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SEMIS - UON

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SEED PRODUCTION FIELD  
DIAGNOSTICS COURSE HELD FROM  
22<sup>ND</sup> TO 26<sup>TH</sup> JUNE 2015 AT UoN  
KABETE CAMPUS

# SEED GROWERS

- Seed Growers are skilled producers who transfer the technology contained in seed from one generation to the next without allowing impurities or contamination from other varieties or crops

# SEED GROWERS Cont'd

- Seed growers may fall into one of the following three classes:
  - ❖ Smallholder growers – mainly contracted in groups
  - ❖ Small scale growers – contracted individually and/or in groups
  - ❖ Large scale growers – contracted individually

# Selection of seed growers

- The criteria used by seed companies to selection farmers to contract are based on the following:
  - ❖ Reliability,
  - ❖ knowledge,
  - ❖ resourcefulness,
  - ❖ willingness to cooperate

# Selection of seed growers

- ❖ Location of farm relative to the seed company
- ❖ Farm size
- ❖ Infrastructure of the farm
- ❖ Labour availability

# OBLIGATIONS OF SEED GROWERS

- Should be familiar with the seed certification requirements in all stages of seed production, conditioning and handling
- Obligations of seed growers fall in all seed production stages and they include:



# OBLIGATIONS OF SEED GROWERS

- a. Agreement to produce a particular crop and variety exclusively for a seed company
- b. Quantity of seed to be produced
  - planted area

# OBLIGATIONS OF SEED GROWERS

## Cont'd

- the minimum yield
- c. Crop management specification
- d. Certification requirements
  - the highest level of integrity
  - Genetic purity – Isolation, roguing of off-type plants from seed fields
  - Physical purity - protected from varietal mixture and other crop species

# OBLIGATIONS OF SEED GROWERS

## Cont'd

- Freedom from pests and diseases
- Germination capacity
- Moisture content
- Traceability of harvested seed
- Ensuring that all equipments and storage facilities are cleaned and disinfected before storing harvested seed

# OBLIGATIONS OF SEED GROWERS

## Cont'd

- Cropping history of the farm
- e. Allow freedom of inspection of seed fields by company representatives and certifying agencies
- f. Seed delivery form, methods and schedules
- g. Keep record of the farm operation eg planting dates

# OBLIGATIONS OF SEED COMPANIES

- Seed company obligations includes
  - a. Supply parent seed
  - b. Specify services to be rendered to the grower
  - c. Pay for the agreed price, including any applicable bonuses or penalties
  - d. Follow the payment schedule

# ETHICALS ISSUES OF SEED GROWERS

- **Ethics** are standards of conduct (or social norms) that prescribe behavior
- **Ethics** are general standards of conduct of a particular profession, occupation, institution, or group within a society
- **Morality** consists of a society's most general standards

# ETHICALS ISSUES OF SEED GROWERS

## □ Code of Ethics

Is a set of principles and rules used by companies, organizations or individuals to govern their decision-making in choosing what is right and wrong.

-Depending on the context of a given code of ethics, penalties and or sanctions may be applied.

# ETHICALS ISSUES OF SEED GROWERS

## □ *The basis of ethics*

- a. Don't harm others or yourself.
- b. Help others and yourself.
- c. Respect truth: do not lie, cheat, deceive.
- d. Be faithful: keep promises and agreements.
- e. Be fair: treat equals equally.



# UNETHICAL ISSUES PRACTICES OF SEED GROWERS

- The growers' actions that are unethical include:
  - a. Tendency not to plant all the seed supplied
  - b. Diversion of inputs
  - c. Non conformity to agronomic practices and seed certification requirements

# UNETHICAL ISSUES PRACTICES OF SEED GROWERS

- d. Tendency of farmers to keep part of the contracted crop to eat at home
- e. Selling of harvested seed to third party
- f. Yield fraud – Adding uncertified seed to certified to increase the yield

# UNETHICAL PRACTICES OF SEED COMPANIES

- Seed company unethical practices include
  - a. Failure to collect produce
  - b. Late payment
  - c. Buying seed from non-contracted growers

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THANKS

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AT UoN KABETE CAMPUS

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Reporting of inspection results, consequences and options for rejected crops presented by Munyao W.M

# REPORTING OF INSPECTION RESULTS

- Field inspection results should be reported immediately after inspection
- Report is made on a standard format
- The report should details:
  - a. varietal impurities,

# REPORTING OF INSPECTION RESULTS

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- The report is made on a standard format
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  - a. varietal impurities

# REPORTING OF INSPECTION RESULTS

- b. difficult-to-separate other crop kinds
- c. isolation
- d. objectionable weed content
- e. diseases and the pedigree of the parent seed  
planted separate



# The report general information

- General information to include in the report should include:
  - a. Name of seed grower
  - b. Grower number
  - c. Field name
  - d. Field number
  - e. Location of the farm
  - f. Name of Crop

# The report general information cont'd

- g. Variety name
- h. Seed lot used Sour of Seed
- i. Class and Quantity of Seed
- j. Class of seed
- k. Total acreage under seed production.
- l. Acreage of field Inspection

# Inspection result

## □ Inspection results

1. Stage of seed crop during inspection
2. Inspection (1. 2, 3 etc)
3. Isolation distance ( M)
  - a. North
  - b. South
  - c. East

# Inspection result

## a. West

4. Name and stage of growth of contaminants
5. Crop Condition
6. Estimated seed yield( Qts/ha)
7. Remarks

# Inspection result - Count

COUNT NO.	OFF TYPES	OTHER CROPS	WEEDS	AFFECTED BY SEED BORNE DISEASES	REMARKS I.E NAMES OF CONTAMINANTS
1					
2					
3					
4					
5					
6					
Total					
Average					
%					



# Inspection result

- The results should be signed by both inspector and the growers
- A decision should be made whether to pass or reject the crop based on the inspection standards

# Consequences and options for rejected crops

- Crop not meeting the certification standard is rejected for certification
- A rejected crop can be downgrade where applicable
- Rejected seed crop should be deposed in other way but not seed



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**SEED PRODUCTION FIELD  
DIAGNOSTICS COURSE HELD  
FROM 22<sup>nd</sup> to 27<sup>th</sup> June 2015  
AT UoN Kabete campus**

**DEFINITIONS OF THRESHOLD LEVELS; ACCEPTABLE  
THRESHOLD LEVELS AND REGULATORY TOLERANCE  
LEVELS FOR TARGETED SEED CROPS PRESENTED BY**

**Munyao W. M**

# PRESENTATION OUTLINE

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- Introduction
- Thresholds levels of diseases
  - Defination
  - Types of thresholds
- Tolerance levels of disease

# INTRODUCTION

- Total eradication of a pest is impossible and undesirable because it can spell the demise of the pest's natural enemies and can upset the broader economic balance.
- It's usually better to determine the level of pest presence or pest related damage that can be tolerated without harm to health and plants.
- Determining these levels or thresholds goes hand and hand with field monitoring

# THRESHOLD LEVEL

- Defination
  - ▣ It is a boundary where something starts or ends
- Characteristics of threshold
  - ▣ changes throughout the season at different stages of crop development

# THRESHOLD

- ▣ vary from variety to variety
- ▣ must be constantly revised to account for new pests, new varieties, new management practices, new marketing standards and variation in commodity prices
- ▣ developed by the grower to suit their IPM needs

# *Types of thresholds*

- **Economic Thresholds (action thresholds)**
  - ▣ The pest density at which some control should be exerted to prevent a pest population from increasing further and causing economic loss

# *Types of thresholds*

- ▣ Can also be defined as the break-even pest density.
- ▣ It is simply the operational criteria for administering pest control action.
- ▣ Normal lower than economic injury level



# *Types of thresholds cont'd*

- Economic threshold depends on:
  - a. Economic injury level
  - b. Pest and host phenology
  - c. Population growth and injury rates
  - d. Time delays associated with integrated pest management tactics utilized

# *Types of thresholds cont'd*

- Examples of economic threshold:
  - ▣ bean leaf beetles in soybeans: "When defoliation reaches 30 percent (before bloom) and there are 5 or more beetles per foot of row".
  - ▣ black cutworms in corn: " apply a post emergence rescue treatment when 3 percent or more of the plants are cut and the larvae are still present.
  - ▣ leaf miners in melons: chemical treatment is recommended if an average of 15 to 20 un-parasitized larvae per leaf are found

# *Types of thresholds cont'd*

## **Damage Thresholds**

- The maximum damage a crop can sustain without yield loss
  - ▣ Generally used for plant diseases. Since disease pathogens are too small to be easily seen, counting their numbers is impractical, so an estimate is made of the amount of damage caused by them.

# *Types of thresholds cont'd*

## Examples of damage threshold

- ▣ counting diseased leaf petioles for soybean pod and stem blight
- ▣ estimating the percentage of whole plant infection caused by fungal leaf blights in corn

# Types of thresholds cont'd

- **Economic Injury Thresholds (EIL)**
  - The lowest pest density at which economic damage occurs, where the cost of the control measure is equal to the loss likely to be inflicted by the pest.
  - EIL is above the economic threshold
  - ▣ Example:
    - beet army worm on melons: if army worms begin feeding on fruits

# Example of EIL for sorghum

## Economic injury level for sorghum midge-susceptible hybrids

Per acre control cost (\$)	Crop market value (\$) per acre										
	100	120	140	160	180	200	220	240	260	280	300
3	1.2*	1.0	0.9	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.4
4	1.6	1.3	1.1	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.5
5	2.0	1.7	1.4	1.3	1.1	1.0	0.9	0.8	0.8	0.7	0.7
6	2.4	2.0	1.8	1.5	1.3	1.2	1.1	1.0	0.9	0.9	0.8
7	2.7	2.3	2.0	1.8	1.6	1.4	1.3	1.2	1.1	1.0	0.9
8	3.0	2.7	2.3	2.0	1.8	1.6	1.5	1.3	1.2	1.1	1.1

\*Number of sorghum midges per panicle

# Examples of EIL for sorghum

## Economic injury levels for sorghum midge-resistant hybrids

Per acre control cost (\$)	Crop market value (\$) per acre										
3	6	5	5	4	4	3	3	3	3	2	2
4	8	7	6	5	5	4	4	4	3	3	3
5	10	9	7	7	6	5	5	4	4	4	4
6	12	10	9	8	7	6	6	5	5	5	4
7	14	12	10	9	8	7	7	6	6	5	5
8	15	14	12	10	9	8	8	7	6	6	6

\*Number of sorghum midges per panicle

# Types of thresholds cont'd

- The concept of EIL aims to:
  - a. promote rational use of pesticides
  - b. avoid pesticide resistance
  - c. Reduces pesticide residues on agricultural products
  - d. Reduce negative effects of pesticides on non-target pests

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# *Types of thresholds cont'd*

- EIL is governed by five primary variables
  1. cost of the management tactic per production unit, (C)
  2. market value per production unit (V)
  3. injury units per pest (I),
  4. damage per injury unit (D)
  5. the proportional reduction in pest attack (K)

# *Types of thresholds cont'd*

## □ **Aesthetic Thresholds**

- ▣ The level at which a pest causes an undesirable change in the appearance of something, typically ornamental plants

# *How thresholds are developed*

- Thresholds can be developed from the following factors among others
  - a. Amount of physical damage related to various pest densities;
  - b. Monetary value and production costs of the crop at various levels of physical damage
  - c. Monetary loss associated with various levels of physical damage

# Units of thresholds

- Thresholds are expressed as:
  - a. damage to leaves, plants, foliage,
  - b. Number of plants showing damage; or Number adults or larvae/stem / plant.
  - c. Number adult insects or larvae / m<sup>2</sup>
  - d. Number adult insects or larvae/sweep

# *Importance of Thresholds*

- Decision making on scheduling of control and control methods
- Establishment of optimal amount of control which can be used to minimize risk of economic damage and environmental hazards

# PEST AND DISEASE TOLERANCE

- Tolerance means the allowable upper limit of observed disease during
  - ❖ field inspection
  - ❖ post-harvest test and
  - ❖ laboratory evaluation

# PEST AND DISEASE TOLERANCE

- Zero tolerance means no allowable limit
- Disease tolerance levels for infected seed crops and seed in seed certification are part of legislative measures for seed health management.

# Pest and disease tolerance cont'd

- In assessing pests and disease in a seed field for allowable tolerances, five rules are generally applied
  - ❖ Examine every field
  - ❖ Sample randomly



# Pest and disease tolerance cont'd

- ❖ Sample across the entire field
- ❖ Take enough samples
- ❖ Keep records of inspection Data and Management

Actions

# Disease tolerance levels

CROP	DISEASE	%TOLERANCE	
		Basic	Certified 1
Bean	Bean common mosaic virus	0	0.1
	Anthracnose of bean %	0.02	0.02
	Halo blight %	0	0.05
	Bacterial canker	0	0.05
	Angular bean leaf spot	0.02	0.05
	Bacterial blight of bean	0	0.05
Maize	Head smut (at final inspection)	0	0
	Common smut (at final inspection)	0	0
	Loose smut (at final inspection)	0	0
Rice	Rice blast (piricularia)%	0.1	0.5
	White tip nematode	0	0

# Disease tolerance levels

CROP	DISEASE	%TOLERANCE	
Groundnut	Ralstonia solanacearum	0	0
	Rosette virus	1/1000 plants	5/1000 plants
Wheat	Kernel bunt	0	1/100m2
	Loose smut	1/100m2	1/100m2
Sunflower	Color rot (At final inspection)	0	0
	Verticillium wilt	0	0
	Downy mildew %	0	0.2
	Leaf blight of sunflower (%)	0	0.2
	Grey mould of sunflower (%)	0.5	1
Sorghum	Covered kernel smut (%)	0.1	0.2
	Mildew	0.1	0.2

# Disease tolerance levels

CROP	DISEASE	%TOLERANCE	
Soybean	Soybean mosaic virus SMV %	0	0.02
	Purple stain %	2.5	2.5
	Bacterial pustule	0	0
	Pseudomonas savastanoi	0	0
Cassava	African cassava mosaic	0	0
	Cassava Bacterial Blight	0	0
	Cassava brown streak disease	0	0
Irish potato	Bacterial wilt of potato, Black leg %, Golden nematode	0	0
	Fusarium wilt	0	2/1000
	Verticillium wilt	0	0.5
	Potato virus Y	0.1	1
	Potato virus X	0.3	2

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