

Vegetable Sensitivity to Auxins



UNIVERSITY OF GEORGIA
EXTENSION



UPW
using pesticides wisely



GEORGIA DEPARTMENT
OF AGRICULTURE

Stewarding Pesticides

(We are all responsible)

Pesticide drift

Endangered species

Pollinator protection

Herbicide resistance

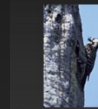
Environmental/worker safety

Endangered/Threatened Species

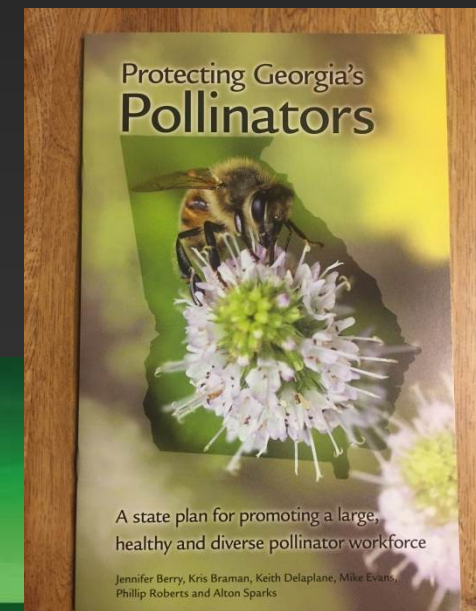


GEORGIA: 63 species, 25 plants

US Fish and Wildlife: <http://www.fws.gov/athens/endangered.html>



United States Environmental Protection Agency



UPW

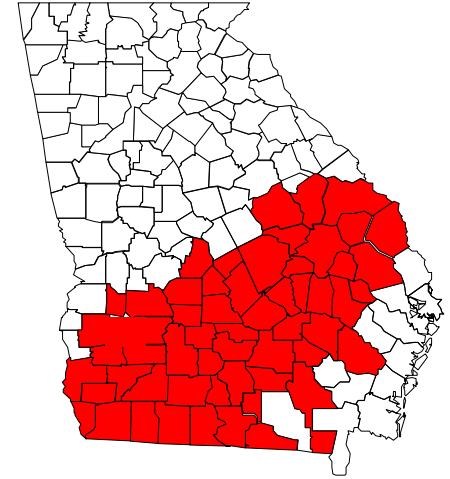
using pesticides wisely



In-person 2 hour classroom training.

UGA Extension Drift Complaints Survey

2014 **289 complaints;** 48 counties



2015 **150 complaints;** 43 counties; Year 1 UPW

2016 **99 complaints;** 52 counties; Year 2 UPW

2017 **93 complaints;** 48 counties; Year 3 UPW;
significant launch of auxin technologies

Key for Success – Change in Behavior

1. Help growers understand how far particle drift and volatility/drift can go!



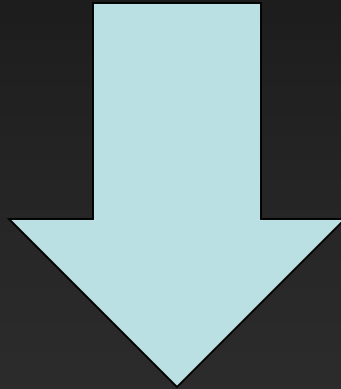
No grower wants to drift!

2. Identify fields that should not be treated with a given herbicide – especially auxins.



1 GOAL

Pesticide Footprint



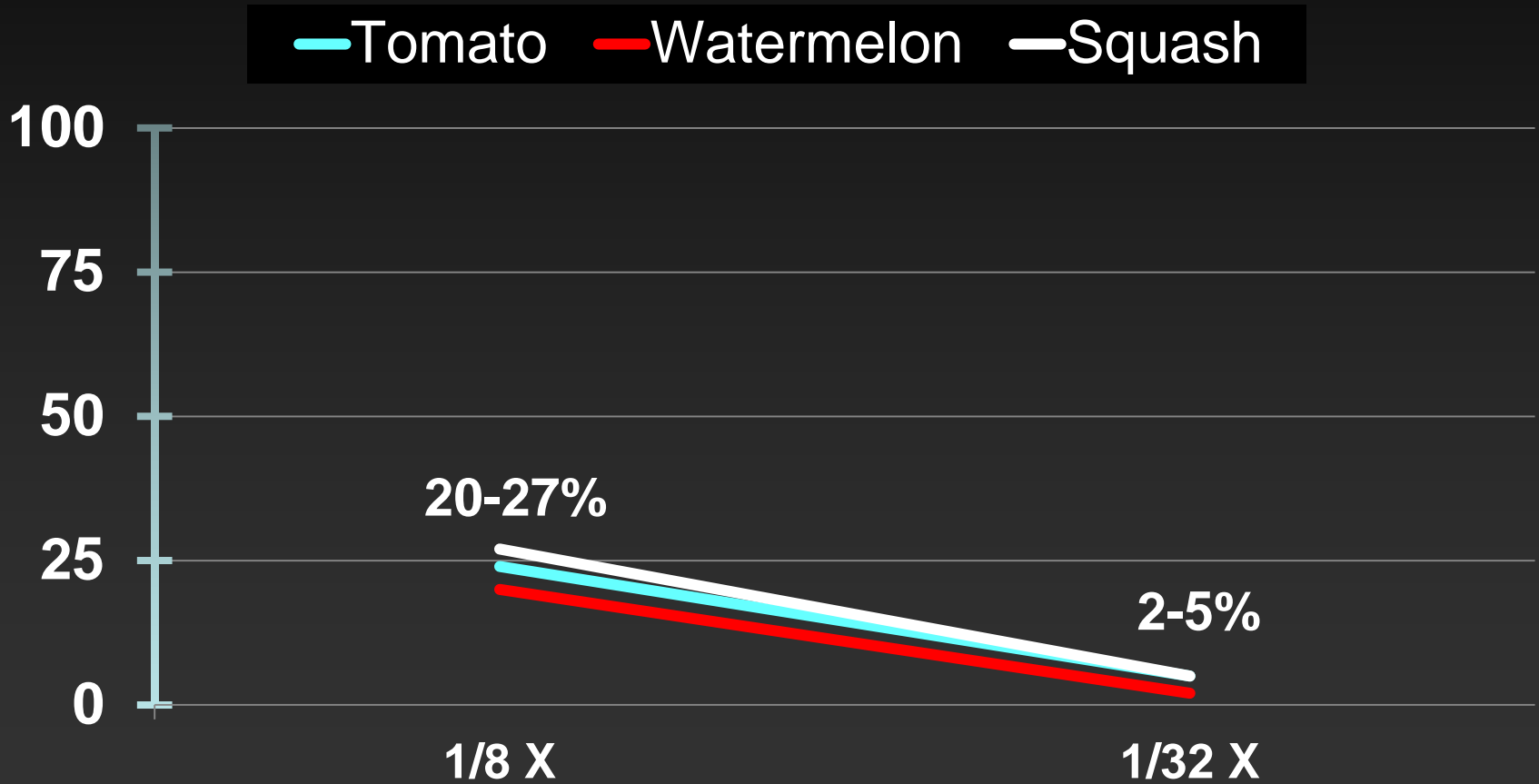
**Sensitivity of
surrounding
plants/animals**



Vegetable Sensitivity to Glyphosate



Visual Tomato, Melon, Squash Injury from Roundup



Yield loss occurred at 1/8X: Squash 56-64%, Tomato 28 to 41%. Veg 41, 2003.
Simulated drift study making applications broadcast at 15 GPA.

Roundup 1/50X

Non-treated

305

404

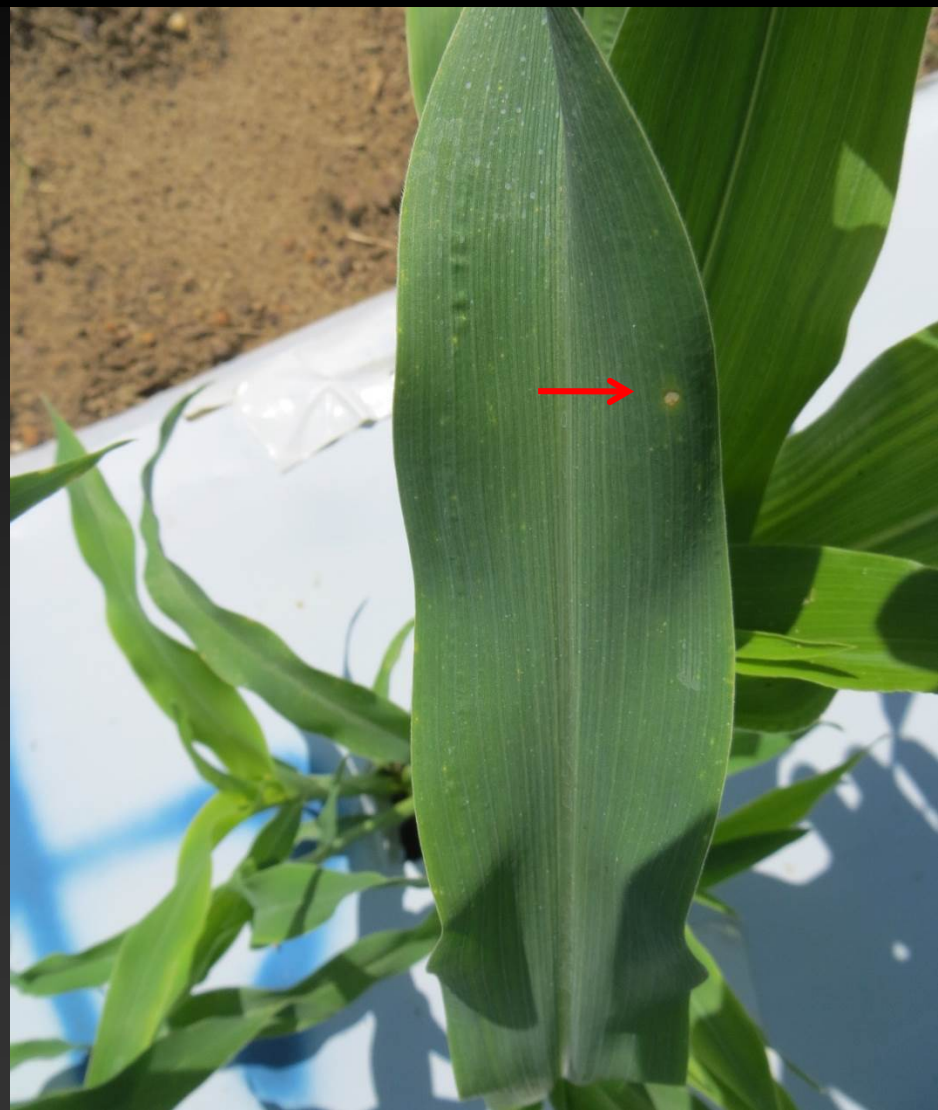


Simulated drift study making applications broadcast at 15 GPA.

Gramoxone and Corn



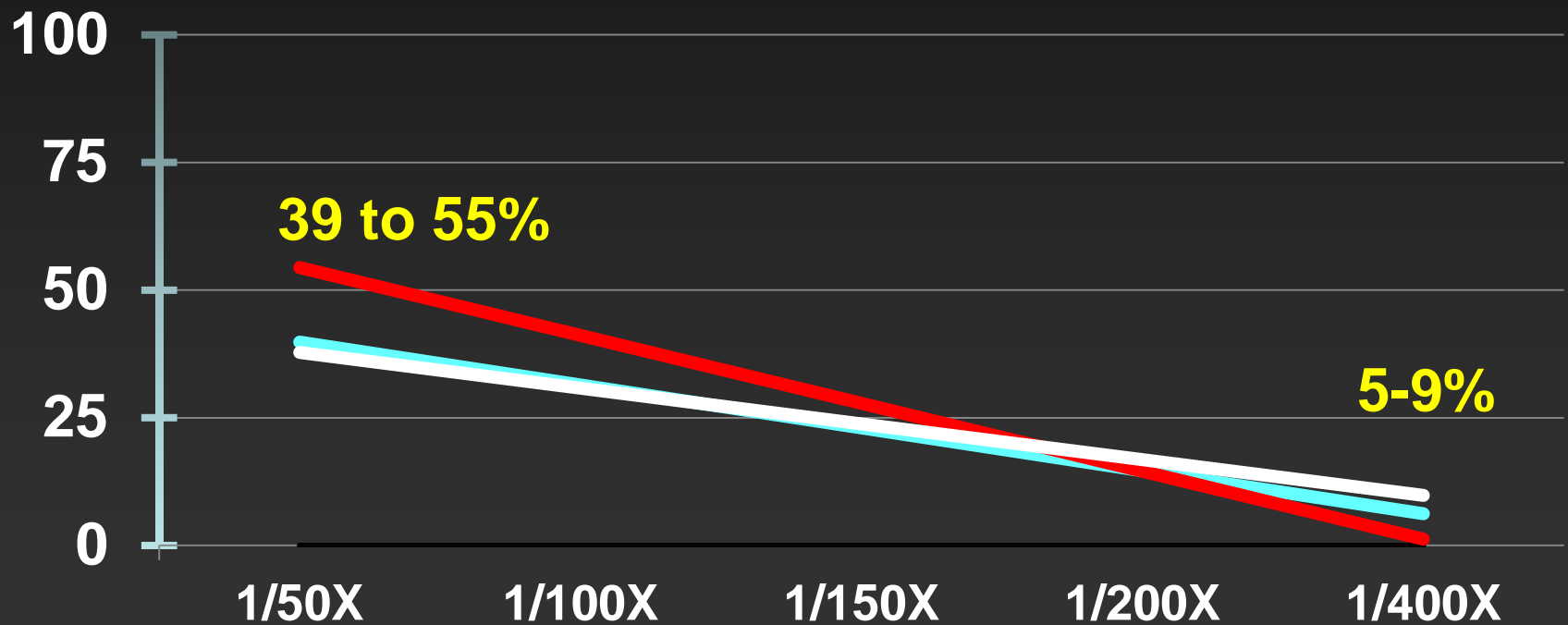
1/250 X



1/500 X

Visual Tomato, Pepper, and Watermelon Injury from Clarity (dicamba)

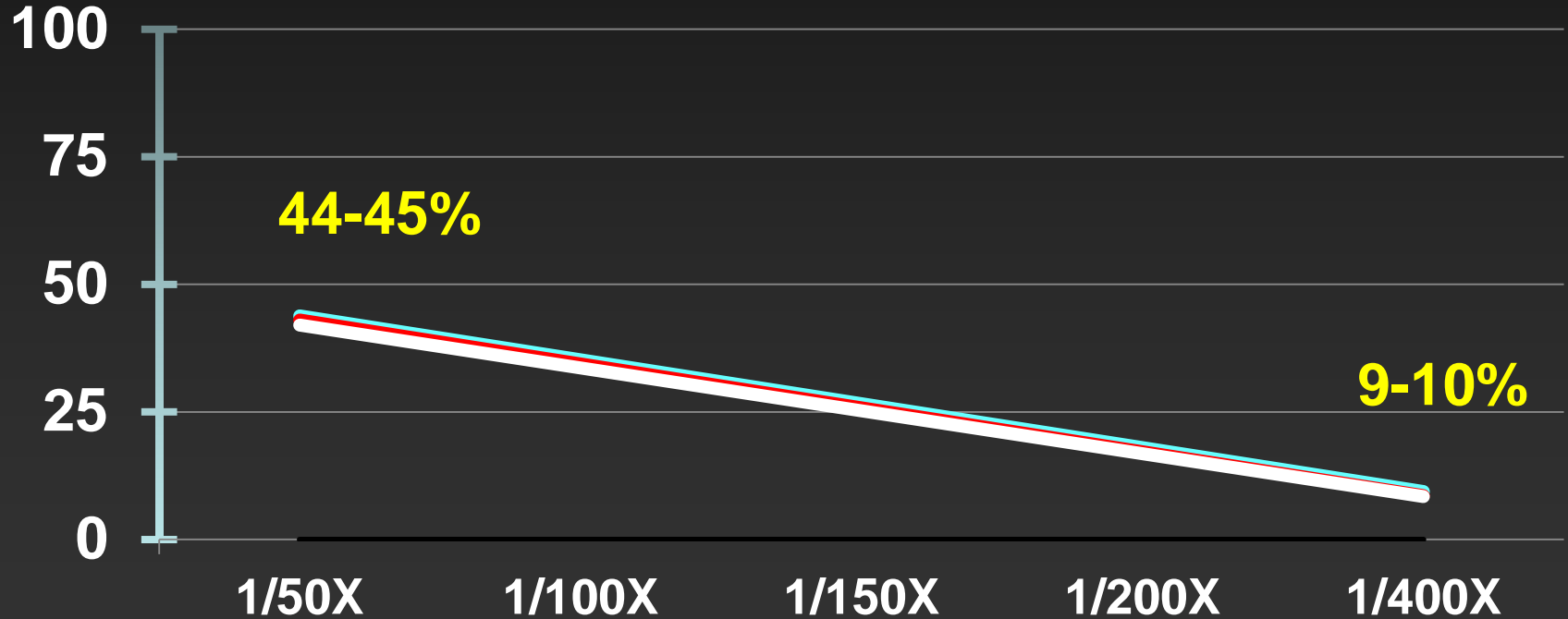
— Linear (Tomato) — Linear (Pepper) — Linear (Watermelon)



4 studies; 2010. Simulated drift study making applications broadcast at 15 GPA.

Visual Tomato, Pepper, and Watermelon Injury from Weedar (2,4-D)

— Linear (Tomato) — Linear (Pepper) — Linear (Watermelon)

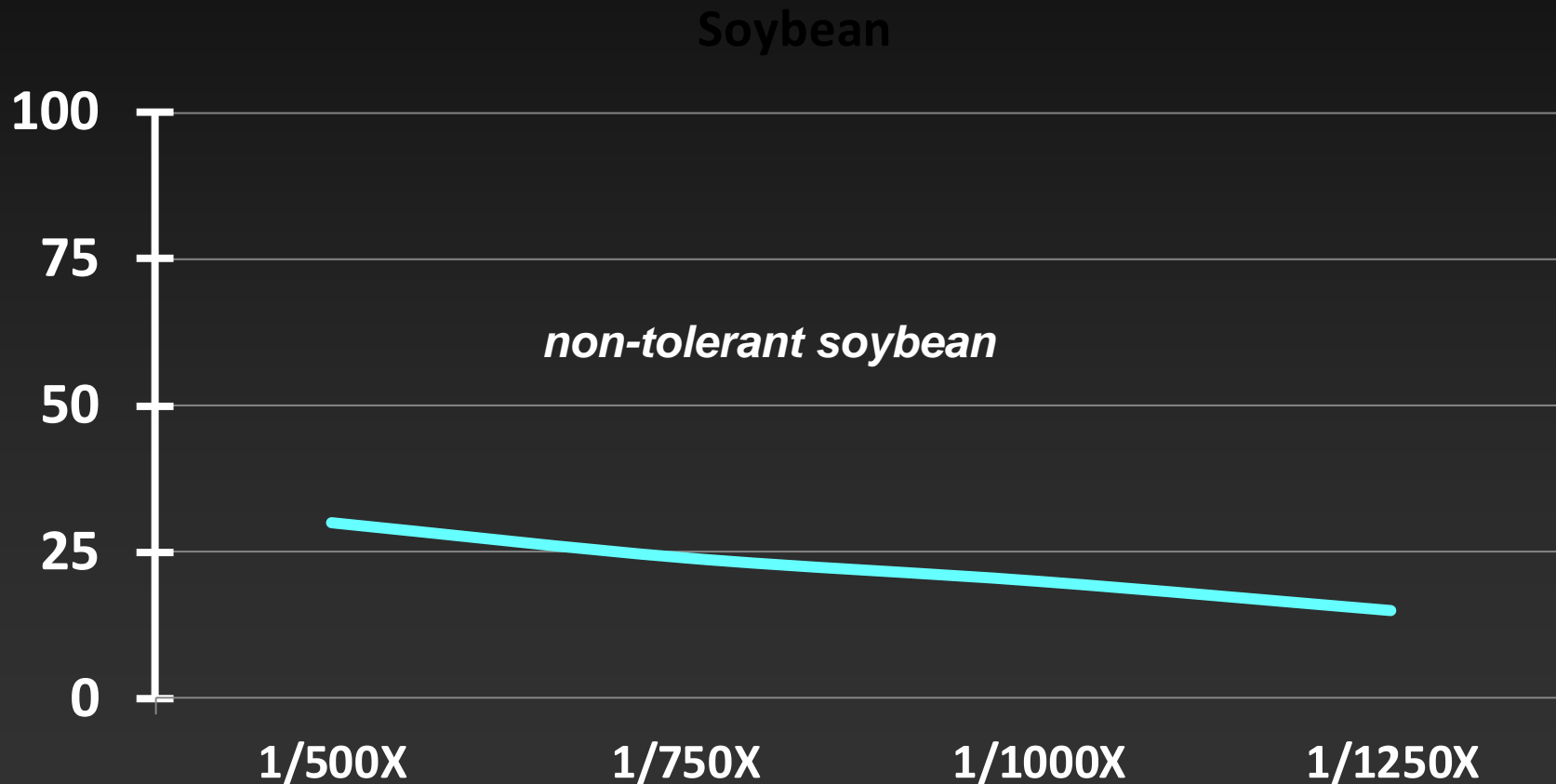


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Crop Sensitivity – Dicamba

non dicamba-tolerant soybean

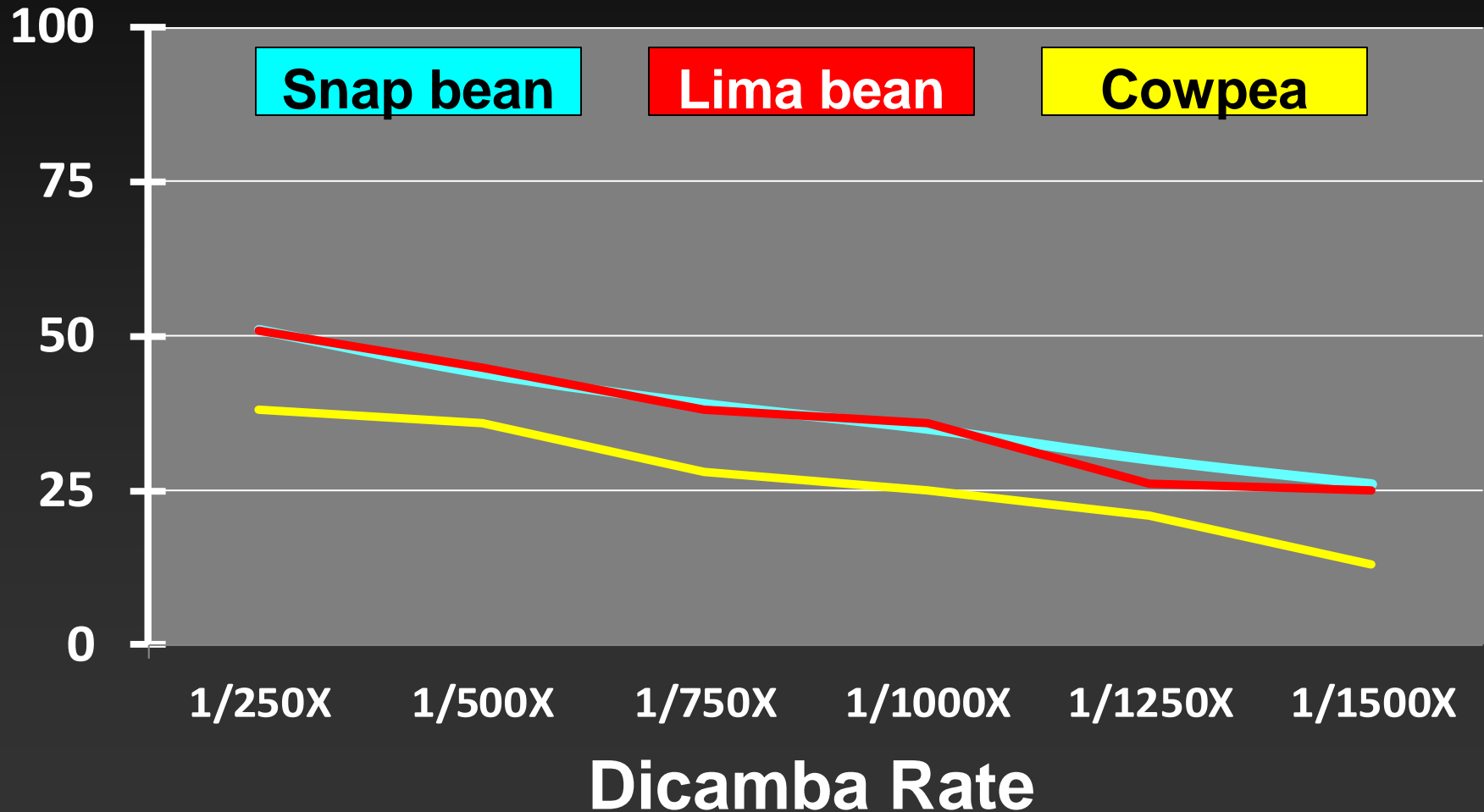
% visual injury



Veg 32: 27 DAT. Simulated drift study making applications broadcast at 15 GPA.

Maximum Visual Injury. 10 DAT, Tifton GA.

Percent Maximum Injury: (Epinasty and Stunting)

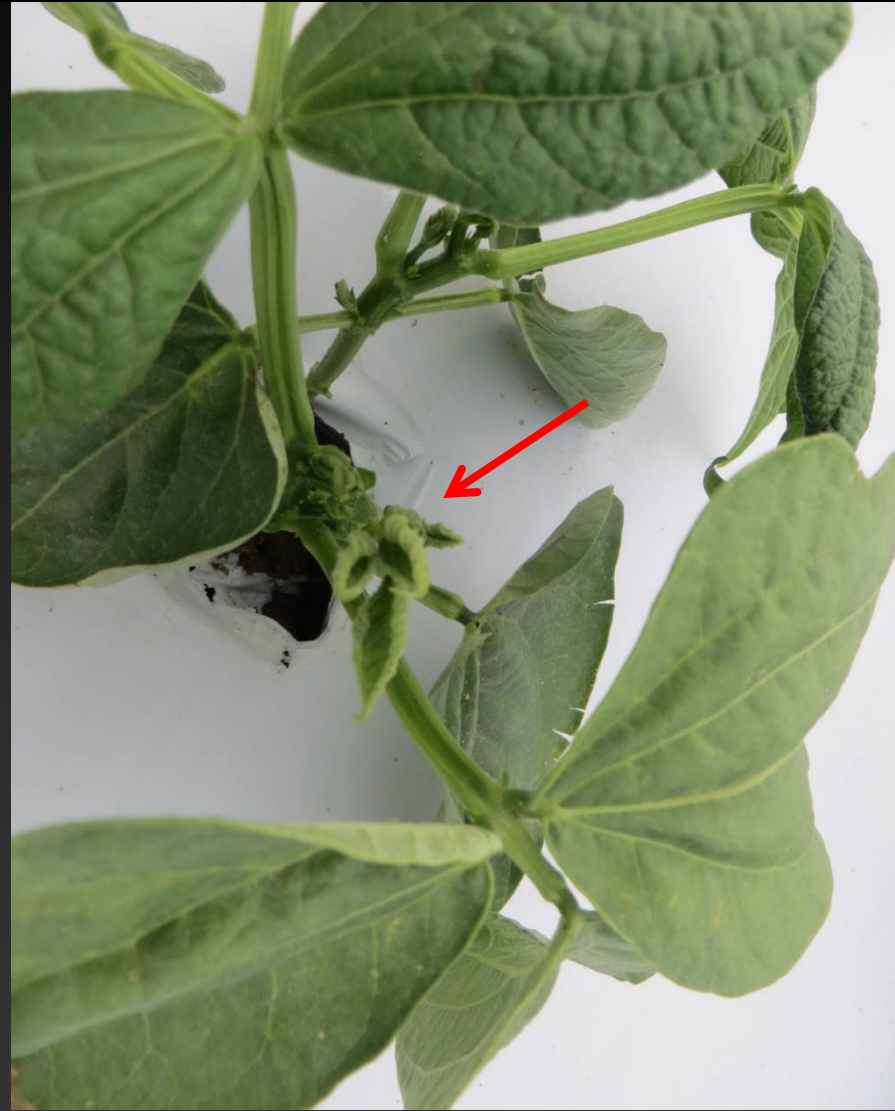


Snap bean: LSD = 8; Lima Bean: LSD = 7; Cowpea: LSD = 7.

Crop Sensitivity – Dicamba Snap Bean



1/500 X



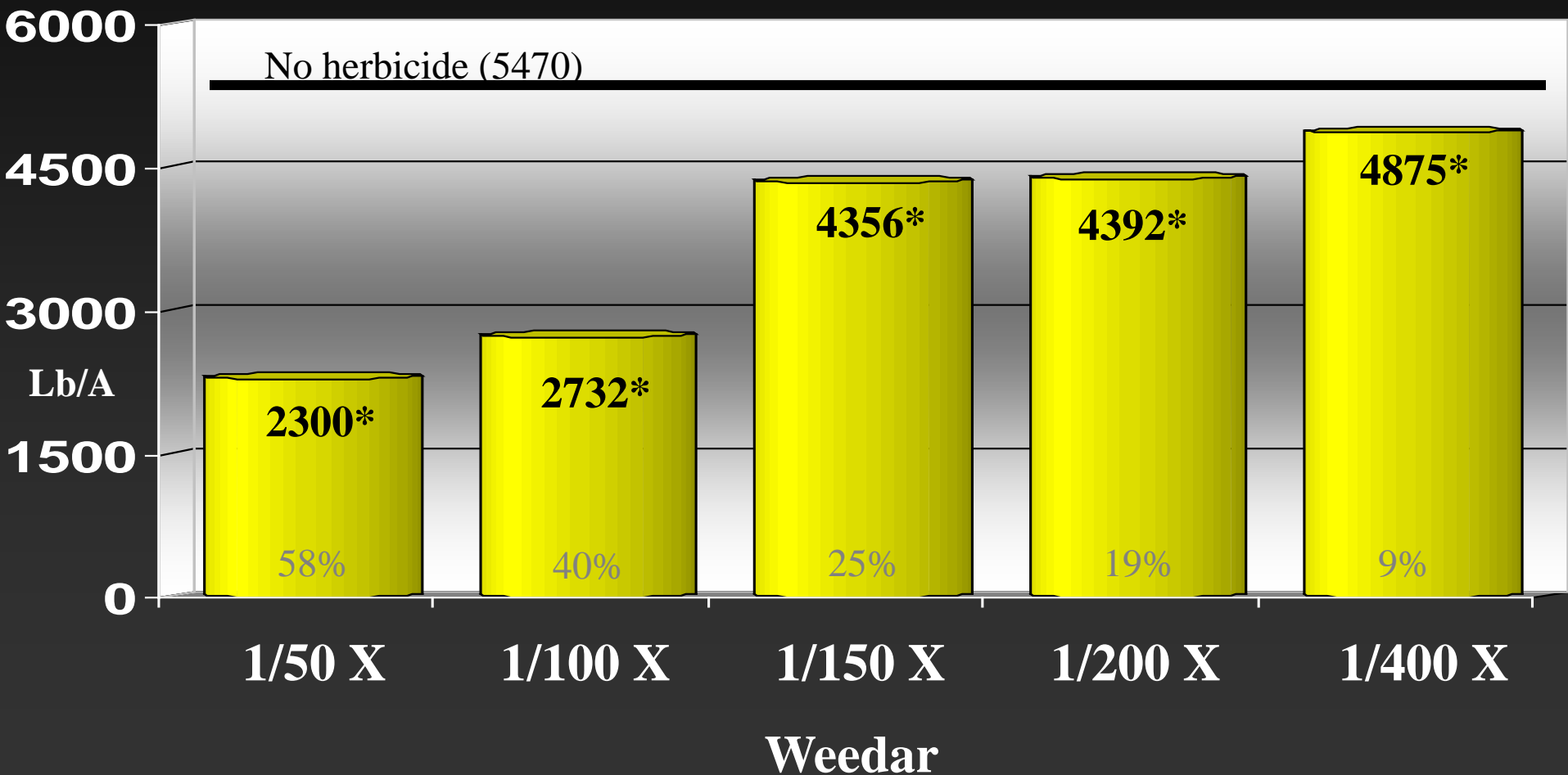
1/1000 X

How Much Clarity Per Acre Does One Need To Injure A Snap Bean Field?

Clarity 4 L (0.3776 ml)



Pepper Yield Loss from Simulated Drift Rates of 2,4-D. 2010.



*=less than control

Fruit Maturity and Malformation

Max of 20% visual plant injury



1/125 X



Non-treated

Tomato Malformation from Auxin



Cantaloupe response to 2,4-D or dicamba



Watermelon response to 2,4-D or dicamba





Bell Pepper response to auxin drift



Cucumber response dicamba




Georgia Vegetable

(making the farm gate value report)

- Banana peppers
- Bell peppers
- Broccoli
- Cabbage
- Cantaloupe
- Carrots
- Collards
- Cucumbers
- Eggplant
- English peas
- Green onions
- Hot peppers
- Irish potatoes
- Kale
- Lettuce
- Lima beans
- Mustard
- Okra
- Onions
- Pole beans
- Pumpkin
- Snap beans
- Southern peas
- Spinach
- Sweet corn
- Sweet potatoes
- Tomato
- Turnip greens
- Turnip roots
- Watermelon
- Winter squash
- Yellow squash
- Zucchini

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 - Winter squash
 - Yellow squash
 - Zucchini
- Only crop without concern**
- 

Visual Sensitivity Scale for Dicamba in GA-2018

Lower

Broccoli
Cabbage
Kale
Mustard
Pecan
Turnip

$>1/75X$

Moderate

Cantaloupe
Canola*
Cucumber
Peach
Peanut
Squash

$1/75-1/300X$

Severe

Cotton
Pepper
Tomato
Watermelon

$1/300-1/800X$

Extreme

Grapes*
Lima Bean
Southern Pea
Snap Bean
Soybean
Sweet potato*
Tobacco*

$< 1/800X$

Herbicide Rate of Visually Detectable Injury

For relative comparison, tomato, squash, and watermelon response to Roundup for visual damage would be in the “lower” category.

*Data from literature; all other data generated in over 70 UGA field experiments.

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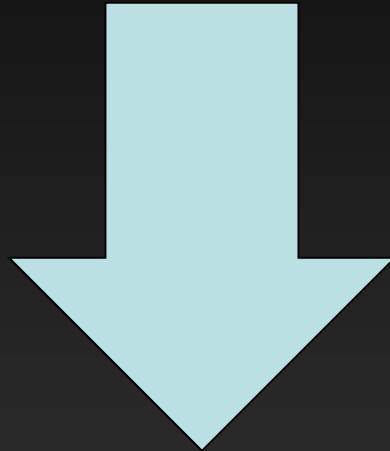
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Pesticide Footprint



Residue Tolerance

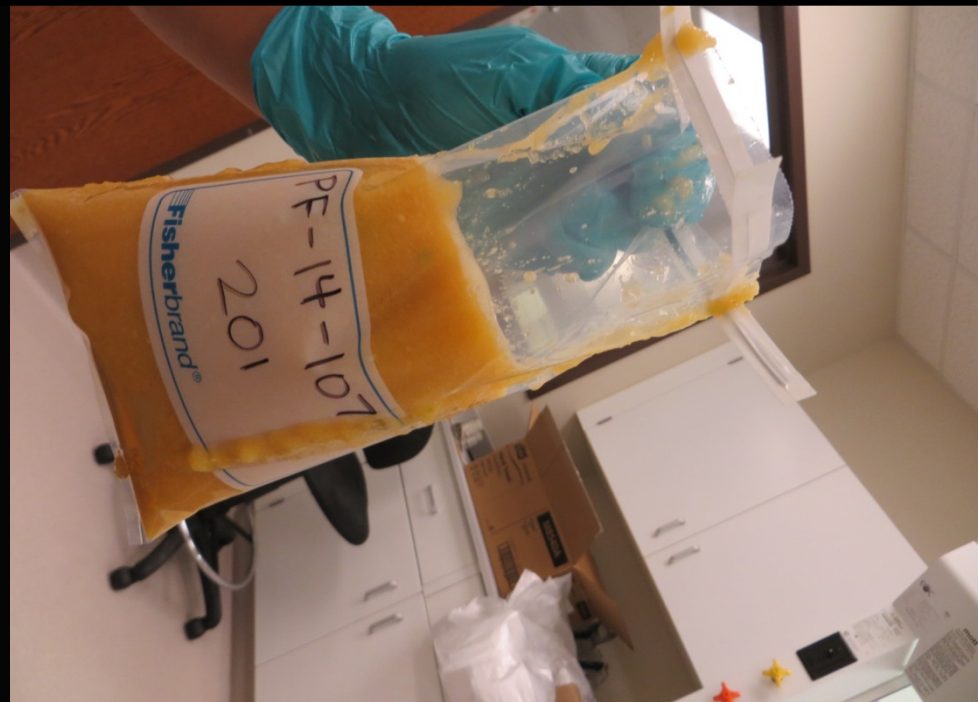
If drift or volatility/drift occurs:

1. Residues must be established

2. Residue levels must be below levels approved by EPA



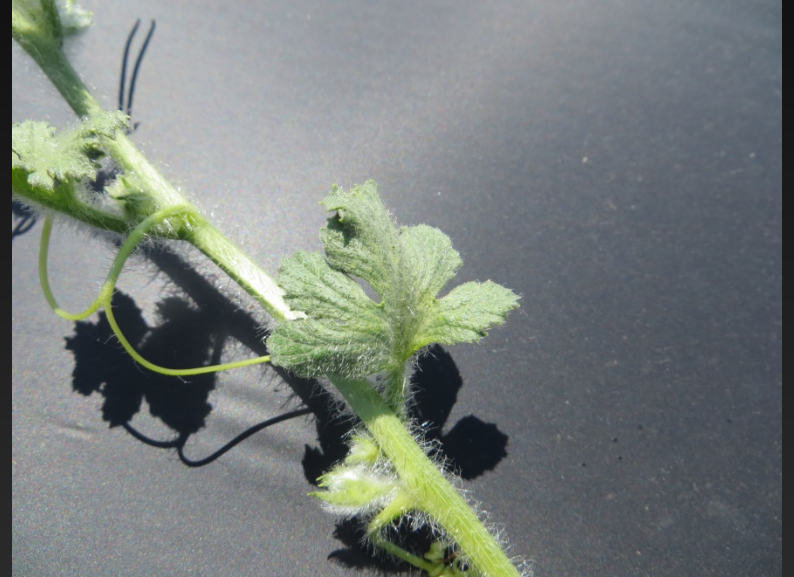
GDA Lab



Lab Conclusions

- 1. Time interval key**
- 2. Rate is important**
- 3. Lab detection rare with low drift**

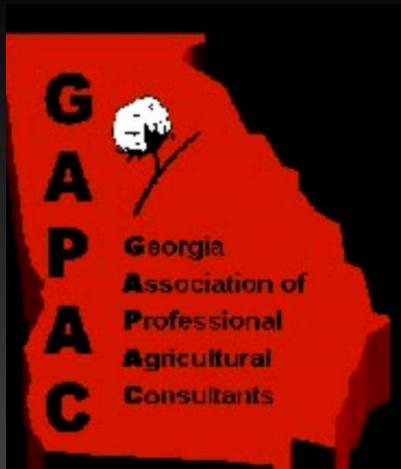
Fresh Market Produce is Vulnerable to Perception



Cooperation And Education



FARMERS



Industry Partners



A Few Specialty Crop Values

(Retail Value Per Acre 2014)

- 1. Watermelon (small bed mulch): \$9000**
- 2. Watermelon (large bed mulch): \$14,400**
- 3. Cantaloupe (small bed mulch): \$8666**
- 4. Snap beans: \$2800**
- 5. Pepper (raised mulch): \$22,400**
- 6. Tomato (raised mulch): \$33,600**
- 7. Blueberry (high bush): \$10,000 (20K re-plant)**
- 8. Pecan: \$3000**