

# **Managing Cucumber Beetles to Reduce Bacterial Wilt in Cucurbits**



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# Cucumber beetles

## Important damage:

- Chew seedlings
- Transmit bacterial wilt
- Chew on fruit surface

## Less critical damage:

- Chew on flowers
- Larvae chew on roots





# Cucumber beetle feeding damage



**light**



**moderate**



**heavy**





**Beetle pressure often intense on Memorial Day weekend**



# Bacterial wilt of cucurbits: Vectored by cucumber beetles

- Transmitted in feces
- Enter via plant wound
- Moisture needed
- Cotyledon stage most susceptible



Russ Ottens, University of Georgia,  
Bugwood.org



# Bacterial wilt of cucurbits: Vectored by cucumber beetles

- **Infective beetles**
  - Overwintering
    - 1%
  - 2<sup>nd</sup> generation (Jul-Sep)
    - 8-12%
  - More if feeding 72 hrs than 12 hrs





# Bacterial wilt: Hosts

- **Cukes & melons**

- Well-known killer



- **Squash & pumpkins**

- Recently adapted to kill

- Slower to kill



# Bacterial wilt of cucurbits

## Beetle species common in cucurbits:

- **Known vectors:**
  - Striped cucumber beetle
  - Spotted cucumber beetle



striped



spotted



# Bacterial wilt of cucurbits

## Beetle species common in cucurbits:

- **Known vectors:**

- Striped cucumber beetle
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striped



spotted

- **Not known to vector:**

- Western corn rootworm beetle
- Northern corn rootworm beetle
- Pale-striped flea beetle



western

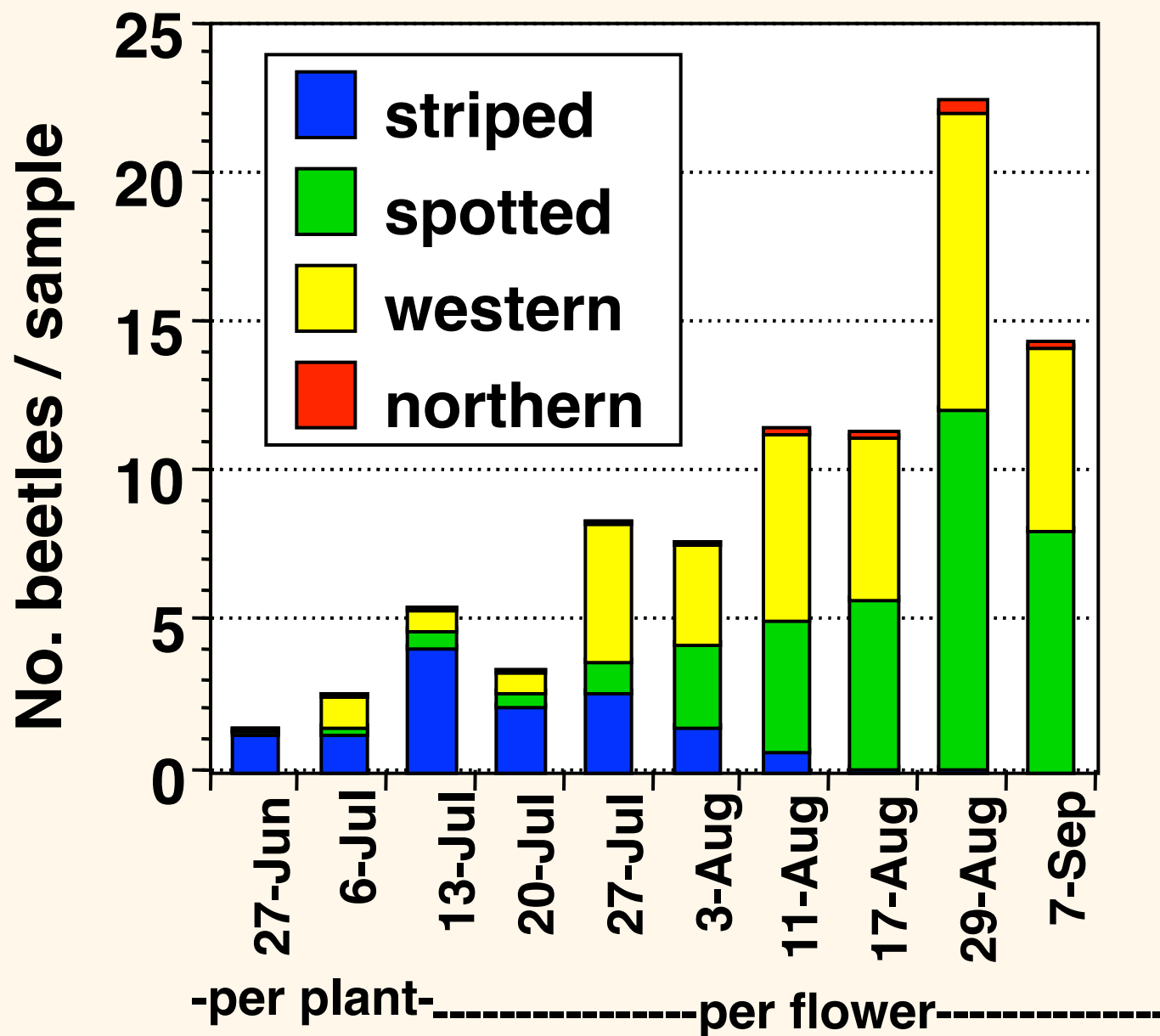


pale-striped



northern

## Seasonal progression of beetle species on squash





# Cucumber beetle management

- **Biological**
- **Cultural**
- **Mechanical**
- **Chemical**

# Natural enemy of cucumber beetles

- Parasitoid fly, *Celatoria*
- Looks like a small house fly
- Kills adult cucumber beetles
- Common in Ohio
  - Striped cucumber beetle, adults:
    - 0 to 38% in survey 13 farms, 2003 & 2004
  - Spotted cucumber beetle, adults:
    - 4% at 1 site, 2000
- We need to encourage its survival!





# Insectary planting as refuge for natural enemies



- Adult parasitoids need nectar
- Adult predators need pollen
- Plant **flowering border**



Stephanie Miller

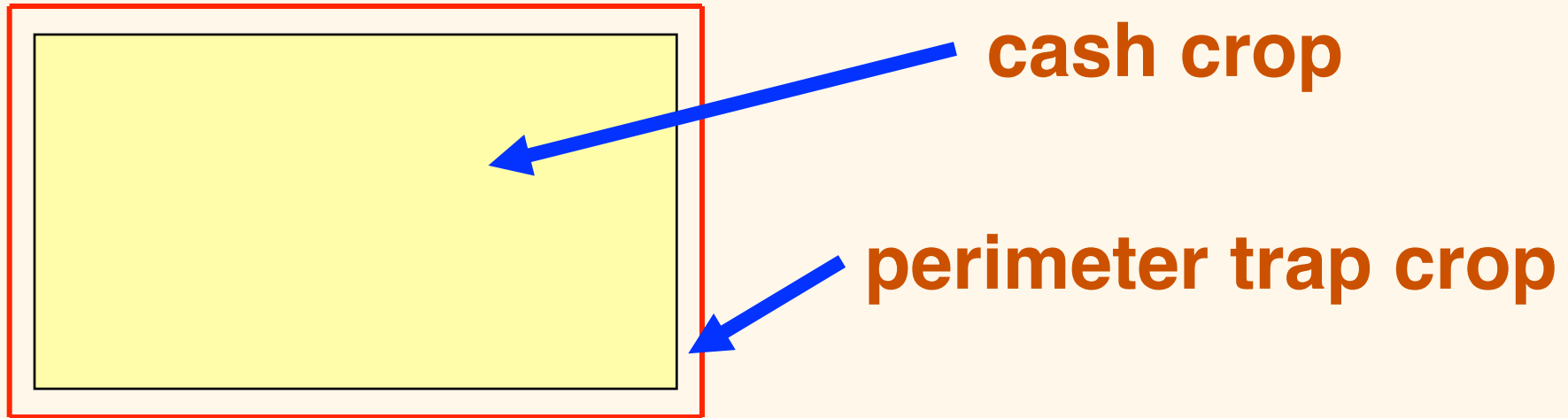
**Beetle infected with nematodes**

# Cultural controls

- **Plant late (mid-June)**
  - After initial peak invasion
- **Avoid straw mulch**
  - Favors development of larvae in soil



# Trap cropping



- **Planting time options**
  - Same time
  - 2 weeks early for trap crop
- **Insecticide options**
  - Use in trap crop only
  - High rate in trap, low rate in cash



# Cantaloupe surrounded by perimeter trap crop of buttercup squash





# Row covers (lightweight)

- Good in recent trials with cantaloupe
- Mechanized system under development



# Cucumber beetle kairomone trap



- Trécé Inc.
- Poison bait: cucurbitacin + carbaryl (inside trap)
- Volatile lure: mimic squash flowers





# Mass trapping

- with kairomone trap & box of plants treated with systemic insecticide
- before seeding the crop

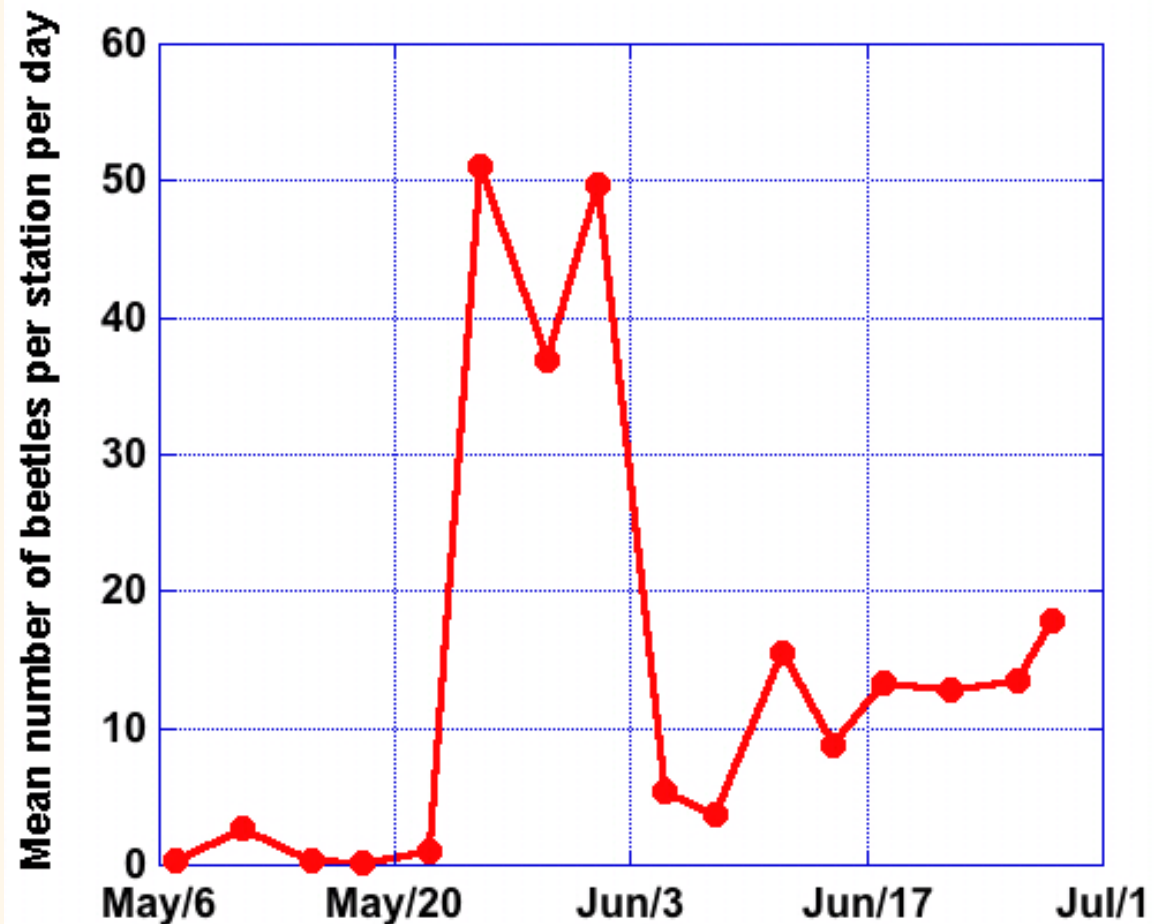




# Results with mass trapping

- 20 stations
- 8 weeks
- 15,099 beetles
- Max 51 beetles/  
station/day
- Peak 5/25 – 6/1

Cucumber beetles trapped at edge of pickle field 2007



# Cucumber beetle management on seedling cucurbits: scout until the 4-leaf stage



Stage	Threshold
cotyledon & 1-leaf	0.5 beetle/plant
2-leaf to 4-leaf	1 beetle/plant
>4-leaf	3 beetles/plant

# Cucumber beetle management on maturing pumpkins & squash

- Scout for damage
  - Examine 50 fruit weekly
  - Feeding usually starts on handle
- Threshold (tentative):
  - 20% of fruit with scars



# Control of cucumber beetles with insecticides?

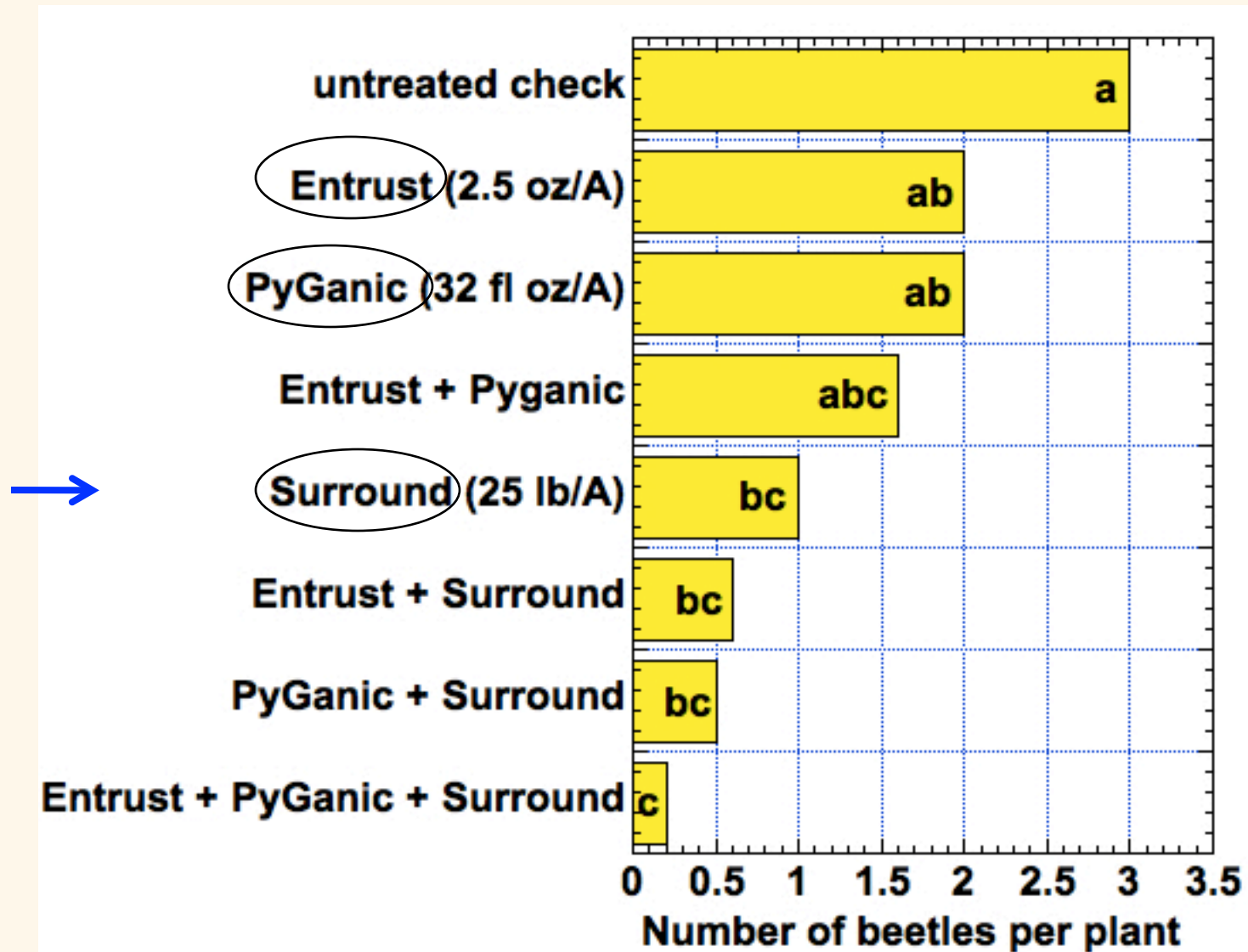
- Seed or soil applied:
  - No current options for organic
- Foliar applied
  - Some options for organic
  - Beware of toxicity to bees



# **Cucumber beetle organic management with OMRI insecticides**

- **Pyrethrins?**
  - **PyGanic**
- **Spinosad?**
  - **Entrust**
- **Kaolin?**
  - **Surround**
- **Neem/Azadirachtin?**
- **any + CideTrak D**

# Cucumber beetle trial, UMass, 2009: 3 foliar applications on 1, 8, 15 June





# Surround® WP

Crop Protectant



## Cucurbit Vegetables

Such as cucumber, summer and winter squash, pumpkin, citron melon, muskmelon, and watermelon

PEST	LBS/ACRE	APPLICATION INSTRUCTIONS
Cucumber beetle, grasshoppers	25-50	Suppression only*. Start prior to infestation, applying every 5-7 days, with the first two applications 3 days apart.
Powdery mildew		Suppression only*. Apply every 7-14 days as required to maintain coverage.
Sunburn and heat stress	25-100	See I D.
*If complete control is needed, consider using supplemental controls.		

Cost ~ \$22 for 25-lb bag

# Repellent: 'Surround'



**Pumpkins 2001**



**Cantaloupe 2012**

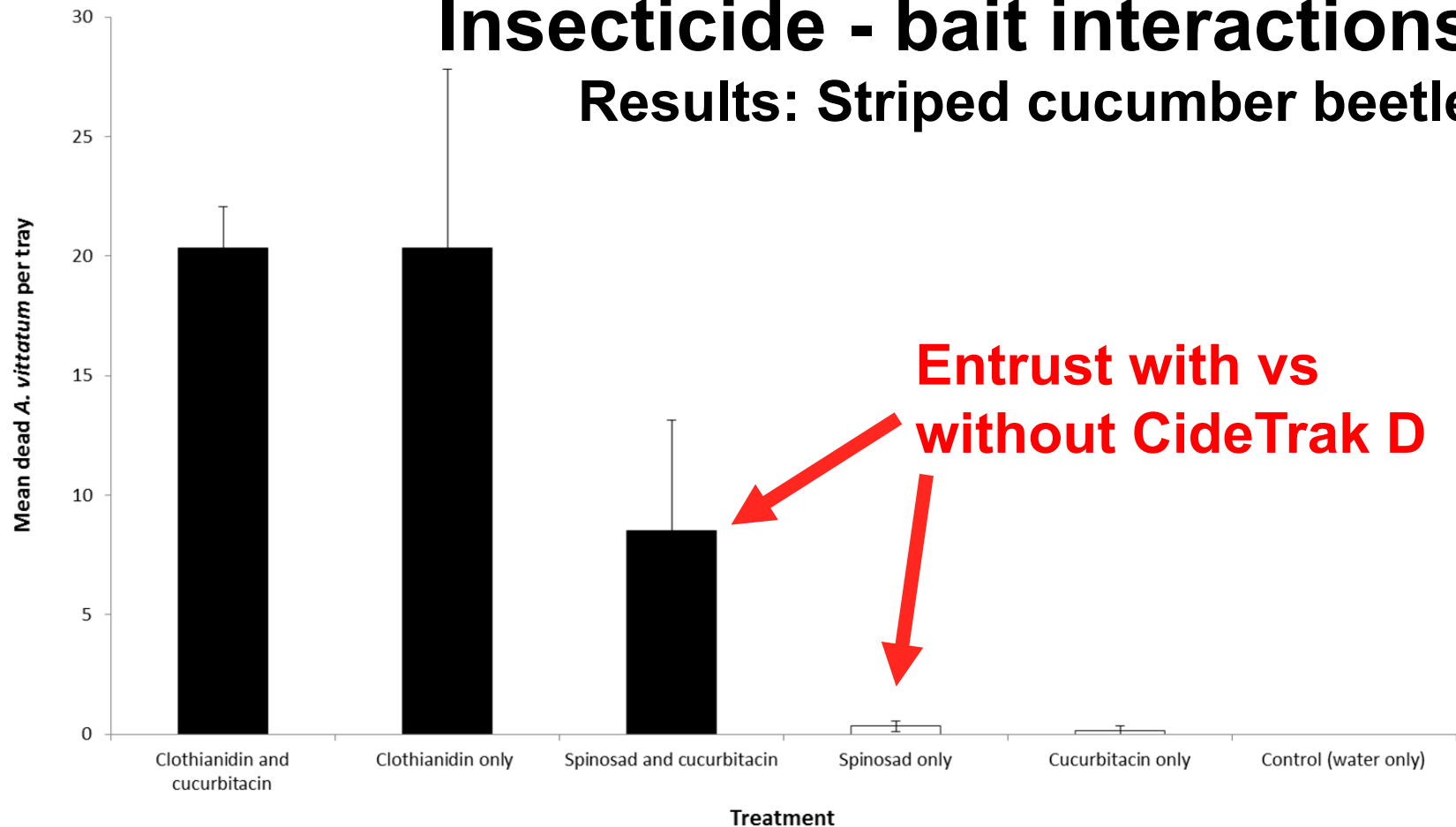


# CideTrak D

- On OMRI list (as adjuvant)
- Gustatory stimulant
- Not insecticide
- Made by Trécé Inc.
- Cucurbitacin
- Buffalo gourd root powder
- Mix with insecticide
- 3.1 oz/A
- Costs \$92.50 for 4-lb bag (@CPS)

# Recent trial with CideTrak D

## Insecticide - bait interactions Results: Striped cucumber beetle



From Logan Minter and Ric Bessin, University of Kentucky



# Summary:

## Cucumber beetle management

- **Biological**
  - Conserve parasitoid flies
- **Cultural:**
  - Plant late (mid-June)
  - Avoid straw mulch
  - Perimeter trap crop
- **Mechanical:**
  - Row covers
  - Mass trapping
- **Chemical**
  - Rescue spray