


The Plant Quarantine and Bio-security Station (PQBS) of KEPHIS

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Plant Quarantine and Biosecurity Station (PQBS)

Introduction and history

- Quarantine stations are established to prevent introduction, establishment and spread of risky pests.
- Quarantine services in East Africa started in 1931 at Amani, Tanzania
- In 1951, the quarantine facility was transferred from Amani to the present site at Muguga.
- It served the three East Africa countries (Kenya, Uganda and Tanzania) until July 1977

Introduction and history, Cont'

- Moved to **Muguga Plant Quarantine Station** in 1977 under the Ministry of Agriculture and later to the then Kenya Agricultural Research Institute (KARI)
- Handed over to KEPHIS upon its Formation in **1996**
- The station stands on an isolated 4 hactare land, 30 Km west of Nairobi and 6Km off Zambezi junction along Nairobi - Nakuru Highway

ROLES AND FUNCTIONS OF THE PQBS

- The station offers **diagnostic** and **advisory** services related to **plant pests** and **diseases**
- The main objective is the **prevention of introduction and spread** of plant pests, diseases and noxious weeds.
- **Facilitates trade** by delaying or totally preventing spread of pests and diseases
- **Supports Phytosanitary decision making** (e.g. risk analysis, inspections, diagnostics)
- **Facilitates exchange of germplasm** (disease/pest free)
- PQBS has been designated by **COMESA** as a **Regional Reference Laboratory for Plant Health**

Capacity of the station

- Equipment/ Facilities
- Trained and skilled personnel
- ISO 17025:2005 Accredited
- Traceability of samples with the use of LIMS
- Capacity building for clients
- Containment Facilities for
  - Plant
  - Insects
- Collaborative activities with stakeholders

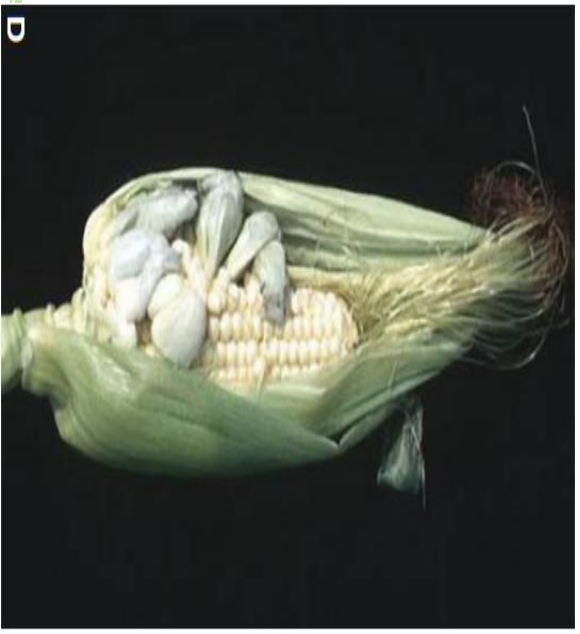
Current diagnostic capacity

The station has **7** fully equipped laboratories

1. Mycology
2. Nematology,
3. Entomology,
4. Bacteriology,
5. Virology,
6. Molecular biology and
7. Tissue culture

Mycology Lab

- The lab diagnoses fungal pathogens affecting plants
- Samples include all plant parts as well as soil and other media
- Both classical(incubation and culture) and modern techniques(molecular) are used.

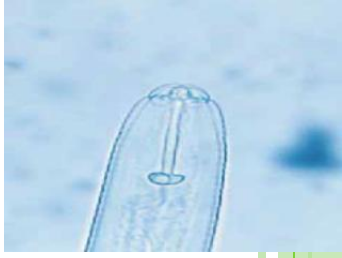


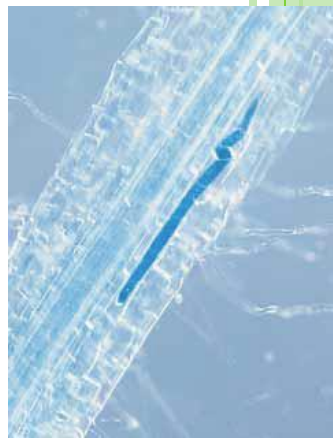

NEMATOLOGY LAB

This lab detects and identifies **plant parasitic** nematodes in;-

- Soil and other growth media
- Water for irrigation
- Plant tissues (roots, seeds etc)
- Processed plant products e.g. coco-peat

The process involves **sample extraction** followed by **nematode identification** and counting.





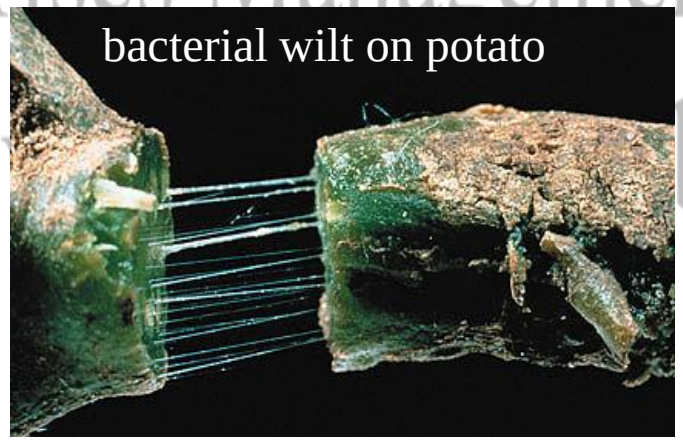
NEMATOLOGY LAB

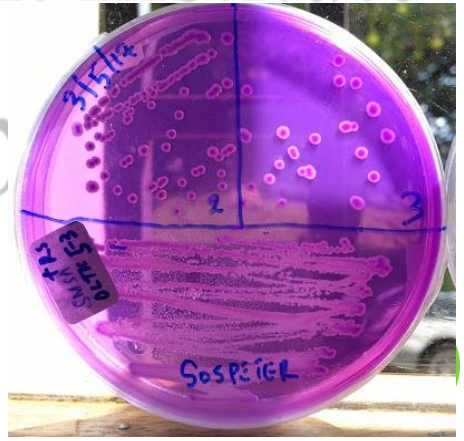
Extraction of cysts using Fenwick Can

Bacteriology Lab

This lab detects and identifies **plant pathogenic bacteria** in;-

- Soil and other growth media
- Water for irrigation
- Plant tissues (roots, seeds, fruits etc)





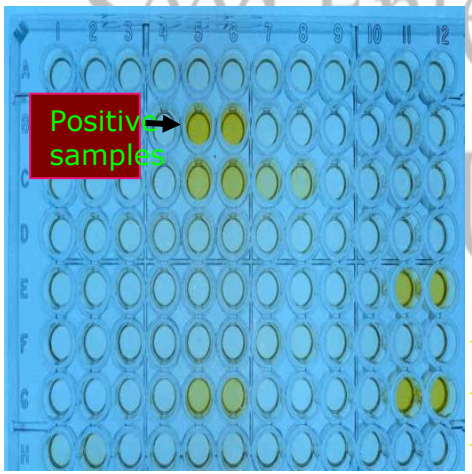
Bacteriology Lab

VIROLOGY LAB

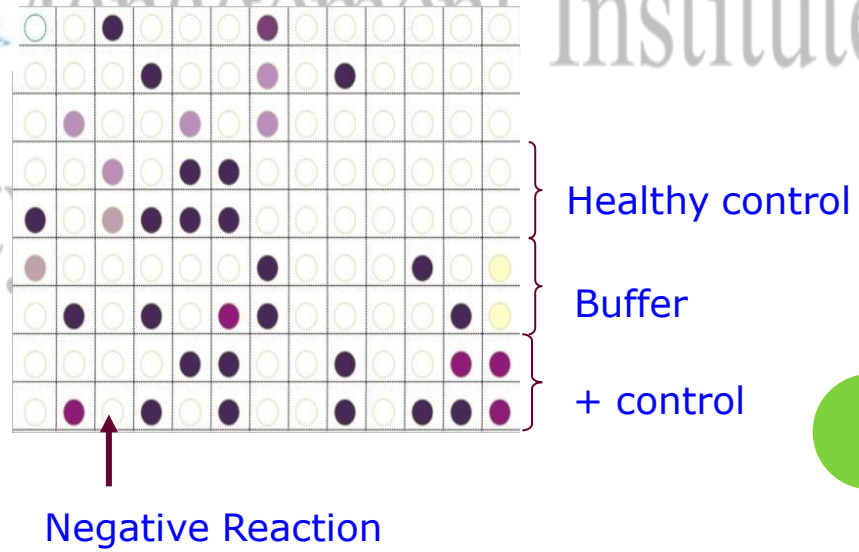
This lab detects **plant pathogenic viruses** in plant tissues (leaves, seeds, fruits etc) using several methods :

- ELISA, Mechanical inoculations, immuno strip assay grafting and grow out tests

DAS ELISA



NCM ELISA



VIROLOGY LAB

ENTOMOLOGY LAB

This lab identifies wide range of **insect and arachnid pests**

Molecular Biology Lab

- Diagnosis of plant pathogens using conventional, realtime Polymerase Chain Reaction (PCR) and Loop Mediated Isothermal Amplification (LAMP)
- DNA Barcoding for identification of pests

Molecular Biology Lab

Modern diagnostic equipments

Tissue Culture Lab

This lab undertakes pathogen cleanup through the use of themotherapy combined with meristem tip culture. They are also involved in the rapid multiplication of pathogen free plan material

Containment facilities

Other recent developments

- Cooled incubators for culture of insects and other pests
- Improved capacity for the detection of cyst nematodes
- Specialized microscopes to enhance pest identification as well as documentation and sharing of results
- Automated greenhouses with temperature and rain sensors, heating and cooling
- The adoption of modern diagnostic methods such as DNA barcoding, Next Generation Sequencing and Loop Mediated Isothermal Amplification (LAMP) assays.
- The use of Laboratory Information Management System for improved traceability and lab management.
- Links with international research bodies eg ILRI BecA, CABI and IPDN etc

SEED CERTIFICATION AND SEED TRADE

- **Field inspection**
  This is the first step in seed certification. Before field inspection commences the seed merchants must:
  Register their fields for inspection
- Provide proof of origin of the parental materials of the varieties registered for inspection. If a new variety, this must also include the descriptors of the parental materials
- Minimum isolation distance must be observed. Timely inspection in the fields is conducted to ensure that seed resulting from a crop meant for seed purpose is of the designated variety (trueness to type) and has not been contaminated genetically or physically (varietal purity) beyond certain specific limits. The crop must be healthy and free from diseases (especially seed borne)

- **Seed Processing**
  Seed crops of approved fields are harvested and processed to remove undesirable contaminants such as weed seeds, inert material, immature seeds, broken and diseased seeds. The seeds are also graded into different sizes and treated with protective chemical
- **Seed Testing**
  Laboratory seed testing is useful in determining quality factors such as purity, germination capacity, moisture content and health status (seed-borne diseases) of seed lots.
- Lab**elling and Sealing**
  Upon satisfactory fulfilment of the prescribed requirement, every seed lot is provided with a label and a seal. Containers are labelled and sealed in such a way the seed cannot be removed or changed without damaging beyond repair, either the container, the label or the sealing device.

- Post Control
  These are tests designed to ascertain whether or not the preceding control measures have been effective. The tests ensure that the characteristics of cultivars/varieties have remained unchanged in the process of multiplication. Under special circumstances, pre-control tests are necessary to determine satisfactory fulfilment of doubted factors.

- Post Certification Survey
  To ensure that all is well with the certified seed till planting time, a post certification survey is conducted at the time of planting throughout the country, by the four regional offices of KEPHIS. Samples are taken from seed stockists, farmers planting and at market places. These samples are planted alongside the post control plots and comparisons made. When complaints of low quality seed arise, such claims are easily verified. All appointed and licensed stockists/sellers must therefore ensure that they only offer for sale certified seed or seed meeting the minimum standards outlined in Cap 326. (All seeds sellers must be registered by KEPHIS).

KEPHIS ROLE IN SEED TRADE

- Registration of seed merchants
- Inspection of storage facilities
- Issuance of seed stockist licenses
- Issuance of seed import and export permits
- Plant variety protection /Breeders rights

Documentation required

- SR14-Notice to import/Export
- ISTA Certificate-Indicates compliance of seed to seed testing rules.
- Import permit
- Export permit

SEMIs UoN

Seed Enterprises Management Institute

University of Nairobi

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University of Nairobi

Thank you

For more information
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