Spotted-Wing Drosophila Management Update



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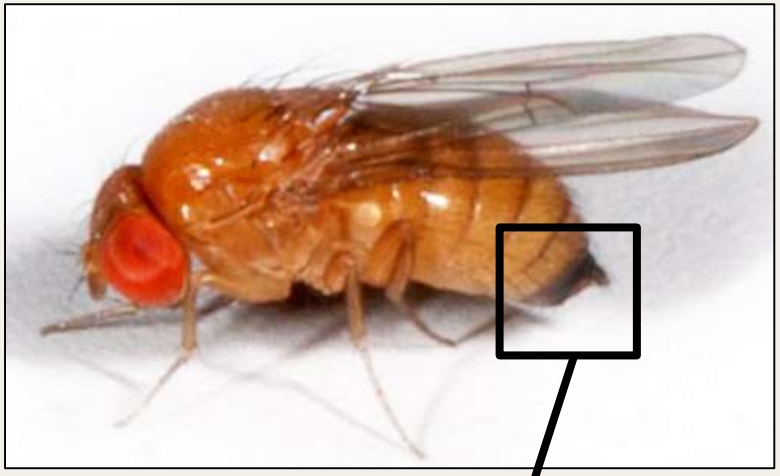
Spotted-Wing Drosophila (SWD)

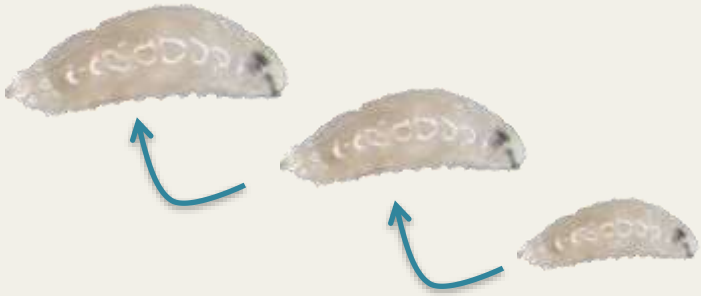
Male

Female



Life Cycle

10 – 15 Days



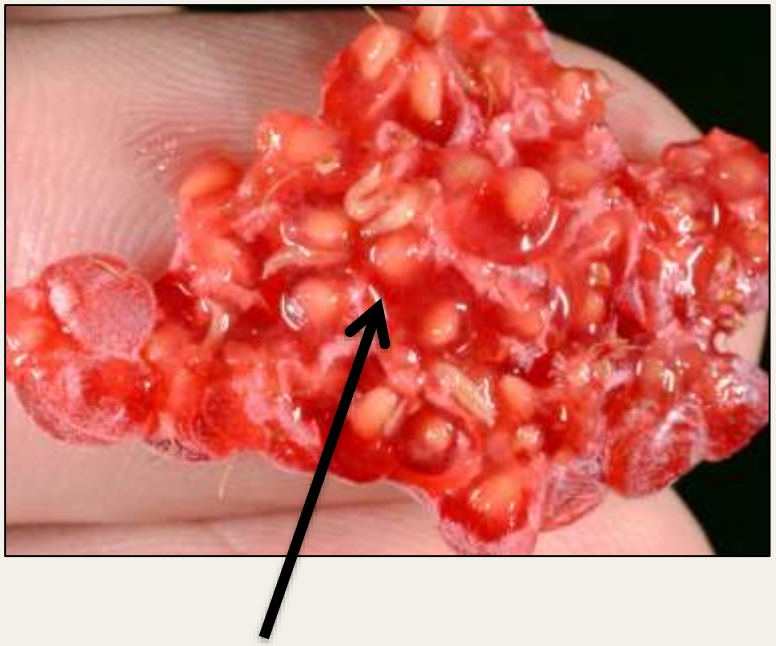
SWD Damage

Egg Laying

Larval Feeding

Chemical Controls

Insecticides mainly target adults



If fruit is already infested, surviving larvae will replace the adults

Crop Specific Spray Tables

Brambles (Blackberry and Raspberry)

Table 2. Examples of SWD-active insecticides for bramble (blackberry and raspberry) production. This is not an exhaustive list, and other formulations of these active ingredients or other active ingredients in these chemical classes may be similarly effective. **ALWAYS read and follow all instructions on the pesticide label; the information presented here does not substitute for label instructions.**

Trade Name	Active Ingredient	Re-entry Interval	Preharvest Interval	Effectiveness[A]	Application Restrictions	Maximum Usage
Pyrethroids and pyrethrins (IRAC activity group 3A)						
Asana XL	Esfenvalerate	12 hrs	7 days	Excellent	Not specified	0.15 lb ai/acre per season
Brigade WSB	Bifenthrin	12 hrs	3 days	Excellent	1 post bloom	0.2 lb ai/acre per season
Danitol 2.4 EC	Fenpropathrin	24 hrs	3 days	Excellent	2 per season	0.6 lb ai/acre per season
Mustang Maxx	Zeta-cypermethrin	12 hrs	1 day	Excellent	Not specified	0.15 lb ai/acre per season
Bifenture 10DF	Bifenthrin	12 hrs	3 days	Good-Excellent	1 post bloom	0.2 lb ai/acre per season
Pyganic EC 5.0 II[B]	Pyrethrins	12 hrs	0 days	Weak-Fair	10 per season	Not specified
Spinosyns (IRAC activity group 5)						
Delegate WG	Spinetoram	4 hrs	1 day	Good-Excellent	6 per year	0.305 lb ai/acre per year
Entrust SC[B]	Spinosad	4 hrs	1 day	Good	6 per year	0.45 lb ai/acre per crop
Spintor 2SC	Spinosad	4 hrs	1 day	Good-Fair	6 per year	0.45 lb ai/acre per crop
Organophosphates (IRAC activity group 1B)						
Malathion 8 Flowable	Malathion	12 hrs	1 day	Good	3 per year	Not specified
Carbamates (IRAC activity group 1A)						
Sevin XLR Plus	Carbaryl	12 hrs	7 days	Fair-Good	5 per year	10 quarts product/acre per year

[A]Efficacy rankings summarized by Rufus Isaacs at Michigan State University and determined by surveys of WERA-1021 SWD Coordinating Committee members.

[B]OMRI approved for use in organic production.

ALWAYS read and follow all instructions on the insecticide label

Spray Coverage

Dense foliage may block pesticide dispersion

Creating refuge for SWD?

Sharpe et al. (2017); Rice et al. (2017)

Spray Coverage

Adult SWD – higher activity levels in inner and lower plant canopy

Outline

- **Is spray coverage important for SWD control?**
- Demonstration trials
- Optimizing spray coverage?
  - Adjusting carrier water volume
  - Sprayer calibration

Laboratory Bioassays

Mustang Maxx →

or

Water (Control) →

Store-bought raspberries individually sprayed in fume hood

Laboratory Bioassays

High Droplet Concentration
4 fl. oz. MM per 50 gallons water

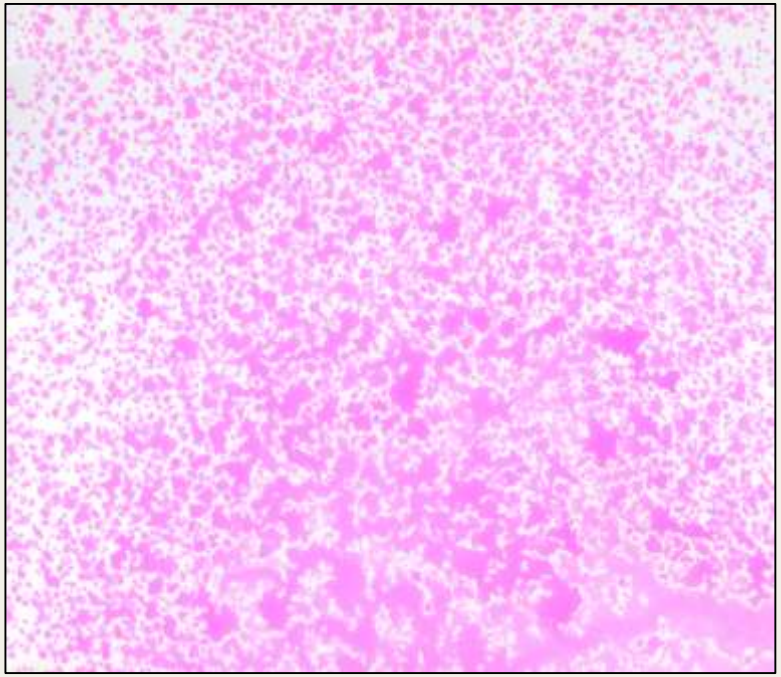
Low Droplet Concentration
4 fl. oz. MM per 100 gallons water

Laboratory Bioassays

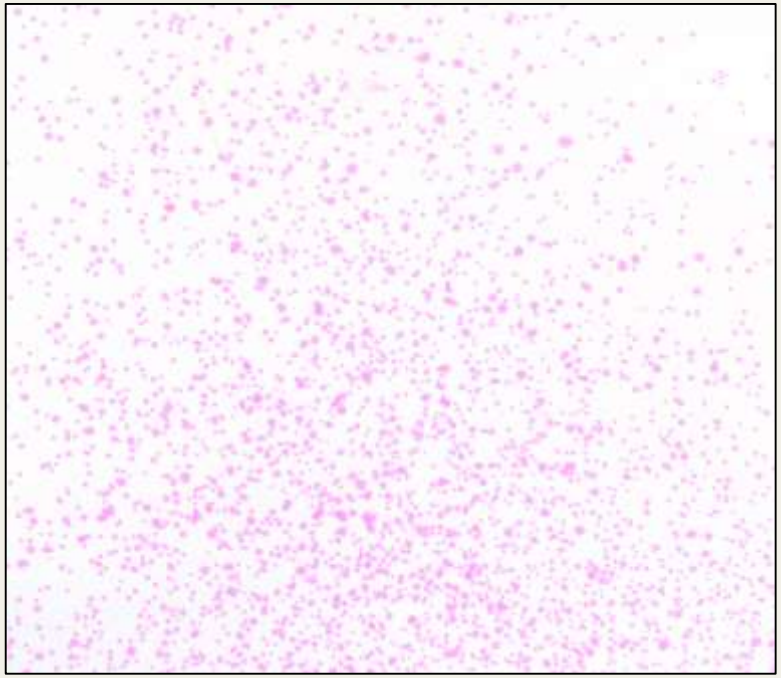
Adjusted “sprayer” speed to create variation in spray coverage

Laboratory Bioassays

Two spray coverage treatments



High spray coverage (~85%)



Low spray coverage (~20%)

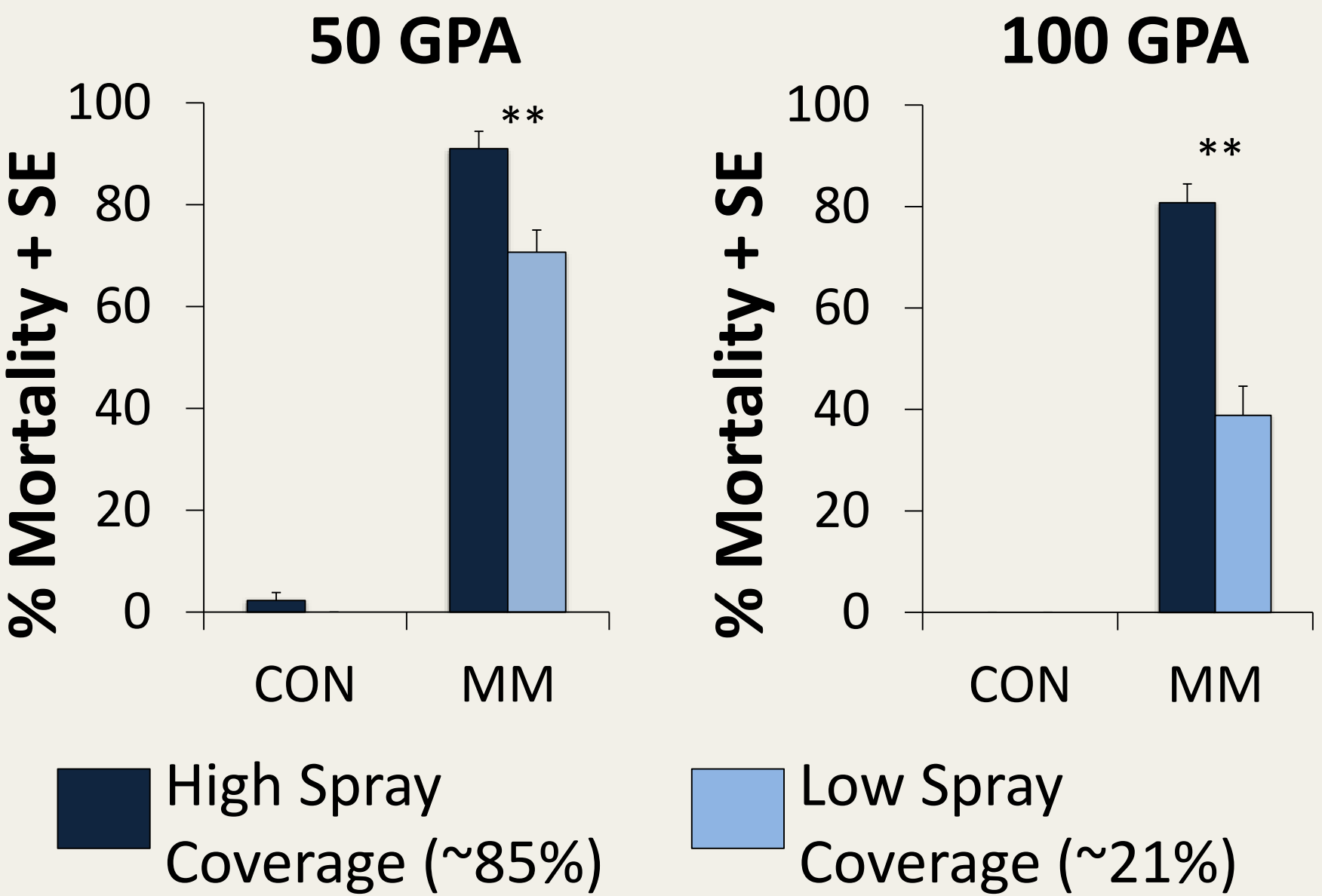
Laboratory Bioassays

Hold 24 hours with treated raspberry

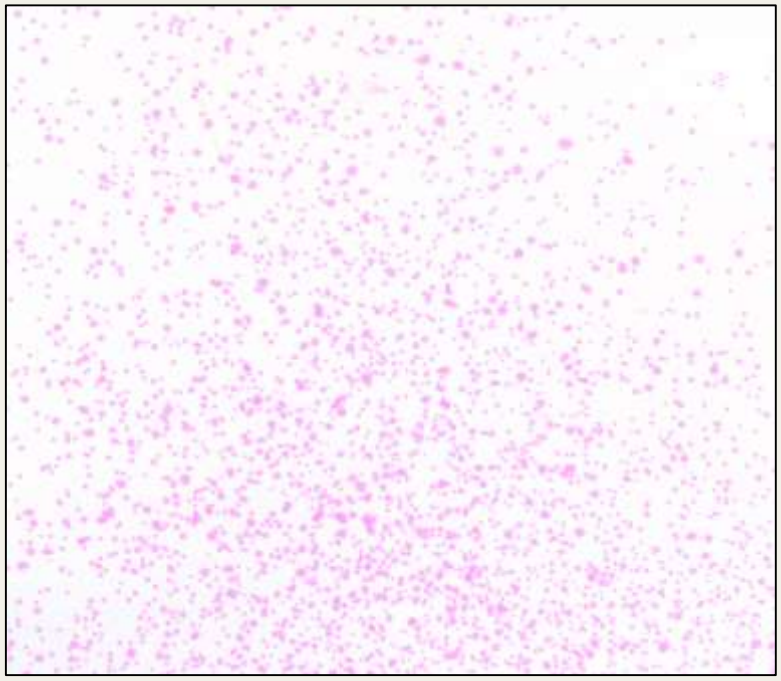
Results: Larval Infestation

With Mustang Maxx, less than 1 larvae per female
No difference between high and low spray coverage

Results: Adult Mortality



Conclusions

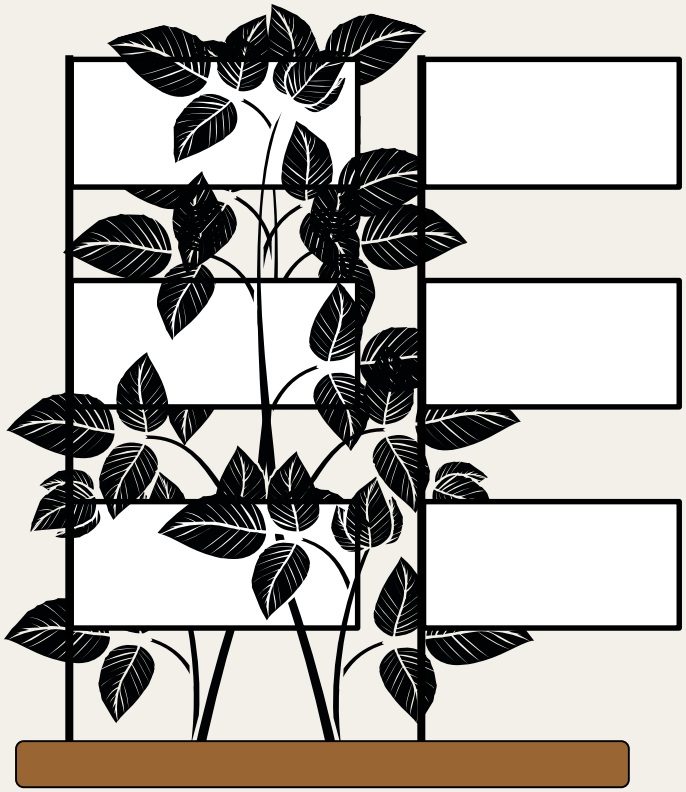


Reduced spray coverage may not effectively control adult SWD populations

Outline

- ✓ Is spray coverage important for SWD control?
- **Demonstration trials**
- Optimizing spray coverage?
  - Adjusting carrier water volume
  - Sprayer calibration

Demonstration Trials

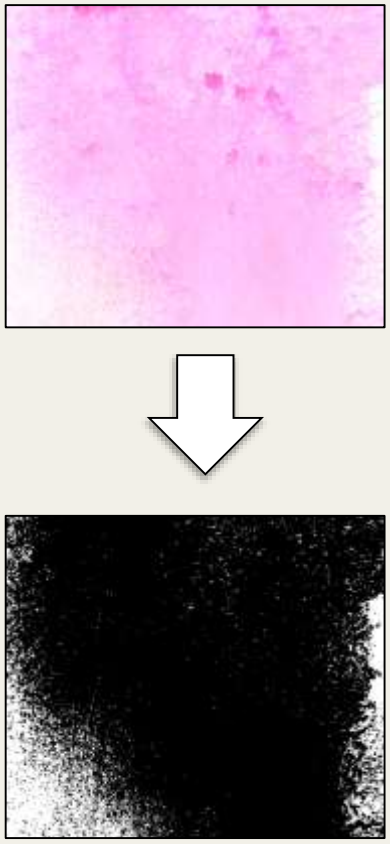


Inner

Outer

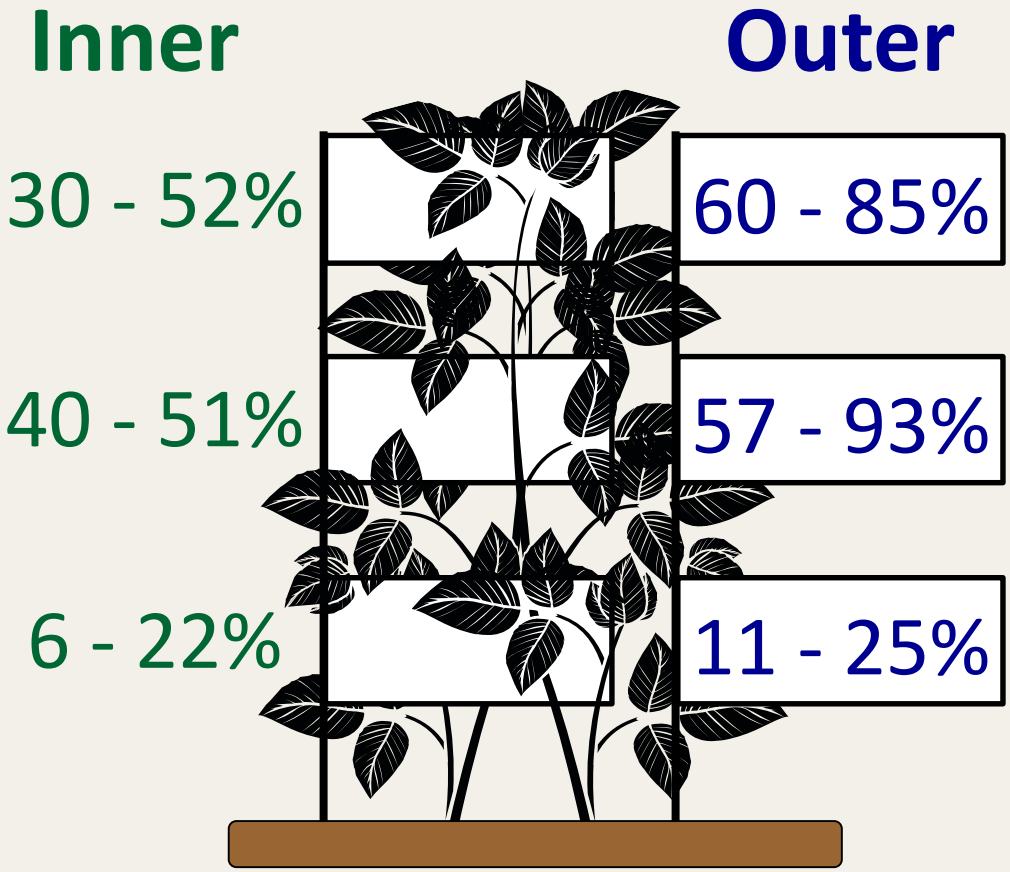
Spray cards deployed in inner and outer plant canopy at varying heights

Demonstration Trials



Visualize spray coverage using pink foam-marker dye

Demonstration Trials



Reduced spray coverage in the inner / lower plant canopy (N=3 spray trials)

Demonstration Trials

Lowest spray coverage in canopy regions with highest SWD activity

Sub-lethal exposure levels → insecticide resistance?

Outline

- ✓ Is spray coverage important for SWD control?
- ✓ Demonstration Trials
- **Optimizing spray coverage?**
  - **Adjusting carrier water volume**
  - – Sprayer calibration

Optimizing Spray Coverage?

Increasing carrier water volume often improves spray coverage

Sharpe et al. (2017); Nansen et al. (2015).

Field Trials (2016 – 2018)

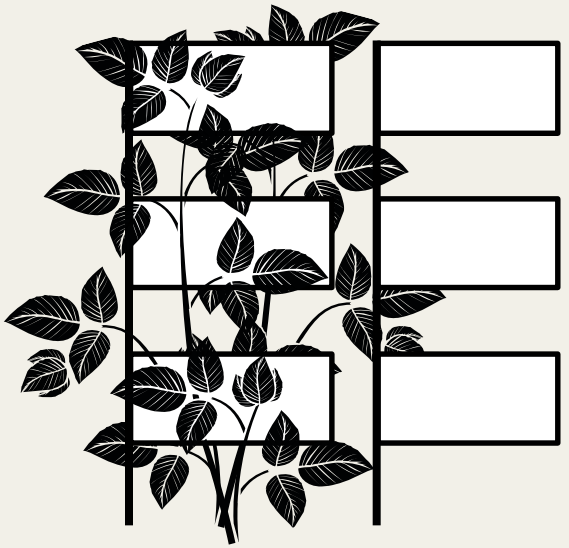
Airblast sprayer

Backpack

Airblast sprayer with two-sided row crop head

Raspberries and/or blackberries sprayed at **50** or **100** gallons per acre (GPA)

Airblast / Backpack Sprayer

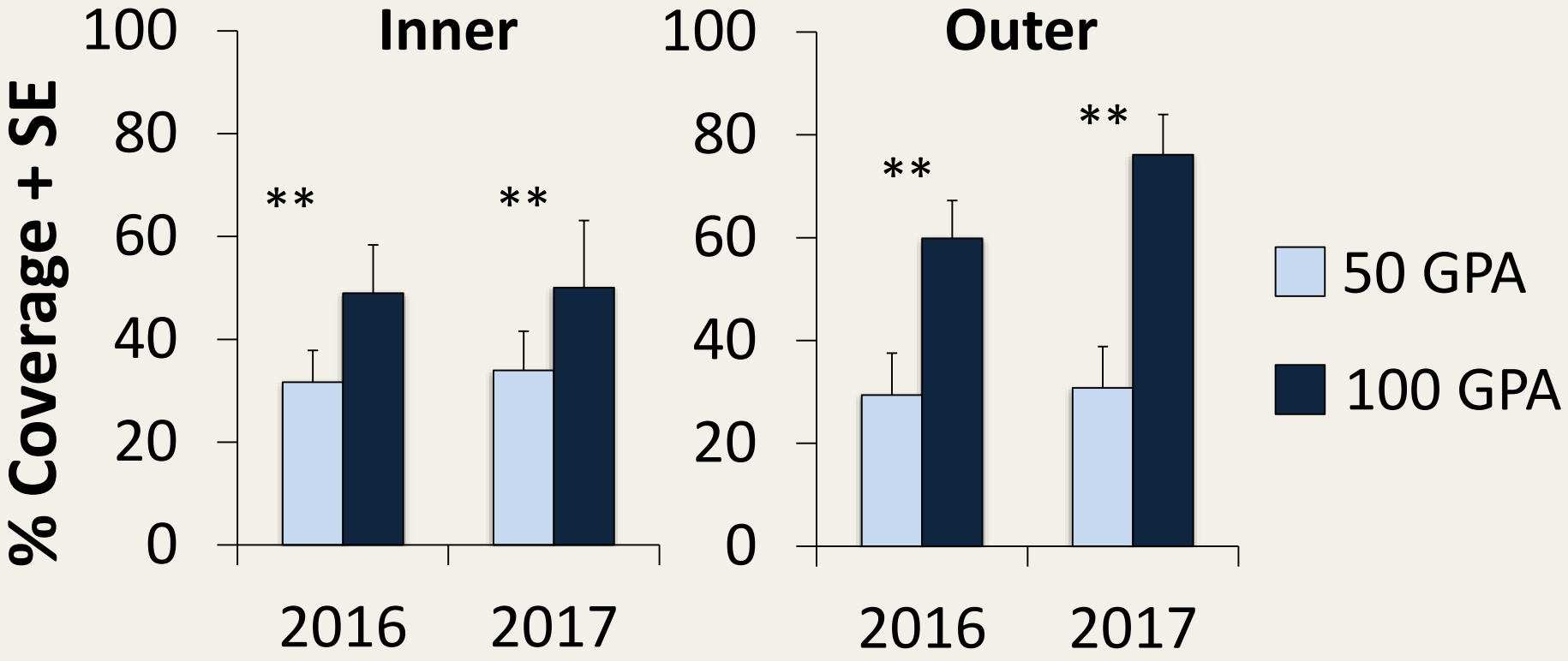


Higher coverage in outer and upper canopy

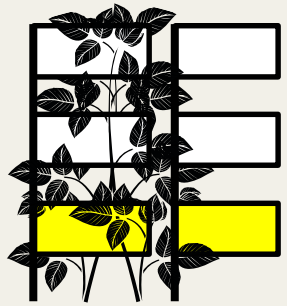
Generally: ↑ carrier water volume

↑ outer spray coverage

Airblast Sprayer



Most consistent improvements in the lower plant canopy



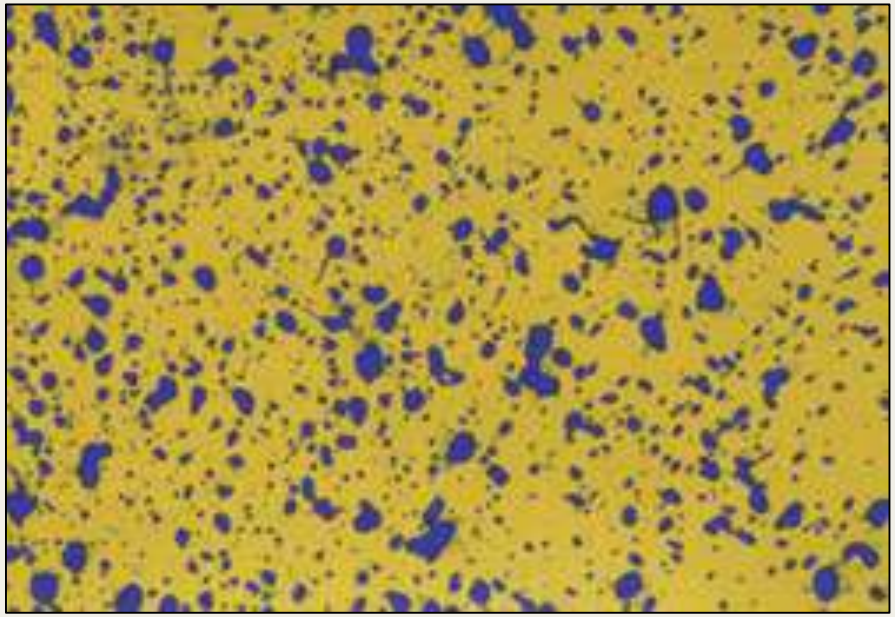
Airblast Sprayer + Row Crop Head

Improved spray coverage in inner/outer canopy and at 50/100 GPA application rate

Outline

- ✓ Is spray coverage important for SWD control?
- ✓ Demonstration trials
- Optimizing spray coverage?
  - ✓ Adjusting carrier water volume
  - **Sprayer calibration**

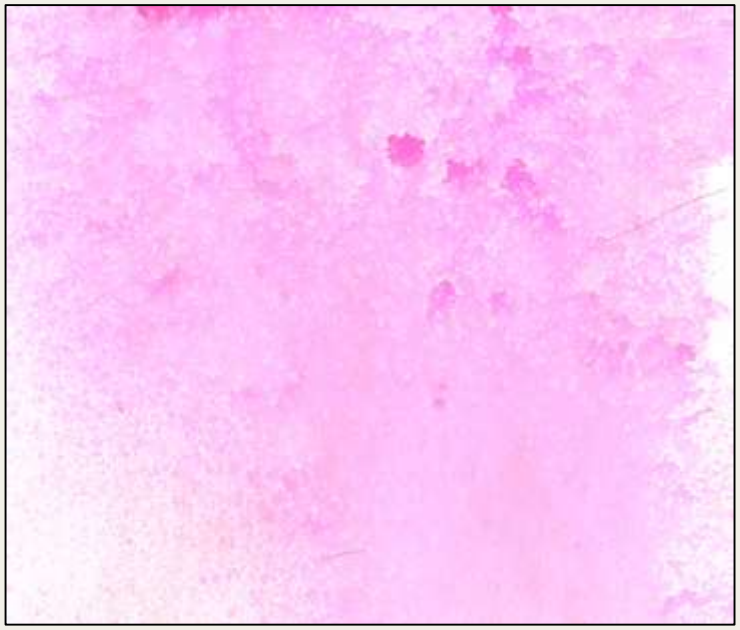
Measuring Spray Coverage



Ambient humidity can impact water sensitive spray cards

Phone apps available to analyze cards

Measuring Spray Coverage



Marker dye not water sensitive

Hamby lab will be conducting spray coverage evaluations in 2020

Troubleshooting Spray Coverage

Canopy management may improve spray penetration

Airblast 101 Handbook

Troubleshooting Spray Coverage

Monitor environmental conditions

High wind contributes to pesticide drift

Airblast 101 Handbook

Troubleshooting Spray Coverage

Make sure air is directed into target plant canopy
Adjusting deflectors on airblast sprayer may help

Airblast 101 Handbook

Troubleshooting Spray Coverage

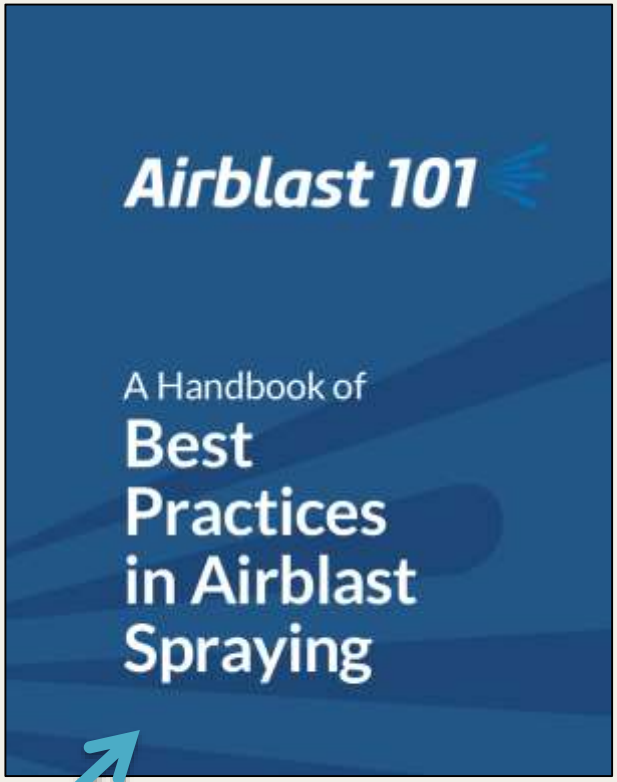
Include adjuvents (e.g. spreader-stickers) to improve coverage

Troubleshooting Spray Coverage

Other factors may include ground speed, sprayer height, nozzle angle

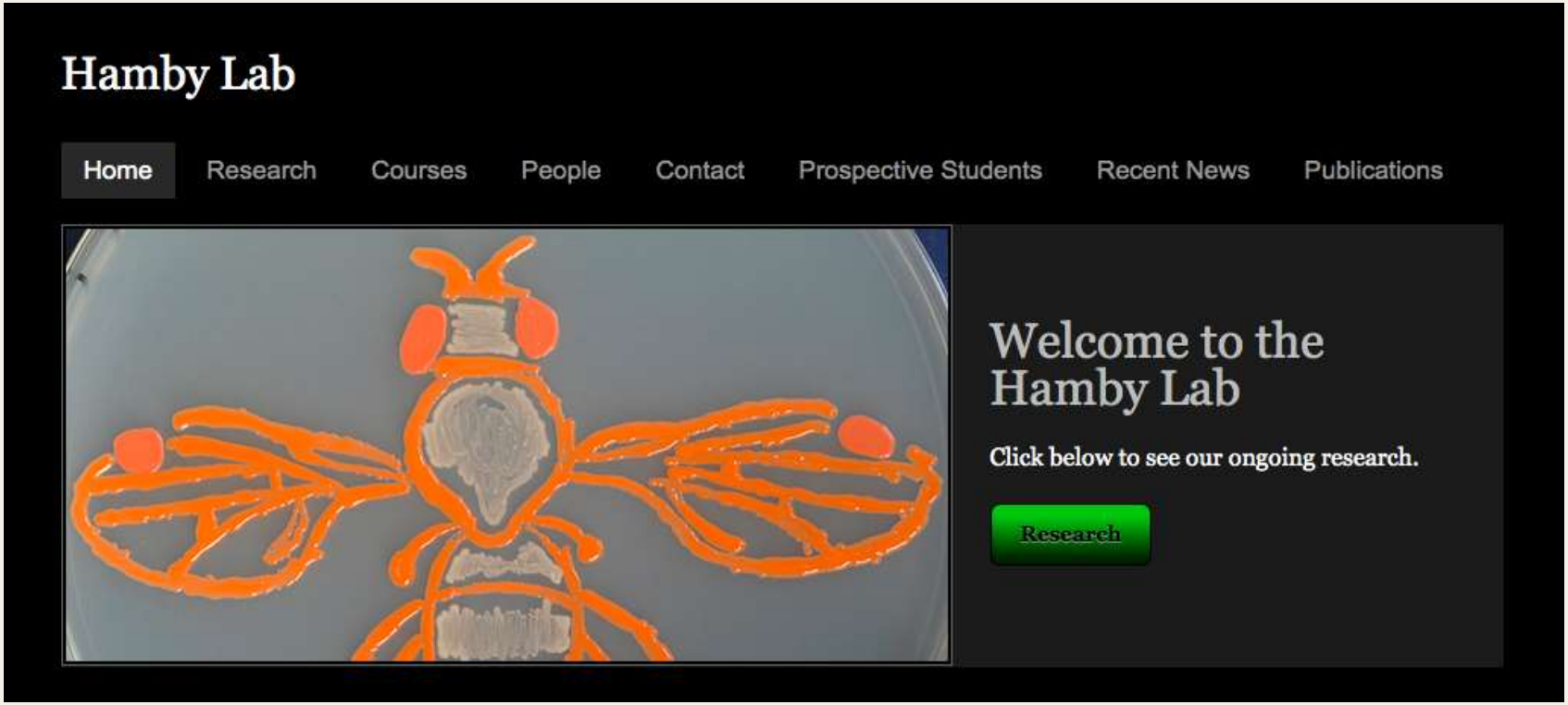
For More Information

http://www.sprayers101.com



Free handbook available for download as a PDF or ebook

For More Information



Lab website: **hambylab.weebly.com**

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Questions?