unit 2 Digestive Anatomy of Ruminants

Module 2 Breeds of Ruminant Animals

- Unit 1 Breeds of Cattle
- Unit 2 Breeds of Sheep and Goat

Module 3 Management of Ruminant Breeding Stock

- Unit 1 Management of Cattle Breeding Stock
- Unit 2 Management of Breeding Stock in Sheep and Goats

Module 4 Housing and Equipment for Ruminant Production

- Unit 1 Housing for Cattle Production
- Unit 2 Housing for Sheep and Goat Production
- Unit 3 Equipment and Management Practices for Ruminant Production

Module 5 Feeding Principles in Ruminant Animals

- Unit 1 Nutrient Requirements and Feeding of Ruminants
- Unit 2 Feeding Materials for Ruminants

Module 6 Disease and Health Care of Ruminant Animals

- Unit 1 Diseases of Ruminants and Their Preventive Measures
- Unit 2 Internal Parasites of Ruminants and Their Control Measures
- Unit 3 External Parasites of Ruminants and Their Control Measures

The units in the different modules discuss each of the relevant topics of the course. The first unit deals with the general features of ruminant animal while the second further discussed on their digestive system. The third and fourth units explain some of the characteristics of breeds of cattle, sheep and goats respectively. The fifth unit examines the management of breeds in cattle while the sixth treated those in sheep and goats. Units seven and eight discussed the housing needs and types for cattle, and also sheep and goats respectively. Unit nine (module 1) gives some of the equipment used for ruminant animal production, the management principles as well as the husbandry practices. The eleventh unit considers the nutrient requirements for ruminants i.e cattle, sheep and goats, while unit twelve explains the feedstuffs/feed materials used in feeding ruminants and feed processing management methods. The last two units elaborated on the health and diseases of ruminants, and their parasites and control.

Assessment

The assessment of the course shall be in two parts. The Tutor-Marked Assignment (TMA) will take a part while the end of course written examination takes the second part. As a result, you must do the TMAs applying the knowledge and techniques in each unit. The assignment must be submitted to your tutor/facilitator for assessment in accordance with the set time in the presentation schedule. The TMAs assessment will constitute 30% while the written examination account for 70% of the total mark for the course.

Tutor-Marked Assignment

The TMA is a continuous assessment component of your course. It carries 30% of the total score. You will be given four TMAs to answer. Three of these must be answered before you are allowed to sit for the end of the course examination. The TMA would be given to you by your facilitator and returned after you have done the assignment.

End of Course Examination

The examination concludes the assessment for this course. It constitutes 70% of the mark for the whole course. You will be informed of the time for the examination.

Summary

Ruminant Animal Production is a course that gives you a good understanding of the care and management of cattle, sheep and goats. It teaches the skills of rearing ruminants in the area of breeding, housing structure and the disease of these animals. Your knowledge, understanding and skill acquisition in this course will enable you to venture into cattle, sheep and/or goat production either on subsistence or commercial scale.

In addition, You will be able to answer the following types of questions among others:

- briefly explain the following management operation in cattle production:
 - a. Castration
 - b. Identification
 - c. De-worming
 - d. Ear notching

- define pasture? Give any four examples of grasses and legumes used in ruminant feeding
- describe pasture management in terms of grazing of ruminants
- discuss the care of a pregnant ewe up to lambing
- state the underlying principles for housing in ruminant production?
- describe any three local breeds of goats
- discuss the economic importance of goats in Nigeria
- describe the traditional housing system in goat production in Nigeria and the preferred housing system
- define hay and how can it be prepared?
- write short notes on the following diseases in ruminant animals:
 - a. Anthrax
 - b. Roundworm
 - c. Brucellosis
- classify roughages with examples
- describe the prevalent system of sheep production in your locality
- with a diagram, illustrate the digestive system of a ruminant.
- enumerate the main differences between ruminant and monogastric animals.

Best wishes.

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MODULE 1 CHARACTERISTICS OF RUMINANT ANIMALS

- Unit 1 General Features of Ruminant Animals
- Unit 2 Digestive Anatomy of Ruminants

UNIT 1 GENERAL FEATURES OF RUMINANT ANIMALS

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- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Definition of a Ruminant Animal
 - 3.2 The Difference between Ruminant and Non-ruminant Animals
 - 3.3 Classes of Ruminant Animals
 - 3.4 Economic Importance of Keeping Ruminant Animals
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Animal rearing is an age long activity that man carries out basically for food and the production of raw materials for agro-industries. Meat or flesh, milk and eggs are primarily obtained directly from farm animals for consumption by man. Wool, fur, hides and skin are other products from farm animals for industrial use as raw materials. Animals are categorized into ruminants and non-ruminants based on some anatomical and physiological differences. Apart from being a source of meat as other animals, ruminant animals are the main sources of raw materials such as wool, fur, hides and skin, milk and many others for the production of clothing materials, leather materials (such as foot wears like shoes, belt, shawl), milk products like yoghurt, butter, cheese, and many other products. Ruminant animals, especially bull or camel are also used as draught animals for transportation and traction.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- define a ruminant animal
- state the basic features that differentiate a ruminant from non-ruminant animal
- identify the categories of ruminant animals
- enumerate the economic values of keeping ruminant animals.

3.0 MAIN CONTENT

3.1 Definition of Ruminant Animals

Ruminant animals are mammals that belong to the order *Artiodactyla*. They are animals with a complex stomach unlike the non-ruminants that have simple stomach. They eat and digest forages or plant based feed by swallowing it first and allowing it to get moistened in the **rumen** which is the first compartment of the complex stomach. The swallowed food is later regurgitated by the animal and re-chewed to break down the plant materials for digestion. This process is called rumination or chewing the cud. The cud is a semi-solid and semi-degraded **digesta** usually in a bolus form which is regurgitated from the reticulorumen of the animal. Examples of ruminant animals are cattle, sheep, goats, camel, water buffalo, giraffes, antelopes to mention but a few. However, we shall limit our discussion in this study to cattle, sheep and goats that are commonly found in our environment.

The diagrams below show the labelled parts of cattle and goat

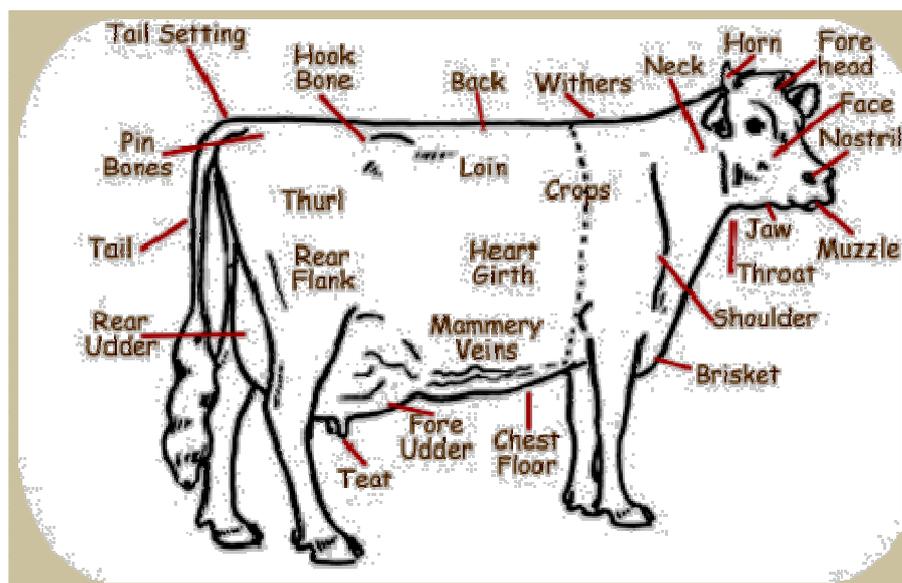


Fig. 1.1: Labelled Diagram of a Cow

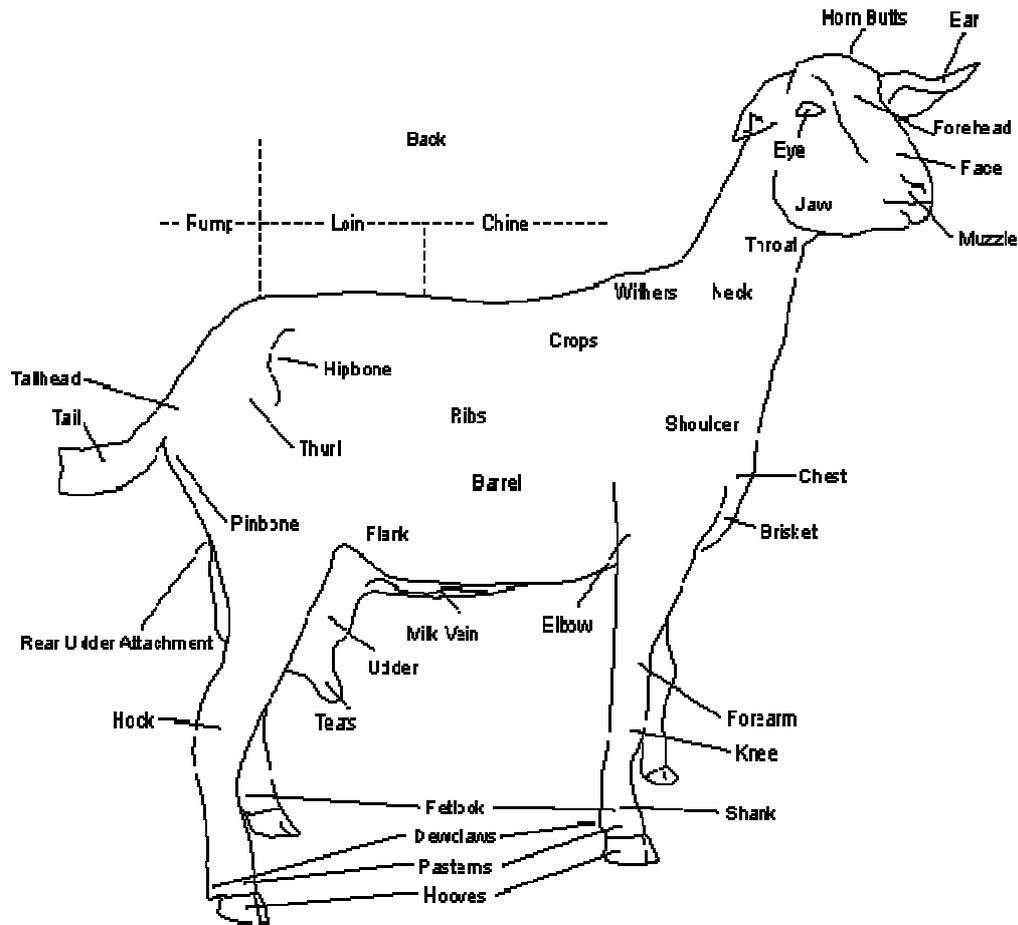


Fig. 1.2: Labelled Parts of a Goat

3.2 The Differences between Ruminant and Non-ruminant Animals

As mentioned above, the main difference between ruminant animals and non-ruminants is the anatomy of their stomach. Contrary to the belief of many, ruminants have only one stomach and not four (Fig 1.3.0).

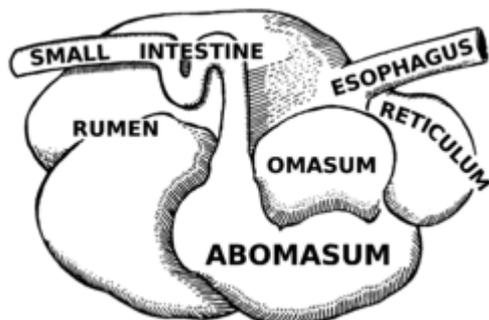


Fig. 1.3: The Four Compartments of Ruminant Stomach

However, the stomach is divided into four compartments or chambers unlike the simple stomach of the non-ruminants that has no division. The compartments are **rumen**, **reticulum**, **omasum** and **abomasum**. The last of the compartments is the true stomach in ruminants while the rumen and reticulum perform the function of moistening the swallowed forage. In the omasum, water and inorganic materials are absorbed before the **digesta** is passed into the true stomach.

Another major physical difference is the possession of split hooves by ruminant animals.

3.3 Classes of Ruminant Animals

Ruminant animals are categorised into two main classes based on their body size namely, the large ruminant animals and small ruminant animals. Examples of large ruminants are cattle, water buffalo, giraffe, camel etc while small ruminants are sheep, goat, antelope etc. Ruminants have an advantage of the ability to eat and utilise low quality fibrous food that cannot be eaten by human or non-ruminants.

3.4 Economic Importance of Keeping Ruminant Animals

Ruminant animals and their products as mentioned in the introduction have tremendous nutritional and economic values to man as stated below:

- Meat and milk of cattle, sheep, goats and other ruminants are good sources of animal protein to man which are of better quality than plant protein.
- They serve as sources of raw materials used in industries e.g. leather goods respectively. Goat hair is also used for making carpets, bag and ropes. Wool is a raw material for the production of clothings for human wear.
- They serve as means of foreign exchange earning. For instance, some countries in Europe such as Denmark and Botswana in Southern region of Africa export beef to earn foreign exchange. Others export dairy products from milk to earn foreign exchange.
- They serve as source of income to subsistence farmers. In Nigeria, cattle, sheep and goats are kept at subsistence level by farmers.
- These animals are able to survive on fallow lands and others that are not good for arable crop farming thereby maximizing the use of the available land resource.
- They are also used as gifts or bride price which serve as family wealth.
- They are sources of gainful employment.

- The manure/dung from these animals can be used as a source of organic fertilizer.
- The skin of the Red Sokoto breed of goats in Nigeria commands high premium in the international market because of its high superior quality
- In the South-Western part of Nigeria, goats are relished as meat and as barbecued during ceremonies. Generally, under the organised production system, ruminant animals are slaughtered during festive seasons all over the world. Blood and bones obtained from slaughtering of these animals are often recycled and processed into blood meal, bone meal which are used as components of animal feed.
- Cattle, and some other ruminants can also be used as “beast of burden”

4.0 CONCLUSION

The general features of ruminant animals have been looked into in this unit. The ruminant and non-ruminant animals were differentiated using the features highlighted and also categorised into large and small ruminants. The nutritional and economic values of keeping ruminants were also discussed.

5.0 SUMMARY

In this unit, you have learnt that:

- ruminant animals are those that feed on plant based feed by swallowing it and later regurgitating the forage for proper mastication or chewing to reduce the semi-solid digesta to particle size for digestion
- ruminant animals differ from non-ruminants because they possess only one stomach with four compartments which are the rumen, reticulum, omasum and abomasum. The fourth compartment called abomasum is the true stomach
- ruminants also differ from non-ruminants because they have spilt hooved toes
- ruminants are divided into large and small based on their body size
- ruminants have tremendous nutritional and economic values. They serve as source of foreign exchange earning and also raw materials for agroallied-industries.

6.0 TUTOR-MARKED ASSIGNMENT

1. What are the main differences between ruminant and non-ruminant animals?
2. Name the four compartments in a ruminant stomach serially.
3. Give any two economic reasons for keeping ruminant animals

7.0 REFERENCES/FURTHER READING

Bucket, M. (1973). *Introduction to Livestock Husbandry*. Oxford: Pergamon Press.

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UNIT 2 DIGESTIVE ANATOMY OF RUMINANTS

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- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Digestion in the Mouth and Oesophagus
 - 3.2 Digestion in the Stomach
 - 3.2.1 Digestion in the Rumen and Reticulum
 - 3.2.2 Digestion in the Omasum
 - 3.2.3 Digestion in the Abomasum
 - 3.3 Digestion in Small Intestine
 - 3.4 Digestion in the Large Intestine
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

The performance and utilisation of plant materials by ruminant animals for production function is related to the efficiency of their gastro-intestinal tract (Fig.1.4). The handling of food materials by ruminant animals and subsequent digestive process differ largely from that of non-ruminants. The gastro-intestinal tract starts from the mouth of the animal. The cheeks form a wall at the two sides of the mouth with the tongue as the soft organ beneath, the hard palate above it and is partially separated from the pharynx. The door of the mouth are the lips which in cattle are somehow stiff and not very flexible while the lips in sheep and goats are more flexible and helps in picking feed faster than in cattle. A good understanding of the digestive system of ruminant based on its anatomy is a key factor for successful ruminant production.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- discuss the anatomy of the gastro-intestinal tract of ruminants
- identify the different segments of the gastro-intestinal tract of ruminants
- draw and label the gastro-intestinal tract of ruminant animals.

3.0 MAIN CONTENT

3.1 Digestion in the Mouth and Oesophagus

The whole process of digestion starts from the mouth of the animal. The combination of the tongue and the lips help ruminant animals to pick and roll the plant material into the mouth. The teeth helps in the mastication or chewing of the plant material. There are two types of dentition in ruminants. The first is called deciduous dentition which is found in young animals with formular I 0/4; C 0/0; P 3/3. The second is called the permanent dentition with formular I 0/3; C 0/3; P 3/3; M 3/3 where I = Incissors, C= Cannine, P= Premolar and M= Molar.

The mouth has salivary gland that secret saliva with pH of about 8.2. It stabilizes the pH of the mouth and reduces the acidity in the subsequent chamber called the rumen. The oesophagus is a tubular column through which food is swallowed and regurgitated for re-chewing. It has no sphincter valves and the muscles contracts in both direction to allow movement of food.

3.2 Digestion in the Stomach

The stomach forms the greater proportion of the ruminants' digestive system. It has four chambers. The first is the rumen, while the second is reticulum, omasum is the third and abomasum the fourth.

3.2.1 Digestion in the Rumen and Reticulum

The digesta move through the oesophagus into the rumen. A thin wall separate the rumen and the reticulum and the contents always mix. Hence the two chambers is called reticulorumen. It is in the rumen that fermentation of the plant materials takes place. The rumen harbours billions of microbes for this function. In the young and unweaned animal, there exist an oesophageal groove that enables the milk ingested to pass down into the abomasum which is the true stomach for digestion and subsequent absorption and utilisation in the small intestine.

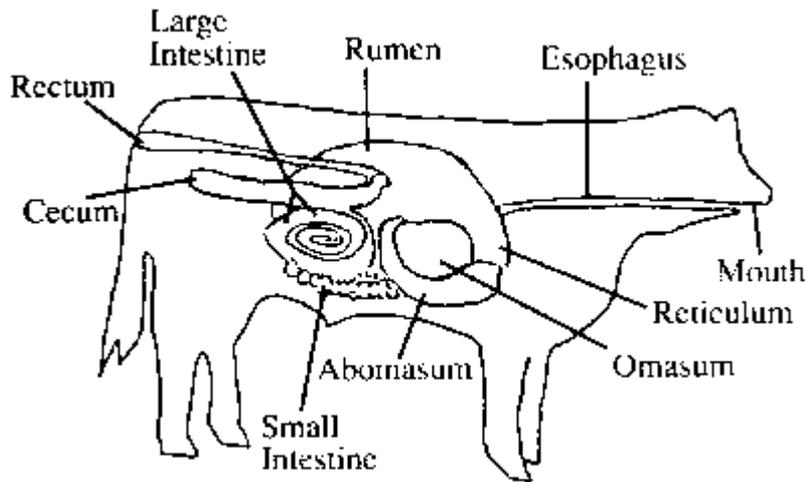


Fig. 1.4: Digestive System of a Cow
www.googleimage.com

3.2.2 Digestion in the Omasum

After fermentation, the digesta flows into the omasum chamber. The omasum is a spherical organ with muscular laminae and in this chamber, water and inorganic minerals are absorbed. The digesta is filtered to ensure that no harmful object enters into the omasum.

3.2.3 Digestion in the Abomasum

This is the true stomach and the first glandular portion whereby digestion by enzymes takes place. Gastric juice containing hydrochloric acid, pepsin, renin and lipase are produced. In young unweaned animals, the abomasum is about 80% of the stomach while in the adult it is only 10%. The digesta stays in the abomasum for about 1-2 hours.

3.3.3 Digestion in Small Intestine

Further breakdown of the food digesta occurs at the upper part of the small intestine. Here, pancreatic juice and bile assist in the digestion process while absorption of the end product takes place in the lower portion of the intestine through a finger-like structure called **villi**.

3.4 Digestion in the Large Intestine

The large intestine is made up of the **colon** and **caecum**. In this part of the Gastro-Intestinal Tract (GIT), some of the food residue is deposited for further fermentation in the caecum which has a blind end containing some microbes. The absorption of water and other nutrients continues in the colon. The digesta moves until it reaches the **rectum** and **anus**. The

undigested food material forms a solid mass in the colon and it is eventually expelled through the **anus**.

4.0 CONCLUSION

In this unit, we have established that the digestive system of ruminant animal has anatomical features that empower the functionality of each identified part of the gastro-intestinal tract.

5.0 SUMMARY

In this unit, you have learnt that:

- the digestive system of ruminants is made up of the mouth, the oesophagus, the four compartmental stomach (rumen, reticulum, omasum and abomasum), the small intestine and the large intestine
- fermentation of the plant material occurs in the rumen which harbour billions of microorganism that attack fibre for proper nutrient utilisation
- the abomasum is the true stomach where digestion takes place
- absorption of water , inorganic mineral and nitrogen takes place in the omasum and also in the small intestine, the colons and large intestine.

6.0 TUTOR-MARKED ASSIGNMENT

1. Describe the gastro-intestinal tract of a cattle with a well labelled diagram.
2. State the functions of each of the four compartment stomach in the alimentary canal of a ruminant.
3. What are the features that enable unweaned young ruminant to make use of milk as food?

7.0 REFERENCES/FURTHER READING

Chesworth, J. (1992). *Ruminant Nutrition*. London: Macmillan Education.

Ranjhan, S.K. (1980). *Animal Nutrition in the Tropics*. New Delhi: Vikas Publishing House PVT Ltd.

MODULE 2 BREEDS OF RUMINANT ANIMALS

- Unit 1 Breeds of Cattle
- Unit 2 Breeds of Sheep and Goats

UNIT1 BREEDS OF CATTLE

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Types of Cattle
 - 3.2 Breeds of Cattle
 - 3.2.1 White Fulani or Bunaji
 - 3.2.2 Sokoto Gudali
 - 3.2.3 Ndama
 - 3.2.4 Holstein/Friesian
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Each group of animals exhibit characteristic features that makes them stand out or easily identifiable. These characteristics are usually inherited hence could be said to be genetically determined. Therefore, a breed is defined as a group of animals that are related by the same ancestor and have the same characteristics such as appearance, conformation, size and other notable and distinguishing features. It is a population of animals distinguishable from others by some genetically determined characteristic features which are very conspicuous.

2.0 OBJECTIVES

By the end of this unit, you should be able to

- identify the different breeds of cattle in Nigeria
- list some beef breeds of cattle
- identify some dairy breeds of cattle
- identify some breeds of cattle based on their external characteristic features.

3.0 MAIN CONTENT

3.1 Types of Cattle

Cattle belong to the family *Bovidae* which is sub-divided into two sub-groups: *Bos Taurus* and *Bos Indicus*. *Bos Taurus* cattle have no hump i.e. do not possess hump while *Bos indicus* possesses humps. In addition, *Bos Taurus* cattle are the types of cattle found in the temperate regions of the world while *Bos Indicus* are found mostly in the tropics. Examples of *Bos Taurus* cattle includes breeds like the Holstein/Friesian, Ayrshire, Jersey, Hereford, Kuri, Ndama, Muturu and so many others while *Bos Indicus* are breeds like the White Fulani, Sokoto Gudali, Red Bororo, Keteku, Wadara (Shua Arab).

Cattle can also be typed or classified based on the main purpose of production. Those specifically bred for milk production are called dairy cattle (e.g. Holstein/Friesian) while those for meat are called beef cattle (e.g. Hereford). Some cattle have dual or even triple-purpose functions. They can be used for dairy, beef production and also used for draught. Examples include most of the local breeds in Africa e.g. White Fulani, Sokoto Gudali etc.

3.2 Breeds of Cattle

Some of the breeds of cattle have been named above. However, we shall only study those that are found in our environment which we will generally call “local” breed and one or two of those not found in our tropical climate which we shall call “exotic” breed.

3.2.1 White Fulani or Bunaji

This breed of cattle is the most prevalent in Nigeria especially in the Guinea and savannah zones of the country. They are large animals with medium to long up-curving horns. They have white coloured coat. The animal has well developed hump with skin folds. At maturity, the female White Fulani or Bunaji cattle weighs 330 to 350 kg while the male or bull weighs about 500 kg. It is a dual or triple purpose type of cattle as it may be fattened for beef, or kept for milk production or used as draught animal especially the bull.



Fig. 2.1: White Fulani Breed of Cattle

3.2.2 Sokoto Gudali

This is a humped breed of cattle. It is polled (no horn) with medium thick, loose and pigmented skin having a whitish creamy colour in female while the male has dim with bluish grey shadings. The animal has pendulous ears with short horns that are a bit longer in the female. The udders in the female are well developed with good teats hence they are regarded as indigenous dairy breed. At maturity, the female weighs an average of about 330 kg while the male weighs about 450 kg. The female produces an average of 1,500 kg of milk per lactation.



Fig. 2.2: Sokoto Gudali Breed

3.2.3 Ndama

This is a breed that is native to the West African Coasts especially Sierra Leone, Congo and Guinea or the FoutaDjallon area. The females weigh about 200 kg while the males weigh up to 300 kg. They do not possess hump. They are compact animal with short horns and light brown skin colouration. They are highly tolerant to trypanosomiasis. They are poor producer of milk.



Fig. 2.3: Ndama Breed of Cattle

3.2.4 Holstein/Friesian

This is one of the breeds that originated from Netherland. It is an exotic breed. It has black colouration with white patches on the coats. The udders are well developed and very large. Friesian are good producers of milk and are mostly used for dairy purposes either as pure or cross-breeds in Nigeria and most African countries.

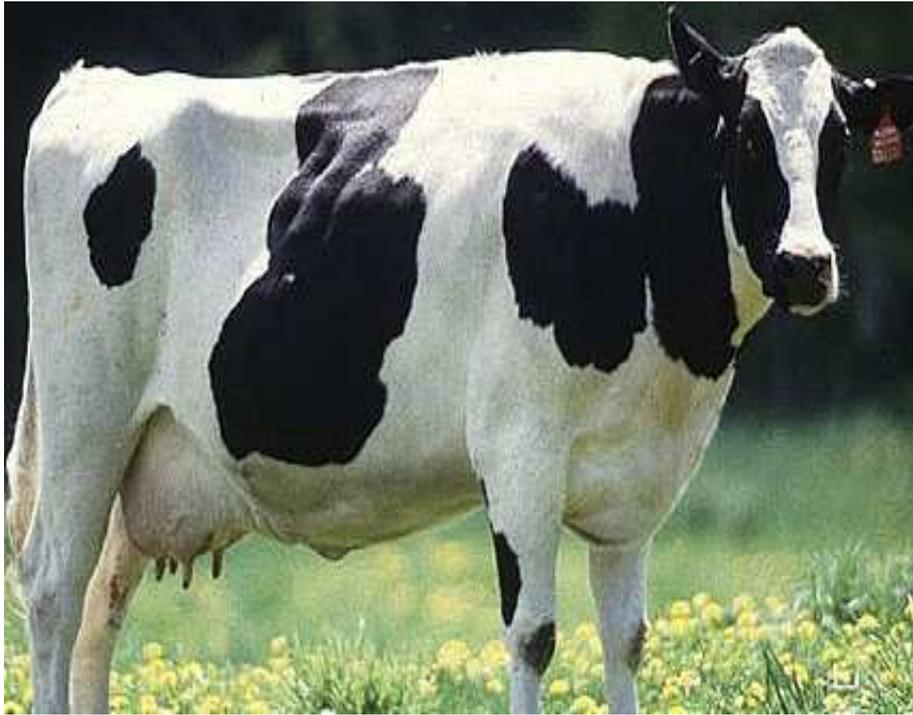


Fig. 2. 4: Holstien/Friesian Breed of Cattle

4.0 CONCLUSION

In this unit, we have been able to discuss the various types of cattle based on environment and conformation. We also classified cattle using the purpose of production.

5.0 SUMMARY

In this unit, you have learnt that a breed is a population of animals with peculiar genetically determined characteristics. The physical characteristics or purpose for which cattle is bred or reared have been used to classify cattle either as humped or those that do not possess humps, dairy or beef and/or draught. The peculiarities or uniqueness of each breed of cattle for easy identification were also highlighted.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define a breed.
2. Explain the difference between a local breed and exotic breed
3. With illustrated diagram, describe one of the local breeds found in Nigeria.

7.0 REFERENCES /FURTHER READING

Katie, Thear, & Alistair, F. (1986). *The Complete Book of Raising Livestock and Poultry- A Small Holder's Guide*. Yaba Lagos: University Services Ltd., Educational Publishers.

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UNIT 2 BREEDS OF SHEEP AND GOATS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Types of Sheep and Goats
 - 3.2 Breeds of Sheep
 - 3.2.1 West African Dwarf Sheep
 - 3.2.2 West African Long-legged Sheep
 - 3.2.2.1 Uda or Fulani
 - 3.2.2.2 Yankasa
 - 3.2.2.3 Balami
 - 3.3 Breeds of Goats
 - 3.3.1 Sahel Goats
 - 3.3.2 Maradi or Red Sokoto
 - 3.3.3 West African Dwarf Goats
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In the tropics, sheep and goats have characteristic features that make them to survive in the environment. These features make these animals to develop a kind of tolerance to the peculiarities (difficulties) of the environment. They have developed certain features that make them live and survive in the humid or arid environment. For example, these animals have long legs to walk long distances in search of food and water. In this unit, we shall discuss the local breeds available in Nigeria and a few exotic ones.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- enumerate the different breeds of sheep and goats
- list some dairy breeds of goat
- identify each of the breeds by their characteristics.

3.0 MAIN CONTENT

3.1 Types of Sheep and Goats

In the West African sub-region and especially in Nigeria, two types of sheep have been identified while three types are known for goats. For the sheep, we have the West Africa Dwarf sheep and the West African long-legged sheep. The three types of goats are the Sahel, Maradi and Dwarf.

3.2 Breeds of Sheep

3.2.1 West African Dwarf Sheep

This breed of sheep is found in the coastal forest areas of the country from the South-West to the South-East. They have small size and usually with an average weight of about 30 kg when fully mature. They have a height of 40 – 60 cm. The sheep have varying colour ranging from all black to all brown or mix colour of white and black. The female sheep (ewe) is polled i.e. without horn while the male (buck) carry horns which could be lateral or spiral. They scavenge for food around the village or town and often time left to roam the street.

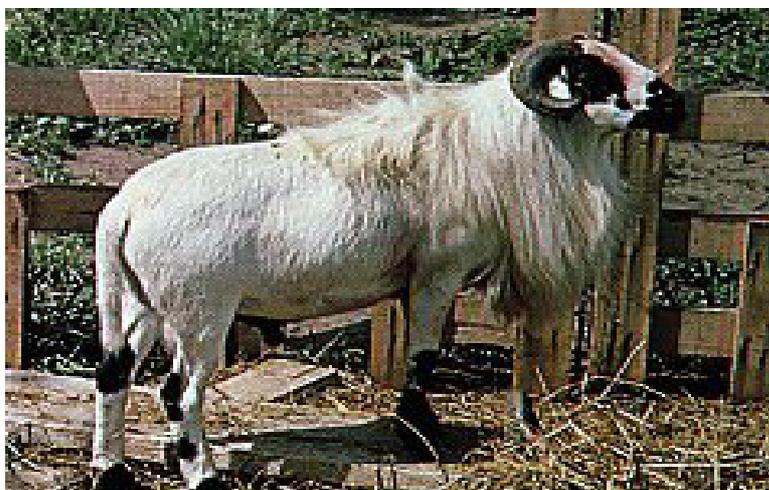


Fig. 2.5: West African Dwarf Sheep (Ram)
(www.googleimage.com)

3.2.2 West African Long-legged sheep

This group of sheep are found in the savannah and sahelo-sudan areas of the Northern part of Nigeria and other West African countries. They are characterised by long legs because they have to travel long distances for grazing as they are mostly owned by the nomadic Fulanis that are known for transhumance movement. The height of the sheep is 65 to 90

cm and weighs between 30 and 50 kg at maturity. They have droopy ears. The male carries horn while the female is hornless. They have long thin tails. There are many breeds of sheep found in this group of which we shall discuss some.

3.2.2.1 Uda or Fulani

The breed is found in the Sahelo-sudan region of Nigeria. It is large, long-legged with convex face. It has a characteristic pied coat – colour pattern of entirely black or brown from the forehead to the lumbar-abdominal girth and white posteriorly. The ears are large, long and pendulous. The rams carry large, wide and spiral horns while the ewes are polled. Matured weight range from 30 to 45 kg for ewes and 35 to 60 for rams.



Fig. 2.6: Ouda Breed of Sheep

3.2.2.2 Yankasa

This breed has a typical white coat colour with black patches around the eyes, ears, muzzle and sometimes the feet. The rams carry curved horn and a heavy hairy white mane. Mature weights vary from 25 to 35 kg for ewes and 30 to 40 kg for rams. It is perhaps the commonest breed of sheep in Nigeria as it is found in all areas north of latitude 14°N.

3.2.2.3 Balami

This breed is found mostly in the North-eastern part of Nigeria especially in Borno state. It is a big, predominantly white-coat coloured sheep with a convex facial profile. The ears are large and droopy. The

tail is thin and long. The males carry prominent horns while the females are polled. It is perhaps the largest breed of sheep in Nigeria. Mature rams weigh between 45 to 65 kg while ewes weigh 35 to 40 kg.

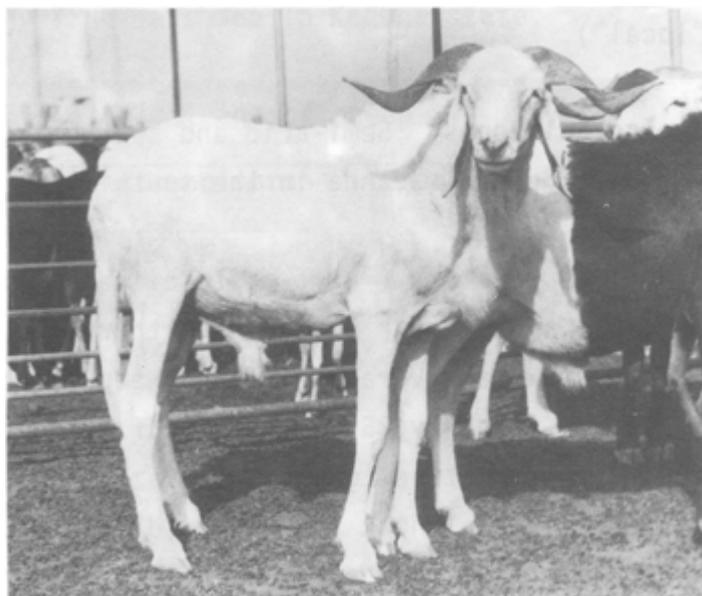


Fig. 2.7: Balami Breed of Sheep

3.3 Breeds of Goats

3.3.1 Sahel Goats

These goats have short fine coats which could be white, black, red or spotted. They have medium to large body size at maturity. The ears are short and possess horizontal or drooping horns in both male and female. The goats are well adapted to long distance trekking for grazing. They are found throughout the Sahel or desert areas of Nigeria. It is a medium or large- sized goat with long leg that have adapted very well to nomadic life or wide range grazing of sparse vegetation. The ears are short and both sexes carry horns. Mature weight in buck is between 25 to 30 kg and 20 to 25 kg in ewes. Like all other breeds of goat, they are used for meat and popularly called “Ogufe” in most of the eateries in Nigeria especially in the South-west.



Fig. 2.8: Sahel Breed of Goat

3.3.2 Maradi or Red Sokoto

This breed of goat is found mostly in the Sokoto area of Nigeria and part of the Niger republic. It is the most well defined breed of goat perhaps in Africa. It has red skin coat that is of good quality for leather production. Other varieties of the breed are the Kano brown or Boronu white. Both sexes carry horns with short ears that are horizontally positioned. At maturity, Maradi goats weigh between 20 and 30 kg.



Fig. 2.9: Maradi or Red Sokoto Breed of Goat

3.3.3 West African Dwarf Goats

The West African dwarf goats found in the forest zone of Nigeria. The goats are small in size with compact body and short legs. The short legs enable them to move under thick vegetation of the forest region. The colour of the coat varies from black to grey to white or multi coloured. Their height is 40 to 50 cm at withers and weighs between 18 and 20 kg

at maturity. They have the ability to produce twin. The breed is very hardy and resistant to trypanosomiasis.



Fig. 2.10: West African Dwarf Goat

4.0 CONCLUSION

We have been able to study the different breeds of sheep and goats as well as their characteristics. The development of certain characteristics as a result of the environment where they exist was also mentioned.

5.0 SUMMARY

In this unit, you have learnt that:

- there are two types of sheep with four breeds namely, such as Uda, Yankasa, Balami and the West African dwarf
- the Uda, Yankasa and Balami belong to the West African long-legged because they trek long distances for food and water
- there are three breeds of goat namely, Sahel, Red Sokoto or Maradi and the West African dwarf
- the Sahel is long-legged and the Red sokoto is well noted for the quality of its skin used for leather production

6.0 TUTOR-MARKED ASSIGNMENT

1. Describe one of the breeds of the West African long-legged sheep.
2. List the distinguishing features between Yankasa and Balami.
3. State the characteristic features that enables the West African dwarf goats to live in the forest zone.

7.0 REFERENCES/FURTHER READING

Katie, Thear, and Alistair, Fraser (1986). *The Complete Book of Raising Livestock and Poultry- A Small Holder's Guide*. Yaba Lagos: University Services Ltd., Educational Publishers.

Payne, W.J.A. & Wilson, R.T. (1999). *Animal Husbandry in the Tropics*. (5th ed.). Oxford, UK: Blackwell Science.

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MODULE 3 MANAGEMENT OF BREEDING STOCK IN RUMINANTS

- Unit 1 Management of Breeding Stock in Cattle
- Unit 2 Management of Breeding Stock in Sheep and Goats

UNIT 1 MANAGEMENT OF BREEDING STOCK IN CATTLE

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Management of a Breeding Bull
 - 3.2 Management of a Breeding Cow or Heifer
 - 3.3 Mating System
 - 3.3.1 Natural Mating
 - 3.3.2 Controlled Mating
 - 3.3.3 Synchronisation
 - 3.3.4 Artificial Insemination
 - 3.4 Management of Pregnant Cow
 - 3.5 Parturition or Calving in Cattle
 - 3.6 Management of Calf
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

The success of any farm animal production lies in the ability to reproduce good quality traits which form the basis for selection and breeding to achieve the objectives of production. The male as well as the female are important because each of them provide half of the inherited characteristics of the offspring. Therefore, the stockman i.e. the farmer must accord good care for the breeding stock in farm animals.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- discuss how to take care of a bull meant for breeding in a cattle farm
- discuss how to take care of a cow or heifer used for breeding in a cattle farm
- determine the best age to use breeding stock in a cattle farm.
- recognize the heat period of a cow or a heifer
- identify a pregnant cow
- list the management tips required for a good husbandry of a bull and cow.

3.0 MAIN CONTENT

3.1 Management of a Breeding Bull

Breeding bull are those used to mate the cow or heifer (young female cow).

Below are measures for effective management of breeding bull:

- They should be kept alone in a pen to prevent indiscriminate mating.
- The bull must not be used more than twice a week to prevent being over-used and the frequency drops as the bull ages. A young bull can be used for breeding as from two years of age and this is a function of many factors such as good and adequate feeding, health and general management practices.
- When used on pasture, a mating ratio of 1:10 is recommended. This means one bull to 10 cows. If this limit is exceeded, it may result into low sperm count - ejaculates.
- Breeding bulls must be adequately fed with low quality roughage and very little quantity of concentrates.
- They must not be over-fed or under-fed. They must not be allowed to put on excess fat. This can be prevented by controlled feeding and allowing the bull to exercise usually on pasture.
- Exercise is also important for the breeding bulls to prevent sluggishness.
- Breeding bulls must be upstanding with good legs.
- Hence they must be under the watchful eye of the stockman to ensure that they do not sustain injury on the legs or any part of the body.
- The hooves must be trimmed regularly to prevent overgrowth, foot rot or lameness.

3.2 Management of Breeding Cow and Heifer

A cow is a female ruminant that is already being used for breeding while a heifer is that which has not been used at all. Like the bull, the cow must be adequately fed with good quality feed, water in a barn or house. Female cattle are often kept together but separated as the need arises for mating. They must be allowed a lot of exercise.

They must be allowed to graze with the bull to stimulate or help detect the heat period which is the period that female animals are very receptive to their male counterpart. Prior to this period, the cow can be given feed in form of concentrate to enhance conception rate. This act is called **flushing**. The heat period of a cow lasts for about 17 hours and it repeats itself every 21 days except if pregnant.

When the cow is on heat, it becomes restless, moos and mounts on one another. The external part of the vulva becomes swollen. It stands and allows the male to ride or attempt to ride other females. The moment the cow is detected to be on heat, mating must be carried out at about twelve hours after to ensure a good conception rate. Detection of heat is now computerized in some dairy farms in developed countries and in a dairy farm in Niger State, Nigeria.

Young female ruminant called heifer comes on their first heat at about one year of age. At this point, they must not be used for mating. However, a heifer is ready for breeding from 18 to 21 months of age and can have its first calving at about 30 to 36 months of age.

3.3 Mating Systems

Co-habitation between male and female is called mating. In animal production, there are different mating systems that can be used.

3.3.1 Natural Mating

This is a mating system where the male is allowed to stay with the female and mate without assistance or interference from the attendant or the stockman.

3.3.2 Controlled Mating

This is a mating system where a particular bulls are assigned to mate a particular cows in a pen or in an enclosure. This system is used where breeding records are important and are taken. There are two types of controlled mating namely; synchronisation and artificial insemination (AI).

3.3.3 Synchronisation

In this type of controlled mating system, the oestrus of the cow is synchronised such that all come on heat about the same time. In this situation, synthetic sex hormones such as oestrogen that comes under different trade names are either injected or implanted either through the vagina or the ear on the cow or heifer. This causes the animals to come on heat about the same time hence they could be mated either by the use of artificial insemination or a bull at the same time. The advantage is that it allows for easy management of the cows and their offspring especially if there is a loss of dam at calving hence the calf could be fostered.

3.3.4 Artificial Insemination

This is also another form of controlled mating. This is the process of collecting semen with living sperm from proven bull using dummy female or vagina and the timely introduction of same to the reproductive tract of a ready female. This is only practised on some government farm in Nigeria. The main problem with the system is that of heat detection. However, the system has the advantage of preventing disease and also overcoming time and space problem.

3.4 Management of Pregnant Cow

The gestation period in cow is 272 to 292 days with an average of 283 days. Immediately the cow holds on to service i.e. become pregnant, it must be separated if it is a farm where separate pens are available for pregnant or in-cows. Otherwise, it must be kept under the watchful eye of the attendant to prevent fighting or any action that can lead to abortion. The cow is confirmed to be pregnant if it does not return to oestrus and when introduced to a male it will refuse mounting. Other means of detecting and confirming pregnancy include:

- rectal palpation could be carried out at about the fifth week after mating through the genital organ of the cow. The trained technician or a veterinarian wears a glove and inserts his/her hand into genitals through the rectum of the cow and gently palpate or feel the development of the foetus.
- hormonal changes in the animal system can also be monitored.
- observation of the physical behavioural changes of the cow as it begins to undergo conformational changes around the belly and loin area.

Adequate feeding, good health care and gentle handling must be given the cow at the first trimester of pregnancy to prevent abortion. A good

combination of good quality succulent grass and legumes must be provided with substantial supply of water. Slippery floor must be avoided to prevent falling and dislocation. Draught must not be allowed in the stall or pen and adequate ventilation ensured. Pregnant cow must not be allowed to walk long distances to prevent stress that may lead to abortion. Towards parturition, the in-cow must be well monitored. A maternity pen must be washed, disinfected well-bedded must be prepared for calving.

3.5 Parturition or Calving in Cattle

At about the 272 days of pregnancy, an in-cow is ready to calve. It must be taken to the calving or maternity pen some few days to end of pregnancy which can be calculated from the records kept by the stockman. If calving must be done on pasture, a clean, quite secluded place must be prepared for it while the stockman watches, in case assistance is required. Towards calving, the udder becomes bigger, the vulva also swells and the ligaments around the tail head drops. Hormones such as oxytocin are released which helps in the contraction of the uterus. The amniotic fluid is released and the animal pushes for the foetus to be expelled. Normally, the foetus comes out with the head laid over the forelegs for ease of passage. After this, the placenta is expelled and buried. The cow must not be allowed to eat it. If the placenta does not come out between 5 to 8 hours of calving or foetus comes with wrong presentation, the assistance of a veterinarian must be sought.

In this part of the world, the cow licks the calf immediately after calving to stimulate the lungs to respiratory action; whereas in the advanced world, this trait has been bred out from the animals. The cow must be cleaned up by washing the vulva and the calf separated from the mother where such facilities exist as in dairy farms or the calf is allowed to run with the dam. Soon after birth, calves must be identified by tagging, tattooing, branding or ear notching.

3.6 Management of Calf after Parturition

After parturition, the calf may be reared on two basic systems namely; natural and artificial rearing. Under the natural rearing, the calf is allowed to run with the dam thereby having unlimited access to the mother's milk. This is called a cow and calf system or single suckling system. If the dam has foster calf, it is called nurse-cow method or multiple suckling. In this situation, the calf stays with the dam for not less than a period of about six months or about 9 months in some traditional system. Calves reared this way are always very strong and grow more rapidly.

Calf should be fed or allowed to suckle the first milk of the mother for about four to five days after parturition. This milk is called colostrum. The first milk or **colostrum** is of importance because it helps transfer immunity of the mother to the calf at birth.

Under artificial rearing, the calf is fed on milk replacers while the calf is allowed restricted access to the milk of the dam. Usually the calf is bucket-fed the milk or through a nipple drinker (see Fig. 3.0). The calf must be trained for this. At about the third week of life, the calf is introduced to solid food and good quality forage. The rule of maintaining good hygiene is very essential in this method. Calves reared under this system are usually kept indoor until about six months of age before turning them to pasture.

Artificial rearing of calves is mostly practised in dairy cattle production while natural one is popular with beef cattle production. Calves must also be debudded and unwanted males castrated. Calves should be completely weaned from liquid diet as from the 16th week of life.



Fig. 3.1: Calf being Fed in Bucket with a Nipple
(www.matronofhusbandry.wordpress.com)

4.0 CONCLUSION

In this unit, the importance of good management for the bull as well as the cow or heifer was highlighted. Different mating systems and identification of heat period were discussed. The management of pregnant cow and the calf were also discussed.

5.0 SUMMARY

Below are the highlights of the summary of what you have learnt in this unit:

- the success of any cattle production is hinged on the ability to manage and select good breeding stock
- Bulls must not be used for breeding before two years of age but be adequately fed and not over-fed to the extent of becoming fat. Legs must be adequately taken care of. Breeding bulls must have a lot of exercise and each must not be mated with more than ten females
- Cow or heifer must be watched for their heat period and mated 12 hours after. Heifer must not be used for breeding before age 18 month. They must be well attended to during calving
- Different mating systems such as natural mating, controlled mating and artificial insemination could be used
- Calves could be reared under natural or artificial systems.

6.0 TUTOR-MARKED ASSIGNMENT

1. What is the mating ratio allowed in cattle production?
2. List the heat signs in a heifer/cow.
3. What management method of rearing is always preferred in a dairy cattle farm? Describe this management method.

7.0 REFERENCES/FURTHER READING

Katie, Thear, & Alistair, F. (eds) (1986). *The Complete Book of Raising Livestock and Poultry- A Small Holder's Guide*. Yaba Lagos: University Services Ltd., Educational Publishers.

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Williamson, G & Payne, W.J.A. (1980). *An Introduction to Animal Husbandry in the Tropics*. London: Longman Group.

UNIT 2 MANAGEMENT OF BREEDING STOCK IN SHEEP AND GOATS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Management of Male Sheep
 - 3.2 Management of Buck
 - 3.3 Management of Female Sheep or Ewe
 - 3.4 Management of Female Goats or Doe
 - 3.5 Management of Pregnant Ewe and Doe
 - 3.6 Lambing or Kidding
 - 3.7 Management of Lamb/Kid
 - 3.8 Management of Growing Sheep/Goats
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

An effective production of sheep and goats for either meat, hides and skin or milk is affected by the occurrence of desirable traits in the breeding stock and the management of the animal to sustain such trait in the flock. Improper handling or management may spell doom for such productive enterprise. Therefore in this unit, we shall study how breeding stock and young stock are managed for effective production.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- describe how to take care of breeding rams and bucks
- enumerate how to take care of breeding ewes and does
- discuss how to manage young sheep or goats i.e. lambs and kids to grower stage or maturity
- identify when a female sheep or goat is on heat.

3.0 MAIN CONTENT

3.1 Management of Ram

Management of ram is very crucial to breeding and indeed the entire production of a sheep farm. If poorly cared for, ram attain puberty at a prolonged age. Normally, a well managed ram in terms of adequate feeding, watering and health care attain puberty at about 6 months of age if under intensive management system. The ram could be older if under the extensive system. Rams must be fed good mixture of grasses and legumes in addition to which concentrates may be given at about 300 to 500 gm per head per day. The hooves must be adequately trimmed to prevent overgrowth and foot rot. They must be regularly disinfected (every quarter) to prevent external parasites.

Ram for breeding is kept in a separate pen or paddock usually very close to the ewe to stimulate sexual desire. At puberty, sperm production of the ram is usually of low quality hence more mature and older rams must be used for mating. There is the tendency to over-use the ram in an extensive system of production. However, the acceptable mating ratio of ram to ewe is between 1: 20 and 1: 30. Excess rams on the farm not required for mating are often castrated. Castrated rams are called wether.

3.2 Management of Buck

The buck is the male goat. It must attain the age of about 12 to 18 months of age before it is used for mating. Even though it reaches puberty earlier than 12 months it is not advisable to use for mating. Buck should be penned separately to prevent indiscriminate mating. It must be fed good quality grass and legumes and given concentrate at about 300 to 500 gm of concentrate on daily basis. A good buck can be used for breeding for a period of 4 to 6 years effectively. The mating ratio in goats is similar to what obtains in sheep. Bucks that are not being used for mating are usually castrated. Castrated bucks are called bullocks and fattened for meat.

3.3 Management of a Female Sheep or Ewe

A female sheep is called “ewe”. It comes to puberty at about the age of 6 to 12 months depending on adequate feeding and healthcare. When nutrition is poor, sheep comes to puberty as late as about 20 months. Attainment of puberty has been shown to be related to the body weight of the animal and breed. Large breeds have been shown to reach puberty much later than small breeds. The moment a ewe is selected for breeding, it must be separated and not allowed to run with rams to avoid indiscriminate mating. Apart from nutrition, the reproductive life of

sheep is also influenced by photoperiod or day-length or season particularly in the temperate region. In the tropics and where there is adequate feeding, this effect do not show as there exist little variation in day length period throughout the year.

Conception rate in ewe can be increased by improving the quality of feed given to the animal which subsequently encourages ovulation. This process is called flushing. It may require putting the female animal on a lush green pasture with quality concentrate a month before mating. A female sheep comes to oestrus or heat from 6 months of age and thereafter heat re-occurs at every 15 to 17 days. Ewe must not be allowed for mating at the first oestrus. Oestrus lasts 20 to 42 hours in sheep. The heat signs are similar to what you have learnt for cattle.

3.4 Management of a Female Goat or Doe.

A female goat is called a “doe.” It comes to puberty at about 6 months of age given good nutrition and healthcare. Breeding in goats is also affected by photoperiodism i.e. the influence of daily circle of light and darkness on the physiology and behavior of an animal. The reproductive activity is influenced by the shortening length of the day. However because there is no much variation in the day length in the tropics the effect is not very pronounced as experienced in the temperate regions. A doe can be mated or serviced as from about 12 months of age. It comes to oestrus as from 6 months old and the oestrus lasts 24 to 36 hours every 18 to 21 days. Like the sheep, a doe must not be allowed for mating at first oestrus. Conception rate can be increased by flushing the doe as for the sheep. The heat signs are similar to what you have learnt for cattle.

3.5 Management of Pregnant Ewe and Doe

After mating, the ewe or doe must be separated from the flock and kept in individual pen or monitored to ensure safety to prevent abortion. The ram or buck must not be allowed to run with the females again if on pasture. They must be grazed on separate paddock or the prepuce of the penis tied to the scrotum to prevent aggressive mating from the males. Ewes or does must be well fed with good grass-legume mixtures with minerals as supplements in form of block multinutrients if available. Concentrates at about 200 to 600 g per day may be given toward the latter part of pregnancy (6 to 8 weeks) to provide extra nutrients for the developing foetus.

The gestation period of an ewe is 140 to 150 days (21 to 22 weeks) which is similar to that of a doe. On the average the gestation period in

sheep and goat is about 5 months. With this, it is possible for an ewe or doe to give birth at least once a year or thrice in two years..

The act of giving birth in sheep is called “lambing” while it is “kidding” in goats.

3.6 Lambing or Kidding

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

3.7 Management of Lamb/Kid

Under the extensive management, the dam (i.e. the female parent) and the baby (lamb or kid) are allowed to run together and penned together. The lamb or kid depend on the dam’s milk for the early part of its life and begin to nib on grasses or forage as from about 3 weeks of age which help stimulate the rumen. If penned and separated, dry forage mixtures such as hay is introduced to the young ones in addition to milk replacers. The young animals can be allowed to **creep** diets or grazing, is a design where young animals have access to good quality feed usually concentrates through small openings not big enough to allow the dam to eat it up. The lamb or kids are weaned at about 6 to 8 weeks after birth. Weaning at about 6 weeks is called early weaning.

At this stage, the animals are separated. Those for breeding are separated from those for fattening or and maintained as growers.

3.8 Management of Growing Sheep/Goats

After the separation of the breeding stock, the remaining animals may be categorised either as fatteners or growers. Fatteners are often given bulk feeding to assist in fast weight gain for slaughtering. They are usually kept in a pen or restricted paddocks. The growers are also kept and

reared together. In this case the male must have been castrated and reared for meat.

4.0 CONCLUSION

In this unit, we have established the correlation between good management of male and female animals and breeding. The care of the young animal has been shown to be of utmost importance in the attainment of puberty and hence effective production.

5.0 SUMMARY

Below is the summary of what you have been learnt in this unit:

- that male animal either buck or ram must be taken care of in terms of adequate provision of feed and healthcare to attain puberty and ready for use in mating in good time
- that the female viz, doe or ewe must also be well managed for early onset of oestrus at puberty. The gestation period in cow is an average of 283 days, while it is an average of 150 days in sheep and goats
- that reproduction is affected in sheep and goats by day length period which is not very pronounced in the tropical climate.

6.0 TUTOR-MARKED ASSIGNMENT

1. Describe the management practice for a pregnant ewe.
- 2(a) List the words used for parturition in cattle, sheep and goat.
- (b) Give a brief description of kidding in goats.

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MODULE 4 HOUSING AND EQUIPMENT IN RUMINANTS PRODUCTION

Unit 1	Housing in Cattle Production
Unit 2	Housing in Sheep and Goat Production
Unit 3	Equipment and Management Practices in Ruminant Production

UNIT 1 HOUSING IN CATTLE PRODUCTION

CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Housing Requirement for Cattle Production
3.2	Housing for Intensive System of Cattle Production
3.3	Housing for Extensive System of Cattle Production
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

Housing is an integral part of management, hence it is of great importance in cattle production. Housing must be well planned with adequate ventilation and sanitation facilities to enhance production both in beef and dairy cattle. However the housing type depends on the system of production.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- state the principles of housing types in cattle production
- state the different housing types in cattle production
- identify the different housing needs in cattle production

3.0 MAIN CONTENT

3.1 Housing Requirement for Cattle Production

To start a cattle production venture, adequate consideration must be given to how the animals will be housed for better management in a better environment and to prevent theft. The following points must be considered while designing a house for cattle:

- i. the building must be sited on a well drained and not undulating floor,
- ii. there must be proper and adequate ventilation and illumination in the building,
- iii. there must be no draught or condensation in the building,
- iv. the building must have well positioned feeders and drinkers
- v. the building must be easily accessible,
- vi. the surrounding must not be bushy to prevent predators and disease vectors.

3.2 Housing for Intensive System of Cattle Production

Generally, cattle are housed in a well shaded open-sided structure called barns or cattle shed (Fig.4.1). This type of housing is common in the intensive type of production. The size of the barn depends on the number of cattle expected to be housed. An average of 2 to 3 m² is allowed per adult cattle. The house must be well equipped with feeders and water troughs with adequate space for farm operations to take place. The floor of the barn is always concrete with rough surface to prevent skidding or falling of the cattle. The construction of the house is such that it has feeding passage with well fitted mangers around the standing area. Drains must be constructed for easy washing, cleaning and evacuation of dung and other waste materials. Individual pens are also used in this system of production especially for calves, breeding bulls and nursing cows.



Fig. 4.1: Cattle Barn
(www.oit.on.ca/...slides/cattleBarn5092.html)

3.3 Housing for Extensive System of Cattle Production

There is no standard for the housing type for this system of production. One of them is cattle kraal (Fig. 4.2) which is an enclosure in an open field or land where the animals are tethered (or tied to pegs already installed). The walls of the kraal could be made of planks or wood, bamboo, mud blocks or stones. The animals are always housed here after the day's grazing.



Fig. 4.2: Cattle Kraal
(www.googleimage.com)

4.0 CONCLUSION

In this unit, we have highlighted housing in cattle production and found that the different systems of production require different housing type.

5.0 SUMMARY

- the purpose for housing of cattle must be considered before embarking on it
- the production system must be identified as this will dictate the housing type. For example the housing need for an intensive system of cattle production is different from the extensive type.

6.0 TUTOR-MARKED ASSIGNMENT

1. Differentiate a kraal from a cattle barn.
2. State any three important factors that must be considered when siting a cattle barn.

7.0 REFERENCES/FURTHER READING

Williamson, G & Payne, W.J. (1980). *An Introduction to Animal Husbandry in the Tropics*. London: Longman Group.

(www.googleimage.com)

UNIT 2 HOUSING IN SHEEP AND GOAT PRODUCTION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Housing for Sheep and Goat
 - 3.2 Housing Type for Sheep and Goat Under Intensive/Semi-intensive System
 - 3.3 Housing Type for Extensive/Traditional System of Sheep and Goat
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In sheep and goat production, housing type depends on the system of production as we have mentioned for cattle.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- enumerate the principles of housing types in sheep and goat production
- discuss the different housing types in sheep and goat production
- identify the different housing need in sheep and goat production.

3.0 MAIN CONTENT

3.1 Housing Requirements for Sheep and Goat Production

In your previous study, the housing need for ruminant or any farm animal was established as one, for better management in a good environment and two, for safe keeping of the animals and other assets. The same principle of housing applies to sheep and goat production. However in the tropics, especially in Nigeria and other Sub-Saharan region, housing for sheep and goats is not given prominence as in the temperate region or as even done for cattle. The main consideration for housing for sheep and goat in this part of the world is to provide sufficient protection from unfavourable weather. The essential consideration is that the environment must be cool, dry and free from draught with access to pasture or outside all the time.

3.2 Housing Type for Sheep and Goat under Intensive/Semi-intensive System

In this type of housing, the entire house is well roofed with windows to protect the animals during the winter season in the temperate region. In summer they have access to pasture. This type of production require a lot of sophistications in the housing construction and very expensive. It is often associated with high level of production in terms of meat, wool or fleece. Such housing is not profitable in this part of the world.

Some government farms or rich individuals do construct a good but simple housing for sheep and goat in Nigeria for semi-intensive production. In this type of housing, a simple building is constructed in which exist slatted floor for the animals to sleep (Fig.4.3). Hay racks are provided in some for feeding the animals when they are turned in from the pasture at the end of the day. The roof of the house should not be too high to prevent been blown off by wind nor too short to prevent proper illumination and draught. It is often made of asbestos material or corrugated iron sheet. If the latter is used, the wall must not be too high to allow illumination and ventilation. It could also be made of wood, mud or blocks depending on availability of fund. The floor must be sloppy for proper drainage and could be made of concrete or rammed. The slats could be of bamboo or wood. What is used is a function of the availability of fund. The house could be divided into pens with drinkers and feeders for concentrate feeding.



Fig. 4.3: Goat Shed with Slatted Floor
(www.googleimage.com)

3.3 Housing Type for Extensive/Traditional System of Sheep and Goat Production

In this type of production which is common, a simple open shed made of cheap roofing material (thatched roof) provides the expected protection. In most cases the floor is rammed and well drained. In some cases, the animals are tethered behind the house in the open as with subsistent farmers.

For any of these two systems, the floor area require for adult animal range from 1.5m² to 2.2m².

4.0 CONCLUSION

This unit discussed the housing need for sheep and goat in the tropics which may not be as elaborate as obtained in the temperate region.

5.0 SUMMARY

The summary of what you have learnt in this unit are enumerated below:

- that the housing need of sheep and goat production depends on the system of production
- that intensive production of sheep and goat is not very common in sub-Sahara region, hence there exist no sophisticated housing as found in the temperate region. What is close to this is a less elaborate housing with slatted or concrete floors often found in government farms and rich individuals with slatted floors
- that the traditional or extensive method housing is simple shed covered with thatched roof and rammed floor.

6.0 TUTOR-MARKED ASSIGNMENT

1. Give the reason why housing is needed in sheep and goat production in Nigeria.
2. What are the essential conditions to be considered in the construction of a sheep house?

7.0 REFERENCES/FURTHER READING

Payne, W.J.A. & Wilson, R.T. (1999). *Animal Husbandry in the Tropics*. (5th ed.). Oxford, UK: Blackwell Science.

Williamson, G & Payne, W.J. (1980). *An Introduction to Animal Husbandry in the Tropics*. London: Longman Group.

UNIT 3 EQUIPMENT AND MANAGEMENT PRACTICES IN RUMINANT PRODUCTION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Equipment Used in Ruminant Production
 - 3.2 Management Practices in Ruminant Production
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

For easy production of ruminant or any farm animal certain equipment have been designed and are used to facilitate management operation. In ruminant animals, these equipment appear to be common and work with the same principle. Virtually all of these equipment are imported but could also be fabricated locally.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- discuss the principle behind some management operation in ruminant production
- recognise and identify the equipment used in ruminant production.

3.0 MAIN CONTENT

3.1 Equipment Used in Ruminant Production

The following equipment are used in ruminant animal production

a. Weighing Scale

This is used to know the weight of the animal. There are different types viz; the walk-in type for the animal (both young and adult depending on their capacity) e.g weigh bridge where the animal walks on the scale or is transported on it and hanging scale.

b. Burdizzo Castrator

This is used to castrate unwanted males on the farm (Fig. 4.4). Castration is the act of making a male animal impotent by open or a surgical removal of its scrotum.

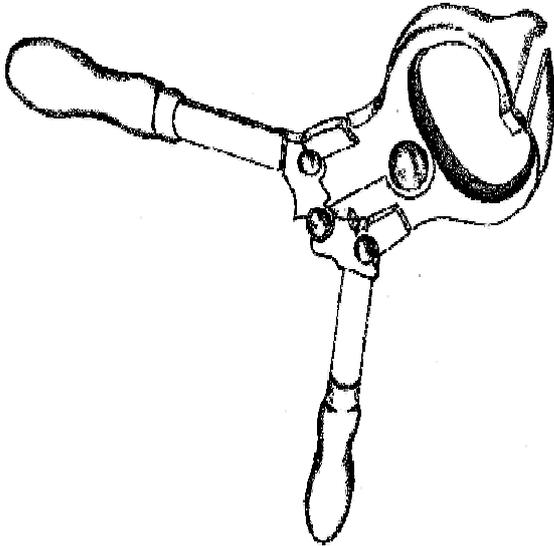


Fig. 4.4: Burdizzo Castrator

www.bluegrasshowsupply.com

c. Elastrator

It is a bloodless castrator that use the ring method (Fig. 4.5)

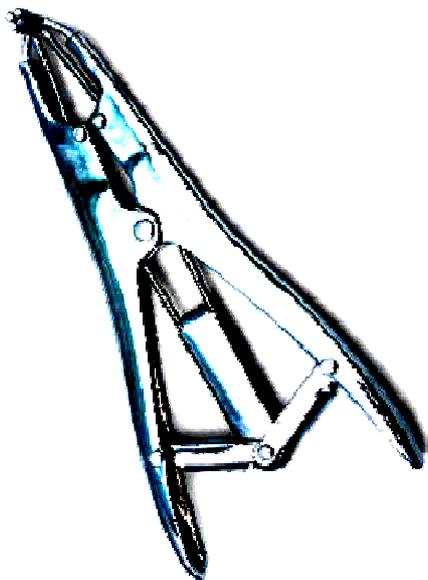


Fig. 4.5: Elastrator for Castration

d. Ear tag Forcep/Puncher

Used for fixing ear tag to the ear of the animal for identification.



Fig. 4.6: Ear Puncher

e. Tattooing Machine

Tattooing is making durable marks, design or patterns on the skin of an animal by pricking the skin and rubbing dyes or stains.

Tattooing machine is an equipment similar to pliers as shown in Fig. 4.6 with set of letters arranged and well fitted to the tongue of the pliers. It then rubbed with an indelible ink to give a permanent marking.

f. Nipple Feeders

For feeding young cattle with milk replacers. (see Fig. 4.0 above)

g. Drenching Gun

This is made of a long tube or rubber hose long enough to enter the mouth of ruminants. It is used for oral administration of liquid drug especially during de-worming exercise (Fig. 4.7)



Fig. 4.7: Drenching Gun

3.2 Management Practices in Ruminant Production

Certain management operations are performed on ruminant animals for effective production of the herd or the individual animal itself. Some of these shall be discussed hereafter.

a. Debudding

This is the act of removing the horn at its budding stage in cattle, sheep and goats. Most breeds of these animals carry horn which when fully grown may become source of injury to the other animals in the flock/herd.

This operation is carried out at about age 3 to 4 weeks of age on any of the animals. The young ruminant is haltered (i.e. using a rope to restrain it) to a pole, held down by the stockman and the base of the horn is felt with bare hand of the operator. The hair around it is shaved and local anesthesia is injected at the base of the eyelid or forehead to minimize pain. A hot iron cauterizer is then plugged into electricity. The hotness of the iron is determined by its ability to burn a piece of dry wood. The hot iron is then applied to the horn bud and carefully twisted to remove the bud. A scar is then left over the tissue at this point. This operation is commonly done in ruminant production especially in the temperate region and most local experimental stations.

The alternative that is common here is the use of handsaw to remove pointed and dangerous horns of adult cattle.

b. Castration

Castration is the act of removing the testicles of a male animal to render them ineffective. This operation is carried out on all unwanted males in ruminant production. This management operation prevents unwanted breeding and improves the carcass quality of the animal. It can be carried out by surgically operation or bloodlessly by the use of a burdizzo or rubber ring elastrator after the animal must have been haltered.

Surgical operation is done within the first week of the animal's life while the bloodless one could be done within the first two weeks of life.

c. Identification

- (i) **Ear Tagging:** This is done for identification purposes. The animal is haltered and the tag is placed in the applicator then clamped to the pina of the ear. Caution must be taken not to damage the blood vessels on the pina. Other operations for identification includes

Tattooing, ear notching, skin branding, horn branding and the use of neck chains or tags- either plastic or metals.

- (ii) **Tattooing** (see page 34)
- (iii) **Ear notching** is cutting the ears in a particular shape and coding the shape. It involves the use of razor or scissors to cut a "V" shape on the tip of the pina. The position of the cut indicate numbers. If it is at the top of the pina it denotes 1, if at the tip, 5 and if under, it is 3. The right ear represent tens while the left represent units. The two is added to give the animal an identification number in the herd.

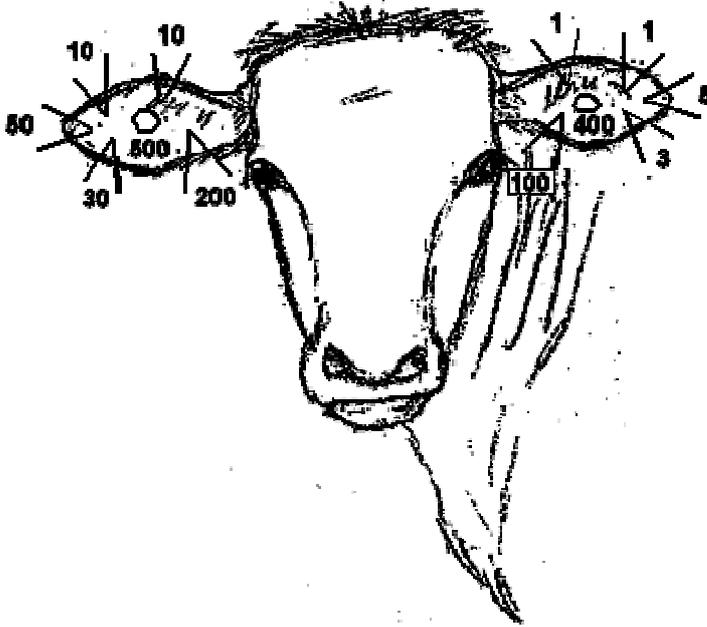


Fig. 4.8: Showing Ear Notching

- (iv) Skin and horn branding are very common in our local setting. Hot iron is used to write numbers and at times names of owners of the animal on their skin or horn. This practice is very common with cattle.

d. Drenching

This is giving the animal medicine to drink. Usually a drenching gun is used. However, it can be improvised by the use of a long-necked bottle on which is fastened a short piece of plastic or rubber tubing. The animal is held in standing position and the bottle put at the back of the mouth so that the content can run into the oesophagus. This process is used for deworming.

e. De-worming

The animals are de-wormed regularly at least two times in a year corresponding to seasons and time of turning them to pasture.

f. Hoof Trimming

This carried out by the use of hoof trimming knife. Overgrown hooves are trimmed to ensure it does not harbour germs or disease and allow the animal to walk well. The debris in the hoof must be removed before carefully cutting the hoof in slices to ensure the tissue is not cut.

g. Docking

The tails of ruminants are cut in a process called docking. This is practiced especially in sheep within one week of life. Long tails in sheep at times do not make for good mating at adult age. An elastrator could be used at times to dock the animal and the wound treated. At this age the pain is minimized.

4.0 CONCLUSION

The different equipment used in the rearing of ruminant animals were discussed and found to be very important in the management practices carried out on the animals for efficient production.

5.0 SUMMARY

Equipment used in the ruminant production includes, weighing scale, burdizzo, tattooing machine, feeders, elastrator, ear tag forcep etc. These equipment are used in management operations such as castration, debudding, identification, hoof trimming, ear tagging, ear notching, deworming and drenching.

6.0 TUTOR-MARKED ASSIGNMENT

1. List and describe the equipment used for the different identification methods in ruminant animals.
2. Explain the procedure for debudding in a young ruminant animal

7.0 REFERENCES/FURTHER READING

Derek, H. Goodwin (1977). *Beef Management and Production*. A Practical Guide for Farmers and Students. Great Britain: The Anchor Press Ltd.

Williamson, G & Payne, W.J. (1980). *An Introduction to Animal Husbandry in the Tropics*. London: Longman Group.

MODULE 5 FEEDING PRINCIPLES IN RUMINANT ANIMALS

- Unit 1 Nutrient Requirements and Feeding of Ruminants
Unit 2 Feeding Materials For Ruminants

UNIT 1 NUTRIENT REQUIREMENTS AND FEEDING OF RUMINANTS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Energy and Protein Requirement for Cattle
 - 3.2 Energy and Protein Requirement for Sheep
 - 3.3 Energy and Protein Requirement for Goats
 - 3.4 Mineral Requirements
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further reading

1.0 INTRODUCTION

All animals have dietary nutrient levels at which they exhibit optimal performance either for production or maintenance. This is what is referred to as the nutrient requirement of the animal and it is a function of age, type of animal, size of animal and production. All the nutrients namely, energy, protein, fat/lipid, vitamins, minerals and water have specific functions in the animal. Of all the mentioned nutrients, two are of utmost importance they constitute the bulk. These are energy and protein which will be discussed in more details more than the others in this unit.

2.0 OBJECTIVES

By the end of this unit study, you should be able to:

- discuss the nutrient requirement of beef and dairy cattle
- enumerate the nutrient requirements for sheep
- explain the different requirements for goats.

3.0 MAIN CONTENT

3.1 Energy and Protein Requirement for Cattle

There are two types of cattle namely beef and dairy cattle. Energy and protein are needed by the animal for such activities as physical, metabolic, and physiological or for maintenance. For beef production, in addition to maintenance, the animal require energy to deposit flesh whereas dairy cattle require more energy for pregnancy and production of milk.

A mature cow with an average weight of about 300 to 400 kg will require about 150 to 250 g digestible crude protein (DCP) on daily basis. It will also require 6 to 11 Mcal (mega calorie) of metabolizable energy (ME) for maintenance. If the cow is lactating, it will require an additional 40 to 45 g of DCP and about 1.2 – 1.3 Mcal. of metabolizable energy. For pregnancy, the same cow will require about 290 g DCP and 12.4 Mcal. ME. Generally, cow must not be fed less than 2.5 – 3% of dry matter content of their body weight.

3.2 Energy and Protein Requirement of Sheep

The nutrient requirement in sheep and goat appear very similar except for dairy goats and sheep kept for wool. Sheep and goat consume 3 - 5% dry matter of their body weight per day. A growing lamb of 5 to 40 kg live weight, will consume dry matter about 3 to 4% of the body weight. Such a lamb will require a daily digestible crude protein of 33 to 67 g digestible crude protein g or 18 to 21.5% of the daily ration. It will also require about 0.65 to 2.50 Mcal ME.

Fatteners require an average dry matter intake about 5% of their body weight, about 52 to 80 g of digestible crude protein or 12 -13% of dry matter intake. They will also require 1.49 – 2.92 Mcal ME. For the early gestation period (about 15 weeks), the dry matter intake should not be more than 2.5 to 3% of body weight with daily crude protein of 49 to 100 g or about 7.5 - 8.2% of the dry matter intake. In the last six weeks of gestation, the dry matter intake should be about 3 to 4% of the body weight while the crude protein requirement at this stage is about 8 – 10% of the dry matter intake.

3.3 Energy and Protein Requirement of Goats

There are different energy and protein needs for growth or production in goats. Growing kids of goats require about 18 to 21% crude protein and about 2.52 Mcal metabolizable energy. These requirements decrease as kids grow in body weight. The crude protein need may be as low as 10%

of the dry matter intake while the energy is 2.16 Mcal ME. The buck will require about 8 – 11% crude protein and about 1.5 – 2.34 Mcal ME. The pregnant doe will require dry matter intake of about 4% body weight. It will also need 8 to 10 % crude protein of the dry matter intake and 2 to 2.50 Mcal ME.

3.4 Mineral requirement

Minerals are organic and inorganic compounds that play vital roles in the metabolic and other physiological development of animals. They are classified as macro and micro minerals. The macro minerals include calcium, phosphorous, magnesium, sodium, potassium and chlorine. Micro minerals are iron, copper, cobalt, iodine, zinc, molybdenum, selenium, fluorine, sulphur and chromium. The requirement of macro minerals are expressed in gram per day or in percentage whereas the micro ones are in parts per million (ppm).

Minerals must be adequately supplied to the animal to prevent mineral deficiency nutritional disease. Calcium and phosphorous must be well supplied in the cattle, sheep and goats' ration for bone development and milking. Beef cattle require about 0.24% calcium and 0.22% phosphorous in their diet. Dairy cattle will require about 0.28% calcium and 0.25% phosphorous. Pregnant cattle will require 0.23% calcium and 0.23% phosphorous. Sheep and goats require 0.23% calcium and 0.23% phosphorous in their diets.

Sources of calcium and phosphorous in the diets of the ruminants are bone meal, oyster shell and dicalcium phosphate. Salt is given to ruminant as "salt lick" either as a form of block or by pouring some little quantity in the feeding trough to supplement what the animal must have taken from other feed ingredients.

4.0 CONCLUSION

In this unit, the nutrient requirements of cattle sheep and goats were given for the different ages.

5.0 SUMMARY

Below are the summary of what you have learnt in this unit.

- there is an amount of nutrient required for maintenance and production
- cattle require 2.5 to 3% of their body weight as dry matter intake
- sheep and goats require 3 to 5% of their body weight as dry matter intake

- The protein and energy need of dairy or lactating animal is higher than for non-lactating animal.

6.0 TUTOR-MARKED ASSIGNMENT

1. State the daily crude protein need of a dairy cattle.
2. Why is the nutrient requirement for dairy animal higher than that of beef cattle?
3. List the energy need of a growing lamb and a buck.
4. What is the difference between maintenance and production energy requirements?

7.0 REFERENCES/FURTHER READING

Chesworth, J. (1992). *Ruminant Nutrition*. London: Macmillan Education.

Ranjhan, S.K. (1980). *Animal Nutrition in the Tropics*. New Delhi: Vikas Publishing House PVT Ltd.

UNIT 2 FEEDING MATERIALS FOR RUMINANT ANIMALS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Feed Materials Used in Ruminant Feeding
 - 3.1.1 Dry Roughages
 - 3.1.2 Succulent Roughages
 - 3.2 Pasture
 - 3.3 Grazing
 - 3.4 Pasture Conservation
 - 3.4.1 Hay
 - 3.4.2 Silage
 - 3.4.3 Haylage
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Feed is an important component of livestock production. The feed and feeding practices employed in farm animal production is one of the determining factors for the profitability of the venture. It is important to know the nutrient need of the animal, the type of feed or meal mixture that will adequately meet the requirements for maintenance and production purposes.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- classify the different feed materials used in feeding ruminants
- define what is a pasture
- enumerate the grazing systems
- discuss pasture conservation.

3.0 MAIN CONTENT

3.1 Feed Materials Used in Ruminant Feeding

Roughages form the main component of ruminant feed. Roughages are bulky feeds containing high crude fibre content usually above 18% and less than 60% total digestible nutrient. Roughages are made up of grasses and legumes or products made from these two. There are two types of roughages based on their moisture content, namely dry roughages and succulent roughages. Fresh grasses, legumes and some browse plants and fodders such as silage constitutes the succulent roughage while hay and other dry standing grass (standing hay) or straw are the dry roughages.

3.1.1 Dry Roughages

Dry roughage has 10 to 15% moisture. These include hay, dry standing grass (standing hay) and straw. Hay is made by cutting the grass or legume while fresh and is sun dried or cured, baled and kept in the feed store for dry season or stall feeding.

3.1.2 Succulent Roughages

These are grasses or legumes or browse plants containing above 60% moisture. They can be cut and fed or grazed. Examples of grasses used as pasture are Guinea grass (*Panicum maximum*), Gamba grass (*Andropogon spp*), Elephant grass (*Pennisetum purpureum*), Giant star grass (*Cynodon, spp*) etc. Examples of legumes are *Centrosema pubescens*, *Calopogonium Spp*, *mucuna Spp*, *Pueraria phaseolorides*, *Lucerne* etc while the following are example of the browse plant, *Gliricidia Sepium*, *Leucena leucocephalia*, *Acacia tortilis* etc. Plants like elephant grass and maize are used to prepare silage. Grasses or legumes are also planted as pasture, fenced and grazed by ruminant.

3.2 Pasture

Pasture can be established by planting some of the earlier mentioned grasses or legumes. It is a piece of land which naturally have grasses or legumes growing on it or planted on it. If it is a natural one it is called natural grassland or if seeded it is called artificial pasture. It may be fenced or otherwise. If grass and legume are planted together they are called mixed pasture and if only one type of pasture is found, it is called sole pasture. Pastures can be managed by application of fertilizer and weeding. It can also be renovated by burning to allow new young green lush pasture to come up or the whole pasture ploughed into the soil so that new ones are allowed to grow in place of the old.

3.3 Grazing Systems

Ruminants are often grazed on pasture where there is facility for it especially during the rainy season when the grasses/legumes grow luxuriously. At this stage, it can form the sole diet for beef cattle with little supplementation in form of concentrate in case of dairy. Where fenced, the pasture could be partitioned or divided into paddocks to facilitate good grazing management. The grazing system used include, continuous grazing, rotational grazing and strip grazing systems. Continuous grazing is an uninterrupted type of grazing system. It has the disadvantage of the pasture being depleted due to overgrazing and a major advantage of little or no need for fencing thereby lowering cost. Rotational grazing from the name implies rotating the animal on fenced pastures. It is an effective grazing management carrying capacity is controlled and persistency of the pasture. It is also good for the control of parasites and other diseases. Strip grazing is restricting the animal to a section of the pasture usually with electric fence. It has an advantage of increased utilisation of the pasture.

3.4 Pasture Conservation

During the rainy season, there is usually an abundance in the supply or availability of fodder i.e. grasses and legumes. Therefore, conservation methods for fodder have been developed over the years to feed ruminants during the dry season. Fodders may be conserved in form of hay, silage, and haylage. These shall be briefly discussed as below;

3.4.1 Hay

Hay is a green grass, legume or any fodder crop of about 80 to 85% dry matter content, harvested, chopped and allowed to dry or cure on the field to 15 to 20% moisture content. The fodder or grass to be used must be harvested in the morning when the weather condition is good i.e. no rain and bright sunshine. The leaves must not be allowed to shatter or rain allowed on it to prevent leaching of the nutrients in the leaves. It must be turned regularly on the field to prevent browning. It is later packed after about two or three days drying on the field, baled using a hay baler and stored for later use especially during the dry or winter season. Hay must be stored in a well ventilated store that will prevent the growth of moulds or fungi. Hay infested with fungi or moulds are definitely not good as feed for ruminants.

3.4.2 Silage

Silage is made from fodder crops (of about 30 – 35% dry matter) through controlled fermentation to retain its high moisture. Silage

making or ensilage involves the cutting and chopping of forage plants into small pieces and kept in specialized trenches/container called silo (either a pit or trench). The pieces are packed air-tight in the silo. If it is not air-tight, it will grow moulds and fungi. Sometime heavy earth moving machine like a tractor is run over the mass of the chopped fodder if in a trench silo to ensure air-tightness. After this, it is covered with polythene sheets with heavy materials like stones or used tyres are put on it and left to ferment for a period of about 21 to 28 days.

A good silage must not grow mould/fungi and must have pH 4.0 to 5.0. The colour must be greenish yellow and have a vinegar odour as a result of organic acids such as formic acid, acetic acid, propionic acid and butyric acid. Silage is very palatable to ruminants.

3.4.3 Haylage

Grasses and legumes that are cut for hay making with dry matter range of about 30 to 45% could be ensiled. The product obtained is called haylage.

4.0 CONCLUSION

In this unit, we have established that ruminants feed on roughages which could be dry or succulent, and may be grasses or legumes.

5.0 SUMMARY

Below is the summary of what you have learnt in this unit:

- the feed materials for ruminants are predominantly grasses and legumes. Concentrates such as soybean cake and others are given only as supplements.
- the feed materials are called roughages which is classified into dry and succulent.
- Ruminants are also fed or grazed on pasture which is a piece of land where grass or legumes or combination of both grow.
- Pasture or fodder crops can be conserved as hay or silage or haylage. This must be done with precautionary measures to ensure that good quality hay or silage or haylage is produced.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define roughages and classify them.
2. List the different grazing system that you know and identify the best of them with reason(s).
3. Differentiate between hay and haylage.

7.0 REFERENCES/FURTHER READING

Chesworth, J. (1992). *Ruminant Nutrition*. London: Macmillan Education.

Oyenuga, V.A. (1968). *Nigeria Foods and Feeding-Stuffs*. Ibadan: University Press.

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MODULE 6 DISEASE AND HEALTH CARE OF RUMINANT ANIMALS

- Unit 1 Diseases of Ruminants and Their Preventive Measures
 Unit 2 Internal Parasites of Ruminants and the Control Measures

UNIT 1 DISEASES OF RUMINANTS AND THEIR PREVENTIVE MEASURES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Infectious Diseases of Cattle
 - 3.1.1 Contagious Bovine Pleuro-pneumonia (CBPP)
 - 3.1.2 Haemorrhagic Septicaemia
 - 3.1.3 Actinomycosis or Bovine Farcy
 - 3.2 Infectious Diseases of Sheep and Goat
 - 3.2.1 Contagious Caprine Pleuro-pneumonia
 - 3.2.2 Foot rot
 - 3.2.3 Orf or Sore Mouth
 - 3.2.4 Peste de Petitis Ruminant
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 - 3.3 General Diseases of Ruminants
 - 3.3.1 Brucellosis
 - 3.3.2 Foot and Mouth Disease
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 - 3.3.5 Mastitis
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
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1.0 INTRODUCTION

Health care is the management of the well-being of animals to ensure normal metabolic and physiological processes in its system. Any situation where by an animal deviates from the normal functioning system is referred to as a disease condition. The abnormal or change in the physiological system is often brought about by micro-organisms called pathogens. These pathogens could be bacteria, virus or fungi. When animals are in any disease condition, the production efficiency becomes low and in some cases may terminate the life of the animal

with a consequential economic loss to the farmer. We shall discuss some few but important ones.

2.0 OBJECTIVES

By the completion of this unit, you should be able to:

- explain disease effect on the production capacity of ruminants
- discuss the symptoms of some infectious diseases of cattle, sheep and goats
- explain the symptoms of some common ruminant diseases.

3.0 MAIN CONTENT

3.1 Infectious Disease of Cattle

3.1.1 Contagious Bovine Pleuro-pneumonia (CBPP)

This is a disease that infects the lungs of cattle. It is caused by *Mycoplasma mycoides*. It is very prevalent in the West African region and other arid and semi-arid zones.

The symptoms of the disease include rapid and laboured breathing associated with cough, anorexia, fever, dry and hard coat. The infected animal will be very reluctant to move and often lag behind others. The animal may die within few days to a week of infection. More than half of the infected animal may die within this short period. Survivals are always carriers of the disease. Infection of other animals is possible through inhalation of the droplets from the nasal discharge of infected animal.

Treatment of CBPP is very rare and in endemic cases tylosin may be used. A veterinarian must be invited for this operation.

The disease is controlled by vaccination with attenuated vaccine given at the tip of the tail. The vaccine can last 12 months. Because the disease is spread by contact and inhalation of droplets from nasal discharge, the infected animals must be separated from the others for housing, during mass movement for feeding and to the market. There must be quarantine programme for such animals. The disease is also controlled by slaughter policy.

3.1.2 Haemorrhagic Septicaemia

This disease is caused by bacterial infection of *Pasteurella multocida*. It is noticed by symptoms such as dullness, fever, excessive salivation, reluctance to walk, nasal discharge, difficulty in respiration and oedema around the neck region. Infected animal dies within two or three days of infection. Infection is through nasal discharge, salivation and faeces. Animals can be treated with oxytetracycline if quickly discovered. It can also be controlled by yearly vaccination.

3.1.3 Actinomycosis or Bovine Farcy

They are caused by *Mycobacterium farcinogen* with observable signs of small lumps or nodules seen under the skin, the shoulders and the limbs. The lumps develop and spread slowly to all other part of the body. Over-time the disease may affect internal organs. Contamination of the skin wounds from tick bites or thorns during grazing. It is a very difficult disease to treat. Therefore, separation and quarantine of the infected animal is advised. Effect on animal is not often very pronounced except for the unsightly skin but they could come down with tuberculosis.

3.1.4 Brucellosis

The causative agent is *Brucella abortus*. It has incubation period of few days to month and infect the uterus and foetal membrane thereby causing abortion. It is a disease that affect both man and animals. It can be passed readily from the lactating animal through its milk or aborted afterbirth. Brucellosis is also spread through contaminated water, food, skin, eye, nostril or by licking the hind-quarter of infected animal by another cattle.

There is no effective treatment but the animal could be immunized. Other control measure apart from immunisation is to completely destroy any herd where it is detected.

3.1.5 Foot and Mouth Disease

It affects cloven footed animals. The symptoms are high fever, blisters around the mouth, udder, teats, hooves and toes resulting to lameness. It spread through direct contact with infected animals or through their manure, forages, water and the attendants on the farm. It is a viral disease.

There is no effective treatment but once detected in any herd, the farm must be isolated and the whole stock should be slaughtered.

3.1.6 Anthrax

It is an acute disease of cattle, sheep, goats and sometimes man. The causative agent is *Bacillus anthracis*. It is incubated within one to two weeks after which may be followed by short illness characterised by fever, laboured breathing, convulsion and sudden death. Discharge of thick black blood comes from the external orifices such as the mouth, nostrils, anus and vulva. If quickly discovered, anthrax can be treated with the administration of antibiotics such as penicillin and oxytetracycline. It can be controlled by burning and burying the carcass of infected animals.

Veterinarian must be contacted the moment the disease is detected on the farm.

3.1.7 Tuberculosis

This is a bacterial infection caused by *Mycobacterium bovis*. Symptoms include, emaciated body, dry husky cough with the infection of the lungs. The disease is confirmed by carrying out the tuberculin test and treated by vaccination.

The disease is transmitted through exhaled air, nasal discharge, saliva, faeces, urine and milk.

3.1.8 Mastitis

It is a disease caused by *Staphylococcus*, *Streptococcus spp* and *Corynebacterium Pyogenes* with the inflammation of the quarters of the udder tissue which becomes at times distended. The causative agent is excreted in the milk and with time the milk is tainted with blood and pus. It causes the infected animal severe pain. The infected tissue becomes fibrous ranging from a few nodules to extensive hardening. It is often detected by experience stockman by palpation of the udder and identifying the hard tissue. In severe cases abscesses or gangrene may develop in the affected part.

Infected animal is treated by first stripping out the milk by hand, wash thoroughly the infected quarter and infused with antibiotic. Repeat regularly for every 12 hours until improvement is noted. Milk from the animal during this period must be discarded.

Strict hygiene is one of the best control measures with regular screening of the milk to identify the infected animals.

3.2 Infectious Disease of Sheep and Goats

3.2.1 Contagious Caprine Pleuro-pneumonia (CCPP)

This disease infects the lungs of goats. It is caused by *Mycoplasma* strains of bacteria. Symptoms of the disease include, fever, nasal discharge, laboured breathing with coughing, pneumonia and inflammation of the chest lining. All these lead to loss of condition. Other goats are infected by contact.

CCPP can be treated if quickly diagnosed with tylosin. It can be controlled by immediate separation of infected animals, slaughtering and vaccination. Over-crowding must be avoided especially overnight.

3.2.2 Foot rot

It is a disease found both in cattle, sheep and goats affecting their feet as in cattle. It is caused by the same causative agent *Fusobacterium necrophorum*. Symptoms include inability of the animal to walk, lameness, at times the animal squat to graze. The animal may be first noticed with the reddening of the skin between the toes called “scald”. Infection spread through contaminated pasture especially during warm wet weather condition.

Treatment is embarked upon by first trimming the hooves and inserting the toes in bactericides e.g. 10% zinc or copper sulphate solution with or without detergent. It can be controlled by the use of foot bath.

3.2.3 Orf or Sore mouth

This is a viral infection of the skin and mucous membranes of sheep and goats. It starts with lesions that are wart-like clusters on the skin around the feet, teats of udder, and the mouth. They develop as ulcer in the vulva. Infection is spread through suckling by the young ones. The effect of non-suckling by the young animal may cause mastitis in the dam.

It can be treated by injection of antibiotics. Standard sanitary procedure must be employed on the farm as control measure. Infected animal must be separated immediately.

3.2.4 Peste des Petitis Ruminant (PPR)

This is a viral infection of goats and sometimes sheep. It is also called “kata”. It is noticed by a profuse nasal discharge of mucus accompanied with high fever and diarrhea. The animal loses appetite and does not

eat. It is depressed with reddened eyes and lining of the nose and mouth with watery discharge. The animal may die within one week of infection.

The disease spread through the placenta of an infected animal and sometime the pasture. There is no known treatment for PPR. Animals that survived always get immuned. Animal may be protected by vaccination with rinderpest vaccine.

3.2.5 Sheep and Goat Pox

It is a viral infection with lesions on the skin and internal organs of the infected animal. In addition to the above, symptoms include, fever, discharge from the nose and eye, red spot over the skin, lining of the mouth, nose and the vula. The animal gets irritated and rubs its body. It leads to abortion in some animals.

There is no treatment but can be controlled by strict observance of hygiene and at times vaccination.

3.3 General Diseases

3.3.1 Bloat

This is a disease that shows with the distension of the rumen as a result of it being filled with gas. It appears at the left hand side of the abdomen behind the ribs and become swollen with a stretched skin coat that gives a sound when tapped with hands like a drum. It is characterised with distressed posture at times with bleating, difficult breathing and the animal may die instantly if unattended to. It is mostly caused by feeding of wet forage.

It implies from the above that to control or prevent bloat, the animal must not be given wet fresh forage rather it should be wilted. It can be treated if quickly diagnosed (because inexperience stockman may not be able to notice this) by drenching with vegetable oils or any anti-foaming agent e.g soya oil, palm oil, etc

4.0 CONCLUSION

In this unit, the various diseases affecting ruminant animals have been discussed identifying those that are infectious in cattle, sheep and goats.

5.0 SUMMARY

Below is the summary of what you have learnt in this unit:

- disease is an abnormal metabolic and physiological functioning of the animal
- diseases such as contagious bovine pleuropneumonia (CBPP), bovine farcy etc are infectious diseases of cattle
- CCPP, foot rot, orf, PPR are also infectious diseases of sheep and goats
- cattle, sheep and goats have general or common diseases such as anthrax, brucellosis, foot and mouth disease etc
- disease brings about economic loss in ruminant animal production.

6.0 TUTOR-MARKED ASSIGNMENT

1. List the symptoms of PPR in sheep and goats.
2. Differentiate between foot rot and foot and mouth disease.
3. State the economic importance of disease in ruminant production.

7.0 REFERENCE/FURTHER READING

Archie, Hunter (1994). *Animal Health*. Volume 2 Specific Diseases. Macmillan Press Ltd., in collaboration with CTA (Technical Centre for Agricultural and Rural Co-operation) P.O.B. 6700 AJ Wageningen.

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UNIT 2 INTERNAL PARASITES OF RUMINANTS AND THE CONTROL MEASURES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Internal Parasites
 - 3.1.1 Roundworms
 - 3.1.2 Lungworms
 - 3.1.3 Tapeworms
 - 3.1.4 Trypanosomiasis
 - 3.1.5 Liver Fluke
 - 3.1.6 Coccidia
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further reading

1.0 INTRODUCTION

A parasite is a living organism that depends upon a living host for survival. It lives either inside or outside the host and thereby causes discomfort or inefficiency in the productive life of the host. Those that live inside the host are called internal parasite and those outside are referred to as external parasites.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- define a parasite and categorise them.
- discuss the common parasites of cattle, sheep and goats
- enumerate the life cycle of these parasites
- state the control measures and treatment for these parasites
- state and appreciate the economic implication of parasitic infestation on ruminant animals used for production.

3.0 MAIN CONTENT

3.1 Internal Parasites

Most of the internal parasites are either worms or flukes which are collectively referred to as helminths. They live in the lungs, liver, stomach and the intestines of animals.

3.1.1 Roundworms

Roundworms found in the gastro-intestinal tracts are called nematodes. The organism that causes the most offensive damage is *Haemonchus contortus* or twisted worm. Others include *Ostertagia* (brown stomach worm), *Trichostrongylus axei* and *Trichostrongylus vitrinus*. They vary in their sizes from tiny thread-like structure of about 5 mm long to over 300 mm.

The life cycle of round worm is shown in Fig. 6.1. The worms mate and lay eggs inside the abomasum of the ruminants which are expelled along with the dung. They hatch and develop to the larva stage on the pasture where they are picked up by grazing animals. The larva cannot survive harsh and dry weather but thrive well in moist and warm weather even up to two years. They develop to mature roundworm within twenty-one days from the time the egg was laid.

In the intestine, the worms damage the inner lining so that blood, nutrients and water are lost in the faeces or urine. Infestation of worm is often accompanied by diarrhea, dehydration and loss of appetite. The implication of this is that nutrients in the feed will be poorly utilised for growth and production purpose.

While sheep and goats suffer from the same specie of roundworm, cattle has a different specie. Hence sheep and goats can graze together without fear of cross infestation.

Worms are often controlled by developing programmes that will match the seasonal occurrence. Routine drenching with chemicals such as benzimidazole, levamisole and organophosphate is necessary. The herd should be de-wormed about 6 to 8 weeks after they might have started grazing during the rainy season and repeated two weeks after. This action is repeated shortly before late rains and the onset of the dry season. The herd must not be allowed to graze infested pasture.

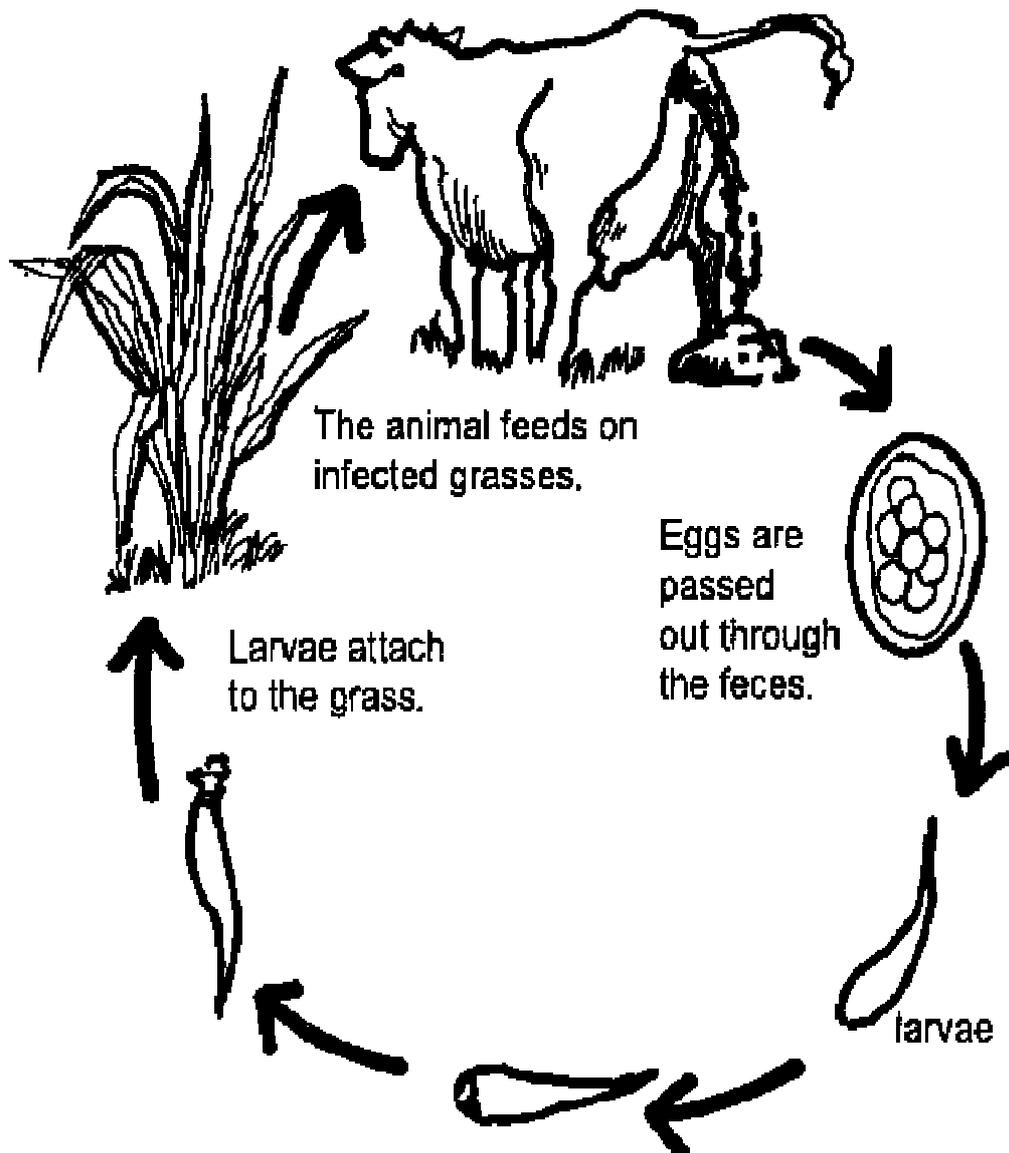


Fig. 6.1: Life Cycle of Roundworm in Cattle

3.1.2 Lungworms

Lungworm is caused by *Dictyocaulus filaria* or *Dictyocaulus viviparus*. They infect the lungs of the animal causing a considerable damage to them and the bronchial tube which leads to coughing.

The symptoms are irregular breathing, coughing associated with worms and blood-stained discharge being expelled from the mouth. The infected animal tends to stand in distress on pasture and take little or no interest in grazing. There is also loss of body condition.

The life cycle of lungworm is shown in Fig. 6.1. The adult lay eggs in the air passages of the lungs where they live. The eggs are coughed up

into the back of the throat and swallowed. The eggs then passed through the alimentary canal of the animal and hatched into immature larvae which are expelled along with the dungs on to the pasture. Animals that are grazing easily pick up the larva, pass them down through the alimentary canal where they infest the walls and find their ways into the blood vessels. They are subsequently carried to the heart and the lungs. On getting to the lungs, they bore through the tissues of the tiny air space causing a lot of damage. They are at this stage capable of laying eggs which are coughed out to the back of the throat and the cycle is re-started.

Lungworms are controlled by the use of appropriate anthelmintics as may be advised by the veterinarian. However, the use of live oral vaccine as a routine immunisation before turning the animals to pasture have been reported in Northern Europe only. This is very important for young animals like calves.

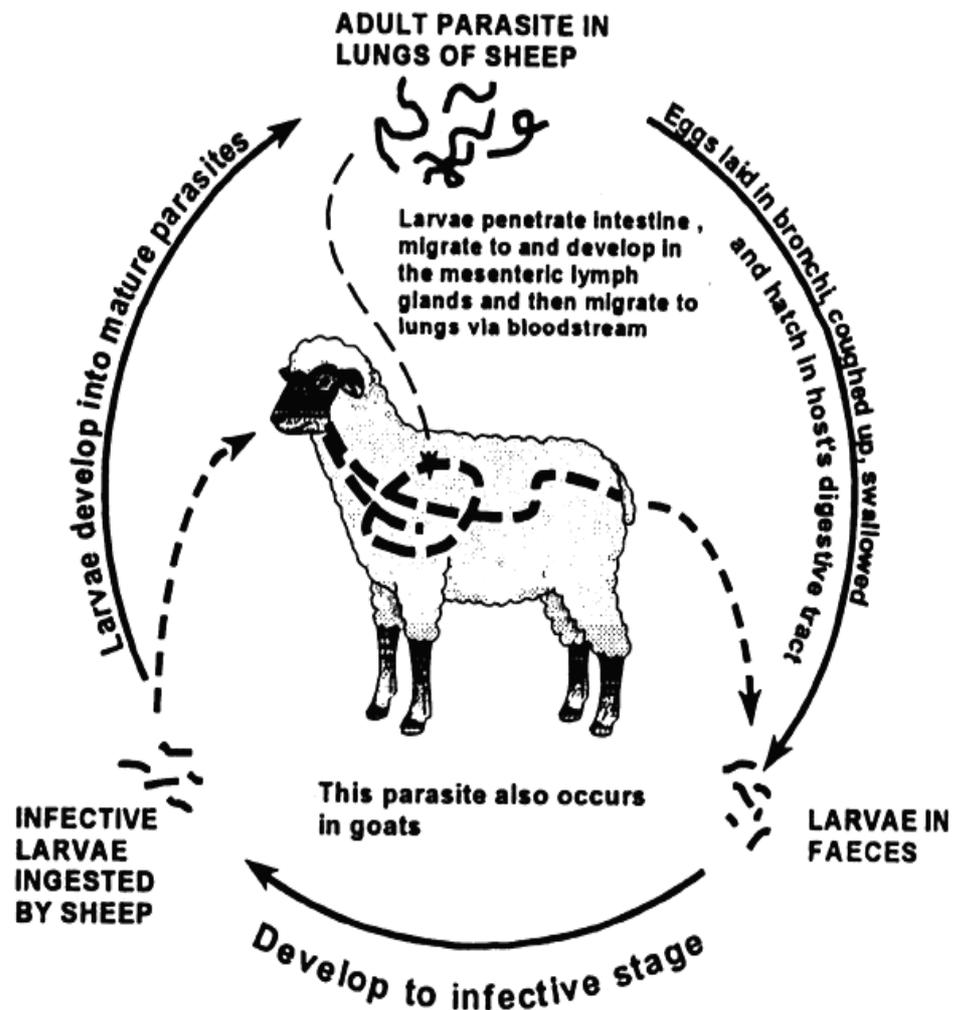


Fig. 6.2: Life Cycle of Lungworm in Sheep

3.1.3 Tapeworms

Tapeworms (*gestoda*) belongs to the phylum platyhelminthes and are related to the flukes (*trematodes*). They have segmented bodies that are tape-like and also host specific. They infect both animals and human. The adult tapeworm cause fewer problems especially in animals under poor plane of nutrition. They are also non-pathogenic. However, the larva of some specie travel to the brain or the spinal cord and cause nervous disorder called coenurosis.

The life cycle of tapeworm is shown in Fig 6.3. When a dog eats the carcass of infected sheep or ruminants, the cysts develop into tapeworm inside the intestine of the dog. The matured worm lay eggs that passed along with the dog's faeces. Grazing ruminants pick the eggs while on pasture which hatches and moves into the blood vessels and eventually found their way to the brain or the spinal cord. If dog eats carcass of infested ruminants, the cycle is re-started. For a control measure and to break the cycle, dogs must not be allowed to eat the carcass of infested animals. Benzimidazole can be used for treatment.

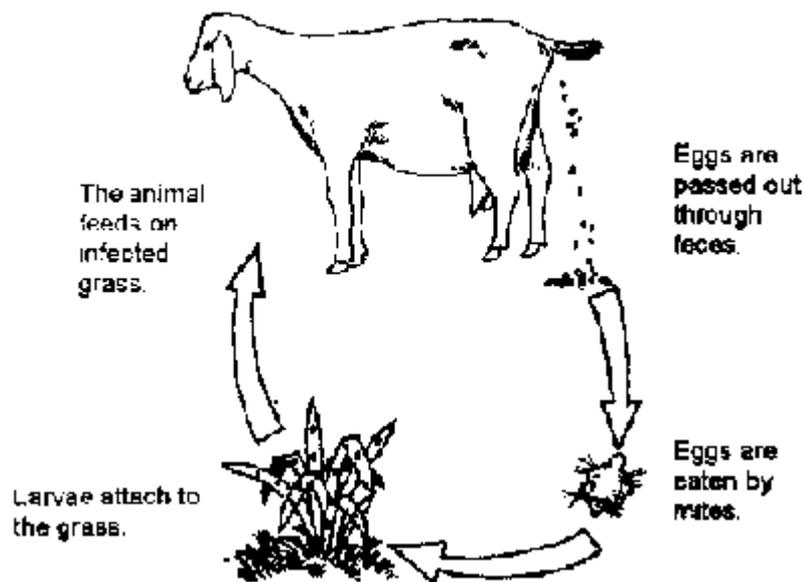


Fig.6.3: Life Cycle of Tapeworm in Goats

3.1.4 Trypanosomiasis

This is a protozoan infection which affect both man and animals especially ruminants. It is caused by trypanosomes parasites which could be *trypanosoma vivax*, or *Trypanosoma brucei* or *Trypanosoma evansi*. They invade the blood stream and cause symptoms such as recurrent fever (with about twelve days in between), anaemia, discharge from the eyes, nervous signs and loss of condition. The animal may be infected for months before it dies finally.

The vector for this disease is tsetse fly which is very prevalent in sub-Saharan Africa. There exist some wild animals that are infected but showing no symptoms and are therefore carriers of the parasites. These wild animals are buffaloes, giraffes and warthogs. Tsetse fly sucks blood from these wild animals and thereby maintains the cycle of the parasites. Human being are also susceptible when they are bitten by these vectors.

Trypanosomiasis is treated by the use of trypanocidal drug such as diminazene aceturate, and homidium chloride. Because of the prevalence, prophylactic drugs are available and use by injection to last for about three months. Such drugs include isometamidium chloride and quinapyramine prosalt. Regular spraying of the environment with insecticides to kill tsetse fly is another control measure apart from prophylaxis.

3.1.5 Liver Fluke

This is one of the most widely distributed and harmful parasites that affects cattle sheep and goats. They are caused by *Fasciola hepatica* or *Fasciola gigantica* of the trematodes. The disease symptoms include paleness of the eyelid and the gum, pot-bellied condition, appearance of soft watery swelling under the jaw, weakness, anaemia and loss of condition. When carcass of infested ruminants is posted, the flukes are found in the liver if opened. It causes a disease called schistosomiasis.

While in the sheep, the adult fluke lay eggs in the bile duct. The eggs are passed into the intestine and expelled along with the dung on to the pasture. Here they can stay up six months if it is on wet environment or they die if on dry land. They hatch into miracidium (after about nine days to eight weeks) which swims and flow with streams or brooks or any water in the drains around. The miracidium is picked up by the water or mud snails (*Limnaea truncatula*) and after about seven weeks they develop and produce another form called cercariae. An average of 1000 cercariae is produced from one miracidium. The cercariae moves and attach itself to the leaves of the plants or grasses around where grazing ruminants pick them up in the encysted form. They migrate into the liver of the animal via the blood vessels and develop into liver fluke after about six weeks. The flukes begin to lay eggs after another six weeks in the ruminant host which are again expelled along with the dungs and the cycle continues (Fig. 6.4).

Liver fluke is treated with benzimidazole and salicylanilides. It controlled by the elimination of the intermediate host- mud snail. This is achieved by spraying the streams, brooks and every drain around the grazing pasture regularly during the wet season.

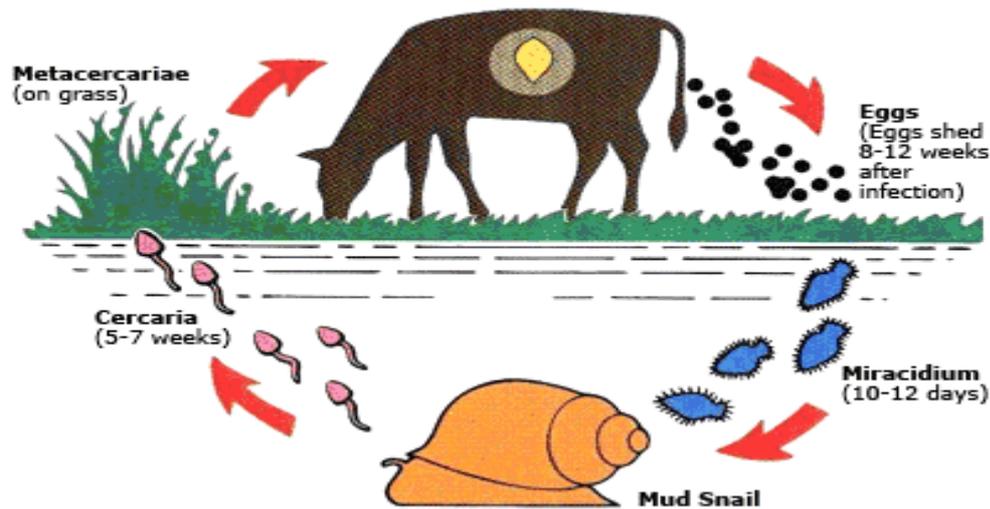


Fig. 6.4: Life Cycle of Liver Fluke in Cattle

3.1.6 Coccidia

This is a protozoa disease caused by the *Eimeria spp* of bacteria. The parasites live in the intestine of the animal. The main symptom is blood-stained diarrhea where ruminants especially young ones are raised intensively.

It can be treated by the administration of sulpha drug and antibiotics. Control measure is by preventing the animals from eating feeds contaminated with faeces.

4.0 CONCLUSION

In this unit, some of the internal parasites of economic importance have been listed and discussed.

5.0 SUMMARY

In this unit, you have learnt the following:

- parasites are of economic importance in the rearing of ruminant for production purpose
- parasites can be internal or external but live on their host to survive by damaging the physiological conditions of the host
- the internal parasites includes worms, trypanosomiasis, liver flukes and coccidia.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify any of the discussed internal parasites that affect both ruminants and human.
2. What is the veritable control measure to adopt for *Fasciola gigantica*?

7.0 REFERENCES/FURTHER READING

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UNIT 3 EXTERNAL PARASITES OF RUMINANT ANIMALS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Ticks
 - 3.2 Lice
 - 3.3 Mites/Mange
 - 3.4 Flies
 - 3.5 Ringworm
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In the last unit, you learnt about internal or endo-parasites of importance in ruminant animals. These animals are also infected with external parasites or ecto-parasites if allowed to thrive may lead to serious economic loss as a result of product devaluation especially as most of these affects the skin and consequently the hides of the animals. The secondary effect may also affect the meat value.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- discuss the different ectoparasites of importance in ruminant animals.
- enumerate the effect of the different ectoparasites on cattle, sheep and goats.
- explain the treatment (where possible) of each of the ectoparasites.
- state the control measures for each of the ectoparasites.

3.0 MAIN CONTENT

3.1 Ticks

Ticks are *Acarines* of high importance as skin parasites. There are two types of ticks namely, hard ticks and soft ticks. The hard ticks are oval in shape, flattened from top to bottom, with a hard protective dorsal

surface (scutum) and an anteriorly projecting mouth part. Soft tick does not have the hard protective dorsal surface. Ticks are vectors of some diseases such as anaplasmosis or gall sickness and heartwater disease. The hard tick has about three species depending on the number of host. There is the one-host tick, two-host tick and three-host tick. Ticks spend only a short period on their host sucking blood and several days to three weeks are spent on pastures or in the sand where they can be easily attached to unsuspecting host in this case ruminants and even man.

Ticks are treated by the application of acaricides through spraying or dip bath. Pour-on preparation can also be used. Ticks can be controlled by denying host animals to be on the pasture. The pasture can also be burnt. However, all these are possible in intensive rearing of ruminants or where there is a good control of the animals that graze in the environment.

3.2 Lice

These are small, flat wingless insects that irritate the body of the ruminants so much that they rub their bodies against solid objects. They live and burrow in the hair and wool of the skin of the animal. They are visible even to the naked eye as roaming tiny objects on the skin when the hair or the wool is parted by hand. There are two types of lice. These are sucking lice and biting or chewing lice. The adult lice live for about one month on the skin of the animal. The female lays about 300 eggs which hatch within three weeks into nymph.

Infested animals constantly get irritated, emaciated, look pale, anaemic and show consistent hitching or rubbing of their body against solid object and thereby damage their skin.

Lice infestation is treated by dip bath, spraying or rubbing of chemicals like permethrin or malathion or by injecting with ivomec. It can be controlled by preventing overcrowding.

3.3 Mites or Mange

Mites belong to the Acarines and cause skin disease called mange. They are so small that they are not visible by the naked eye. They also live all their lives on the host. *Psoroptes* and *Chorioptes spp* of mites are the superficial burrowing type in the skin while the *Demdex* and *Sarcoptes spp* burrow deeper into the skin. Symptoms of mange include irritation, scratching, biting, rough peeling skin, and loss of hair on the skin.

Treatment is by spraying, dip bath, injection with ivermectin or ivomec and rubbing of malathion powder on the skin of the animals.

3.4 Flies

Flies are insects that breed during the summer or rainy months of the year. The flies bite the skin and feed on the wound of ruminants. Some of the flies transmit secondary disease.

There are different types of flies viz:

- a. Biting flies that bites and suck blood of the host.
- b. Myiasis flies are those that lay eggs in the open wounds, other natural openings and skin of the animal. They invade and damage the tissue.
- c. Blowfly myiasis or blowfly strike is green in colour and lay their eggs on the skin section soiled with faeces around the hind-quarter. The eggs hatch into larva which crawl to the skin and gets hooked to it by their mouth hooks. This gives a larva-infested lesions or strike on the animal. This lesion could very distressful and debilitating causing pains and at times death of the animal.

Flies are treated and controlled by spraying, dip bath, use of fly repellants like pour-on etc.

3.5 Ringworms

This is a fungal infection of the skin of ruminants and even man caused by *Microsporum* or *Trichophyton* fungi. It is noticed in animals first by hair loss in a circular form which may be about 3 – 4 cm in diameter. The hair loss gives way to a greyish and crusty appearance on the skin of the animal. It affects all ages of animals especially when housed together with poor ventilation and sunlight.

Infected animal should be separated and quarantine programme must be made effective where rampart. It is spread by direct contact through the spores of the fungi. It can be treated by oral application of griseofulvin.

4.0 CONCLUSION

This unit has been able to show the characteristics of parasites that lives on ruminant animals if not taken care of and the economic importance to production.

5.0 SUMMARY

In this unit, we have discussed that external parasites live on the skin of the animal which value is decreased if seriously infested.

6.0 TUTOR-MARKED ASSIGNMENT

1. In what ways are the external parasites differ from the internal ones?
2. Name any of the external parasites with more than one host.

7.0 REFERENCES/FURTHER READING

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