Managing insect pests wisely
(Your fields are more similar to Yellowstone than you realize)

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Most plants are not sitting ducks
To combat insects, plants rely on:
– Tolerance
– Resistance (plant defenses)
  • Spines, hairs, toxic chemicals
– Insect predators, parasitoids
  • Predaceous beetles & bugs, parasitic wasps

Crop fields are “unnatural”
• Large monocultures of artificially selected plants
  • Weak plant defenses
  • Little diversity, genetically uniform
  • Ideal setting for pests

Where do insect pests outbreak? Two reasons
Why?
• Plant defenses
• Natural enemies

Gypsy moth defoliation of hardwood trees along the Allegheny Front near Snow Shoe, Pennsylvania in July of 2007

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Food webs are complex and unpredictable

Shoot 1 wolf, livestock attacks increase 4-6%

A simple food web
Potato Leafhopper on Alfalfa

Migrates from southern states
- Annual pest, populations tend to be spotty
- Peaks in July

Some years, PLH comes in early and heavy—before 1st harvest
- Usually not an issue ’til 2nd harvest

To manage, PLH populations:
- Spray only when necessary (maintain good insects)
- Scout (with sweep net) and apply economic thresholds

<table>
<thead>
<tr>
<th>Economic Threshold for Potato Leafhopper</th>
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<tbody>
<tr>
<td>Average Number of Leafhoppers/Sweep</td>
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<tr>
<td>0 to 4</td>
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<td>0</td>
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No-till decreases labor, conserves soil, water

- Stability provides a good habitat for natural enemies

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- Cover crops enhance good populations further

Slugs can damage virtually all crops

- Canola
- Corn
- Soybean
- Alfalfa & Sm. grains

~20% of no-till acreage loses yield (~600,000 acres)

Tillage strongly influences soil-dwelling animal

Conservation Tillage – stability/resilience

- Predators
- Decomposers
- Pests

Conventional Tillage

- Predators
- Decomposers
- Pests
Cover Crops Benefit Soil Health

- Build SOM, soil fertility
- Reduce soil erosion
- Enhance soil organisms
- Creates habitat for insect predators

Ground beetles = lions of no till fields

Neonic seed treatments exacerbate slug problems

Soybean field experiment 2012

- Treated: Thiamethoxam (0.152 mg/seed) + fungicides (CruiserMaxx)
- N = 6
- 0.25-acre plots
- No-till planted in 30" rows

Slugs decrease soybean yield

Predators control slug populations

Neonics seed treatment disrupts biological control
**Bottom line:**
- Manage for the pests you have
- Insecticide treated seeds make slug populations worse

**Insecticides will disrupt natural control**
- Scrutinize, optimize insecticide usage
- Soil insecticide, broadcast, seed treatments, etc.

Use Integrated Pest Management
- Scout
- Apply economic thresholds
- Use insecticides only when it makes economic sense

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**Planting green into hairy vetch (Sjoerd Duiker)**

Establishing cash crop into green cover crop (Herbicide will be applied 1-7 days after planting)

**Lucas Criswell (Union County, PA): IPM and soil health**

**First step to planting Green, Plant it!**

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Observation: clean fields provide one food source – the crop

Lucas Criswell (Union County, PA)

Can intercropping improve slug control?

Rye planted between soybean rows

Intercropping decreases slug damage, increases predators

Slug damage to corn

Ground beetles

Planting green to combat slugs, version 1…

More committed to planting green, version 2…

2013: 500 acres
Soil is covered always, increasing organic content, biodiversity. Need to commit to IPM (Scouting).

Benefits to rolling:
- Uniform cover
- Better planting
- Biomass persists longer

 Rolled rye, side by side (140 N):
203 bu/ac - treated Acremax
204 bu/ac - untreated untreated

Saving ~$9000 in pesticides.

Benefits to keeping soil covered:
- Less soil erosion, weed suppression, natural enemy habitat

More diverse rotations have fewer pest problems
Consider no-till, diversifying, cover crops, value soil health
- Build natural enemy populations

Scrutinize, optimize insecticide usage
- Soil insecticide, broadcast, seed treatments, etc.

Use Integrated Pest Management
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Assassin bug (wheel bug) in action

Thanks for your attention.

Questions??

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