# Setting your "defoliation eye" for field crop pest management

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## Outline for today

- Testing your "defoliation eye"
- Scouting reminders
- Reviewing importance of IPM and economic thresholds

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## Estimate percent leaf defoliation

A) 0-10%
B) 11-20%
C) 21-30%
D) 31-40%
E) 41-50%
F) >51%


Photos by John Obermeyer, Purdue Extension

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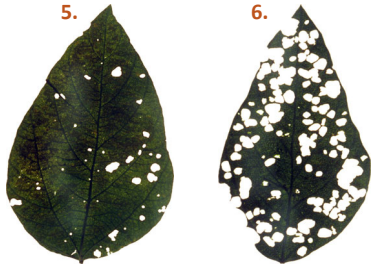


Photos by John Obermeyer, Purdue Extension

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## Defoliation summary

1. (B) 16%
2. (A) 9%
3. (B) 17%
4. (C) 29%
5. (A) 3%
6. (D) 35%

- More difficult for whole plant and field wide estimations
- Humans tend to over-estimate defoliation
- Calibrate your "eye" every spring to be more accurate

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## How to sample insects and recognize plant injury

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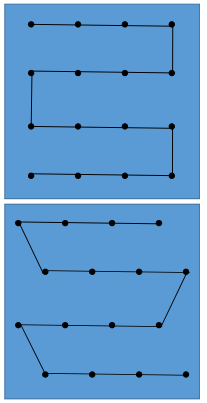
## Key points about scouting

- Start looking before you expect them
- Continue sampling regularly
- Try to cover the field
- DON'T avoid and DON'T "eyeball"
- Use a defined walking pattern



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## Estimating insect defoliation in soybean

1. Walk at least 10 rows into the field.

2. Take a trifoliate from the top, middle and bottom of a randomly-selected plant (A).

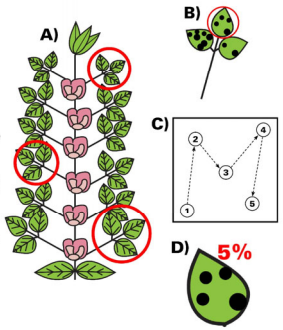
3. From each trifoliate, remove the leaflet with most defoliation and the trifoliate with the least defoliation. Keep the remaining leaflet (B).

4. Stop at 9 more randomly-selected plants in the area and repeat #3.

5. Move to four more areas in the field, repeating #3 and #4 (C). You will end up with 50 leaflets for the field.

6. Estimate the percent defoliation of each leaflet (D) and calculate the average for the entire field.

7. Consider a foliar insecticide to protect yield if the average defoliation is above 30% for vegetative soybean and above 20% for reproductive soybean.

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## Use the "best" collecting method

- Varies depending on target insect
- Estimate density or injury
  - # insects per plant
  - % defoliation
- In-field counts, sweep net

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## Recognizing feeding injury

- **Chewing**: remove plant tissue, girdle stems, defoliate, skeletonize leaves, or clip pods
  - Beetles, grasshoppers, caterpillars

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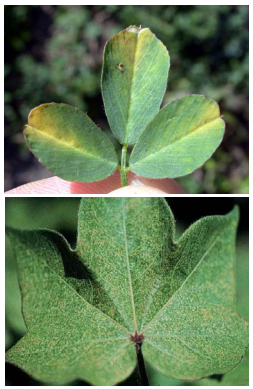
## Recognizing feeding injury

- **Piercing-sucking**: feed on phloem and can cause stippling or punctures that result in discoloration or mottling, honeydew
  - Aphids, thrips, spider mites, stink bugs



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## Using IPM to manage field crop pests

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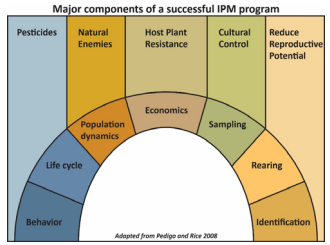
## What is IPM?

- Integrated Pest Management
  - Using multiple, proactive tactics
  - Discouraging feeding and mating
  - Suppressing pests to acceptable levels
  - Making profitable choices
  - Sustainable, profitable farming

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## Understanding pest life cycle is essential

- Number of generations per year
- Overwintering or migratory
- Reproductive potential
- Crop injury (yield loss) potential
- Target "weak link" for management

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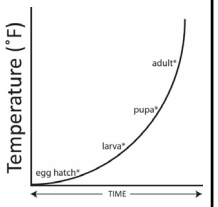
## Understanding pest biology is key

- Insects are "cold-blooded" (poikilothermic) and unable to regulate body temperature
- Maturation is based on accumulating temps
  - Every season is a little different
  - Calendar-based scouting is not reliable

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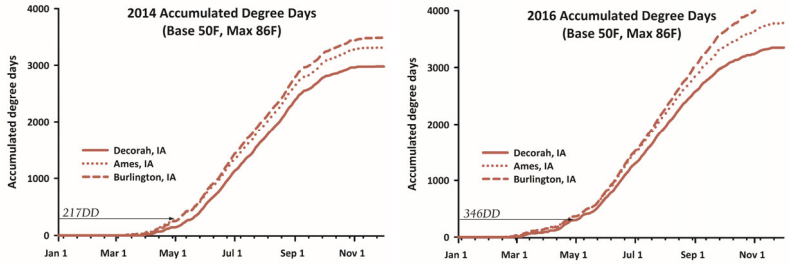
## Insects are predictable, based on degree days

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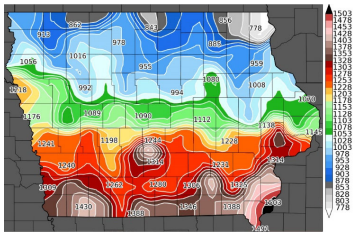
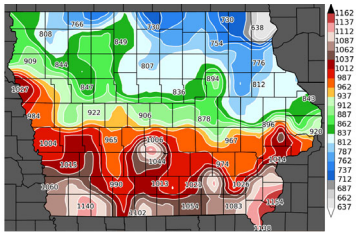
**30 May 2017; Common stalk borer movement to corn (1,300 DD, base 41)**



**13 June 2017; Japanese beetle adult emergence (1,030 DD, base 50)**



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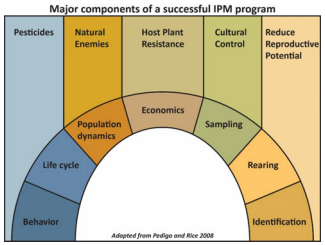
## Why promote IPM and thresholds?

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## Field crop entomologists know…

- Pests can reduce yield
  - Indirect injury to leaves, stems
  - Direct injury to seeds
- Feeding typically happens over time
- Rarely does 1 pest cause economic loss in the Midwest, but multiple pests colonize at the same time

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## Why entomologists promote thresholds

- Protect beneficials and pollinators
- Minimize resurgence
- Prevent flares of other pests
- Prolong insecticide efficacy, aka… delay genetic resistance to MOA

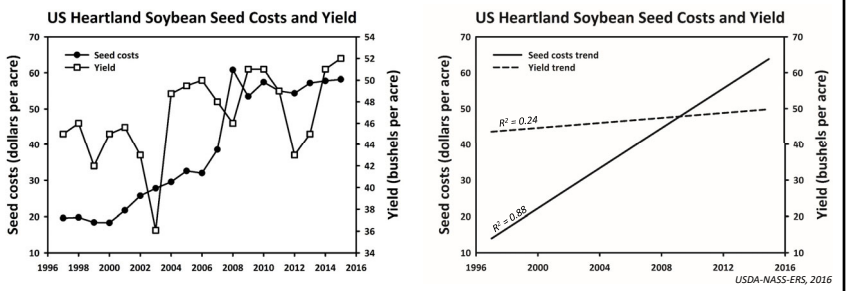



## What agronomists know about soybean

- Defoliation can affect transpiration, photosynthesis, nutrient deficiencies, water loss, etc.
- Iron chlorosis can reduce production
- Plants compensate from defoliation
- Leaves can still intercept light
- Soybean produces leaves until R4-5



## What farmers know too well…$$$





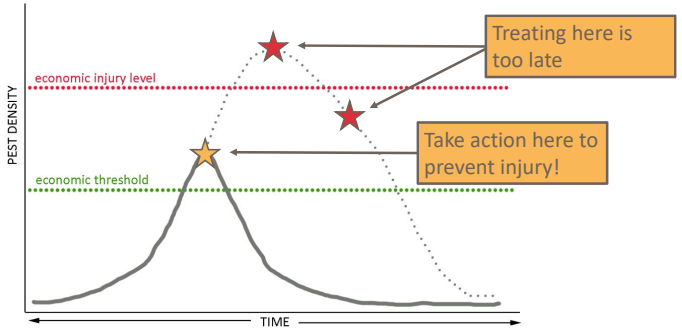

## Use treatment thresholds to manage pests

## Treatment thresholds

- *Economic injury level*: lowest population density that will cause economic damage
  - E.g., bushels per acre
- *Economic threshold*: point at which action should take plant to avoid EIL
  - E.g., pest density or plant injury

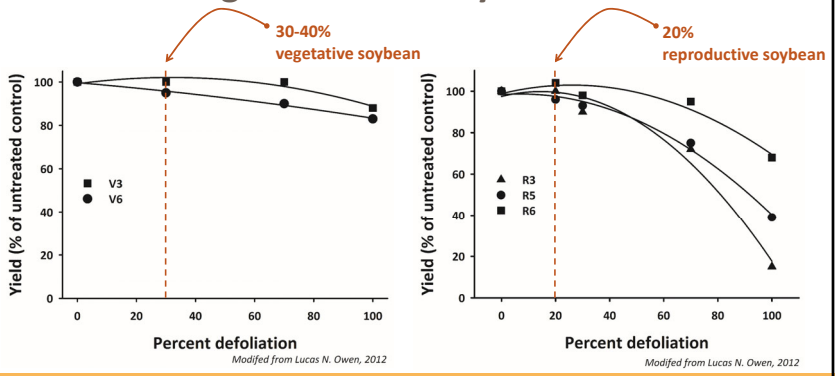


## Example of an economic threshold






## General ET guidelines in soybean






## Important considerations

- Strive for 100% kill with applications
- Uniform coverage
  - Sufficient volume/pressure
- Be aware of pre-harvest intervals later in season (30d, 45d, 60d)
- Assess product efficacy (check strips!)
- Continue to scout

## Take home points

- Sample regularly
  - Know the target pest(s)
  - Confirm feeding activity
- Recognize indirect/direct plant injury
- Estimate defoliation on whole plants and field wide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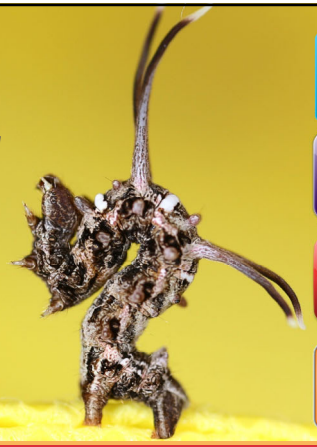
## THANK YOU!

**Twitter:** @erinwhodgson
**Website**: *crops.extension.iastate.edu*
- **ICM News*
- **ICM Blog*
- **Publications*
- **Events and News*
- **Soybean Pest Podcast*



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