COURSE GUIDE

ANP 506
ANIMAL HEALTH AND DISEASES

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INTRODUCTION

ANP506 – Animal Health and Diseases is a 2-credit course intended to expose you to common causes and types of important livestock diseases in Nigeria and methods used to prevent disease occurrence including principles of animal health management. Disease is the second most important cause of production loses in Nigerian livestock industry and poor animal health remains a constraint to livestock productivity. It is necessary that animals are in good health not only to ensure absence of diseases and consequently wholesome food of animal origin but also to enhance maximum return on investment in animal production.

Animal Health and Diseases examines the causes and effects of important diseases of food ani- mals in Nigeria especially ruminants. The course also describes how these diseases can be pre- vented or controlled to minimize their effects on livestock. This course is designed to equip you with the basic knowledge of animal health maintenance necessary for food animal production.

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The course consists of two parts – Course Guide and the Main Text. You are required to read the course guide before proceeding to the main text. The course guide describes what the course is about and how you will use the course materials to aid your learning in the course. The course facilitator is expected to read the course guide session as guide on facilitation of this course.

WHAT YOU WILL LEARN IN THIS COURSE

In this course you will learn the basic concepts in animal health and disease management as well as the causes of important livestock diseases. You will also learn the methods used in the preven- tion, treatment and control of common livestock diseases and the importance of applying this knowledge in reducing the impact of disease on the livestock industry in Nigeria.

COURSE AIM

This course aims at equipping you with skills and knowledge necessary to maintain basic animal health management practices on a farm.

COURSE OBJECTIVES

The objectives of this course are:

1. Describe the factors that affect the health status of animals
2. Understand how to identify sick animals

3. Explain the causes of some important Ruminant livestock diseases in Nigeria
4. List the common diseases shared between animals and man (zoonotic diseases)
5. State the methods used in prevention, treatment and control of livestock diseases
6. Discuss the impact of diseases on the livestock industry in Nigeria

WORKING THROUGH THIS COURSE

This course is made up of three modules and thirteen study units as follows:

Module 1 General concepts in animal health management and disease

Unit 1 Basic terms used in animal health and disease
Unit 2 Factors affecting the health status of animals
Unit 3 General classification of livestock diseases
Unit 4 Principles of Animal immunity
Unit 5 Prevention and Control of livestock diseases

Module 2 Common Diseases of livestock in Nigeria and their causes

Unit 1 Bacterial diseases
Unit 2 Viral diseases
Unit 3 Parasitic diseases
Unit 4 Metabolic/Nutritional diseases
Unit 5 Plant poisoning

Module 3 Impact of Livestock diseases and Treatment in Nigeria

Unit 1 Impact of livestock diseases on the Nigerian livestock industry
Unit 2 Zoonosis and Public health significance of livestock diseases
Unit 3 Treatment of livestock diseases

Every unit contains a list of references and further reading.Try to get the textbooks and materials listed. The textbooks and materials are meant to deepen your knowledge of the course.

Apart from the print course material, you will equally have the soft copy of the material in NOUN web site – www.nou.edu.ng. When you get to the site, click on course ware and select this course.

This course will be facilitated through face-to-face at the study centres and online through iLearn platform. In the platform you will receive both synchronous and asynchronous facilitations supplemented with video tapes. To get to i-learn platform, click on www.nou.edu.ng, and click on i-Learn.

ASSESSMENTS

The assessments are in four forms – self-assessment exercises, Tutor Marked Assignments (TMAs), Computer Marked Assignments (CMAs), and final examination.

The self-assessment exercises are provided for you to check your progress. Each unit has self- assessment exercises within the texts, and the answers are provided at the end of each unit. You should be sincere when working on the self-assessment exercises. Do not be quick at looking at the answers. Check the answers only when you know you have sincerely completed the questions asked. It is only by this way you will find the questions helping to aid your learning and mastery of the skills. The self-assessment exercises will not be scored.

The TMAs and CMAs will be scored and they will form part of the final assessment for graduation. There will be four continuous scored assessments in this course. The first assessment is the CMA. This will be multiple choice questions that you will take through the computer and you will have immediate score feedback. In addition, you will take three TMAs. These will be practical questions where you will be tested

STUDY UNITS

The study units for this course are arranged in three modules and comprises of the following:

Module 1 General concepts in animal health management and disease

Unit 1 Basic terms used in animal health and disease
Unit 2 Factors affecting the health status of animals
Unit 3 General classification of livestock diseases
Unit 4 Principles of Animal immunity
Unit 5 Prevention and Control of livestock diseases

Module 2 Common Diseases of livestock in Nigeria and their causes

Unit 1 Bacterial diseases
Unit 2 Viral diseases

MAIN COURSE

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MODULE 1 GENERAL CONCEPTS IN ANIMAL HEALTH MANAGEMENT AND DISEASE

UNIT 1 BASIC TERMS USED INANIMAL HEALTH AND DISEASE

CONTENTS

1.0 INTRODUCTION

Animals that are healthy will perform well and produce maximally for the benefit of man. Diseases generally reduce the performance or productivity of animals especially food animals (livestock) and ruminants in particular. It is therefore important that good animal management practices be observed on a farm or where animals are kept not just to keep diseases away but for maximum performance.

There are basic terminologies that are used when describing animal health and diseases and these are to be understood. This unit will define or explain the certain basic terms used in animal health. It will also describe how you can recognize sick animals and the action to take in order to determine the cause or aetiology of the disease affecting a sick animal. The objective of this unit is given below.

2.0 OBJECTIVES

After going through this unit, you should be able to:

- Define or explain some common terminologies used in relation to animal health such as disease, diagnosis, symptoms or clinical signs, immunity, disease prevention, disease control among others.
- Know what to look out for when animals are sick
- Know how diagnosis are arrived at
- Know how diseases are classified or grouped
- Understand the basis of immunity to diseases as well as the principle underlying prevention and control of animal diseases.

3.0 MAIN CONTENT

3.1 Definition of common terms used in animal health

An animal is said to be in good health when it is in a complete state of physical, social and mental well-being and not just that the animal is free from disease. This means that the animal in question must be adequately cared for with respect to provision of feed, water, space, clean environment etc. An animal that lacks these basic provisions can easily come down with a disease.

Disease is a deviation from the normal and is revealed by changes in the animal. Any animal that has a disease will show some abnormality. This change in the animal can be observed from the behavior, structure or function of the animal in question. A sick animal will look dull and weak (lethargy), stay on its own and will refuse to feed (anorexia). A dairy animal that produces milk will have a drop in the quantity of milk produced. You can also notice a change in shape in areas of the body structure of a sick animal depending on the part or organ of the body that is affected. These changes can be major or minor depending on the severity of the disease condition and it can also be qualitative or quantitative.

The observable changes seen or noticed when an animal is sick is known as symptoms or clinical signs. There are symptoms or clinical signs that are common to most diseases while some are specific to particular diseases. Some of the common symptoms seen in most diseases include: refusal to eat, fever or pyrexia (increase in body temperature), dullness etc.

The changes observed when an animal is sick is a basis for diagnosis or determining what is causing the sickness in the animal, and diagnosis can be defined as the art and science of determining the nature and causes of diseases and differentiating between diseases.

To arrive at a diagnosis, you have to get some information or facts about the animal. The information you gather or collect should be as comprehensive as possible and these can be regarded as components of diagnosis. These include:

- History taking:- This is gathering some information about the animal such as identity of the animal (specie, name or tag no., age, sex, breed, colour of the animal etc), when the animal was first noticed to have changed in behavior or performance, how long this condition has been on etc

- Physical examination:- This done by observing the animal itself for any sign of abnormality, taking the temperature, pulse rate, respiratory rate. If this done on a farm, it can include looking at the housing and environment where the animal is kept, the type of feed given to the animal or animals etc.

- Laboratory examination:- This is carried out on samples or materials collected from the animal or the environment where the animal is kept. The sample collected is subjected to several laboratory procedures to detect the presence or absence some disease-causing agents or substances. Examples of samples collected from a sick animal include blood, faeces, skin scrapings, urine or even organs of a dead animal (especially, where there are many animals on a farm) etc. Also, some part feed of the given to the animal can be collected for laboratory examination. Laboratory examination of samples collected from sick animals is important in arriving at a definitive diagnosis.

3.2 Recognition of sick animals

Diseases result in a disturbance in the normal behavior, activity or performance of the animal or animals. In most cases you can observe this change in behavior, activity or performance. General signs or symptoms of sick animals are:-

- Anorexia (inappetance) – the animal goes off feed or refuses to eat
- Fever (pyrexia) – this an increases in body temperature of the animal above normal
- Weakness (lethargy)

- Depression

These symptoms or clinical signs may not all be present in all diseases all the times. For example an animal suffering from helminthosis (worm infestation) may not show fever unless this condition has another concurrent infection.

4.0 CONCLUSION

At this point you have understood that it is important to keep animals healthy and can explain or define some common terminologies used in animal health. You have also learnt basic things that are done to determine the cause of a disease or a diagnosis is arrived at. In addition, you have also learnt some general observable signs of a sick and what samples can be collected from sick animal for further examination to support a correct diagnosis.

At this stage you can define or explain terminologies like disease, diagnosis as well as describe steps used to arrive at diagnosis of a sick animal. You should also be able to mention some general signs of a sick animal. In fact if you are present on farm when veterinary doctor come to look at a sick animal, you know some initial or basic things he will do to determine the cause of sick animal.

5.0 SUMMARY

This unit is an introduction and has shown that keeping animals healthy is important for optimum production and defined some basic terminologies used in relation to animal health and diseases. The unit has also revealed the steps involved in arriving at the diagnosis of a sick animal as well as given some general symptoms or clinical sign of diseases in animals.

will further discuss the factors that affect the health status of animals and the predisposing conditions to diseases.

6.0 TUTOR MARKED ASSIGNMENT

1. Using your own words, explain what you understand by the terminologies: Diagnosis, Diseases List the general signs or symptoms you see in a sick animal
2. List three samples that can be taken from a sick animal to help the veterinary doctor arrive at a correct diagnosis.

7.0 REFERENCES/FURTHER READING

Tropical Animal Health, Horst S.H. Seifert

Radostits, O.M., Gay, C.C., Blood, D.C., and Hinchcliff, K.W., 2000. Veterinary Medi- cine. A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Ed. W.B. Saunders, Philadelphia

Herd Health: Food Animal Production Medicine, 2nd edition, eds. Radostitis, Leslie and Fetrow

Tortora, G.J. 2010. Microbiology: An Introduction 10th ed. San Francisco: Pearson Ben- jamin Cummings,

UNIT 2 FACTORS AFFECTING THE HEALTH STATUS OF ANIMALS

CONTENTS

1.0 INTRODUCTION

The state or condition of an animal or group of animals to large extent determines how it reacts to the presence of an infectious agent. An infectious agent is a disease causing microorganism such as a bacteria, virus etc. Healthy animals can withstand or offer some resistance to infectious agents. However, stress (physical, nutritional or otherwise) decreases the ability of animals to resist infectious agents or other disease-causing parasites. In animal production, it is important to ensure that animals are in relatively healthy state or conditions at all times. This also helps to ensure maximum return on investment in commercial farms and keeping the animals safe.

In order for an animal to come down with a disease, certain factors must be present. These factors are conditions which enable an infection to be established or support the development and/or multiplication of disease causing microorganisms or parasites. The factors that influence the health status of animals are many; some can be controlled while others are not. These may be classified as environmental and management factors. These factors vary in their degree of importance with respect to different diseases. This unit will discuss the factors that affect the health status of animals and how these factors contribute to causing or reducing disease conditions of animals.

2.0 OBJECTIVES

At the end of this unit you should be to:

- List the factors that affect the health status of animals.
- Differentiate between environmental and management factors affecting the health status of animals.

You should also be able to state which of these factors are controllable and which ones are not.

3.0 MAIN CONTENT

3.1 Environmental Factors

These factors which are physical in nature influence the health status of animals to varying degrees and they cannot be controlled on the field. They can however, be controlled in an animal facility depending on the sophistication of the facility and the species of livestock. These factors are:

- **Temperature** - Animals have the ability to withstand severe temperatures but this will significantly affect productivity if the exposure is for a long period. This is because the animal will become stressed and stress increases susceptibility to disease.

- **Humidity** - High humidity will promote the growth of certain microorganisms like fungus whereas too low a humidity will result in irritation of the mucous membrane. Humidity is important in poultry since they do not have sweat glands and heat is lost through the respiratory tract.

- **Solar radiation** - This also plays a role in increasing the heat load on an animal. This takes on special importance in hot humid zones especially in Nigeria with the importationof exotic animals or use of exotic semen from temperate countries to upgrade indigenous livestock breeds. Solar radiation can be a problem in animals without pigmentation. However, the effect of radiation can be minimized by the shaded areas or pens.

- **Air movement** – The extent of air movement can help in heat loss through evaporation and conduction/convention. Air circulation assists in the supply of fresh air and removal of toxic air.

- **Rain** – Heavy rainfall can result in excessive cooling for animals and/or marshy conditions where animals are kept. This can predispose animals to conditions such as footrot in ruminants. Provision of shelter and good flooring with drainage is the method to guide against this problem.

- **Climate/Seaso**n – In addition to the environmental factors mentioned above, the climate or season the year can influence the health status of an animal by having a bearing on the infectious agents or parasites that predominate at any particular time. For example, helminth infections are common during the rainy season. This is because temperature and moisture to large extent determines the ability of a parasite to survive outside the host.

3.2 Management Factors

- **Hygiene** - Good hygienic practices area good means of reducing disease risk within a herd or flock. Simple procedures such as cleaning of the where the animals stay or changing of bedding/flooring can help reduce the degree contamination or parasitism. Cleaning removes faeces and thus disturbs the normal environment of disease-causing agents such as gastrointestinal parasites by preventing them from completing their life cycle. It is important that feed/water sources are not contaminated.

- **Nutrition** – Adequate feeding of all classes of livestock is important in order to increase disease resistance and achieve maximum production. Poor nutrition leads to poor health. Because of the poor feed resource base for livestock in Nigeria occasioned by the seasonal feed shortage, grazing livestock in Nigeria experience exacerbated condition when exposed to infectious agents. It is therefore necessary to provide supplemental feeding to livestock especially during the dry season. For poultry and other classes of livestock, the high cost of feed ingredients can lead to the compounding of feeds low in nutrients.

- **Type of housing** – Different categories of people use different housing types and different methods to raise livestock depending on the species, resource availability and level of education. The particular housing system and method of raising the animals can influence the rate and severity of an infection especially with parasitic infections. For ruminants, animals that are housed or confined where pasture growth is suppressed or flooring is intact, and feeding/watering troughs are kept above the floor will be at lower risk of diseases of gastrointestinal parasitism. Here, absence of pasture makes the environment not conducive for parasite multiplication. For animals on pasture, the level of pasture contamination depends on factors like concentration of animals, duration of time spent by animals on the pasture, climate or weather condition among others. It is important that the choice

of housing and method of raising livestock be such that it decreases the risk of infection or enhances the health status of animals.

- **Ecology/Pest and wildlife**
  Most parasites that transmit diseases utilize intermediate host to complete their life cycle. This intermediate host can be a pest or wildlife. It is therefore essential not unnecessarily expose livestock to pest and wildlife. This is problem with ruminant owned by nomads as close contact between these animals and wildlife leads to exchange of parasites.

- **Introduction of new animals/animal number**
  There always exists the risk of introducing new parasites into a herd or flock when adding new animals to a herd. This can be problem where replacement animals are bought from the open market or neighbours farm. Any new animal to be added to an existing stock should be quarantined and treated appropriately before addition. The ease and risk disease transmission increases with increase in animal numbers. Increase in animal numbers increases contact between animals and consequently ease of transmission. An increase in animal numbers can also lead to an increase in accumulation of faeces within confined areas and this not good for endoparasitism except where insecticidal eartags are used. In poultry, it is advisable to always clean and disinfect houses before bringing new birds or allowing the house/pen to be empty for sometime.

4.0 CONCLUSION

In this unit you have learnt that certain factors can influence the ease with which an animal can become sick or help in the transmission of diseases in animals. These factors can be from the environment or from the management practices adopted. You have also been told how some of these factors can be controlled to ensure that the risk or ease at which animals become sick is minimized.

5.0 SUMMARY

This unit has examined the factors that impact on the health of animals. These factors exact an influence on productivity and profitability of livestock in general by contributing positively or negatively to the occurrence of diseases. It has also stated the importance of controlling these factors to minimize stress and ensure that animals remain healthy for maximum productivity. Unit 3 will describe how the diseases that affect livestock are transmitted and classified.

6.0 TUTOR-MARKED ASSIGNMENT

1. List three management and environmental factors that affect the health status of animals.
2. In your own words explain how any two of the management factor can negatively affect the health of animals.

7.0 REFERENCES/FURTHER READING

Herd Health: Food Animal Production Medicine, 2nd edition, eds. Radostitis, Leslie and Fetrow Tropical Animal Health, Horst S.H. Seifert

Van Houtert M.F.J, Sykes A.R. 1996. Implications of nutrition for the ability of rumi- nants to withstand gastrointestinal nematode infections. Int J Parasitol 26:1151–1167

Preston T.R, Leng, R.A. 1987. Matching ruminant production systems with available re- sources in the tropics and sub-tropics, 1st edn. Penambul Books, Armindale (New South Wales, Australia

UNIT 3 GENERAL CLASSIFICATION OF LIVESTOCK DISEASES AND METHODS OF TRANSMISSION

CONTENTS

1.0 INTRODUCTION

A disease can be described as a condition resulting in a deviation from the normal functional or behavioural status of an animal. Disease can be infectious or noninfectious. Infectious diseases are those diseases that are caused by pathogenic microorganisms such as bacteria, viruses, protozoa and fungi that invade an animal's body and can spread from one animal to another directly or indirectly (contagious). Noninfectious diseases on the other hand are not caused by pathogens rather they can result from nutritional deficiencies, the environment or are inherited (genetics). A pathogen is a disease causing microbial agent. This unit will present the different ways diseases are classified and the methods of disease transmission in animals

2.0 OBJECTIVES

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

- Classify livestock diseases using varying methods
- State different ways by which diseases are transmitted in animals
- List the causes of diseases.

3.0 MAIN CONTENT

3.1 Causes of Diseases

Diseases are caused by mostly pathogenic microorganisms or parasites which invade, colonize and multiply within the host cells (animal cells) causing a significant change in the body. These pathogens can be

bacteria, virus, fungi, protozoa or even a parasite. The first man to associate a particular microbe with a particular disease was Robert Koch in 1877. He attributed the disease anthrax to the organism called *Bacillus anthracis*. The manner in which a disease develops (pathogenesis) differs with different diseases. There are other causes of diseases which include injuries, poisons/chemicals, poor nutrition or genetics.

3.2 Methods of Disease Transmission

Diseases are transmitted from one animal to another through the following ways:

1. Contact Transmission: This can be by direct contact between animals that are staying together in the herd or flock or when they meet in open field during grazing or even at animal markets. It can also be indirect contact when animals come in contact with other objects that a sick animal has had contact with'. These objects can non-living (fomite) such as syringes, boots worn by attendants, feeding troughs, pasture etc.
2. Vehicular Transmission: This type of transmission occurs via a medium which can through feed (food poisoning), water, air (spores), fluids (saliva) etc.
3. Vectors: This type of transmission refers to other animals that carry disease causing agent from one host to another and majority of these are insect or arthropods. They transmit these pathogenic microorganisms and/or parasites either mechanically or biologically. In mechanical transmission, they passively carry the pathogen on their body parts while in biological transmission which usually involves biting actiona, part of the life cycle of the pathogen occurs within the body of the vector. An example of this when the transmission of Malaria by mosquitoes or Trypanosomosis by Tsetse fly (Glossina species).

3.3 Classification of Livestock Diseases

Livestock diseases can be classified using different criteria depending on what best satisfies the situation under consideration. Consequently diseases can be classifies based on species of animals (Avian Diseases, bovine diseases, equine diseases, caprine diseasesetc); system of the body affected (Cardiovascular diseases, respiratory diseases, reproductive diseases etc) and the causative organism. However, the etiology or causative organism is the most widely used method of classification. Here they are classified as:

- Bacterial diseases - example, Anthrax, Mastitis, Salmonellosis, Fowl typhoid, etc
- Viral diseases – example, Foot and Mouth Disease, Rinderpest, African swine fever etc
- Protozoan diseases – example, Coccidiosis, Trypanosomoses, Babesiosisetc
- Rickettsial diseases – example, Anaplasmosis, Cowdriosis, Infectious keratoconjuctivitis
- Fungal diseases - example, Aspergillosis, Ringworm, Epizootic lymphangitis
- Endoparasitic diseases (caused by worms) – example, Fascioliosis, Haemonchosis etc
- Ectoparasitic diseases (caused by ticks, lice, fleas) - example, Mange, fleabite dermatitis, etc
- Deficiency diseases – Vitamin defiencies, preganacy tooxaemai, etc
- Toxicoses - examples – Nitrate poisoning

Livestock diseases can also be classified on the basis of disease prevention into six categories which are:

- Neonatal diseases – diseases that affect very young animals, mainly diarrhoeal in anture
- Vector-borne diseases – diseases transmitted by a living vector such
  trypanosomosis
- Soil-borne diseases – disease mostly caused by aerobic and anaerobic spore-forming bacteria (e.g. botulism)
- Contact diseases – usually responsible for serious epidemic diseases in livestock in the tropics such as Rinderpest, Foot and Mouth disease etc
- Parasitic diseases – similar to contact diseases examples include haemonchosis, fascioliosis etc.
- Nutritional and metabolic diseases

4.0 CONCLUSION

In this unit you have learnt that diseases are caused by several factors ranging from microbial pathogens to poor nutrition. Diseases are either infectious or noninfectious depending on the cause and their ability to spread. You have also learnt that diseases can be transmitted through contact, vectors or inanimate vehicles. This unit also described the basis of classification of diseases such as the causative organism, the species of livestock and the system of the body affected.

5.0 SUMMARY

This unit discussed the general causes of diseases in livestock and how diseases are transmitted from one animal to the other. The various basis of disease classification were also explained using examples.

6.0 TUTOR- MARKED ASSIGNMENT

1. State three ways in which diseases can be transmitted
2. Using the etiology or causative organism give three classes of livestock Diseases.

7.0 REFERENCES/FURTHER READING

Radostits, O.M., Gay, C.C., Blood, D.C., and Hinchcliff, K.W., 2000. Veterinary Medi- cine. A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Ed. W.B. Saunders, Philadelphia

Herd Health: Food Animal Production Medicine, 2nd edition, eds. Radostitis, Leslie and Fetrow

Kusiluka, L.S. and Kambarage, D. 1996. Diseases of Small Ruminants. A Handbook. Centre for Tropical Veterinary Medicine, Scotland. 166pp

UNIT 4 PRINCIPLES OF ANIMAL IMMUNITY

CONTENTS

1.0 INTRODUCTION

Animals are constantly exposed to a variety of disease-causing agents or pathogens. When these pathogens enter the body and are able to colonize the host and multiply, they cause disease. An animal's immune or defense system is that part of the body which acts to counteract any infectious agent that is introduced into the body. This defense system of the body can be said to comprise of three parts namely; the layered defense (skin and mucus), the innate or natural immunity which is nonspecific and the adaptive immunity.

2.0 OBJECTIVES

- At the end of this unit, you should be able to: Explain what immunity in animals is
- Describe the basic types of immune responses in animals.

3.0 MAIN CONTENT

3.1 Types of Immunity

Immunity can be classed as either natural or acquired. Natural immunity is an innate or inborn ability to resist certain types of diseases and this immunity does not involve production of antibodies. Acquired immunity on the other hand is immunity that animal develops to resist specific infectious agents either passively or actively. Passive immunity involves the transfer of pre-formed antibodies from an immune animal to a susceptible animal to provide protection against a pathogen as obtained when a calf suckles the dam soon after calving or by injection of antiserum into another animal. This type of immunity last for a short period. Active immunity is obtained when animal develops antibodies following exposure to an infectious agent or pathogen either natural

infection or by vaccination. This type of immunity last longer in the animal.

The Immune System

The function of the immune system of the animal is to protect the body against pathogenic agents. The immune of the animal is innate and is composed of two parts, humoral and Cellular. The humoral part produces substances like antibodies) found in the blood. These substances are able to prevent growth and development of pathogens or make them stick together to facilitate their removal from the body. The cellular part produces cells (like T-lymphocytes, Natural Killer cells) that ingest and destroy pathogens. Both the humoral and cellular immunity are not directed against particular pathogens and therefore are said to be nonspecific.

4.0 CONCLUSION

In this unit you have been introduced to what is immunity in animals and how an animal's body reacts to the presence of an infectious agent. You have also been exposed to the two different types of immune responses that occur in the body.

5.0 SUMMARY

This unit has discussed the basic concept of immunity in animals. The next unit will expose you to the methods used in the prevention, control and eradication of diseases. The basis for the use of each method to prevent, control or eradicate diseases will also be stressed.

6.0 TUTOR MARKED ASSIGNMENT

1. What do you understand by passive and active immunity?
2. How many parts can the immune system be divided into?
3. Name any two cell types produced by the immune system?

7.0 REFERENCES/FURTHER READING

Immunobiology-The Immune System in Health and Disease, 4-5th edition, eds. Janeway, Travers, Walport and Capra

Radostits, O.M., Gay, C.C., Blood, D.C., and Hinchcliff, K.W., 2000. Veterinary Medi- cine. A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Ed. W.B. Saunders, Philadelphia

Baker RL, Gray GD (2004) Appropriate breeds and breeding schemes for sheep and goats in the tropics. In: Sani RA, Gray GD, Baker RL (eds) Worm control for small ru- minants in tropical Asia. ACIAR, Canberra d'Ieteren G, Authié E, Wissocq N, Murray M (1998) Trypanotolerance, an option for sus- tainable livestock production in areas at risk from Trypanosomosis. Rev Sci Tech 17:154–175

UNIT 5 PREVENTION AND CONTROL OF LIVESTOCK DISEASES

CONTENTS

1.0 INTRODUCTION

Animal production can be improved by increase in animal number (herd size) and increase output per unit animal. In order to achieve this improvement, prevention and treatment of diseases must be complementary to other measures like adequate nutrition and good management practices. Prevention in this sense simply means avoidance of disease and control refers to reduction in disease incidence or prevalence. Eradication refers to complete removal of a disease from an area. Hygiene is actually preventive medicine and therefore used to prevent diseases. The number of animals that develop a disease within a particular time frame is known as incidence of the disease and this is a measure of the rate of spread. Prevalence of a disease refers to the number of animals that develop a disease at a specific time and this indicates how serious and how long the disease affects the population of animals. A disease that is constantly present in a population is said to be endemic. The general methods used for control of livestock diseases are usually aimed at prevention of disease occurrence, control of a disease that is already in existence and eradication of the disease from an area. The particular method applied in each circumstance is tailored to achieve a specific objective.

2.0 OBJECTIVES

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

- Differentiate between the use of the words “Prevention, control and eradication” of diseases.
- Explain the methods used in prevention, control and eradication of livestock diseases in Nigeria.

3.0 MAIN CONTENT

3.1 Methods for Prevention

The two major methods used for prevention of livestock diseases is aimed stopping a disease from getting to a herd, flock or group of animals. These methods are quarantine and vaccination.

- **Quarantine** – This is physical separation of healthy animals from sick or new animals. Also, movements of items are restricted between the two groups of animals. All new animals to be added to a farm, flock or herd should be quarantined, tested and/or treated appropriately before introduction into the farm or herd. Where very strict quarantine is practiced, the herd is closed to live animals and artificial insemination is used.

- **Vaccination**
  This method is used where exposure to a disease is likely and in the hope that vaccination will protect the animals if and when exposed. Vaccination is based on the principle of herd immunity and suppression of disease when individual animals are resistant. All animal are vaccinated using a suitable vaccine. A vaccine is a biological substance which stimulates the body's immune system to produce antibodies. Vaccination should be done as close as possible to the period of greatest risk of the animals to the disease being vaccinated against. Vaccination should not carried out during period of stress for the animals. Diseases commonly vaccinated against in Nigeria include Rinderpest, Anthrax, Contagious Bovine Pleuropneumonia (cattle), Fowl typhoid, Newcastle Disease, Fowl pox (poultry) and Rabies in dogs.

3.2 Methods for Control

The methods used control is aimed reducing the disease to a level that is tolerable or economically feasible. The goals for control are to decrease the prevalence of an existing disease, decrease the incidence of new infection and decrease the morbidity and mortality. These are achieved by identifying the infected animals or herd and this is followed by the following:

- **Treatmen**t – All infected animals are promptly treated with appropriate therapeutic agents. This method depends on the availability of cheap and safe drugs. Use of broad spectrum antibiotics and anthelminthics are useful in achieving mass treatment.

- **Sanitation** – Proper hygienic practices that will ensure and maintain a clean environment where animals are housed must be practiced. Clean water and proper feeding troughs should be provided as faecal contamination of feed and water are usually good sources of infection. For grazing animals, this will include roation of grazing areas.

3.3 Methods for Eradication

The aim of eradication is to eliminate a disease completely from a herd and/or geographical area. The methods generally applied to achieve eradication of diseases are:

- Depopulation – This method is used normally when other means are not likely to achieve the desired result and when the disease in question will have a devastating consequence. It is used to completely stamp out a disease. It requires that all animals or species concerned in a particular area or farm be killed or destroyed. The destruction can be total or limited. The method works best developing countries like Nigeria when implementation is compulsory and is initiated and supervised by the government with compensation of the affected farmers.

Where limited destruction of animals is to applied, it is preceded by testing to identify affected animals to be destroyed. This is known as "test and slaughter" or "test and removal." This method relies on the use of sensitive diagnostic tests to identify animals to be removed and the economic costs of the removal.

4.0 CONCLUSION

In this unit you have been introduced to the difference between the use of the words prevention, control and eradication as used in preventive medicine. Also, the different methods used to prevent, control and eradicate livestock diseases were also explained in this unit. A major factor that contributes to successful disease control programmes is surveillance. It is only through surveillance that the presence or absence of diseases can be confirmed.

5.0 SUMMARY

This unit has discussed the basic methods used in the prevention, control and eradication of diseases. The basis for the use of each method to prevent, control or eradicate diseases has also been stressed. The next unit will expose you to the common diseases of livestock in Nigeria and how the methods described are used in relation to their control.

6.0 TUTOR MARKED ASSIGNMENT

1 In your own words differentiate between incidence and prevalence of a disease
2 What do you understand by the word “quarantine” as used in prevention of animal diseases?
3 List the methods used control of livestock diseases

7.0 REFERENCES/FURTHER READING

Radostits, O.M., Gay, C.C., Blood, D.C., and Hinchcliff, K.W., 2000. Veterinary Medi- cine. A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th Ed. W.B. Saunders, Philadelphia

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