

Butte–Yuba–Sutter Water Quality Coalition

Irrigated Lands Regulatory Program

Lindsay Hyde

BYSWOC
Administrator



Irrigated Lands Regulatory Program (ILRP) Regulates discharge from irrigated agricultural lands for surface and groundwater.



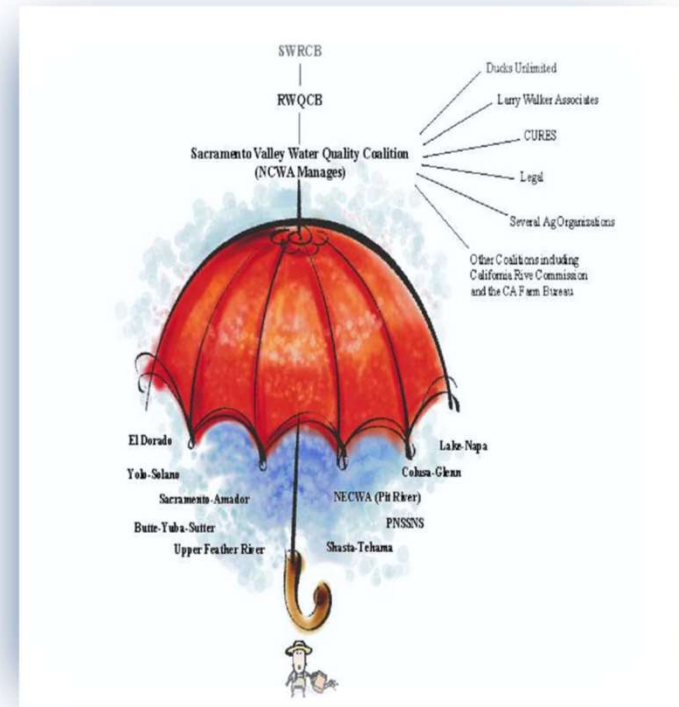
-
- Colusa-Glenn
 - El Dorado
 - Sacramento-Almador
 - Shasta-Tehama
 - Lake
 - Solano
 - Napa
 - Upper Feather River
 - Pit River
 - Placer/Nevada/S. Sutter/N. Sacramento
 - Yolo
- Butte-Yuba-Sutter

The Coalition's Role

BYS is the helping hand to assist members to comply with the regulations required by the ILRP.

Education and Outreach Coordinator Function:

1. Answer questions and provide assistance with reporting requirements.
2. Work directly with monitoring staff and Ag Commissioners to address exceedances.
3. Coordinate educational opportunities that focus on current water quality issues and the best management practices to avoid exceedances in the future.
4. Provide a much cheaper option than reporting directly to the Regional Water Board.



BYSWQC Member Requirements

- Keep Current on Membership Dues
- Complete Reporting Requirements
- Attend an Outreach Event
- Irrigation and Nitrogen Management Plan (Kept on Farm)
- INMP Summary Report (Submitted ONLINE)
- MPIR (Submitted ONLINE)
- Sediment and Erosion Control Plan (if needed)
- Farm Evaluation Survey (Every 5 years)

These are annual obligations!
 To remain a member in good standing, all requirements must be completed and submitted to the Coalition by the appropriate due date.



Butte-Yuba-Sutter Water Quality Coalition - Data Management Tool

Owner: DOE JOHN | Reporter: DOE JOHN | Year: 2022 | User: BYS09999

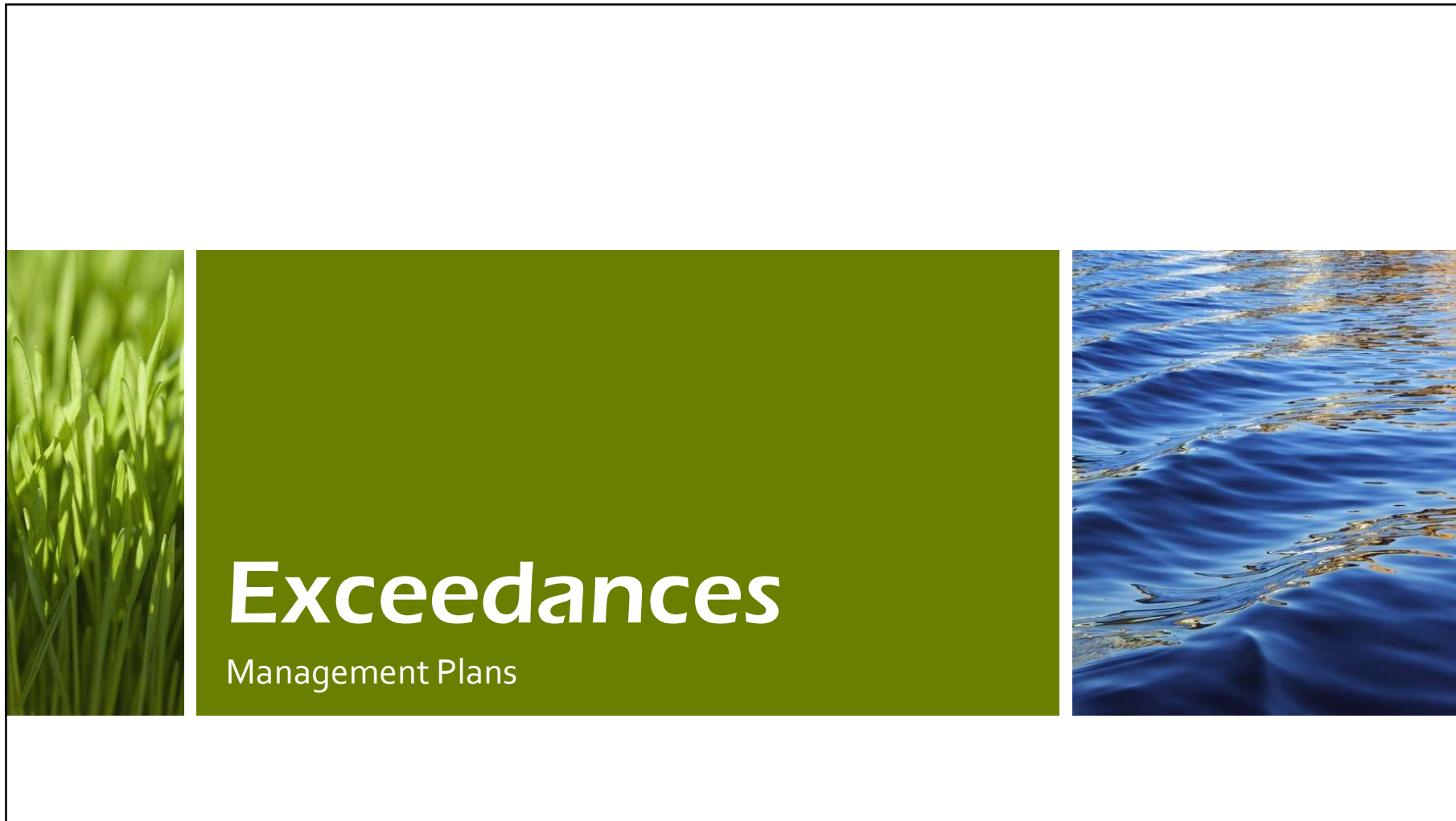
MEMBER DATA | INMP SUMMARY REPORT | MPIR | SECP PLAN | MAPS AND REPORTS | INMP WORKSHEET

1 Account | 2 Account Contacts | 3 Parcels | 4 Cropping

PREVIOUS Review Account Status and Select Account NEXT

- Select account, print report, request account deactivation, view completion status and balance due here.
- Select an account by clicking on the "Select" button on the corresponding account row. This will advance you to the next step in the process.
- Print a copy of the completed reporting to retain on-farm by clicking on "Print Report".
- Request account deactivation by clicking on "Deactivate".
- Accounts that have not completed the reporting process will be identified with **NOT COMPLETE**.
- Accounts that have completed the reporting process will have a **COMPLETE**.
- Any balance due for the account will be displayed in the Balance Due column.
- At the conclusion of data reporting, you will be brought back to this page to review completion status.

	Owner ID	Owner Name	Reporter ID	Reporter Name	Total Irrigated Acres	Overall Completion Status?	INMP Reporting?	INMP Certification?	Outreach and Training?	Irrigation Wells?	Irrigation Uniformity?	Crop Fertility Plan?	SECP Plan?	Balance Due
SELECT	BYS09999	DOE JOHN	BYS09999	DOE JOHN	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0



What Happens When There is an Exceedance?

The BYSWQC handles all communication and outreach regarding the issue, to include:

- Work with the Regional Water Board to satisfy their outreach requirements.
- Work with growers to let them know the exceedance happened.
- Provide Best Management Practices (BMP's) to reduce the risk of an exceedance occurring in the future.

Current Exceedances

- Pyrethroids

- Pine Creek

- Lower Snake River

- Lower Honcut Creek

*These all resulted in Management Plans!



BYSWQC Contacts

Lindsay Hyde

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Yuba City, CA 95991
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**BUTTE-YUBA-SUTTER
SUBWATERSHED
MONITORING OVERVIEW &
PYRETHROID MANAGEMENT PLANS**

Mike Trouchon
Larry Walker Associates
April 20, 2023



Water Quality Monitoring in the BYS Subwatershed

- Water quality monitoring in the Butte-Yuba-Sutter Subwatershed is based on two primary criteria:
 1. Irrigated Lands Regulatory Program Pesticides Evaluation Protocols (PEP)
 2. Water quality issues identified from prior monitoring

Water Quality Monitoring in the BYS Subwatershed

- 2016 Pesticides Evaluation Protocol:
 1. Coalition is required to monitor for specific registered pesticides based on their application rate (use) in a specific drainage.
 2. Each registered pesticides is assigned a relative risk score based on its toxicity to humans or aquatic organisms
- How does Pesticide Evaluation Protocol determine monitoring?
 - Pesticide A: little use and low toxicity = won't be monitored
 - Pesticide B: little use and high toxicity = will be monitored

Water Quality Monitoring in the BYS Subwatershed

- Water quality issue identified from prior monitoring:
 - Prior monitoring for a parameter showed one exceedance:
 - Single Exceedance Monitoring.
 - Prior monitoring for a parameter showed two or more exceedances in a 3-year period:
 - This scenario would mean that a Management Plan was triggered and there would be Management Plan monitoring until the Management Plan was completed.
 - The soonest a Management Plan can be completed is 3 years IF there are no more exceedances for the parameter in question.

Water Quality Monitoring in the BYS Subwatershed

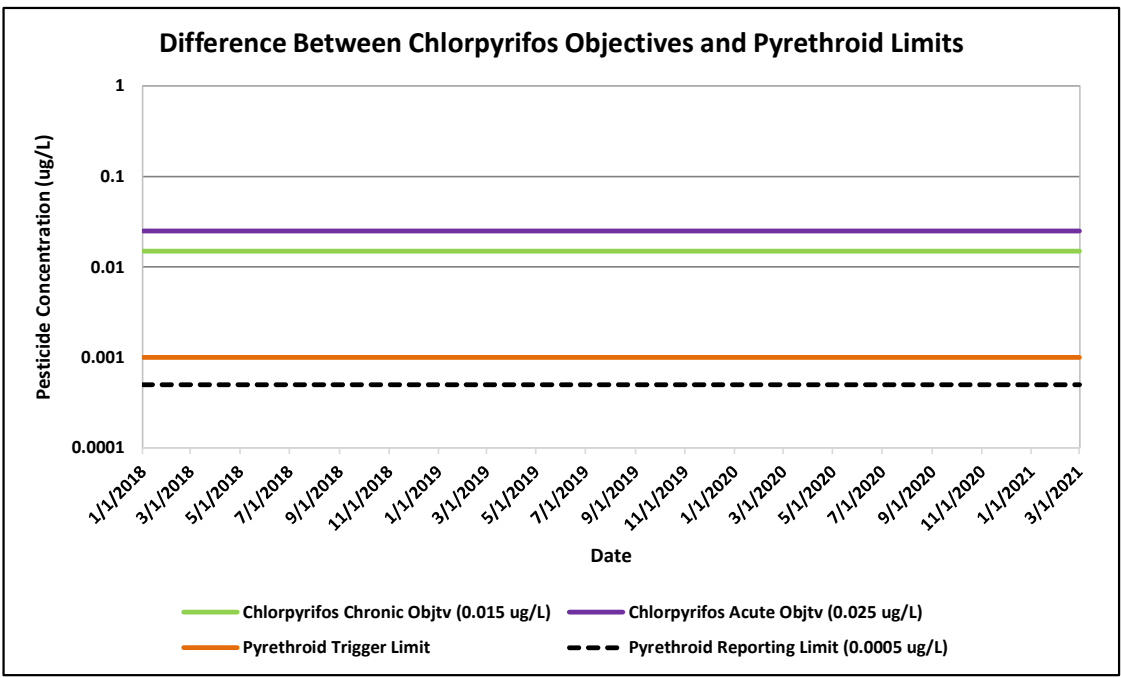
- What's an exceedance? An exceedance of what?
 - An exceedance of a water quality objective (WQO).
 - A WQO is a numeric value above which regulators believe (based on science) that the concentration of some parameter (mostly pesticides and other organic compounds) MAY POTENTIALLY cause harm to humans or aquatic organisms.
 - There are 112 water quality objectives in total that BYS monitoring data are compared to if/when a given parameter with a WQO is monitored.
 - In recent years exceedances have been caused by pyrethroids.

Monitoring for Pyrethroid Pesticides

- Pyrethroids are:
 - Highly toxic at very low concentrations to amphipods, such as ***Hyaella azteca***, that are eaten by waterfowl and fish.
 - Tightly bound to organic matter in the water column making them less toxic to critters as organic carbon concentrations increase.
- The Central Valley Pyrethroids Control Program identifies six pyrethroids for analysis and requires that the toxicity of each one be added together to determine if concentrations are **collectively toxic** to test organisms (i.e., *Hyaella*).
- The six pyrethroids include: Bifenthrin, Cyfluthrin, Cypermethrin, Esfenvalerate, Lambda-Cyhalothrin, and Permethrin.
- Each of these six pyrethroids show different levels of toxicity:
Bifenthrin > Lambda-Cyhalothrin > Cypermethrin > Cyfluthrin > Esfenvalerate > Permethrin



Pyrethroids: What concentrations are likely to be toxic? Let's compare Chlorpyrifos to Bifenthrin* (*Athena, Bifenture, Brigade, Capture, Fanfare, Sniper)



Monitoring for Pyrethroid Pesticides in the Sacramento Valley: Regulatory Background

- Central Valley Water Board released a proposal for the Control of Pyrethroid Pesticide Discharges in the Central Valley in **February 2017**.
- Central Valley Water Board adopted a **Central Valley Pyrethroids TMDL and Basin Plan Amendment (BPA)** in **June 2017** that includes a Conditional Prohibition of Pyrethroid Pesticide Dischargers.
- Sacramento Valley Coalition was required to begin monitoring for pyrethroids at representative and integration sites under the *Pesticides Evaluation Protocol* in **January 2018 based on use of pyrethroids in a particular drainage**.
- Pyrethroids TMDL and BPA approved by the State Water Resources Control Board in **July 2018** and approved by the Office of Administrative Law on **February 19, 2019**.
- U.S. EPA approved Pyrethroid TMDLs included in the BPA on **April 22, 2019**.
- Sac Valley Coalition began Baseline Pyrethroid Monitoring in **October 2020**. Any exceedances observed during Baseline Monitoring or after count toward the triggering of a Management Plan.

Monitoring for Pyrethroids in the BYS Subwatershed

BYSWQC has active Management Plans for pyrethroid pesticides at each of its three representative monitoring sites

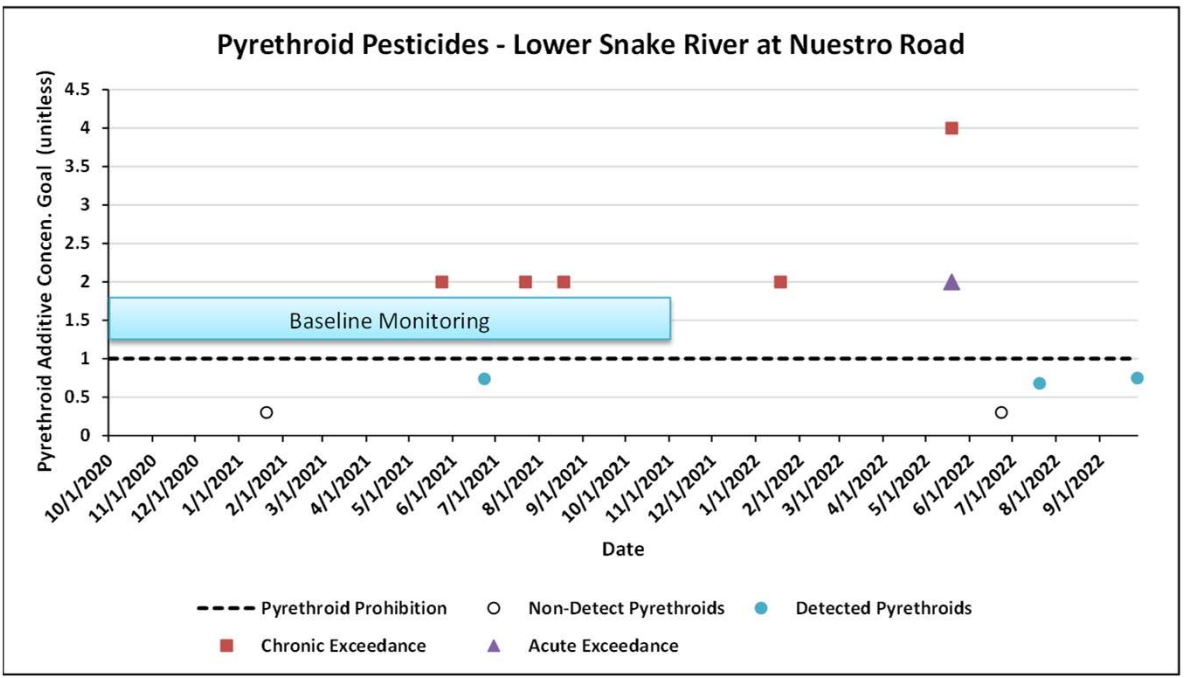
Waterbody	Analyte/Year Triggered	Management Plan Status
Lower Snake River	Pyrethroid Pesticides (July 2021)	Est. completion Summer 2025
Lower Honcut Creek	Pyrethroid Pesticides (January 2022)	Est. completion Fall 2025
Pine Creek	Pyrethroid Pesticides (August 2021)	Est. completion Winter 2025
It's important to complete Management Plan Implementation Report (MPIR) survey questions.		

BYS Subwatershed 2021-2022 Monitoring Overview

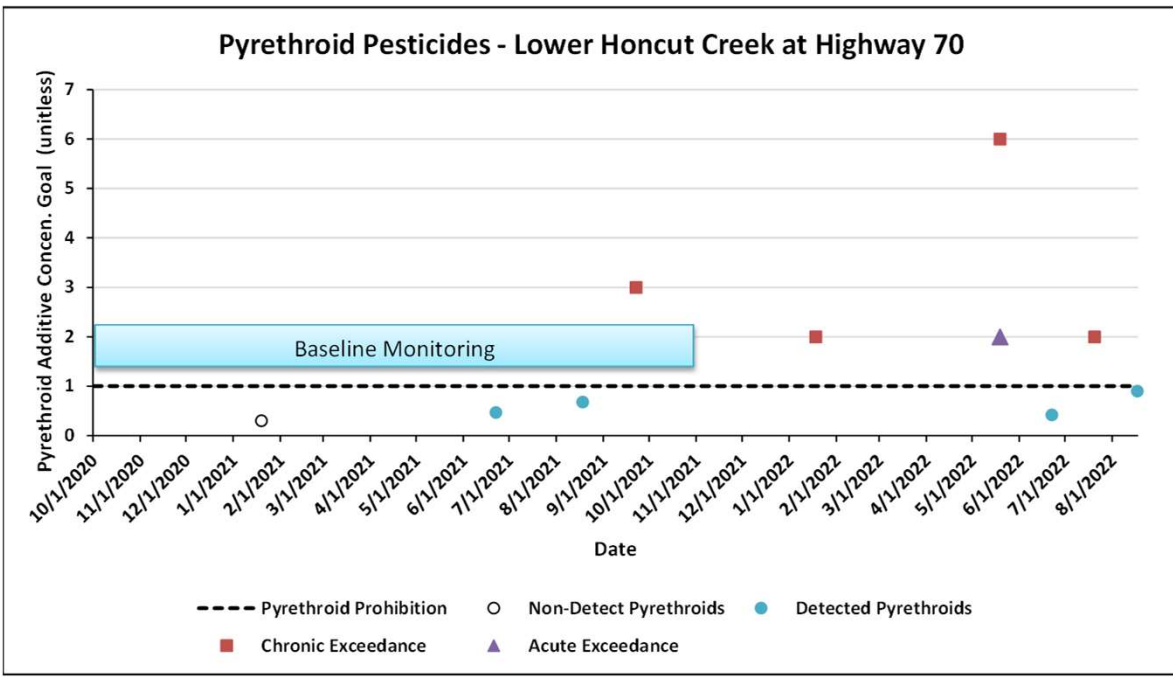
BYSWQC 2021-2022 (Oct. 1, 2021 – Sep. 30, 2022) Water Quality Exceedances

Waterbody	Date	Pyrethroid or Parameter Associated with Exceedance	Mgmt Plan Status
Lower Snake River	Jan. 18, 2022	Bifenthrin and Esfenvalerate	Active, be careful when applying pyrethroids
	Apr. 20, 2022	<i>Hyalella</i> sediment toxicity – unknown cause (not pyrethroids)	None
	May 19, 2022	Cyfluthrin and Lambda-Cyhalothrin	Active
Lower Honcut Creek	Jan. 18, 2022	Esfenvalerate	Active, be careful when applying pyrethroids
	Apr. 20, 2022	<i>Hyalella</i> sediment toxicity – unknown cause (not pyrethroids)	None
	May 19, 2022	Lambda-Cyhalothrin	Active
	Jul. 20, 2022	Bifenthrin and Cyfluthrin	Active

Butte-Yuba-Sutter Subwatershed Monitoring Overview
High Priority Management Plan
Pyrethroid Exceedances in Lower Snake River Requiring Management Plan



Butte-Yuba-Sutter Subwatershed Monitoring Overview
High Priority Management Plan
Pyrethroid Exceedances in Lower Honcut Creek Requiring Management Plan



Monitoring for Pyrethroids – Continued

- The current 2023 Monitoring Year (Oct. 1, 2022 – Sep. 30, 2023) is a “core” or “non-assessment” year, which means that the monitoring done in the BYS Subwatershed is either (a) single exceedance follow-up monitoring or (b) Management Plan monitoring.
- PEP monitoring not required again until 2025 Monitoring Year (Oct. 1, 2024 – Sep. 30, 2025).
- Single exceedance and Management Plan monitoring occurs in the same months as prior exceedances were observed.
- Hopefully, the sediment toxicity to *Hyalella azteca* that was observed in April 2022 won't be observed again this month when sediment toxicity monitoring is performed.
- Upcoming Lower Snake River pyrethroid monitoring: May, July, August.
- Upcoming Lower Honcut Creek pyrethroid monitoring: May, July, September.
- Take home message: Be careful when applying pyrethroids because just a minuscule amount making its way to a waterbody can result in an exceedance.

Questions?



Effective Orchard Spraying

Franz Niederholzer, Univ of California Cooperative Extension Advisor
Colusa and Sutter/Yuba Counties

April 20, 2023



**University of California
Cooperative Extension**
Agriculture & Natural Resources



Careful, effective pesticide use supports IPM adoption.

- **Rust management in almond & prune**
- **Scab management in almond**
- **Mite management in all tree crops**

The goal of spraying is uniform pesticide deposition throughout the canopy.



The goal of spraying is uniform pesticide deposition throughout the canopy and limited losses outside the orchard.



Ag spraying should be...

Effective



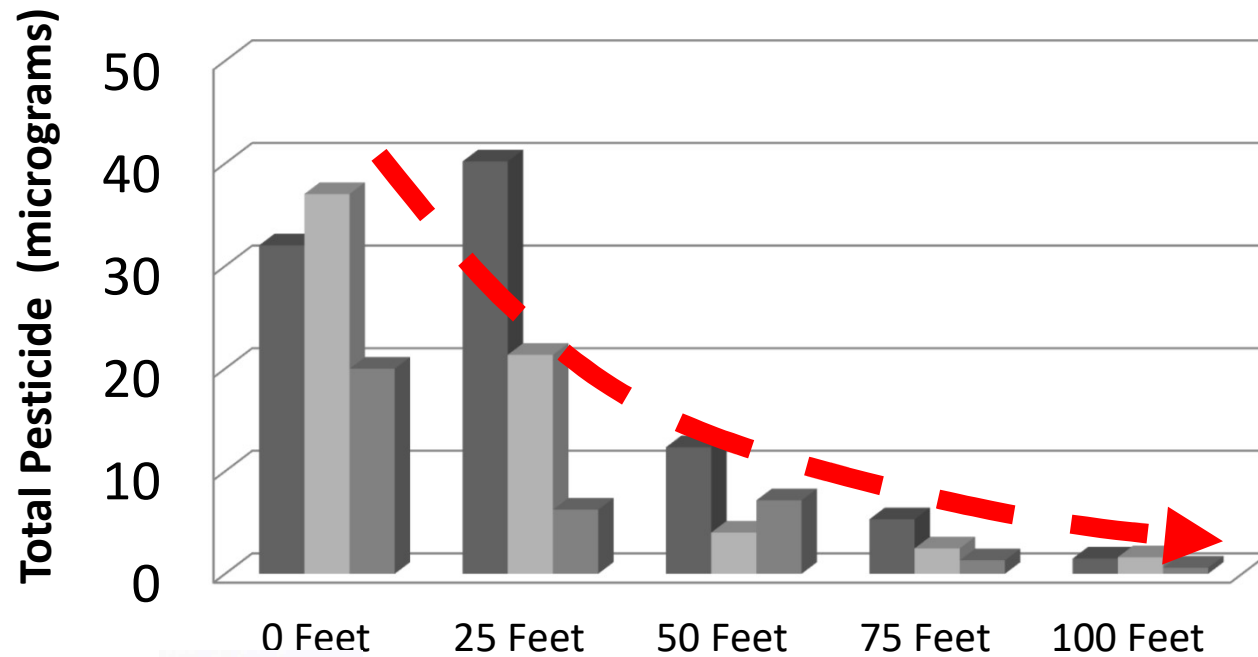
Efficient



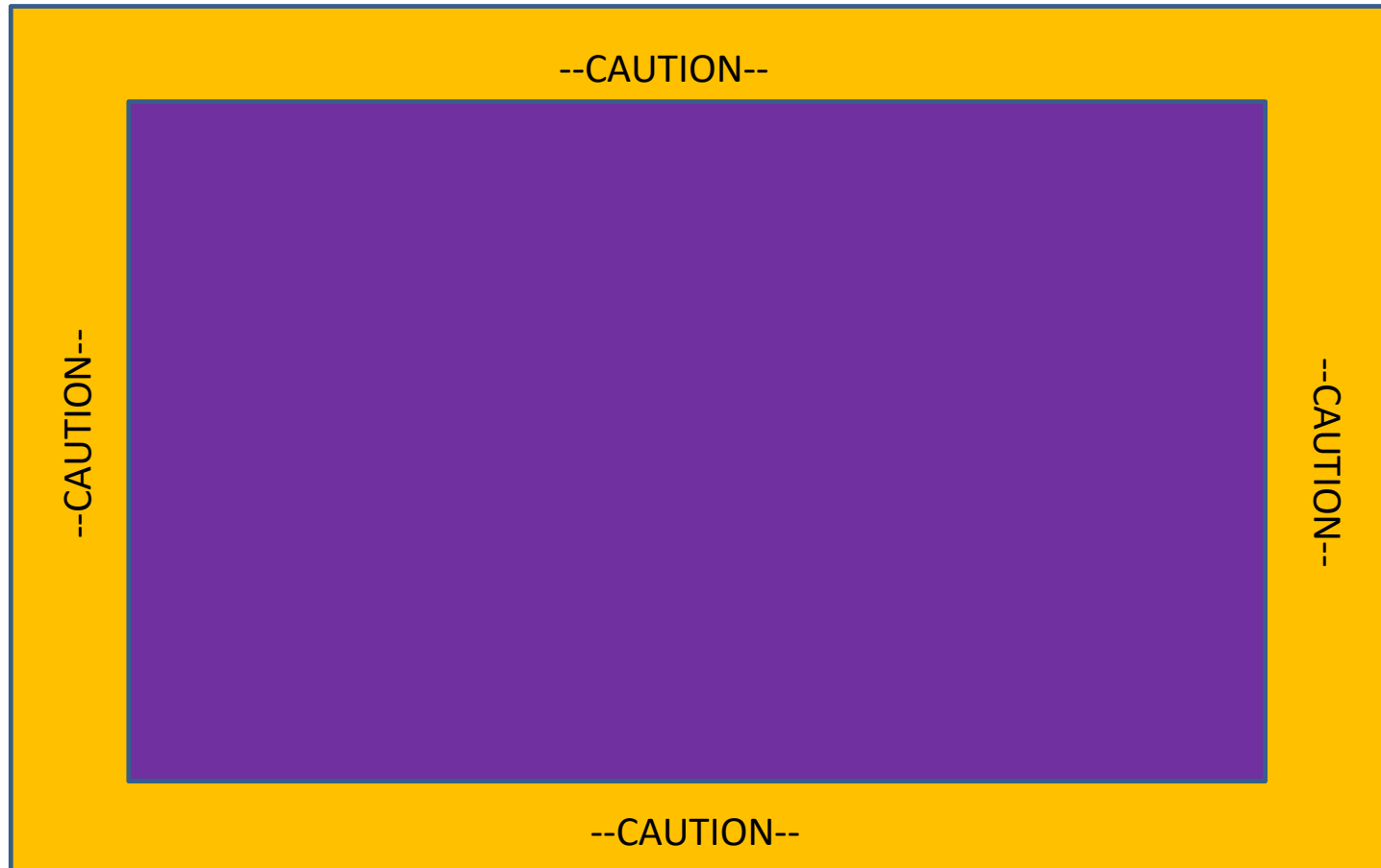
Safe



Droplet drift risk is greatest at the edge of a field.



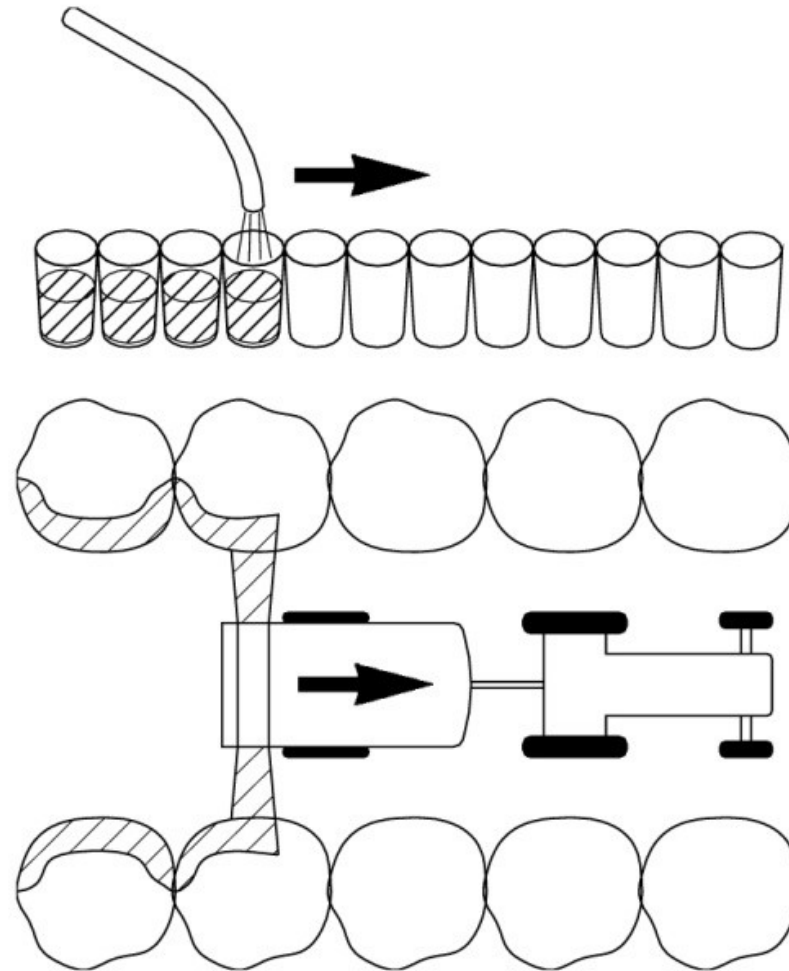
Think of an orchard as two orchards when it comes to spraying, especially if the edges are near water, roads, homes, etc.



There are three key steps to proper airblast sprayer calibration and set up.

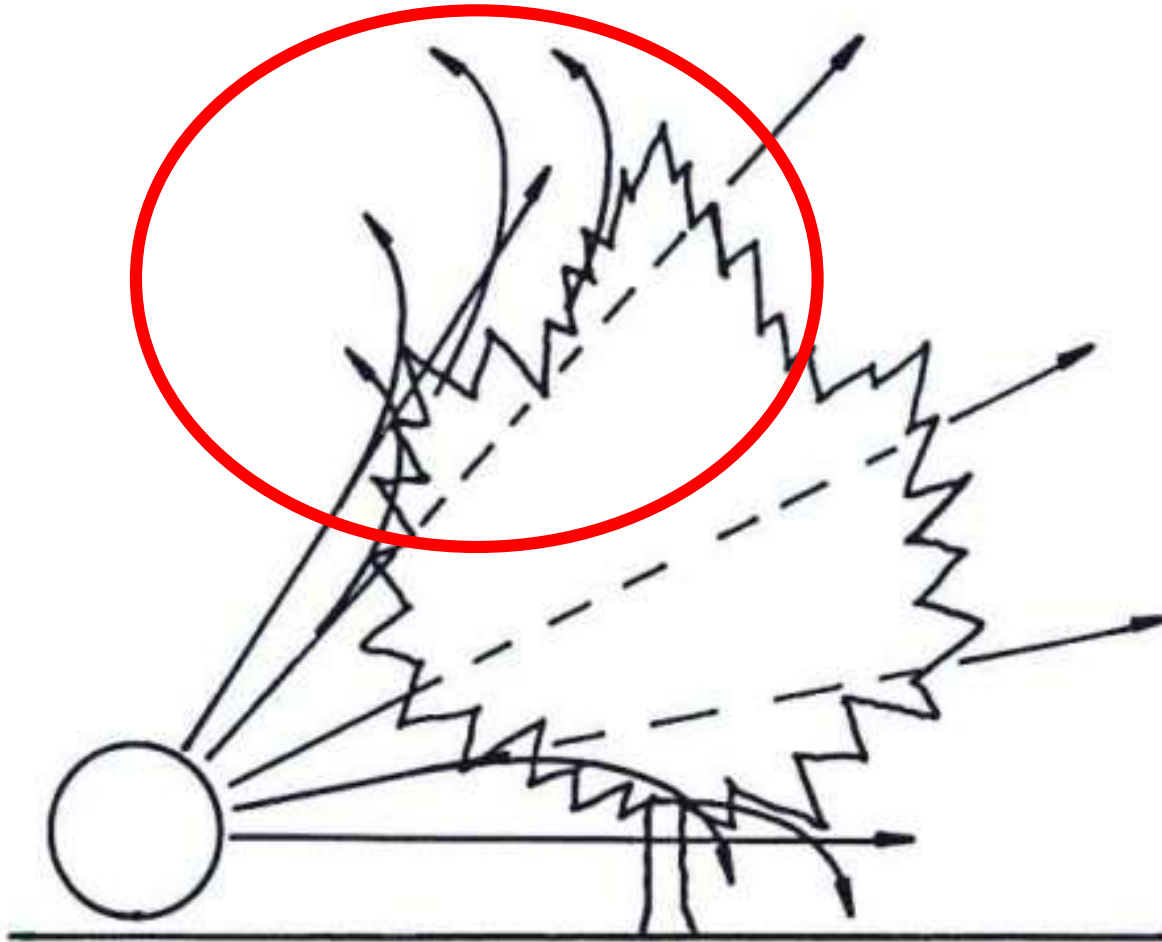
1. Adjust **Air flow** using ground speed
2. Direct the **Spray flow** with nozzle selection and placement
3. Confirm **Delivery**

1. Sprayer speed determines pesticide flow in the tree.



<http://www.hardi-international.com/>

Seeing spray above the trees is not a guarantee of good coverage.



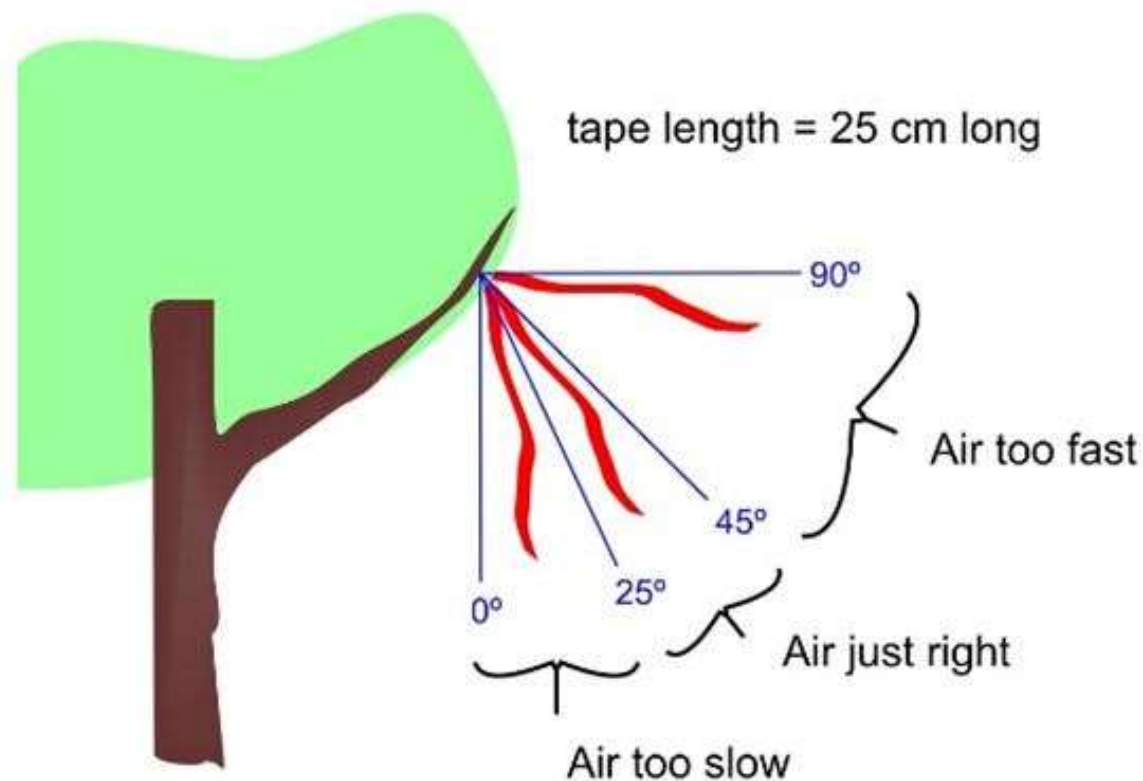
<http://pub.epsilon.slu.se/9399/>



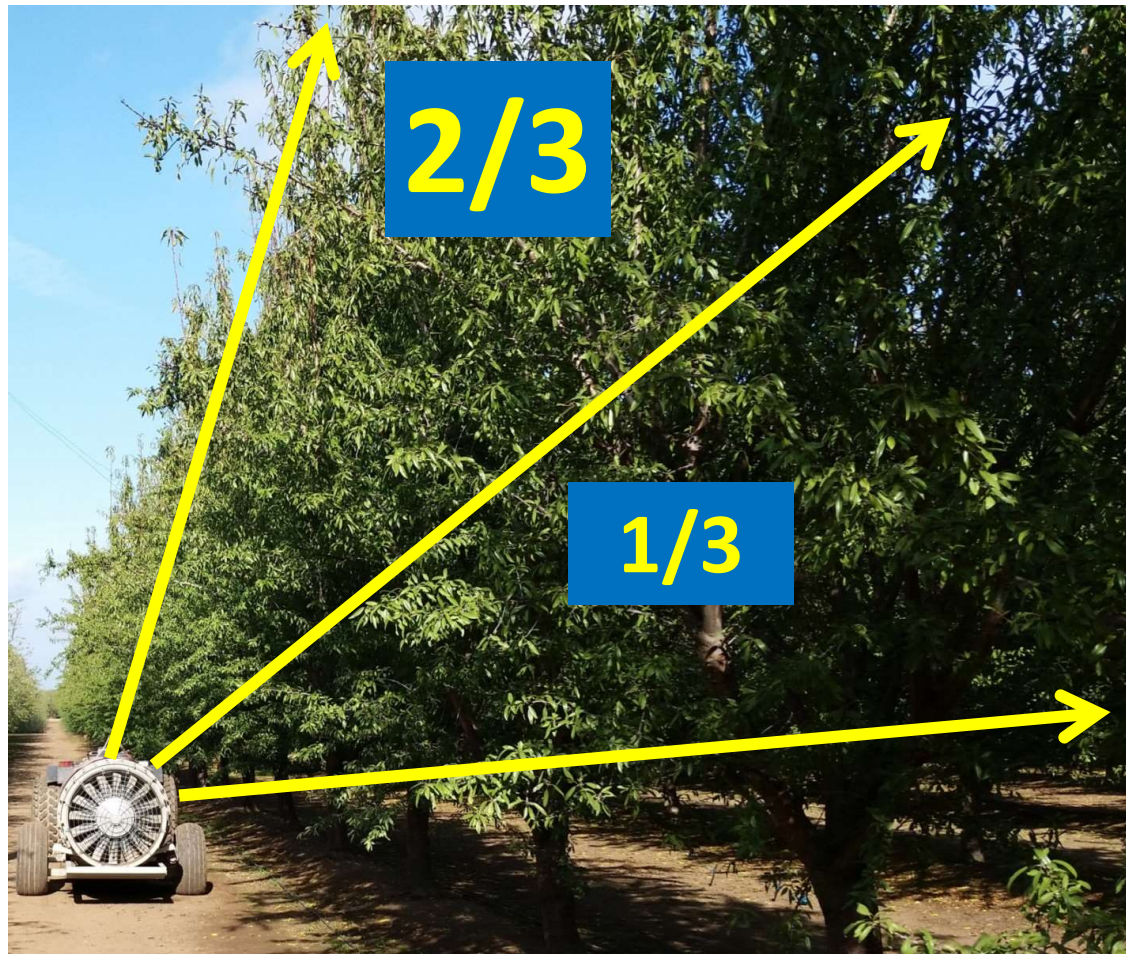
**Set ground speed
based on upper
canopy coverage.**

**Air movement =
coverage potential.**

Just enough air to move the flagging close to 45° is all that is needed.



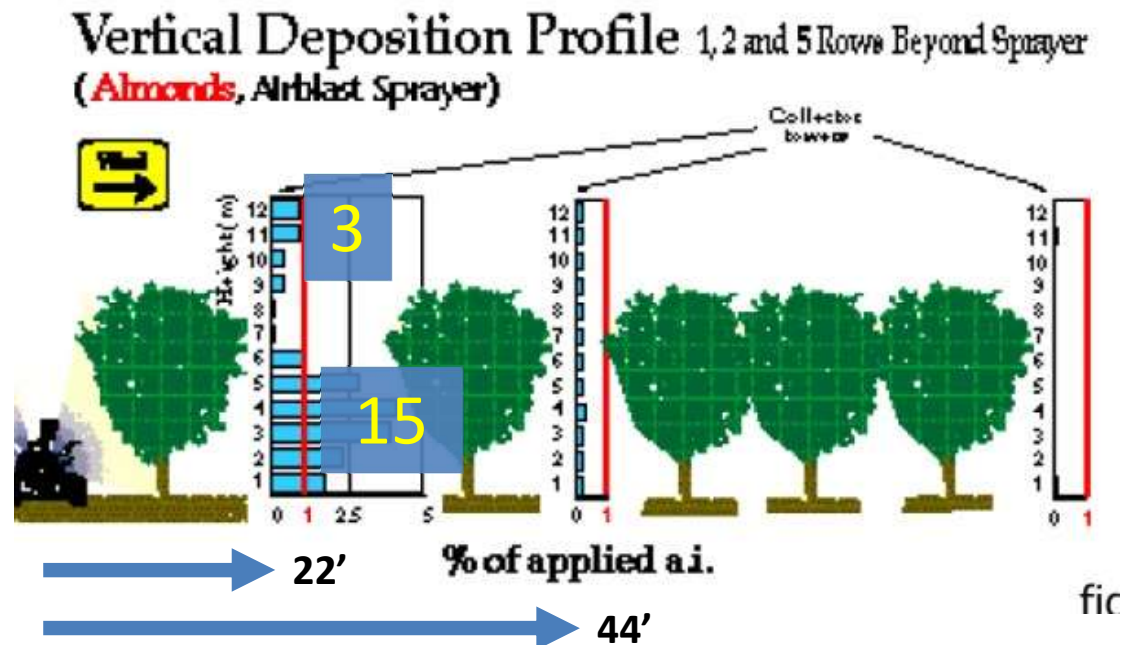
2. Aim high. Target the upper half of the canopy w two thirds of the spray volume.



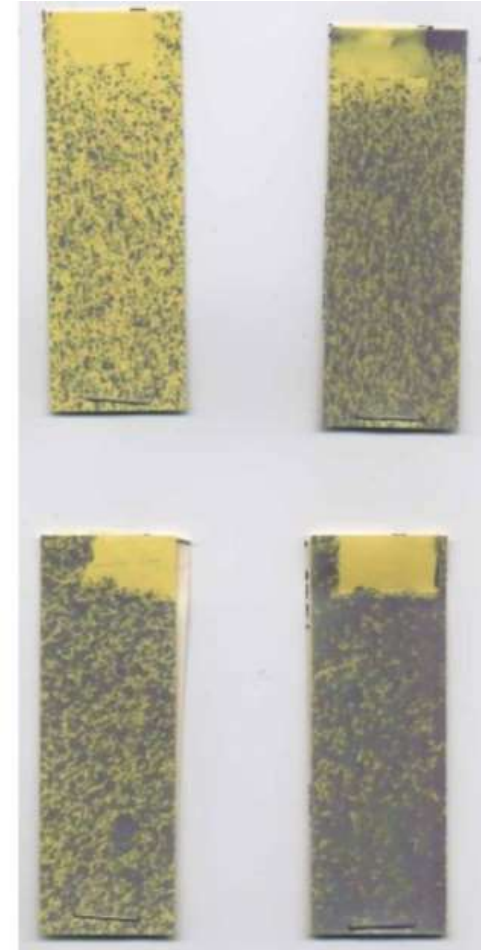
Direct more spray higher in taller orchards (w/ less leaves & crop) down low)



Most wasted pesticide is lost below the canopy; on to the ground. Use smaller nozzles on lower canopy.



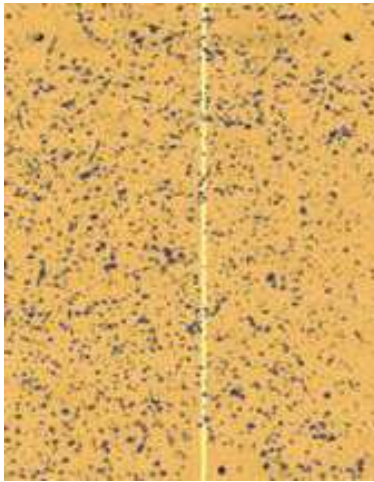
Check your coverage with water sensitive paper, clay or other means.



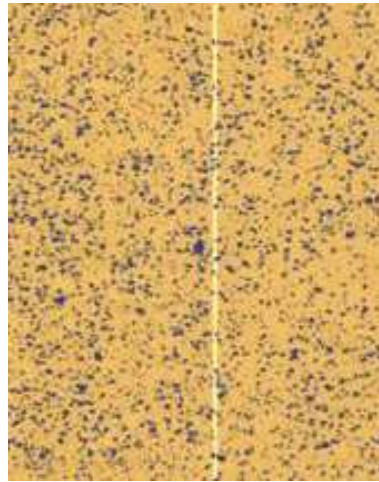


**TeeJet
nozzles
arranged to
match the
canopy (and
consider
gravity).**

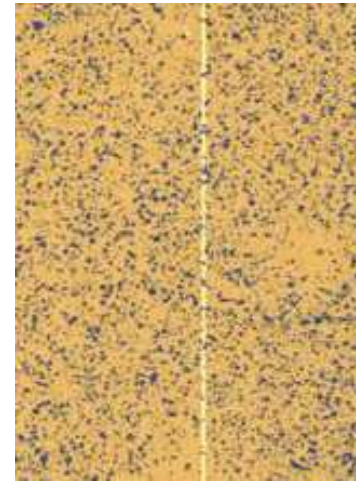
**Spray coverage at 3 canopy heights
spraying w 80% of GPM in top half of
open nozzles. 2 MPH ground speed.**



8 ft

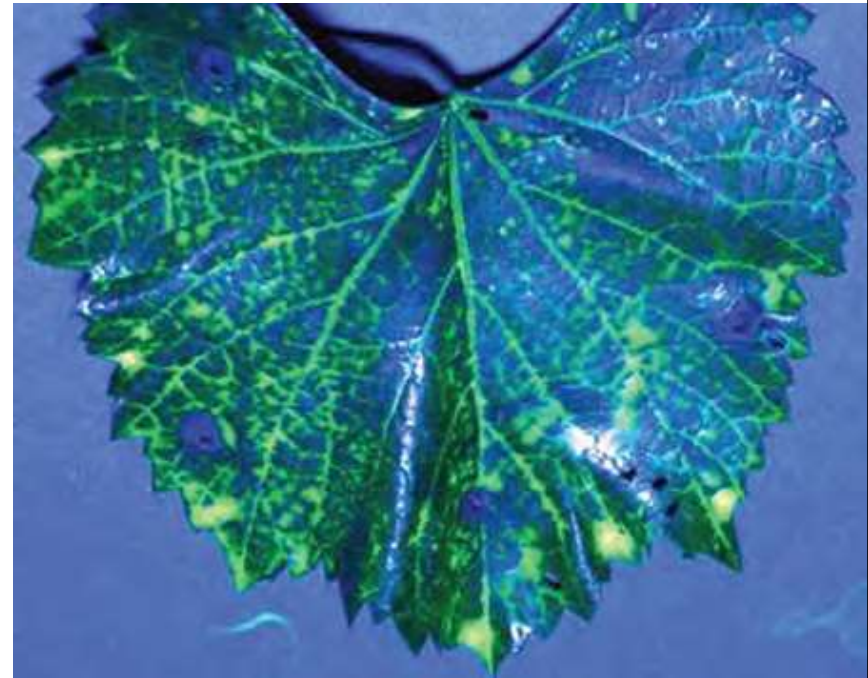
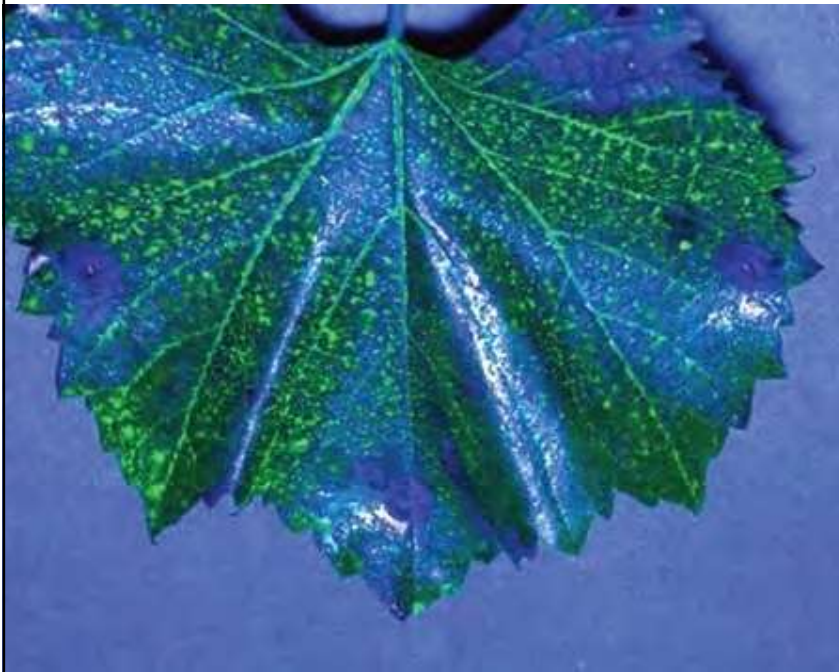


12 ft



16 ft

Good leaf spray coverage is a light, even coating, not a leaf sprayed so pesticide pools on the edges, causing spray burn.



A. Landers, Cornell Univ.

Spray above the treetops is inefficient (costs \$) and bad karma.



3. Basic Calibration: Check Delivery.



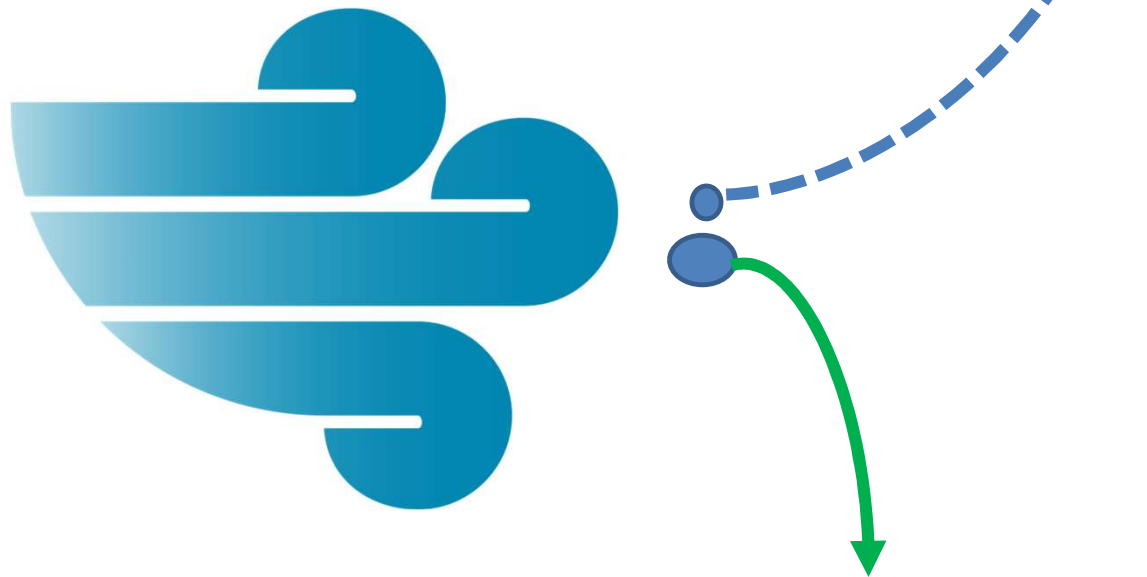
$$\text{GPA} = \text{GPM}/\text{APM}$$

$$\text{GPA} = \frac{\text{Spray rate}}{\text{Land rate}}$$

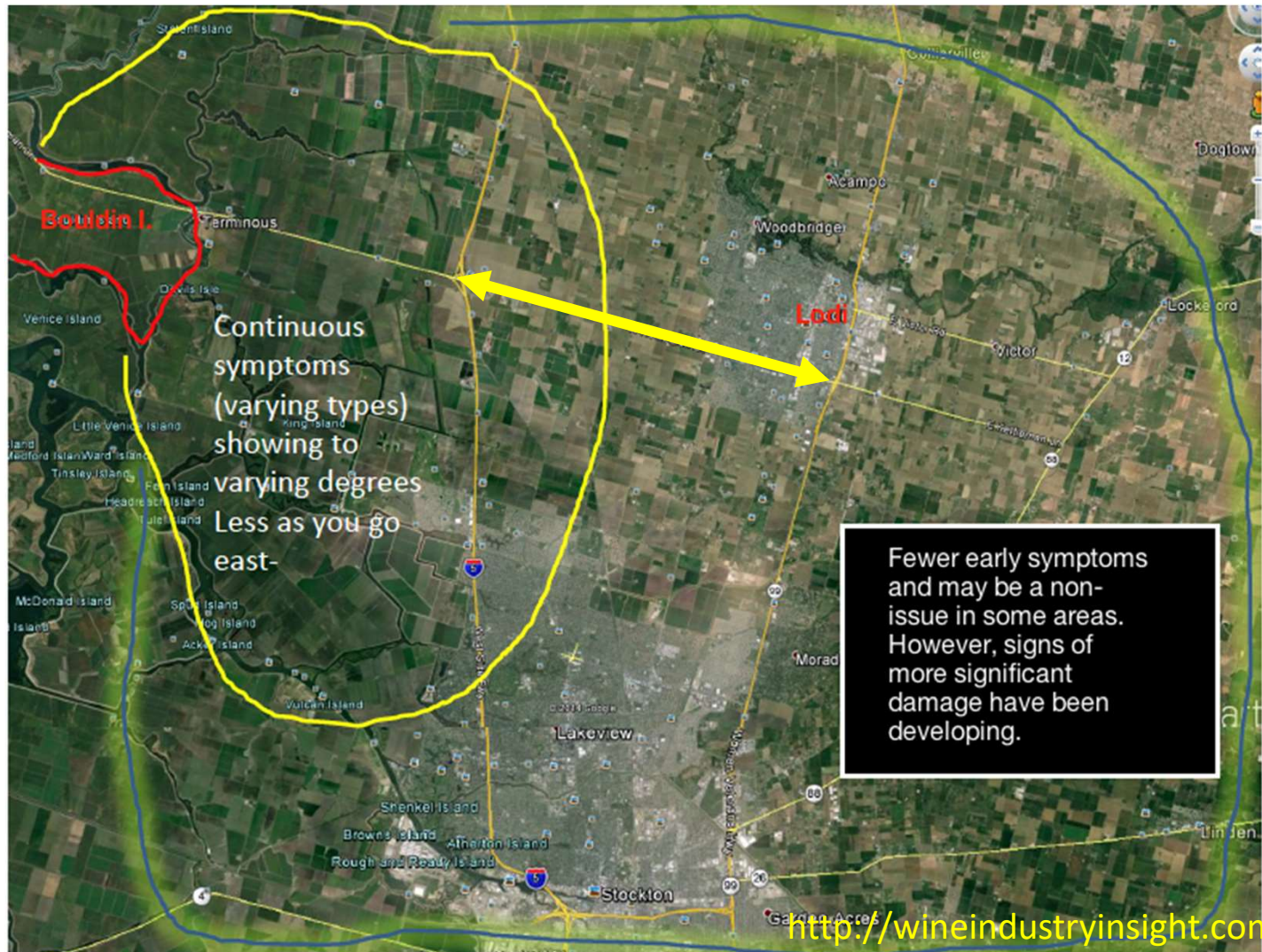




**Small drops are light and lift,
large drops are heavy and drop.**



In May, 2014, an herbicide applied by air in San Joaquin Co. drifted for miles.

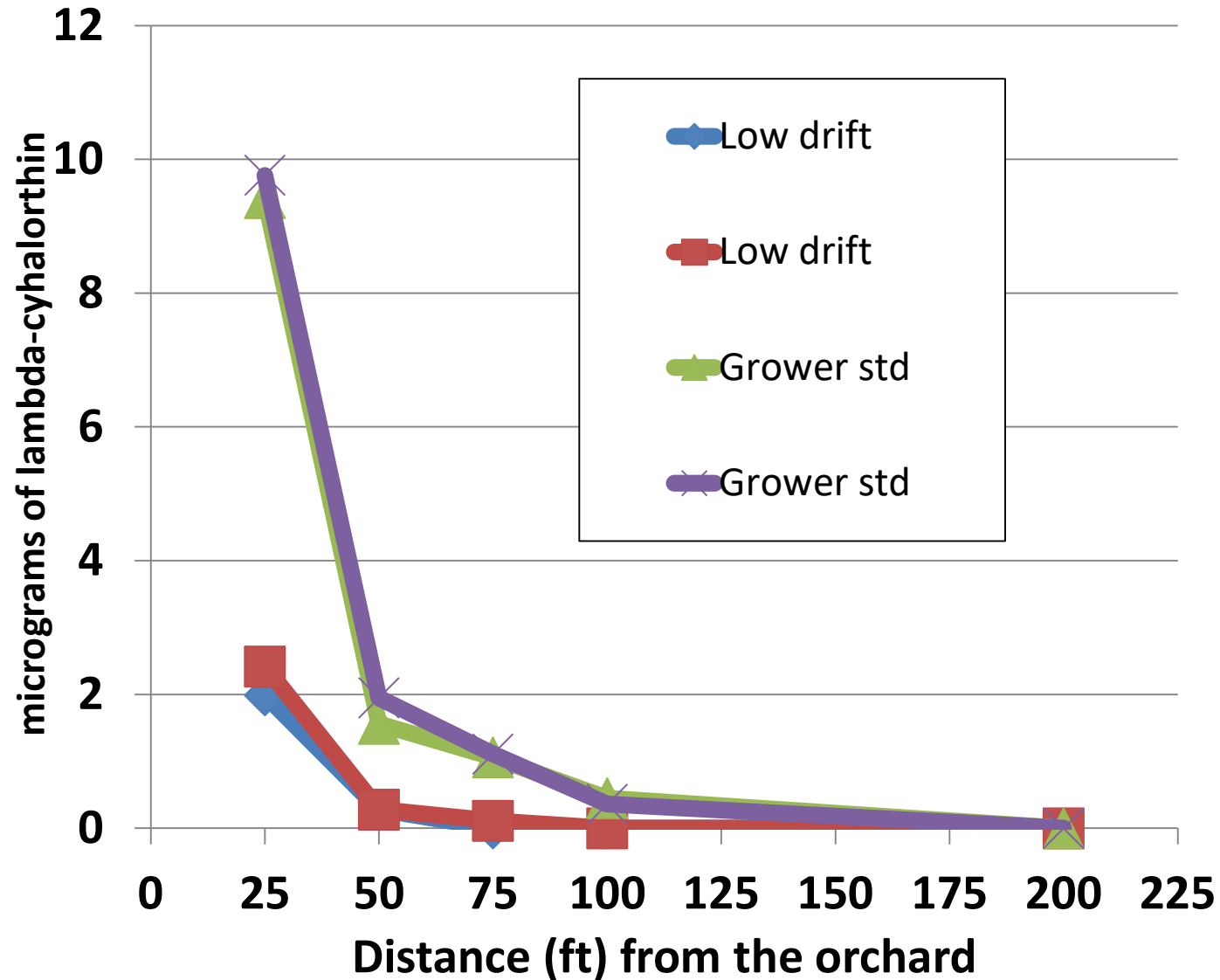


There are some things you can manage to help reduce drift.

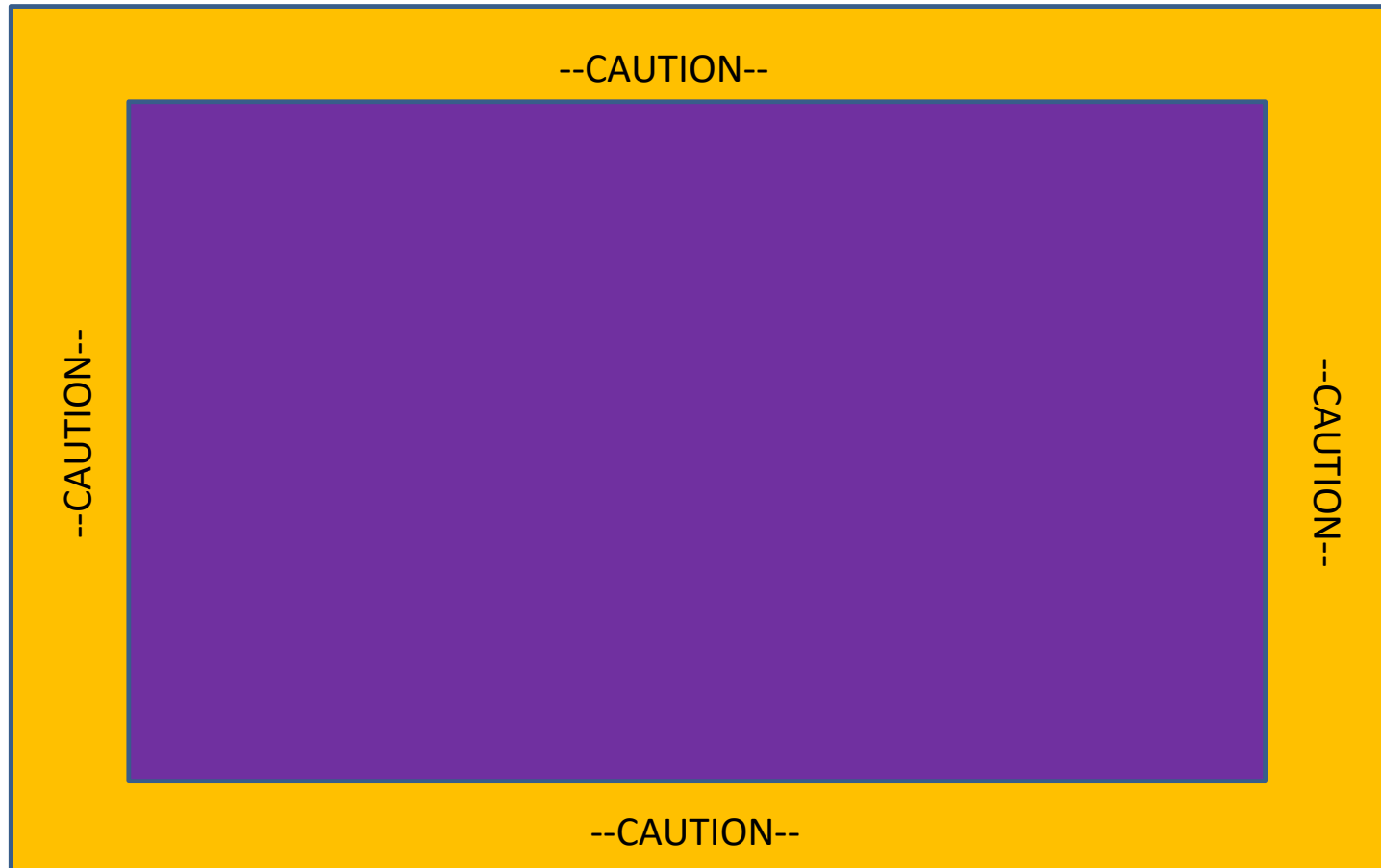
- **Droplet size**
 - **Nozzle size and design**



Gear up, throttle down reduces drift w/o harming pest control in fall, when drift risk is highest.



Treating the edges of a field like a “Buffer zone” means that while different practices (materials?) are used, but the whole field is sprayed.



There are some things you have to manage around to manage drift.

- **Pest pressure (sometimes)**
- **Weather**
 - **Wind (direction?)**
 - **Relative humidity**



Still, cool mornings = inversion that can trap spray at low elevation and risks crop damage when it touches down.

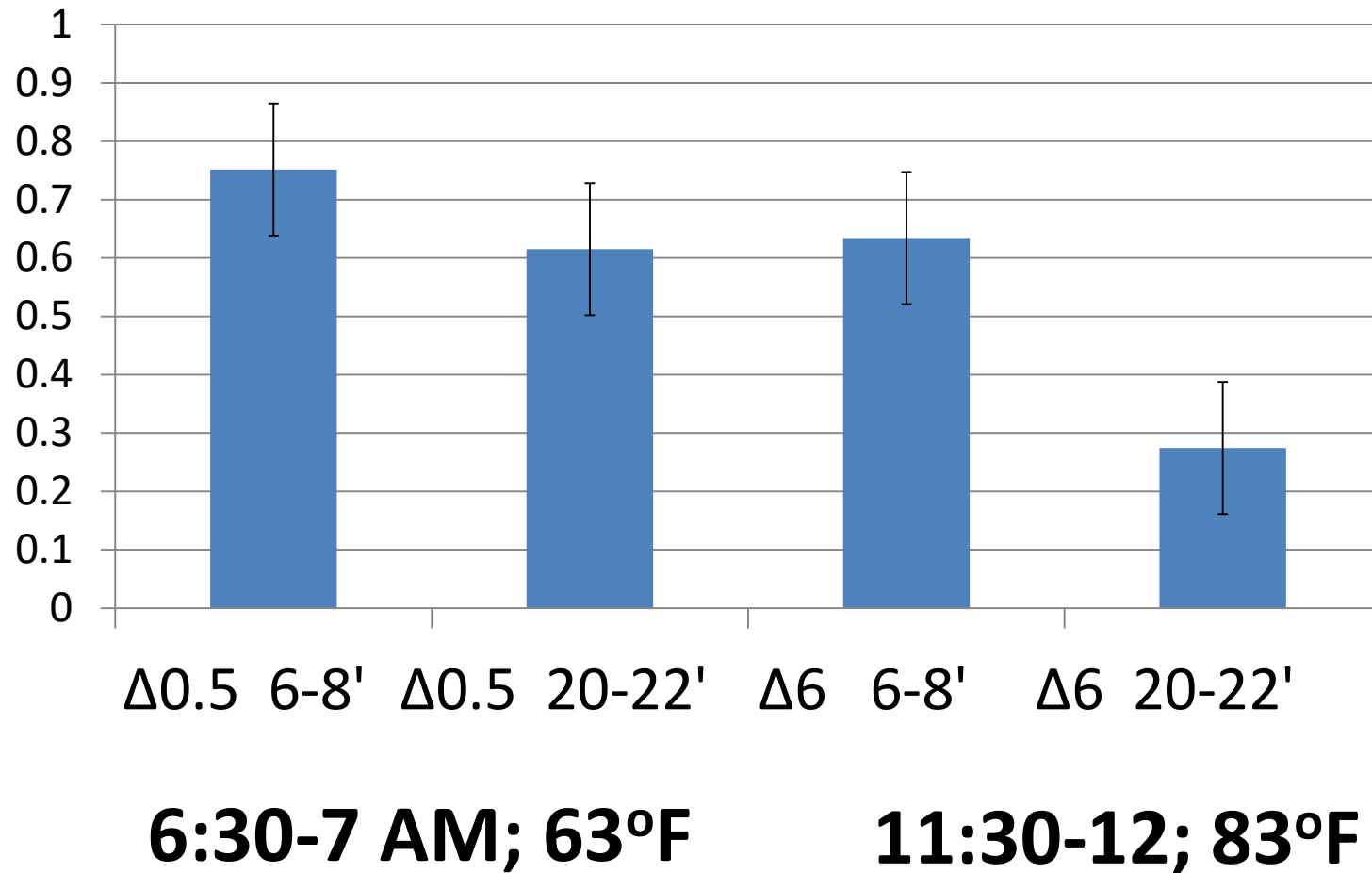


**6:38 AM
June 13**

When the sun is up, the ground is warm, and dust and spray readily lifts and disperses.

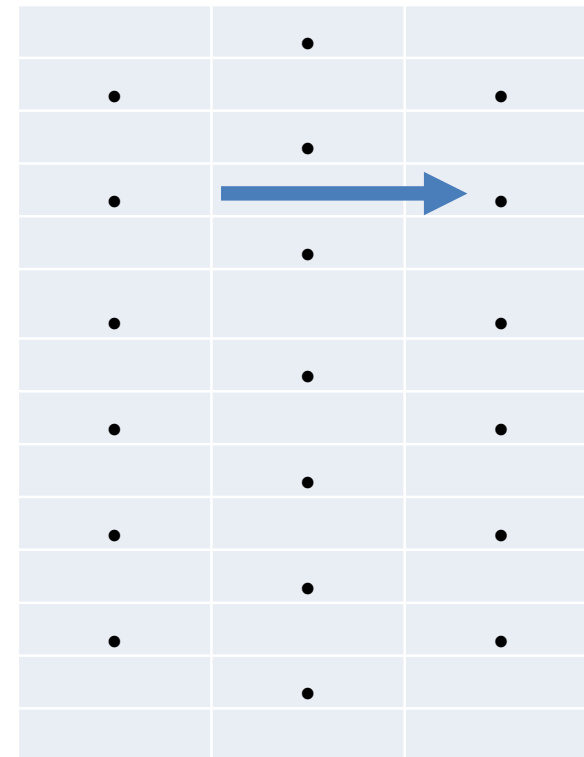
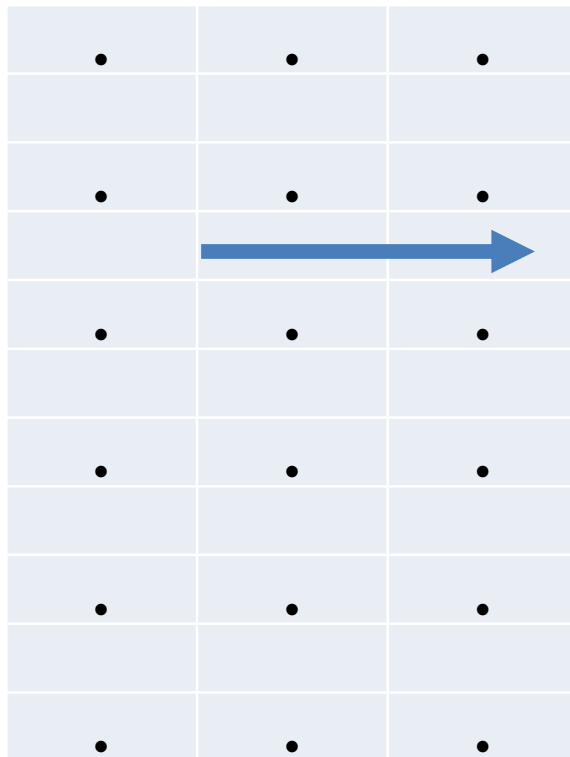


Warm, dry air can rapidly evaporate small droplets and reduce spray coverage (and increase drift).



**For best coverage, spray when temps drop
and humidity climbs.**

Low-tech drift management: Plant on the off-set square.



Review: There are some things you can manage to help reduce drift.

- **Droplet size**
 - **Nozzle size & design (D8, 5, 4's w D25 2-hole swirl plates at 2 mph = 100 GPA**
- **Droplet release height**
 - **Ground speed**
- **“Buffer zones”**

Take home points on spraying.

- 1. Match ground speed to the canopy size.**
- 2. Match nozzles (GPM) to the target**
- 3. Check GPA**
- 4. Check coverage**
- 5. Watch the weather**

Take home points on spray drift.

1. Spray drift is manageable. Have a plan, keep records, train employees, pay attention to changes.
2. Match sprays to the target
3. Medium-large droplets drift less. Adjust droplet size with nozzle selection/air speed.
4. The hardest drift to manage is at the field edges.



**TeeJet
nozzles
arranged to
match the
canopy (and
consider
gravity).**

