CATTLE DISEASE DIAGNOSTIC MEASURES IN KERALA

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INTRODUCTION

Cattle farming plays a crucial role in the economy of Kerala, a state located in southern India. The state's agricultural landscape is dominated by smallholder farms, and cattle farming is a significant source of livelihood for farmers in the region. However, the prevalence of various diseases among cattle poses a significant threat to their health and the livelihoods of farmers who rely on them. To combat this, veterinarians in Kerala employ various diagnostic measures to detect and manage cattle diseases. These measures include clinical examinations, blood tests, skin tests, milk tests, and necropsies. Additionally, preventive measures, such as vaccination, deworming, and proper hygiene, are also implemented to protect cattle from diseases. Herein, we will explore in detail the various cattle disease diagnostic measures used in Kerala, along with the preventive measures taken to ensure the health and wellbeing of these animals.

The increase in productivity of livestock and poultry in Kerala due to modern scientific breeding programs has led to the emergence of new challenges in the form of animal diseases. While in the past, the low productivity of animals made the economic impact of diseases relatively low, the high-yielding crossbred animals of today are much more susceptible to common as well as newly

emerging diseases. The economic losses caused by animal diseases can be significant, affecting not only farmers but also the wider economy through decreased productivity and trade restrictions.
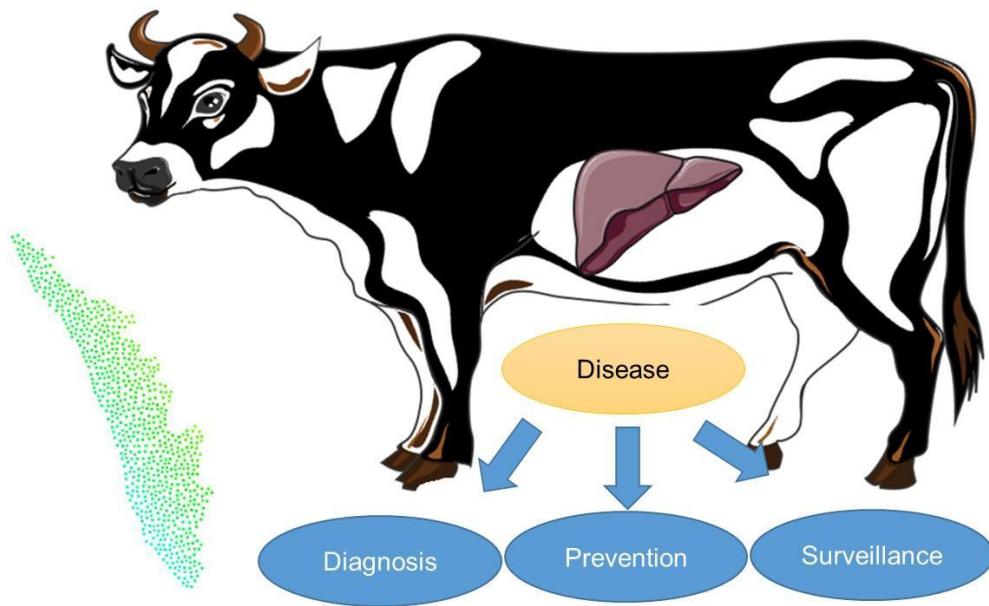

Figure: Schematic representation of cattle disease measures in Kerala.

Cattle in Kerala are prone to a variety of diseases, including Foot and Mouth Disease (FMD), Anthrax, Bovine Tuberculosis (TB), and Brucellosis. FMD is a highly contagious viral disease that causes fever, blisters, and sores in the mouth and on the feet of cattle. Anthrax is a bacterial disease that affects both animals and humans and can be fatal if left untreated. TB is a bacterial disease that primarily affects the lungs but can also spread to other parts of the body. Brucellosis is a bacterial infection that affects cows and can lead to abortion, infertility, and reduced milk production. To diagnose these diseases, veterinarians in Kerala employ various diagnostic

measures, including clinical examinations, blood tests, skin tests, milk tests, and necropsies. A clinical examination is the first step in diagnosing a disease. Veterinarians conduct a physical examination of the animal to check for any visible signs of illness, such as fever, loss of appetite, lethargy, coughing, or diarrhea. This helps to detect the presence of the disease early on.

The Disease Investigation Unit (Cattle) was established to investigate and diagnose diseases in cattle, which is of great importance to the farmers in Kerala who rely on cattle for their livelihoods. The unit uses various diagnostic measures, including clinical examinations, blood tests, skin tests, milk tests, and necropsies, to identify and manage cattle diseases. The Disease Investigation Unit (Poultry) is dedicated to investigating and diagnosing diseases in poultry, which is also a significant industry in Kerala. This unit employs similar diagnostic measures, along with other specialized tests, to detect and manage poultry diseases. The Disease Investigation Unit (T.B) is responsible for investigating tuberculosis in animals, including cattle, which can have significant economic and public health implications.

The establishment of these specialized units has greatly enhanced the ability of veterinarians in Kerala to diagnose and manage animal diseases. The Disease Investigation Officers, who are highly trained professionals, are responsible for investigating disease outbreaks, providing diagnostic support to veterinarians in the field, and conducting research on animal diseases. Their work is critical to the early detection and management of animal diseases, which is crucial for minimizing economic losses and protecting public health.

COMMON DIAGNOSTIC TESTS

a. Blood Test:

Blood tests are also commonly used to diagnose cattle diseases in Kerala. Blood samples are taken from the animal and tested for specific antibodies or antigens that indicate the presence of the disease. For example, in the case of FMD, a blood test is performed to detect the presence of FMD virus antibodies. Similarly, in the case of TB, a blood test can help detect the presence of Mycobacterium bovis, the bacteria that cause the disease.

Blood tests are a commonly used diagnostic tool for detecting and diagnosing various diseases in cattle. In addition to clinical signs, blood tests can provide valuable information on the animal's immune response, organ function, and overall health status. Blood samples can be easily collected from the animal and analyzed in a laboratory setting to provide a comprehensive assessment of the animal's health. One type of blood test commonly used in cattle disease diagnosis is a complete blood count (CBC). A CBC provides information on the animal's red blood cell count, white blood cell count, and platelet count. Changes in these values can indicate the presence of an infection or inflammation, as well as other diseases such as anemia, leukemia, and blood parasites. Another commonly used blood test is serum biochemistry. Serum biochemistry measures various compounds in the blood, such as enzymes, electrolytes, and proteins. Abnormal levels of these compounds can indicate liver or kidney dysfunction, metabolic disorders, or other diseases such as Johne's disease or bovine viral diarrhea virus. Serological tests are also used in cattle disease diagnosis. These tests detect the presence of antibodies in the animal's blood against a particular pathogen. Serological tests are commonly used to diagnose diseases such as bovine brucellosis, tuberculosis, and leptospirosis. In addition to these tests, molecular diagnostic techniques such as polymerase chain reaction (PCR) and

accubits
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loop-mediated isothermal amplification (LAMP) can also be used to detect the DNA or RNA of various pathogens in blood samples. These techniques are highly sensitive and specific and can be used to detect even low levels of the pathogen in the animal's blood. Blood tests are a valuable diagnostic tool for cattle disease diagnosis, as they provide quick and non-invasive information on the animal's health status. Veterinarians can use the information provided by blood tests to make informed treatment decisions and prevent the spread of infectious diseases. However, it is important to note that blood tests are only one component of a comprehensive diagnostic workup, and clinical signs and other diagnostic tests should also be taken into consideration.

b. Skin tests

Skin tests are a valuable diagnostic tool used in cattle disease diagnosis. These tests are commonly used to detect diseases that are caused by intracellular bacteria, such as tuberculosis and Johne's disease. Skin tests involve the injection of a small amount of purified protein derivative (PPD) or other antigens into the skin of the animal, typically on the neck or shoulder. The injection site is then monitored for any signs of a reaction, such as swelling or redness. The most commonly used skin test in cattle disease diagnosis is the tuberculin skin test. The tuberculin skin test is used to detect bovine tuberculosis, a chronic and contagious bacterial disease caused by Mycobacterium bovis. The test involves the injection of a small amount of tuberculin PPD into the skin of the animal. The injection site is then monitored for 72 hours, and any signs of a reaction, such as swelling or redness, are recorded. A positive reaction indicates that the animal has been exposed to the bacteria that causes tuberculosis, but does not necessarily mean that the animal is infected. Further diagnostic tests, such as blood tests and radiography, may be necessary to confirm a diagnosis. In response to this situation, the Veterinary College in Mannuthy, Thrissur established a disease investigation organization with three specialized units dedicated to investigating cattle, poultry, and tuberculosis. Each unit was

placed under the control of a Disease Investigation Officer in the rank of Assistant Director. The establishment of these units was a significant step in the efforts to combat animal diseases in Kerala, as it allowed for a more systematic approach to disease investigation and control.

Another skin test commonly used in cattle disease diagnosis is the Johnin skin test. The Johnin skin test is used to detect Johne's disease, a chronic and contagious bacterial disease caused by Mycobacterium avium subspecies paratuberculosis. The test involves the injection of a small amount of Johnin PPD into the skin of the animal. The injection site is then monitored for 72 hours, and any signs of a reaction, such as swelling or redness, are recorded. A positive reaction indicates that the animal has been exposed to the bacteria that causes Johne's disease, but does not necessarily mean that the animal is infected. Further diagnostic tests, such as fecal culture and PCR, may be necessary to confirm a diagnosis. In addition to these tests, other skin tests, such as the mallein test for glanders and the avian and bovine tuberculin skin tests for avian and human tuberculosis, may also be used in cattle disease diagnosis. Skin tests are a valuable diagnostic tool for detecting diseases that are caused by intracellular bacteria, and can be used to identify infected animals before they show clinical signs. However, it is important to note that skin tests are not foolproof, and false positives and false negatives can occur. Therefore, skin tests should always be used in conjunction with other diagnostic tests to confirm a diagnosis.

c. Milk tests

Milk tests are a useful diagnostic tool for detecting certain diseases in dairy cattle. Milk is a readily available sample that can be easily collected from the animal, making it a convenient and non-invasive diagnostic method. Milk tests can be used to detect bacterial infections, viral infections, and other diseases that can affect milk production and quality. Milk samples are collected from cows to test for the presence of bacteria that cause the disease. If the bacteria are

present, the milk will test positive for the disease. In some cases, if an animal dies suddenly or shows signs of severe illness, a post-mortem examination or necropsy is conducted to identify the cause of death and diagnose any underlying diseases. This helps to identify the disease quickly and take necessary measures to prevent further spread of the disease. One type of milk test used in cattle disease diagnosis is the California Mastitis Test (CMT). The CMT is a simple and quick test used to detect mastitis, a common bacterial infection that affects the udder of dairy cows. The test involves adding a small amount of CMT reagent to a milk sample, and observing any changes in the viscosity or appearance of the milk. A positive reaction indicates the presence of mastitis, and further diagnostic tests, such as bacterial culture and sensitivity testing, may be necessary to identify the causative bacteria and determine an appropriate treatment plan. Another milk test commonly used in cattle disease diagnosis is the somatic cell count (SCC) test. The SCC test measures the number of white blood cells, or somatic cells, present in a milk sample. High SCC values are indicative of inflammation in the udder and can be caused by bacterial infections, such as mastitis. The SCC test is routinely used in the dairy industry to monitor udder health and detect subclinical mastitis, which can affect milk production and quality. In addition to these tests, milk can also be tested for the presence of viral infections, such as bovine viral diarrhea virus (BVDV) and bovine leukemia virus (BLV), using various diagnostic techniques such as ELISA and PCR. Milk tests are a valuable diagnostic tool for detecting certain diseases in dairy cattle, and can be used to identify infected animals before they show clinical signs. However, it is important to note that milk tests are not foolproof, and false positives and false negatives can occur. Therefore, milk tests should always be used in conjunction with other diagnostic tests to confirm a diagnosis.

d. Necropsy

If an animal dies suddenly or shows signs of severe illness, a post-mortem examination or necropsy is conducted to identify the cause of death and diagnose any underlying diseases.

Necropsy, also known as post-mortem examination or autopsy, is an important diagnostic tool used in cattle disease diagnosis. It involves the examination of the body of a deceased animal to determine the cause of death and identify any underlying health issues or diseases. Necropsy can be performed on individual animals or as part of a herd health investigation, and can provide valuable information for disease control and prevention. During necropsy, the body of the animal is thoroughly examined both externally and internally. The external examination includes the assessment of body condition, skin lesions, and other external abnormalities. The internal examination involves the dissection of the animal to examine the organs and tissues, such as the lungs, liver, heart, kidneys, and lymph nodes. Tissue samples may also be collected for further laboratory testing, such as histopathology and microbiology. Necropsy can help identify a wide range of diseases and health issues in cattle, including infectious diseases such as bovine tuberculosis, Johne's disease, and foot-and-mouth disease, as well as non-infectious conditions such as toxicities and metabolic disorders. Necropsy can also provide information on disease prevalence, transmission routes, and risk factors, which can be used to develop targeted control and prevention strategies. Necropsy is particularly important in cases of sudden death or unexplained illness in cattle. It can help to determine the cause of death and identify any potential health threats to other animals in the herd. Necropsy can also provide valuable information for veterinary practitioners, researchers, and public health officials, helping to improve disease surveillance and control measures.

PREVENTIVE MEASURES

In addition to these diagnostic measures, preventive measures are also taken to protect cattle from diseases. Vaccination against FMD, Brucellosis, and Anthrax is a common preventive measure. Regular deworming is also essential to protect cattle from parasitic infections that can lead to illness and poor health. Proper hygiene and sanitation in the animal's environment are

also critical to prevent the spread of diseases. Here are some preventive measures that can be taken for cattle disease diagnosis:

1. Vaccination: Vaccination is one of the most effective preventive measures for cattle diseases. Vaccines are available for a range of diseases, such as bovine viral diarrhea virus (BVDV), infectious bovine rhinotracheitis (IBR), and foot-and-mouth disease. Vaccination can prevent the occurrence of diseases and reduce their severity.
2. Biosecurity: Biosecurity measures are important in preventing the spread of diseases between animals and herds. This includes measures such as quarantine, disinfection, and the use of protective clothing and equipment. All visitors to the farm should be required to follow biosecurity protocols.
3. Proper nutrition: Proper nutrition is essential for maintaining the health and immunity of cattle. A balanced diet that meets the nutritional requirements of cattle can help prevent diseases and reduce the severity of infections.
4. Regular veterinary checkups: Regular veterinary checkups can help identify potential health issues and prevent the spread of diseases. A veterinarian can provide advice on disease prevention, vaccination schedules, and treatment options.
5. Herd management: Proper herd management practices, such as proper housing, ventilation, and sanitation, can help prevent the spread of diseases between animals. Regular monitoring of the herd for signs of illness can also help prevent the spread of diseases.
6. Testing: Regular testing of animals for diseases, such as tuberculosis and brucellosis, can help identify infected animals and prevent the spread of disease within the herd.
7. Record keeping: Keeping detailed records of animal health and management practices can help identify potential risk factors and prevent the spread of diseases.

The government of Kerala has implemented several measures to ensure the health and wellbeing of cattle in the state. The state has established veterinary hospitals and clinics in various parts of the state to provide accessible and affordable veterinary care to farmers. The government provides training to veterinarians and farmers on disease prevention and management. Regular health camps are conducted to monitor and diagnose cattle diseases. The government also provides financial assistance to farmers for the purchase of vaccines.

DISEASE SURVEILLANCE

Surveillance is a crucial aspect of cattle disease diagnosis and prevention. It involves the ongoing monitoring and analysis of animal health data to detect and respond to disease outbreaks in a timely manner. By constantly monitoring the animal health data and identifying patterns and trends in disease occurrence, stakeholders can quickly identify outbreaks and respond with the appropriate control measures. Effective surveillance also involves an accurate diagnosis of diseases, risk assessment, rapid response to outbreaks, data analysis, and communication with stakeholders. Surveillance involves the ongoing monitoring of animal health data, such as mortality rates, clinical signs, and laboratory test results. This data is used to identify patterns and trends in disease occurrence, which can help detect outbreaks and emerging diseases. Accurate and timely reporting of disease data is essential for effective surveillance. Veterinarians, farmers, and other stakeholders should be encouraged to report any suspected cases of disease to the relevant authorities. Diagnostic tests, such as blood tests, skin tests, milk tests, and necropsy, should be performed as necessary to confirm disease diagnoses. Risk assessment is an important aspect of surveillance. It involves the identification of potential risk factors for disease occurrence and spread, such as herd size, animal movements, and biosecurity measures. Rapid response to disease outbreaks is essential for preventing the spread of disease. This may include measures such as quarantine, culling infected animals, and disinfection of

premises. Data analysis is a critical component of surveillance. The ongoing analysis of disease data can help identify patterns and trends in disease occurrence, which can inform disease control and prevention strategies. Effective communication is essential for successful surveillance. Stakeholders should be kept informed of disease occurrences, control measures, and prevention strategies. Ultimately, surveillance is essential for maintaining the health and productivity of cattle populations and ensuring the safety of the food supply chain.

CONCLUSION

In conclusion, the increase in productivity of livestock and poultry in Kerala has brought with it new challenges in the form of animal diseases. The establishment of the Disease Investigation Organization with its specialized units dedicated to investigating cattle, poultry, and tuberculosis has greatly enhanced the ability of veterinarians in Kerala to diagnose and manage these diseases. The work of the Disease Investigation Officers is critical to the early detection and management of animal diseases, which is crucial for minimizing economic losses and protecting public health. Cattle disease diagnosis, prevention, and surveillance are all essential components of maintaining healthy and productive cattle populations. By using various diagnostic measures, implementing preventive measures, and constantly monitoring and analyzing animal health data, stakeholders can detect and respond to disease outbreaks in a timely manner, reducing the impact and spread of diseases in cattle populations. Effective communication and collaboration between veterinarians, farmers, and other stakeholders is also essential for successful disease prevention and surveillance. Ultimately, by implementing comprehensive disease control and prevention strategies, we can ensure the health and welfare of cattle populations and the safety of the food supply chain.

Reference

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