

# Tree Fruit Insecticide Update



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THE OHIO STATE UNIVERSITY

# Topics

- **Insecticides**
  - New products
  - New uses
  - Cancelled products
- **Pests of concern**
- **Ohio apple insecticide trial, 2016**

# New product, 2016: **BeetleGONE!**

- **Biological insecticide**
- **B.t.g. = *Bacillus thuringiensis galleriae***
- **Targets adults (!) & larvae:**
  - **Japanese beetle**
  - **strawberry root weevil**
  - **Oriental beetle**
- **Crops:**
  - **pome fruit**
  - **stone fruit**
  - **berries**

# New product, 2016: **BeetleGONE!**

- **B.t.g.** = *Bacillus thuringiensis galleriae*
- **Action**
  - **Must be ingested**
  - **Cease feeding within hours**
  - **Good coverage needed**
- **Made by Phyllom BioProducts**

# Coming soon? **Spear**

- **Biological insecticide**
- **Japanese beetle, caterpillars, thrips**
- **Registered: Spear T**
  - **For greenhouse use only: veg, flowers**
  - **For thrips control**
- **Coming: tree fruit & small fruit**
- **Not yet registered:**
  - **Spear O**
  - **Spear C**
  - **Spear P**
- **By Vestaron Corp.**

# Sivanto Prime



- **A.I.: flupyradifurone**
- **IRAC group 4D (butenolides)**
  - ‘cousin’ to neonicotinoids (4A)
- **Systemic action**
- **Liquid: 1.67 lbs a.i./gal**
- **By Bayer**
- **Federal label: January 2015**
- **New uses: Sept. 2016**

# Sivanto: target pests

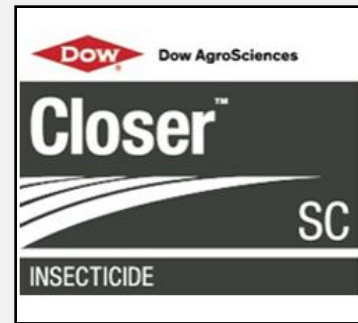
- leafhoppers
- aphids
- San Jose scale
- pear psylla
- vine mealybug
- blueberry thrips
- blueberry maggot

# Sivanto: crops

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

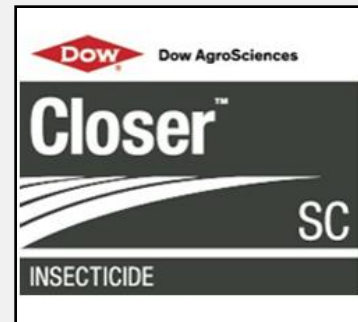


# Closer SC



- **Re-established October 2016**
  - registered May 2013
  - suspended Sept. 2015
  - cancelled November 2015
- **A.I.: sulfoxaflor**
- **IRAC group 4C:**
  - ‘cousin’ of neonicotinoids (4A)
  - different subgroup than Admire

# Closer SC



- **Crops**

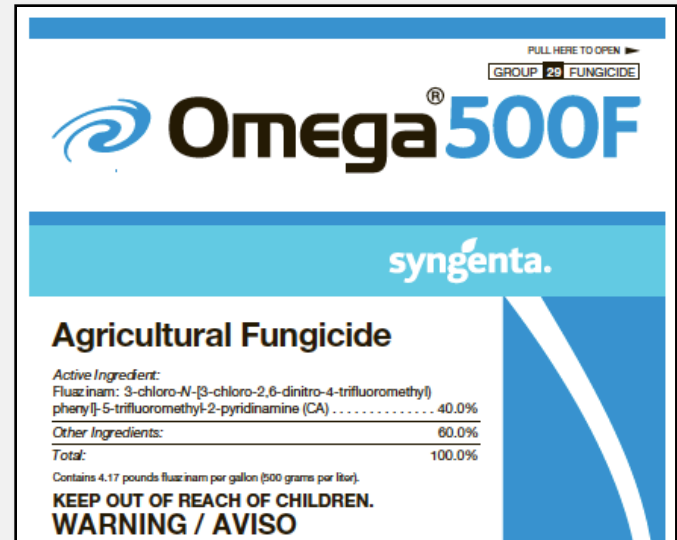
- pome fruit
- stone fruit
- grape
- strawberry

- **Pests**

- plant bugs
- aphids
- leafhoppers
- whiteflies

# Omega

- fluazinam
- primarily a fungicide
- also kills spider mites
- apples: 28-day PHI
- by Syngenta



# Madex HP



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

# New uses

- **Portal XLO**

- **Peach**

- On main label
    - No longer on supplemental label

# Products re-named

- **Portal XLO**
  - Replaced Portal 0.4EC
  - Same rates
- **Sivanto Prime**
  - Replaced Sivanto 200SL
  - Same rates

# Cancellation: flubendiamide

- **flubendiamide**
  - Belt SC, made by Bayer
  - Synapse WG, made by Bayer
- **flubendiamide + buprofezin**
  - Tourismo, made by Nichino
- **cancelled August 2016**
- **distributors can sell inventory**
- **growers can use product per label**

# Cancellation: Calypso 4F

- thiacloprid
- voluntary cancellation announced by Bayer, Dec. 2013
- state registrations being phased out
- **still registered in Ohio for 2017**
- growers can use product per label
  - **Apple, pear**
  - **Stone fruit**




# Phase-out of endosulfan (Thionex)

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


# Deletions from midwest spray guide

- **Carzol** (formetanate hydrochloride)
  - restricted to nectarines in Pacific NW

# Pollinator Protection: new bee advisory box on label



**APPLICATION RESTRICTIONS** EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.



Look for the bee hazard icon in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

**This product can kill bees and other insect pollinators.**

- Now on labels of neo-nics (Belay, Actara, Admire, Venom) & Exirel

# Pests of current interest

<b>New</b>	<b>brown marmorated stink bug</b> <b>spotted wing drosophila</b>
<b>Old</b>	<b>woolly apple aphid</b> <b>San Jose scale</b> <b>European red mite</b>



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

- attacks healthy ripening fruit
- Larvae feed inside fruit
- Most concern on berries
- Peach most vulnerable
- Cherry usually too early



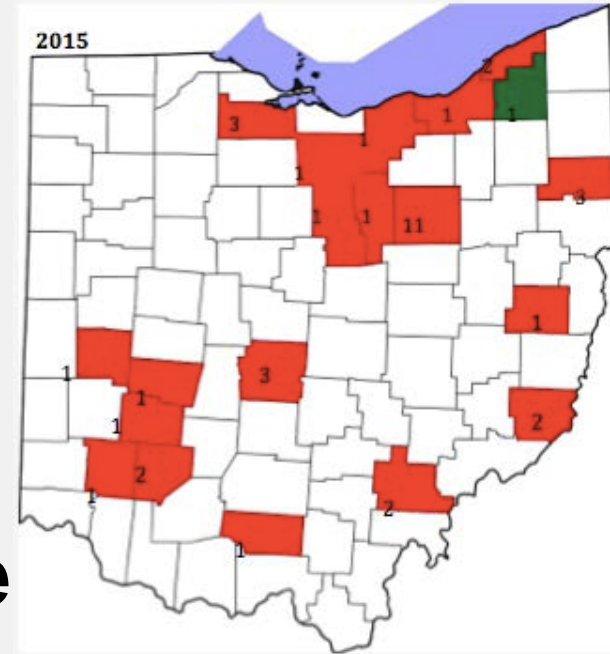
# Spotted wing Drosophila in Ohio

- **Bad news**

- Widespread →
- Severe damage

- **Good news**

- **Under control if insecticide program used**
- **Traps\* help determine need**
- **Salt water test\* helps determine control success**



\* Details on website: [u.osu.edu/pestmanagement/](http://u.osu.edu/pestmanagement/)

# Insecticide choices for SWD

<i>Category</i>	<i>Product</i>
Most effective	<b>a diamide:</b> Exirel (cyantraniliprole)
	<b>spinosyns:</b> Delegate, Radiant (spinetoram) Entrust (spinosad) [OMRI]
	<b>organophosphates:</b> Imidan, Diazinon, Malathion
	<b>pyrethroids:</b> Mustang Maxx, Brigade, Pounce, Hero, Danitol, Baythroid, Warrior, Asana
	<b>a carbamate:</b> Lannate (methomyl)
Moderately eff.	<b>a neonicotinoid:</b> Assail (acetamiprid) <b>a carbamate:</b> Sevin (carbaryl)
Slightly	<b>Pyganic (pyrethrins) [OMRI]</b>

# Chart for SWD on all fruit crops

( [u.osu.edu/pestmanagement/](http://u.osu.edu/pestmanagement/))

Efficacy	Mode of action group	Product	Residual activity (days)	Pre-harvest interval (PHI)						
				<u>raspberry, blackberry</u>	<u>blue-berry</u>	<u>straw-berry</u>	<u>grape</u>	<u>cherry</u>	<u>peach</u>	<u>plum</u>
Very effective	5	§ Delegate	5-7	1 day	3 days	X	7 days	7 days	14 days	7 days
	5	§ Radiant	5-7	X	X	1 day	X	X	X	X
	28	<u>Exirel</u>	5	X	3 days	X	X	3 days	3 days	3 days
	3A	! Mustang Max	7-10	1 day	1 day	X	1 day	14 days	14 days	14 days
	3A	! Brigade	7-10	3 days	1 day	0 days	30 days	X	X	X
	3A	! Hero	7-10	3 days	1 day	X	30 days	X	X	X
	3A	! <u>Danitol</u>	7-10	3 days	3 days	2 days	21 days	3 days	3 days	3 days
	3A	! Asana	7-10	7 days	14 days	X	X	14 days	14 days	14 days
	3A	! <u>Baythroid</u>	7-10	X	X	X	3 days	7 days	7 days	7 days
	3A	! Warrior	7-10	X	X	X	X	14 days	14 days	14 days
	3A	! Pounce	7-10	X	X	X	X	3 days	14 days	X
	1B	<u>Imidan</u>	7	X	3 days	X	14 days	7 days	14 days	7 days
	1B	!§ <u>Diazinon</u>	7	7 days	7 days	5 days	X	21 days	21 days	21 days
	1A	! <u>Lannate</u>	3-6	X	3 days	X	X	X	4 days	X
Effective	1B	<u>Malathion</u>	5-7	1 day	1 day	3 days	3 days	3 days	7 days	X
	5	Entrust [OMRI]	3-5	1 day	3 days	1 day	7 days	14 days	14 days	7 days
Moderately effective	1A	<u>Sevin</u>	10	7 days	7 days	7 days	7 days	3 days	3 days	3 days
	4A	§ Assail	1-3	1 day	1 day	1 day	3 days	7 days	7 days	7 days
Slightly eff.	3A	<u>Pvganic</u> [OMRI]	1-3	0 days	0 days	0 days	0 days	0 days	0 days	0 days
Not effective	4A	<u>Actara</u>	1-3	3 days	3 days	X	5 days	14 days	14 days	14 days
	4A	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.*



# Management of SWD



Photo by  
Hannah Burrack, NCSU

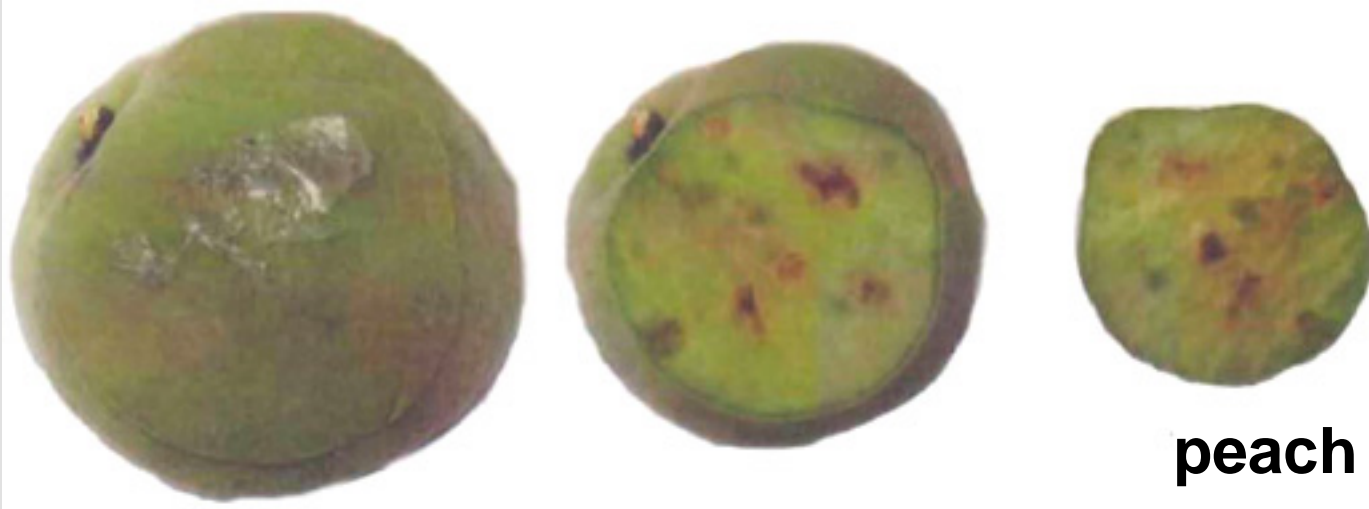
- **Use traps for adults, check weekly**
- **If any SWD in traps:**
  - **Start spray program when berries color**
  - **Spray every 7 days until final harvest**
  - **Alternate:**
    - Delegate (1-day PHI)
    - Mustang Maxx (1-day PHI)
    - Malathion (1-day PHI)
- **Do a salt test with ripe fruit, weekly**
  - **If find larvae: tighten to 5-day schedule**

# Brown marmorated stink bug



- Invading Ohio since 2007

# Brown marmorated stink bug: injury on tree fruit



Tracy Leskey, USDA, 2010

# Insecticides for stink bug

<i>Product</i>	<i>Apple</i>		<i>Peach</i>	
	<i>PHI</i>	<i>Limit</i>	<i>PHI</i>	<i>Limit</i>
Venom	-	-	3	1-2 ap.
Brigade, Hero	-	-	-	-
Belay	7	1 ap.	21	2 ap.
Leverage	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.
Assail	7	4 ap.	7	4 ap.
Actara	35	3 ap.	14	2 ap.

# Monitoring BMSB with traps

- **Improved double lure by USDA-ARS**
  - ARS#20 (10 mg)
  - MDT (66 mg)
- **Available from several companies**
  - AgBio
  - Alpha Scents
  - Rescue
  - Trécé
  - Scentry
  - Bedoukian
- **Several trap styles**
  - Black pyramid
  - Yellow pipe trap
  - Clear sticky panel





# Action threshold for BMSB on apples?

- Use 2 traps:
  - 1 on edge
  - 1 in interior
- Threshold = average **10 adults** per trap
- Cumulative capture since last spray
- Once  $>$  threshold:
  - spray
  - re-set count to zero

# **Recent problems with old pests on apple**

**Flaring after cicada control, 2016:**

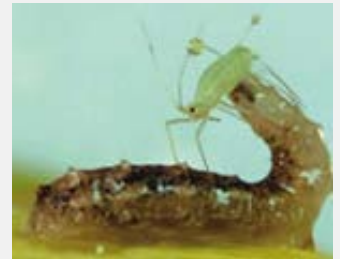
- **Woolly apple aphid**
- **San Jose scale**
- **European red mite**



# Woolly apple aphid



- Preyed on by hover fly larvae
- Insecticides:
  - Diazinon AG600 WBC
  - Lorsban, pre-bloom
  - Beleaf
  - Closer
  - Movento, at petal-fall
- Use high volume water





# San Jose Scale: control by oil



- Best control of scale if applied before buds swell
- Prevent damage to tree by applying when temperature above freezing within a day of application
- Apply dilute (2 gal oil in 100 gal water; spray to run-off), cover all bark

# San Jose Scale: control by insecticide post-bloom

Product	Pre-bloom	Post-bloom
Esteem	✓	✓
Lorsban 4E	✓	
Supracide	✓	
Diazinon AG600 WBC	✓	✓
Admire		✓
Assail		✓



# Miticides on apples: 12 choices

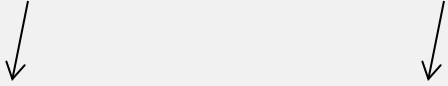
<i>Product</i>	<i>Group</i>	<i>Target life stage</i>	<i>Predators</i>
<b>Vydate</b> (RUP)	<b>1A</b>	<b>Nymphs &amp; adults</b>	<b>harsh</b>
<b>Agri-Mek</b> (RUP)	<b>6</b>	<b>Nymphs &amp; adults</b>	<b>moderate</b>
<b>Apollo</b>	<b>10A</b>	<b>Eggs &amp; young nymphs</b>	<b>slight</b> *
<b>Onager</b>	<b>10A</b>	<b>Eggs &amp; young nymphs</b>	<b>slight</b> *
<b>Savey</b>	<b>10A</b>	<b>Eggs &amp; young nymphs</b>	<b>slight</b> *
<b>Zeal</b>	<b>10B</b>	<b>Eggs &amp; young nymphs</b>	<b>moderate</b>
<b>Kanemite</b>	<b>20B</b>	<b>Nymphs &amp; adults</b>	<b>slight</b> *
<b>Nexter</b>	<b>21A</b>	<b>Nymphs &amp; adults</b>	<b>harsh</b>
<b>Portal</b>	<b>21A</b>	<b>Nymphs &amp; adults</b>	<b>slight</b> *
<b>Envidor</b>	<b>23</b>	<b>Eggs, nymphs, adult females</b>	<b>moderate</b>

# Apple insecticide trial, 2015

## Target pest: codling moth

	1 <sup>st</sup> generation (3 sprays)	2 <sup>nd</sup> generation (2 sprays)
1	Delegate, Delegate + Beleaf, Delegate	Altacor
2	Delegate, Delegate + Beleaf, Delegate	Altacor
3	Delegate, Delegate + Closer, Delegate	Altacor
4	Altacor, Altacor, Altacor	Assail + oil
5	-	-

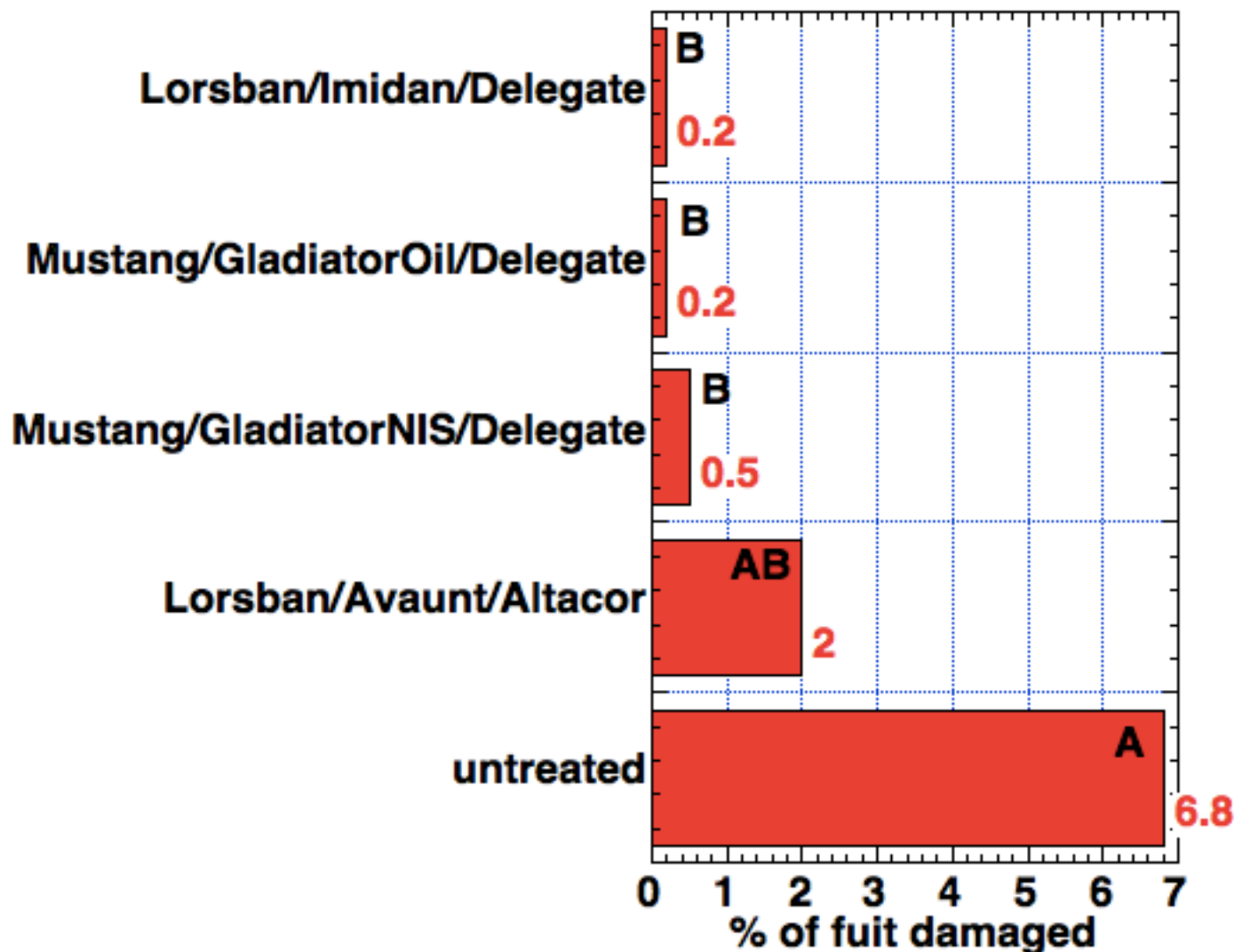
# Apple trial, 2015: pre-bloom treatments



	1/2-inch green	Pink bud	Petal-fall	CM 1 <sup>st</sup> gen.	CM 2 <sup>nd</sup> gen.
1	-	MustangMaxx	Gladiator + oil	Delegate	Altacor
2	-	MustangMaxx + Beleaf	Gladiator + NIS	Delegate	Altacor
3	Lorsban	-	Imidan	Delegate	Altacor
4	Lorsban	-	Avaunt	Altacor	Assail
5	-	-	-	-	-

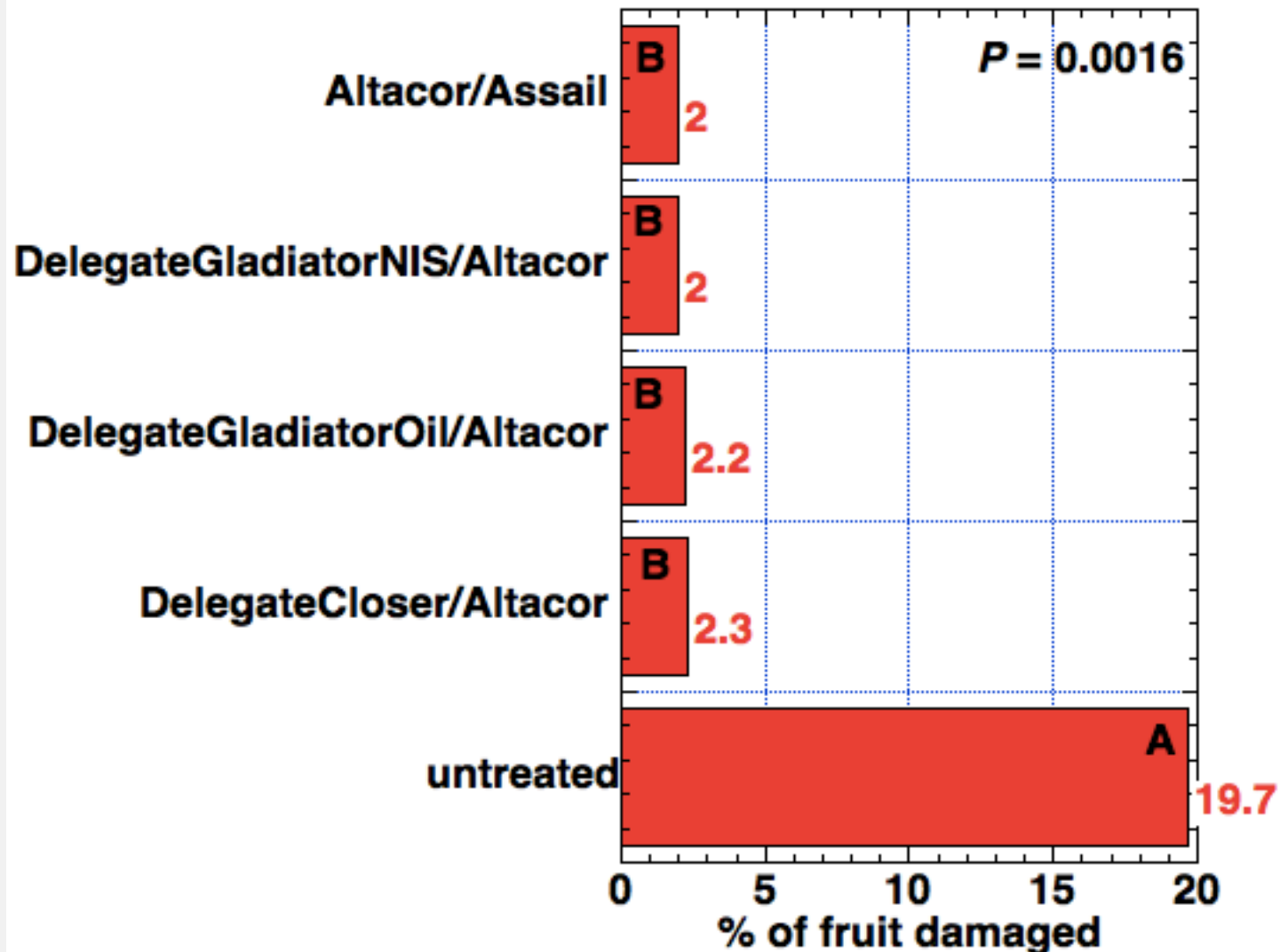
# Mid-season evaluation, 6 July

## Codling moth, 1<sup>st</sup> generation Franklin County, Ohio, 2016



# End of season evaluation, 18 August

## Codling moth, 2<sup>nd</sup> generation Franklin County, Ohio, 2016



# Apple insecticide trial, 2016

- **Target pest: codling moth**
- **Other pests in untreated plots:**
  - **San Jose scale 43%**
  - **Stink bug 8%**
  - **Plum curculio, oviposition 3%**
  - **Plum curculio, late feeding 3%**





# Got orchard with wormy fruit?



- Verify species (CM or OFM?)
- Modify sprays for codling moth
  - Improve timing
  - 3 sprays per generation
  - Increase water (50-100 gpa)
  - Change insecticide
- If OFM found, modify timing
- See 10-pg document for details

# Insecticides for worms in apple (PA, NJ, MI)

<i><b>Pest</b></i>	<i><b>Excellent</b></i>	<i><b>Good</b></i>	<i><b>Fair</b></i>
<b>Both CM &amp; OFM</b>	Rimon Altacor Delegate	Avaunt Calypso <i>Imidan*</i> Intrepid Lannate	Belay Proclaim SpinTor Surround
<b>CM</b>	virus	Assail pyrethroids**	Esteem Sevin
<b>OFM</b>	Assail pyrethroids**	Esteem Lorsban Sevin	-

*\*if population is not resistant*

**\*\*pyrethroids: Asana, Baythroid, Danitol, Decis, Proaxis, Mustang, Warrior**

# News on fruit spray guides



- **2015 & earlier:**
  - Midwest Small Fruit & Grape Spray Guide, 88 pp (~\$10)
  - Midwest Tree Fruit Spray Guide, 72 pp (~\$10)
  - buy from OSU
- **2016, 2017:**
  - Midwest Fruit Pest Management Guide, 168 pp (\$15)
  - buy directly from Purdue University

the end



**Info on fruit & veg. pests**  
**[u.osu.edu/pestmanagement/](http://u.osu.edu/pestmanagement/)**

**Questions?**

**e-mail: [welty.1@osu.edu](mailto:welty.1@osu.edu)**  
**office phone: 614 292 2803**