

# LABORATORY CERTIFICATION STANDARDS

**Presented by**

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# Presentation Outline

1. The Need for Laboratory Seed Testing
2. Sampling and Lab follow ups
3. Types of Seed Tests
4. Quality Assurance Issues in Lab Seed Testing

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# Need for lab tests

- The primary **purpose** of Seed Testing is to provide the **seed industry** with a prompt and efficient seed quality testing service, and to encourage the use of **high-quality**, tested seed by the **farming industry**.
- Seed testing remains critical to customers—**farmers, seed companies, government**—to know what they are purchasing.
- It is important to **seed companies** to identify which **seed lots** are of high **quality** and hopefully of high **vigor**.

# Sampling and Lab follow ups

- Laboratory certification indicates final process of seed certification
- Importance of good **sampling** procedures-
- Result of Lab. seed testing depended on how well this was done in the field.
- Hence very critical and crucial

## Lab Procedures:

- Sample receipt, verification and recording
- Sub-sampling for appropriate tests

# Seed Testing

Seed testing procedures include:

- Purity testing
- Germination testing
- Other tests

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# Cont....

In Kenya;

- The first Seed Testing Laboratory was established in 1944 at NARL, Kabete. (mainly used by european farmers to est their seed before export)
- In 1979, the Seed Testing Laboratory was moved to Lanet in Nakuru- NSQCS
- All certified seed must meet minimum seed testing standards set out in the Seeds and Plant Varieties Act (Cap 326)
- The seed testing procedures are carried out in accordance to ISTA standards. (First ISTA meeting held in 1964)

# Purity Analysis

- Cleaned seed should not contain a high percentage of other particles
- objectives of purity analysis is to determine:
  - ❖ composition of sample by weight
  - ❖ Identity of other species and inert matter.
  - ❖ the physical quality of the seed lot
- Components of the sample are separated into the following fractions;
  - Pure seed
  - Other seeds
  - Inert matter

# Cont....

- **Pure seed:**

- ❖ Species stated by the sender Or species found to predominate in the test
- ❖ Includes all botanical varieties/ cultivars
- ❖ Intact seeds
- ❖ Broken seeds, more than one half their original size



# Cont....

## ● Inert matter

- ❖ Soil/earth particles, sand
- ❖ Straw or chaff, stems, leaves, etc
- ❖ Nematode galls
- ❖ All non seed matter
- ❖ Seed and seed like structures like:
  - Pieces of broken or damaged seeds half and less than half of the original size
  - Seed units in which it is readily apparent that there is no true seed present

# Cont...

## ■ **Other seeds:**

❖ Shall include seeds of any plant species other than that of pure seed:

- weed seeds
- crop seeds

### **Apparatus**

- Magnifiers, reflected light, sieves, blowers.
- The purity analysis is done on a working sample taken from the submitted sample.

# Germination Test

- Germination is the emergence and development of essential structures of a seedling to a stage that indicates whether or not it is able to develop further into a satisfactory plant under favourable conditions in soil.
- It can be used to compare the quality of different lots and estimate the field planting value.

- 400 seeds from pure seed fraction planted in four replicates on substrate (paper, sand/organic growing media, soil or on top of paper covered with sand)
- Incubation at controlled conditions for germination
- Evaluate record and calculate into:
  - normal seedlings
  - abnormal
  - hard seeds
  - fresh seeds (dormancy)
  - dead seeds

# Cont....

- Normal seedlings:

- Well developed shoot and root systems,
- shoot and root systems with slight defects or infected with secondary infection.

- Abnormal seedlings:

- Damaged seedlings
- Deformed seedlings
- Decayed seedlings
- Primary infection

## Cont....

- Un-germinated seed- Seeds that failed to germinate by the end of the test period.
  - Fresh seed
  - Dead seed
  - Hard seed

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# Other seed tests

- Tetrazolium test
- Seed vigour testing
- Moisture content

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# Tetrazolium testing

- It is a quick biochemical test that assesses the seed viability using the staining pattern of living tissue.
- This makes it possible to distinguish the red-colored living parts of seeds from the colorless dead ones.

• Living

Dead



## Cont...

- Make a quick estimate of the viability of seed samples in general and those showing dormancy in particular
- Determine viability of individual dormant seeds when there are high percentage of dormant seeds after the end of a germination test

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# Seed vigour testing

- The sum of those properties that determine the activity and performance of seed lots of acceptable germination in a wide range of environments.
- Germination test conducted in optimum conditions-performance of a seed lot in the field cannot be known.
- seed lots having similar laboratory germinations may give widely differing field emergence values.

## Cont....

- two seed lots having the same germination percentage in the laboratory may age differently when stored.

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# Seed aspects associated with Vigour

- Emergence ability of seeds under unfavorable environmental conditions
- Rate and uniformity of seed germination and seedling growth
- Performance after storage, particularly the ability to germinate
- A vigorous seed lot is one that is able to perform well even under environmental conditions not optimal for the species.

# Why vigour tests

- To provide information about the planting value in a wide range of environments and/or storage potential of seed lots
- To provide additional information to the standard germination test to assist in differentiation of seed lots of acceptable germination.

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# Moisture Testing

- The moisture content is an important factor in seed longevity and quality. In seed trade, high seed moisture content may exaggerate the weight of the seed lot and encourage disease infection during storage. The recommended seed moisture content levels are stated in the Seeds and Plant Varieties Act (Cap. 326).

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# Pathology tests

- Seed pathology tests are done to detect and identify seed-borne pathogens.
- Different methods are used depending on the pathogen being investigated (fungi, bacteria or virus).
- Seed pathology is also crucial in the routine seed field inspections and surveillance.

# Seed certificate issuance

- Issuance of certificates-signifying completion of whole process and grant for commercialization
- [12 months validity for cereals, pulses and others; 9 months for vegetables and others]
  - National-Local trade
  - OIC-International trade
  - Electronic database [Internet]

# Quality Assurance

## Issues in Lab Seed Testing

- Accreditation-ISTA
  - Audits-ISTA & National
  - Staffing-Well qualified and undergo specialized trainings locally and internationally
  - QAM-Document (regularly revised) guides all processes of testing and related management issues
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FOR LISTENING*

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