

PEST ISSUES WITH COVER CROPS



COVER CROP TRAINING MODULE

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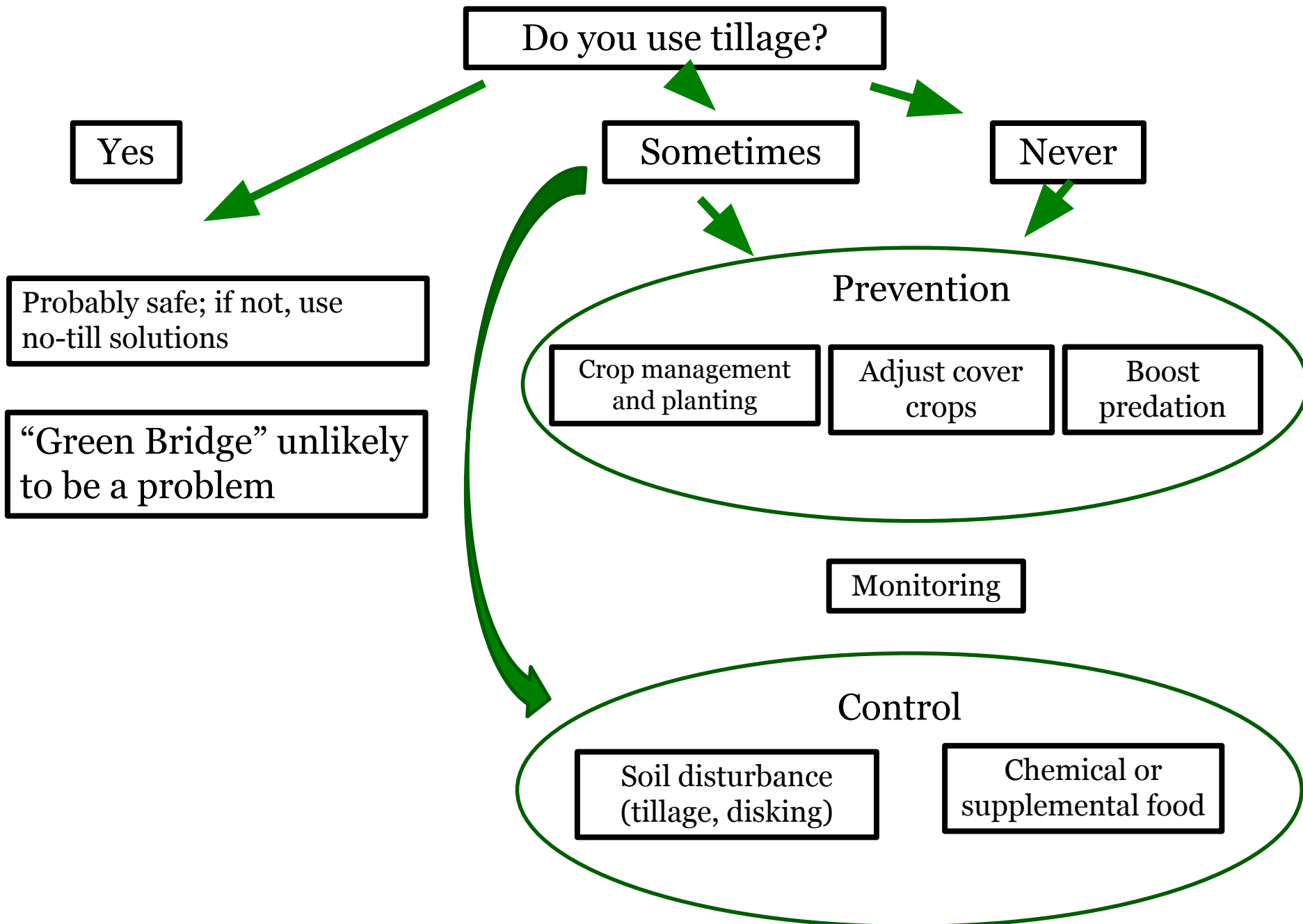
These training modules are being made available by free use of other educators through University of Missouri and the Midwest Cover Crops Council, which participated in the WFF project supporting development of these modules and provided many of the technical reviewers.



Outline

1. Voles
2. Slugs
3. Other pests and diseases





Vole biology

- Two pest species in the Midwest-
 - Prairie vole- burrows underground
 - Meadow vole- burrows and tunnels usually near the surface
- Diet
 - Green vegetation and some seeds
 - Prefer clovers and vetches but meadow voles will eat grasses



Above:
meadow vole

Right: prairie
vole



Vole biology

- Prodigious reproductive rates = fast recovery from population control
 - ~6 young per litter
 - Start reproducing at a month old
 - Gestation period ~21 days
- **2-3 year population cycles**



Vole impact on crops, patchy in fields

- Can be a problem in no-till fields **without** cover crops
- Cover crops provide additional cover and food for voles
- Will eat crop seed if not planted deeply enough
- Eat the tops of seedlings, more of a problem in soybeans



Barry Fisher, NRCS-Indiana

Voles and cover crops



Joe LaRose

A vole foraging at night in a cover crop



Vole problems are more likely:

- Next to grassy areas
- When planting after pasture or hay

Prevention

Crop management and planting

Adjust
cover crops

Boost
predation

1. Close the seed slot
2. Drill cash crop
3. Plant deeper
4. Use rotary hoe to fluff residue

Prevention

Crop management
and planting

**Adjust cover
crops**

Boost
predation



Rob Myers

1. Worst may be a thick vetch or clover
2. Diversify cover crop mix: include some radishes and/or other Brassicas
3. Decrease spring cover
 - A. *Decrease seeding rate*
 - B. *Mix with 40-50% winterkill*



Joe LaRose

Prevention

Crop management
and planting

Adjust cover
crops

**Boost
predation**

Coyote in a cover cropped field

1. Protect predators



Joe LaRose

Prevention

Crop management
and planting

Adjust cover
crops

**Boost
predation**

1. Protect predators
2. Enhance habitat
 - A. *Raptor perches*
 - B. *Tree habitat*
 - C. *Field edges,
fencerows, etc*



Raptor perch



Owl perch/house

Monitoring

- What to look for
 - Burrows and runs
- When to scout
 - late winter, easiest after a snow
 - 1 week before planting
- Threshold: 5 active burrows per acre-proceed to control



Control

Soil disturbance
(tillage, disking)

Chemicals or
supplemental food



Edwin Remsberg, SARE

Control

Soil disturbance
(tillage, disking)

Chemicals or
supplemental food

1. Provide supplemental food just before planting
 - Corn: Broadcast cracked corn (4 bushels per acre)
 - Soybeans: crack corn/beans
2. Toxic bait-Zinc phosphide
 - Only approved for corn
 - 4-6lbs per acre in furrows where vole activity is highest
 - ~\$15 per acre
 - Caution: Can kill other vertebrates

Benefits of vole populations

- Eat weed seeds
- Consume pest insects
- Provide food for other wildlife such as raptors

*Populations peak at most every 2-3 years



Slugs



About slugs

- Most economically important Midwest row crops is the gray garden slug
- Do well in cool, moist conditions
- Eat a large variety of plants, seeds, and occasionally other invertebrates
- Juveniles, not adults, are a threat to crops
- Most eggs hatch around mid-spring (May)
- Typically only a problem on fields where there is residue on the soil surface
- Less of a problem in sandy soils



Bobby Clark



Bobby Clark

Slugs and cover crops

- Slugs can damage cover crops and hinder establishment
 - Seeds broadcasted in the fall can be consumed
 - Damage to cover crop before frost and slug dormancy



Maggie Douglas

Slug damage to canola

Slugs and cover crops

- Cover crops provide additional soil coverage and residue, and therefore can increase slug populations in no-till systems

However

- Depends on
 - cover crop species
 - diversity
 - termination method
 - insecticide use



Edwin Remsberg, SARE

Prevention

Crop management and planting

1. Close the seed slot
2. Drill/plant deeper
3. Diversify crop rotation
4. Plant corn earlier in south before slug emergence, or possibly later in the north to get corn growing fast
5. Use popup fertilizer to boost early growth

Adjust
cover crops

Boost
predation



Prevention

Crop management
and planting

**Adjust cover
crops**

Boost
predation



Field with cover crop mix of winter-kill and winter hardy plants in November

1. Alter and diversify cover crop mix
 1. Avoid or reduce radishes
2. Decrease spring cover
 - Decrease seeding rate
 - Mix with 40-50% winterkill
4. Plant green
 - Slugs may prefer the dying cover crop
 - Supports ground beetles that suppress slug populations

Prevention

Crop management
and planting

Adjust cover
crops

**Boost
predation**



Ground beetles

1. Protect predators
 - **Minimize insecticide spraying-especially preplant**
 - **Use nontreated seed: neonicotinoids harmless to slugs, fatal to their predators**
2. Enhance habitat
 - Cover crop mixes allowed to grow longer and flower
 - Field edges, strips, etc.

Monitoring

- How?
 - Cover boards, check in the morning

Or

- At night with flashlight



Monitoring

- What to look for
 - Corn: long strips
 - Soybeans: spots on edge of leaf
- When to scout
 - A week before planting until V3
- Threshold: none established



Control

Soil disturbance
(tillage, disking)

Chemicals or
supplemental food



Edwin Remsberg, SARE

Control

Soil disturbance
(tillage, disking)

Chemicals or
supplemental food



1. Toxic baits– expensive and inefficient.
 - I. Metaldehyde (Deadline)
 - $\geq \$16$ per acre
 - Apply in the evening
 - Not before a rain
 - Target to where slug damage is worst



Photo credit:
Bobby Clark

Other Pests and Diseases



Rob Myers

Mix of crimson clover, hairy vetch and crimson rye



Ken Wise, NY State IPM

Wireworm

Additional insect problems

Certain combinations of cover crops and cash crops can be an issue

- Alfalfa before soybeans can attract legume pests
- Grasses before corn can lead to armyworm and wireworm damage

Solutions:

- Avoid using a cover crop before a crop from the same plant family
- Use diverse cover crop mixes



Fall armyworm

Benefits for pest control

Cover crops can decrease damage from some insect pests by:

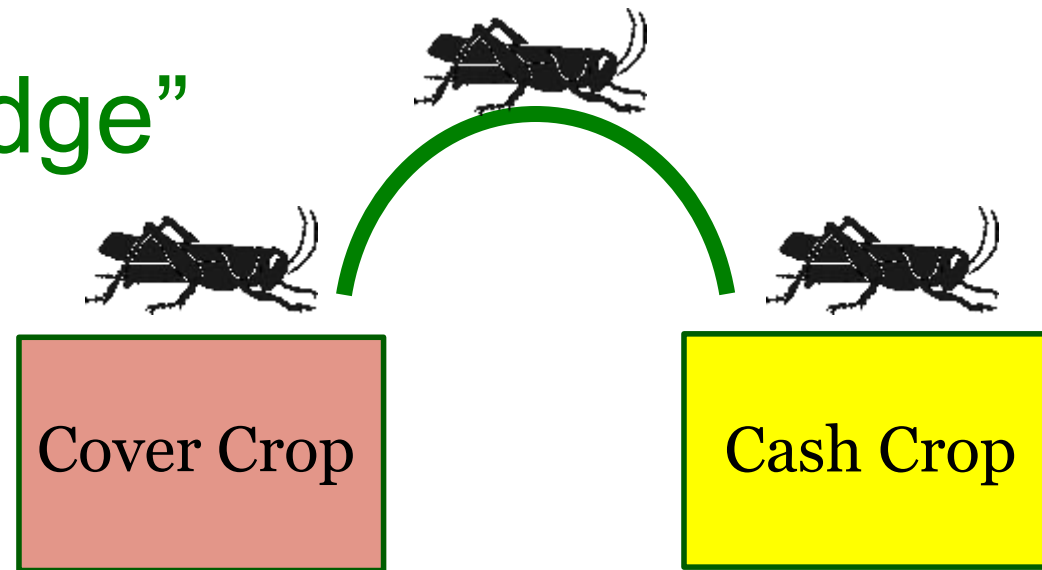
- Providing habitat for beneficial insects and microbes
- Improving plant resistance by improving soil health
- Making it harder for pests and disease to encounter host crop



“The Green Bridge”

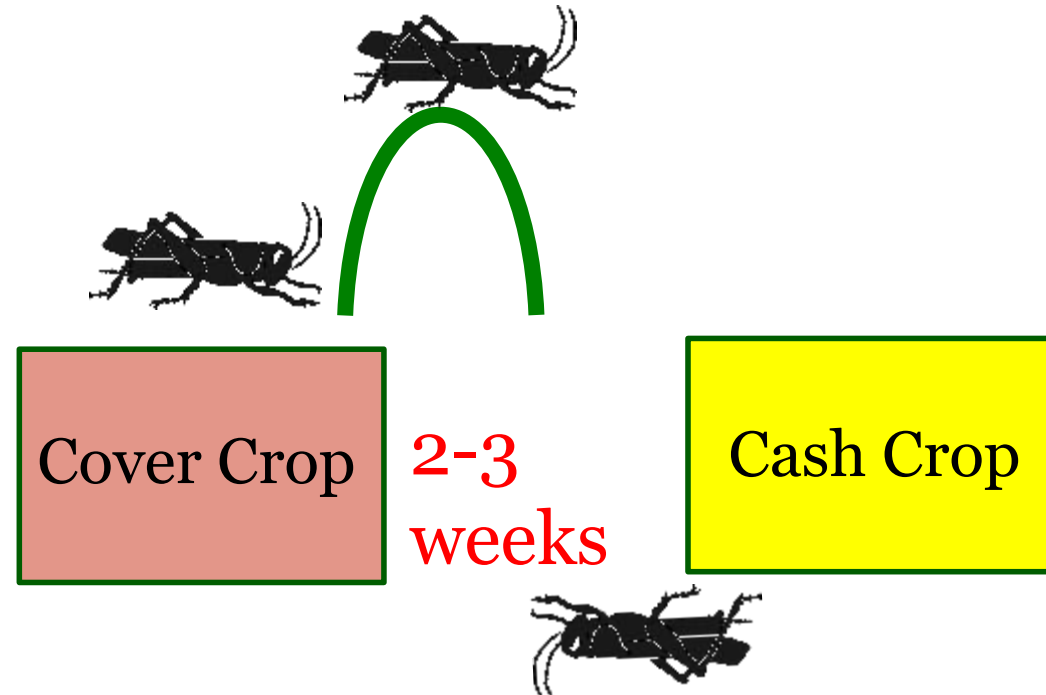
2. Hypothesis

- Pests move directly from a dying cover crop into young cash crop
- Dying vegetation incubates pathogens



Solution if occurring:

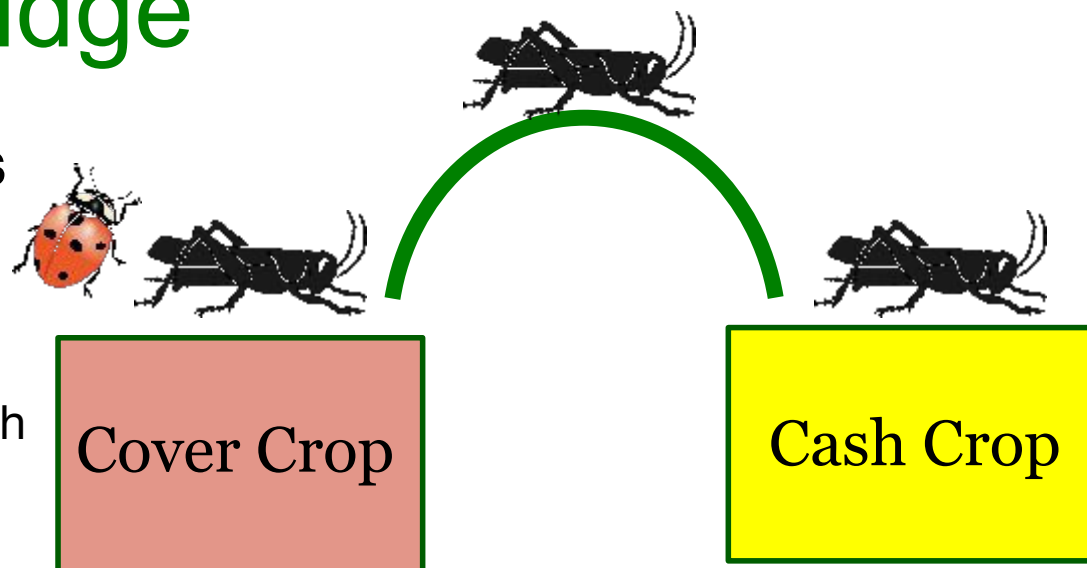
- Terminate earlier
(≥ 2 weeks earlier)



“The Green Bridge”

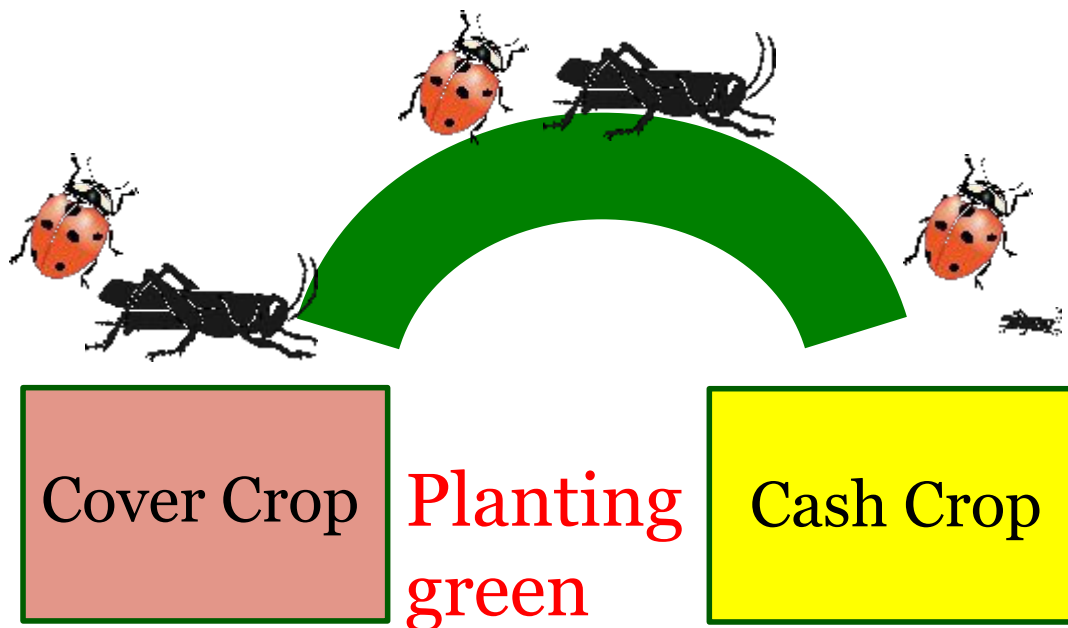
2. Alternative Hypothesis

- Pests move directly from a dying cover crop into young cash crop
- Predators do not have enough prey and habitat to make it from cover crop to cash crop



Solutions:

1. Terminate earlier (~2 weeks).
2. **Planting green: allows predators to survive (alleviates damage from other pests like slugs and cutworms)**



For more details, see extension and NRCS resources

Slugs

- [General](#) (Penn State University)
- [Scouting protocol](#) (Virginia Tech University)

Voles

- [Colorado extension](#)
- [Missouri extension](#)
- [NRCS](#)

Summary

- Voles and slugs are more likely to be an issue in high residue situations, either no-till alone or with a cover crop
 - Adjust management of both cash crop and cover crop to reduce issues
 - Encourage predators of pest populations
 - Implement biologically diverse cropping systems
- Insect pests can be affected greatly by management for predator insects
- Termination timing with the cover crop can be a factor with early spring pests; more research on “green bridge” and late termination is needed
- Scout regularly for pests, adapt, and experiment