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Name of Session: Definition of threshold levels, obligations and ethical/economic issues for seed growers and seed merchants

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Outline

- Introduction
- Definition of thresholds
- What is expected of seed merchants
- What is expected of a seed growers

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Introduction

- Total eradication of a pest is impossible and undesirable because it can spell the demise of the pests' 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 in hand with field monitoring

Threshold level

- Definition
 - It is the magnitude or intensity that must be exceeded for a certain reaction, phenomenon, result or condition to occur or be manifested
- Characteristics of threshold
 - changes throughout the season at different stages of crop development

Threshold level

- 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

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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.

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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

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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

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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.

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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

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

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 proportionate 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, mostly ornamental plants

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How thresholds are developed

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

Units of thresholds

- Thresholds are expressed as:
 - a. damage to leaves, plants, foliage,
 - b. Number of plants showing damage; or Number of 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

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Ethics

- Ethics is the science of morals-It deals with what is **good** and **bad** or **right** and **proper** and just versus what is **bad, wrong** and **unjust**.
- Unethical behavior is defined as behavior that contravenes rules designed to maintain the fairness and morality of a situation.
- The overriding question in ethics is – **Will my decision and action injure someone else?**
- Integrity is the quality of doing the right thing for the right reason even when nobody is watching or one is likely to know what you have done

What is expected of seed merchants/growers

- Seed merchants are the owners of the seed
- The quality of seed is the responsibility of the seed company
- Train their contracted growers on seed production and seed quality
- Scouting and monitoring of seed crops for pests and diseases
- Disease/pest control at all stages
- Work hand in hand with their contracted growers in ensuring that disease tolerances are achieved.
- Withdrawal of crop from certification incase infestation/infection is too high to be controlled.

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Thank you for listening

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