

# Pesticide Stewardship



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EXTENSION

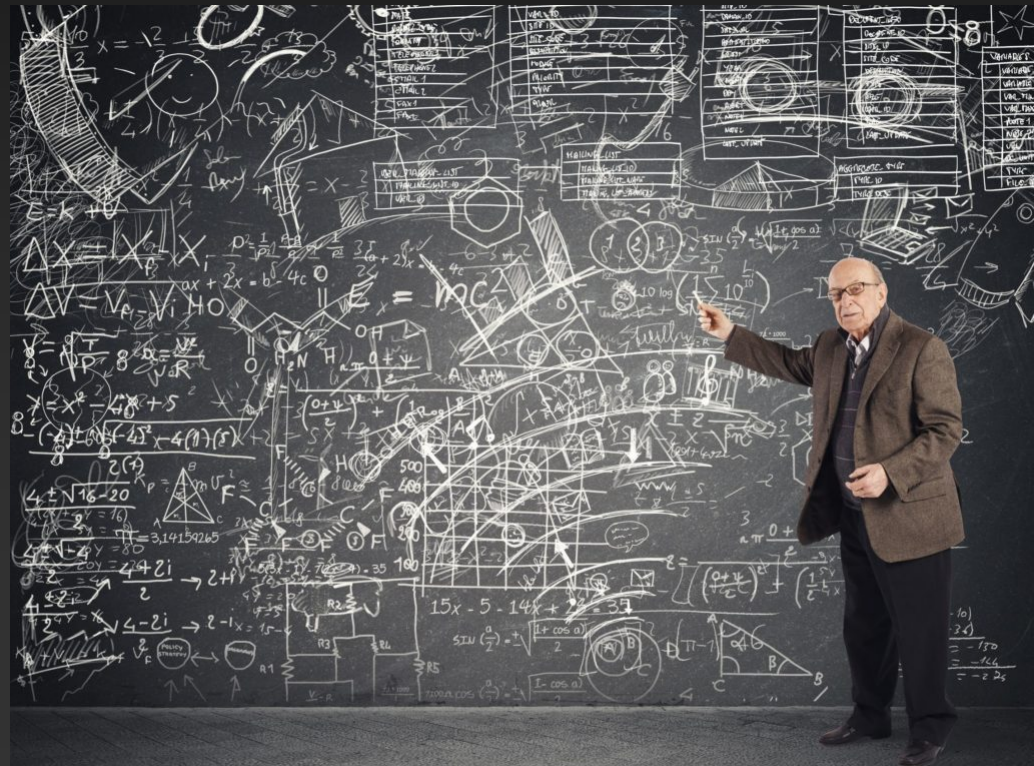


UPW  
using pesticides wisely



GEORGIA DEPARTMENT  
OF AGRICULTURE

# Science is Clear Regarding the Auxin Technologies..... **Its' Complicated**



# Feeding the World\*



- **2.1 million U.S. farms**
- **One farm feeds 165 people a yr**
- **Population 7.6 billion**
- **In 2050 = 9.7 billion**



\*Info obtain from farm bureau web site.

# Feeding the World



- Availability of economically effective pesticides are essential
- We are the ones that must steward all pesticides



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EXTENSION

UPW  
using pesticides wisely



GEORGIA DEPARTMENT  
OF AGRICULTURE

# Herbicide-Resistant Weeds in the U.S.

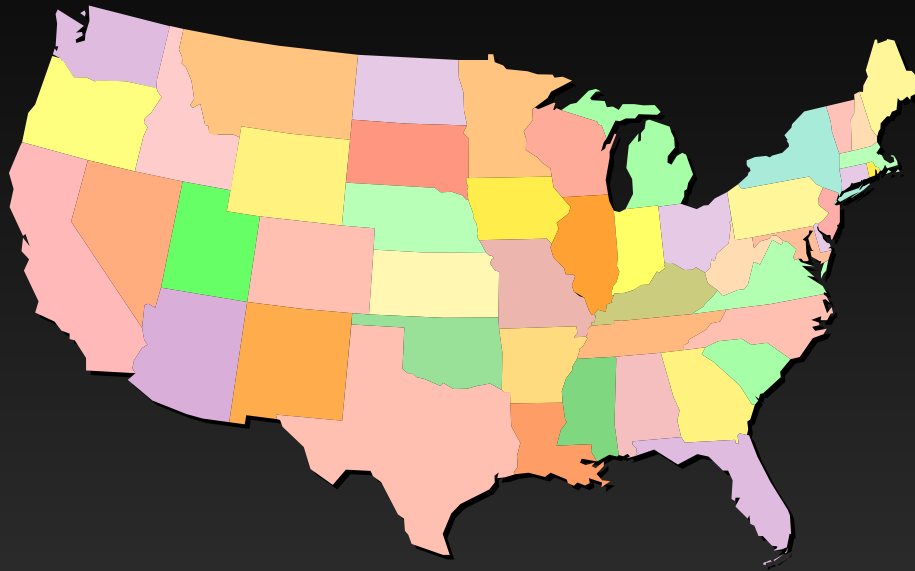
*S. Culpepper, P. Dotray, L. Sosnoskie, L. Steckel, A. York*



K. Sprague, Michigan; K. Bradley, Missouri, T. Baughman, Oklahoma; J. McGinty, Texas; S. Byrd, Texas; G. Morgan, Texas; Drew Lyon, Washington; W. Brim-Deforest, California; Brad Hanson, California; Bill McCloskey, Arizona.

# Most Impactful Resistant Weeds

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1. *Amaranthus* and Ryegrass
2. Kochia and Fleabane
3. Horseweed
4. Grasses???

# Approaches to Management

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1. Tillage
2. Cover crops
3. Herbicide programs



# Number of Palmer Amaranth Plants During Early Season. Macon Co., Georgia 2008.\*



**No Deep Tillage**



**Deep Turn**

No Herbicide Treatment



# Using Heavy Rye Covers For Sustainability



Rye Cover

Weedy Cover

# Auxin Systems



Auxin system



Non-treated

# Stewarding Pesticides

## Identified goals

Endangered species

Pollinator protection

Pesticide resistance

Pesticide drift

Environmental/worker safety

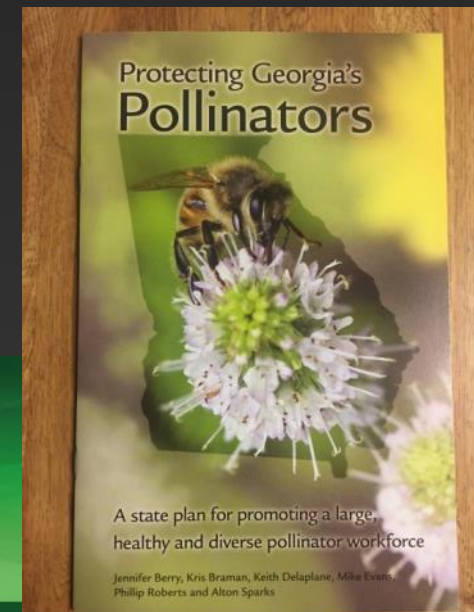
### Endangered/Threatened Species

**GEORGIA:** 63 species, 25 plants

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



United States Environmental Protection Agency



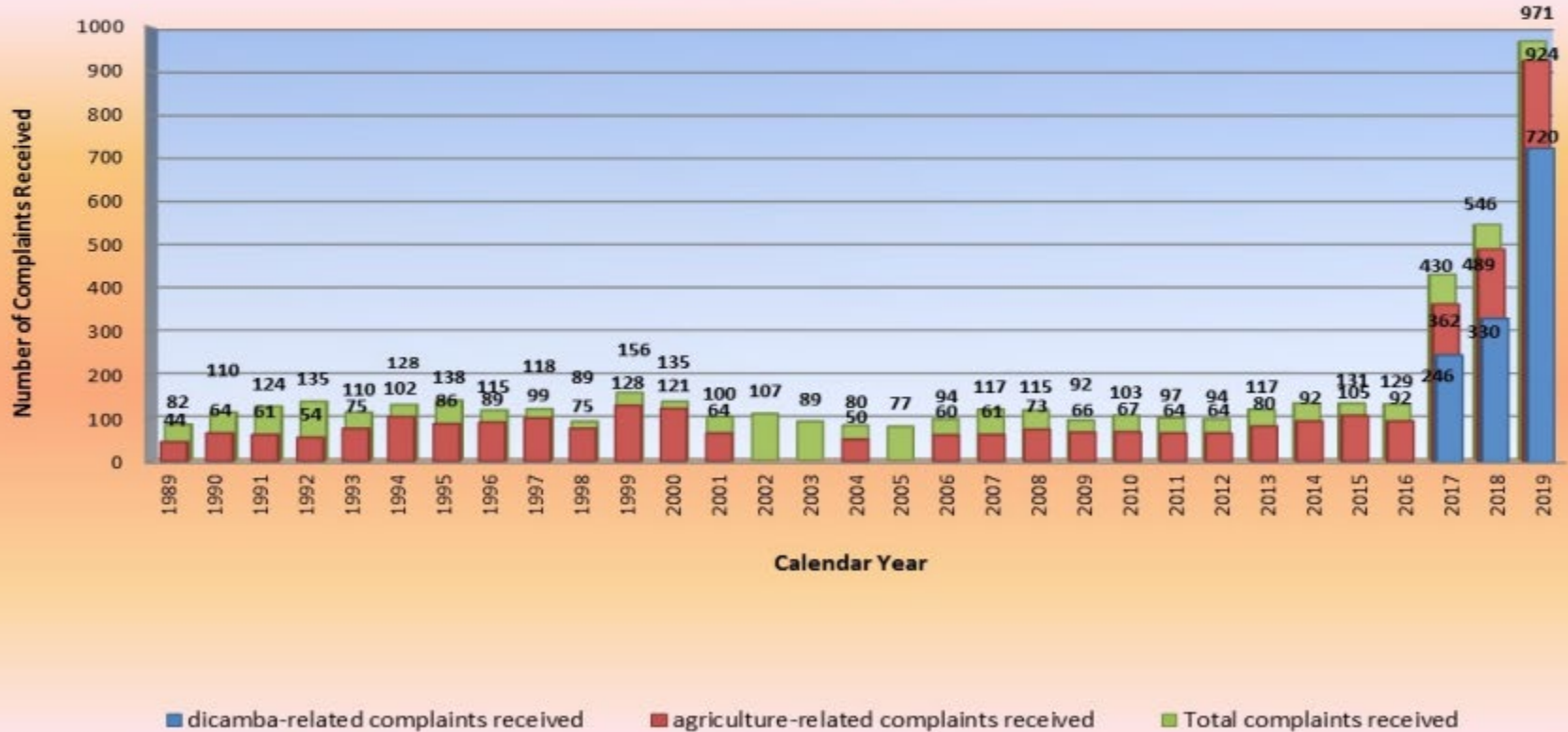
# Survey on Dicamba

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- 1. Georgia and Tennessee**
- 2. Culpepper and Steckel**
- 3. Aaron Hager contributed**

# Pesticide Misuse Complaints History

Formal Pesticide Misuse Complaints Received & Investigated by the Illinois Department of Agriculture



# Culpepper – GA and Steckel -TN

1. Do you believe the current dicamba technology is capable of being stewarded in your area?

**Tennessee**

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Formulations must  
improve

**Georgia**

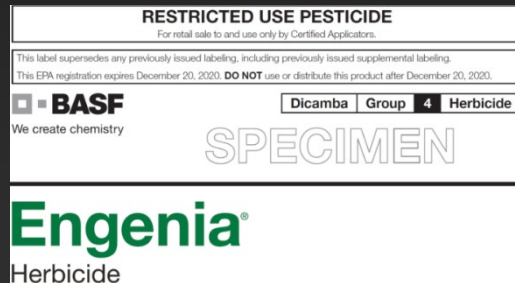
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Formulations must  
improve

# Use Proper Dicamba Formulation – Restricted Use Pesticide

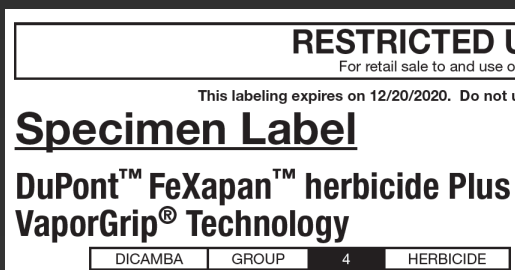


XtendiMax™ with Vapor Grip™



Engenia™

**Better  
Formulations  
Needed**



FeXapan™ with Vapor Grip™

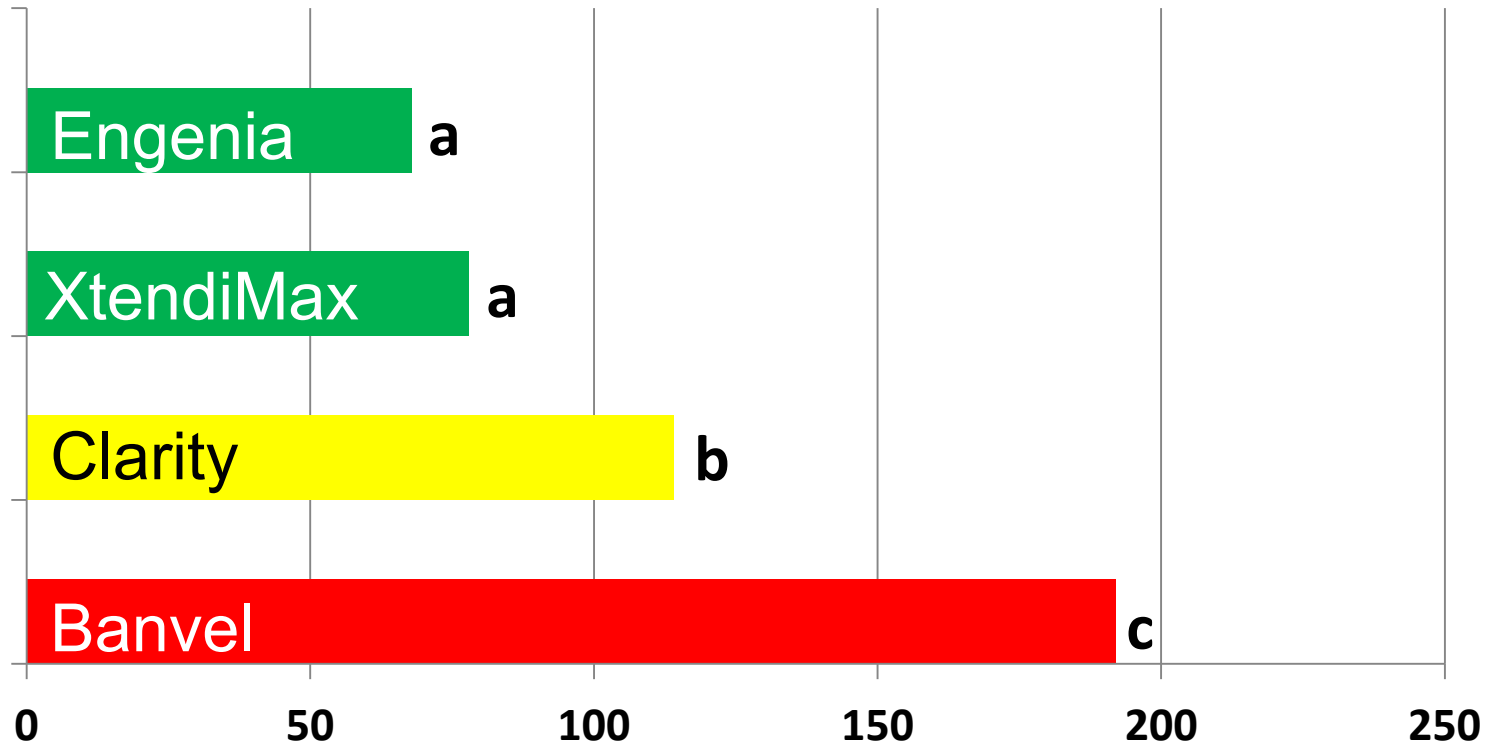
# UGA Volatility Research – Controlled Envir.

## 8 treatments, 24 tunnels



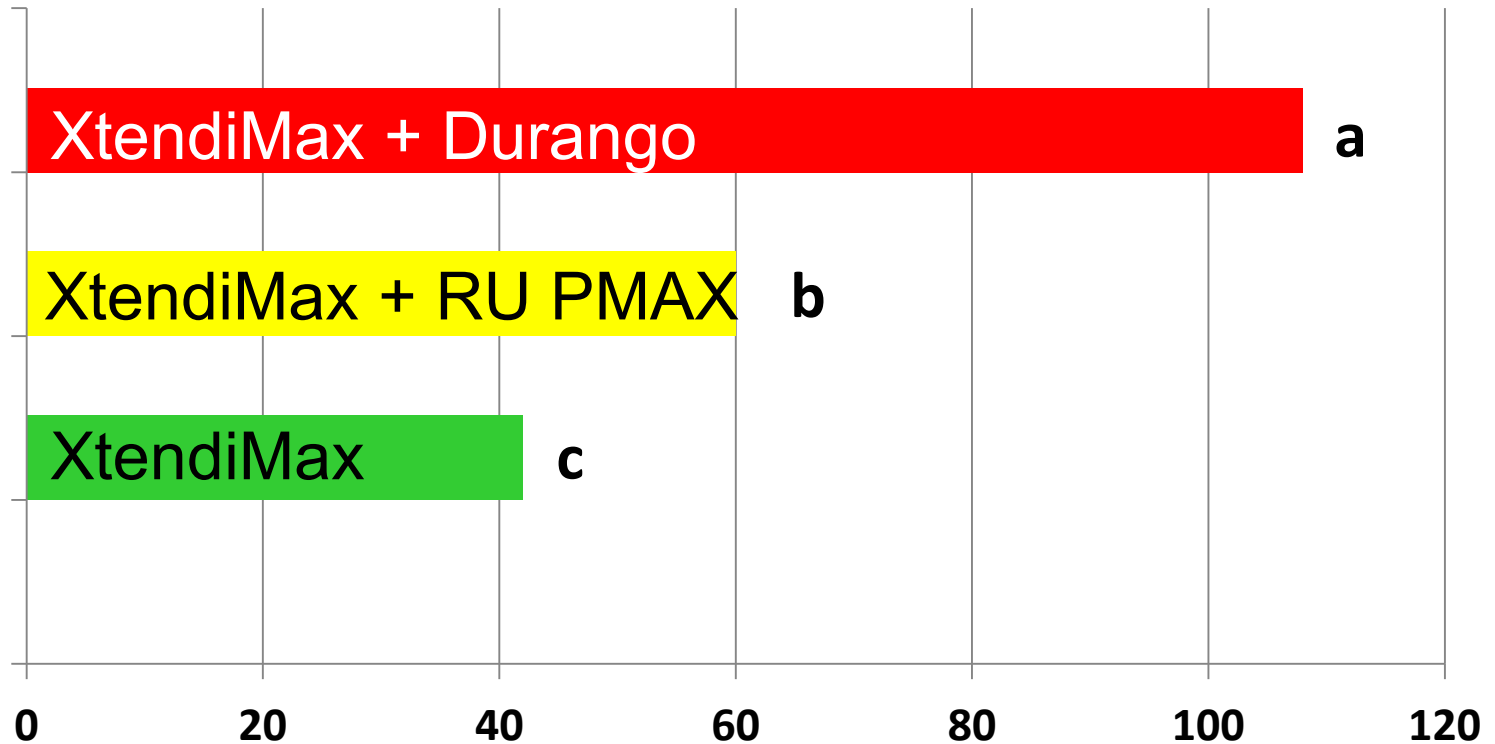


# UGA Tunnel Volatility Data 2017/2018



**Square foot of soybean damage from volatility.**

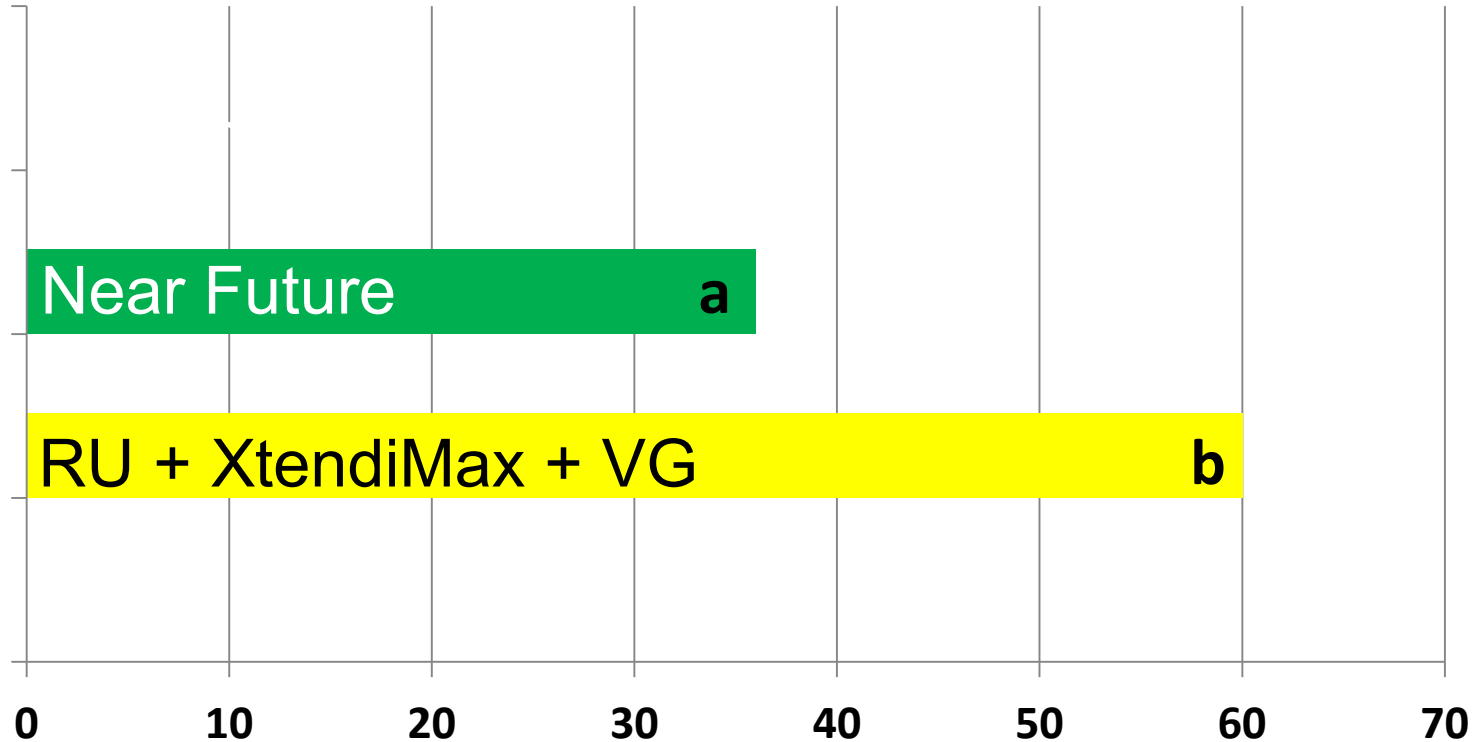
# UGA Tunnel Volatility – Tank Mix. 2018



**Square foot of soybean damage from volatility.**

Max injury from XtendiMax = 16; XtendiMax + RU = 14; XtendiMax + Durango = 27. Treated 2 flats. Dicamba 2 lb ai/A; glyphosate 4 lb/A. Damage taken from soybean; 21 DAT.

# UGA Tunnel Volatility Data 2019



**Square foot of soybean damage from volatility.**

# Culpepper – GA and Steckel -TN

2. As formulations improve, are you concerned off-label product use continues?

**Tennessee**

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Not much

**Georgia**

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Yes – greatest  
challenge (price)

# Bad Decision to Use Old Products... but happens if you do?

**Grower**

**Dealership**



# Bad Decision to Use Old Products... but happens if you do?

**Grower**

**Dealership**



# Survey Question #5

UPW Grower meetings 2019

Grower ONLY Question – 1347 growers answered this question

What is your most reliable source for information regarding weed control and pesticide stewardship?

1. \_\_\_\_\_ (more reliable source)

2. \_\_\_\_\_

3. \_\_\_\_\_ (less reliable source)

*Note: All growers had to hand write in answers without potential options provided.*

# What is your most reliable source for information regarding weed control and pesticide stewardship?

Response	Times provided	Points by ranking*
Extension	1008	2791
Chemical dealers	537	1083
Crop consultants	188	434
Other growers	147	236
Internet sources	115	192
Grower meetings	92	275
Industry reps	83	157
Product labels	45	106
GA Pest Mgmt Hanbook	31	73
Magazines	15	32

\*Points were determined by giving 3 points for 1<sup>st</sup> choice of importance, 2 points for 2<sup>nd</sup> choice, and 1 point for 3<sup>rd</sup> choice. All locations – 1347 growers participated



# Culpepper – GA and Steckel -TN

3. Are most of the issues a result of particle drift or volatility?

**Tennessee**

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**Volatility**

**Georgia**

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**Particle**

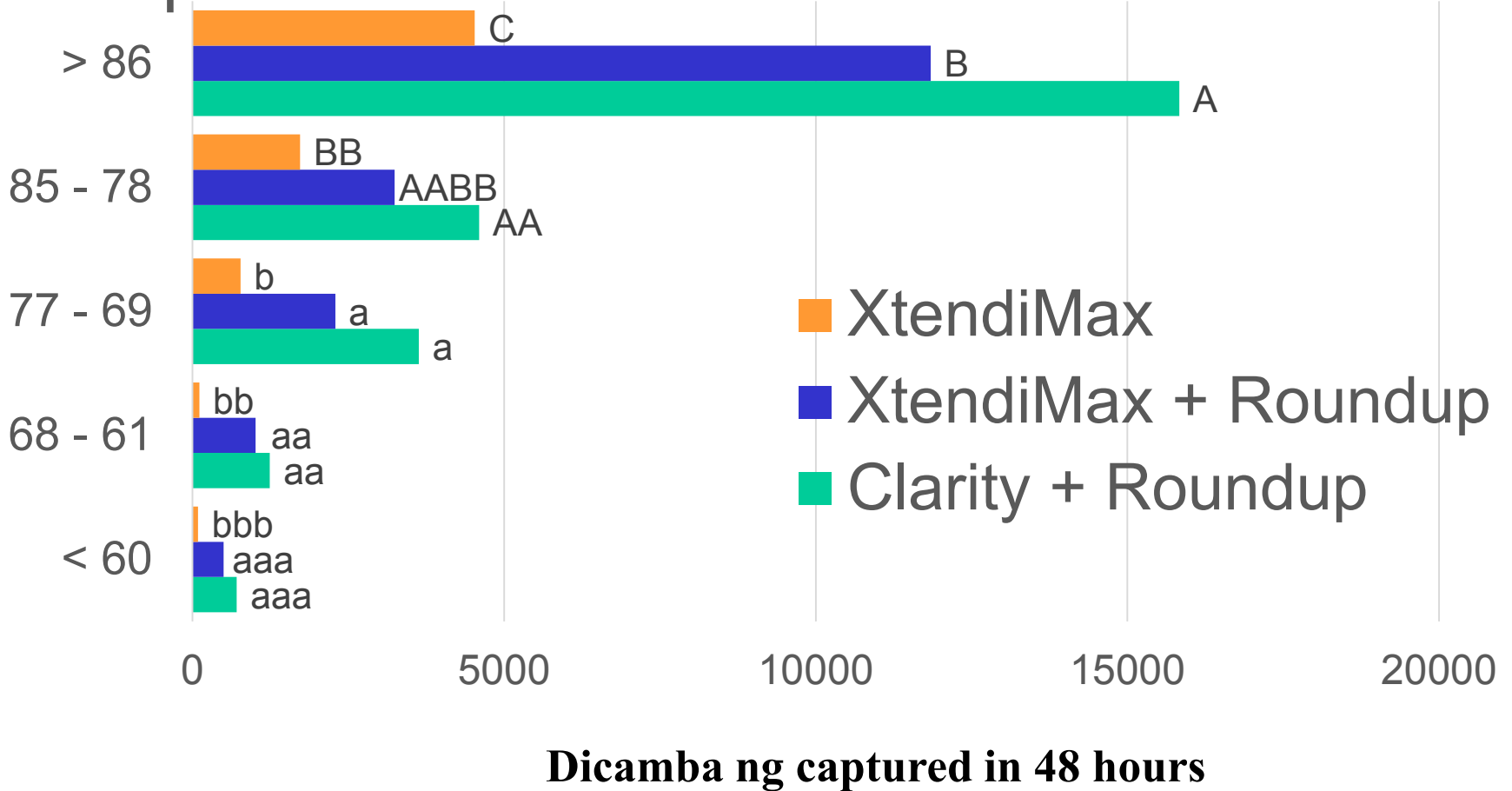
# Dicamba Off-Target: Particle or Volatility

**In Georgia: particle drift is 99+% of all pesticide drift complaints.....**



# Dicamba Temperature Interaction

Temp F



Preliminary UT data, sprayed on soil  
Humidomes in 2017, Mueller

Mean separation using single degree of freedom contrast;

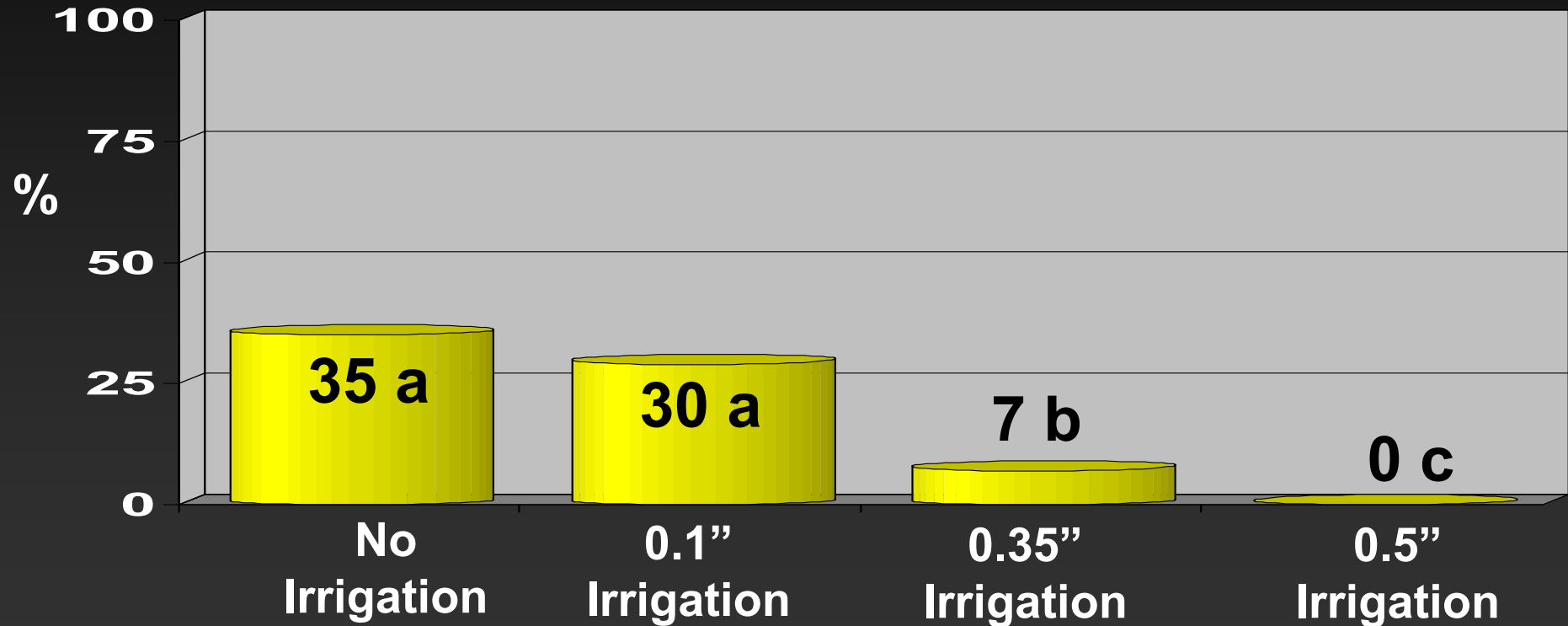
# Are there other ways to mitigate volatility?



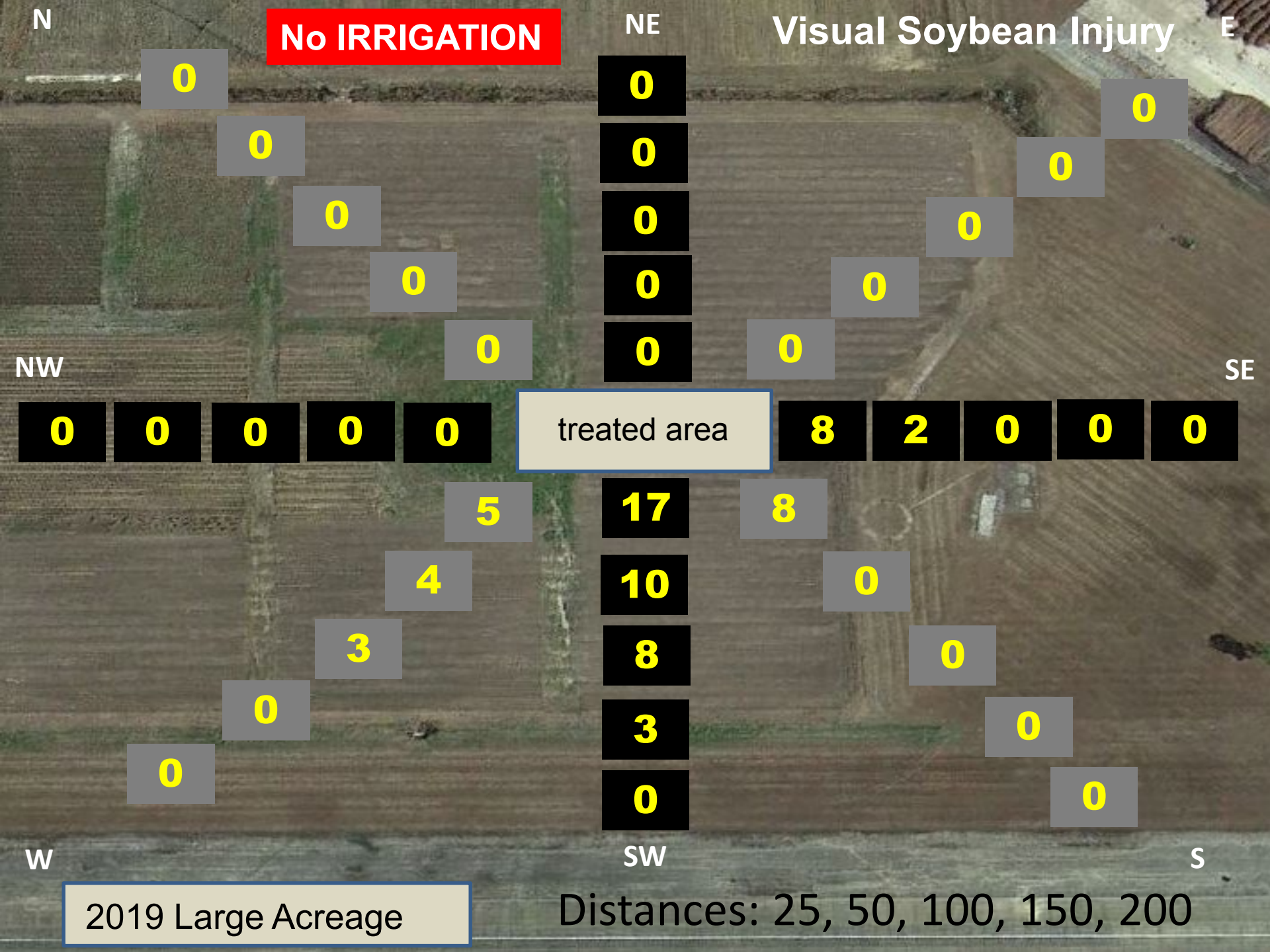
**Do you remember 2018 labels: do not apply if rainfall expected in 24 hrs?**

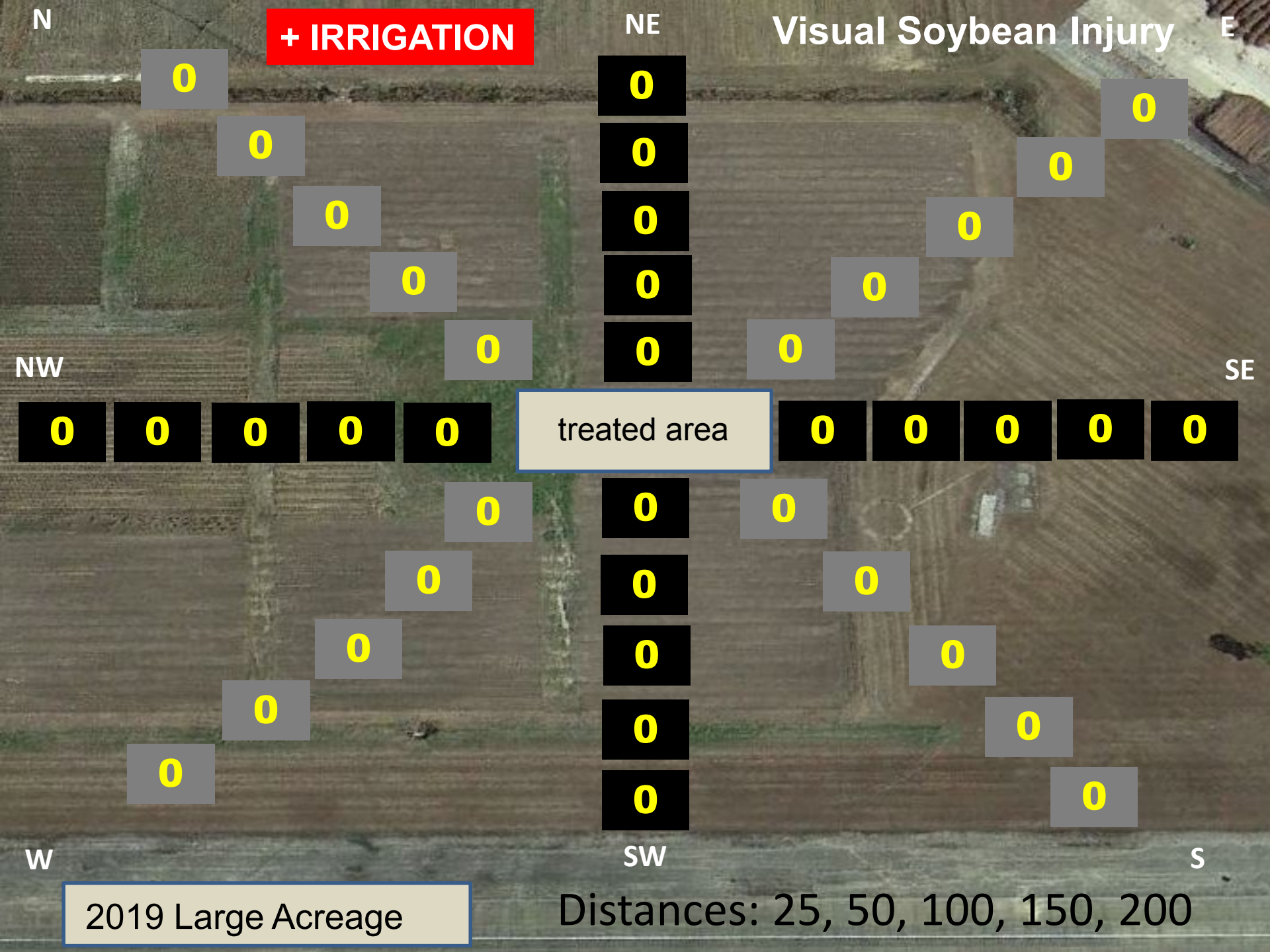
# Irrigation Influences Volatility! Tunnels, 2019.

% soybean damage from volatility



\*RU PMAX + XtendiMax 3X. Need 4 hr of drying time.





**+ IRRIGATION**

Visual Soybean Injury

treated area

2019 Large Acreage

Distances: 25, 50, 100, 150, 200

N

NE

E

NW

SE

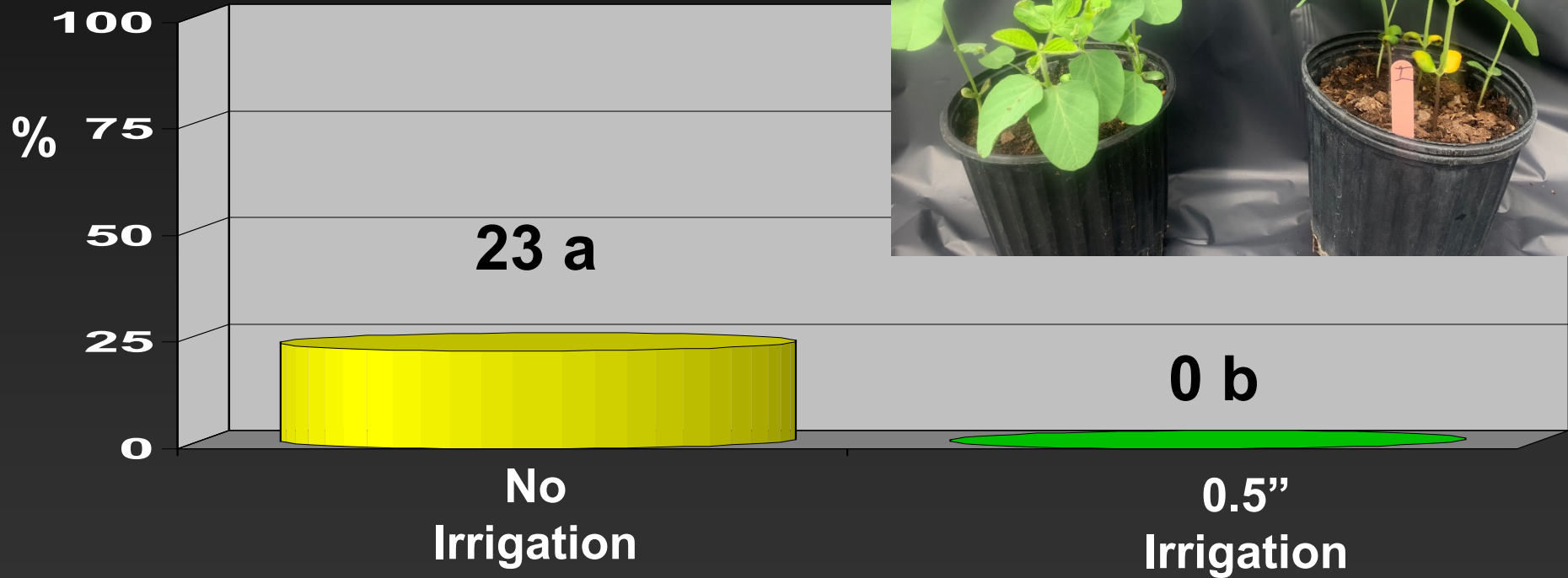
W

SW

S

# Irrigation Influences Volatility! Field Study.

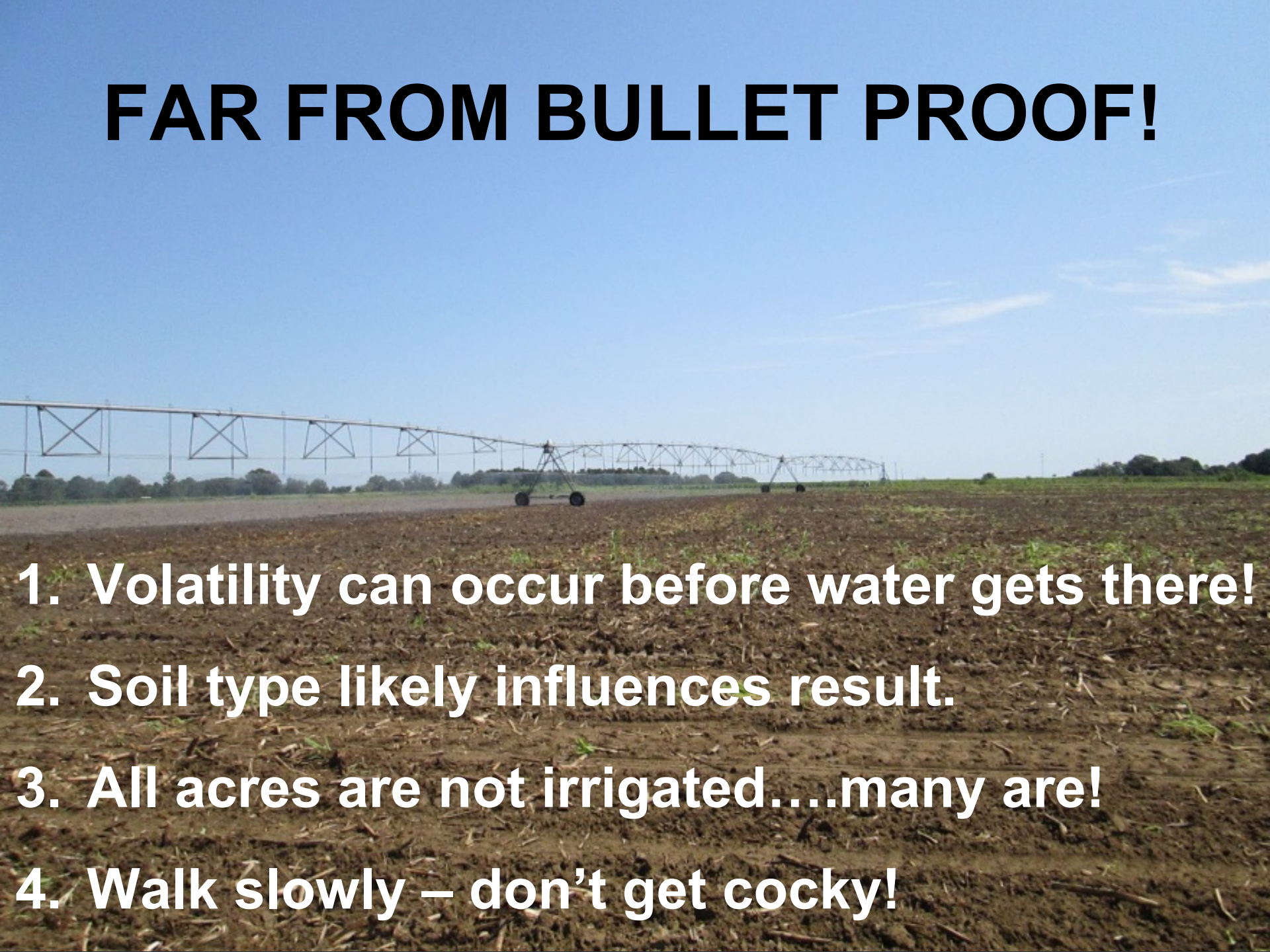
% soybean damage from volatility at 9 ft from treated



\*1X field rate of glyphosate and dicamba.



# **FAR FROM BULLET PROOF!**

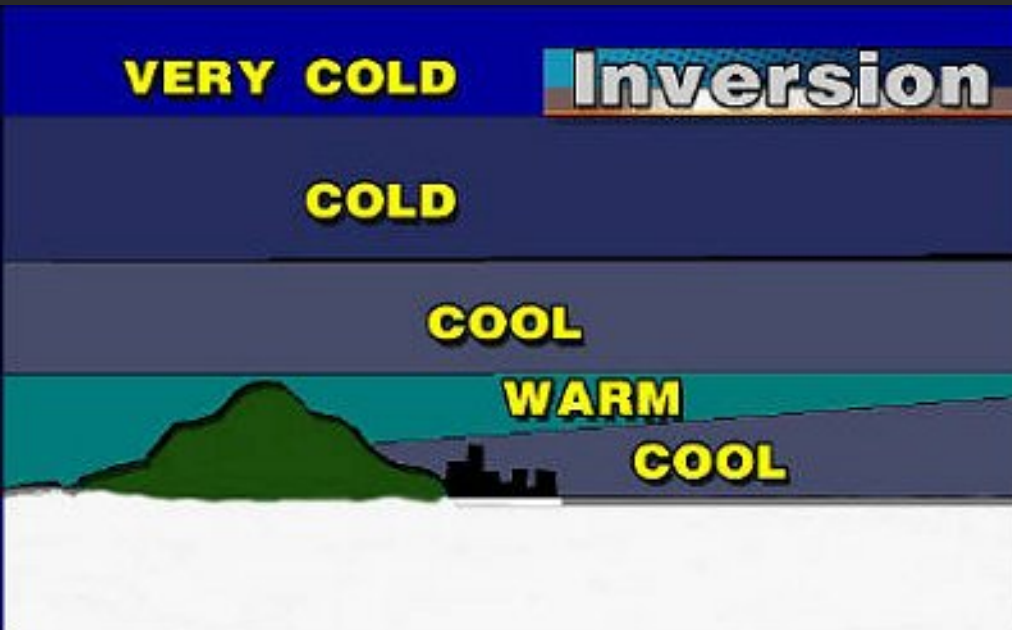
- 
- A wide-angle photograph of a center pivot irrigation system in a large, open field. The system consists of a long, straight metal structure supported by a series of towers, extending from the foreground into the distance. The ground is dark brown soil, and there are some small green plants starting to grow. The sky is a clear, bright blue with a few wispy clouds. The overall scene is a vast, flat agricultural landscape.
- 1. Volatility can occur before water gets there!**
  - 2. Soil type likely influences result.**
  - 3. All acres are not irrigated....many are!**
  - 4. Walk slowly – don't get cocky!**

# Significant Effort on Inversions

Engenia/Xtendimax require 3 to 10 mph

Avoid  $< 3$  mph - inversions

Avoid  $> 10$  mph – more droplets move



# Dr. Eric Webster



# Dr. Eric Webster



# Culpepper – GA and Steckel -TN

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4. Should there be cutoff dates on applications?

**Tennessee**

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Yes

**Georgia**

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No



Environmental Topics

Laws & Regulations

About EPA

Search EPA.gov



CONTACT US

SHARE



# Pesticide Labels

## About Pesticide Labels

## Regulation of Labels



- [Introduction to labels](#)
- [Finding pesticide labels](#)
- [Keep safe: read the label first](#)



- [Web-distributed labels](#)
- [Label review manual](#)
- [Label review training](#)
- [Pesticide registration notices about labels](#)
- [Label guidance for specific types of pesticides](#)
- [SmartLabel pilot](#)

### Related Information

- [Pesticide registration](#)
- [Electronic submission of labels](#)
- [Protecting pollinators by improving labels](#)
- [Find more pesticide information](#)

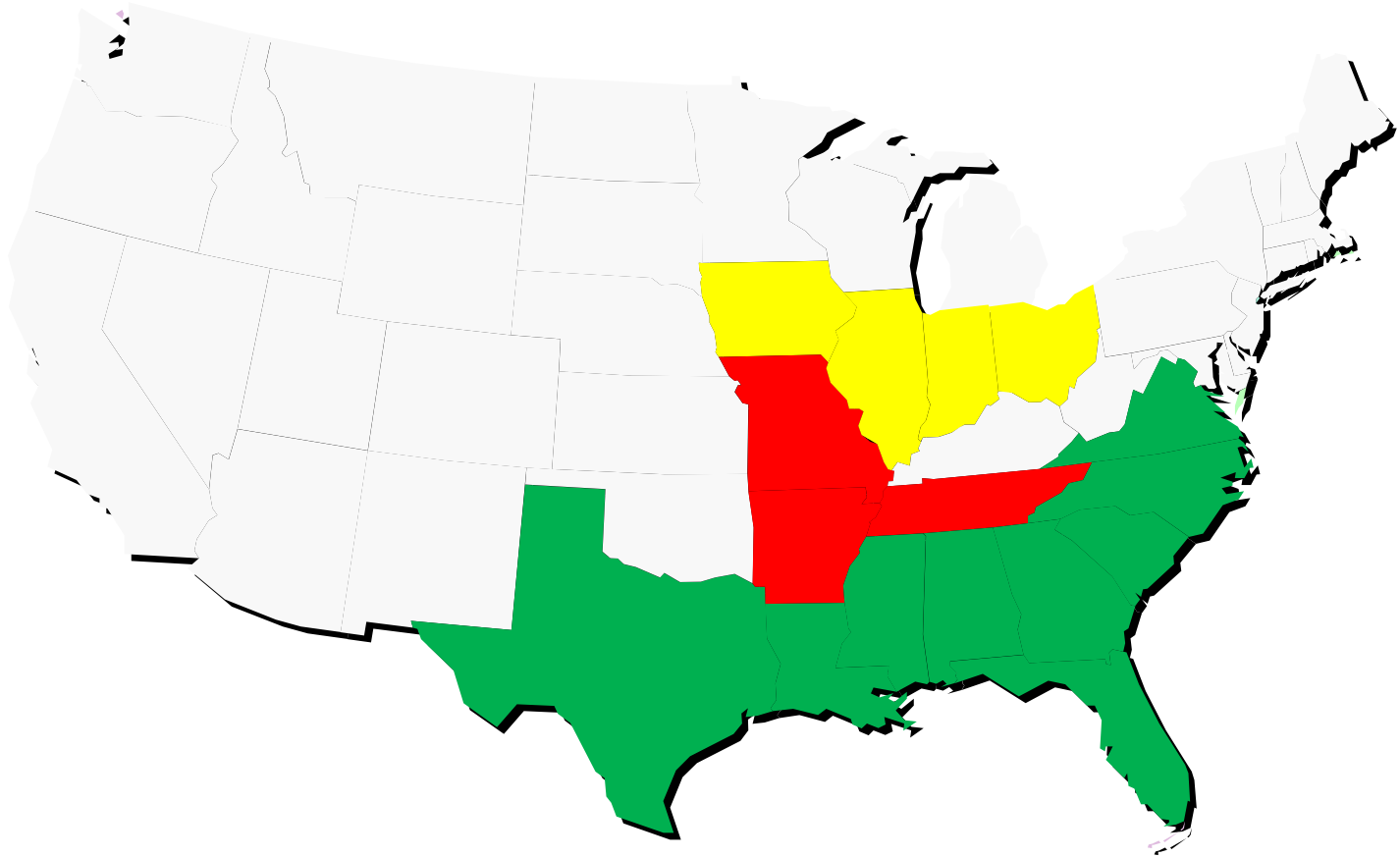
Search the Pesticide Labels site

**The Label is the Law.....YOU MUST FOLLOW THE LABEL**

# Labels Need A Make Over

- 1. Regionalized label recommendations**
- 2. Implement smart labels**
- 3. Prescription recommendations**

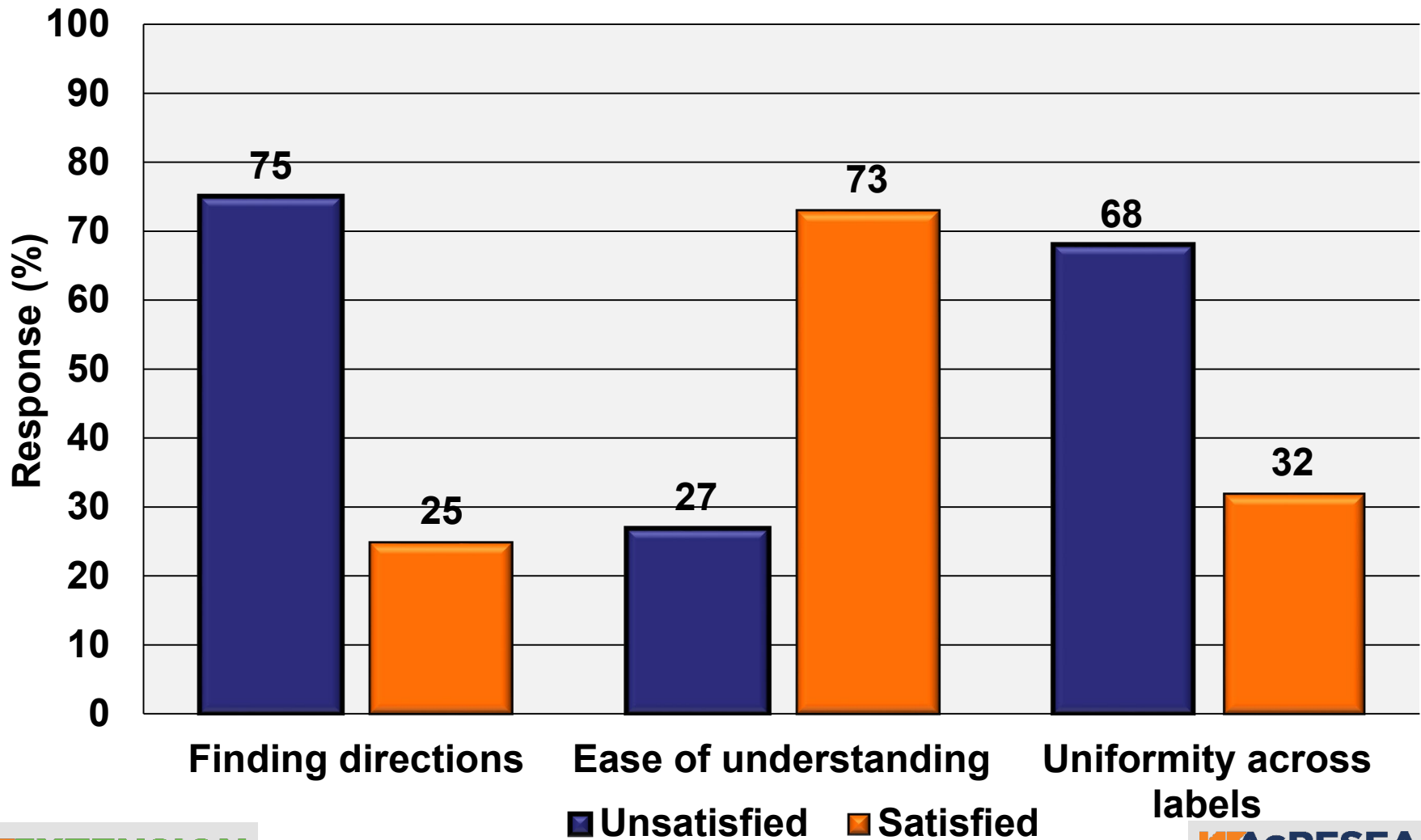
# Example of Regionalized Label



**Industry should work with academics and state department of ags to develop label recommendations.**

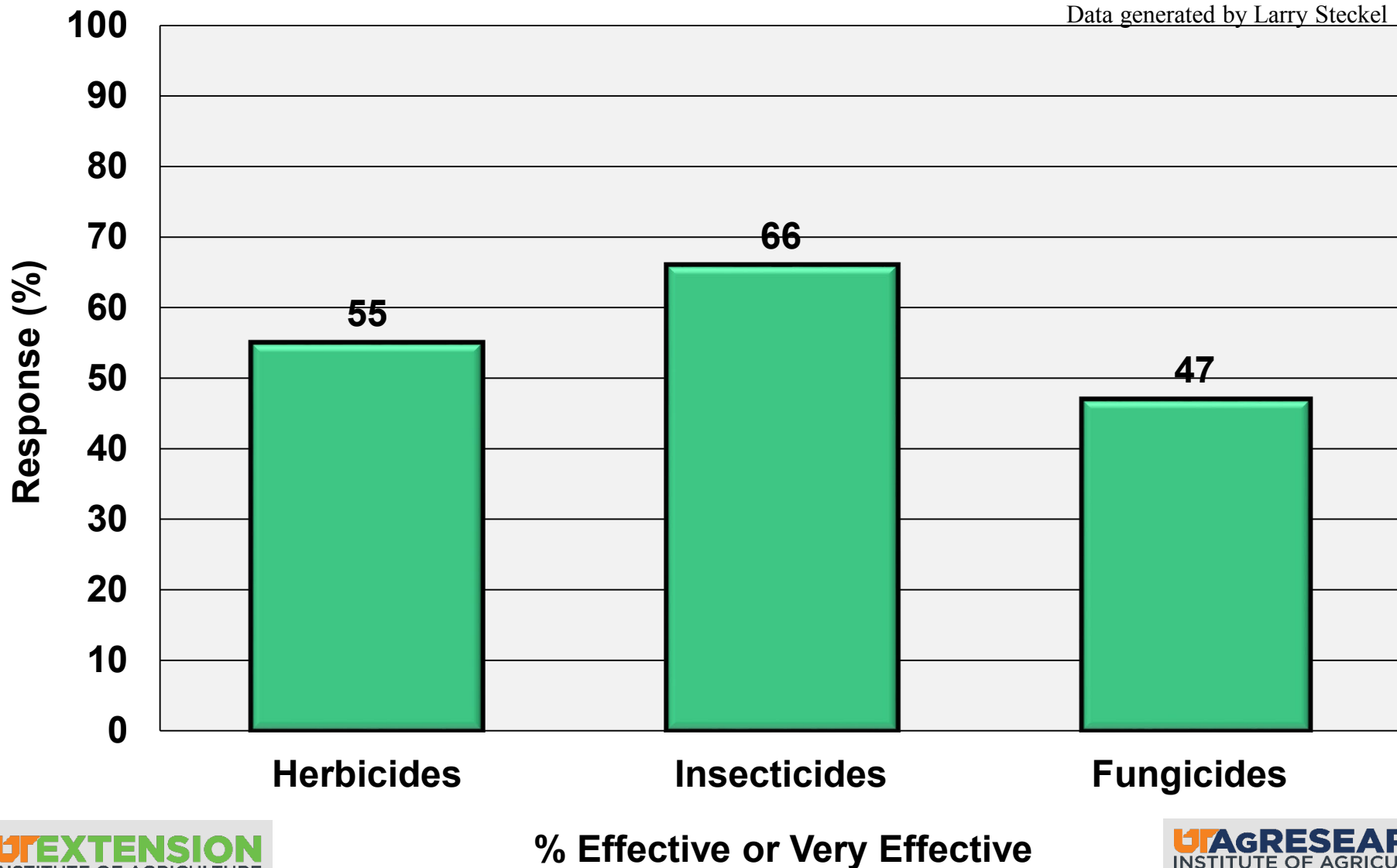


# Please rate your overall satisfaction level with pesticide labeling based on:



# How effective are pesticide labels in curbing pest resistance?

Data generated by Larry Steckel





# Pesticide Labels

## About Pesticide Labels

### Information

Information  
data, facts

- [Introduction to pesticide labels](#)
- [Finding pesticide labels](#)
- [Keep safe: handling and storing pesticide labels](#)
- [Distributed labels](#)
- [Label review manual](#)
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Search the Pesticide Labels site

**It is just not so simple**

**The Label is the Law.....YOU MUST FOLLOW THE LABEL**

# Labels Need A Make Over

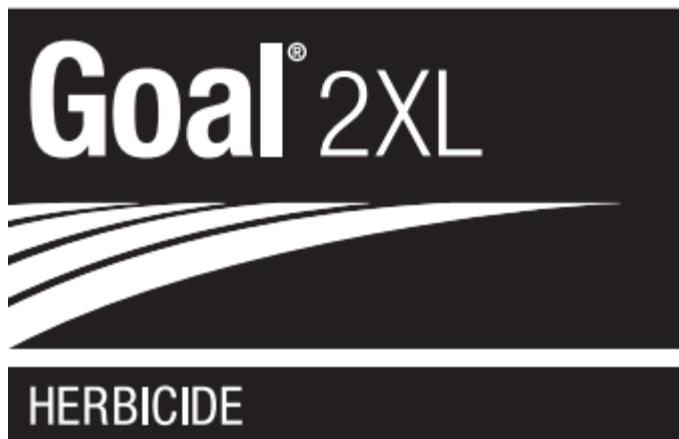
## **MID-TERM GOAL**

- 1. Regionalized label recommendations**
  - A. Better info - stewardship***
  - B. Better info – herbicide resistance***
  - C. Help address risk cup issues***

# Pigweed/Purslane In Collards - 2019



# Goal Would Change Collard Production



Great herbicide for collards but risk cup issues....several uses on label in our region that are not needed!



# Match Label Rate with Actual Use Rate



1. Labeled PRE in cotton = max rate 24 oz/A
2. Max use in field 16 oz/A; average use is 11 oz/A
3. Reflex used on > 1 million A of GA cotton.

**Assume max use rate = 375,000 lbs fomesafen**

**Actual use rate = 171,875 lbs fomesafen**

# Stewardship = Cooperation + Science + Education



**Farmers**



**Industry  
Partners**

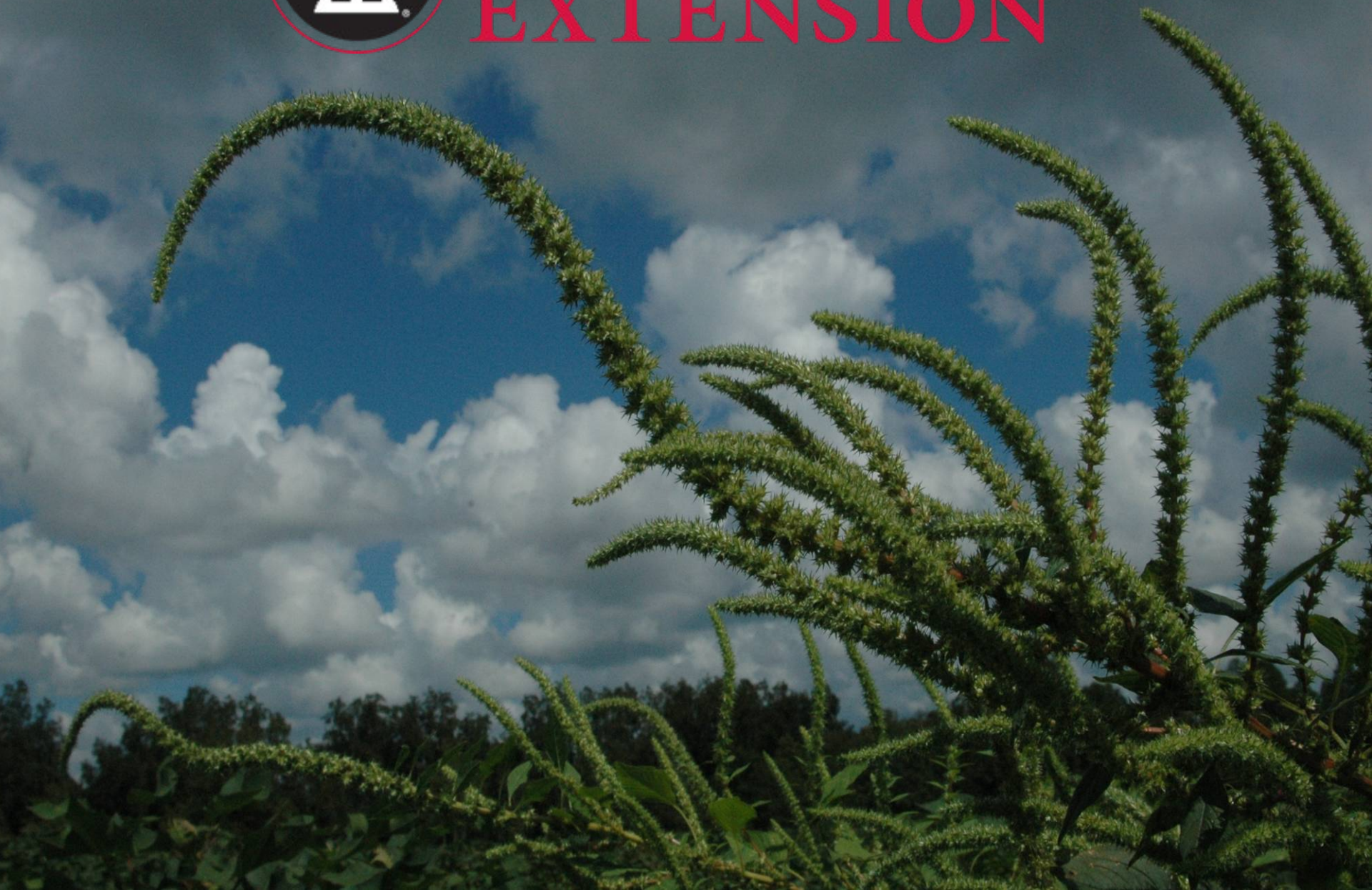


**Ag  
Advisors**





THE UNIVERSITY OF GEORGIA  
**COOPERATIVE  
EXTENSION**



# UGA's 15 Factors Influencing Success

Spray Tip

Spray Pressure

Sprayer Speed

Boom Height

Tank Cleanout

Drift Control Agent

Proper Formulation

Wind

Land Terrain

Humidity/Temp

Size  
of Crop

Buffers

Herbicide Footprint/  
Surrounding crops

Volatility

Residue Tolerance

# Dicamba Salts and Relative Volatility

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**Dicamba Acid**

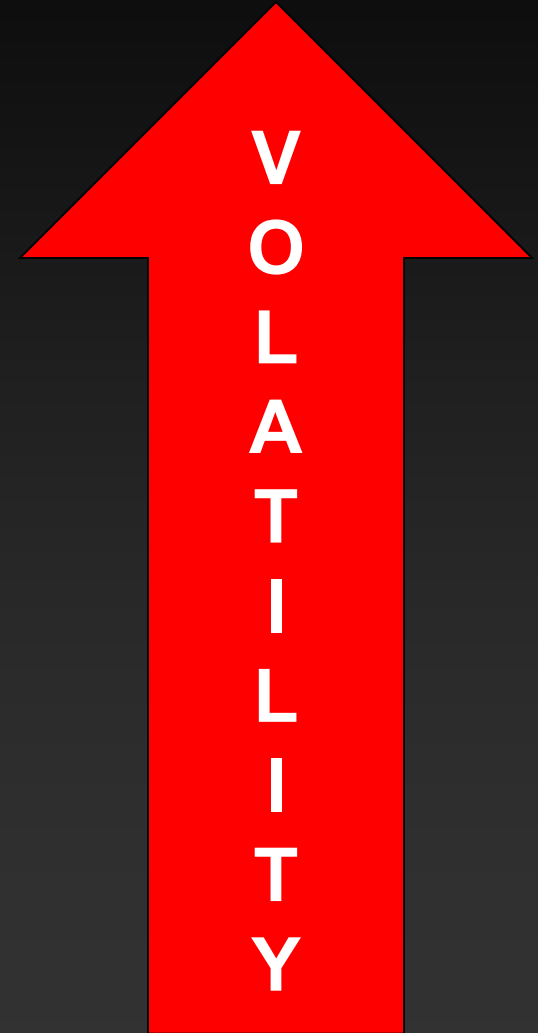
**Dicamba Na<sup>+</sup> or K<sup>+</sup>**

**Dicamba DMA (Banvel)**

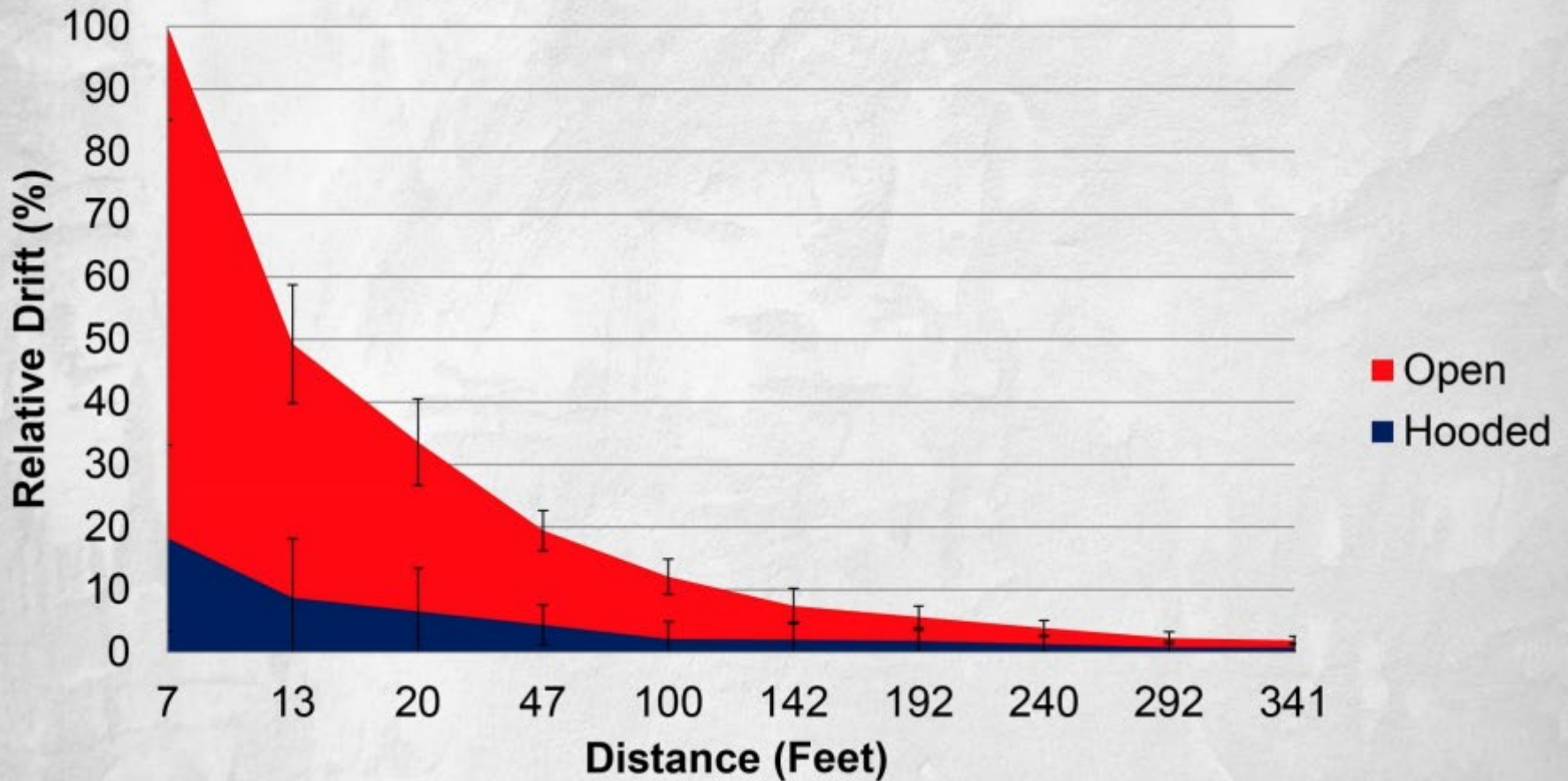
**Dicamba DGA (Clarity)**

**Dicamba BAPMA (Engenia)**

**Dicamba DGA + VaporGrip (Xtendimax)**



Open – 7.5 MPH Redball Hooded – 8.2 MPH



\*Dan Reynolds – Mississippi State University

