Pest I.D.

Not all insects in your farm are bad!

- Learn how to I.D. both the common pests of your crop and the damage that they cause
- Many insects actually help you out by killing significant numbers of pests so learn to recognize them also.

Steven Katovich, USDA Forest Service, Bugwood.org

Russ Ottens, University of Georgia, Bugwood.org

Kevin D. Arvin, Bugwood.org

Pest I.D.

In the United States, the number of described insect species is approximately 91,000

Smithsonian Institute
http://www.si.edu/encyclopedia_si/nmnh/buginfo/bugnos.htm

- Only about 30 or so are commonly vegetable pests here

Whitney Cranshaw, Colorado State University, Bugwood.org

Photo by Clemson University - USDA Cooperative Extension Slide Series

Pest I.D.

How to Identify an unknown pest

- Catch the bug or get a good picture and description of where it was found etc… then:
  - Vegetable Insects
  - http://www.ipmimages.org/
  - http://bugguide.net/node/view/15740
  - http://about.extension.org/
  - Regional and statewide extension personnel: http://extension.missouri.edu/

Wilsonj@lincolnu.edu or Pineroj@linconu.edu

Source: http://www.ipminstitute.org

IPM is best described as a continuum. Many, if not most, agricultural growers identify their pests before spraying. A smaller subset of growers use less risky pesticides such as pheromones. All of these growers are on the IPM continuum.

The goal is to move growers further along the continuum

Scouting Equipment

Hand Lens

Optivisor

Net sweep

Sticky yellow trap cards
(greenhouse/high tunnel/field)

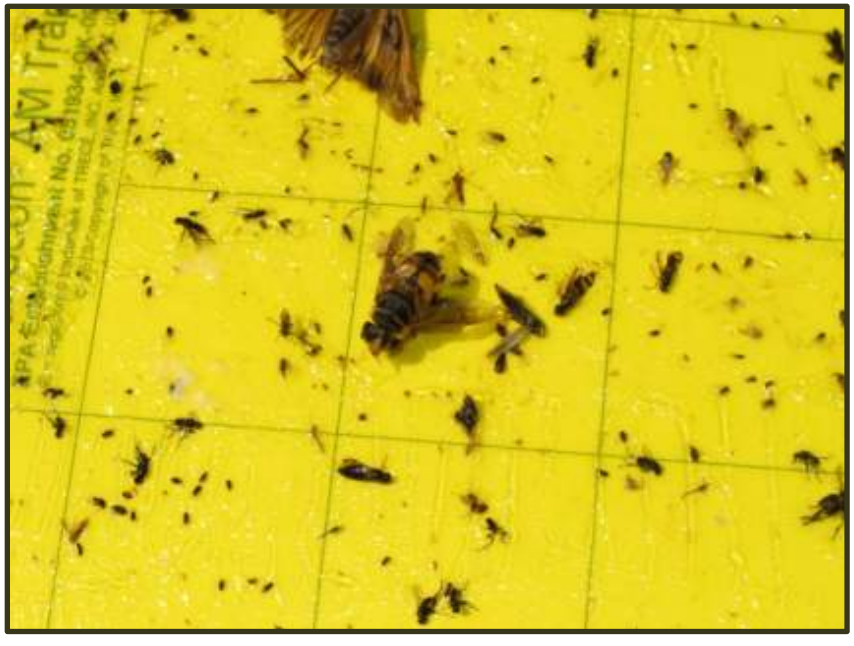
Scouting records

"If the insect in question is found, say bean leaf beetles, then a more thorough process can be implemented to determine the number of insects per plant, length of row, etc. *A sweep net is helpful for scouting bean leaf beetles and caterpillars in soybeans, and is absolutely essential for scouting potato leafhoppers in alfalfa. Sometimes it can be used to make the first detections of soybean aphids as small populations can be hard to find when searching for them visually". Dr. Marlin Rice*

Cucumber beetle monitoring

- Fields should be monitored frequently (2-3 times per week) to detect mass emergence of beetles in the spring. Focus insecticide applications on periods of heavy beetle activity

- STICKY CARDS: Standard



Different response to traps

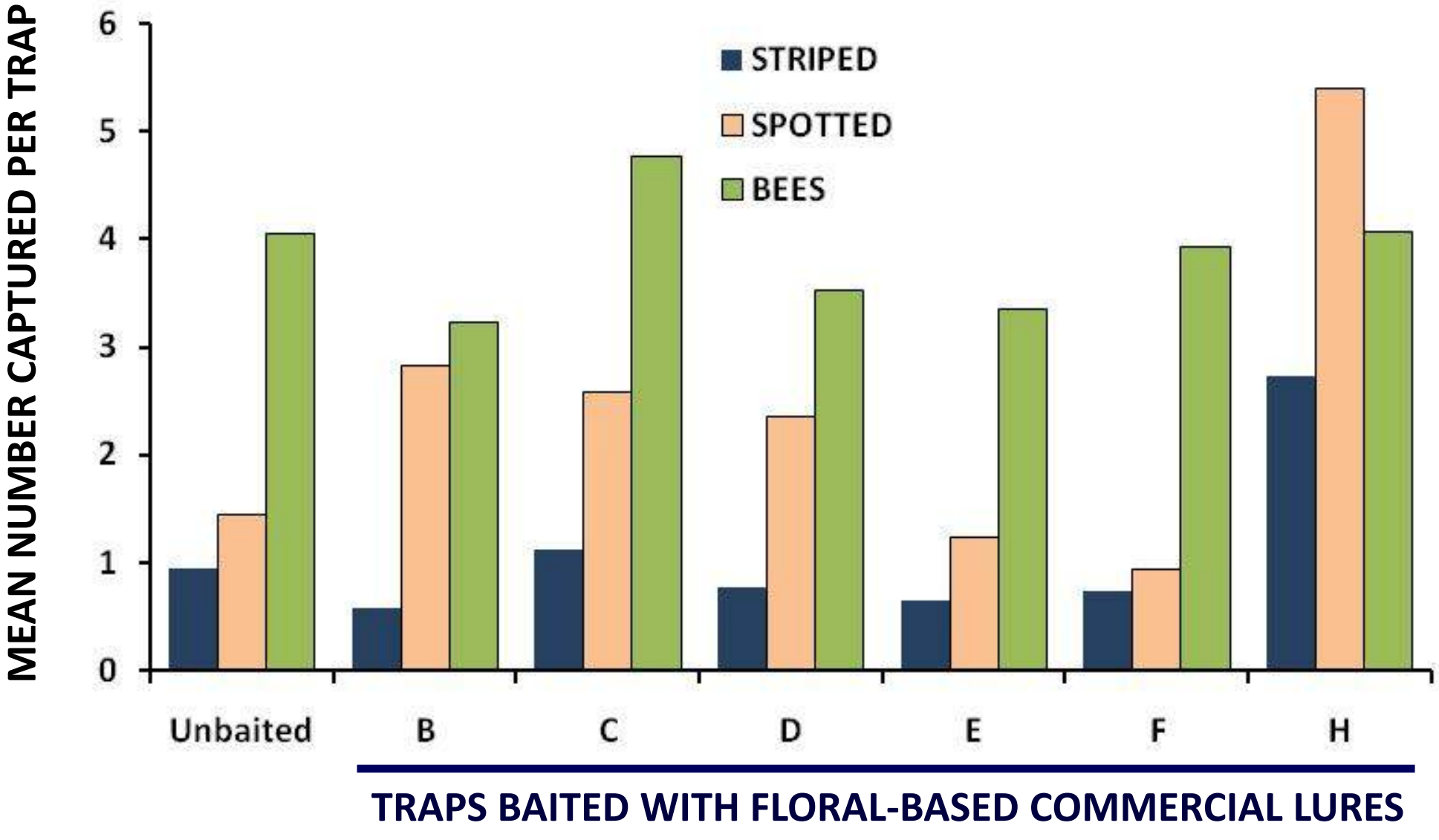
Corn rootworm trap

Sticky card

Effective monitoring systems?

"The economic threshold for direct counting cucumber beetles on muskmelon is 1 beetle per plant, and ***using yellow sticky traps is 10 beetles per trap per day"***

2010 Eval. of lures using sticky cards



* Funding provided by North Central IPM Center (2010-2011)

Stark City, MO, August 2011

1. Tomato pinworm (*Keiferia lycopersicella)*
2. Two-spotted spider mites
3. Fruit sunscalding

Tomato Pinworm Monitoring and Control

- Primary pest of tomatoes in regions of Florida, California, Texas, and Mexico
- Larvae are leafminers during early instars and then become leafrollers as they increase in size
- Although foliar injury can suppress growth of younger plants, greatest damage occurs when older larvae enter the tomato fruit
- Worms enter below the calyx and increase the likelihood of decay
- **Monitoring:** Pheromone-baited traps

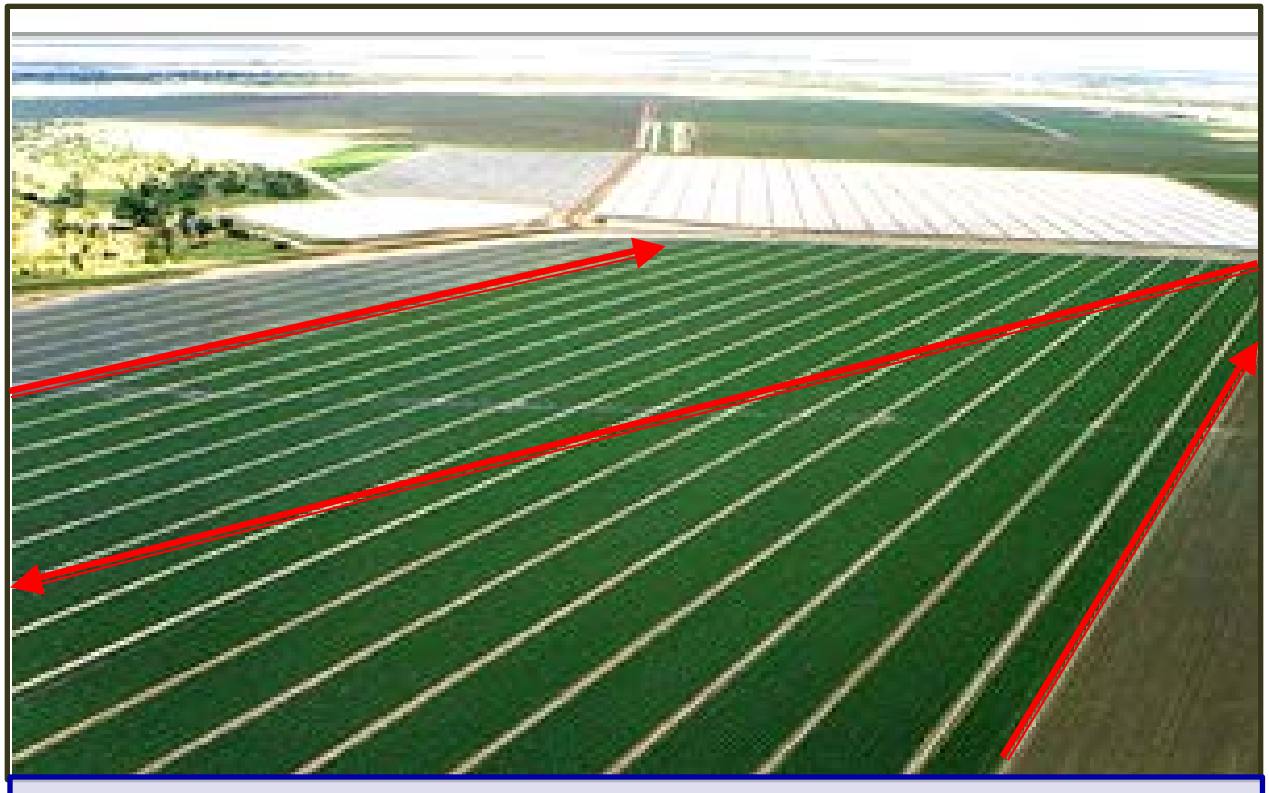
Monitoring Systems

The most effective lures combine sex pheromones and plant volatiles…

ANOTHER USE FOR TRAP CROPS!

Scouting

- Determine whether pests are approaching a damaging level



The field should be scouted in a "Z" pattern. For each 20-acre field, inspect 100 plants (10 plants in 10 locations)

- Until an **economic threshold** is reached, the cost of yield and quality loss will be less than the cost for control

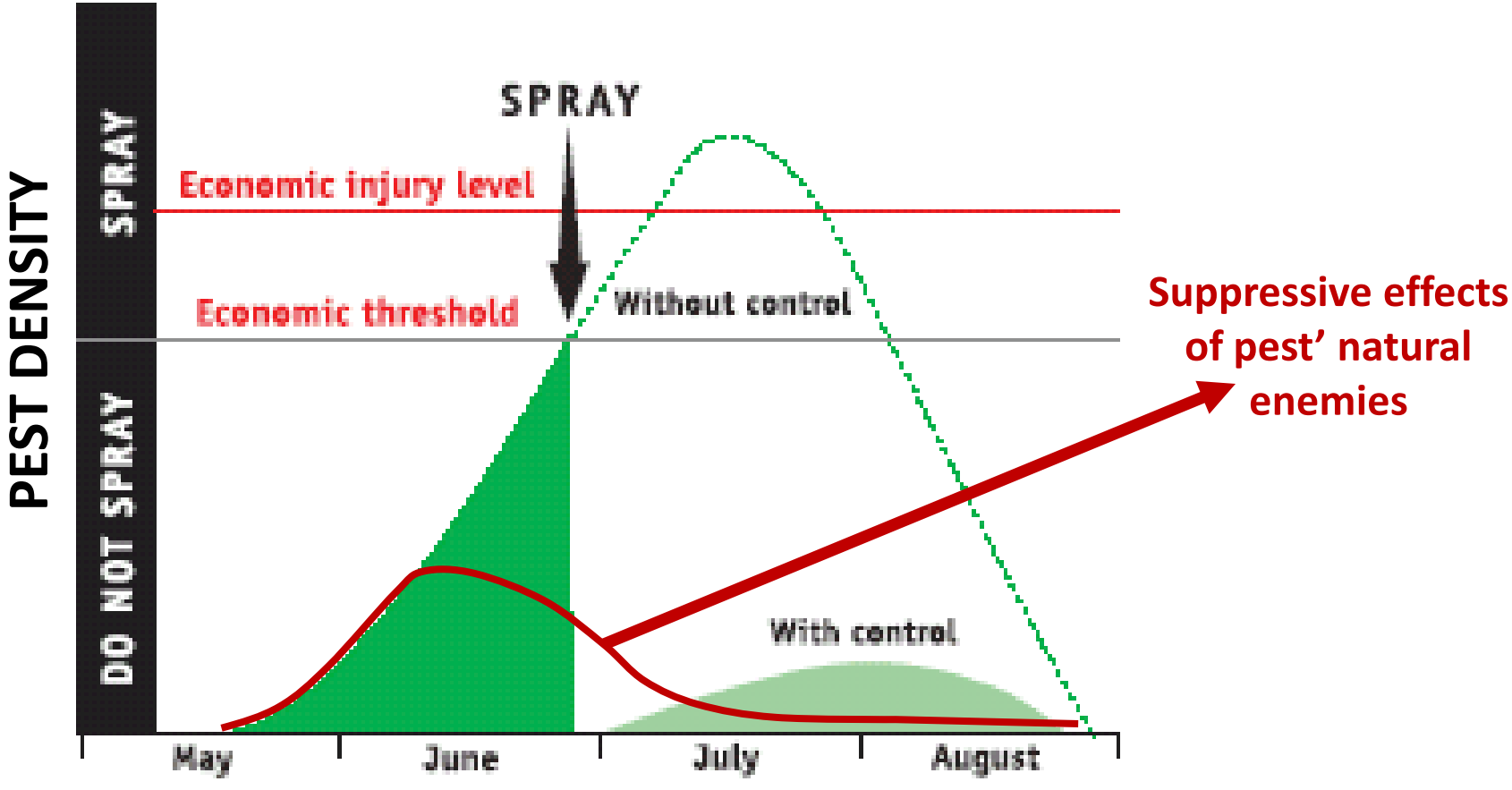
Economic Thresholds

- Nearly all crops can tolerate a certain amount of pest damage without appreciable effects on vigor and yield
- **ET: A measure of tolerable damage or pest density**
- **In most cases, complete control of pests is neither necessary nor appropriate for IPM**

Colorado potato beetle - adult

- Potatoes can be defoliated by as much as 30% **before flowering** or **during tuber fill**
- When potatoes are flowering, they cannot tolerate more than 6-8% defoliation

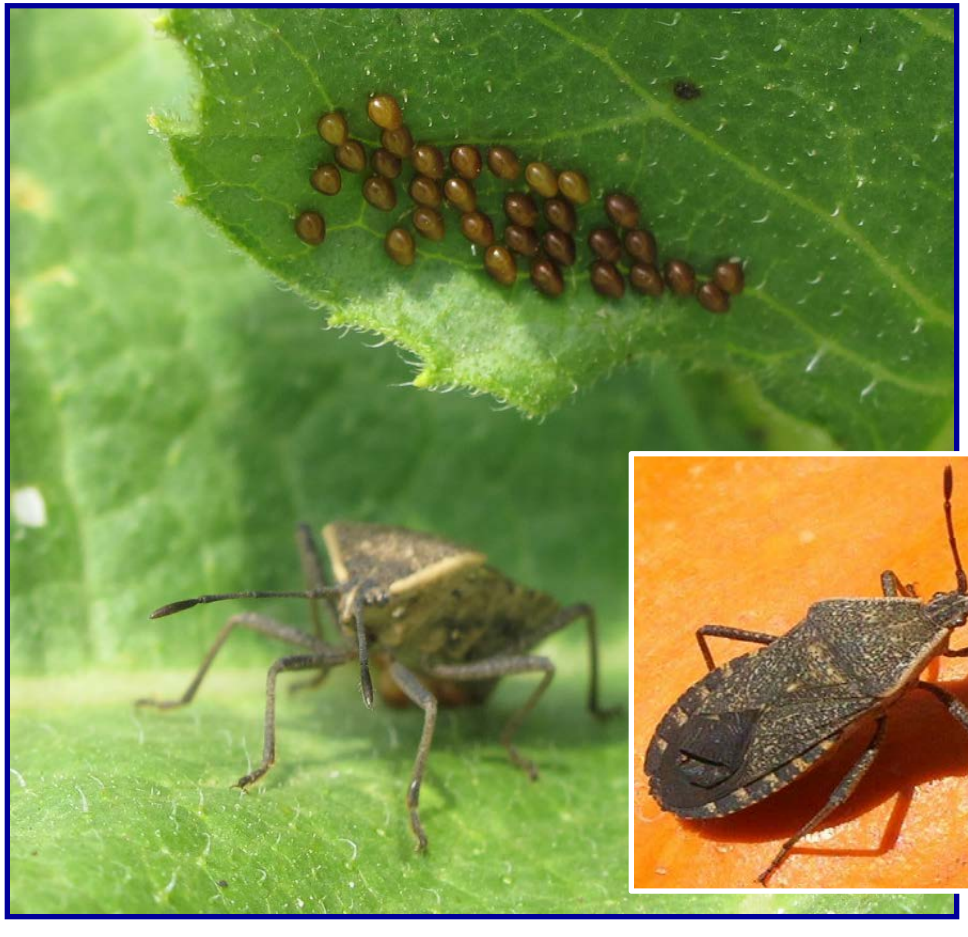
For many insect pests, quantitative studies of the **amount of damage** versus **reduction in crop yield** have established ***allowable levels of damage or population density***



Examples of thresholds

CUCURBITS:

- Cucumber beetles: Avg. of 1 beetle per plant
- Squash bugs: Seedling stage: if wilting is observed and bugs are present. Early flowering stage: avg. of 1 egg mass per plant
- Mites: Heavy mite infestations during a hot, dry period justify miticide application. However, if the infestation is not spreading, **spot spraying** may be effective



SOYBEAN:

- Soybean aphid: Avg. of 250 / plant