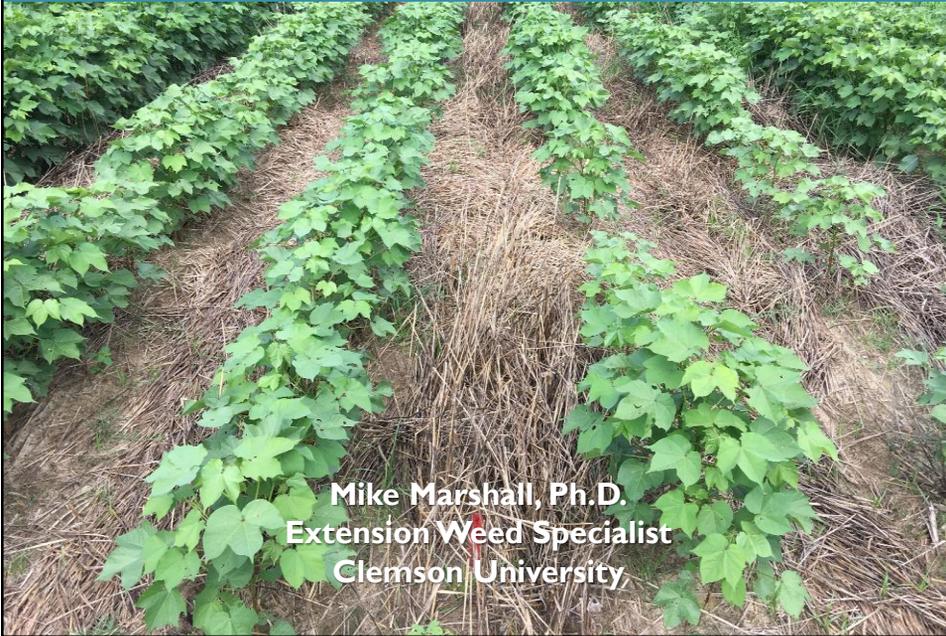
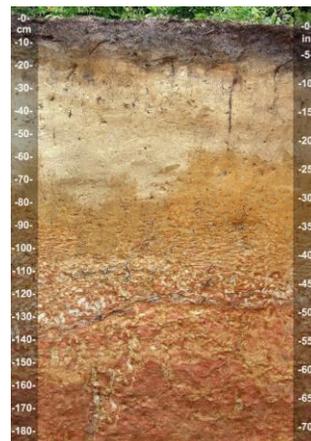


Cover Crops for Managing Weeds



Weed Seed Bank

- Seed size
- Environmental factors
 - Light
 - Moisture
 - Temperature
 - Oxygen
- Depth in soil profile



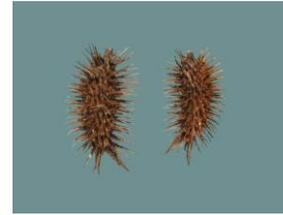
Seed Size



Palmer amaranth – 1.0-1.3 mm



Large crabgrass– 2-3 mm



Cocklebur – 1.0-1.5 cm



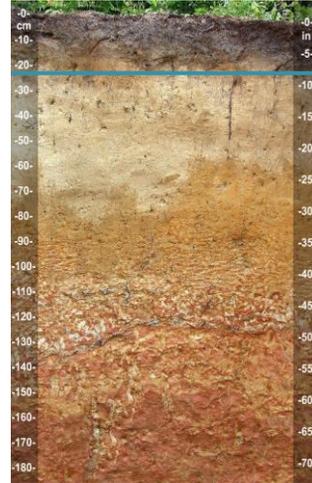
Annual Morningglory – 5-6 mm

Environmental Factors

- Light (presence or absence)
 - Henbit - darkness
 - Palmer amaranth – light
- Moisture
 - Seeds imbibe water and swell to initiate germination
- Temperature
 - Henbit – lower temps
 - Palmer amaranth – higher temps
- Oxygen
 - Adequate amounts needed for energy production in the germination seed.

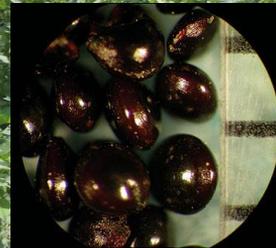
Placement in profile

- Tillage can move seeds to lower depths
- Larger seed can germinate from lower depths
- Small seeds need to be closer to the surface

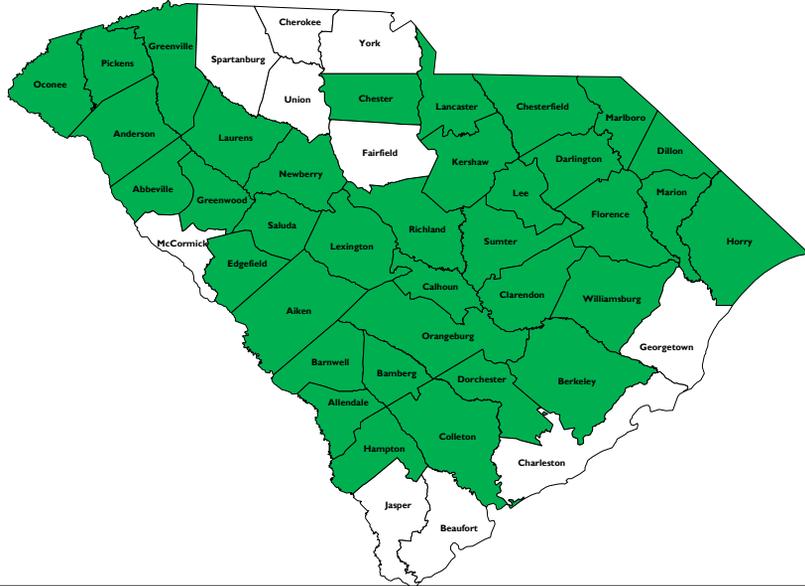


Palmer Amaranth (*Amaranthus palmeri*)

- grows faster than other pigweeds (up to 1-2" per day!!)
- Very competitive
- prolific seed producer
 - Up to 450,000 seeds/plant



Current Glyphosate and ALS-Resistant Palmer Amaranth Distribution in SC



Fall Planted Cover Crops for Weed Suppression



Cover Crops for Weed Suppression



Cover Crop Terminated and Rolled Prior to Planting

Effect of Residue Cover on Weed Seed Soil Bank

- Reduced light reaching soil surface
- Reduced temperature fluctuations in the upper soil profile
- Release of chemicals inhibit germination of small seeded weeds



Cover Crops/Herbicides for Managing Palmer Amaranth in Cotton



Objectives

- To determine efficacy of fall planted cover crops on glyphosate-resistant Palmer amaranth populations in cotton.
- To determine impact of selected herbicide programs in conjunction with fall cover crops on cotton growth and yield.

Materials and Methods

- Field experiments were conducted on growers fields (LOC1 and LOC2) and at Edisto Research and Education Center (EREC, LOC3) located near Blackville, SC.
- Cover crop mixture (rye, oats, turnip, vetch, radish, and clover) was seeded in growers fields (LOC1 and LOC2) at 70 lb/A between October and December in 2013 and 2014 in half of the field. The rest was left unplanted (weedy winter cover).
- LOC 3 (EREC) was seeded in strips at 40 lb/A in cereal rye in the fall of 2015, 2016, and 2017. Untreated (winter weeds) strips were included as comparison.

Materials and Methods (cont)

- Cotton variety 'Phytogen Widestrike 499' was planted in 2014 and 2015 and DeltaPine 1646 in 2016, 2017, and 2018.
- Preemergence (PRE) herbicides were applied after planting followed by POST1 (APT1) at 2-3 lf cotton, POST2 (APT2) at 6-8 lf cotton, and LAYBY at 18-20 inch cotton growth stage.
- Palmer amaranth populations were collected using of 1.5 ft² quadrat at APT1, APT2, and at LAYBY [only presenting LAYBY data]

Grower Demo Herbicide Programs in the Cover/No Cover Strips

Treatment 1: (High Input RR program; Using Widestrike Cotton)

Burndown: Roundup (22 oz/A) + 2,4-D (1 qt/A) + Valor (2 oz/A) [30 preplant]
PRE: Reflex (1 pt/A) + Diuron (1 pt/A) + Paraquat (2 pt/A) [At-plant]
EPOST: Roundup (22 oz/A) + Warrant (3 pt/A) [2 weeks after PRE]
MPOST: Roundup (22 oz/A) + Warrant (3 pt/A) [2 weeks after EPOST]
Layby: MSMA (2.67 pt/A) + Diuron (1 pt/A) [2-3 weeks after MPOST]

Treatment 2: (Low Input LL program; Using Widestrike Cotton)

Burndown: Roundup (22 oz/A) + 2,4-D (1 qt/A) [30 preplant]
PRE: Reflex (1 pt/A) + Diuron (1 pt/A) [At-plant]
EPOST: Liberty (29 oz/A) + Dual Magnum (1.3 pt/A) [2 weeks after PRE]
MPOST: Liberty (29 oz/A) [2 weeks after EPOST]
Layby: MSMA (2.67 pt/A) + Diuron (1 pt/A) [2-3 weeks after MPOST]

Treatment 3: (High Input LL program; Using Widestrike Cotton Variety)

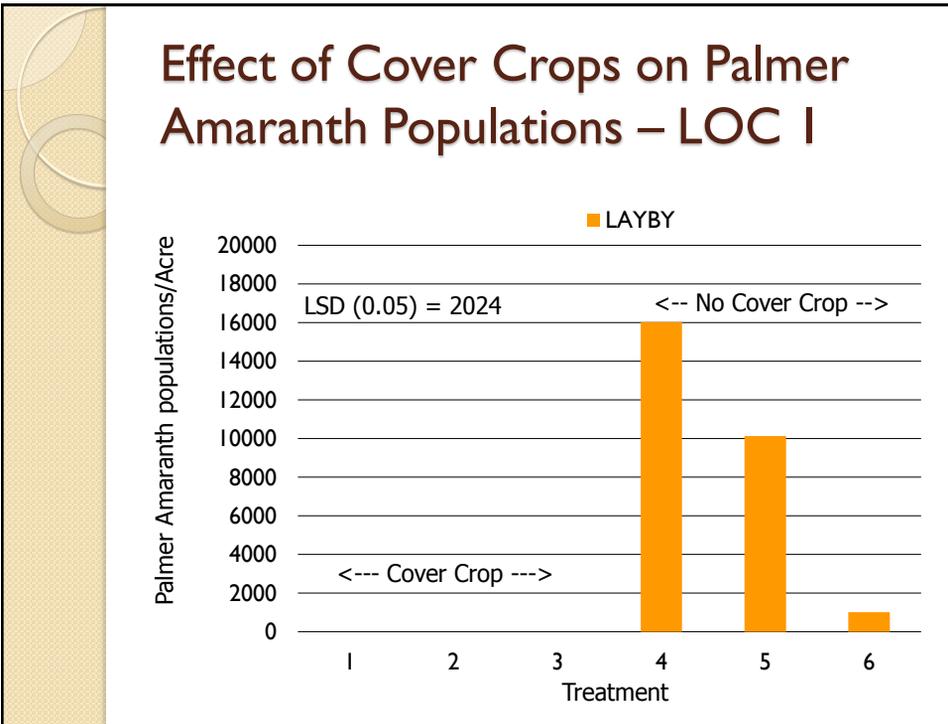
Burndown: Roundup (22 oz/A) + 2,4-D (1 qt/A) + Valor (2 oz/A) [30 preplant]
PRE: Reflex (1 pt/A) + Diuron (1 pt/A) + Paraquat (2 pt/A) [At-plant]
EPOST: Liberty (29 oz/A) + Staple (2.5 oz/A) [2 weeks after PRE]
MPOST: Liberty (29 oz/A) + Dual Magnum (1.0 pt/A) [2 weeks after EPOST]
Layby: MSMA (2.67 pt/A) + Diuron (1 pt/A) [2-3 weeks after MPOST]

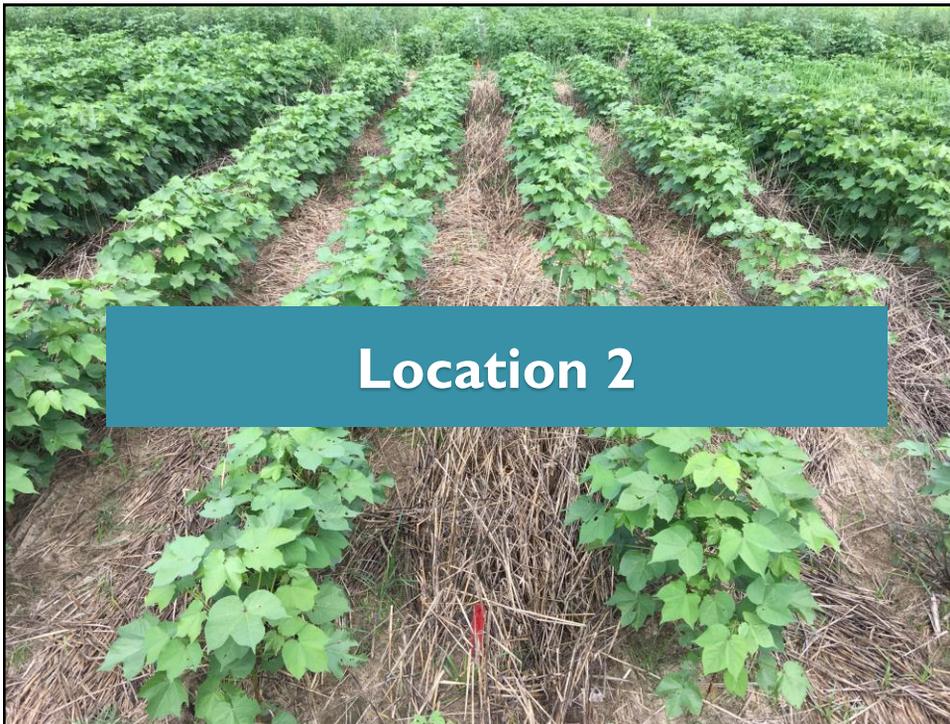
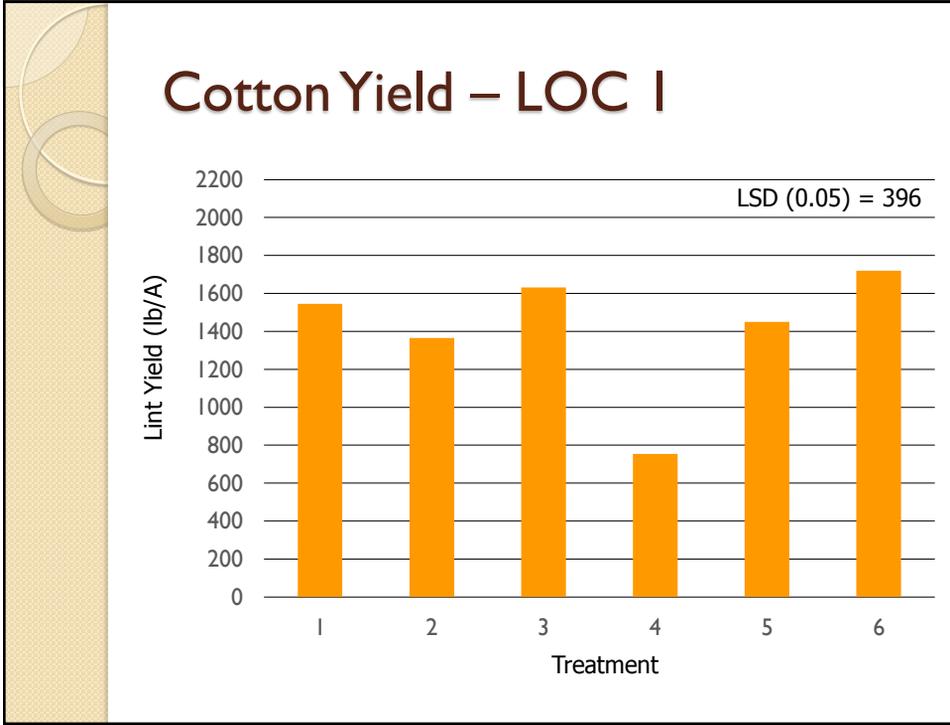
Edisto (LOC3) Herbicide Programs in the Cover/No Cover Strips

TRT	PRE	POST1	POST2	LAYBY
1	None	Liberty	Liberty	None
2	None	Roundup	Roundup	None
3	Reflex+Diuron	Roundup+Warrant	Roundup+Warrant	MSMA+Diuron
4	Reflex+Diuron	Liberty+Staple	Liberty	MSMA+Diuron
5	Reflex+Diuron	Liberty+Staple	Liberty+Dual Magnum	MSMA+Diuron
6	Untreated Check			

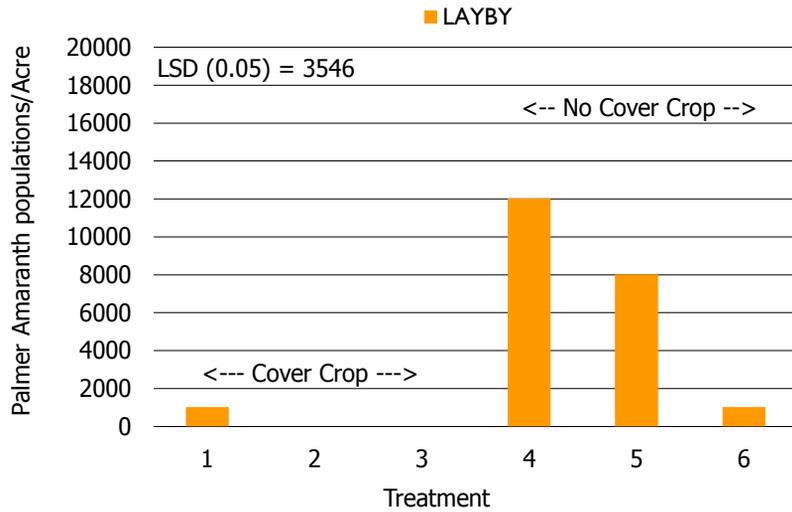


Location I

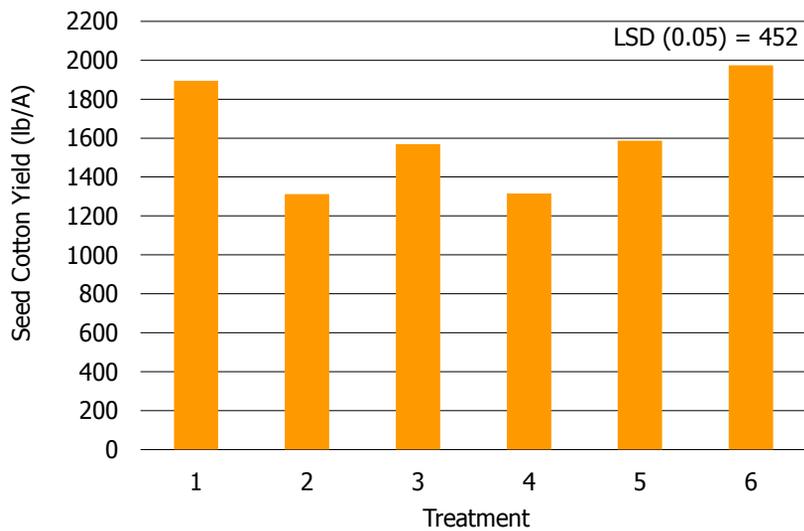


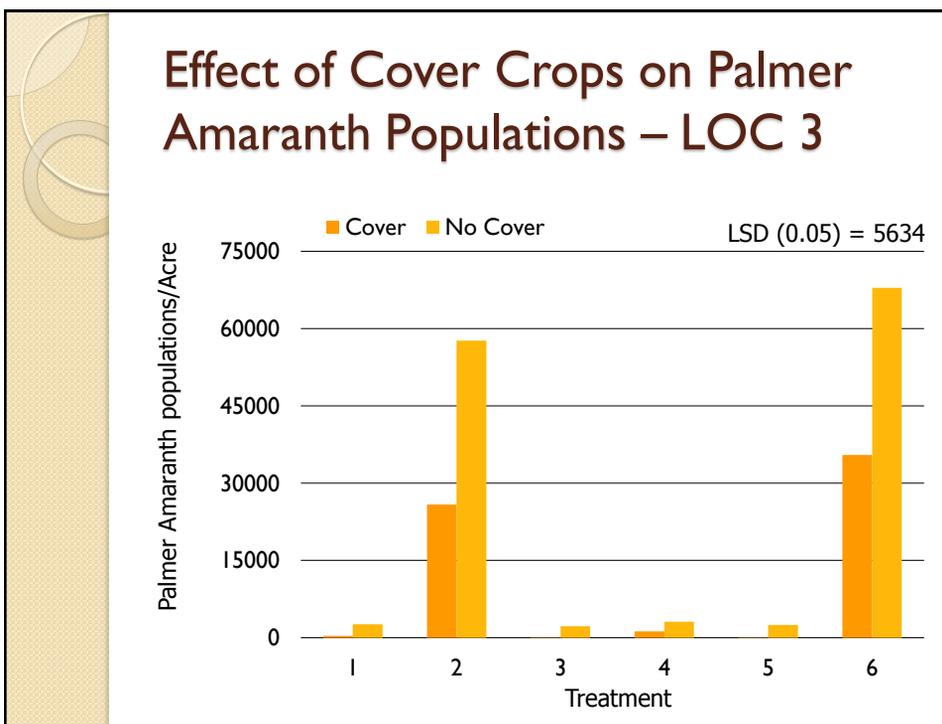


Effect of Cover Crops on Palmer Amaranth Populations – LOC 2

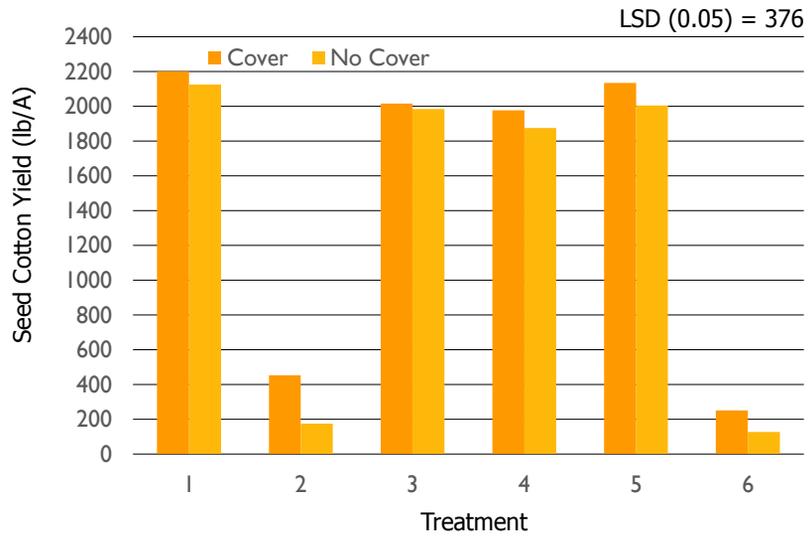


Cotton Yield – LOC 2





Seed Cotton Yield – LOC 3



EREC LOC 3 - Cover

PRE: Reflex (1 pt/A) + Diuron (1 pt/A)
POST1: Liberty (29 oz/A) + Staple (2.5 oz/A)
POST2: Liberty (29 oz/A) + Dual Magnum (1.0 pt/A)
Layby: MSMA (2.67 pt/A) + Diuron (1 pt/A)

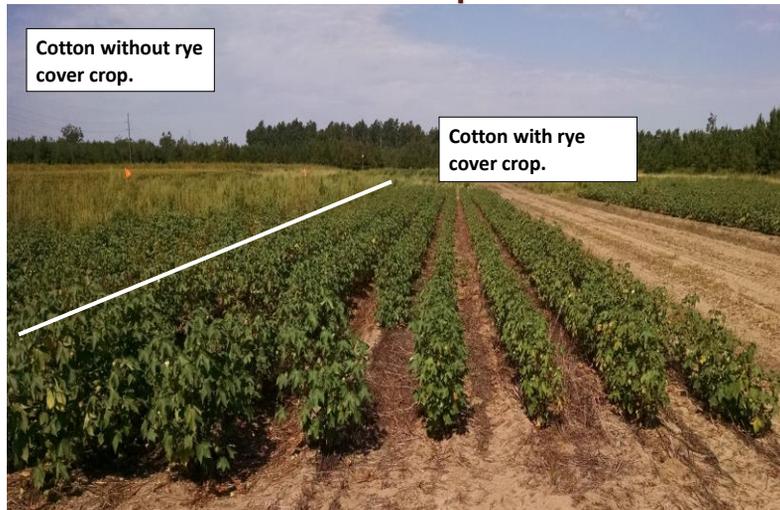
EREC LOC 3 - Cover

PRE: Reflex (1 pt/A) + Diuron (1 pt/A)
POST1: Roundup (22 oz/A) + Warrant (3 pt/A)
POST2: Roundup (22 oz/A) + Warrant (3 pt/A)
Layby: MSMA (2.67 pt/A) + Diuron (1 pt/A)

EREC LOC 3 - No Cover

PRE: None
POST1: Roundup (22 oz/A)
POST2: Roundup (22 oz/A)
Layby: None

EREC Cotton Strip Plots w and w/o cover crop



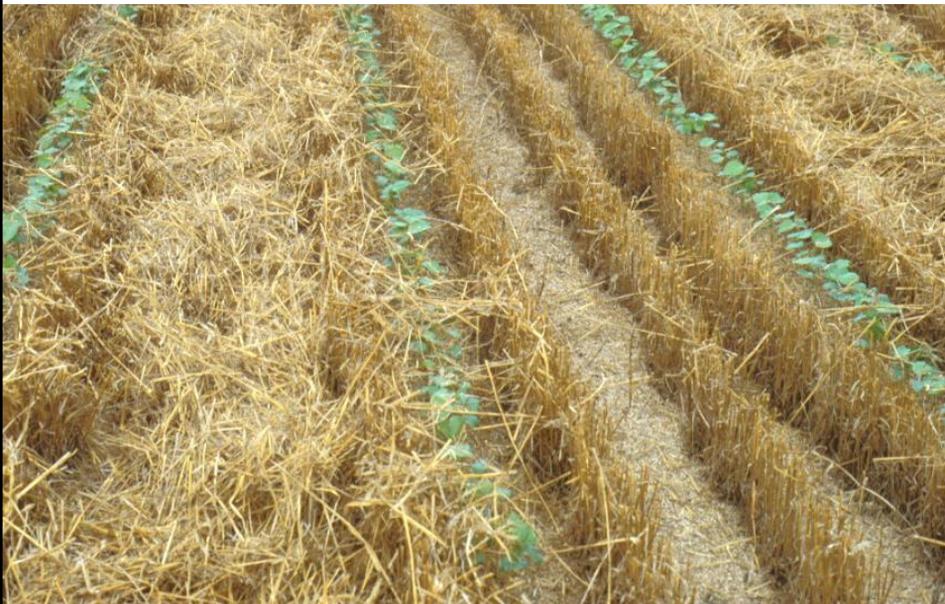
Summary

- Overall, fall seeded cover crops appeared to reduce overall emergence of Palmer amaranth from the soil seed bank.
- Postemergence Liberty based systems with residual herbicides provided consistently better Palmer amaranth control in these studies.
- Minor in-season cotton crop response was observed (<10%) with the herbicide programs in these studies.

Summary (cont)

- Seed cotton yields were reduced by higher Palmer populations in the glyphosate based programs.
- A combination of cover crop plus postemergence + residual herbicides reduced the Palmer amaranth emergence from the seed bank.

Interseeding System – Wheat/Cotton



Interseeding System

- System involves planting skip row wheat
- Blocking every 5th seed tube on a grain drill (7.5 in spacing)
- Plant w/narrow row unit planter ~3 wks before wheat harvest

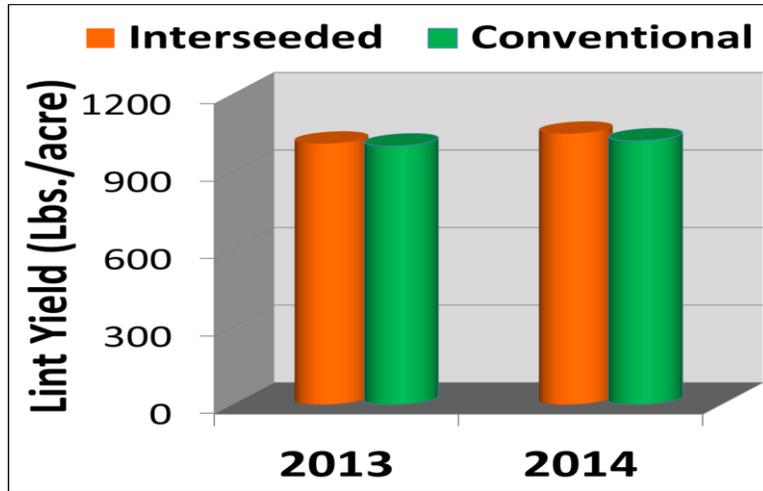


Interseeding System

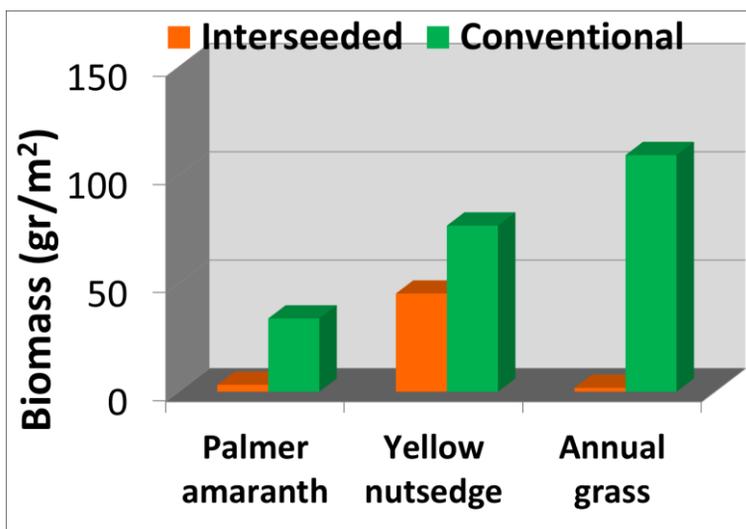
- Wheat is harvested
- Summer crop has a 3 wk head start over double crop practice
- Straw residue left helps suppress weeds



Interseeding Results Cotton 2014



Weed Suppression in Interseeded Cotton



Acknowledgements

- NRCS – National CIG grant program
- NRCS – SC CIG grant program
- SC Cotton Board
- SC Cotton Growers

Questions?

