given herd.

- It will save the farmer from unnecessary expenditure on inefficient treatment regimes.
- Improved animal productivity resulting from effective nagana control should lead to better farmer incomes.
- The techniques are applicable to sleeping sickness

The use of molecular characterisation to study the variability of Newcastle disease viruses from recent outbreaks in eastern Uganda.

Introduction

Newcastle disease is World wide affecting primarily birds particularly chicken. It is a major constraint causing economic losses in poultry industry. The Virus is a single strand RNA. Recent molecular techniques can identify differences, which correlate with different virulent phenotypes.



First Newcastle disease outbreak in Uganda was documented in 1955 but was not until 1986 when the virus was characterised using monoclonal antibodies as virulent. Currently molecular characterisation is being used to study the variability of Newcastle viruses.

Virus isolates

16 Newcastle disease virus isolates from different outbreaks in Pallisa, Tororo, and Soroti were prepared and tested using Haemagglutination Inhibition (HI) and Haemagglution (HA) tests. The virus isolates were characterised by Reverse Transcriptase PCR (RT-PCR) technique

Results

- Serological tests showed that the virus strains identified were of wild type, not of vaccine origin
- Intercerebral Pathogenic Index of 1.8 indicated that the virus strains were virulent types
- The amino acids around the F2/F1 cleavage site
- indicated that the virus strains were virulent.
- Phylogenetic analysis showed that the virus strains were identical and belonged to 8 genotypes
- Similarity in F gene amino acid sequence, pathogenicity and clustering of isolates suggested common source of infection and ancestry.

Benefits

- Healthy birds,
- Improved diagnostic tools put in place
- Improved vaccines prepared for Ugandan strains
- Effective Newcastle Disease control strategy put in place
- Increased income to farmers from sale of birds and eggs

Application of microsatelite markers in genetic characterization of indigenous chickens in Uganda.

Introduction

Although indigenous chickens constitute 90% of the national chicken flock, nothing is known about their genetic constitutions and true performance potential.

Characteristics of microsatelite markers

- Short DNA fragments with motif repeats
- High degree of hypervariability
- Abundant and well distributed in genomes
- Appropriate tools: linkage mapping, identification of quantitative trait loci, and parentage testing

Methodology

Collection of blood samples, DNA extraction and quantification, Amplification of DNA amplicons and Analysis of amplified products

Expected benefits

- Specific genetic constitutions of indigenous chickens will be determined
- This will be used to develop appropriate breeding lines for various agroecologies in Uganda
- Improved indigenous chicken for rural farmers
- Enhanced national strategic breeding programs

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BIOTECHNOLOGY RESEARCH IN LIVESTOCK

NARO



2003

Application of Polymerase Chain Reaction (PCR) in the diagnosis of animal trypanosomosis (Nagana)and Contagious Bovine Pleuropneumonia (CBPP) in Uganda.

Introduction

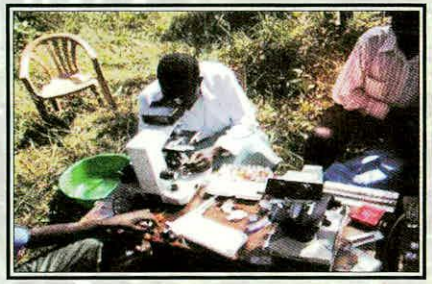


Animal diseases constitute one of the most important constraints in livestock production in Uganda; and their diagnosis is problematic due to lack of highly sensitive, specific and field friendly tests.

Diagnosis of both trypanosomosis and contagious bovine Plueropneumonia is difficult partly because the current diagnostic tests have low sensitivities and specificities.

Current diagnostic tests:

- Parasite examination tests are simple, cheap and field applicable, but have low sensitivities and specificities.



- Serological tests detect suspected infected animals on which to focus parasite demonstration. These tests are problematic because antigens and antibodies lack stability and reproducibility; hence give false positives and negatives.

Molecular tests are highly sensitive but are still costly in terms of reagents and equipment and restricted to laboratories. However, Polymerase chain reaction is becoming cheaper and wide spread in diagnosis of diseases.

Procedure

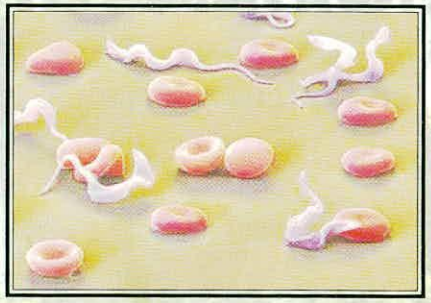
Extraction of DNA,PCR amplification,Separation of DNA and Identification of stained bands.

Expected benefits

- PCR test will be used to accurately assess disease prevalence and assist policy makers in focusing and implementing appropriate disease control strategies.
- Detection of infected cattle that test negative by serological tests will help in disease eradication.
- Rural poor farmers would benefit since infected animals would be treated and reduce spread of disease.
- Increase in income to farmers through sale of healthy animals and their by products.
- Improved monitoring of control programme with more sensitive diagnostic tests will result in large numbers of infected animals identified and
- Country would be zoned into specific disease free zones for beef production.

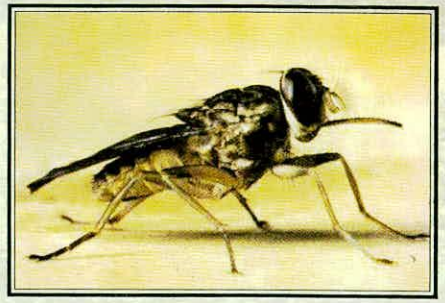
The use of molecular markers in the identification of drug resistance in trypanosomes.

Introduction



African trypanosomosis is transmitted by the bite of a tsetse fly to either animals or humans. In animals especially cattle it causes nagana and in humans it causes sleeping sickness. The disease is fatal if not treated. About 10 millions square kilometres of arable land is infested with tsetse flies, which hinders the development of livestock production.

- Africa loses US$ 1,338 millions annually due to reduced animal productivity caused by nagana and spends about US$ 35 millions on nagana treatment.



Faced with the continued lack of a vaccine against trypanosomosis, chemotherapy remains the main control strategy. Few drugs are available and drug resistance in all trypanosome species has been reported from all regions of Africa.

- Resistance in animal trypanosomosis has been reported for all drugs in use.
- Over the past few years, treatment failures using melarsoprol are the increase particularly in Angola, Sudan Democratic republic of Congo and Uganda.
- Relapse rates of up to 30% have been reported in sleeping sickness in north west Uganda.

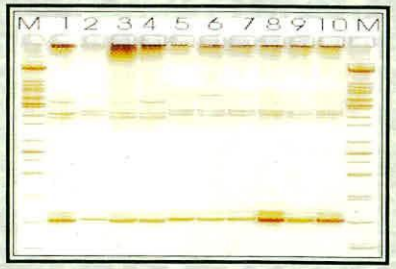
Identification of markers

Some of the currently used drugs use nutrient transporters to enter trypanosomes. Genetic changes (mutations) in these transporters render the parasite drug resistant.

By genetic analysis, drug resistance parasites can now be distinguished from drug sensitive trypanosomes.

Benefits from the use of these techniques

- The Veterinarian can now reliably predict the potential treatment outcome.
- This enables a proper decision of the right drug to administer to a



SSCP Analysis: 1, 3, 4 are wild type (sensitive) 2, 5, 6, 7 are mutants (resistant)