Insect Management
Know your system...

• What is the plant, what is normal?
• Most plant health problems are not caused by biotic (living) factors such as insects and disease.
• Most plant health problems are a result of non-biological factors (environment, cultural methods, irrigation, plant nutrients, etc.).
• Proper identification of insects is critical.
IPM for insects

- Integrated pest management (IPM)
  - Use multiple tactics to reduce pests
  - Protect yield and minimize loss
  - Only spray when needed
  - Understanding the field history
How to scout for insects

• Understand their biology
  – Recognize feeding damage
  – Where they feed on the plant
How to scout for insects

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How to scout for insects

• Know how to find them
  – Where they are in a field
  – When they are feeding
How to scout for insects

- Common tools to estimate density
  - Sweep net, in-field counts, sticky traps, etc.
Typical scenarios

High and low insect populations are common.
Only scouting will tell you what the insects are doing.
IPM tactics for insects

- Regulatory
- Genetic
- Mechanical/physical
- Cultural
- Biological
- Chemical
Genetic control

- Select varieties that will help minimize yield loss
- Conventional and molecular breeding
- Host plant resistance or tolerance
  - Insects don’t survive or do as well
Mechanical/Physical control

- Sanitation
- Tillage
- Harvesting

Soybean tillage photo: Lynn Betts, USDA, Natural Resources Conservation Service
Cultural control

- Date of planting
- Rotate crops
- Keep plants healthy
- Avoid susceptible varieties
Biological control

• Natural enemies controlling “pests”

• Predators and parasitoids
  – Most pests have enemies
  – Will respond to low/moderate density

• Encourage natural enemies
  – Reduce broad spectrum insecticides

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Pathogens

• Targeted host selection
• Kill, reduce reproduction, or shorten the life
• Environment controls effectiveness
• Relatively slow acting; may take several days

Fungal-infected aphid  Bacteria-infected caterpillar

© Karrie Koch, University of Minnesota
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Bt as an example...

- *Bacillus thuringiensis* “Bt”

1. Insect consumes foliage
2. Toxin binds to gut
3. Gut breaks down, allows normal bacteria to enter body cavity
4. Insect dies in 1-2 days
Chemical control

• Traditional insecticides
  – Broad spectrum, long residual, toxic
  – Pyrethroids, organophosphates, carbamates

• Reduced risk insecticides

• Limit pesticide applications
  – Follow label rates/harvest intervals
  – Think about good timing – when is the best time
  – Alternate chemical classes
Economic thresholds are key!

• Be ‘ok’ with some insects
  – Avoid calendar-based sprays

• Use a cut-off point, or threshold, to suppress insects
  – 5 beetles/sweep or 25% defoliation

• Extend insecticide effectiveness
  – Saves money!
  – Prevents genetic resistance
  – Preserves natural enemies
  – Reduces environmental risks
When should a grower spray?

Spray after reaching ET but before surpassing EIL.

- **economic injury level**
- **economic threshold**

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Items to consider

• Market value of crop
• Overall production costs
• Insecticide costs (product plus delivery)
• Sufficient coverage
• Maximum suppression
• Leave a check strip!
Summary

• Know the system – plants and insects
• Consider history of insect activity
• Use IPM tactics to minimize insects
• Only spray when needed