

SEED PRODUCTION FIELD
DIAGNOSTICS COURSE HELD FROM
16th to 23rd November 2014 AT UoN
CAVS

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

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PRESENTATION OUTLINE



- Introduction
- Threshold
 - Definition
 - Types of thresholds
- Tolerance levels of disease

INTRODUCTION

- **Seed is an international commodity**
- **Seed is a carrier of inoculums**
- **Seed borne inoculum may**
 - ▣ **Cause disease in the crop**

INTRODUCTION

- ▣ **Introduce disease to new regions**
- ▣ **Reduce germination and % normal seedlings**
- ▣ **Seed borne inoculum therefore must be managed to avoid spread of diseases and reduction of yield losses**

THRESHOLD LEVEL

□ Definition

- ▣ It is a boundary where something starts or ends
- ▣ The point that must be exceeded to begin producing a given effect or result or to elicit a response

□ 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.
- ▣ Normally 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

- **Damage Thresholds**

- The maximum damage a crop can sustain without yield loss

- **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

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
 - ▣ Amount of physical damage related to various pest densities.
 - ▣ Monetary value and production costs of the crop at various levels of physical damage.
 - ▣ Monetary loss associated with various levels of physical damage.
 - ▣ Amount of physical damage that can be prevented by the control measure.
 - ▣ Monetary value of the portion of the crop that can be saved by the control measure

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 of adult insects or larvae / m²
 - d. Number of 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 infested 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	
		Basic	Certified 1
Groundnut	Ralstonia solanacearum	0	0
	Rosette virus	1/1000 plants	5/1000 plants
Wheat	Kernel bunt	0	1/100m ²
	Loose smut	1/100m ²	1/100m ²
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	
		Basic	Certified 1
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

THANKS FOR LISTENING

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