

Vegetable Herbicide Update - 2022

1. Review/update on Roundup/Rely
2. Chateau rate flexibility for row middles
3. New Prowl uses
4. New Reflex uses
5. Bicyclopyrone
6. Few updates!



FIFRA Section 24(c) Special Local Need

FOR DISTRIBUTION AND USE ONLY IN THE STATE OF GEORGIA

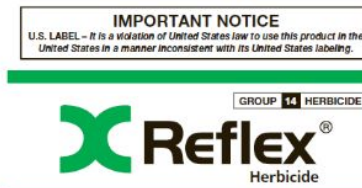


Prowl® H2O

Herbicide

For Use in Selected Crops

Active Ingredient:
pendimethalin: N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine 38.7%
Other Ingredients: 61.3%
Total: 100.0%



63045R2-9



Specially formulated
for Roundup Ready® crops

Roundup
POWER MAX II
HERBICIDE



Transplant cucumber injury from RU PMAX II applied preplant at 64 oz/A



None



7 d

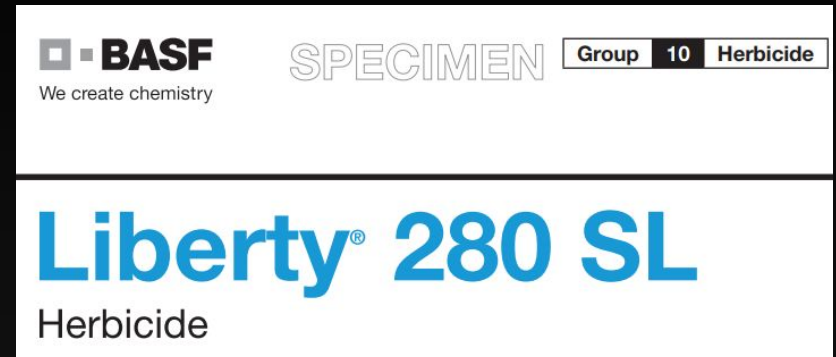


4 d



1 d

Rely – fruiting vegetables/cucurbits



Hoping for label fall of 2022

Preplant Bareground

Preplant Mulch

Row Middles

Three applications not to exceed 87 fl oz



None

Rely 48 oz/A


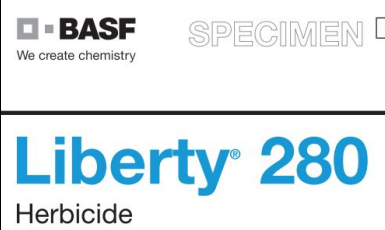




Factors to consider

Liberty® 280 SL
Herbicide

1. Soil Type
2. Production - seeded vs transplant
3. Rate
4. Irrigation
5. Interval after application
6. Crop sensitivity differences

Application Method			Irrigation 0.5” after spray before plant
Preplant Bareground Transplant	32 oz – 7 day	32 oz – 14 day	YES

*Liberty preplant rate range expected to be 29-43 oz/A.


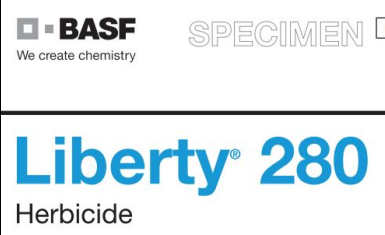
**When applying either product over mulch, do not punch holes until after irrigation/rain; plant in old holes will likely be damaged.

Rely 48 oz/A

No Irrigation

Irrigation



Application Method			Irrigation 0.5” after spray before plant
Preplant Bareground Transplant	32 oz – 7 day	32 oz – 14 day	YES
Preplant Over Mulch	32 oz – 3 day 64 oz – 10 day	32 oz – 3 day	Yes

*Liberty preplant rate range expected to be 29-43 oz/A.

**When applying either product over mulch, do not punch holes until after irrigation/rain; plant in old holes will likely be damaged.

Rely 3 qt - washed



Rely 3 qt - NOT washed




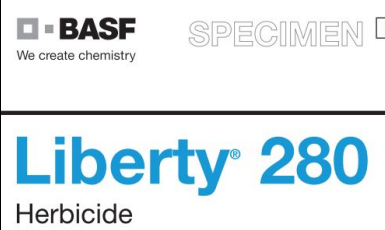
RU Applied Preplant and Washed From Mulch



Plant lands in old hole



Plant lands new hole

Application Method			Irrigation 0.5” after spray before plant
Preplant Bareground Transplant	32 oz – 7 day	32 oz – 14 day	YES
Preplant Mulch	32 oz – 3 day 64 oz – 10 day	32 oz – 3 day	Yes
Row Middle	Up to 64 oz	Up to 64 oz	--
Preplant – Seed	32 oz – 3 day	32 oz – 7 day	YES

*Liberty preplant rate range expected to be 29-43 oz/A.

**When applying either product over mulch, do not punch holes until after irrigation/rain; plant in old holes will likely be damaged.

Row Middle Weed Control Gets Way Better

FIFRA Section 24(c) Special Local Need



FOR DISTRIBUTION AND USE ONLY IN THE STATE OF GEORGIA

CHATEAU®

H E R B I C I D E S W

EPA Reg. No. 59639-99

EPA SLN No. GA150002

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

DIRECTIONS FOR USE IN ROW MIDDLES OF FRUITING VEGETABLES, CUCURBIT VEGETABLES AND BRASSICA HEAD AND STEM VEGETABLES

This label is valid until December 31, 2025 or until otherwise amended, withdrawn, cancelled or suspended.

APPROVED CROPS INCLUDE

Fruiting Vegetables: eggplant; groundcherry (*Physalis* spp); okra; pepino; pepper (includes bell pepper, chili pepper, cooking pepper, pimento, sweet pepper); tomatillo; tomato.

Cucurbit Vegetables: chayote (fruit); Chinese waxgourd (Chinese preserving melon); citron melon; cucumber; gherkin; gourd, edible (includes hyotan, cucuzza, hechima, Chinese okra); *Momordica* spp (includes balsam apple, balsam pear, bittermelon, Chinese cucumber); muskmelon (includes cantaloupe); pumpkin; squash, summer; squash, winter (includes butternut squash, calabaza, hubbard squash, acorn squash, spaghetti squash); watermelon.

Brassica Head and Stem Vegetables: Broccoli; Brussels Sprouts; Cabbage; Cabbage, Chinese, napa; Cauliflower; cultivars, varieties, and/or hybrids of these commodities.

Third Party Chateau Label

Chateau Row Middle

1. Raised bed at least 4" high 25" wide
2. Up to 8 oz/A per crop (be conservative)
3. Spray before planting;
4. Contact no more than 1" up mulch side
5. **Product can not be effectively washed from the mulch**
6. $\geq 0.25''$ rain after application before plant

**Non-treat
ed**

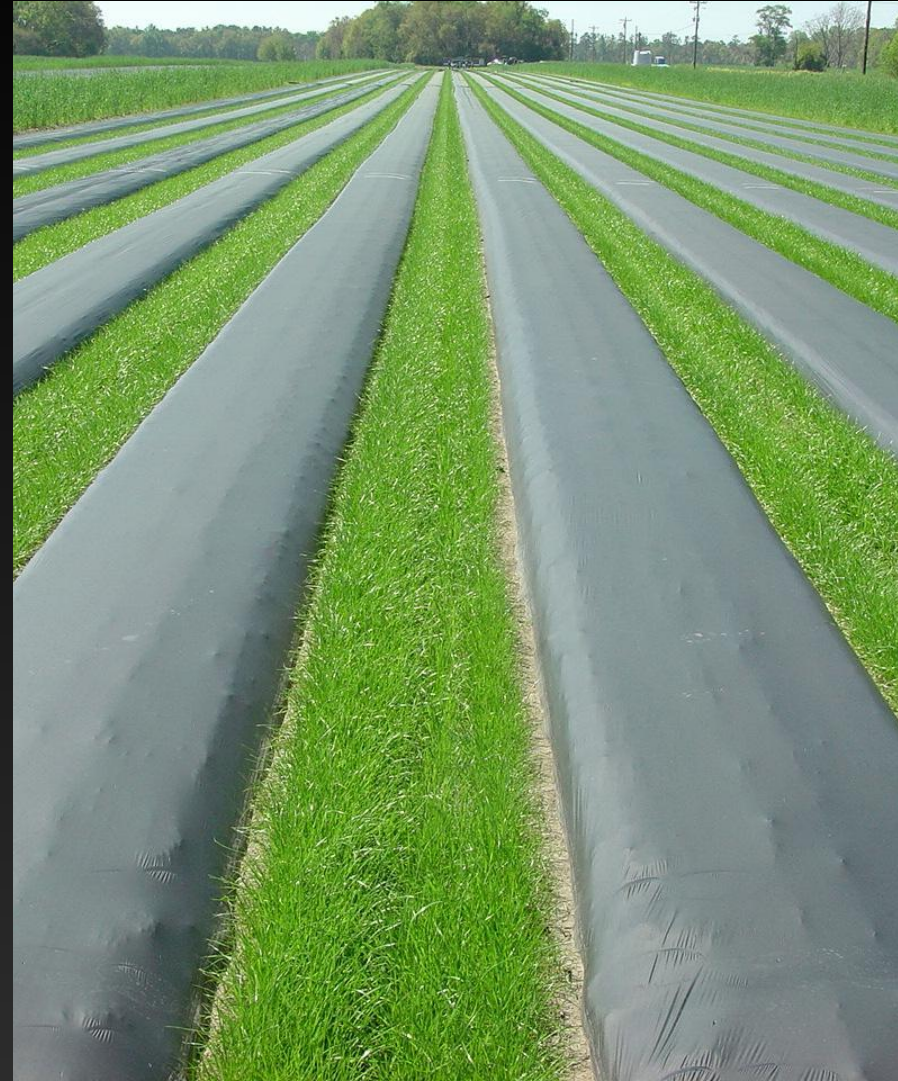
**RU +
Chateau
2 oz/A**

**RU +
Chateau
5 oz/A**



Challenge: Crop 1 Cover

- ❑ Cover crop response to Chateau + Dual/Prowl/etc
- ❑ Ryegrass very sensitive to Chateau
- ❑ Establish cover and then apply.....when? What growth stage?

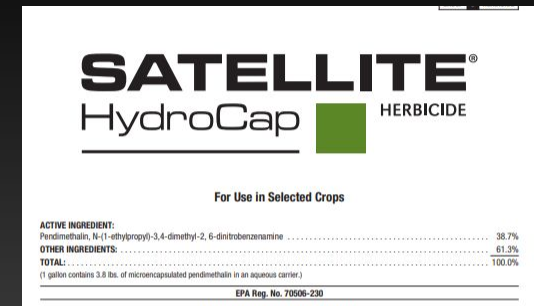
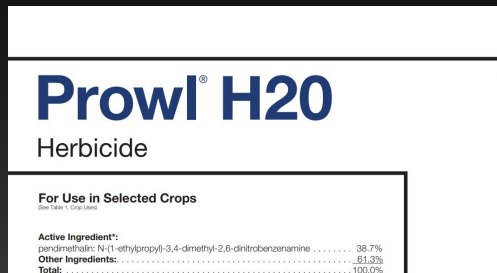


Prowl H20/Satellite HydroCap

Broccoli, Brussel Sprouts, Cabbage, Cauliflower

Cantaloupe, Watermelon, Muskmelon

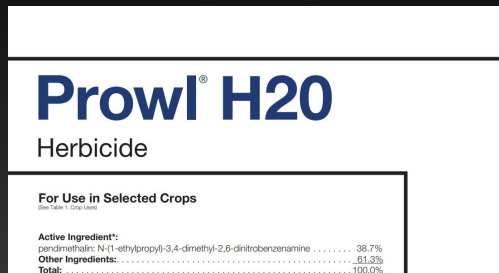
Eggplant, Pepper, Tomato



Apply up to 2 pt/A, shielded application, no contact, spray 6 inches from stem/vines

Prowl H20

Green Onions

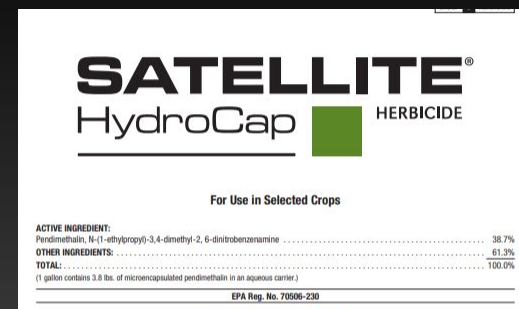


Apply 1.5-2.0 pt when onions have 2-3 leaves

Satellite HydroCap

Label actually allows spray over leaf brassica greens but this may be a bad idea.

However, row middle application may be helpful!



Apply up to 2 pt/A, shielded application, no contact, spray 6 inches from stem/vines

No Herbicide



IMPORTANT NOTICE
U.S. LABEL – It is a violation of United States law to use this product in the United States in a manner inconsistent with its United States labeling.

GROUP 14 HERBICIDE

Reflex[®]
Herbicide

syngenta.

For Control of Certain Weeds in Cotton, Dry Beans, Potatoes, Snap Beans, and Soybeans
Active ingredient/Guarantee
Sodium salt of fomesafen
5-[p-chloro-4-(trifluoromethyl)phenoxy]-N-methylsulfonyle-2-methylbenzamide 77.2%
Other ingredients 22.8%
Total 100.0%

Reflex Herbicide is formulated as a soluble liquid.
Reflex Herbicide contains 1.0 benzothiazole-3-one at 0.02% as a preservative.

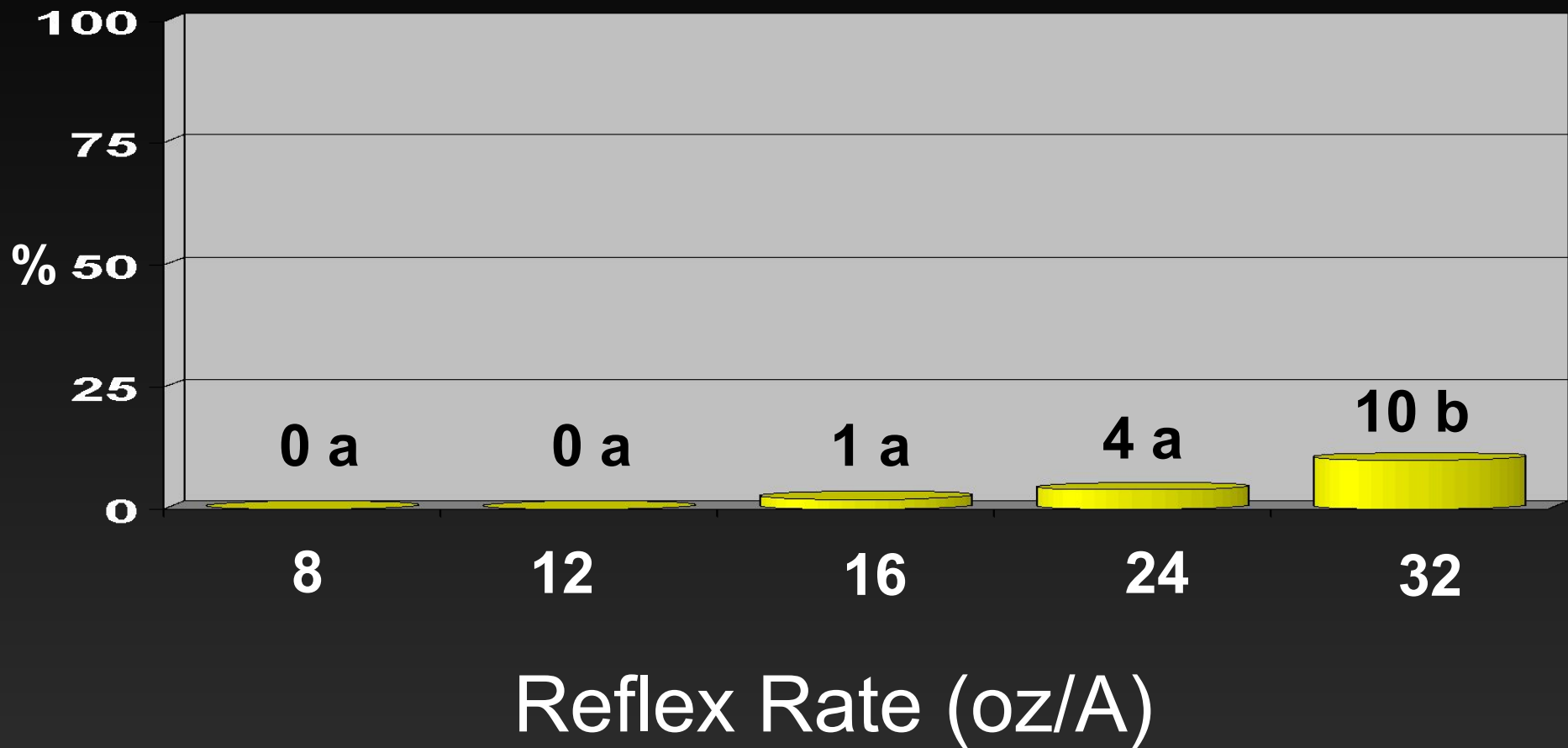
Reflex Herbicide is equivalent to 21.7% or 2 pounds per U.S. gallon or 240 grams per liter of fomesafen active ingredient.

KEEP OUT OF REACH OF CHILDREN.

DANGER/PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)
See additional safety precautions and directions for use.

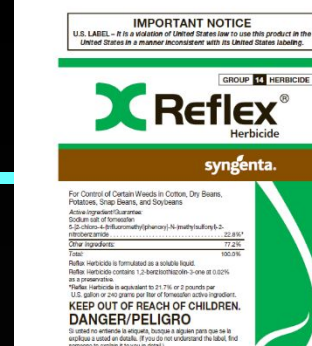
Visual Eggplant Injury to Reflex Preplant. TyTy, GA. 2017. 26-29 DAT.



*Values followed by the same letter are not different at $P = 0.05$. Data combined over 2 runs.



Reflex

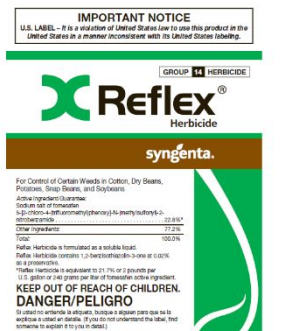


Eggplant

Label Hopeful Early 2022:

Bareground: spray 12 oz/A; irrigate, transplant

Under Mulch: 12 oz/A after final bed (including drip) iust before mulch being laid



Reflex



Sweet Potato

Label Hopeful Early 2022:

Bareground: spray up to 1 pt/A; irrigate,
transplant

Proposed Bicyclopyrone Use in Watermelon

Application Timing: Preplant and Post-Directed Row Middles

Use Rate: 2.6-3.5 fl oz/a (37.5-50 g ai/ha)

PHI: 14 days

Crop Specific Use Directions:

- Apply before transplanting watermelons or post-directed
- Avoid contacting watermelon foliage during application or crop injury may occur.
- Use of a hooded or shielded sprayer will minimize crop injury when applying as row middle treatment.



Bicyclopyrone
Pre-Transplant
3.6 oz/a



Bicyclopyrone
POST-DIRECTED
3.6 oz/a



Foliar contact can
result in transient
bleaching.

Bicyclopyrone POST @ 3.6 oz/a

Classification: PUBLIC - Not for Distribution

Photos: NC – 2020 – Syngenta Trial – 6 days after post applications

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Bicyclopyrone: General Use Directions in Specialty Crops

- Minimize soil movement during the transplanting or planting process following pre-transplant or preplant application.
 - If a significant amount of treated soil is moved, weed control in the row will be reduced.
- Application should be made to small weeds (<2").
- Use NIS or COC to enhance weed control.
 - Add a NIS at 0.25% v/v or COC at the rate of 1.0% v/v.
 - AMS may be added to improve the consistency of weed control.

Top 10 Troublesome Most Weeds Among All Broadleaf Crops, Fruits, and Vegetables

Rank	Most Troublesome	Bicyclopyrone Control or Partial Control	
		PREEMERGENCE	POSTEMERGENCE
1	Palmer amaranth	+	+
2	Kochia	+	+
3	Common lambsquarters	+	+
4	Nutsedge spp.	—	—
5	Horseweed (Marestail)	+	+
6	Waterhemp	+	+
7	Pigweed spp.	—	—
8	Canada thistle	+	+
9	Morningglory spp.	+	+
10	Common Ragweed	+	+

Var. Olychen (2019-2020) Survey of the most common and troublesome weeds in broadleaf crops, fruits & vegetables in the United States and Canada. Weed Science Society of America National Weed Survey Dataset.

Available: https://wssa.net/wp-content/uploads/2019-Weed-Survey_broadleaf-crops.xlsx

Classification: PUBLIC - Not for Distribution

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Bicyclopyrone

- Registration summer 2022??
- Watermelon tolerance good
- More data need on weeds
- Carryover - potential problem!

Bicyclopyrone	
PESTICIDE TYPE	HERBICIDE
CHEMICAL CLASS HRAC Code	HPPD inhibitor, subclass triketone Group 27
COMMON TRADE NAMES	Acuron
MAJOR DEGRADATE	Five major transformation products
APPLICATION RATE (lbs a.i./A)	Single: 0.045 Max Annual: 0.045
REGISTRATION STATUS	EPA: April 2015 Minnesota: May 2015
TOXICITY PROFILE FOR APPLICATORS	Signal word: Caution IV (oral, dermal, and inhalation)
BASIC MANUFACTURER	Syngenta Crop Protection
MDA LABORATORY CAPABILITIES	In discussion
HUMAN HEALTH	
NON-CANCER	Acute PAD = 0.01 mg/kg/day Chronic PAD = 0.00028 mg/kg/day
CANCER	Suggestive evidence of cancer
<i>Acute and chronic PADs are doses that include all relevant uncertainty and safety factors</i>	
ENVIRONMENTAL AQUATIC TOXICITY	
FISH	Acute: >46,850 ppb Chronic: >10,000 ppb
INVERTEBRATE	Acute: 46,650 ppb Chronic: >103,700 ppb

Cooperation And Education



**Georgia
Farmers**



Consultants

**Industry
Partners**

Cooperation And Education



Georgia

**Support by the Vegetable Commodity
Commission Makes These
Efforts Possible**



Cooperation

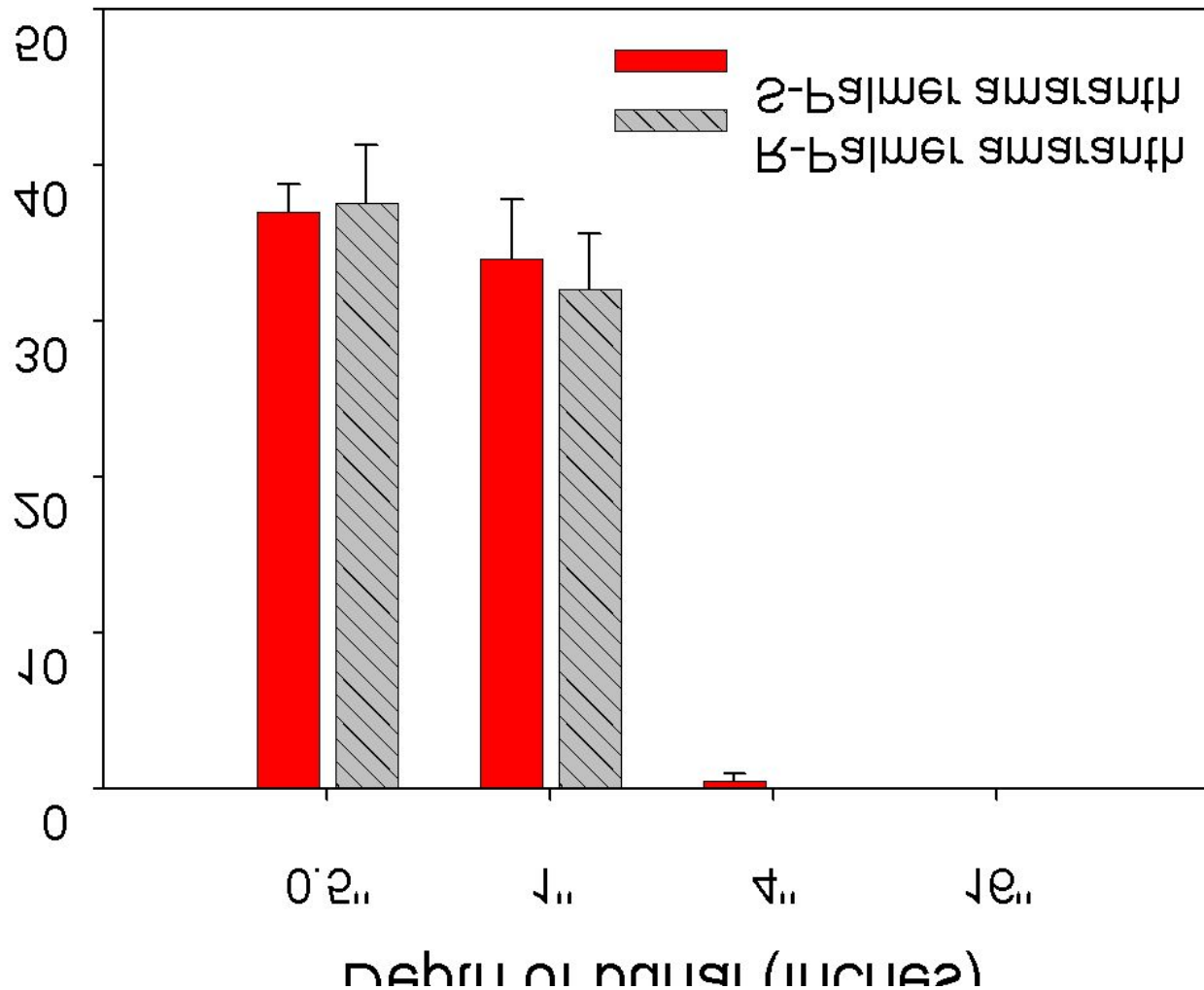
**Industry
Partners**

DEEP TURNING CAN IMPROVE WEED CONTROL





Influence of burial depth on Palmer amaranth emergence



Keeley et al. (1987) reported 36-44% emergence at 0-1", 7% at 2", and 2% at 3".

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



No Deep Tillage



Deep Turn

No Herbicide Treatment

DEEP TURNING CAN IMPROVE WEED CONTROL



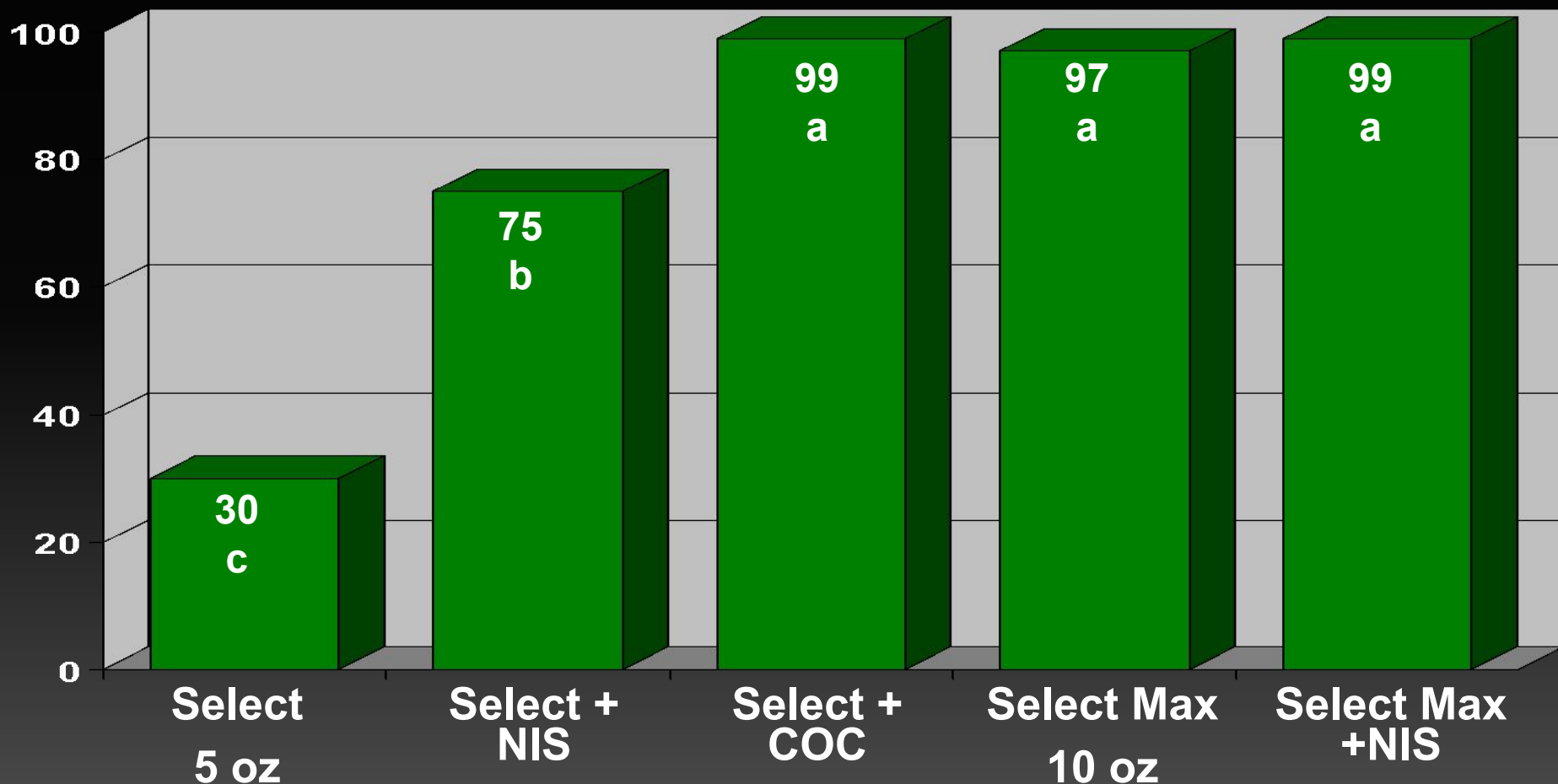
Deep Turn

Drilled

Grasses Are Extremely Competitive



Percent large crabgrass control with various clethodim products and adjuvants. TyTy, GA.



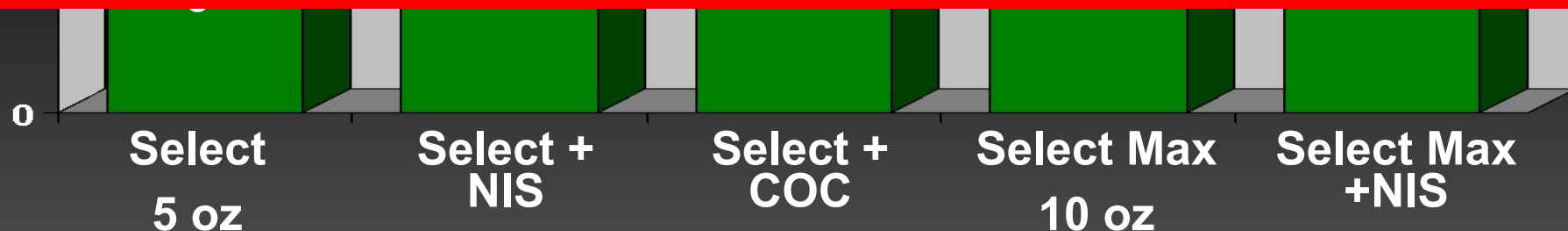
Large Crabgrass 3 inches at time of application!

Percent large crabgrass control with various clethodim products and adjuvants. TyTy, GA.



GOOSEGRASS MUCH MORE CHALLENGING

- ❑ 1.5 inch or less
- ❑ Suggest adding NIS
- ❑ Resistance to POST herbicides huge concern



Large Crabgrass 3 inches at time of application!



Select Max – State Label

- 1) State label allows no adjuvant
- 2) 9-10 oz/A without adjuvant; $\leq 3''$ grass
- 3) Goosegrass more challenging, add NIS?
- 4) Grasses often need to be treated in 15-21 days
- 5) Beans, peas, carrot, cucurbits, legumes, fruiting veggies, garlic, head & stem brassica, leafy brassica greens, lettuce, onion.



1. Residual herbicides are key in crop.
2. Between Crops: Max Roundup allowable followed by Gramoxone 5 to 7 d later.



Effective Residual

Atrazine
Chateau
Devrinol
Dual Mag
Goal
Outlook
Prowl
Reflex
Sencor
Sonalan
Sencor
Treflan
Valor

1. Residual herbicides are key in crop.
2. Between Crops: Max Roundup allowable followed by Gramoxone or P and later.



CAN BE Effective POST

Atrazine

Lorox

Sencor

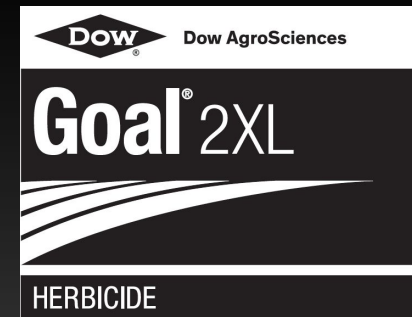
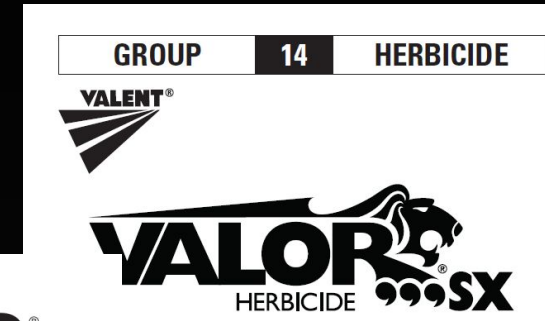
RU fb Gramoxone

- 1. Residual herbicides are key in crop.**
- 2. Between Crops: Max Roundup allowable followed by Gramoxone 5 to 7 d later.**

TREFLAN



Palmer amaranth resistant to PPO herbicides POST



Herbicide resistance – a perpetual nightmare

Greenhouse – 7 days

None

Cobra
125 oz
+
COC

Blazer
240 oz
+
NIS

Reflex
240 oz
+
NIS



Palmer Response to Valor PRE. Greenhouse, Tifton GA.



**Non-treated
control**



**Valor PRE
“Normal”
Population**



**Valor PRE
PPO POST
Resistant
Population**

Palmer Response to Valor PRE. Greenhouse, Tifton GA.



**Non-treated
control**



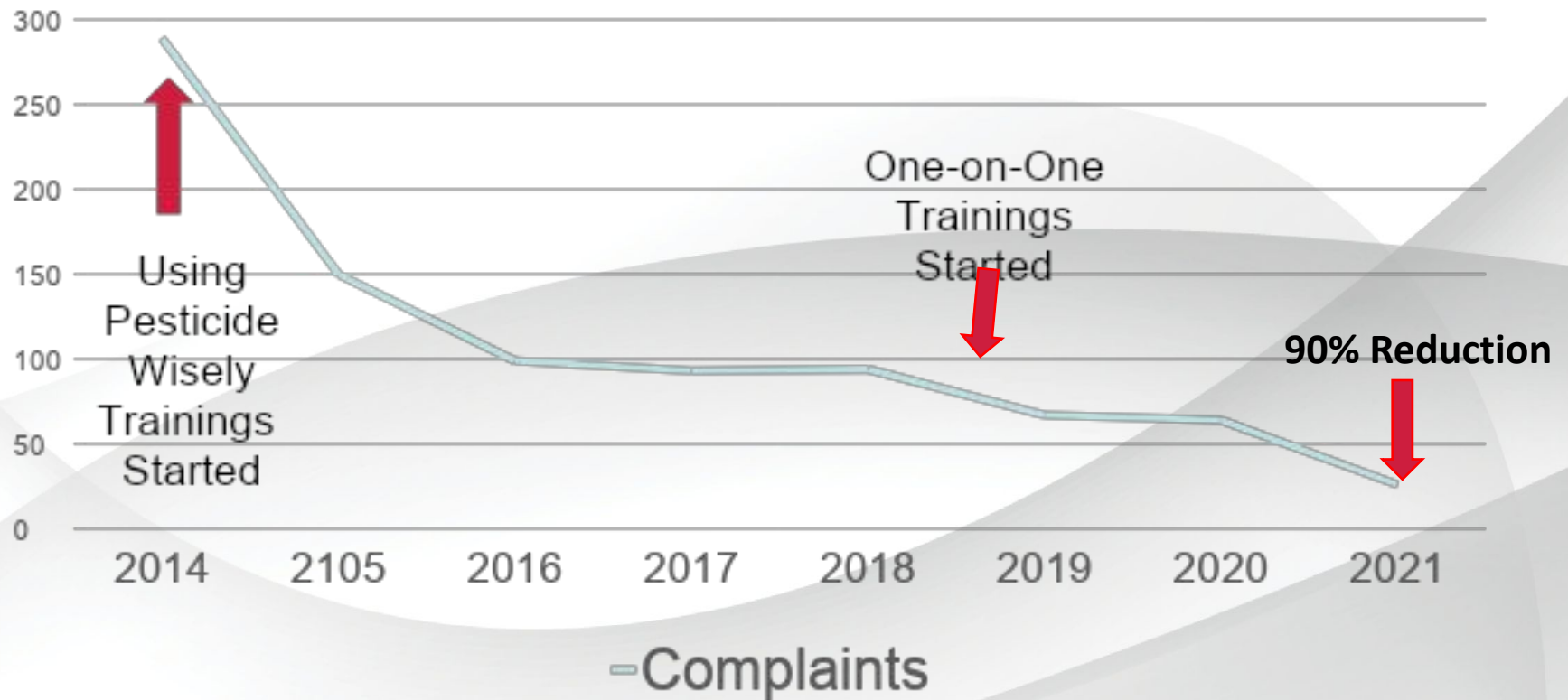
**REFLEX = ~15 X
Valor = ~ 30 X**

**Valor PRE
“Normal”
Population**



**Valor PRE
PPO POST
Resistant
Population**

UGA Extension Pesticide Drift Complaints



Endangered Species Act - 1973

- Provides framework to conserve and protect endangered & threatened species and their habitats!

- Why now?

FOR PUBLICATION

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

NATIONAL FAMILY FARM COALITION; CENTER FOR FOOD SAFETY; CENTER FOR BIOLOGICAL DIVERSITY; PESTICIDE ACTION NETWORK NORTH AMERICA, <i>Petitioners,</i>	No. 19-70115
v.	Environmental Protection Agency
U.S. ENVIRONMENTAL PROTECTION AGENCY; ANDREW WHEELER, in his official capacity as Administrator, <i>Respondents,</i>	OPINION
MONSANTO COMPANY, <i>Respondent-Intervenor.</i>	

On Petition for Review of an Order of the
Environmental Protection Agency

Argued and Submitted April 21, 2020
San Francisco, California

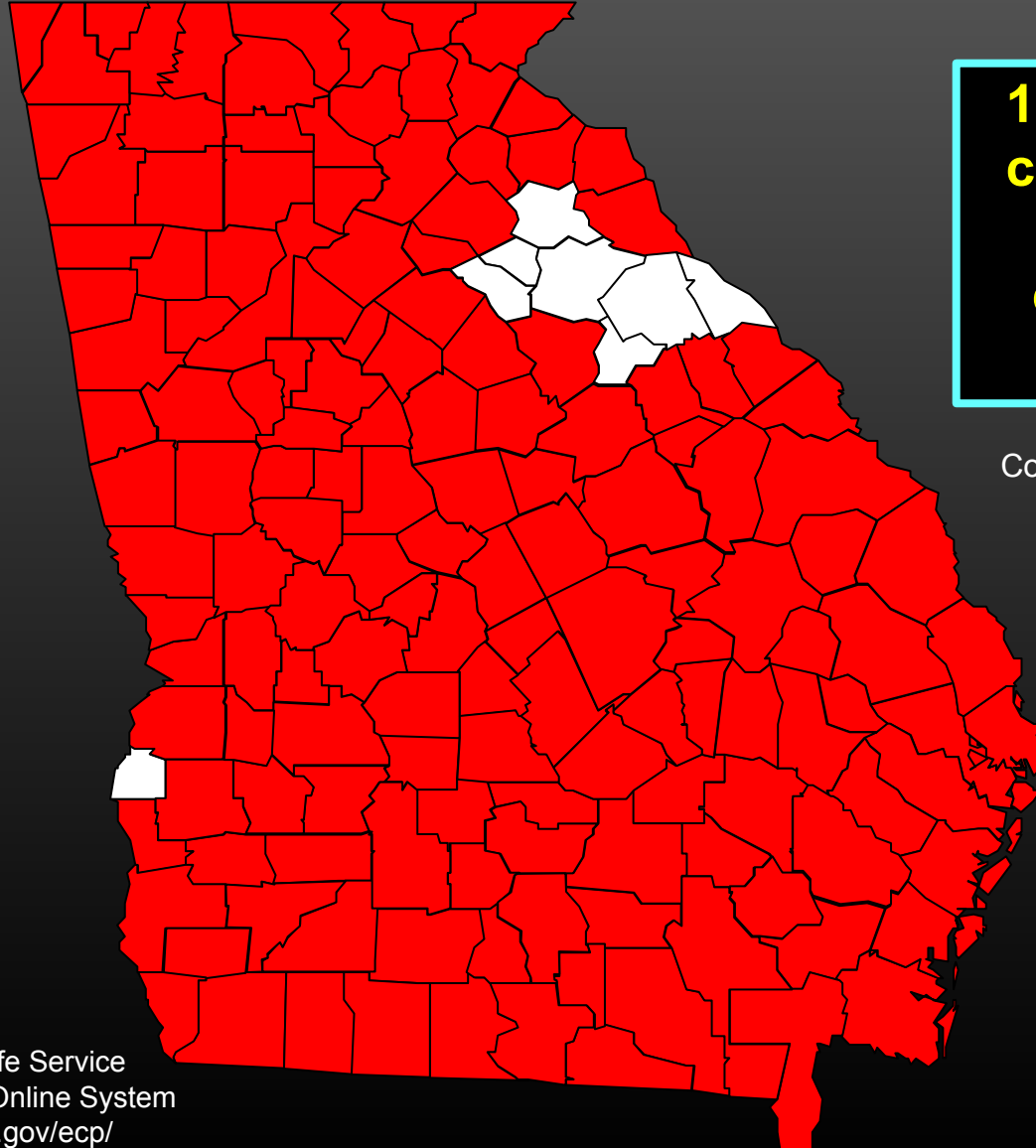
Filed June 3, 2020

Before: Michael Daly Hawkins, M. Margaret McKeown,
and William A. Fletcher, Circuit Judges.

Opinion by Judge W. Fletcher



Georgia Counties with Threatened and Endangered Species

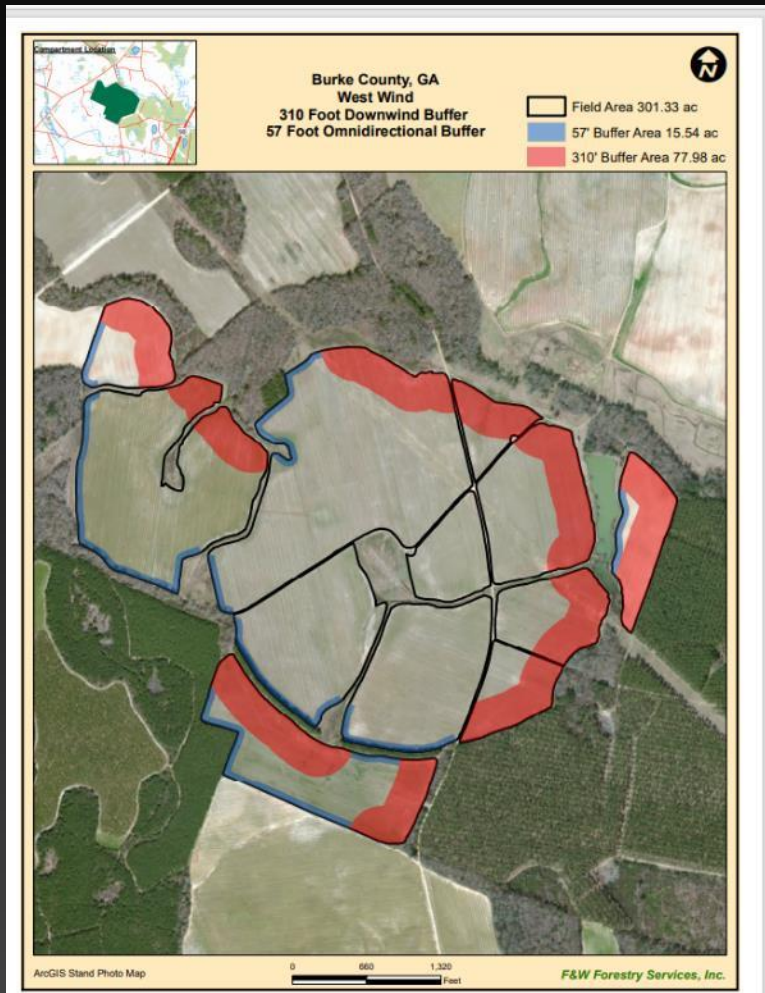


**151 out of 159
counties have
threatened/
endangered
species**

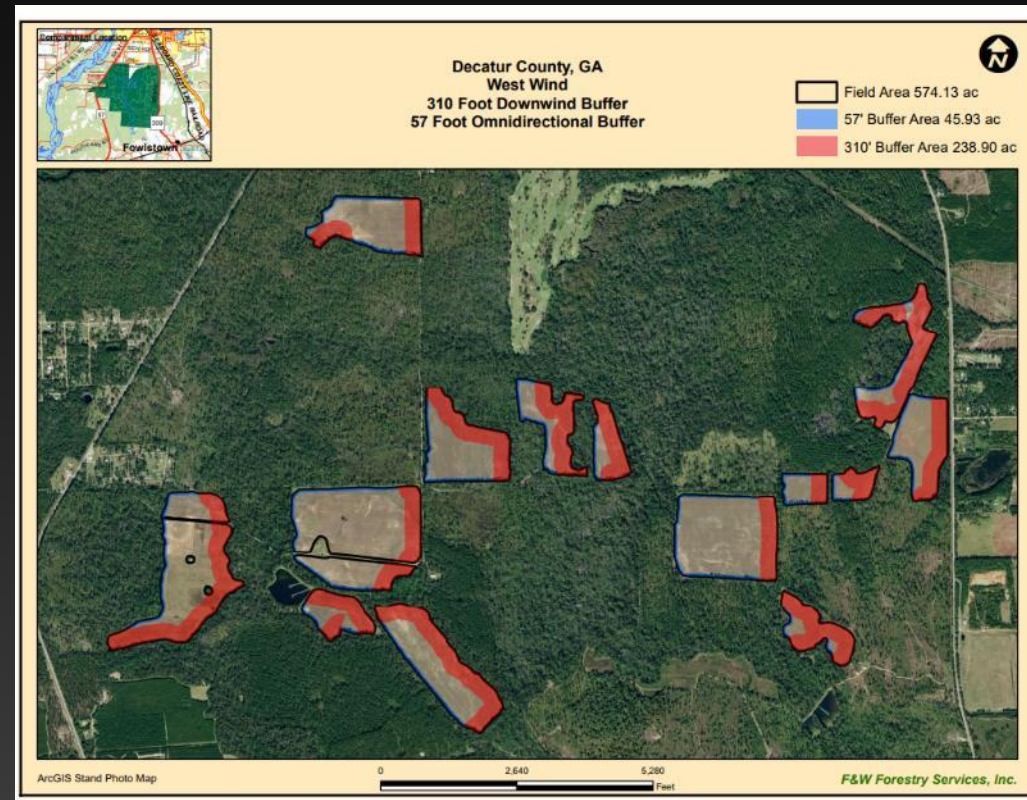
Counties with threatened/
endangered species
highlighted in **red**.

Impact on Real Georgia Farmers*

Buffer 310 downwind; 57 omni directional



Best case = lose 31%

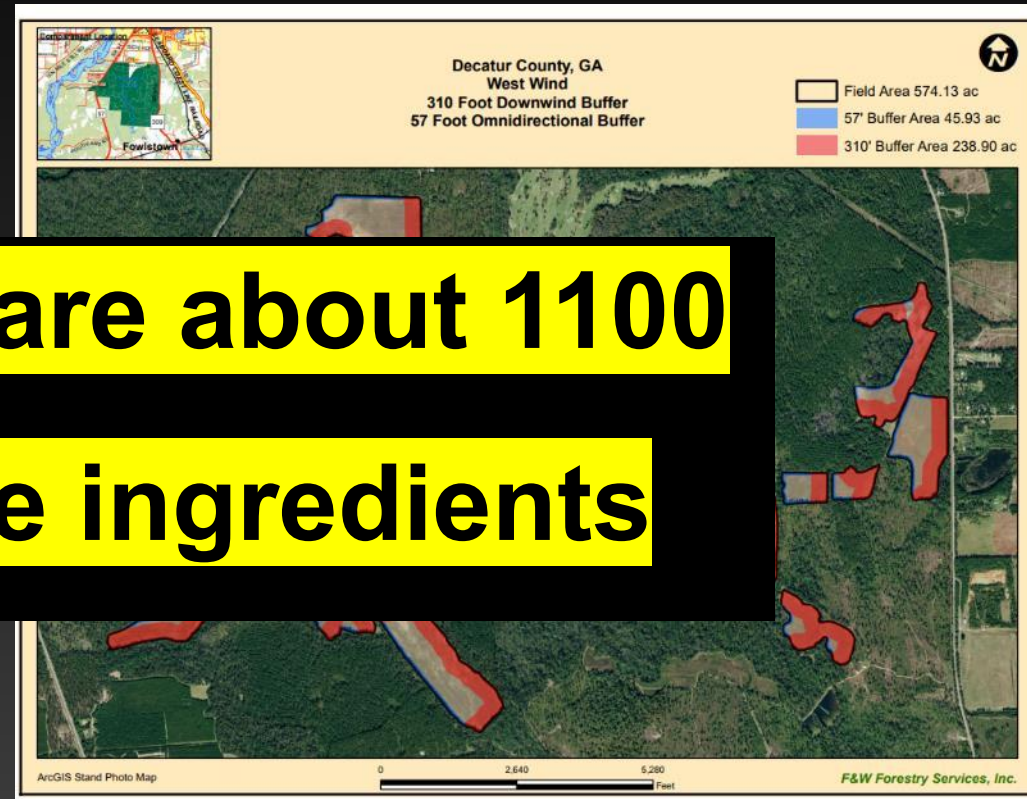
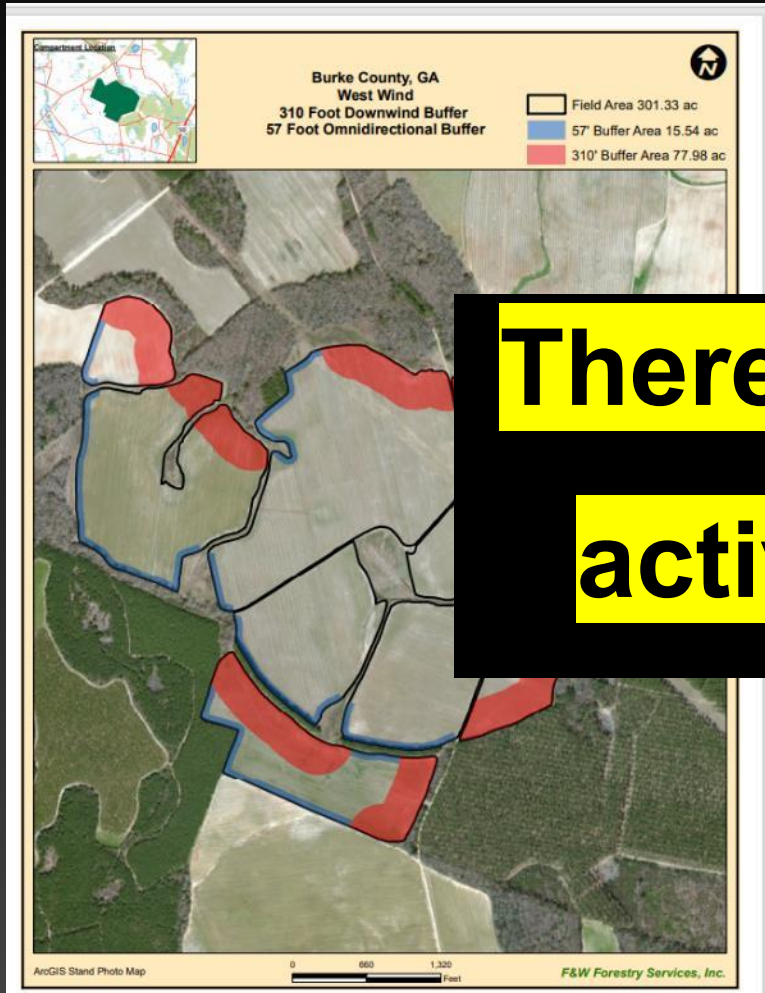


Worst case = lose 49.6%

*Calculation assumes west wind.

Impact on Real Georgia Farmers*

Buffer 310 downwind; 57 omni directional



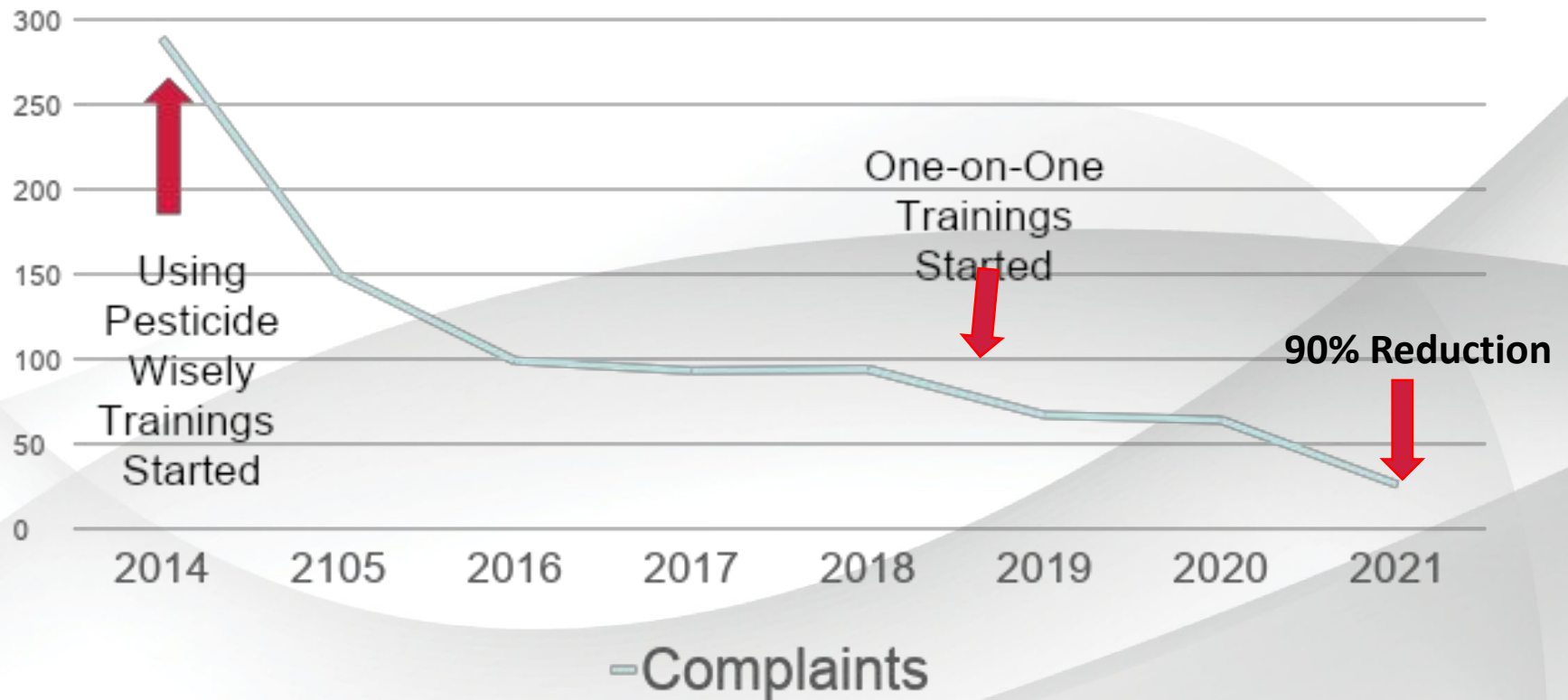
**There are about 1100
active ingredients**

Worst case = lose 49.6%

Best case = lose 31%

*Calculation assumes west wind.

UGA Extension Pesticide Drift Complaints



LAMINATED HANDOUTS:

Watermelon

Squash

Sweet potato

PRINTED HANDOUTS:

Cole Crops and Greens

Comments/Questions?

