

WEED CONTROL RESEARCH WITH LIBERTY IN LOUISIANA COTTON

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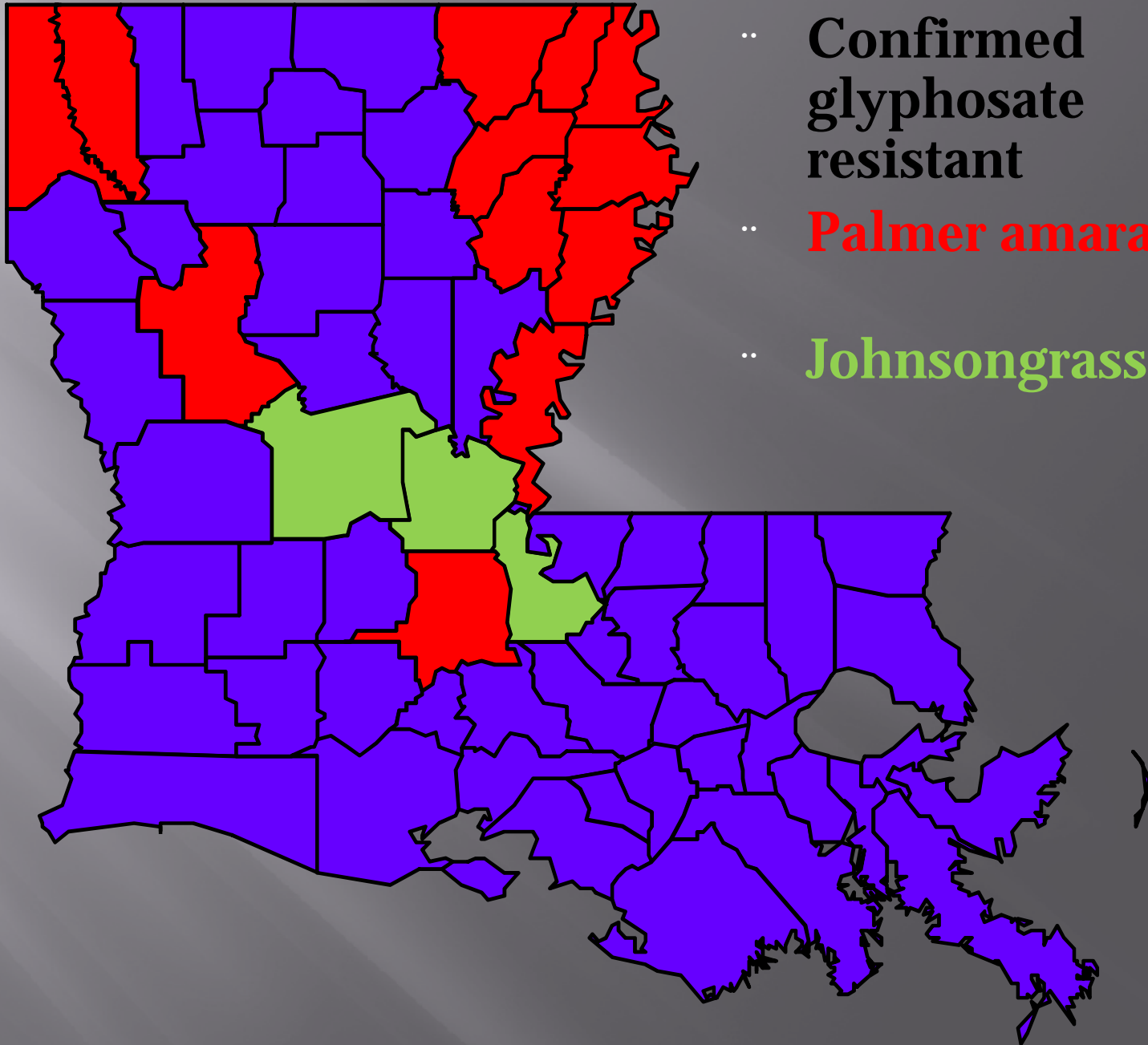
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Reason for Liberty Link Switch

- Preserve herbicide-resistance technology in cotton!
- Why?
 - Herbicide-resistant weeds
 - glyphosate-Rs weeds
- Where?



.. Confirmed
glyphosate
resistant

.. Palmer amaranth

.. Johnsongrass

Palmer amaranth

- Life cycle: Summer
- Reproduction: Dioecious
- Seed production: 200,000 seeds/plant with 73% germination
- Growth rate: 0.21 cm/day



Aug. 21st

Aug. 15th

Sources: Mosyakin and Robertson 2008; Ehleringer 1983; Gallagher and Cardina 1997; Keeley et al. 1987; Horak and Loughlin 2000

**Managing
Palmer is a**

**“Numbers
Game”**



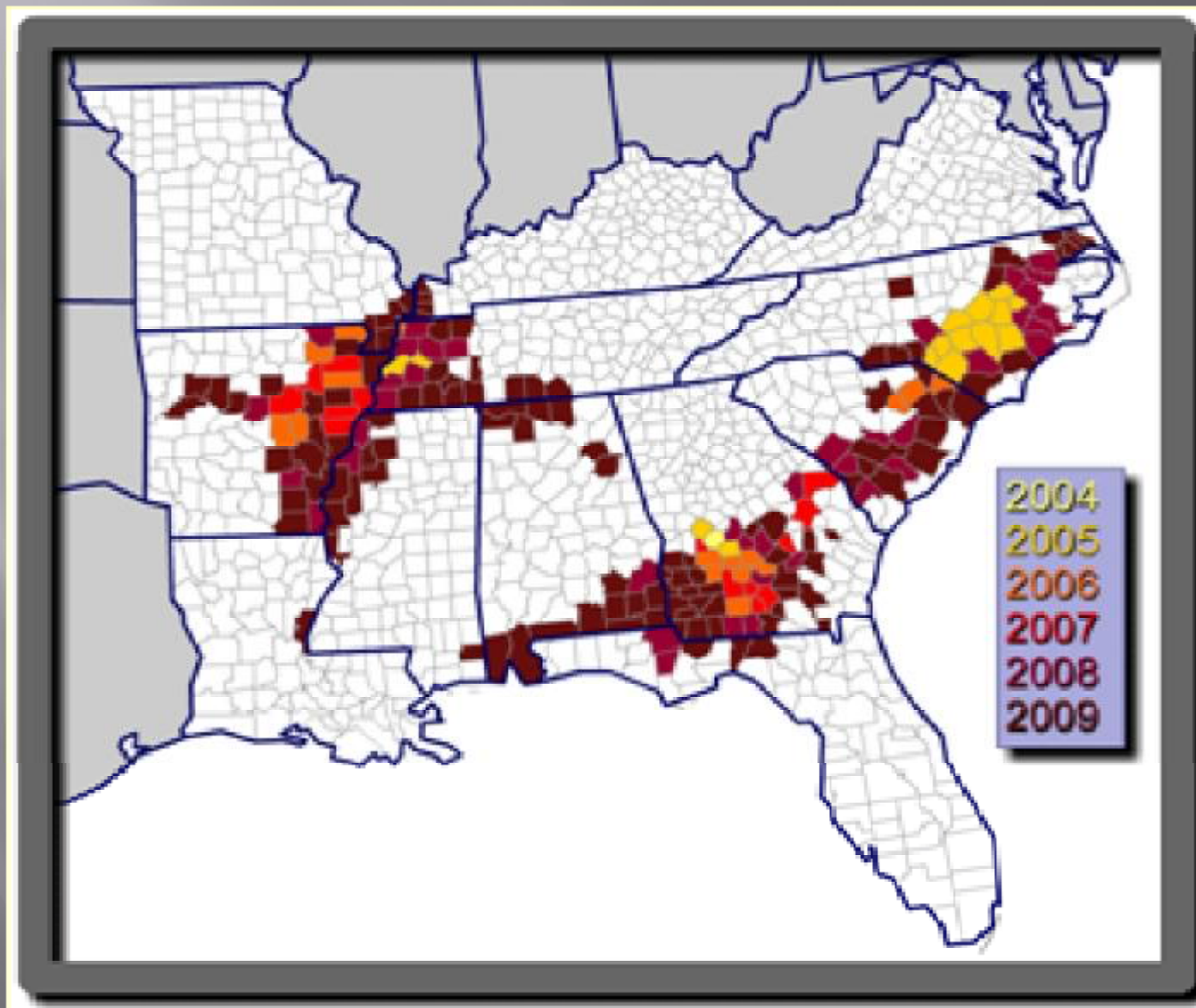
1,774,900 Seed

Numbers Game

- $150 \times 33\% \text{ female} = 50$
females/A
- $50 \times 150,000 \text{ seed} =$
 $7,500,000 \text{ seed/A}$
- $7,500,000 - 95\% - 99\%$
control = 3750
plants/A



Counties with Confirmed Populations of Glyphosate-Resistant Palmer Amaranth - 2009



Slide: Dr. Bob Nichols – Cotton Incorporated



GR Palmer amaranth



Photo: Dr. Larry Steckel – Univ. of Tenn.



Photo: Dr. Stanley Culpepper – Univ. of Georgia



Photo: Dr. Jason A. Bond – Miss. State Univ.



Liberty Link Cotton

- Emergence to early bloom 22-29 oz (87 oz total); 3 apps up to 29 oz
- Single 43 oz rescue application (72 oz total)
- 10 to 14 days between applications
- 70 d PHI
- Tank mixtures allowed (Dual Magnum, Staple etc.)
- Additional surfactant not needed with mixtures
- Spray coverage essential



Liberty Link Cotton Research

- Speed of activity intermediate of Glyphosate and paraquat
- 29 oz rate has provided the greatest consistency when applied to susceptible weeds 3 to 4 inches in height
- Excellent control (90 to 100%) of cocklebur, morningglories, hemp sesbania, sickelpod, prickly sida, Pa. smartweed, copperleaf, smellmellon
- Control seems to be better on seedling johnsongrass as size increases (to a point)
- Control of larger morningglories and hemp sesbania is much better than with glyphosate
- Control of pigweed has been erratic
- Poor control of nutsedge
- Control of larger annual grasses (>3 to 4") can be erratic and require highest rate, especially goosegrass and broadleaf signalgrass (may budget in a graminicide)



Liberty Link Cotton Research

- Multiple applications needed due to lack of residual control
- Residual grass materials at planting have benefitted system where timely applications were delayed and pigweed/grass pressure was heavy.
- Dual Magnum has provided residual grass control with OT applications
- Staple/Dual Magnum have provided residual pigweed control
- POST only systems with timely application have looked real good
- Resistance Management



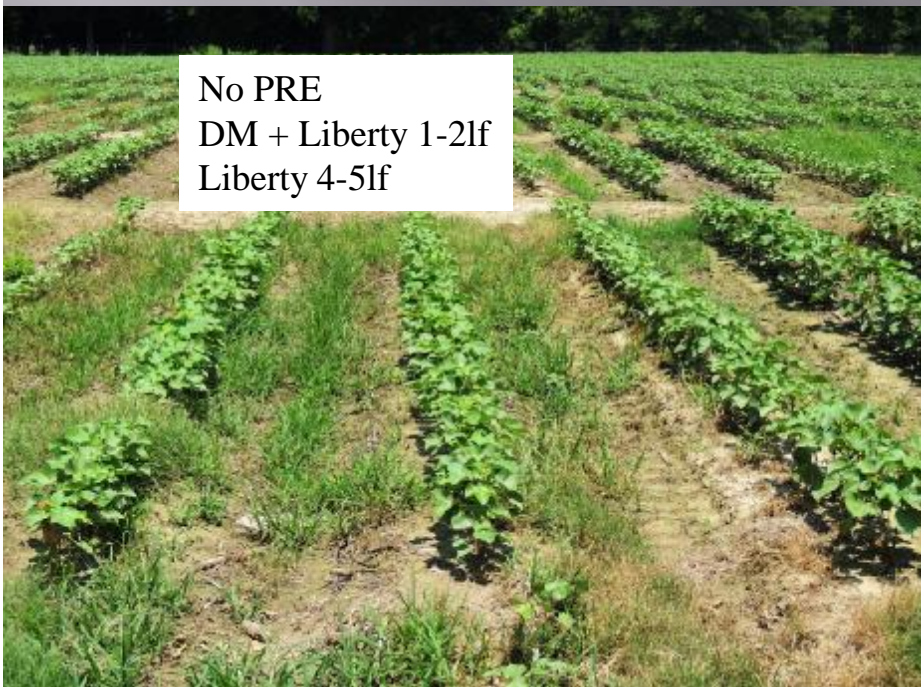


NTC



Cotoran Pre
DM + Liberty 1-2lf
Liberty 4-5lf

PRE 5/7; 1-2lf 5/21; 4-5lf 6/1 (pics 6/15)



No PRE
DM + Liberty 1-2lf
Liberty 4-5lf



Liberty 1-2lf
Liberty 4-5lf

GR Palmer Amaranth Management in Cotton

Pre Emergence AND 1 to 2 If AND/OR 5 to 7 If P.Direct

Cotoran/Caparol
on any soil or
Reflex on coarse
soils

16 oz Dual
Magnum or
48 oz
Warrant

+/- Ignite

Glyphosate or
Ignite +/- Dual
Magnum or
Warrant

Direx + MSMA

Hooded

On larger
Palmer or
cotton

Gramoxone
Inteon + Direx
+ Valor



Glytol Cotton Systems

Roundup Powermax 1-2lf
Liberty 4-5lf

Liberty 1-2lf
Roundup Powermax 4-5lf



Experimental design

• Herbicide system

- Non-herbicide tolerant – conventional herbicides
- Roundup Ready Flex – glyphosate + conventional herbicides
- Liberty Link – Liberty + conventional herbicides

• Treatments

- PRE
 - None or Cotoran @ 1 qt/A
- EPOST and MPOST
 - Dual Magnum @ 1.33 pt/A or Staple LX @ 2.1 oz/A
 - Glyphosate or Liberty co-applied in respective system
- Layby
 - MSMA @ 2 lb ai/A + diuron @ 1.5 pt/A or Valor @ 2 oz/A

Site Description

- Dean Lee REC – Alexandria
- Northeast Res. St. – St. Joseph
- Weeds evaluated
 - Alexandria
 - Barnyardgrass, entireleaf morningglory, hemp sesbania, sicklepod, and Palmer amaranth
 - St. Joseph
 - Barnyardgrass, entireleaf morningglory, hemp sesbania, sicklepod, large crabgrass, goosegrass, pitted morningglory, and redroot pigweed

Results & Discussion

- **Weed control**
 - Roundup Ready Flex = Liberty Link > conventional
- All weeds in Roundup Ready Flex and Liberty Link systems were controlled >95% 28 days after the layby application
- Differences in control among treatments only in the conventional weed management system

Lint yield

- Roundup Ready Flexx system = 1226 lb/A
- Liberty Link system = 1298 lb/A
- Conventional system = 687 lb/A
- Difference of 575 lb/A @ \$0.70 = \$402.50

- In the conventional system
 - Cotoran PRE = 776 lb/A
 - No PRE = 599 lb/A
 - Difference of 177 lb/A @ \$0.70 = \$123.60
 - Cotoran @ 1 qt/A = \$9.76

Summary

- Without weed resistance

- RRF or LL systems work
- Conventional herbicide programs
 - Can be expensive
 - May not provide great weed control

- With weed resistance

- Need alternative herbicides, which may not provide excellent overall control.

Summary

- In Louisiana, we deal with immense weed pressure from multiple weed species
 - Multiple morningglory species
 - Sicklepod
 - Hemp sesbania
 - Multiple grass weed species
 - Add in:
 - GR Palmer amaranth and/or johnsongrass
- Data indicates that glyphosate or Liberty systems that include other herbicides work.
- Stewardship of glyphosate technology is critical.

Pest Complexes



GLUFOSINATE AND INSECTICIDE COMBINATIONS IN LIBERTY LINK COTTON

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OBJECTIVE

Evaluate effects of insecticides on Liberty Link cotton tolerance when co-applied with Ignite or Ignite and Stance

MATERIALS & METHODS

•Northeast Research Station, St. Joseph, LA. and Dean Lee Research Station, Alexandria, LA.

•RCB, factorial arrangement, 3 replications

•Treatments applied at match-head square or 1st bloom growth stages

•Silt loam soil

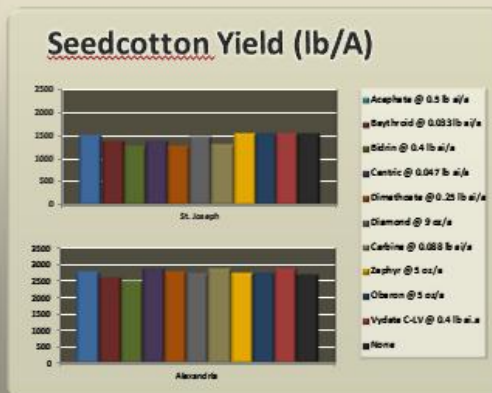
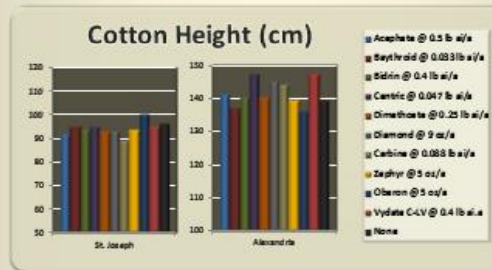
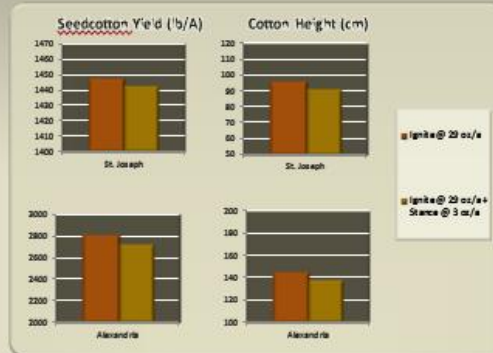
•Cotton FM 1735 LL

•Treatments applied with 11002 FF nozzles; 15 GPA

• Visual cotton injury 7,14, & 28 d after each application

•Plant height prior to harvest

•Seedcotton Yield



RESULTS & DISCUSSION

For the matchhead square or 1st bloom growth stage application, injury at either location in the form of minor leaf speckling was no greater than 5% for any treatment (data not shown). Averaged across insecticides and application timing, cotton height was lower with the addition of Stance to Ignite compared to Ignite alone at Alexandria (145 vs 138 cm) but not St. Joseph (96 vs 92 cm). At both locations, averaged across Stance co-application and application timing, Ignite co-applied with insecticides did not result in reduced height late season compared with Ignite applied alone. Averaged across insecticides and application timing, Ignite applied alone resulted in a seedcotton yield of 2792 and 1447 lb/A at Alexandria and St. Joseph, respectively, and was not reduced with addition of Stance. Similarly, at both locations yield was not reduced with addition of insecticides to Ignite when compared to Ignite applied alone or in combination with Stance.

CONCLUSION

Co-application of insecticides evaluated in this study did not negatively affect growth or yield of Liberty Link cotton when co-applied with Ignite alone or with Stance.

Summary

- **Liberty Link System is a good fit in Louisiana**
- **Cost factor of herbicide**
- **Resistance management benefit**
- **Volunteer control**