

Emerging and Secondary Pests of Highbush Blueberry Production



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Spotted wing Drosophila (SWD)



Winter morphs have longer wings and are darker in color

Blueberry IPM disrupted by invasive insects



pre-bloom

bloom

green berry

ripening

harvest

post harvest

caterpillars

fruitworms

aphids

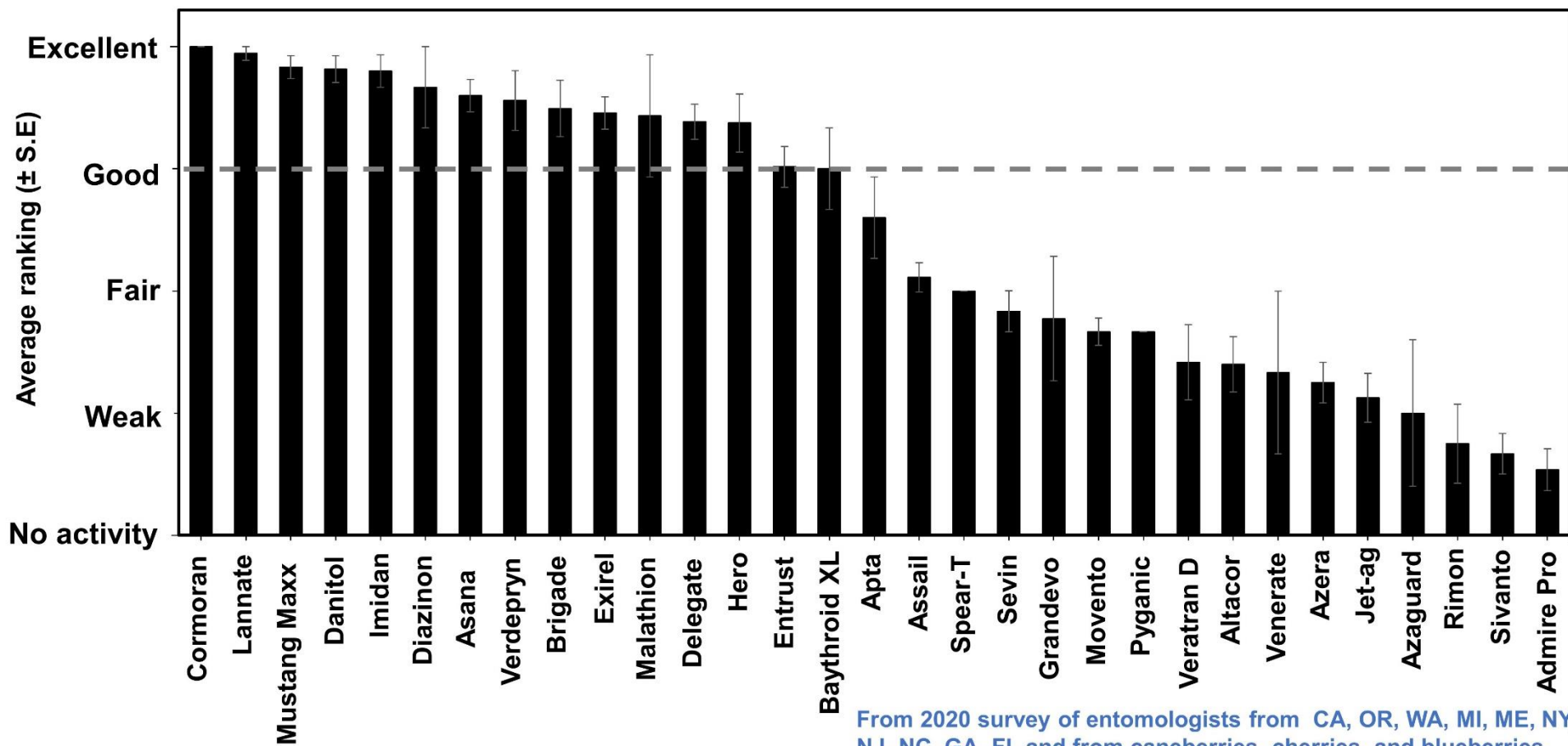
blueberry maggot

Japanese beetle

SWD

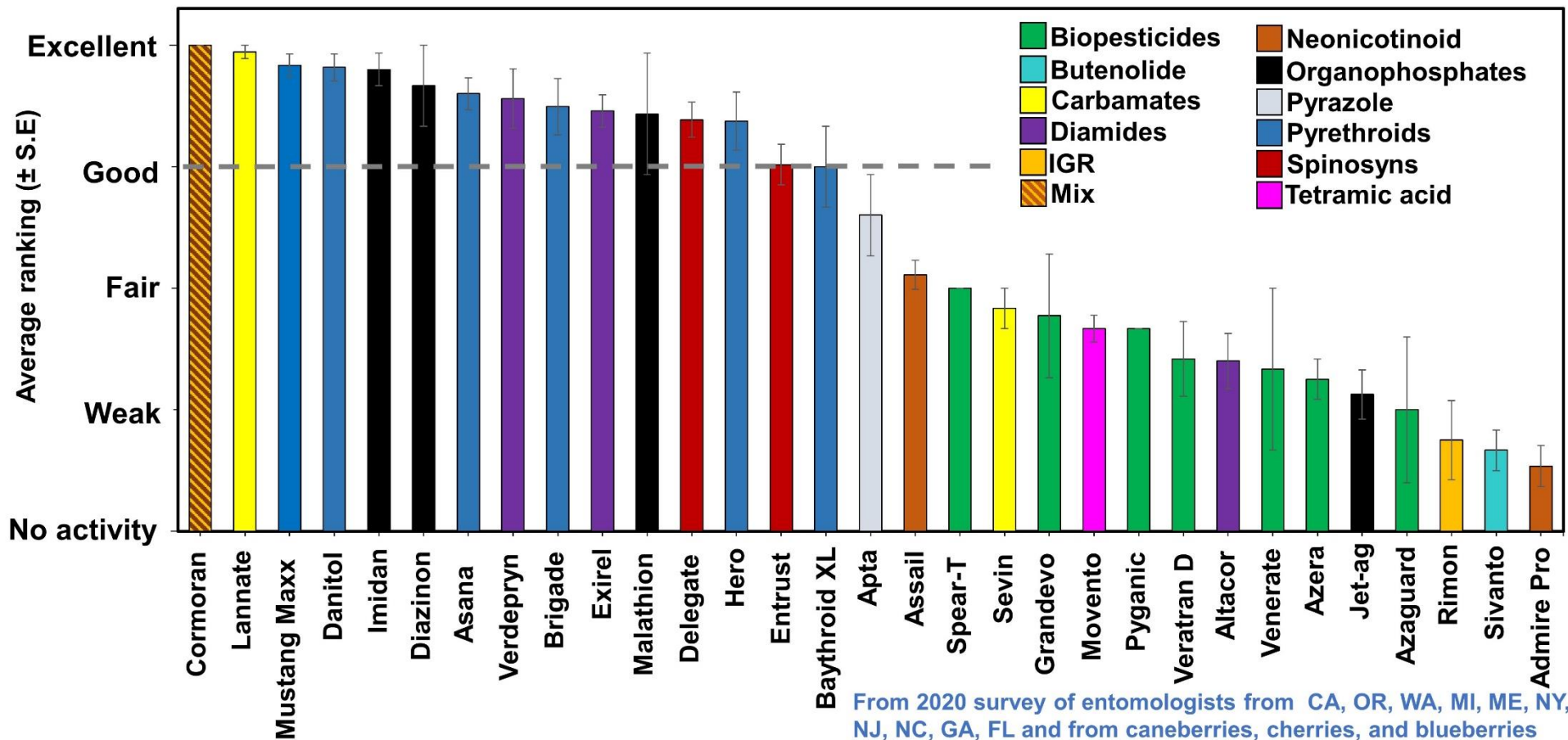


Summary rankings of insecticide efficacy against SWD

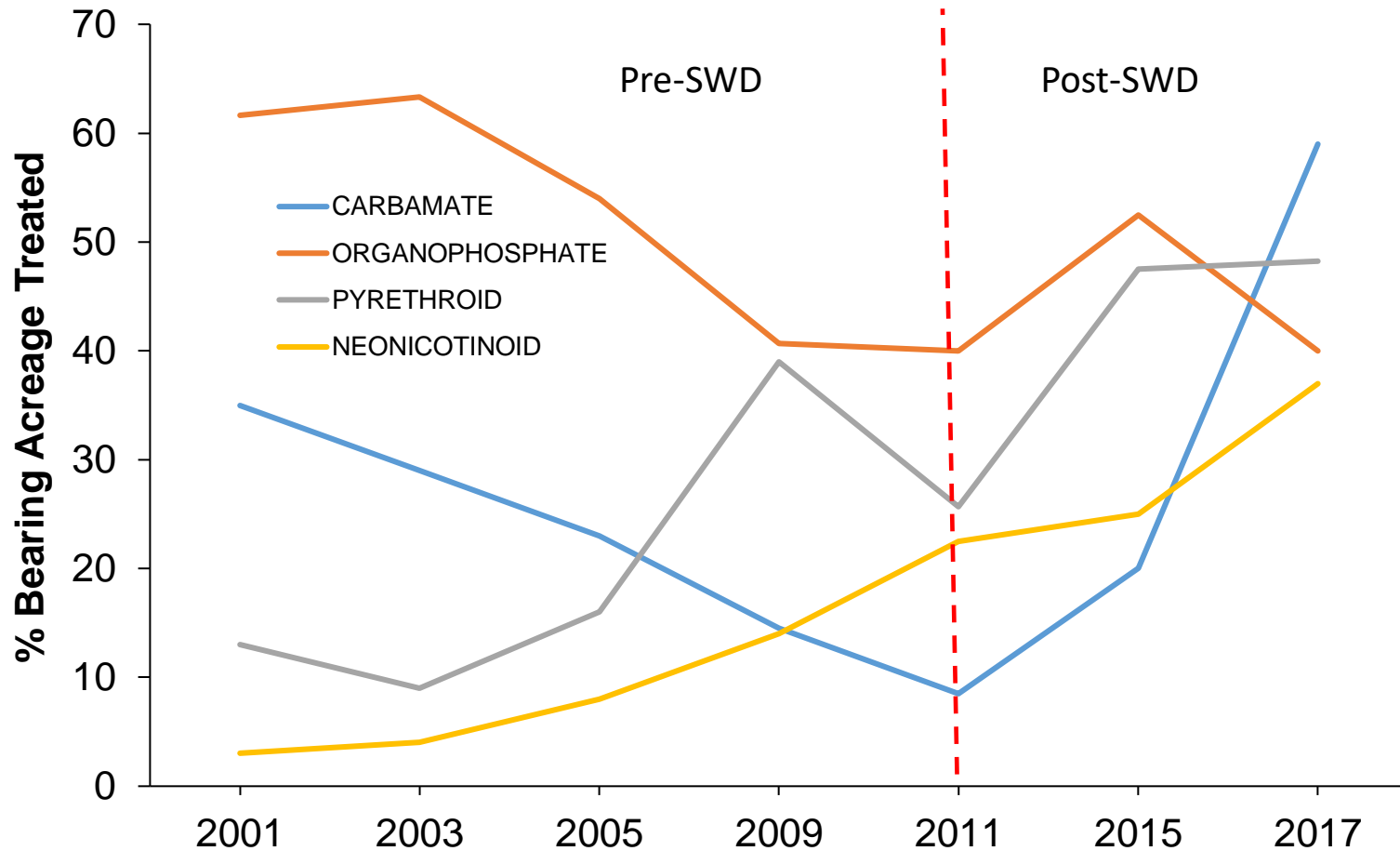


From 2020 survey of entomologists from CA, OR, WA, MI, ME, NY, NJ, NC, GA, FL and from caneberries, cherries, and blueberries

Summary rankings of insecticide efficacy against SWD



Increase in insecticide treatments



Source: USDA NASS Data for Blueberry in Michigan

Resulting secondary pests

- Cottony cushion scale
- Azalea bark scale
- Maple leaf scale
- and possibly others



Ash Sial
UGA







iNaturalist

Explore Community More

Life > Animals > ... > Genus *Hemadas* > Blueberry Stem Gall Wasp

Search Species...

Blueberry Stem Gall Wasp (*Hemadas nubilipennis*)

Filter by Place



View More

TOP OBSERVER

erikamitchell
Leaderboard 16

TOP IDENTIFIER

calconey
Leaderboard 88

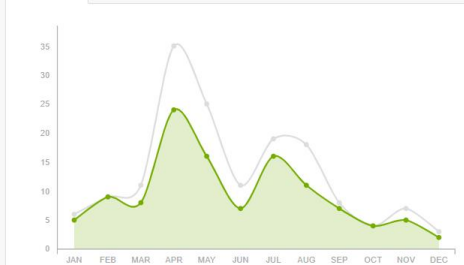
LAST OBSERVATION

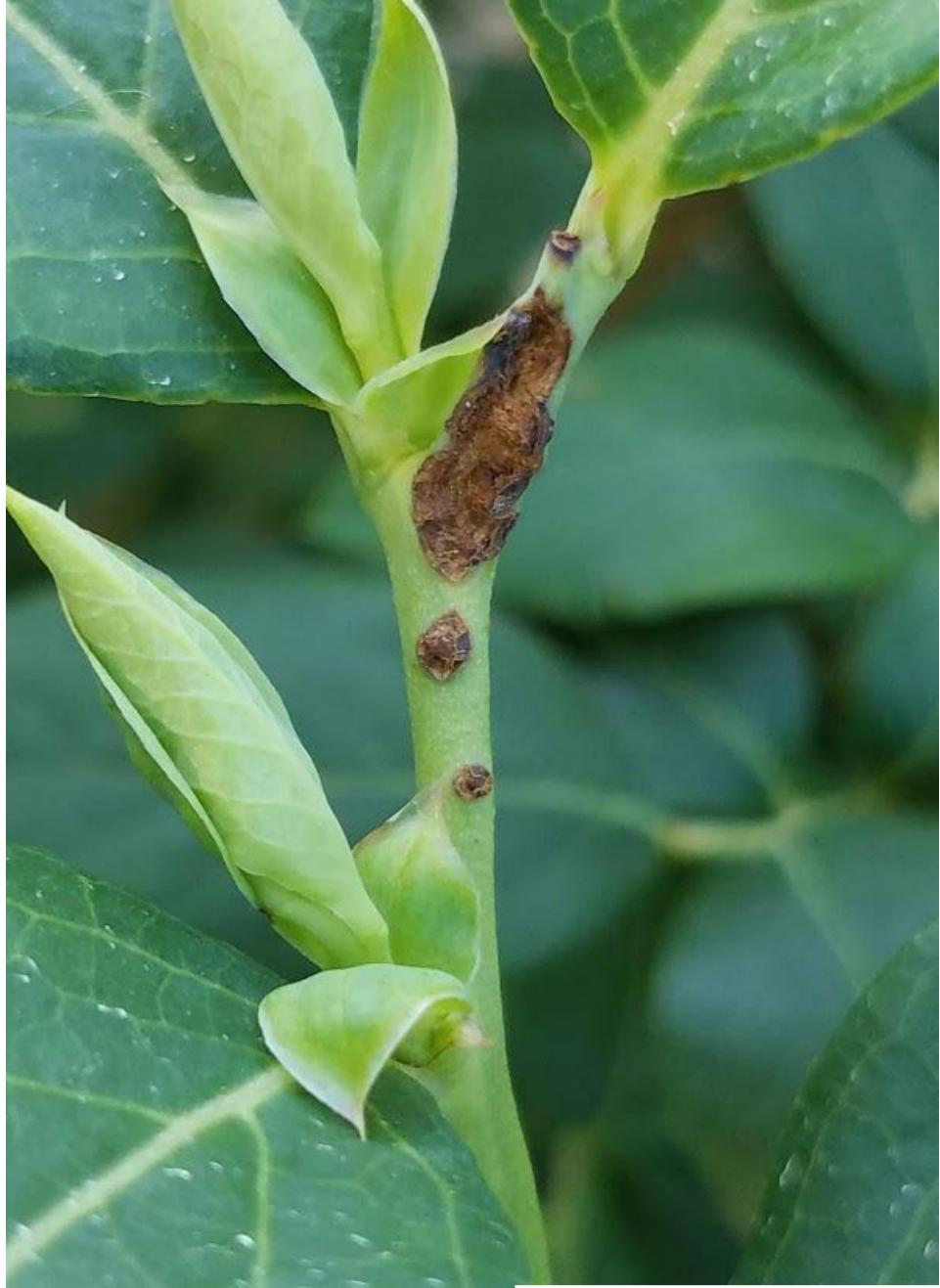
June 02, 2020
View Observation

TOTAL OBSERVATIONS

156
View All

Seasonality History Life Stage







Blueberry stem gall wasp



Natural enemies emerging from galls

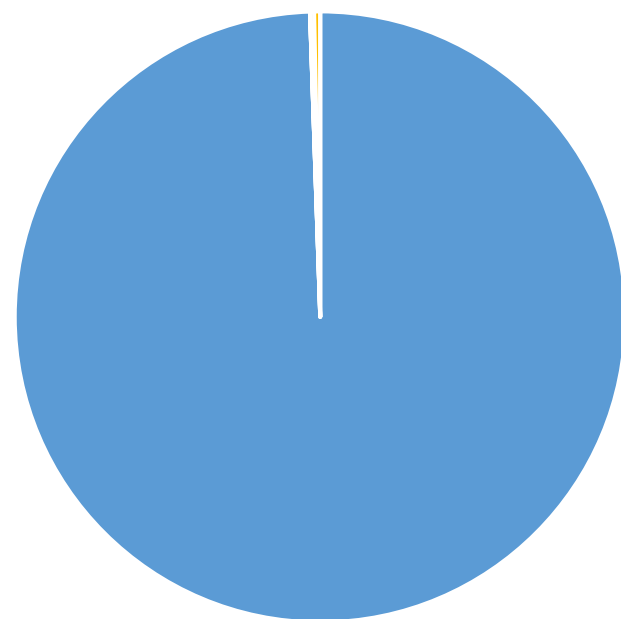
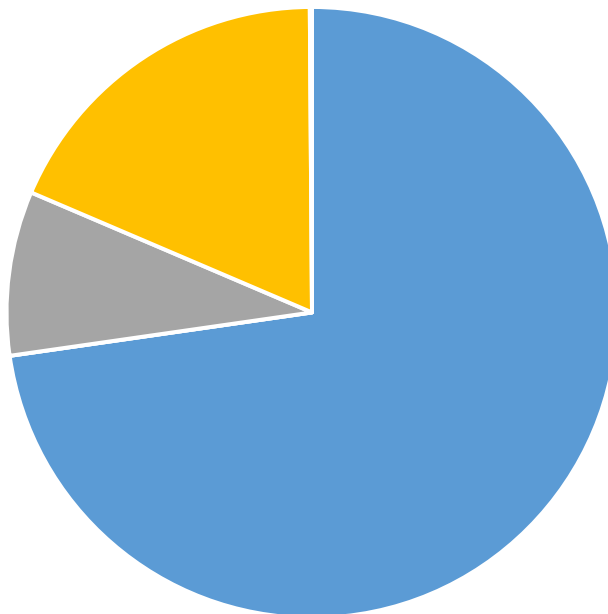
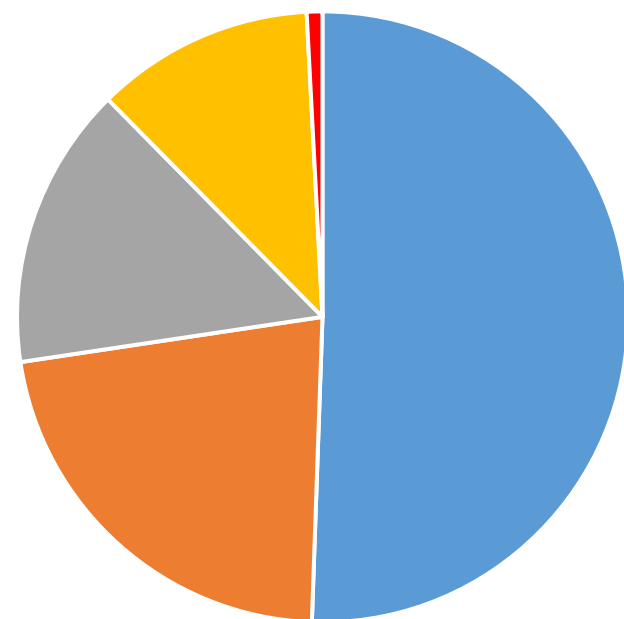


■ *H. nubilipennis* ■ *E. solenozopheria* ■ *O. vacciniicola* ■ *S. vacciniicola* ■ Other

Minimally Managed

Organic

Conventional



Some parasitoids are impacted by SWD management

- Impacts to be determined
- Some species infest galls/emerge twice per year [5]
- Timing of 2nd emergence coincides with SWD
- *E. solenozopheriae* observed emerging late in MI
- Absent in organic and conventional sites

TABLE 1

SPECIES OF CHALCIDOIDS EMERGING IN 1926 FROM 400 GALLS FORMED IN THE SUMMER OF 1925

Species	No. of individuals found to have emerged at different dates				
	June 7	July 15	Aug. 1	Aug. 18	Sept. 21
<i>Hemadas nubilipennis</i> Ashm.	1,639	11	0	0	0
<i>Decatoma</i> sp.	891	5	0	0	0
<i>Eurytoma solenozopheria</i> Ashm.	184	33	0	0	0
<i>Ormyrus vacciniicola</i> Ashm.	70	27	0	452	84
<i>Eupelmus</i> sp.	16	13	0	0	0
<i>Solenozopheria vaccinii</i> Ashm.	0	0	0	0	0



⁵ Diggers BF, JNY Entomol Soc, 35:253-259 (1927)

Which varieties are resistant?

29 varieties assessed across 99 fields in 5 counties.

Avoid highly and moderately susceptible varieties for new plantings.



Variety	Average galls per bush
Highly Susceptible	
Jersey (18)	102.4
Northland (2)	28.5
Pemberton (1)	20.1
Bluejay (6)	19
Moderately Susceptible	
Liberty (6)	6.7
Aurora (4)	4.9
Duke (7)	1.7
Legacy (1)	1.8
Bluetta (3)	0.2
Brigitta (7)	0.2
Patriot (1)	0.8
Low Susceptibility	
Elliott (21)	0.1
Rubel (6)	0.01
Spartan (2)	0.02
Bluecrop (23)	0
Blueray (8)	0
Draper (2)	0
Nelson (4)	0
Weymouth (3)	0

Pruning to remove galls



- Prune out and destroy galls.
- Need to get all galls.
- Annual activity.
- Multiple year commitment.

Gall size and wasp emergence



~1.5 inch, 3.25g
67 wasps emerged

<0.5 inch, 0.34g
18 wasps emerged

Growers' management with insecticides

Fields with fewer galls were...

- Treated immediately after honey bee hives were removed.
- Treated post bloom with Lannate and Mustang Maxx.
- Use refined light summer oil or an adjuvant such as Wetcit, Exit, or Oroboost.
- Treat with higher (60 gallons/ac) volume.



Recent spray trials

Trial 1 - Foliar sprays

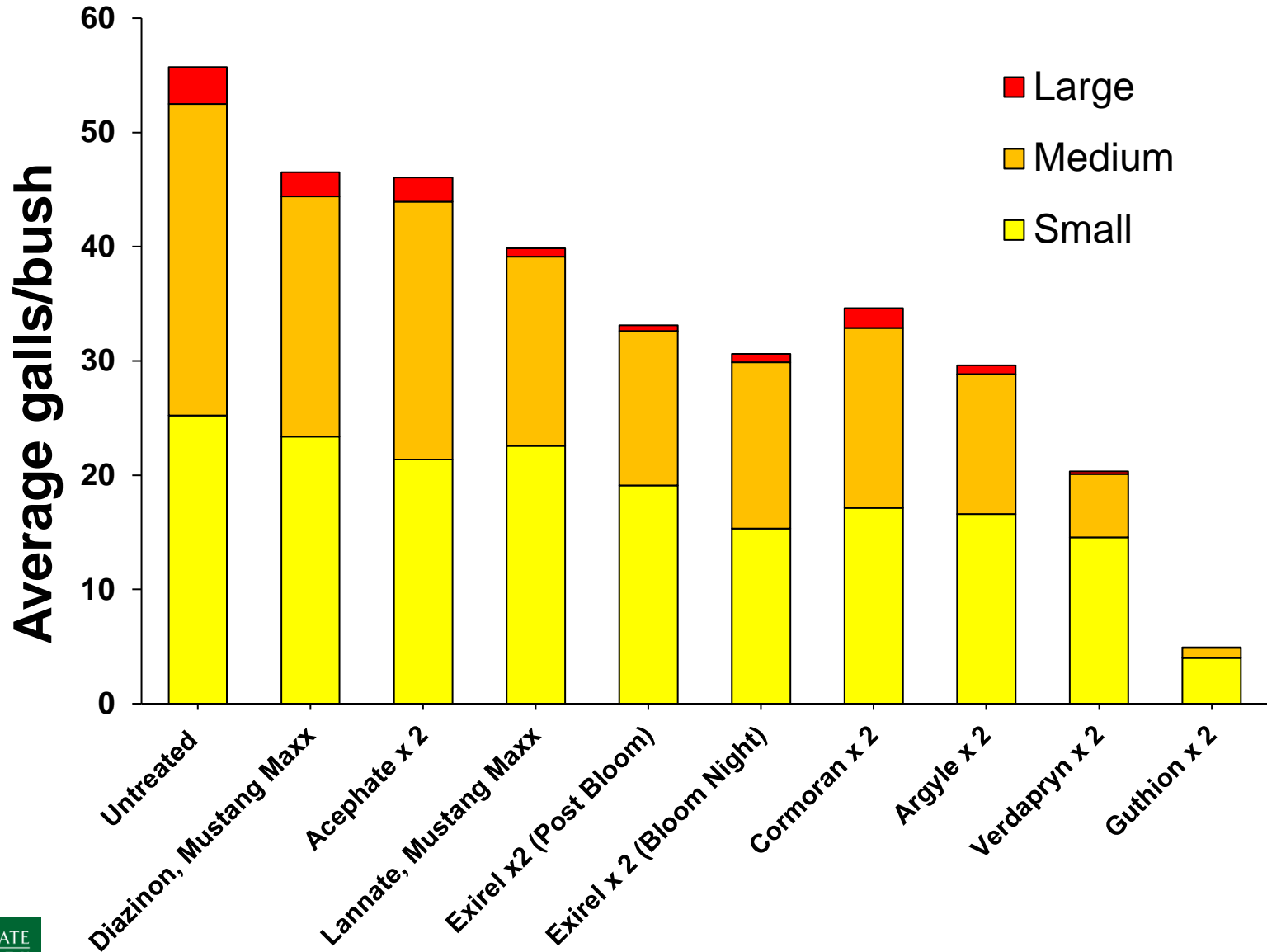
- In-bloom and post-bloom sprays.
- 10 treatments, new and old products.
 - Guthion (Yikes!)
- Good gall wasp pressure.
- Application made with backpack sprayer



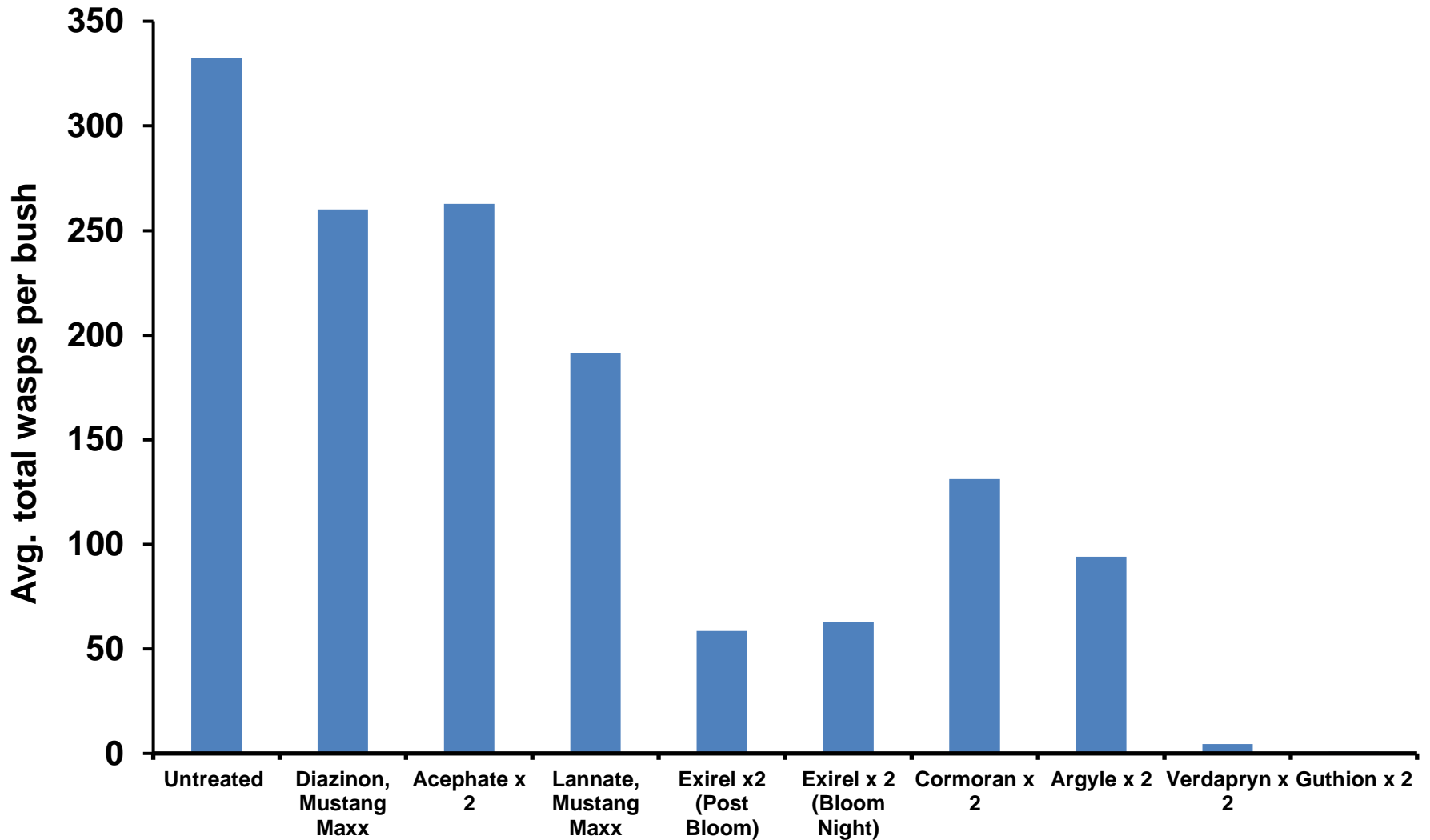
Trial 2 - Systemic products

Foliar trial results

*Regenerating Jersey field
Ottawa County*



Foliar Trial - Avg. total wasps per bush



Untreated



Lannate, Mustang Maxx



Untreated



Guthion



Untreated



Verdepryn



Systemic insecticides

*Mature Liberty field
Muskegon County*

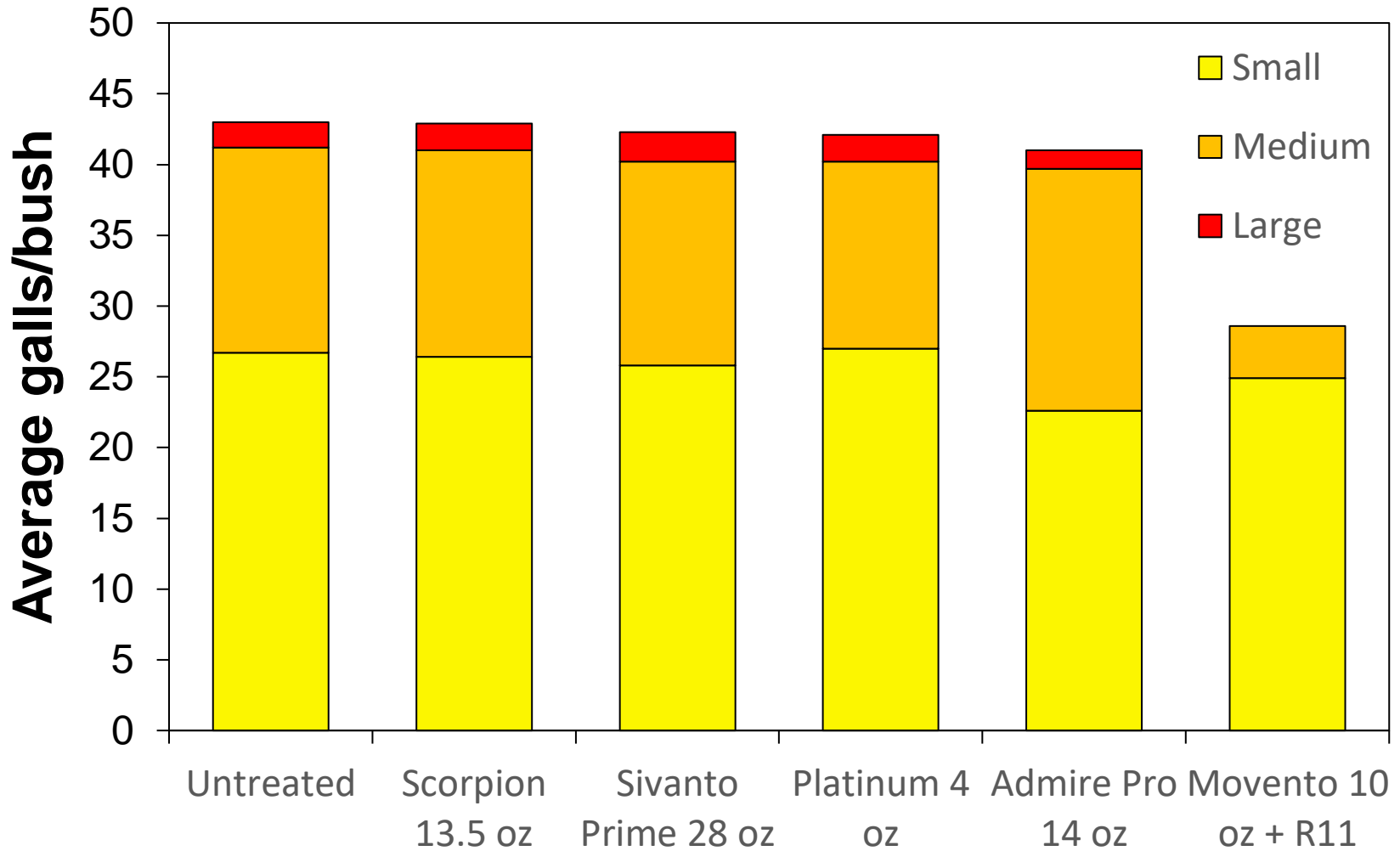
Trt.	Treatment	Active Ingredient	Rate	Application	Application timing
1	Untreated	-	-	-	-
2	Scorpion	Dinotefuran	13.5 fl. oz	drip	A
3	Sivanto Prime	Flupyradifurone	28 fl. oz	drip	A
4	Admire Pro	Imidacloprid	14 fl. oz	drip	A
5	Platinum	Thiamethoxam	4 oz	drip	A
6	Movento + R-11	Spirotetramat	10 fl. oz	foliar	B, C

A = 6/25/2019

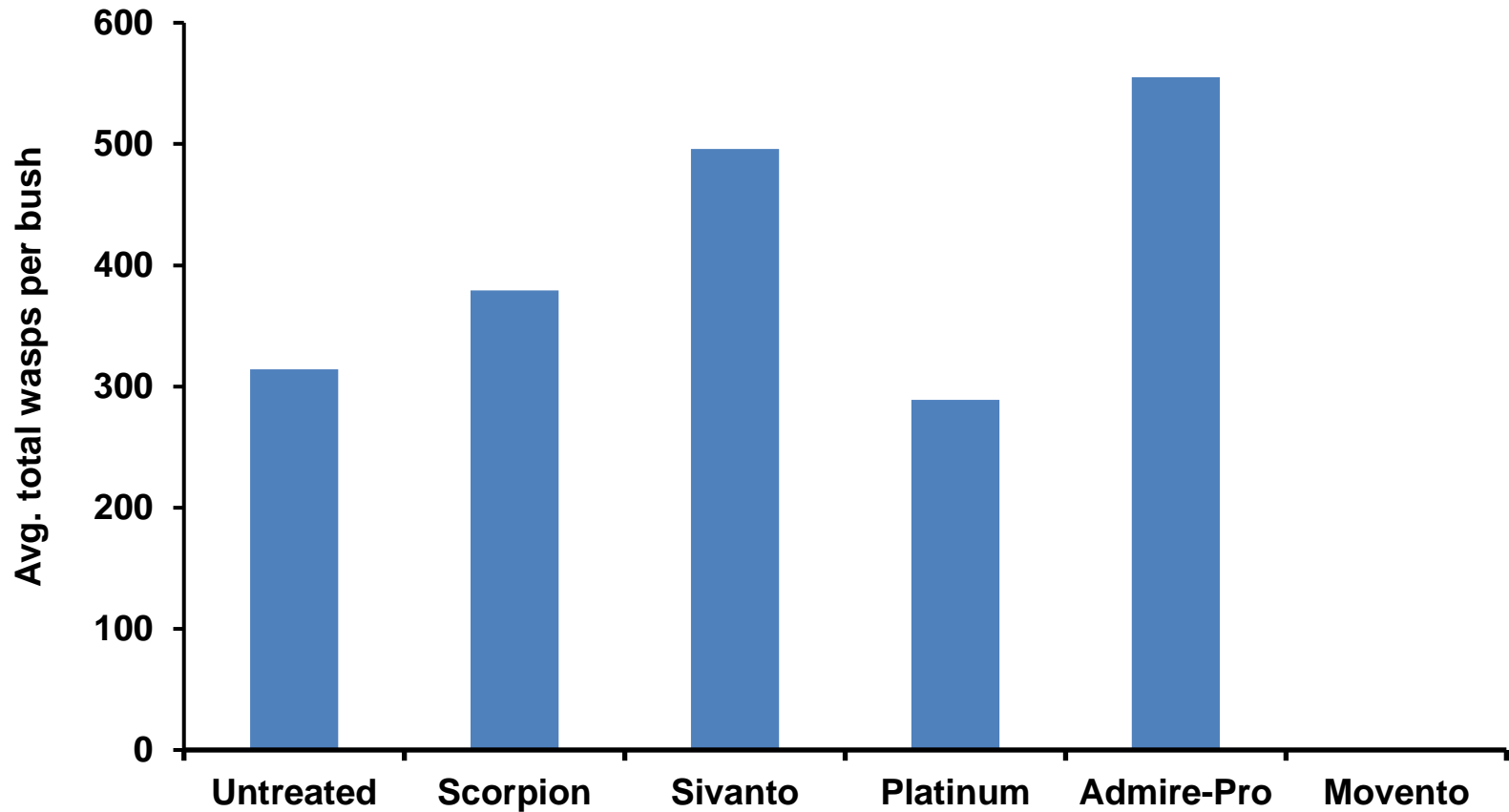
B = 6/29/2019

C = 7/7/2019

Systemic insecticide results



Systemic - Avg. total wasps per bush

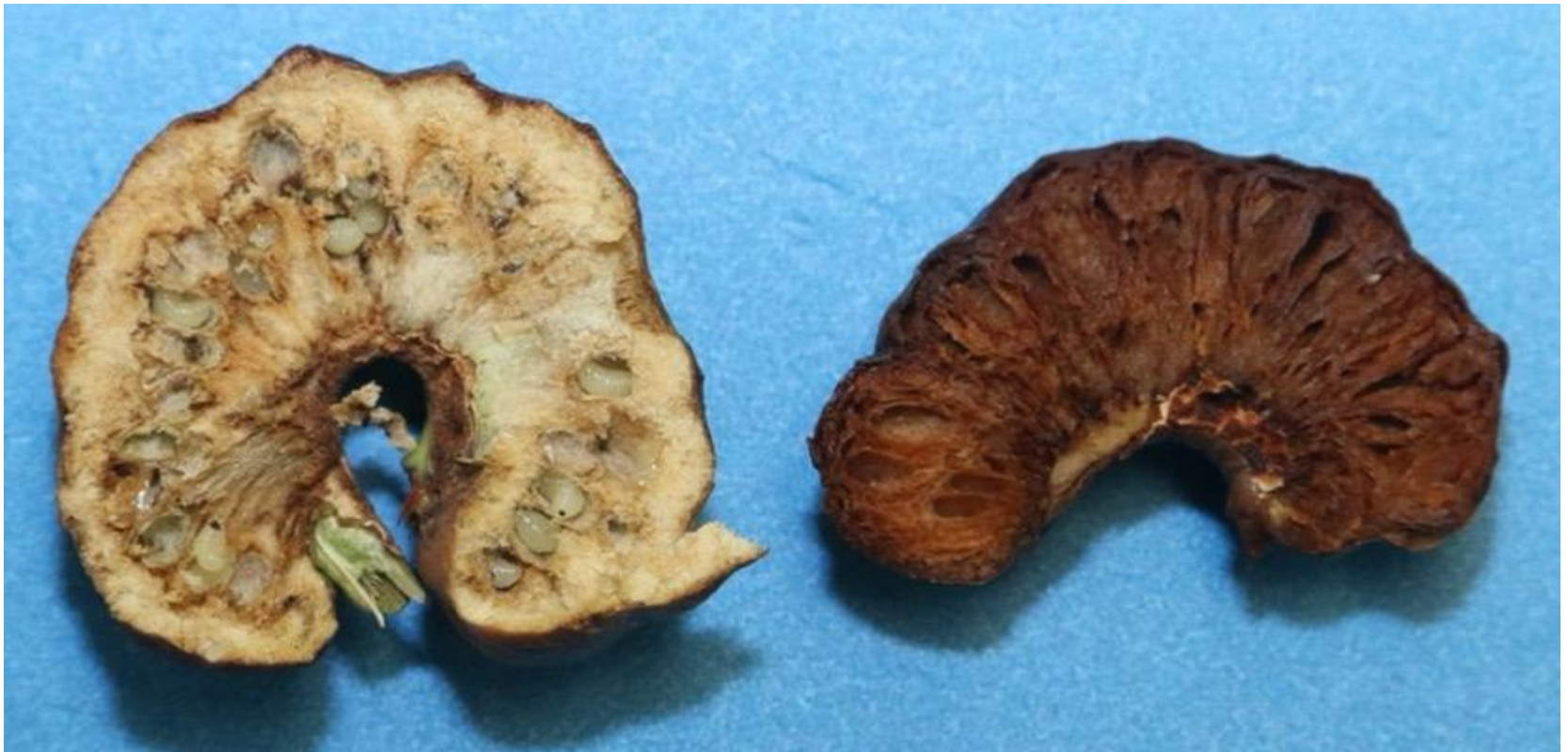


Movento foliar treatment

Untreated

Treated

Movento 10 oz/ac + R11
2 post-bloom applications

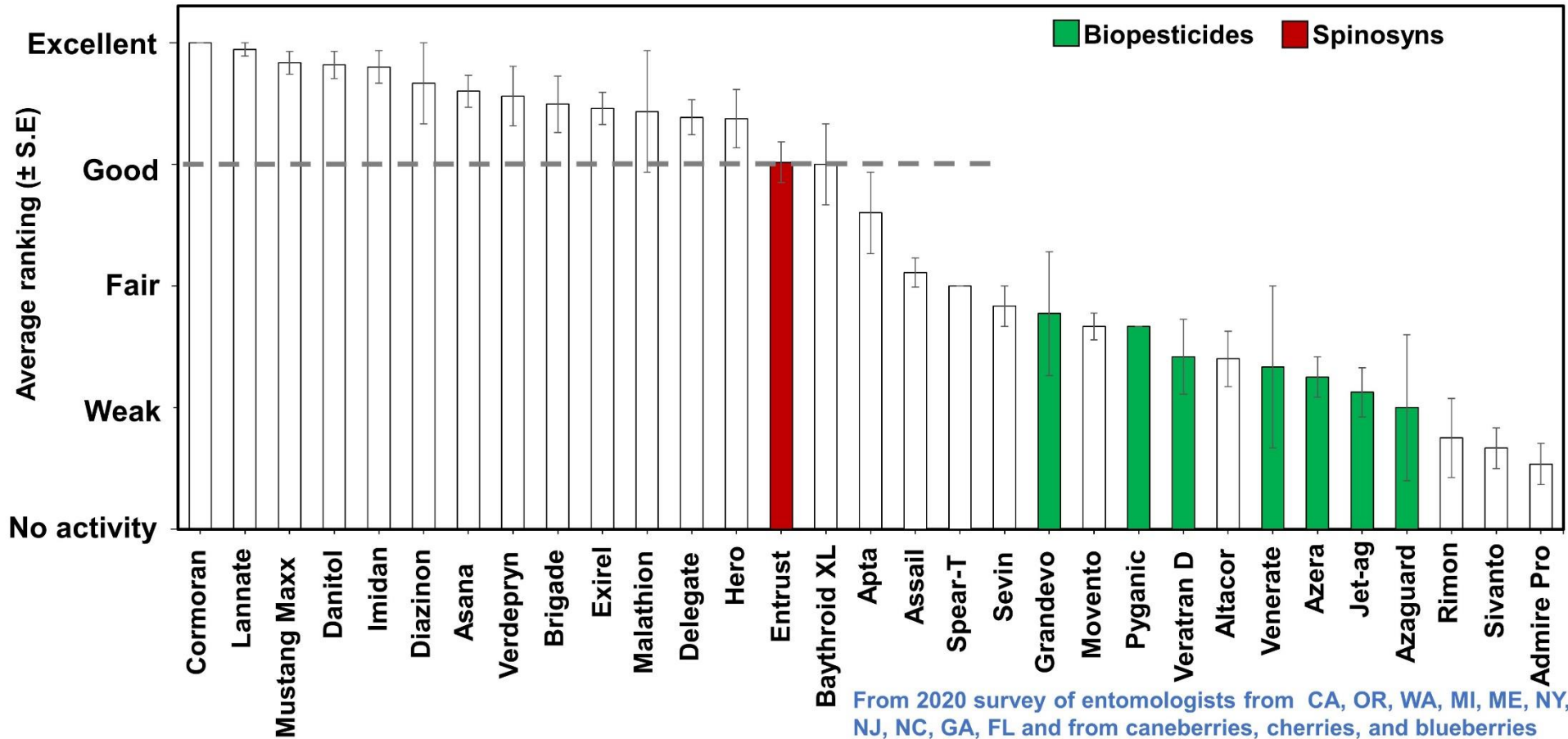


Reducing gall wasp infestation

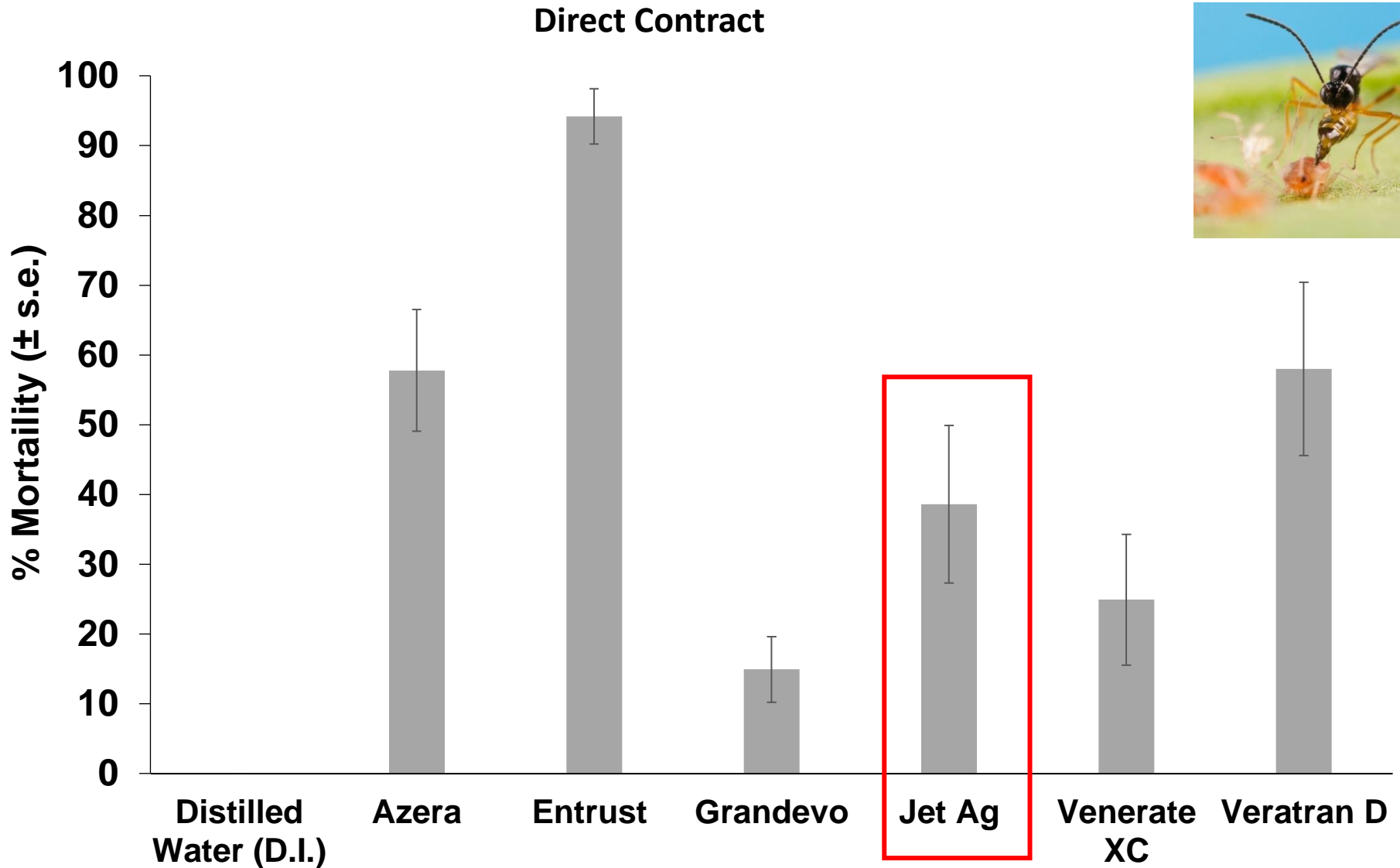
- Strategy 1: Don't grow susceptible varieties.
- Strategy 2: Prune and destroy galls.
- Strategy 3: Chemical control
 - Immediate post-bloom
 - Focus on coverage: high volume (60 GPA or higher).
 - Add a second spray one week later. Also gets fruitworms.
- Combine tactics for overall reduction

Reducing pest resurgence through product selection

What productions will conserve natural enemies for control spotted-wing drosophila



Biopesticide impact on *A. colemani*



Yeasts are important to SWD

PAA products can impact yeast in vitro

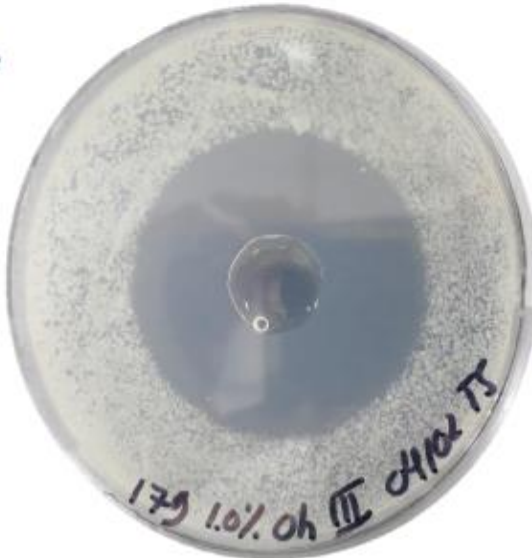
Control



Half-dose
(0.5%)



Full-dose
(1%)



One and a half dose
(1.5%)

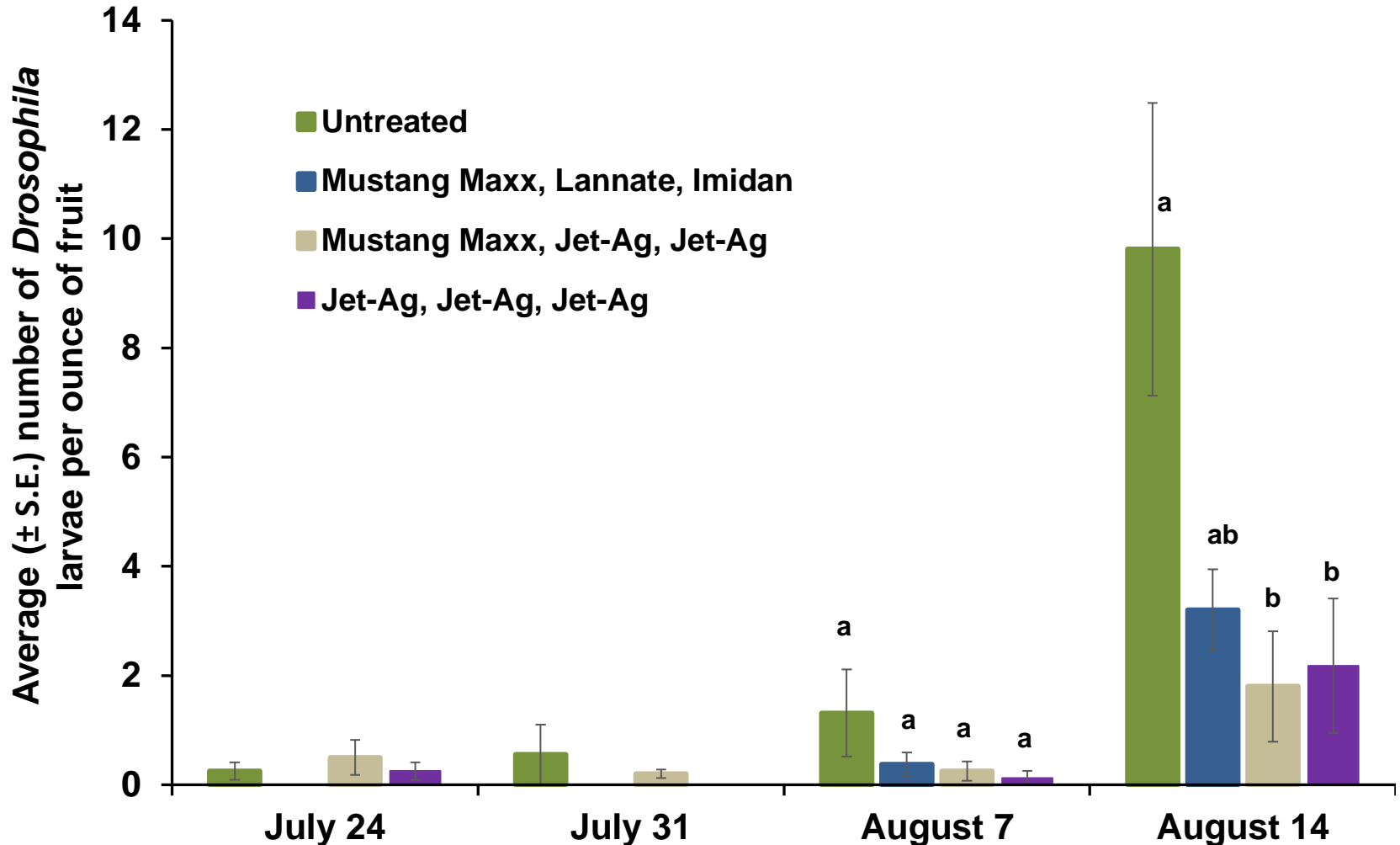


Hamby lab (UMD)

Example pictures for growth inhibition -
Strain 179 JetAg-
Agar was inoculated
at the same day

PAA impacts SWD infestation in field trials

Small plot trials in MI Blueberry



New directions in SWD management



Ganaspis brasiliensis



Acknowledgements



Project GREEN



- **Grower Cooperators**
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