



SOKOINE UNIVERSITY OF AGRICULTURE  
FACULTY OF AGRICULTURE  
DEPARTMENT OF CROP SCIENCE AND  
PRODUCTION  
P.O. BOX 3005, CHUO KIKUU, MOROGORO,  
TANZANIA  
TEL: 255023 260 3661/260 3681/260 3511-4; FAX 255 2600167  
E-Mail: [headcrop@suanet.ac.tz](mailto:headcrop@suanet.ac.tz)/[pscrops@suanet.ac.tz](mailto:pscrops@suanet.ac.tz)

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# PLANT DISEASE DIAGNOSTIC CAPACITY AND NEEDS IN CROP PRODUCTION.

JACKSON B.NAHSON

Dept.of Crop Science and Production.

- **SUA MAIN CAMPUS**



The Main Campus lies on the slopes of the Uluguru Mountains at an altitude of about 500-600 metres above sea level and receives an average annual rainfall of between 600 - 1000 mm.

It is situated at about 1.2kms from Morogoro Town.

# GOALS.

- To enhance the food production capacity and the nutritional status of resource-poor people as a result of development of better preventive and control strategies against seed borne diseases.

# SPECIFIC OBJECTIVES.

- To assess the prevalence, distribution and impact of the most important seed borne diseases in the major crops in different ecological zones.
- To disseminate knowledge on the plant disease management and control to local farmers.

# WHO ARE INVOLVED?

- The University staff
- Researchers
- Students

# METHODOLOGY

The techniques for isolation,  
Characterization and  
identification of;

- Plant pathogenic Fungi
- Plant pathogenic Bacteria
- Plant pathogenic Viruses

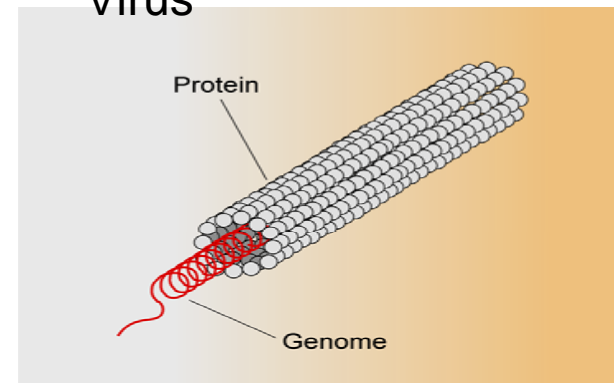
Fungi



Bacteria



Virus



# Plant pathogenic Fungi

- They are isolated from Foliage, Stem, Leaf, Root, Seeds and Grains.
- Seeds are plated on blotters and incubated
- The isolation media is mainly PDA
- The observation and characterization is by Stereo and Compound Microscopes where they are identified basing on the form of their mycelium and conidia arrangements.

P.C.AGARWAL 1989. Seed-borne disease and Seed Health Testing of Rice.

## Fungi on seeds



# Plant pathogenic Bacteria.

- They are isolated from the infected parts of plants (leaf, sheath and fruit).
- Seeds or grains are directly plated on general media or selective media for growth (fig.1)OR
- Sown for observation of symptoms on the seedlings and then isolated.
- Characterization is done by observing its colony morphology and gram reaction.
- Tests for identification includes Biochemical, Pathogenicity, hypersensitive reaction, Serological and Molecular tests.

C.N.Mortensen(2005).Seed Bacteriology Laboratory guide

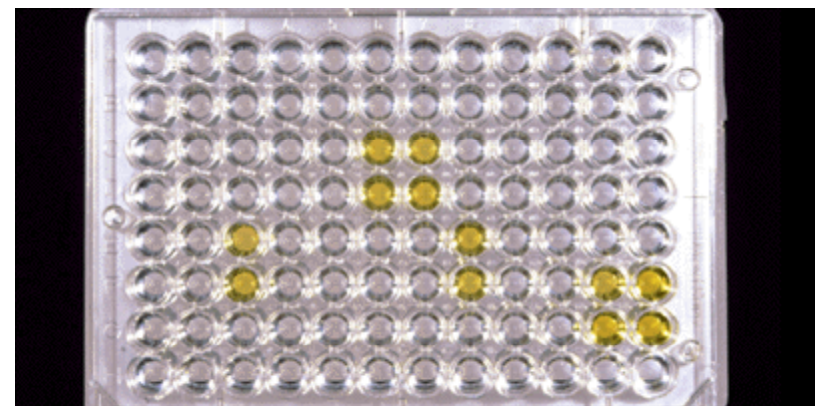
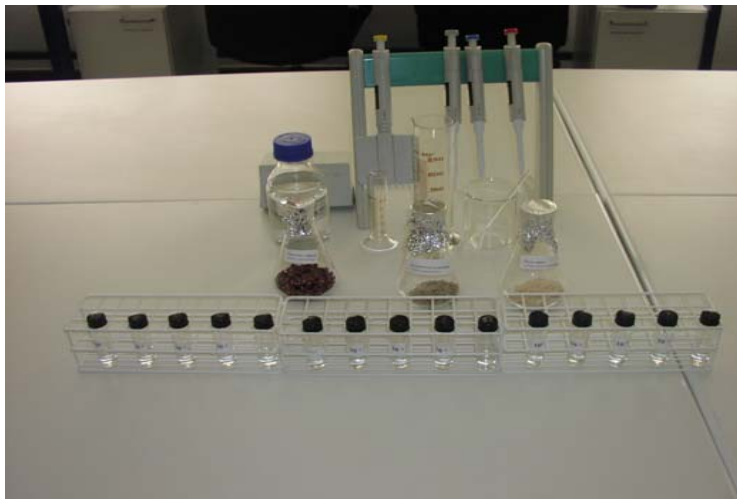
Adams,M.H.,1959.Bacteriophages.Interscience,New York and London.



Liquid assay



Direct plating (fig.1)



Serological testing

# Plant pathogenic Viruses.

Plant Virus diagnosis techniques are:

- Biological assays which involves;

## 1. GROWING-ON TEST.

Seedlings are raised from seeds and several viral symptoms observed. These includes dwarfism, chlorosis, mosaic, mottling, ringspots, vein banding, necrosis, leaf rolling, curling and wrinkling.

The symptom-bearing seedlings are harvested, homogenised and tested serologically

S.E. Albrechtsen (2006). Testing methods for Seed-Transmitted Viruses.

anon. (2004b) International rules for Seed Testing.

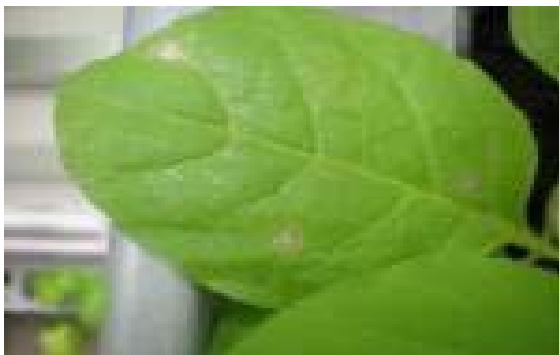
Or Molecularly.

## 2.INDICATOR PLANT SYMPTOMS.

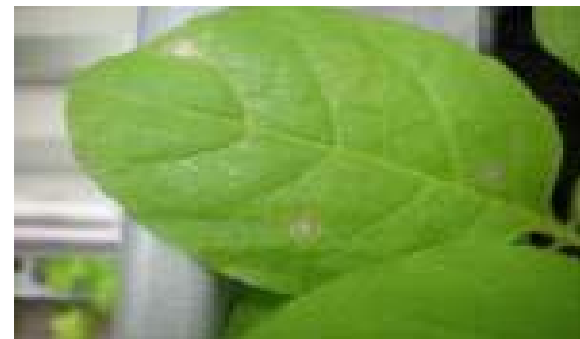
Plant indicator species and cultivars such as Chenopodium, Nicotiana, Cucumis and Phaseolus are used in virus diagnosis.

These species are inoculated with a specific virus strain and symptoms observed, these includes local and systemic symptoms.

TMV on  
N.Clevelandii



ToMV on N.glutinosa



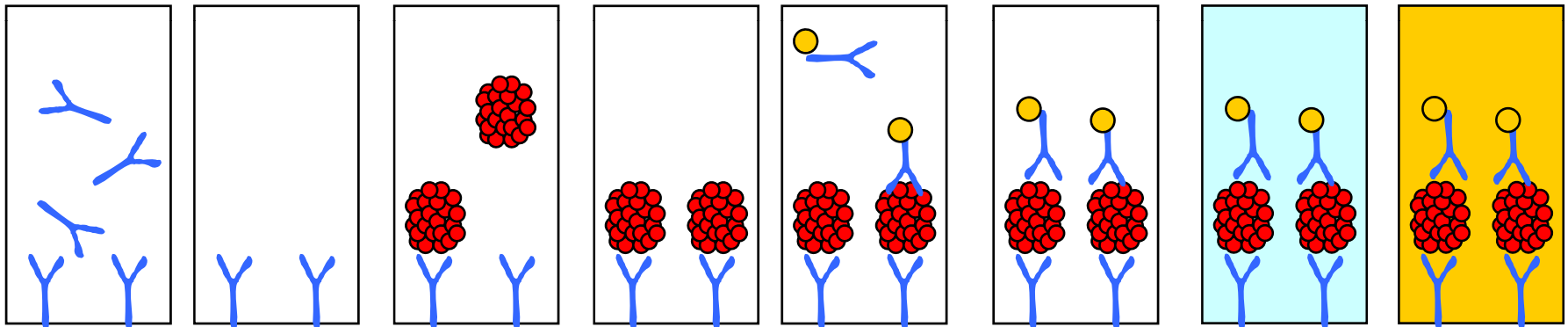
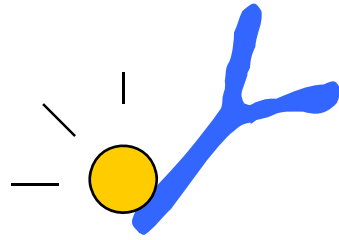
# Serological testing methods.

- The use of a specific reaction between an antibody and its corresponding antigen.

This is done by a sensitive serological assay called, Enzyme-linked immunosorbent assay (ELISA).

The type of ELISA we prefer is AgF (Indirect type).

# ELISA    Enzyme-linked immuno-sorbent assay



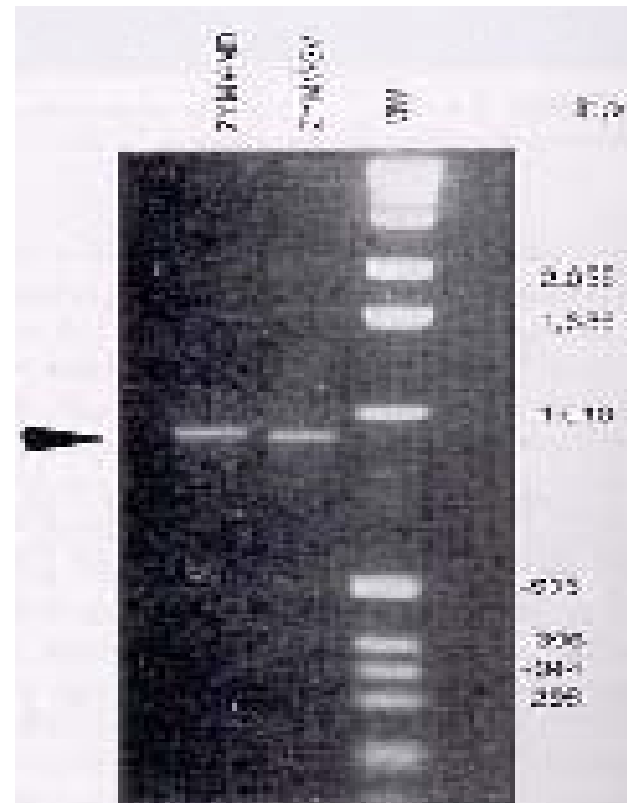
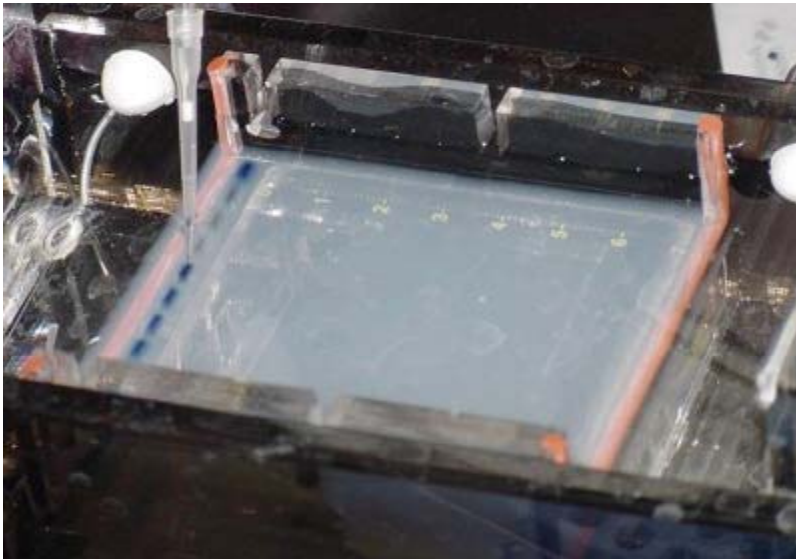
## THE MOLECULAR ASSAY METHODS.

- Denaturation of dsDNA, Annealing of the primers to complementary nucleotides and Extension of DNA strands by the Enzyme Polymerase.
- Loading the gel with PCR master mix in the Electrophoresis tank.
- Observing the amplified bands under the UV-transilluminator.

## THERMAL CYCLER



## ELECTROPHORESIS



PDD

REINFORCEMENT AND PLANS.

ASHC



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- 4-6<sup>th</sup> April,2006,there was an inauguration of African Seed Health Centre, which is within the Department of Crop Science and Production.The Centre was funded by DANIDA through Danish Seed Health Centre (DSHC)
  - It consists of four Labs; Bacteriology,Mycology,Virology and Seed testing.It is offering Postgraduate studies on Plant Pathology,Seed Technology and Diploma on Seed Technology.

# AKNOWLEDGEMENT.

- On behalf of my Institute, I sincerely acknowledge the ideas, plans and implementation of this very important workshop.
- There is no doubt, the knowledge gained here will be helpful to every participant.

THANK YOU ALL.