Reducing Off-target Application of Herbicides

Peter Dittmar

Horticultural Sciences Dept.

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Presentation outline

- Preparing to spray
- Setting up the sprayer
- Spraying the crop
- After spraying

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Presentation outline

- Preparing to spray
  - Select the correct herbicide
    - Application timing
    - Carryover restrictions
  - Field Conditions
  - Speak with neighbors
- Setting up the sprayer
- Spraying the crop
- After spraying

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Application timing

- Preplant
  - Preemergence weeds for residual weed control
  - Burndown herbicides for control of emerged weeds
- Postemergence / Posttransplant
  - Some preemergence herbicides
  - Selective POST herbicides

Carryover restrictions

- Consult the label
  - "Rotational Crop Restrictions"
  - "Rotational Crop Information"
  - "Crop rotation"
- Most of the time vegetables are not listed so grouped under "any other"

ROTATIONAL CROP RESTRICTIONS

The following rotational crops may be planted after applying Reflex Herbicide at recommended rates:

Crop To Be Planted	Minimum Rotation Interval (After Last Reflex Herbicide Application)
Cotton, dry beans, potatoes, snap beans, and soybeans	0 days
Small grains such as wheat, barley, rye, peppers (transplanted), tomatoes (transplanted)	4 months
Corn*, peanuts, peas, rice, seed corn	10 months
To avoid crop injury do not plant alfalfa, sunflowers, sugar beets, sorghum** or any other crop within	18 months

Do not graze rotated small grain crops or harvest forage or straw for livestock.

*Use a 12 month minimum rotation interval for popcorn in the states of Ohio, Kentucky, Illinois, Indiana, Iowa, and Region 4 when applied at rates of 1.0 pint per acre or more.

*Use 18 month minimum rotation interval for sweet corn in the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont and Region 5.

**Sorghum may be planted back after 10 months in Region 1.

(Anonymous 2012)

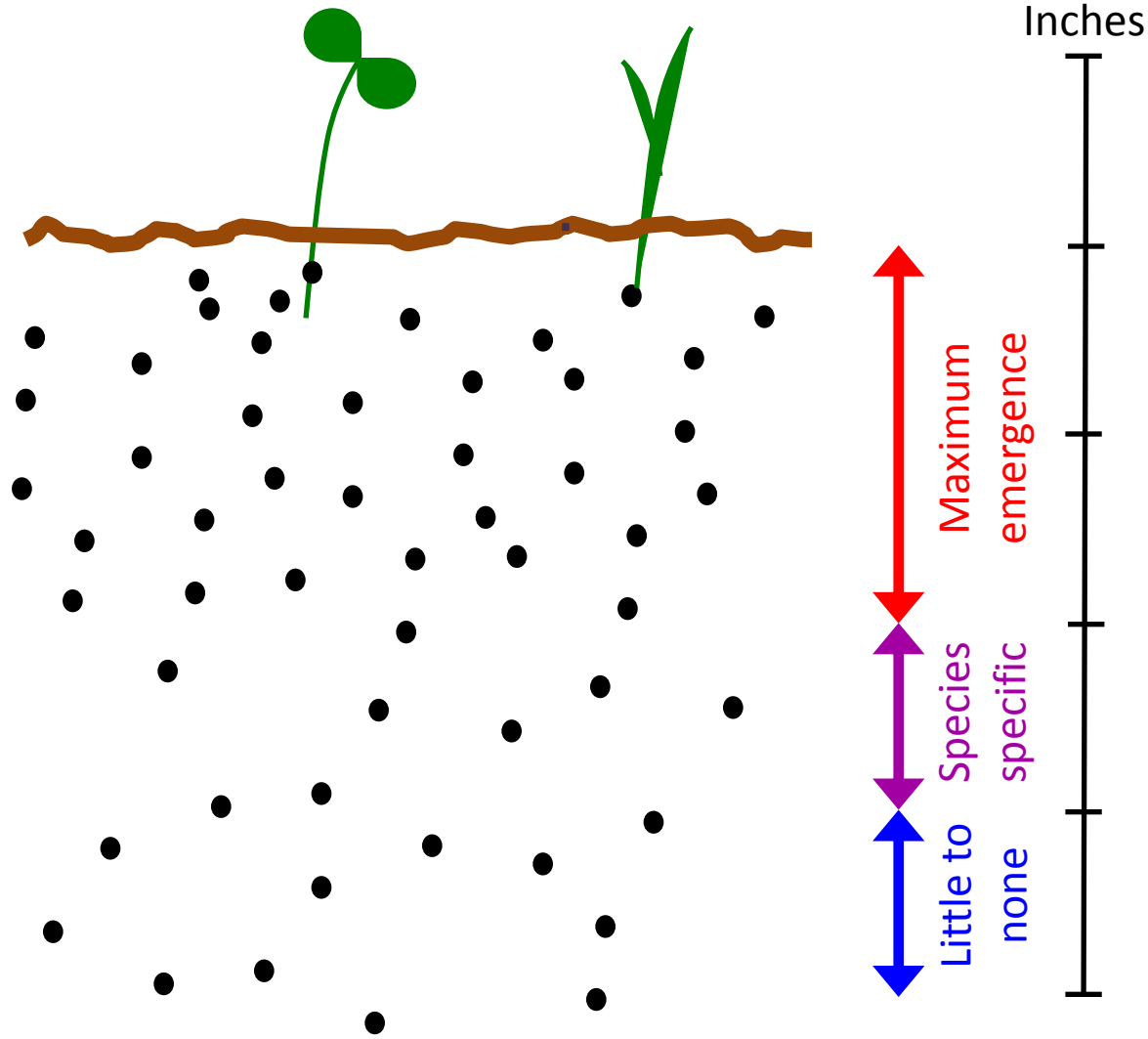
Samples of carryover

Fomesafen in corn

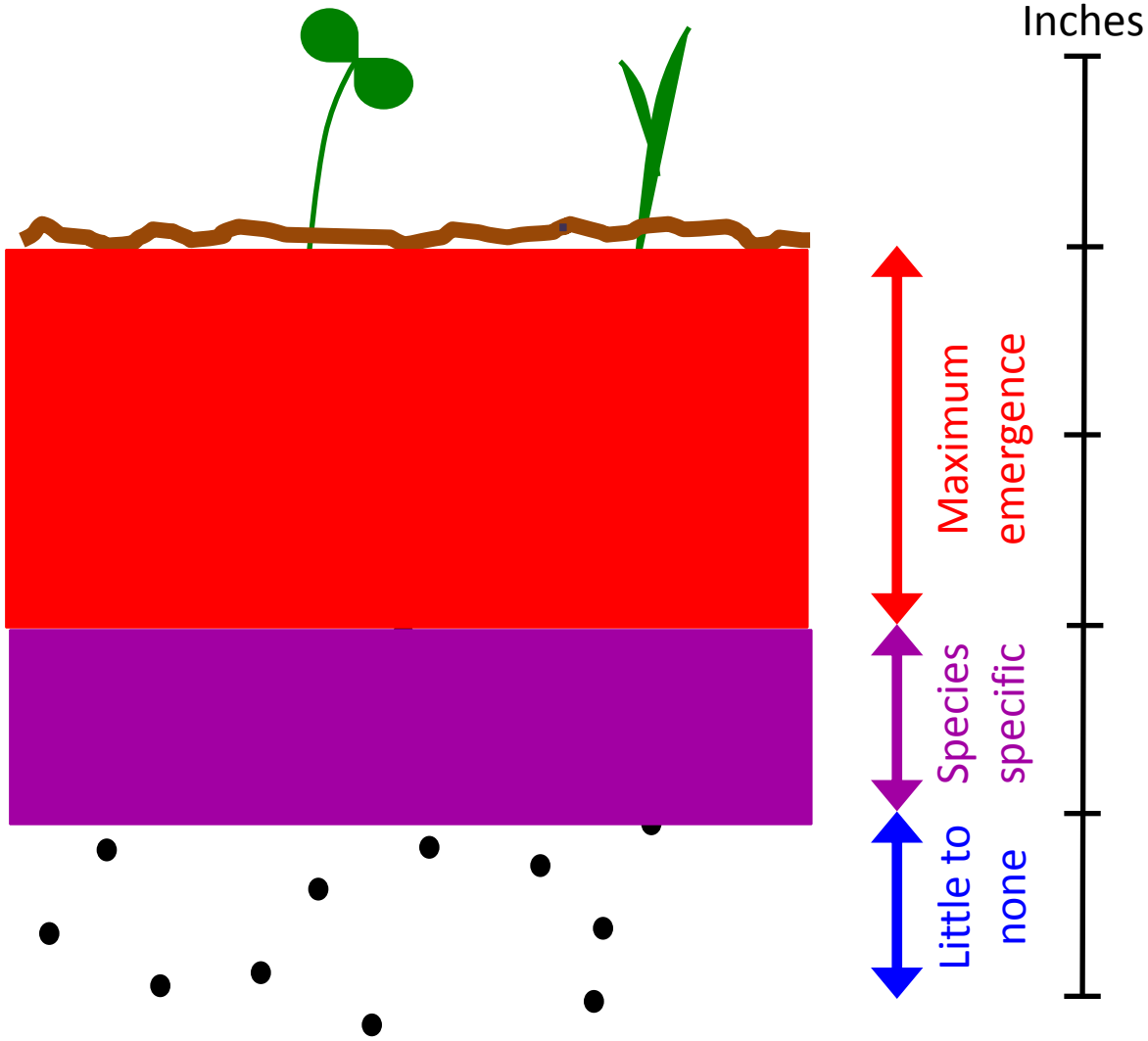
Field conditions

- Wind
  - Less than 10 mph is ideal
- Rain
  - Rainfastness for postemergence herbicides
    - Allows for appropriate absorption of the herbicide
    - Varies by herbicide
  - Movement of the herbicide through the soil profile

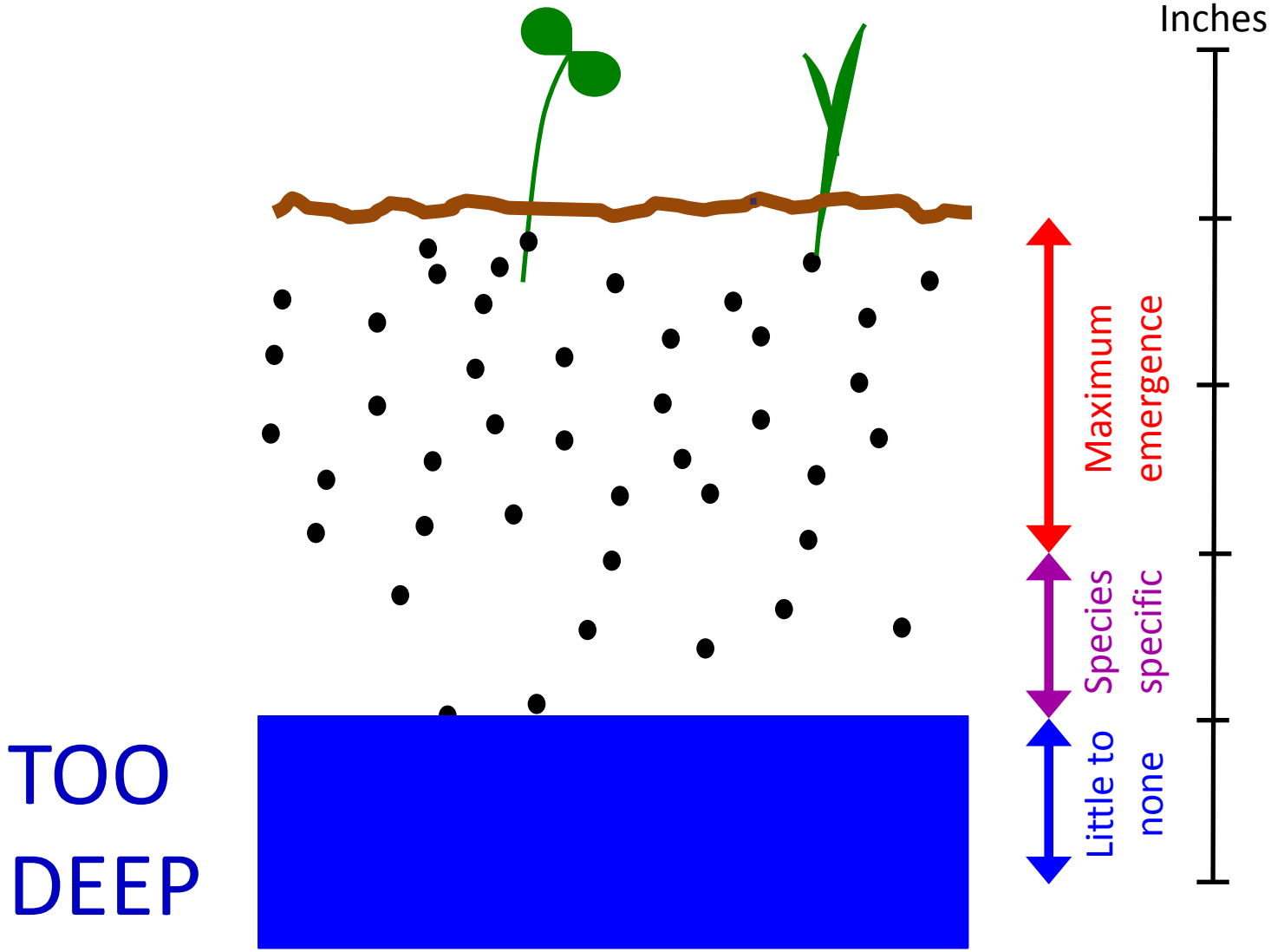
Preemergence herbicide movement



Preemergence herbicide movement

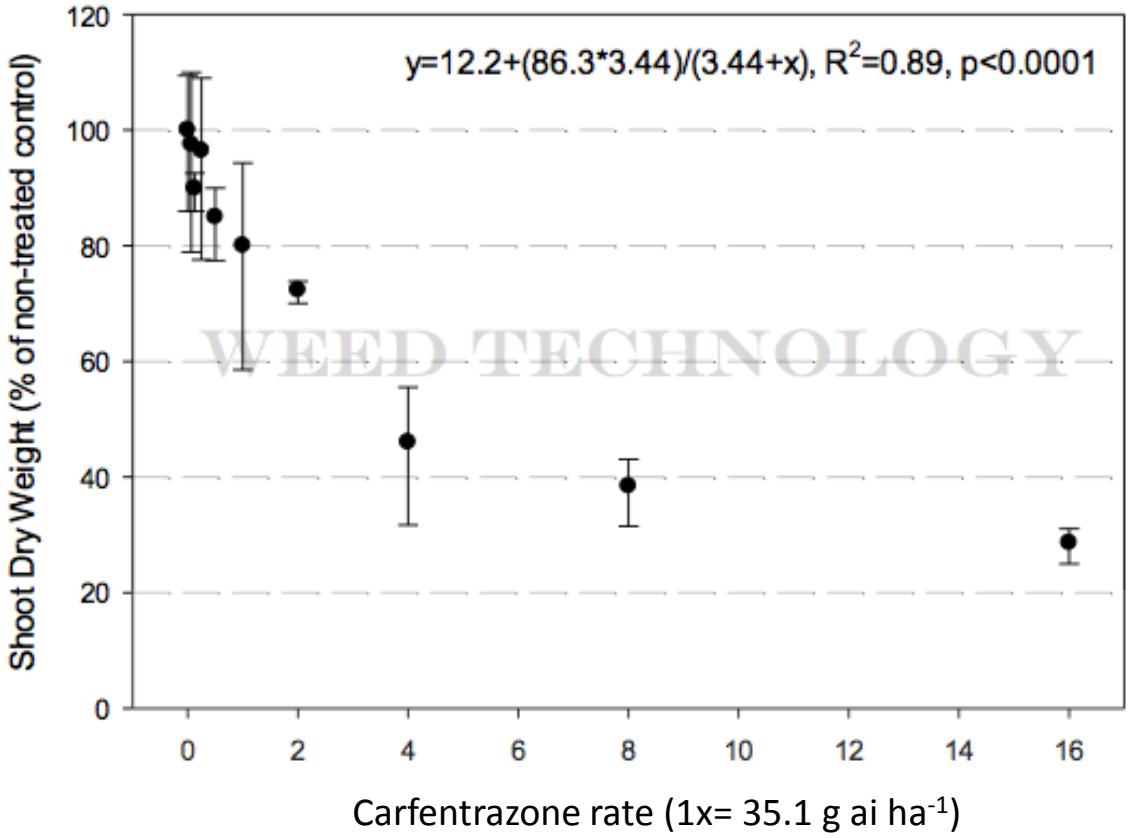


Preemergence herbicide movement



Field conditions

- Heavy rainfall recently or coming soon



(Crespo et al. 2012)

Talk with the neighbors

- New technologies in agronomic crops

	Dicamba	Glyphosate	Glufosinate	2,4-D
Roundup Ready®		X		
Genuity® Roundup Ready® 2 Xtend	X	X		
Bollgard II® Roundup Ready® Xtend with LibertyLink®	X	X	X	
Enlist™ Corn		X		X

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Enlist™ Corn		X		X

Vegetable farmer ⟷ Corn/cotton farmer

Auxin herbicides

2,4-D drift in tomato

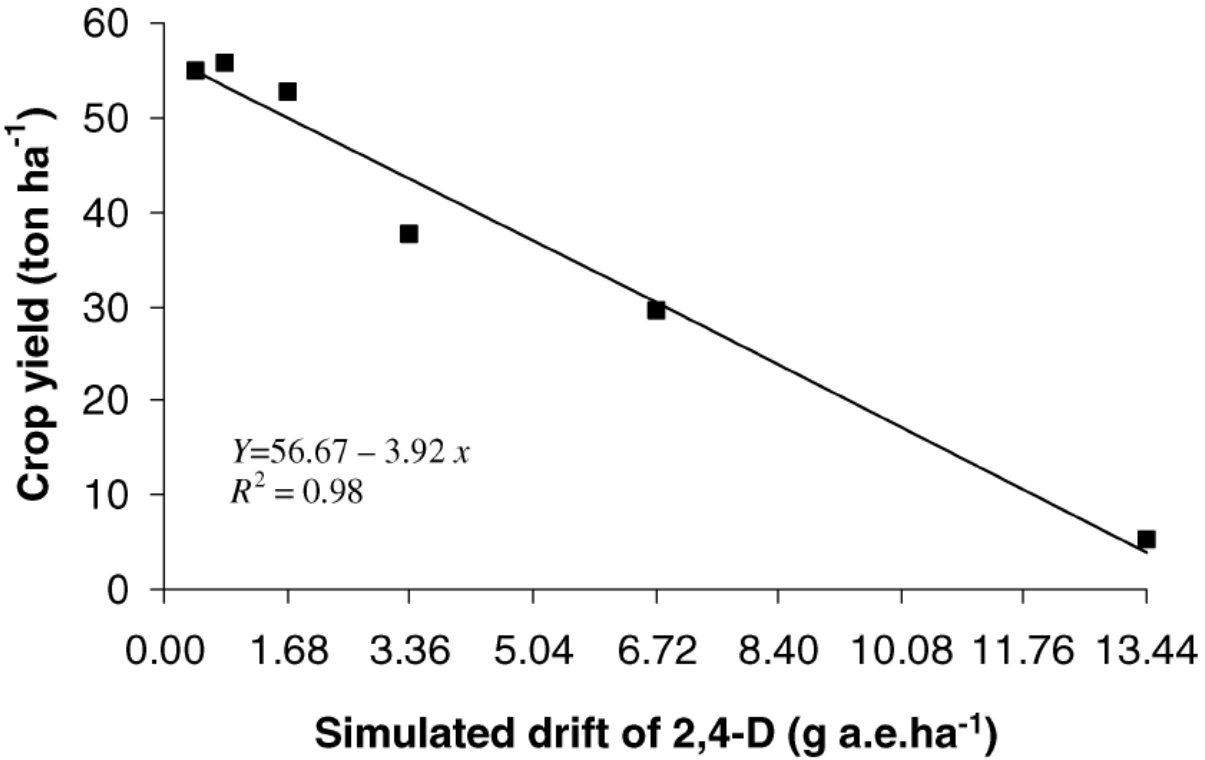

Figure 2: Crop yield as a function of 2,4-D rates applied to tomato at the beginning of flowering stage. (Fagliari et al. 2005)

2,4-D drift in tomato

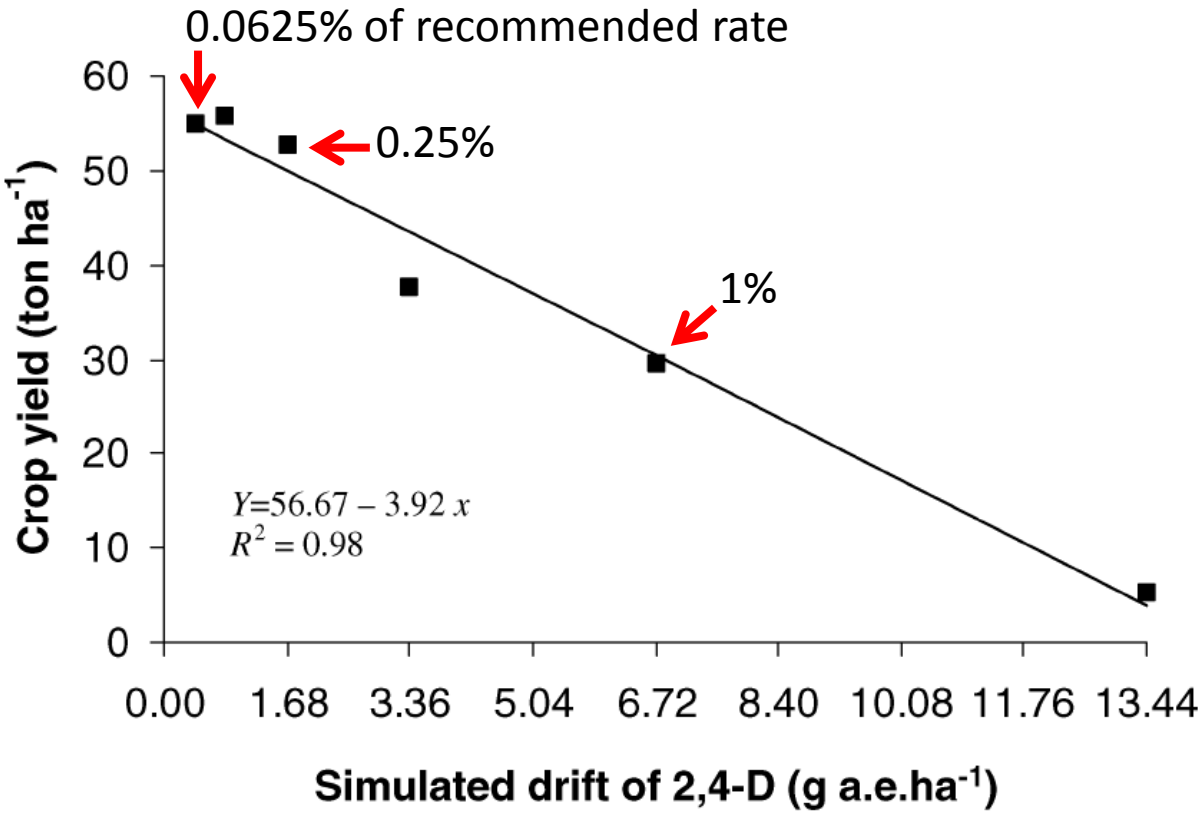

Figure 2: Crop yield as a function of 2,4-D rates applied to tomato at the beginning of flowering stage. (Fagliari et al. 2005)

Presentation outline

- Preparing to spray
- Setting up the sprayer
  - Nozzle selection
  - Hooded sprayers
  - Drift prevention adjuvants
- Spraying the crop
- After spraying

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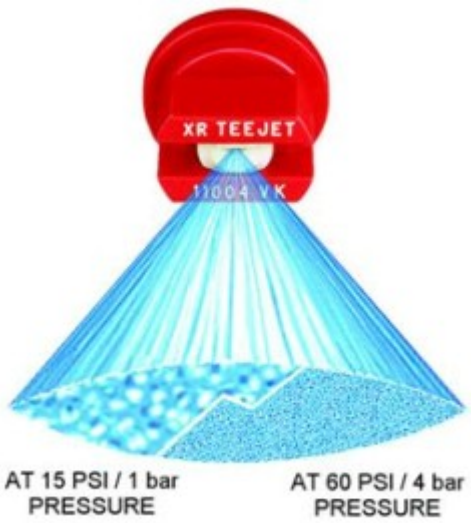
Nozzle selection & pressure

Extended Range

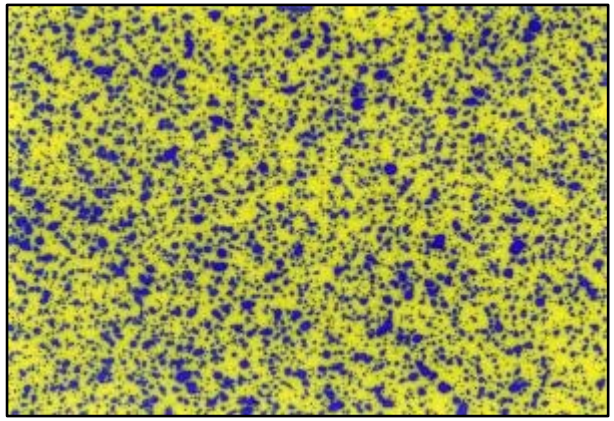


Drift Guard

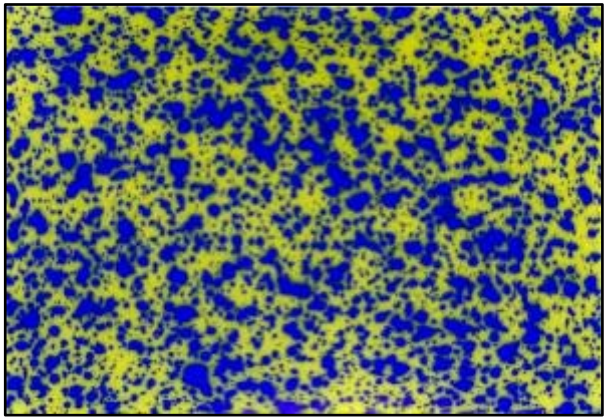
Air Induction

Nozzle selection

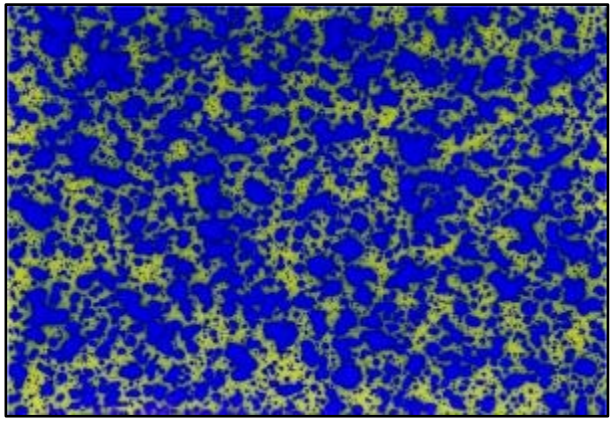
Extended range
10 GPA- 21% coverage

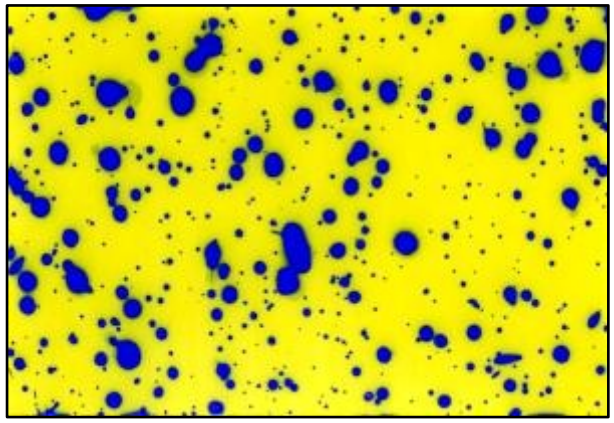


Extended range
20 GPA- 47%

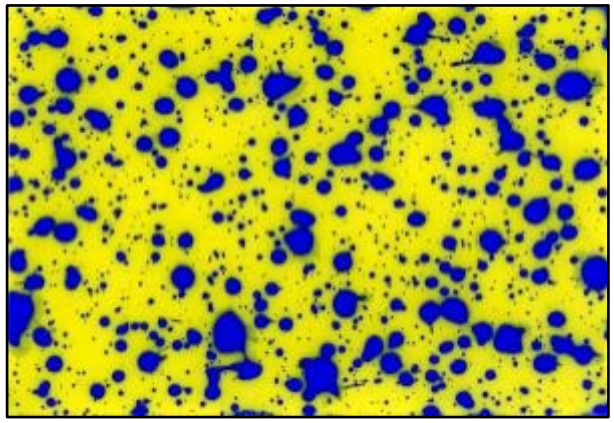


Extended range
30 GPA- 69%

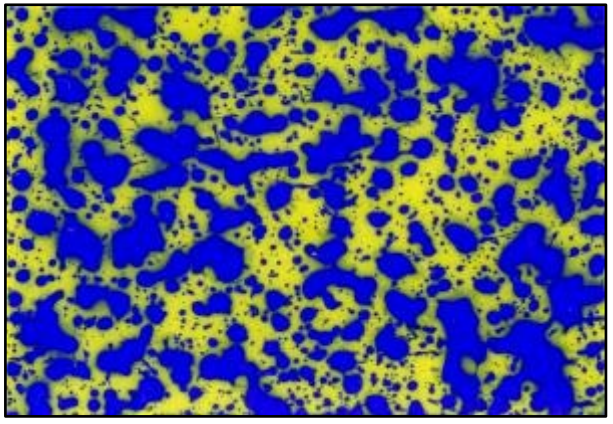




Air induction
10 GPA- 11%



Air induction
20 GPA- 28%



Air induction
30 GPA- 55%

Spray drift distance

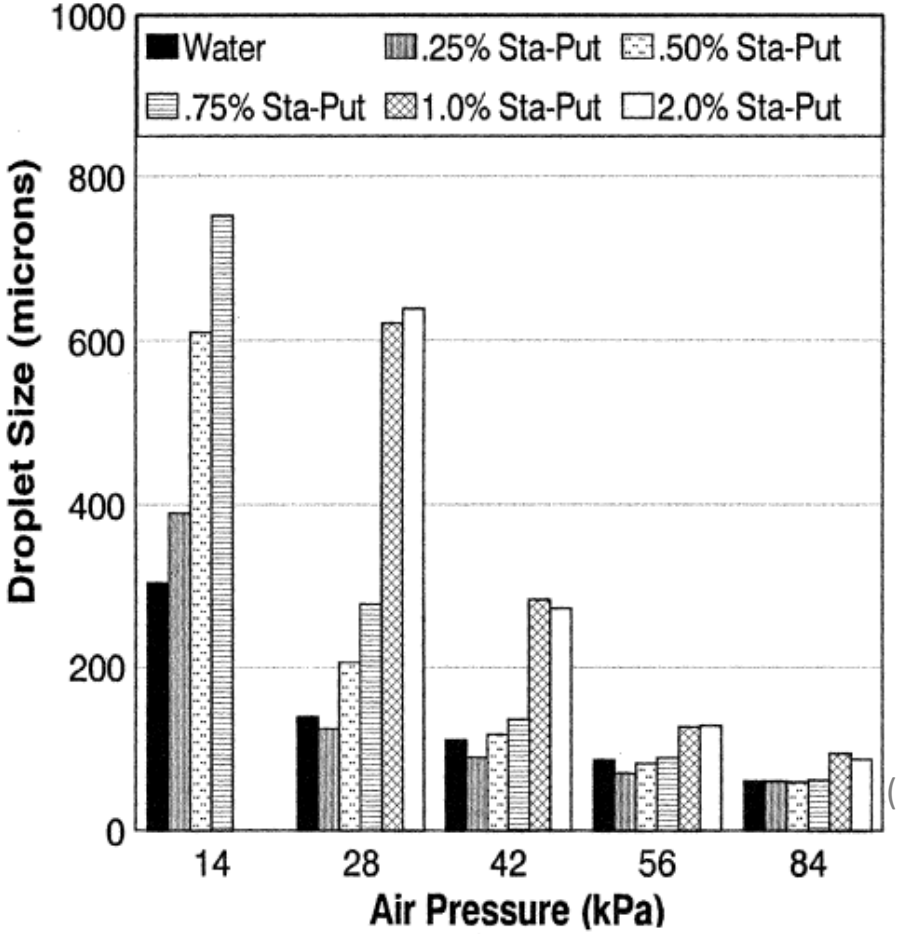
Droplet diameter (microns)	Type of Droplet	Time required to fall 10 ft.		Lateral distance 10 ft. in 3 mph wind	
5	Fog Very fine spray	66 4	min. min.	3 1,100	miles ft.
100	Fine spray	10	s.	44	ft.
240	Medium spray	6	s.	28	ft.
400	Coarse spray	2	s.	9	ft.
1,000	Fine rain	1	s.	5	ft.

(modified from Dexter 1995)

Hooded sprayer

Include a drift control adjuvant

- Increases the size of the spray particle



(Hanks, 1995)

Figure 3. Effect of air pressure and concentration of Sta-Put® on $D_{v.5}$ of water applied with an air-assist spray system.

Presentation outline

- Preparing to spray
- Setting up the sprayer
- Spraying the crop
  - Monitor nozzles
  - Watch the weather
- After spraying

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Monitor the nozzles

- Make sure a nozzle is not clogged
- Watch for tubing that comes unconnected
- Technology to assist

Spray placement

- Direct spray to the plant
- Reduce absorption of the herbicide
  - Fewer leaves
  - Stem is woodier

Spray placement

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Continue to monitor the weather

Presentation outline

- Preparing to spray
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  - Wash the tank
  - Rain or irrigation over the top of plastic

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Triple rinse the tank

Auxin herbicide tank contamination

Plain water

Dicamba 1%

Cleaning plastic after application

- 2 – 3 in. of irrigation or rainfall after application

Conclusions

- Preparing to spray
- Setting up the sprayer
- Spraying the crop
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Questions.

Peter Dittmar

pdittmar@ufl.edu

352-273-4771

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References

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-Fagliari, J. R., R. S. de Oliveira Jr., and J. Constantin. 2005. Impact of sublethal doses of 2,4-D, simulating drift on tomato yield. J. of Environ. Sci. and Health, Part B: Pesticides, Food Contaminants, and Agricultural Wastes 40:201-206.