

REPORT ON

TRAINING WORKSHOP ON PRODUCTION AND MARKETING OF HYBRID

MAIZE SEEDS IN GHANA AT KNUST, KUMASI



June, 2019

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Introduction

As Ghana's seed industry continues to be dominated by old open-pollinated varieties (OPV) which are non-uniform, less productive, less tolerant to biotic and abiotic stress and inefficient in inputs usage, the short course for the production and marketing of Hybrid Maize Seeds in Ghana organized in collaboration between Food and Agriculture Organization (FAO), Ministry of Food and Agriculture (MoFA), Kwame Nkrumah University of Science and Technology (KNUST) and National Seed Trade Association of Ghana (NASTAG) aimed at enhancing the capacity of the private seed sector in the best practices of hybrid seed production and marketing which are known for their uniformity and stability in yield. The second phase of this training was from 16th to 20th June, 2019 to enhance the capacities of participants (Private Seed Producers) in the production of hybrid maize on field and in storage.

Objectives

The second phase of the hybrid seed production sought to equip Seed Producers with knowledge on the relevance of plant protection on hybrid seed production, specifically the training sought to equip Seed Producers to appreciate:

- ❖ The economic importance of field/seed borne diseases to varietal purity of seed for the production of high quality seeds.
- ❖ The relevance of quality/healthy maize seed in sustainable agricultural production for future and improved livelihoods.
- ❖ The importance of good land selection, cropping history, good land preparation, planting and management for quality maize seed production.
- ❖ The relevance of post-harvest operations (drying, sorting, shelling, cleaning, grading, seed treatment and packaging) and storage facilities on hybrid seeds.

Training topics and discussion

Field insect pests

Insects

Insects constitute about 75 % to 85 % of total animal population with sizes ranging from 0.2 to 0.75 cm. They have one pair of compound eyes (facet). Insects have three important features that distinguish them from any other animal.

- ❖ Insects have three distinct parts namely head, thorax and abdomen.
- ❖ They have three pairs of legs on each thoracic segment.
- ❖ Insects have two pairs of wings on the meso- and meta thoracic segments.

Pest Associated with maize

- ❖ Plant insects
- ❖ Seed insects
- ❖ Foliage insects
- ❖ Stem insects
- ❖ Post-harvest insects

Types of seed pest

- ❖ Insects
- ❖ Millipedes

- ❖ Lizard and toads
- ❖ Birds
- ❖ Squirrels

Seed pest damage

- ❖ Scratch – Dig up and/or eat up seeds or germinating seeds in the soil.
- ❖ Cut-worms (*Agrotis* spp.) – Feed at night and burrow into soil during the day. One cut-worm has the capacity of cutting 7 – 8 plants per day.
- ❖ Crickets – Cut seedlings at ground level and pull cut seedling into hole to feed.
- ❖ Grasshoppers – Consume leaf and soft parts of stem.
- ❖ Aphids or Plant lice – Pierce and suck, small, sluggish and soft bodied parts of plants. They are usually green but can be brown, red, purple or black.
- ❖ Leafhoppers – Pierce through plant and suck sap, this may lead to plants wilt. They also transmit maize streak virus diseases.

Streak disease

Streak disease is characterized by pale yellow streaks running parallel to veins along the entire length of the leaf. Early infestation may lead to stunted growth of seedlings.

Foliage pest

- ❖ White flies – They are not primary pests of maize. White flies transmit virus diseases faster through piercing and sucking foliages. They hide abaxial (under) surfaces of leaves and produce honeydew onto adaxial (upper) surfaces of lower leaves leading to mould growth and development.
- ❖ Army worm – Mostly attacks grassy plants. The larvae are usually black or dark green in color while pupae are reddish dark brown. Young larvae scrape leaf surface creating translucent panes but do not perforate. Older larvae chew up leaves starting from leaf edge towards mid-vein.

Stem and leaf borers

Stem and leaf borers are important pest of cereals and grasses and can infest up to 70% of monocrops. The major species with agricultural relevance include *Sesamia* spp. (Pink coloured, bore and eat through plant stem), *Busseola* spp., *Eldana* spp. and *Chilo* spp.

Root pests

Wire-worm

The adult female worms dip into soil and lay eggs while young larvae bore into roots and create tunnels. The economic importance of this worm ranges from reduced root systems to reduced water and nutrient absorption. Plants may wilt and suffer stunted growth and lodging.

White grubs

The white grub is whitish and semi-transparent. At rest, the white grub has a C-shape. It is found in soil and feeds on roots.

Termites

There are three species of termites with severe agric-economic importance in maize production. These species namely *Odontotermes* spp, *Macrotermes* spp and *Hodotermes* spp, damage plant stem on fields and some seeds.

Field Diseases

This session (highlight of stored insect pest) was handled by Dr. C. Kwoseh

Losses due to insect infestation are related to storage condition and duration. Infestations are noticed when pest emerge from storage to disperse or scatter as a result of overcrowding.

Kinds of store insects

- ❖ Grain weevil
- ❖ Tropical warehouse moth
- ❖ Biscuit beetle
- ❖ Flour mite
- ❖ Book lice
- ❖ Larger and lesser grain borer
- ❖ Angoumois grain moth
- ❖ Indian meal moth

Prevention and control of store insect pests

Preventive measures

- ❖ Select a place and method of storage that best suit the produce and local conditions.
- ❖ Some produce can be stored unshelled or shelled in cribs.
- ❖ Improve ventilation.
- ❖ Bags should be stacked on pallets.
- ❖ Different products should be stacked separately.
- ❖ Food store should be swept out every week.
- ❖ Seeds should be stored between 10 – 12°C.

Control measures

- ❖ Moisture control – store seeds below 9% moisture content.
- ❖ Chemical control – use of insecticides, fumigants etc.
- ❖ Biological control – use of biological agents to control pest.
- ❖ Integrated Pest Management (IPM) – IPM should be viewed as the best possible management strategy.

Stored product diseases

- ❖ Pathogenic diseases – mostly associated with micro-organisms such as fungi and bacteria.
- ❖ Non-pathogenic diseases – mostly linked to field conditions such as in balance of nutrients on fields.

Factors influencing stored product diseases

- ❖ Field condition
- ❖ Harvesting and handling procedures
- ❖ Conditions during transit and storage

Insect pests of stored maize seeds

This session was led by Dr. Osekre

Type of losses caused by insect pests

- ❖ Qualitative losses

- ❖ Quantitative losses
- ❖ Nutritional losses
- ❖ Economic losses
- ❖ Losses in seed viability

Causes of post-harvest losses/seed

Direct losses

- ❖ Premature harvest
- ❖ Poor maturation
- ❖ Poor threshing
- ❖ Insufficient or poor drying and cleaning
- ❖ Biochemical changes
- ❖ Leakage and waste
- ❖ High moisture content
- ❖ Inadequate storage

Ingredients of Safe Seed Storage (IPM)

- ❖ Prevention – Keep pest from entering a facility or product.
- ❖ Avoidance – Make environment unfavorable for establishment, population growth, and spread.
- ❖ Suppression – Eliminate established infestation.

Remember **DICE** in practicing safe seed storage

D – Dry grain before storage

I – Inspect warehouse area before storing

C – Clean around storage warehouse

E – Examine grain regularly

Recommended insecticides for insect pests

- ❖ Beetles (maize weevil, LGB, LsGB, etc.) – Spinosad, Deltamethrin, Betallic
- ❖ Moths (Angoumois grain moth, *Ephestia*, Indian warehouse moth etc.) – deltamethrin, Allethrin

List of Participants

S/n	Name	Company	Contact
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Pictorial presentation of training activities

Some activities that took place during the second phase of the production and marketing of hybrid seeds in Ghana are presented in plate 1 and 2.



Plate 1: Seed Producers taken through a lecture on hybrid seeds demonstration field at KNUST.



Plate 2: Seed Producers taking data on hybrid maize crops at the hybrid seeds demonstration field at KNUST.



Plate 3: Some insects (Army worm) observed during a visit to the hybrid seed demonstration field at KNUST.



Plate 4: Some insects (Variegated grasshopper) observed during a visit to the hybrid seed demonstration field at KNUST.



Plate 5: Some insects (larger and lesser grain borers) displayed during a lecture on store insect pest at the AGRA building lecture room, KNUST.



Plate 6: Professor Akromah took Seed producers to his farm to show the effects of poultry manure on growth and yield of maize.



Plate 7: Seed producers on a field tour of Professor Akromah Farms during 2nd phase of the hybrid maize production training.



Plate 8: Professor Afun took participants through signs and identification of insects' pest infestation on hybrid seed demonstration field. KNUST.