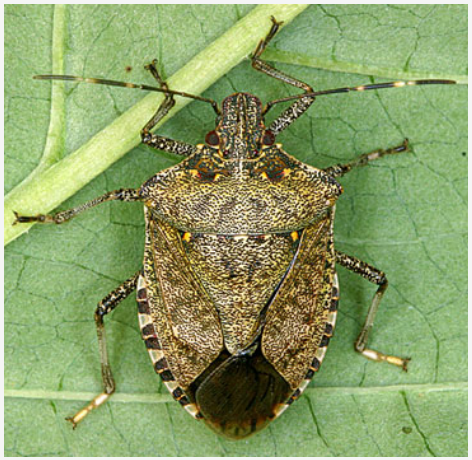
Pesticide Applicator Training Program:

Vegetable & Fruit Insect Management News



Celeste Welty
Extension Entomologist
Ohio State University
January 2015

New products

- **2014**
  - Sivanto™
  - Torac™
  - Exirel™
  - Verimark™
  - Nealta®
- **2013**
  - Closer™
  - Transform®
  - Madex HP

Sivanto™

- A.I.: flupyradifurone
- IRAC group 4D (butenolides);
  - ‘cousin’ to neonicotinoids
- 200 SL (1.67 lbs a.i./gal)
- By Bayer
- Federal label January 2015

Sivanto: target pests

- leafhoppers
- aphids
- whiteflies
- squash bug
- Colorado potato beetle
- thrips
- pear psylla
- San Jose scale
- blueberry maggot
- mealybug

Sivanto™: Pre-harvest interval

Crop	PHI (days)	
	foliar	soil
Brassica head & leafy	1	-
Cucurbits	1	21
Fruiting veg.	1	45
Leafy veg.	1	-
Legumes	7	-
Root veg.	7	-
Tuber/corm veg.	7	-

Sivanto™: Pre-harvest interval

Crop	PHI (days)	
	foliar	soil
Blueberry	3	-
Strawberry	0	-
Grape	0	30
Apples, pears	14	-
Hops	21	-

Nealta™

- **Miticide**
- **1.67 SC** (suspension concentrate)
- **A.I.: cyflumetofen**
- **IRAC group 25 (new)**
- **By BASF**
- **Federal label May 2014**

Nealta™ miticide

Crop	Pre-harvest interval (days)
pome fruit	7
grapes	14
strawberries	1
tomatoes	3

Nealta™

- **Efficacy**
  - **Similar to other miticides (Oberon, Acramite, Zeal, Envidor)**
  - **New mode of action**
  - **Excellent rotation partner**
- **Predators**
  - **Not as harsh as Zeal or Envidor**

Torac™

- A.I.: tolfenpyrad
- IRAC group 21A
  (with Portal, FujiMite)
- 1.29 EC
- By Nichino America
- Federal label January 2014

TORAC™
INSECTICIDE

Torac™: veg pests

Crop	PHI	Target
Leafy veg	1 day	leafhoppers aphids flea beetles thrips caterpillars (suppression)
Potato	14 days	Colorado potato beetle (larvae & adults) Leafhoppers Aphids Thrips

Exirel™ & Verimark™

- A.I.: Cyazypyr® (cyantraniliprole)
- IRAC group 28
  - with Altacor, Coragen, Belt
- Federal label 1/31/2014
- Exirel: foliar
- Verimark: soil

Exirel on fruit (3-day PHI)

Blueberry, pome fruit, stone fruit

Rate	Target
Low (10-17 fl oz/A)	Codling moth White apple leafhopper Cherry fruit fly
Middle (10-20.5 fl oz/A)	Oriental fruit moth
High (13.5-20.5 fl oz/A)	Spotted wing Drosophila Japanese beetle Plum curculio Pear psylla Rosy apple aphid *Suppression:* apple maggot

Exirel on veg (1-day PHI)

Brassica leafy veg, bulb veg, cucurbit, fruiting veg, leafy veg

Rate	Target
Low (7-17 fl oz/A)	Caterpillars
High (13.5-20.5 fl oz/A)	Aphids Flea beetles Leafminers Thrips Whiteflies

Verimark™

- For soil applications
- brassica head & leafy veg
- cucurbit
- fruiting veg
- leafy veg
- potato & tuber/corm veg

Verimark™: veg pests

Rate	Target
Low (5-10 fl oz/A)	Caterpillars
Middle (6.75-13.5 fl oz/A)	Flea beetles Leafminers Aphids Whiteflies
High (10-13.5 fl oz/A)	Thrips Root maggots

Closer & Transform

- A.I.: sulfoxaflor
- IRAC group 4C:
  - Neonicotinoid group
  - Different subgroup than Admire
- Registered May 2013 by Dow

Closer & Transform

	Crop	Pest
Closer	pome fruit, stone fruit, grape, strawberry, brassica leafy veg, cucurbit, fruiting veg, leafy veg	plant bugs aphids whiteflies
Transform	potato, root/tuber, beans (succulent, edible podded)	aphids plant bugs stink bugs whiteflies scales thrips

Madex HP

- Pome fruit, stone fruit
- A.I.: *Cydia pomonella* granulosis virus isolate V22
- Codling moth & oriental fruit moth
- Registered August 2013 by Certis
- Recommended for 1st generation (May/June) in tank mix with fungicide

New uses, 2013: Movento on bulb vegetables

- Onion thrips control
- PHI:
  - 3 days for group 3-07A: dry bulb onion, garlic
  - 7 days for group 3-07B: green onion, leeks, chives
- spirotetramat (group 23, with Oberon & Envidor)

New uses, 2013: Movento on bulb vegetables

- Rate 5 fl oz/A
- Limit 10 oz/A per year
- Slow acting
- Apply early
- Use with penetrating surfactant

New uses, 2013: dinotefuran

Venom (Valent) & Scorpion (Gowan)

Crop	*Pests*	*PHI*
Peaches, nectarines	**Leafhoppers, stink bugs, peachtree borer, plum curculio**	**3 days**
Onion, bulb & green	**Thrips, leafminers**	**1 day**
Potato	**Colorado potato beetle, flea beetle, leafhoppers**	**7 days**
Grape	**Leafhoppers, grape berry moth, mealybug, thrips, multicolored asian lady beetle**	**1 day**

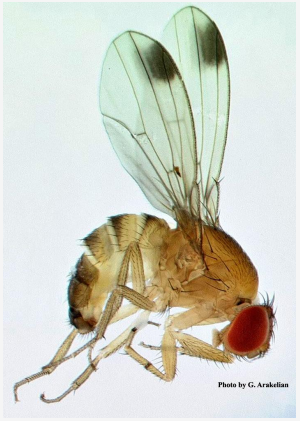
New uses, 2013

- **Calypso** (Bayer)
  - Now for use on stone fruit
  - A.I.: thiacloprid
  - Japanese beetle, plum curculio
- **Portal** (Nichino)
  - Now for use on stone fruit
  - A.I.: fenpyroximate
  - Mites, leafhoppers

Phase-out of endosulfan (Thionex)

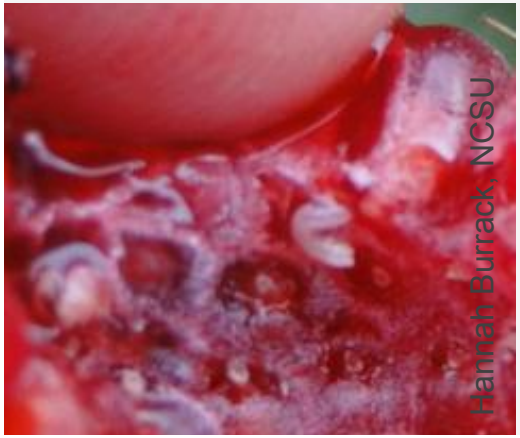
Date for final use	*Crop*
7/31/2012	cukes, melons, summer squash, eggplant, cabbage+, kale+, lettuce, peach, plum, cherry, strawberry (annual)
7/31/2013	pear
7/31/2015	**pumpkin, winter squash, tomato, pepper, potato, sweet corn, apple, blueberry**
7/31/2016	**strawberry (perennial)**

New Pests



- Spotted wing Drosophila
- Brown marmorated stink bug
- Spotted lanternfly

A new pest of fruit crops in Ohio:
Spotted wing Drosophila



- Looks like common vinegar flies on overripe, fallen, decaying fruit
- The new species attacks healthy ripening fruit
- Larvae feed inside fruit

Hosts

of Spotted wing Drosophila

Photo by Martin Hauser

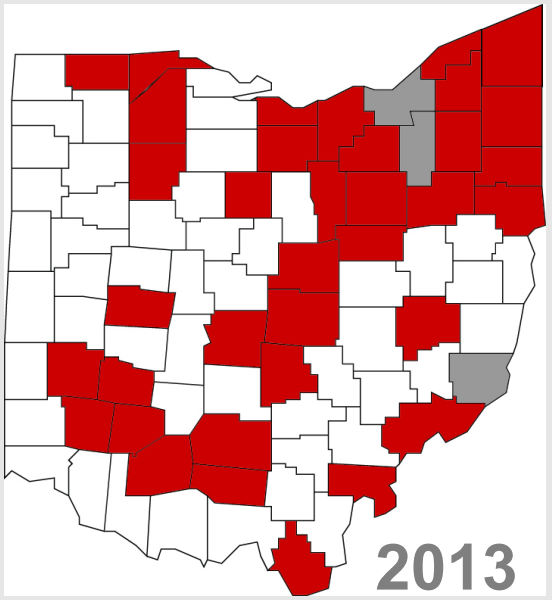
- **Early:** cherries
- **Mid:** raspberries, blueberries, blackberries
- **Late:** grapes
- strawberry, peach, plum
- cherry tomato, kiwi, pear, apple

Fruit injury by Spotted wing Drosophila

Spotted wing Drosophila in Ohio

- **Most reports**
  - Blackberries
  - Raspberries
  - Blueberries
- **Some reports**
  - Peaches
  - Grapes

Spotted wing Drosophila in Ohio



- **Bad news**
  - Widespread
  - Severe damage
- **Good news**
  - Under control if insecticide program used
  - Traps help determine need

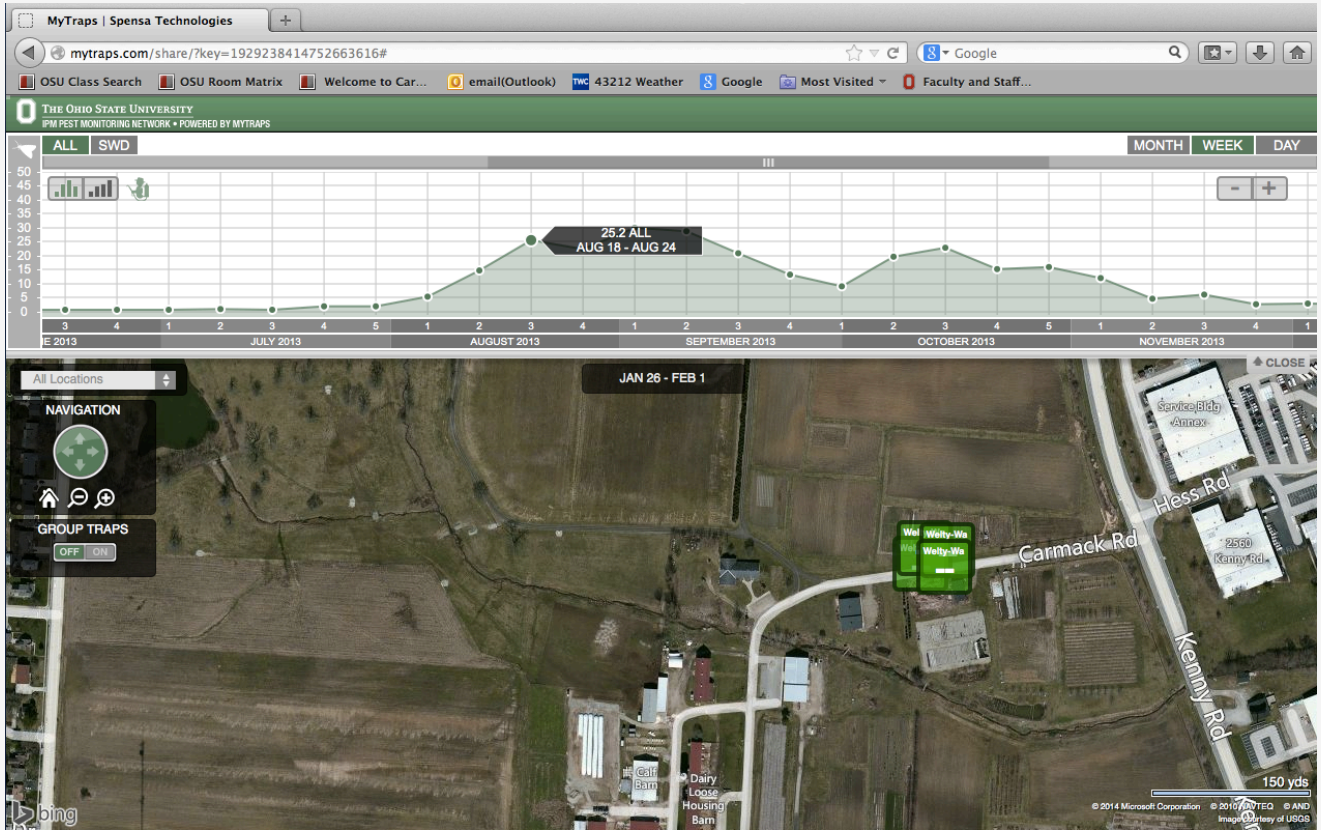
Bait traps to monitor adult SWD

- **Apple cider vinegar (1 inch)**
  + a drop of dish soap
  - Option 1:
    - Use 1 quart clear deli container
    - ¼” holes near top on 1 side
  - Option 2:
    - 24 oz peanut butter jar + red tape
    - 5 holes @1”, cover with mesh

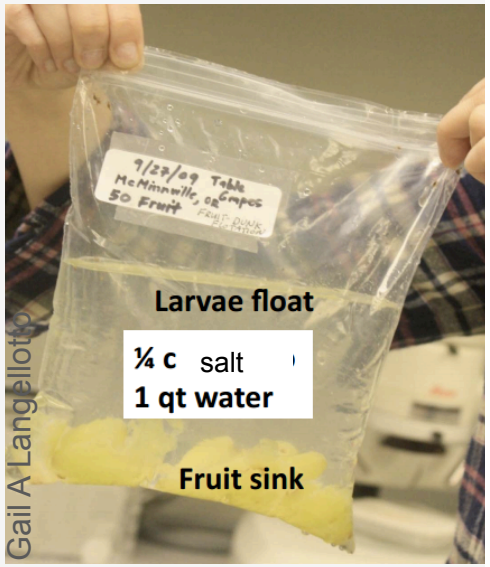
- **Alternative: fermenting bait**
  - Mix: Yeast (1/4 tsp active dry)
    Sugar (1/2 tsp)
    Flour (2 Tbsp) + Water (4 tsp)
  - Place in 4-oz specimen cup with mesh cover
  - Float cup on apple cider vinegar in jar trap

Trap network 2013 & 2014

- **26 traps in 14 counties**
- **trap counts on MyTraps website**
  http://mytraps.com/share/?key=19292384147526636 16



Test fruit for SWD larvae with salt test



- Put fruit in zip-top bag
- 4 cups warm water + 1/4 cup salt
- Examine for floaters in 15 minutes
- To find smallest larvae, pour through coffee filter

Management of spotted wing Drosophila

- Prompt harvest as soon as ripe
- Chill fruit as soon as harvested
- Sanitation
  - Destroy leftover fruit
  - Do every 2 days
  - Culls in clear plastic bags in sun, 1 week
  - Strongly recommended
- Insecticides

When to start spraying?

- If the adult flies are detected
- Fruit is susceptible to injury once it has started to turn color

Insecticide choices for SWD control

- **Most effective:**
  - Exirel (cyantraniliprole)
  - spinosyns:
    - Delegate (spinetoram)
    - Entrust (spinosad) [OMRI]
  - organophosphates:
    - Malathion, Imidan, Diazinon
  - pyrethroids:
    - Mustang Max, Brigade, Pounce, Hero, Danitol, Baythroid, Asana, Warrior
  - Lannate

Insecticide choices for SWD control

- **Moderately effective:**
  - Assail
  - Sevin
- **Slightly effective:**
  - Pyganic [OMRI]
- **Not effective:**
  - Actara
  - Admire Pro & Provado
  - Altacor

How often to spray?

When residues no longer active

Product	*Residual activity*
Delegate	5-7 days
Imidan, Diazinon	7 days
Pyrethroids: Asana Baythroid Brigade Danitol Hero Mustang Max Pounce Warrior	7-10 days
Malathion	5-7 days
Lannate	3-6 days
Entrust	3-5 days

Chart for SWD on all crops

(http://bugs.osu.edu/welty/pdf/SWD_Ohio_handoutV11.pdf)

Efficacy	Product	Residual activity (days)	Pre-harvest interval (PHI)						
			raspberry, blackberry	blue-berry	straw-berry	grape	cherry	peach	plum
Very effective	§ Delegate	5-7	1 day	3 days	X	7 days	7 days	14 days	7 days
	§ Radiant	5-7	X	X	1 day	X	X	X	X
	! Mustang Max	7-10	1 day	1 day	X	1 day	14 days	14 days	14 days
	! Brigade	7-10	3 days	1 day	0 days	30 days	X	X	X
	! Hero	7-10	3 days	1 day	X	30 days	X	X	X
	! Danitol	7-10	3 days	3 days	2 days	21 days	3 days	3 days	3 days
	! Asana	7-10	7 days	14 days	X	X	14 days	14 days	14 days
	! Baythroid	7-10	X	X	X	3 days	7 days	7 days	7 days
	! Warrior	7-10	X	X	X	X	14 days	14 days	14 days
	! Pounce	7-10	X	X	X	X	3 days	14 days	X
	Imidan	7	X	3 days	X	14 days	7 days	14 days	7 days
	! § Diazinon	7	7 days	7 days	5 days	X	21 days	21 days	21 days
	! Lannate	3-6	X	3 days	X	X	X	4 days	X
Effective	Malathion	5-7	1 day	1 day	3 days	3 days	3 days	7 days	X
	Entrust [OMRI]	3-5	1 day	3 days	1 day	7 days	14 days	14 days	7 days
Moderately effective	Sevin	10	7 days	7 days	7 days	7 days	3 days	3 days	3 days
	§ Assail	1-3	1 day	1 day	1 day	3 days	7 days	7 days	7 days
Slightly effective	Pyganic [OMRI]	1-3	0 days	0 days	0 days	0 days	0 days	0 days	0 days
Not effective	Actara	1-3	3 days	3 days	X	5 days	14 days	14 days	14 days
	Admire Pro	1-3	3 days	3 days	7 days	0 days	7 days	0 days	7 days

! *Restricted-Use Pesticide*

§ *Not allowed in greenhouses or high tunnels*

X *means that the product is NOT ALLOWED for use on that crop.*

Insecticide for SWD in high tunnels?

- Label prohibits in greenhouses:
  - Delegate
  - Diazinon
- Label allows in greenhouses:
  - Malathion
- Label 'silent' on greenhouses therefore ok to use:
  - pyrethroids: Asana, Baythroid, Brigade, Danitol, Hero, Mustang, Pounce, Warrior
  - Lannate
  - Imidan
  - Entrust

Insecticides for SWD on brambles

Product	*Pre-harvest interval*	*Maximum number of applications allowed* *(if used at max rate)*
Delegate	1 day	3
Mustang Max	1 day	6
Malathion	1 day	3
Entrust [OMRI]	1 day	4
Danitol	3 days	2
Brigade	3 days	2
Hero	3 days	2

Summary: Management of SWD on brambles

1. Use vinegar traps, check weekly
2. If any SWD in traps, start spray program when berries start to color
   - Spray every 7 days until final harvest
   - Alternate:
     - Delegate (1-day PHI)
     - Mustang Max (1-day PHI)
     - Malathion (1-day PHI)
   - Do a salt test with ripe fruit, weekly

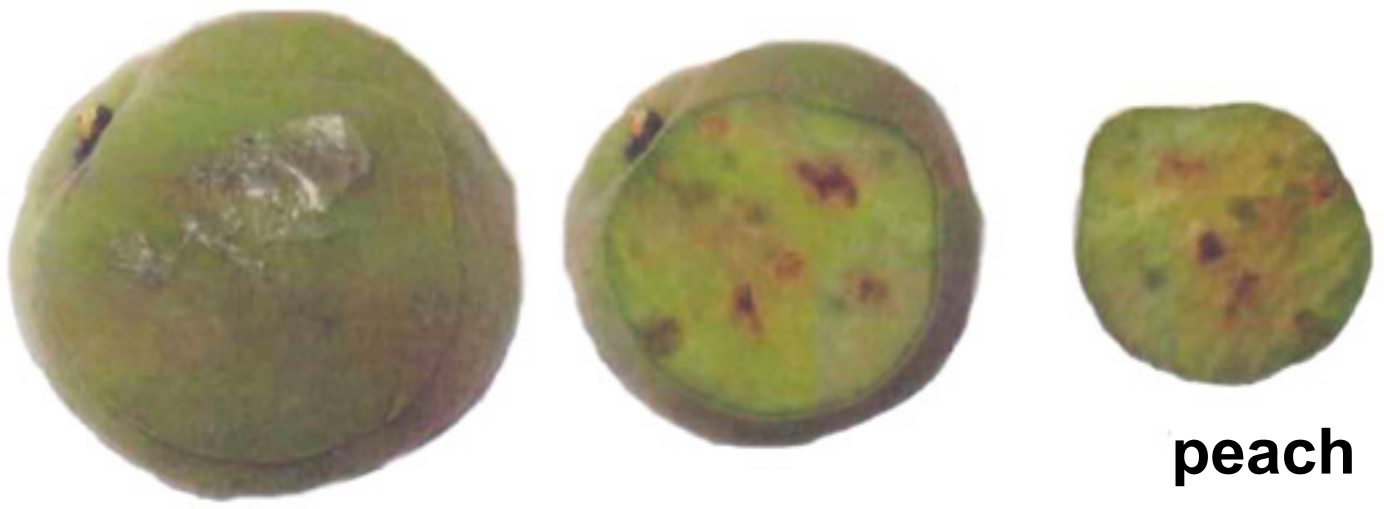
Brown marmorated stink bug


adult


nymph

- Attacks fruits & seed pods
- Invading Ohio since 2007

Brown marmorated stink bug: injury on tree fruit



Tracy Leskey, USDA, 2010

Brown marmorated stink bug: injury on grapes & berries

Brown marmorated stink bug: injury on vegetables

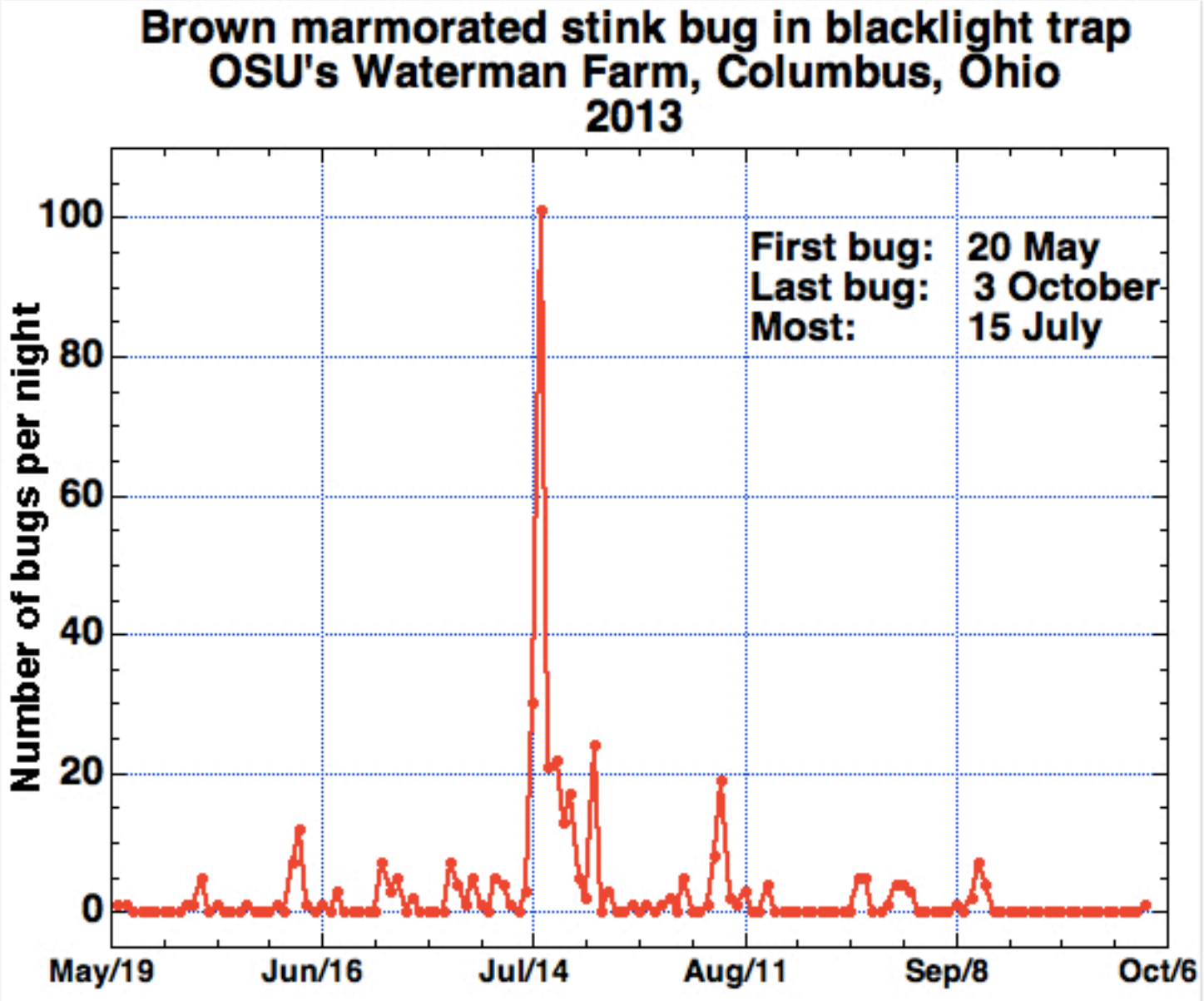
pepper

corn

tomato

beans

Stink bug monitoring by blacklight trap



Stink bug pheromone traps

black pyramid
from AgBio ($30)

Home-made from PVC topped by ‘Dead-Inn’ trap from AgBio

Pheromone lure

- Improved lure by USDA-ARS
- Double lure for synergy
  - ARS#20 (10 mg)
  - MDT (66 mg)
- Available from several companies
  - AgBio
  - Rescue
  - Trécé
  - Scentry
  - Alpha Scents
  - Bedoukian

Action threshold?

Tentative, for apples:

- **Cumulative capture since last spray**
- **Mean of 10 adults per trap**
- **Once > threshold:**
  - **spray**
  - **re-set count to zero**

Insecticides for stink bug

Product	*Apple*		*Peach*	
	PHI	*Limit*	*PHI*	*Limit*
Venom	-	-	3	1-2 ap.
Belay	7	1 ap.	21	2 ap.
Leverage 360	7	1 ap.	7	2 ap.
Baythroid	7	1 ap.	7	2 ap.
Danitol	14	2-4 ap.	3	2-4 ap.
Permethrin	Not after petal-fall	2 ap.	14	3 ap.

→ But rate too low

Insecticides for stink bug:
fewer choices for raspberries & blackberries

Product	*PHI*	*Limit*
Venom	-	-
Belay	-	-
Leverage 360	-	-
Baythroid	-	-
Danitol	3	2-3 ap.
Permethrin	-	-
Assail	1	5 ap.
Actara	3	2-3 ap.
Hero	3	2-4 ap.

Insecticides for stink bug

Product	*Peppers*		*Sweet corn*	
	PHI	*Limit*	*PHI*	*Limit*
Venom	1 day	1-2 ap.	-	-
Leverage	0 days	3-4 ap.	-	-
Brigade	7 days	2-6 ap.	1 day	2-6 ap.
Belay	21 days	3-4 ap.	-	-
Orthene	7 days	2 ap.	-	-
Hero	7 days	1-2 ap.	3 days	1-2 ap.

Potential pest of fruit crops in Ohio:

Spotted lanternfly

- Found Sept 2014, Berks Co., PA (NW of Phila.)
- A planthopper
- Sucks sap
- 1” long
- Feed on grape, apple, stone fruit
- Poor flier, stong jumper

Potential pest of fruit crops in Ohio:

Spotted lanternfly

- Hosts in fall:
  - Tree of Heaven
  - Grapes
- Congregate on trunk at base of tree
- Weeping wounds of sap on bark

Potential pest of fruit crops in Ohio:

Spotted lanternfly

Egg masses:

- Laid in late September
- New masses: covered with gray pitch-like material →

- Older masses: columns of brown seed-like columns →

- On trees, stones, furniture

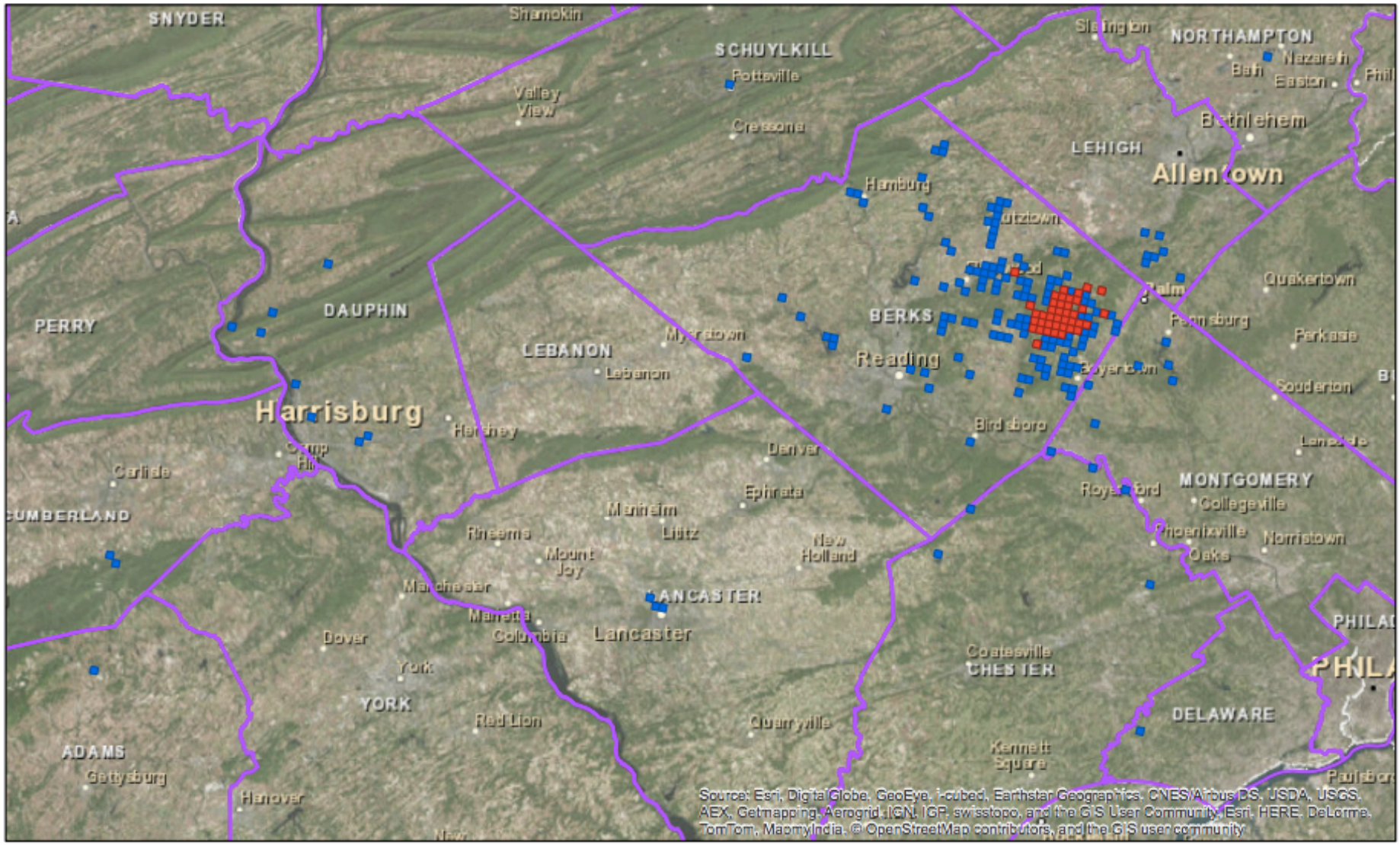
Potential pest of fruit crops in Ohio:

Spotted lanternfly

- Eggs hatch late April, early May
- 4 nymph sub-stages
- Adults by July

Lycorma Detection Survey

Results Through 15 December 2014



Survey Grids

- Surveyed - Positive
- Surveyed - Not Found

the end

Info on fruit & veg. pests
http://bugs.osu.edu/welty/

Questions?

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