

Lecture Outline
PEST MANAGEMENT

I. Control Strategies

A. Legal controls

1. quarantine
2. licensing and certification

B. Cultural controls

1. crop rotation
2. cultivation
3. sanitation
4. planting or harvesting dates

C. Physical or mechanical controls

1. window screens
2. wire drags
3. flaming
4. electrocution

D. Biological control

1. predators
2. parasites
3. pathogens
4. strategies
 - a. environmental manipulation
 - b. mass rearing and mass release
 - c. augmentation
5. attributes of a good biocontrol agent
 - a. high reproductive rate
 - b. good synchrony with host
 - c. host specificity
 - d. tolerates wide range of environ. conditions
 - e. good host searching/finding ability

E. Genetic control

1. Induced sterility
 - a. irradiation
 - b. chemosterilization
 - c. cytoplasmic incompatibility
2. Host resistance
 - a. tolerance
 - b. resistance (antixenosis)
 - c. antibiosis
3. Biotechnology and bioengineering
 - a. transgenic plant substances

- F. Chemical control
 - 1. Allelochemicals
 - a. attractants
 - b. repellants
 - 2. Semiochemicals
 - a. aggregation or dispersal pheromones
 - b. sex pheromones
 - i. mass trapping
 - ii. mating disruption
 - iii. inundation
 - c. insect growth regulators (IGR)
 - i. juvenile hormone analogues
 - ii. molting hormone analogues
 - iii. chitin inhibitors
 - iv. chemosterilants
 - 3. Conventional insecticides
 - a. Stomach poisons
 - i. metal salts
 - ii. organic compounds
 - b. Contact poisons
 - i. inorganic compounds
 - ii. natural oils and botanicals
 - iii. chlorinated hydrocarbons
 - iv. organophosphates
 - v. carbamates
 - vi. synthetic pyrethroids
 - c. Constraints
 - i. residues
 - ii. activity spectrum
 - iii. biomagnification
 - iv. resistance
 - v. microbial degradation
 - 4. Microbial pesticides
 - a. Bacteria
 - b. Fungi
 - c. Viruses
 - d. Protozoa
 - e. Bioengineered products
 - 5. Pesticide formulations
 - a. adjuvants
 - b. fumigants
 - c. wettable powders
 - d. emulsifiable concentrates
 - e. granules
 - f. systemic insecticides
 - 6. Economics of insecticide development
 - a. discovery and patenting
 - b. testing and development
 - c. marketing and advertising

II. Regulatory Entomology

- A. Federal insecticide, fungicide, and rodenticide act (FIFRA)
 - 1. Toxicology -- standards for testing
 - a. toxicity -- LD/50
 - b. carcinogenic
 - c. teratogenic
 - 2. Tolerances
 - a. NOEL
 - b. reference dose
 - c. market basket survey
 - 3. Labeling
 - a. ingredients
 - b. formulation and concentration
 - c. signal words
 - d. legal uses and application rates
 - e. safety and health information
 - f. disposal instructions
- B. Role of federal agencies
 - 1. Establish tolerances -- FDA
 - 2. Enforce tolerances -- FDA and USDA

III. Pest Management

- A. Integrated control
 - 1. Identification
 - 2. Quantification
 - 3. Determination
 - 4. Specification
 - 5. Application
 - 6. Evaluation
- B. Multidisciplinary approaches
- C. Resistance management
- D. Expert systems