Pesticide Applicator Training Program:

Insect Management on Vegetable & Fruit Crops




Celeste Welty

December 2008

Veg & Fruit Insect News

- Product news
- New pest alert
- Research results
- Ohio crops using IPM

New insecticides with new active ingredients

- Movento (group 23)
  - Fully systemic
  - Sucking pests
- Synapse & Belt (group 28)
- Coragen & Altacor (group 28)

New products in group 28

Product	*A.I.*	*Crops*	*Pests*	*Application*
Coragen	chlorantra-niliprole (Rynaxypyr)	veg	caterpillars, Col. potato beetle, leafminers	foliar or drip irrigation
Altacor	chlorantra-niliprole (Rynaxypyr)	fruit, potato	caterpillars, Col. potato beetle	foliar
Synapse	flubendiamide	veg	caterpillars	foliar or overhead irrigation
Belt	flubendiamide	fruit, sweet corn	caterpillars	foliar or overhead irrigation

New insecticides: pre-mixes of old + new a.i.s (price advantage??)

- **Durivo** (for drip irrigation only)
- **Voliam Flexi**
- **Voliam Xpress**
- **Endigo**
- **Brigadier**

New pre-mixes

Product	*Older a.i.*	*Newer a.i.*
Durivo	thiamethoxam **(Actara)**	chlorantraniliprole **(Coragen)**
Voliam Flexi	thiamethoxam **(Actara)**	chlorantraniliprole **(Coragen)**
Voliam Xpress	lambda-cyhalothrin **(Warrior)**	chlorantraniliprole **(Coragen)**
Endigo	**l**ambda-cyhalothrin **(Warrior)**	thiamethoxam **(Actara)**
Brigadier	bifenthrin **(Capture)**	imidacloprid **(Provado)**

New insecticides with old a.i.s

- Onager (= Savey)
- Portal (= Fujimite)
- Belay (= Clutch, Poncho)

New pest alert

- Western bean cutworm

- Silverleaf whitefly

- Swede midge

- Brown marmorated stink bug

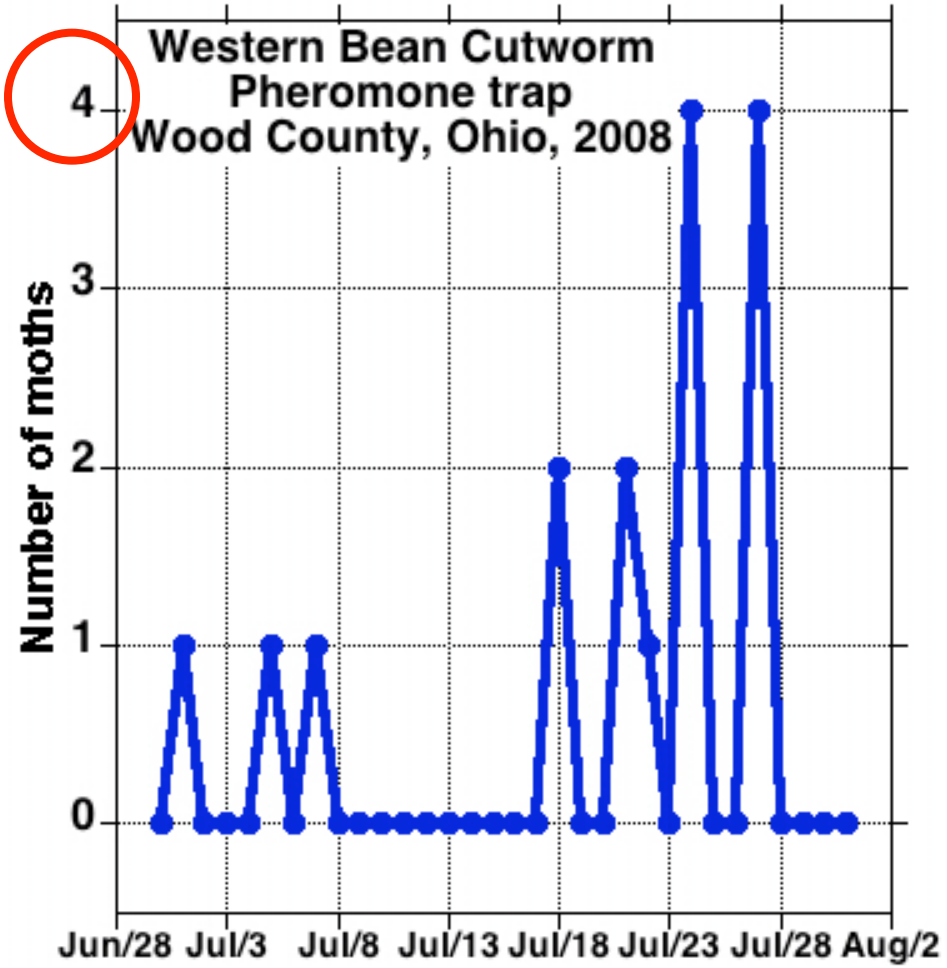
Western bean cutworm

- Long-time pest of corn & dry beans in Colorado & Nebraska
- Moving eastward to Iowa starting 2000
- Now common in Illinois & Wisconsin
- Pest of sweet corn ears
- Distinguish from corn earworm:
  - dark stripes immediately behind head
  - absence of small dark spines or stripes on side of body

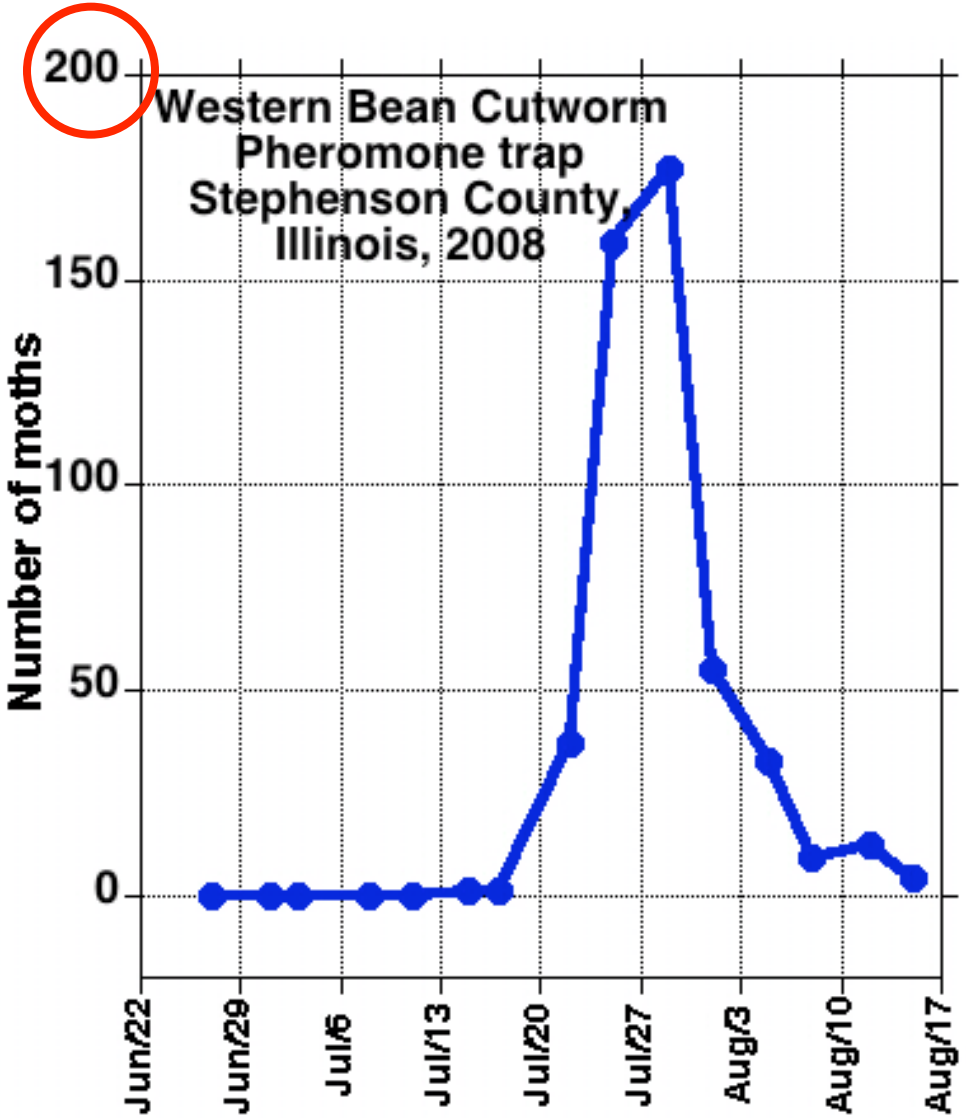
Western bean cutworm

- **Monitor by pheromone trap**
  - **One generation per year**
  - **Adults active in July**
  - **confirmed catches of moth in NW Ohio in 2007 & 2008**

Site with highest catch in Ohio



Site with highest catch in Illinois



Western bean cutworm

- If any moths caught in trap, then scout
  - Late July & early August
  - In plantings with tassels emerging
  - Upper 4 leaves of 100 plants/planting
  - Look for eggs & young larvae

- Thresholds (sweet corn):
  - 4% of plants infested (processing)
  - Tentative: 1% of plants (fresh-market)
- Insecticide:
  - When ~90% of tassels have emerged
  - When eggs are hatching
  - A pyrethroid or Penncap-M or Sevin

Silverleaf whitefly

(a.k.a. biotype B of sweetpotato whitefly)

- Key pest in Florida
- Suspected in OH
- Tomato:
  - Feeds on leaves
  - Symptoms only on fruit
  - Irregular ripening
- Squash:
  - Silvering on leaves
  - From veins out
  - Plants stunted, white

Silverleaf whitefly

- Florida-grown transplants treated with soil drench 7-10 days before shipping
  - Admire, Platinum, Venom
- Ok to use neonic. one more time as transplant drench
- Foliar sprays: rotate non-neonic.

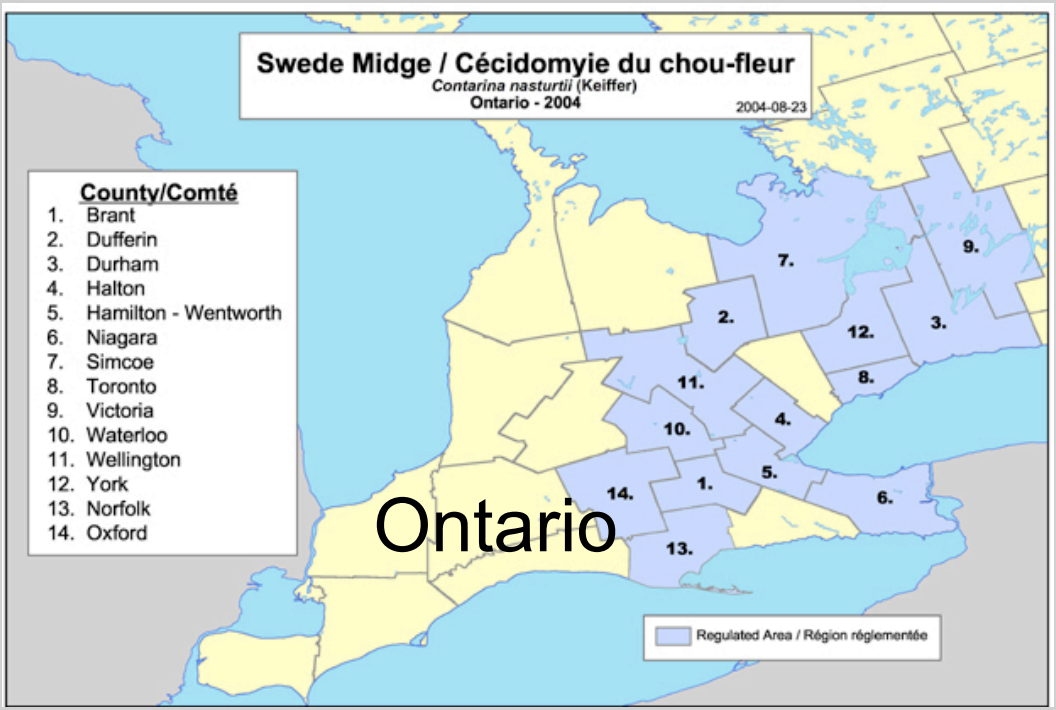
Silverleaf whitefly: insecticide options

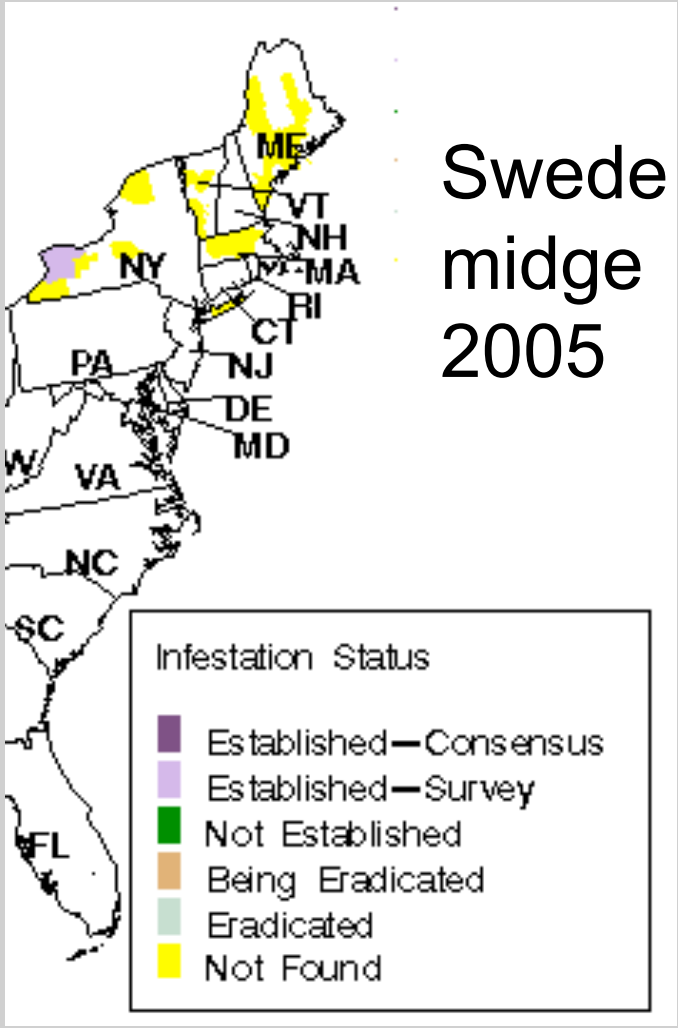
Insecticide	Adult rating	Nymph rating
neonic. drench (Admire, Platinum, Venom)	**3 (~60%)**	**5 (>90%)**
neonic. foliar (Assail, Actara, Platinum, Provado)	**3 (~60%)**	**5 (>90%)**
Oberon	**3 (~60%)**	**5 (>90%)**
Courier	**1 (<30%)**	**4 (~80%)**
Knack	**1 (<30%)**	**4 (~80%)**
Vydate	3 (~60%)	2 (~40%)
soap	2 (~40%)	3 (~60%)
Agri-Mek	2 (~40%)	2 (~40%)
pyrethroids	2 (~40%)	2 (~40%)
Monitor or Lorsban (tank mix w/ pyrethroid)	3 (~60%)	3 (~60%)
Thiodan (for tank mix w/ pyrethroid)	2 (~40%)	2 (~40%)
Movento	**4?**	**5?**

Swede midge

- Attacks cole crops
- Quarantine pest
- Important in Ontario & Quebec since 2000
- First detected in USA (western NY) in 2005
- Ohio: 1st traps in 2008

Swede midge

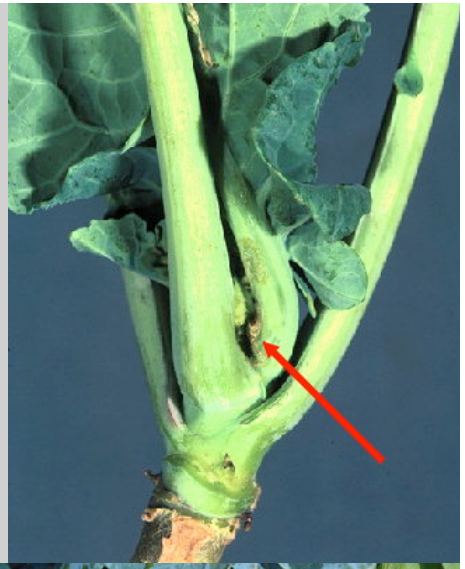




Swede midge 2005

Swede midge

- **Symptoms:**
  - Swollen & distorted shoots
  - Leaf crumpling
  - Brown scarring on petioles
  - Multiple heads & stems
  - Swollen florets



Brown marmorated stink bug

- In PA since 2001
- Now in NJ, MD, DE, VA, WV, NY
- Pest in Japan, China, Korea
- Attacks fruits & seed pods
- Also a nuisance pest: invades homes to overwinter
- 1st report in Ohio: Nov. 2007
- New OSU fact sheet: **FS-3824-08**

Hosts of Brown Marmorated Stink Bug

- **Fruit crop hosts:**
  - **Peach, apple, pear, cherry, Asian pear**
  - **Raspberries, grapes, currants**
- **Vegetable crops**
  - **Green beans**
  - **Peppers**
  - **Asparagus**
- **Agronomic crops**
  - **Soybean**
  - **Corn**

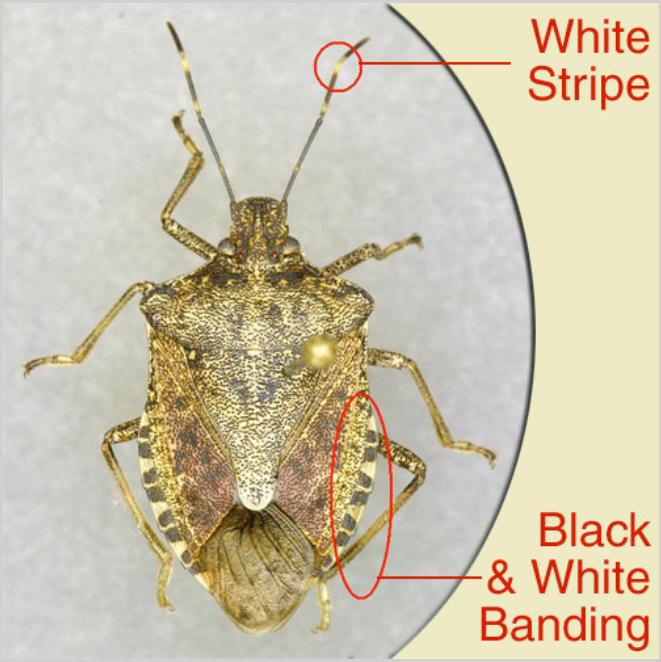
Brown marmorated stink bug

nymph

- **Both adults & nymphs feed on plants**
  - **Fruit**
  - **Leaves**

Brown marmorated stink bug

- **Identify by white bands on antennae & sides**



top view

bottom view

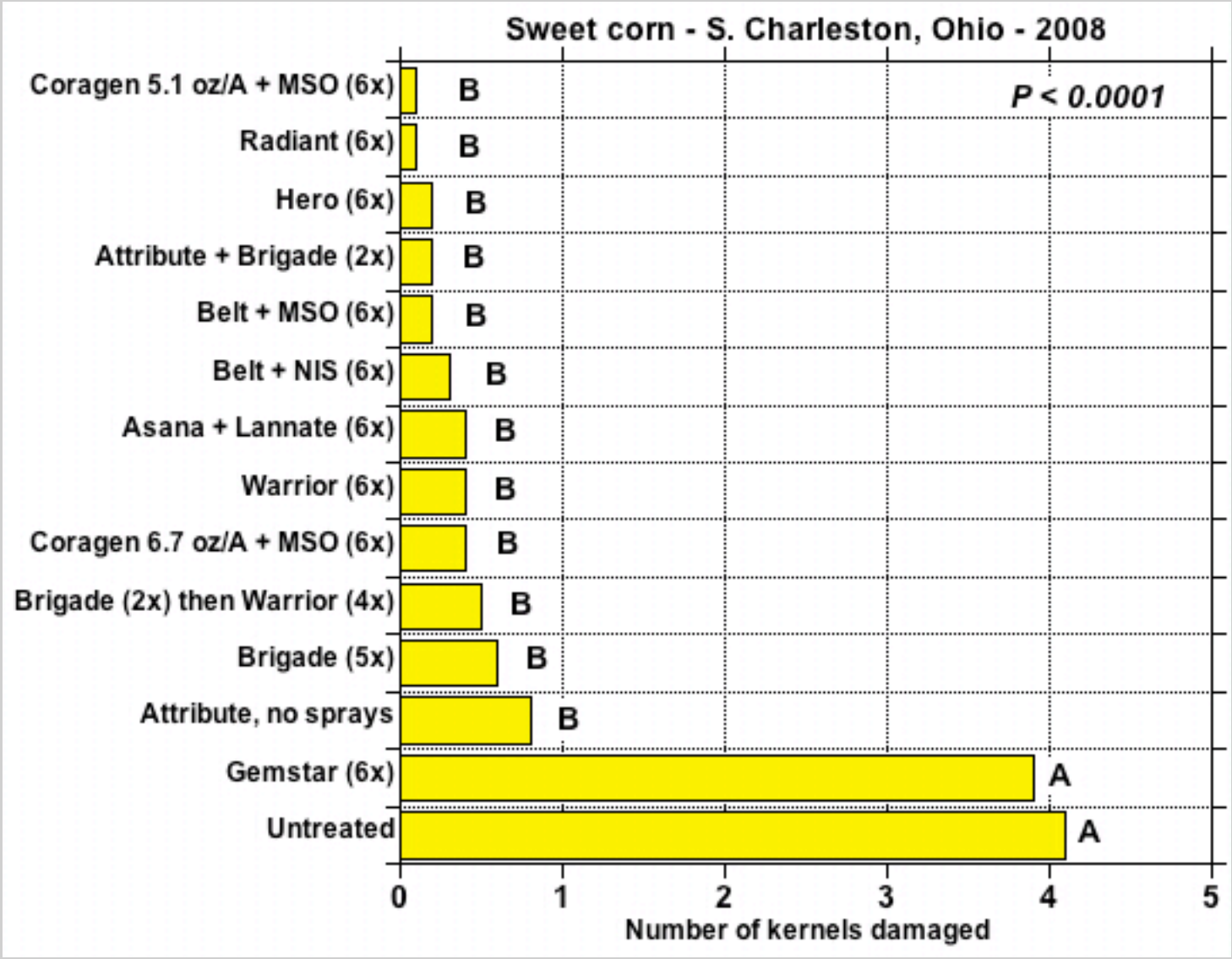
Research results, 2008

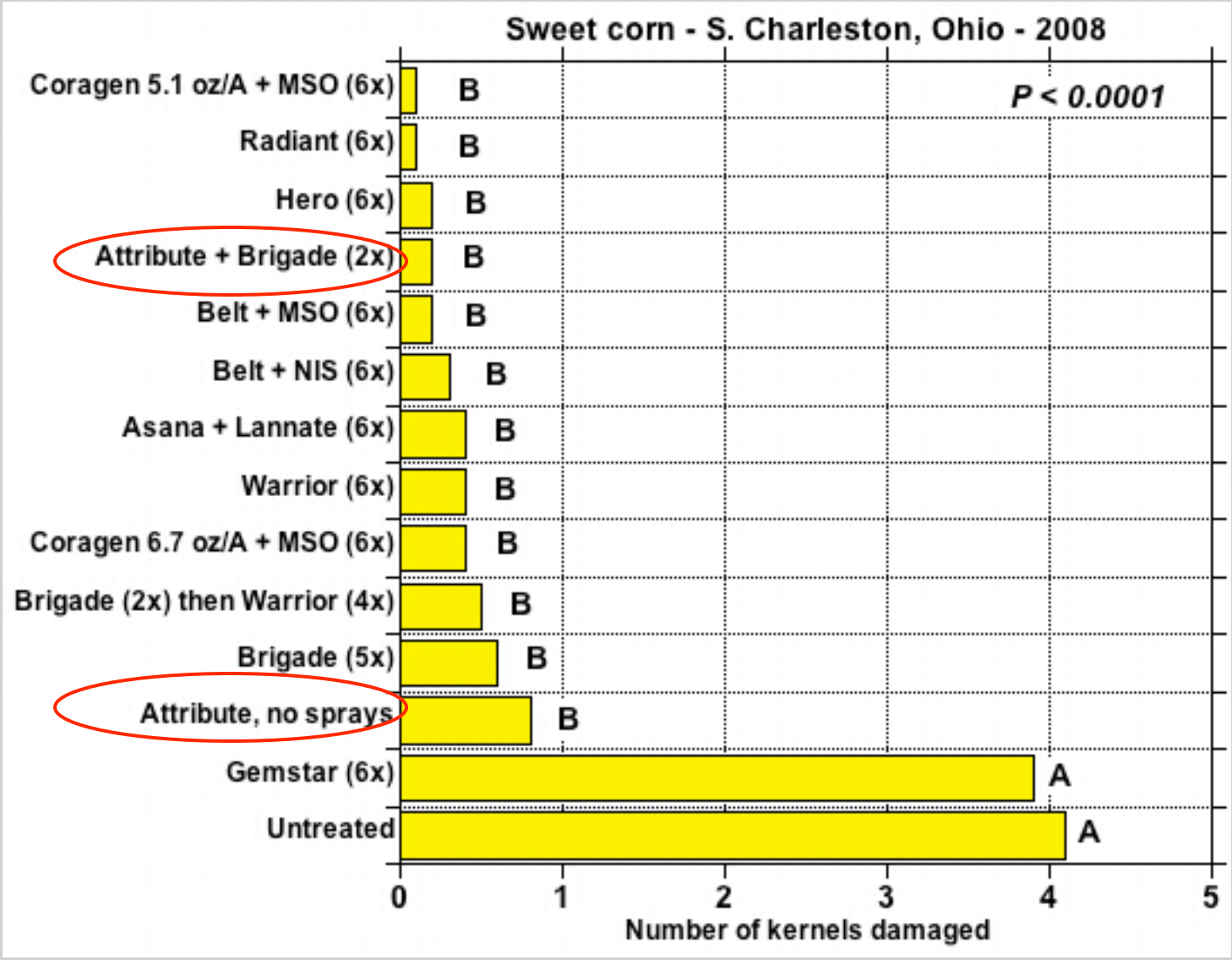
- Sweet corn
- Zucchini
- Pickling cucumbers
- Pumpkins
- Cabbage (NY)
- Apples

Sweet corn trial, 2008

(Jasinski, Welty, & Precheur)

- Corn earworm targeted
- Insecticide:
  - 6 applications
  - 3-day schedule
  - 15 Aug. – 2 Sept.
- Evaluated 8 Sept.
- Eur. corn borer most abundant


Sweet corn - S. Charleston, Ohio - 2008
P < 0.0001
Coragen 5.1 oz/A + MSO (6x)
Radiant (6x)
Hero (6x)
Attribute + Brigade (2x)
Belt + MSO (6x)
Belt + NIS (6x)
Asana + Lannate (6x)
Warrior (6x)
Coragen 6.7 oz/A + MSO (6x)
Brigade (2x) then Warrior (4x)
Brigade (5x)
Attribute, no sprays
Gemstar (6x)
Untreated
B
B
B
B
B
B
B
B
B
B
B
B
A
A
0
1
2
3
4
5
Number of kernels damaged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Attribute, no sprays
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Untreated
B
B
B
B
B
B
B
B
B
B
B
B
A
A
0
1
2
3
4
5
Number of kernels damaged

Sweet corn pest management

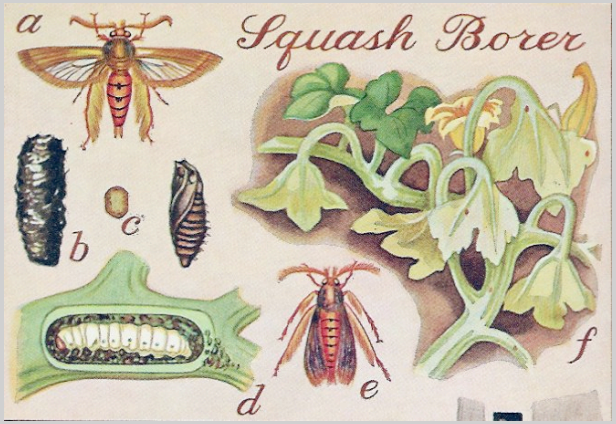
- B.t. sweet corn: excellent when supplemented with 2 sprays
  - 1st: 75% fresh silk
  - 2nd: 4 days later
- Newly registered a.i.s excellent:
  - Radiant
  - Belt
  - (& Coragen, registration pending)
- Among pyrethroids, Hero best

Related problem on tomato

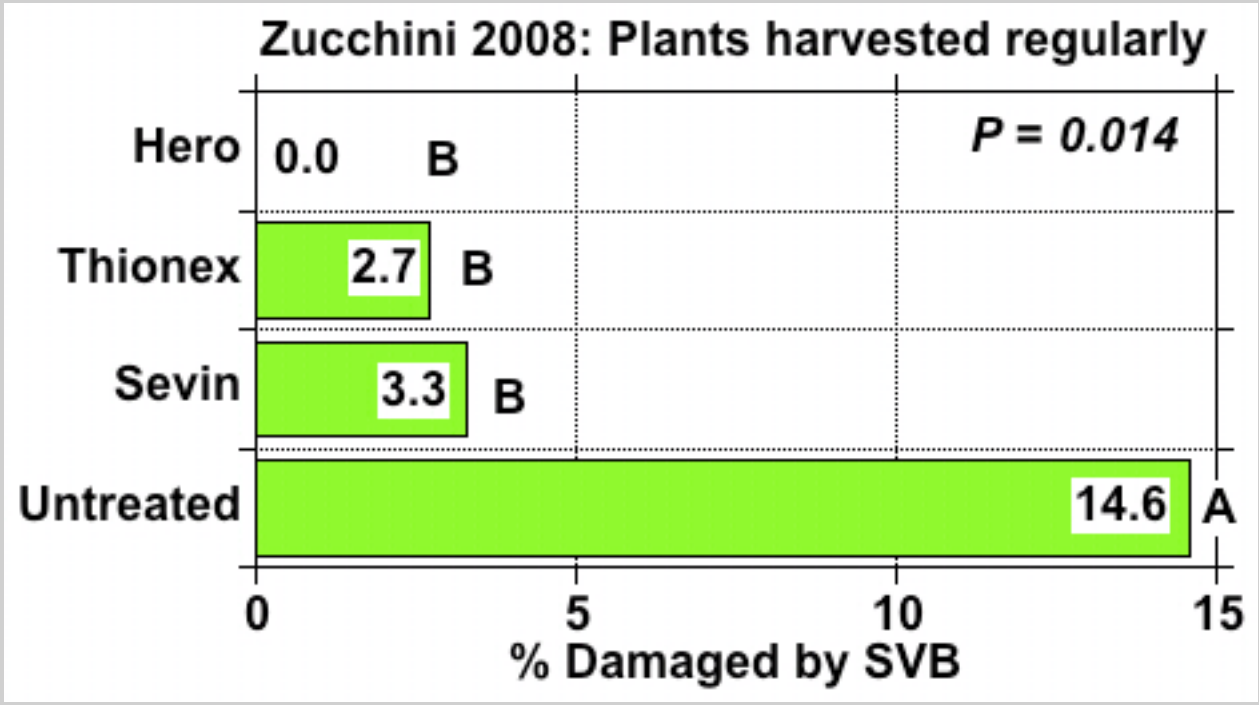
- For tomato fruitworm
- Alternatives to pyrethroids:
  - Coragen
  - Synapse
  - SpinTor/Radiant
  - Proclaim
  - Avaunt
  - Intrepid

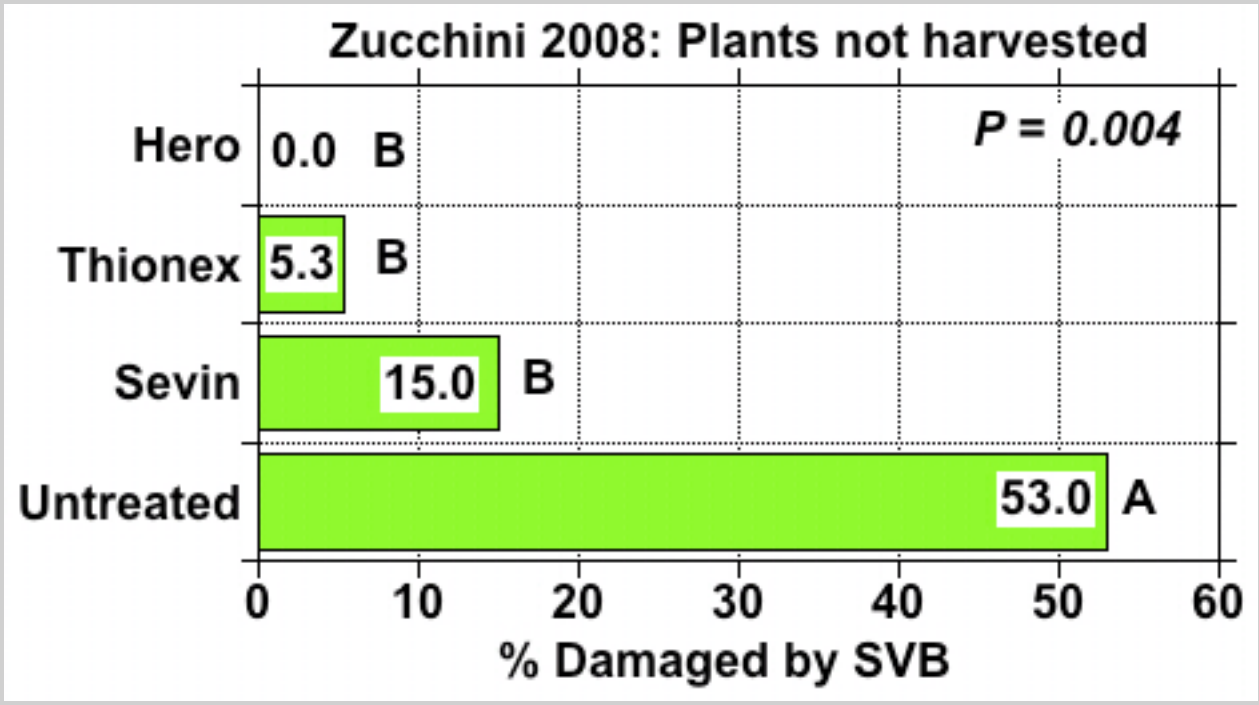
Squash vine borer trial, 2008

(Welty & Jasinski)



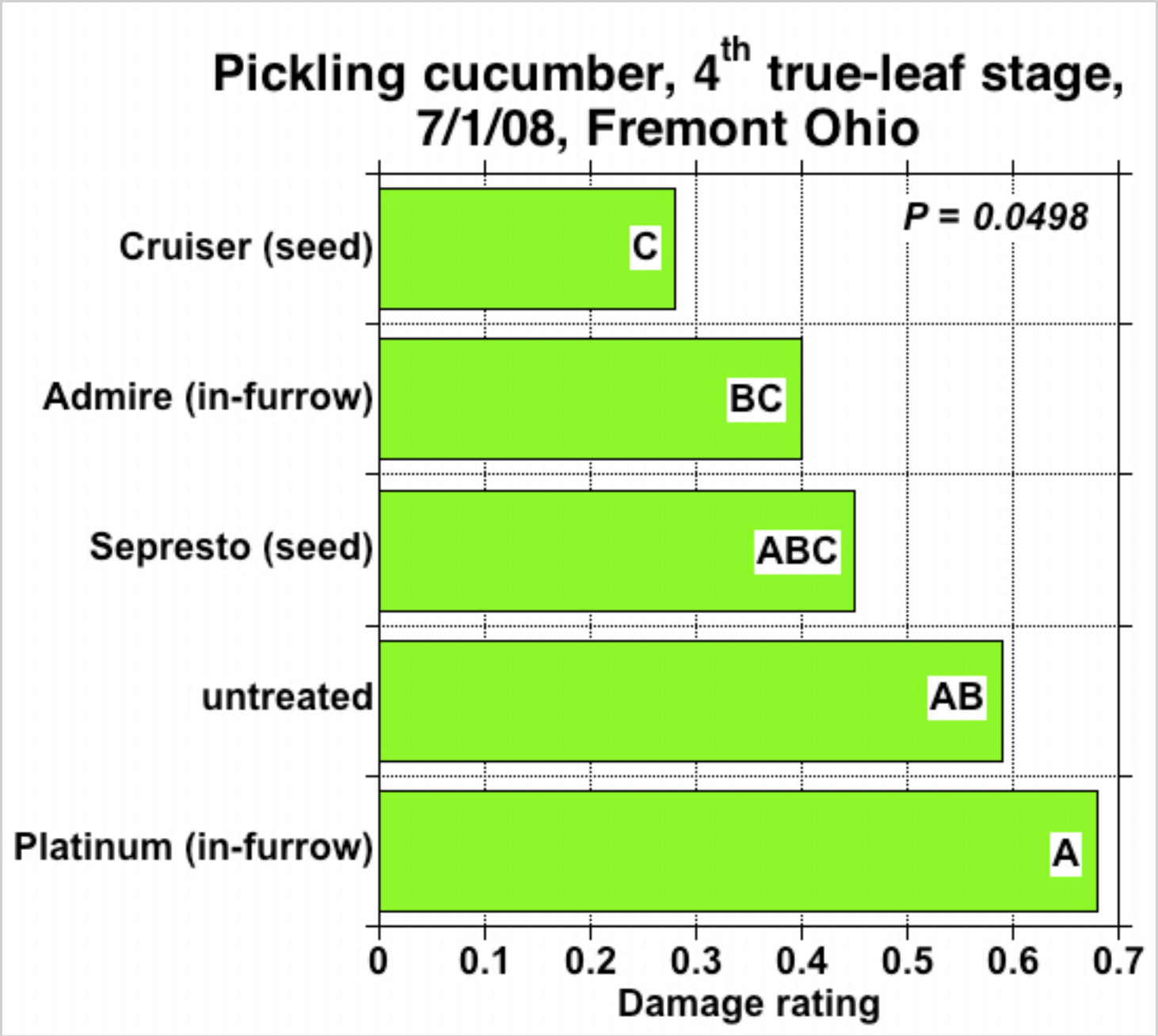
- Zucchini
- Insecticide:
  - 4 applications
  - Weekly
  - 3 July to 25 July
- Evaluated 8 August

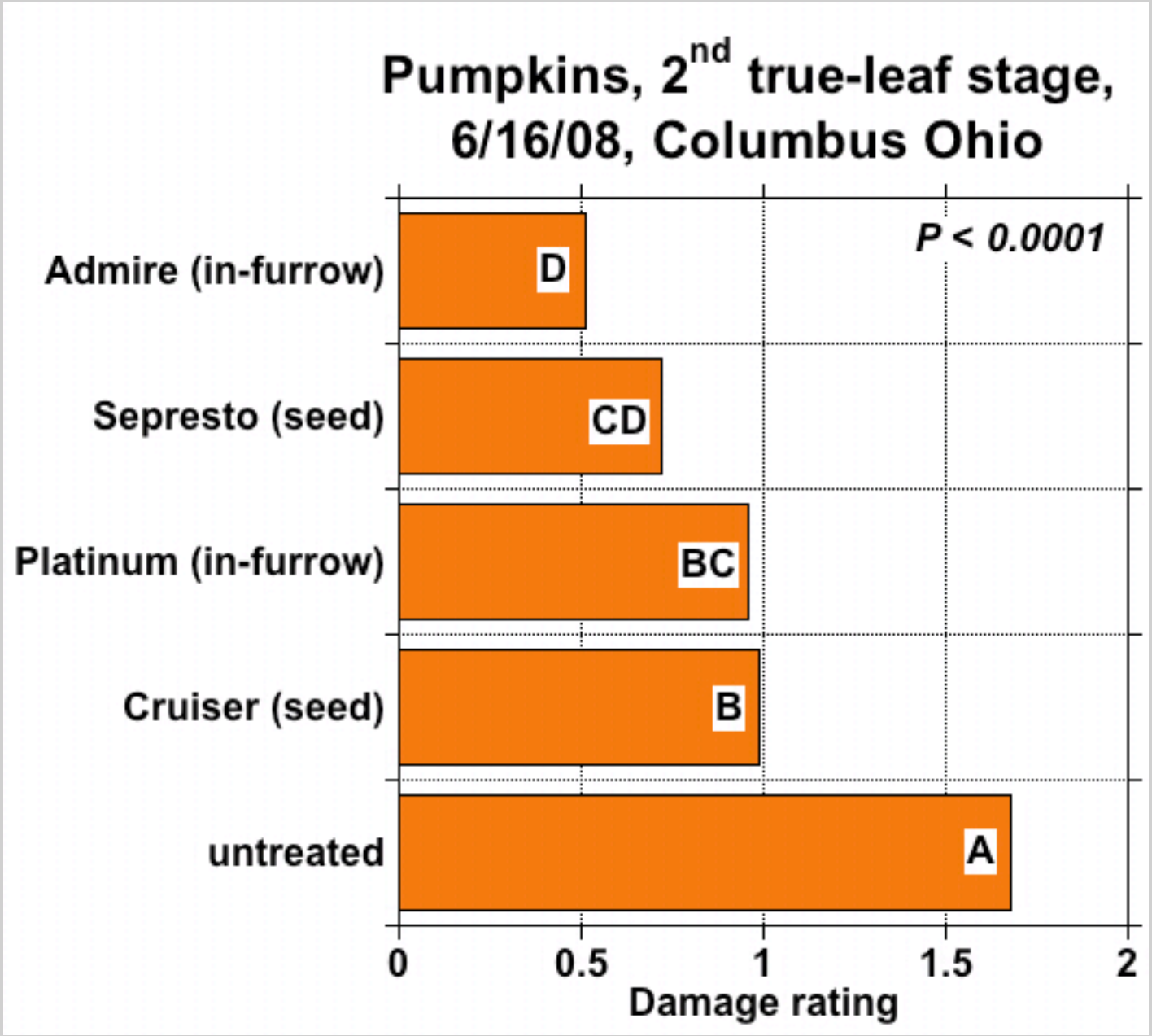

Zucchini 2008: Plants harvested regularly
P = 0.014
Hero
0.0
B
Thionex
2.7
B
Sevin
3.3
B
Untreated
14.6
A
0
5
10
15
% Damaged by SVB

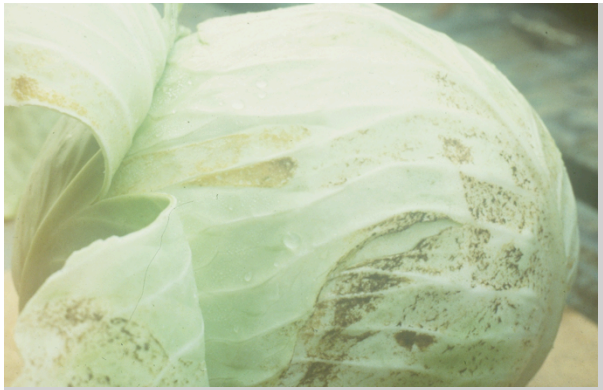

Zucchini 2008: Plants not harvested
P = 0.004
Hero
0.0
B
Thionex
5.3
B
Sevin
15.0
B
Untreated
53.0
A
0
10
20
30
40
50
60
% Damaged by SVB

Cucurbit seed treatment trials, 2008

- Cucumber beetle control
- Cruiser = thiamethoxam
  - Just registered as ‘FarMore’ (Syngenta)
- Sepresto = clothianidin + imidacloprid
  - Not yet registered (Bayer)
- Compare with in-furrow

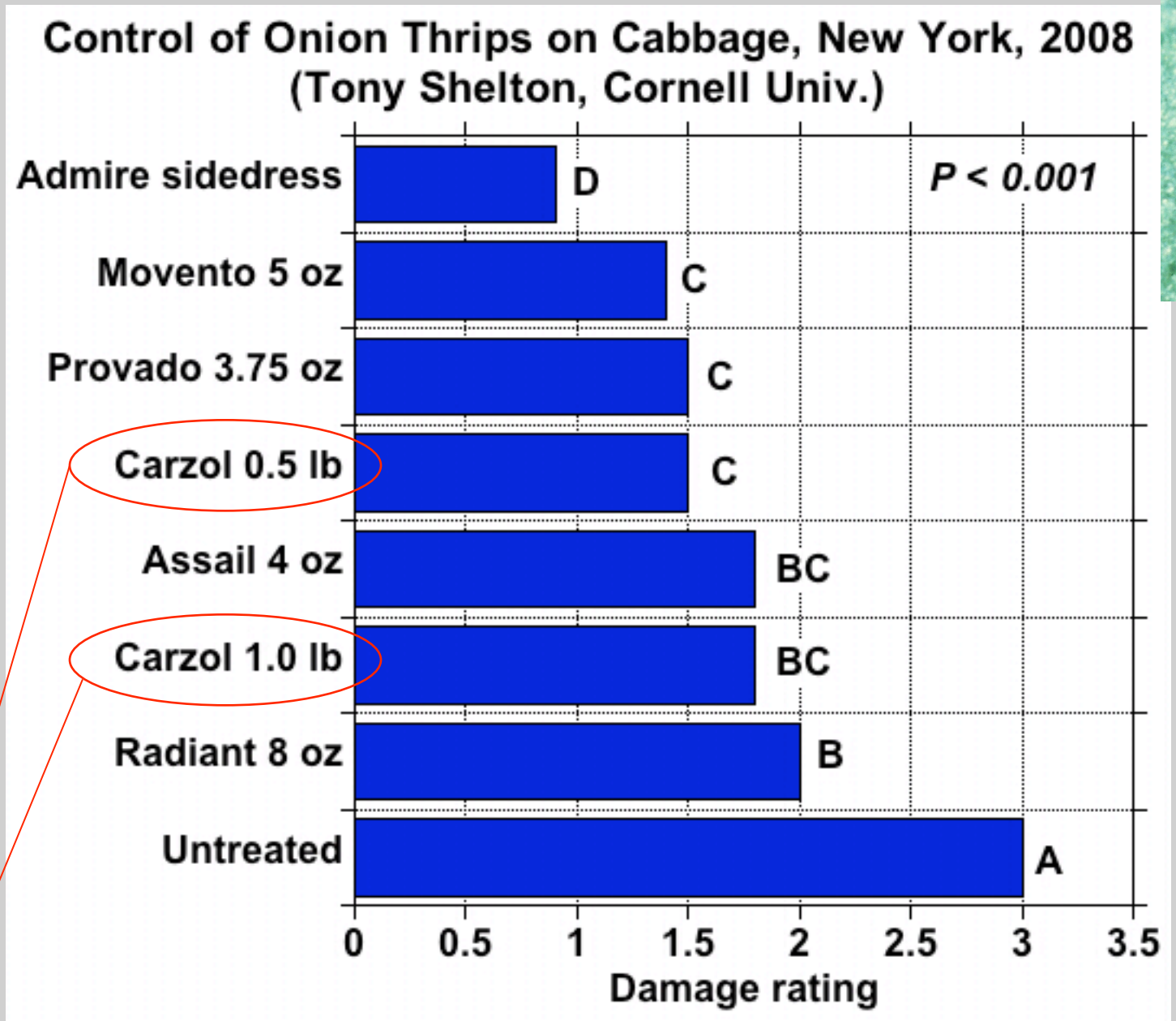

Pickling cucumber, 4th true-leaf stage,
7/1/08, Fremont Ohio
P = 0.0498
Cruiser (seed)
C
Admire (in-furrow)
BC
Sepresto (seed)
ABC
untreated
AB
Platinum (in-furrow)
A
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Damage rating


Pumpkins, 2nd true-leaf stage,
6/16/08, Columbus Ohio
P < 0.0001
Admire (in-furrow)
D
Sepresto (seed)
CD
Platinum (in-furrow)
BC
Cruiser (seed)
B
untreated
A
0
0.5
1
1.5
2
Damage rating



Onion Thrips Management on Cabbage

- Select a thrips-tolerant variety
- Chemical control options:
  - Dimethoate cancelled 2006
  - Foliar Sprays: at cupping & 10 d later
    - Movento (new!)
    - Radiant (replaces SpinTor)
    - Assail
    - Metasystox-R
  - Sidedress at cupping stage
    - Admire



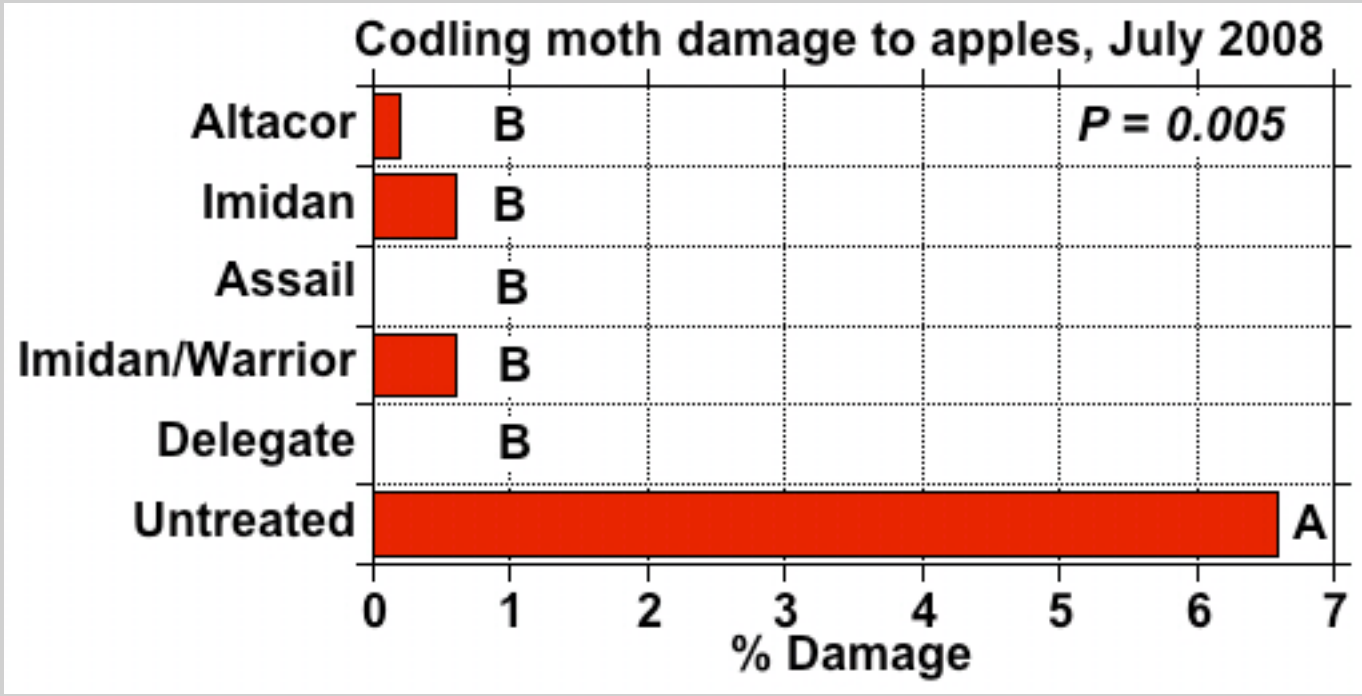
Not registered on cabbage

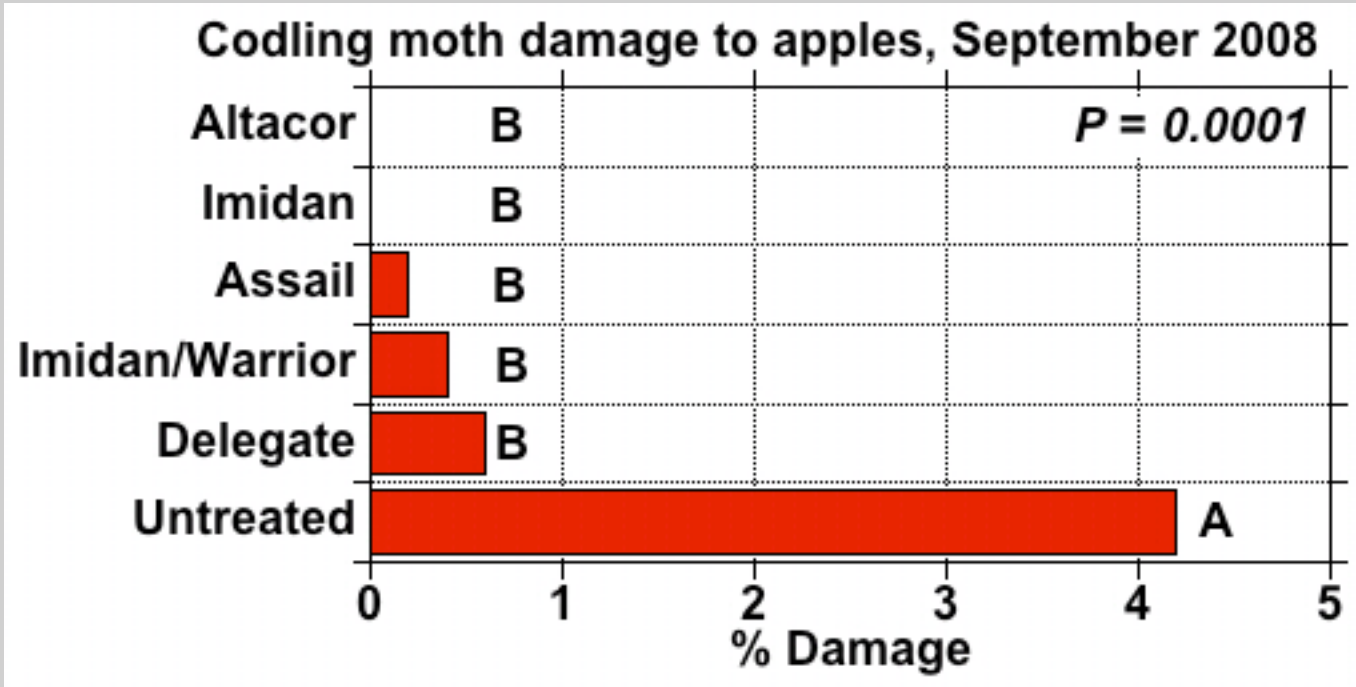
Apple codling moth trial, 2008

- Need alternatives to O.P.s due to resistance
- Codling moth population lower than normal in 2008 (due to crash in 2007 from lack of food after Easter freeze)

Treatments in codling moth efficacy trial 2008

	1st generation	*2nd generation*
1	Delegate	Delegate
2	Altacor	Altacor
3	Assail	Assail
4	Imidan	Imidan
5	Imidan	Warrior
6	untreated	untreated


Codling moth damage to apples, July 2008
Altacor
Imidan
Assail
Imidan/Warrior
Delegate
Untreated
B
B
B
B
B
A
P = 0.005
0
1
2
3
4
5
6
7
% Damage


Codling moth damage to apples, September 2008
Altacor
Imidan
Assail
Imidan/Warrior
Delegate
Untreated
B
B
B
B
B
A
P = 0.0001
0
1
2
3
4
5
% Damage

Codling moth control

- **Newly registered a.i.s excellent:**
  - **Altacor**
  - **Delegate**
  - **(& Belt, not in trial)**

Got orchard with wormy fruit?



- **Common observations**
  - Year 1: high CM trap counts; fruit are fine
  - Year 2: high trap counts, some wormy fruit
  - Year 3: high trap counts, many wormy fruit
  - Spray program:
    - Only Imidan or Guthion used
    - Only 2 sprays per generation
    - Low gallonage (<50 gpa)
    - Early halt to spray program in August
  - Species usually is codling moth

Got orchard with wormy fruit?

- **What to do in year 4?**
  - **Verify species (CM or OFM?)**
  - **Modify sprays for codling moth**
    - **Improve timing**
    - **Use 3 sprays per generation**
    - **Change insecticide**
    - **Increase gallonage (50-100 gpa)**
  - **If OFM found, modify timing**

Integrated Pest Management Programs

- Beginning level
  - Pest monitoring
    - Scouting
    - Trapping
  - Thresholds (decision making)
  - Selective insecticides
  - Possible reduction in insecticides
- Advanced level
  - Multiple tactics

IPM Guidelines for Ohio Veg Crops

Crop	*Location of IPM information in 2008 Ohio Veg. Production Guide (Bulletin 672)*
Cabbage	pp. 108-115
Sweet corn	pp. 250-251
Pumpkins	p. 229 & 234-235
Potatoes	p. 204 & 211-214
Tomatoes	pp. 268-270
Peppers	p. 199

IPM Guidelines for Ohio Fruit Crops

Crop	*Location of IPM information*
Apples	Midwest Tree Fruit Pest Mgmt. Handbook (Bulletin 506A)
Peaches	
Strawberries	Midwest Small Fruit Pest Mgmt. Handbook (Bulletin 861)
Grapes	
Raspberries	
Blueberries	

The End