

# University of Georgia Programs for Controlling Palmer Amaranth in 2013 Cotton

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It is imperative that growers continue to use sound herbicide programs (Table 1) but also integrate these programs with other control measures, such as hand-weeding, to remove escapes before seed are produced, deep turning to reduce the number of plants emerging (ideally wait 3.5 to 4 years before repeating), and/or using a heavy mulch cover crop to suppress emergence in conservation tillage systems. These integrated programs proved to be very successful during 2012. Continued efforts are underway to further improve management programs while becoming more economical.



Actually drier during spring of 2012 as compared to 2010. 2012 herbicide system consisted of POST herbicides applied based on days from planting or previous application rather than weed or cotton size.

During 2012, we evaluated a new management approach on Georgia farms where POST herbicides were applied based on days after planting rather than on crop or weed size. For example, in RR cotton planted on April 25, the grower planted into a clean seedbed and applied PRE herbicides; at 14 days after the PRE (regardless of environmental conditions), the POST 1 application was made; a POST 2 application was made 15 days after the POST 1 application; and 18 days after the POST 2 treatment the layby was applied. **Results from 2012 on farm studies showed this approach was as effective as or more effective than typical grower practices 100% of the time.** Growers are still encouraged to try this approach on a limited basis to determine if this approach is helpful to them.

**Table 1. Managing glyphosate-resistant Palmer amaranth in conventionally tilled and conservation tillage RR Flex cotton.<sup>1</sup>**

Prior to Planting	Preemergence (PRE) <sup>2</sup>	POST 1 at 12-14 d after PRE <sup>3</sup>	POST 2 at 13-15 d after POST 1 <sup>3</sup>	Layby at 16-18 d after POST 2 <sup>3</sup>
<b>CONVENTIONAL TILLAGE</b>				
<b>Reflex<sup>4</sup> 12 oz/A + Prowl/Treflan</b> <i>apply preplant incorporated 1 to 1.5 inches deep (preferably within 7 days of planting)</i>	<b>1. Warrant + Reflex</b> <b>2. Direx + Reflex</b> <b>3. Prowl + Reflex</b> <b>4. Direx + Warrant + Reflex</b> <i>(Reflex: use 8 to 10 oz/A)</i>	<b>Roundup + Staple<sup>5</sup></b>  <i>(Palmer ≤ 1")</i>	<b>Roundup + Dual Magnum</b>  <i>(before Palmer up)</i>	<b>Direx + MSMA<sup>6</sup></b>  <i>(Palmer &lt; 5")</i>
<b>Keep clean with tillage or herbicides as noted in conservation tillage</b>	<b>1. Warrant + Reflex</b> <b>2. Direx + Reflex</b> <b>3. Prowl + Reflex</b> <b>4. Direx + Warrant + Reflex</b>			
<b>CONSERVATION TILLAGE</b>				
<b>Valor with burndown</b> <i>(Palmer &lt; 1" and more than 10 d before planting)</i>	<b>1. Warrant + Reflex</b> <b>2. Direx + Reflex</b> <b>3. Prowl + Reflex</b> <b>4. Direx + Warrant + Reflex</b>  <i>(Reflex: use 12 oz/A with Warrant &amp; 14-16 oz/A with Direx or Prowl)</i>	<b>Roundup + Staple<sup>5</sup></b>  <i>(Palmer ≤ 1")</i>	<b>Roundup + Dual Magnum</b>  <i>(before Palmer up)</i>	<b>Direx + MSMA<sup>6</sup></b>  <i>(Palmer &lt; 5")</i>
<b>Valor + Direx + paraquat<sup>2</sup></b> <i>(Palmer 1 to 5" and more than 10 d before planting)</i>				
<b>Direx + paraquat<sup>2</sup></b> <i>(Palmer ≤ 5" and less than 10 d before planting)</i>				

<sup>1</sup>Follow all herbicide label use restrictions and plant back intervals.

<sup>2</sup>Add adjuvant with paraquat during burndown; also add paraquat + adjuvant with all preemergence applications if any pigweed is emerged.

<sup>3</sup>Use shorter time interval for POST applications if planting after May 10 and the longer interval if planting before May 10.

<sup>4</sup>The split Reflex program including preplant incorporated and PRE Reflex applications is the most effective program in cotton.

<sup>5</sup>Replace Staple with Warrant if carryover or ALS-resistance is an issue.

<sup>6</sup>Add adjuvant. Also add Aim, Envoke, or ET if morningglory is > 3"; follow cotton size restrictions. Suprend + MSMA is as effective as Direx + MSMA.

Liberty herbicide is arguably one of the most important herbicides for the sustainability of our cotton farms. Although cotton resistant to 2,4-D, dicamba, or HPPD herbicides is being developed, the value of these technologies will be greatly reduced if we lose the effectiveness of Liberty to resistance. It is absolutely critical to protect Liberty by using sound management programs (Table 2).

**Table 2. Managing Palmer amaranth with ONE or TWO applications of Liberty in GlyTol/Liberty Link Cotton.<sup>1</sup>**

Preplant	Preemergence (PRE) <sup>2</sup>	POST 1 at 14-16 d after PRE <sup>3</sup>	POST 2 at 14-16 d after POST 1 <sup>3</sup>	Layby at 16-18 d after POST 2 <sup>3</sup>
<b>Valor with burndown</b> (Palmer < 1" and more than 10 d before planting)	<b>1. Warrant + Direx</b> <b>2. Direx or Cotoran + Prowl</b> <b>3. Warrant + Reflex</b> <b>4. Direx + Reflex</b> <b>5. Prowl + Reflex</b>	<b>ONE LIBERTY APPLICATION<sup>4</sup></b>		<b>Direx + MSMA<sup>6</sup></b>  (Palmer < 5")
<b>Valor + Direx + paraquat<sup>2</sup></b> (Palmer 1 to 5" and more than 10 d before planting)		<b>Liberty + Staple<sup>5</sup>, Dual Magnum, or Warrant</b> (Palmer ≤ 3")	<b>Roundup + Staple<sup>5</sup> or Dual Magnum</b> (Palmer < 1" with Staple; no Palmer up for Dual )	
<b>Direx + paraquat<sup>2</sup></b> (Palmer ≤ 5" and less than 10 d before planting)		<b>Liberty + Warrant</b> (Palmer ≤ 3")	<b>Liberty + Dual Magnum</b> (Palmer ≤ 3")	
		<b>TWO LIBERTY APPLICATIONS</b>		

<sup>1</sup>Cotton must be tolerant to Liberty (glufosinate) herbicide. Follow all labeled herbicide use restrictions, including application rates and plant back intervals.

<sup>2</sup>Add adjuvant with paraquat during burndown; also add paraquat + adjuvant with all preemergence applications if any pigweed is emerged.

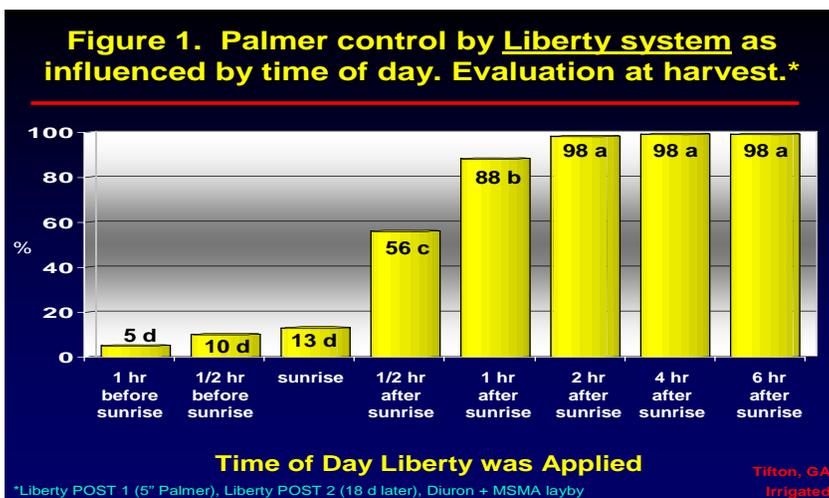
<sup>3</sup>Use shorter time interval for POST applications if planting after May 10 and the longer interval if planting before May 10.

<sup>4</sup>If Palmer is not up at POST 1 but grasses are intense then switch the order of the Roundup and Liberty mixtures using Roundup mixtures at POST 1.

<sup>5</sup>Staple systems should be avoided if ALS-resistant Palmer amaranth is present or carryover concerns exist. Make only one Staple application per year.

<sup>6</sup>Add adjuvant. Also add Aim, Envoke, or ET if morningglory is > 3"; follow cotton size restrictions. Suprend + MSMA is as effective as diuron + MSMA.

Aggressive research is underway to better understand each cotton herbicide and how to maximize its use. During 2011/2012 one such effort was to better understand how the time of day in which Liberty is applied can greatly influence the level of Palmer control achieved (Figure 1). Better understanding the weaknesses and strengths of each herbicide will improve control and reduce input costs over time.



**PROTECTING LIBERTY FOR FUTURE SUSTAINABILITY: THE DECISION IS YOURS!**

1. Do not make more than 2 applications of Liberty per year.
2. Spray Liberty when the biggest pigweed in the field is 3 inches or smaller.
3. Never ever use a reduced rate!
4. To maximize activity, wait 1.5 hr after sunrise to begin spraying and stop spraying at least 1.0 hr before sunset.
5. Apply at a minimum of 15 GPA using a speed, spray tip, and pressure that delivers a medium spray droplet.
6. Integrate herbicide programs with 1) hand weeding, 2) tillage, and/or 3) heavy rye cover crop residue.

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