

# **Palmer Amaranth Control in Soybeans**

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Glyphosate-resistant Palmer amaranth is wide-spread across the Coastal Plain and is showing up alarmingly fast in the Piedmont. Not all Palmer amaranth in North Carolina is glyphosate-resistant. However, growers are encouraged to assume that all Palmer amaranth is resistant to glyphosate and to react accordingly.

Growers who currently do not have Palmer amaranth are encouraged to prevent it from becoming established. Learn to recognize the weed and remove any escapes before a seed head is produced. A single female Palmer amaranth can produce a half million seed. If the seed were uniformly distributed, that is equivalent to more than 10 seed per square foot over an entire acre. Don't ignore escaped weeds; devastating populations can build up quickly. Clean equipment as well as possible when moving from infested to non-infested fields.

Rotate crops and chemistry as much as possible. Include corn or sorghum in the rotation where practical; atrazine-based programs are very effective on Palmer amaranth. Be careful to not negate the benefits of rotation by allowing a crop of seed to be produced after corn harvest. In the fall, Palmer amaranth can go from seed to seed in about 40 days.

## **Palmer Amaranth Control in Roundup Ready Soybeans**

Programs for Palmer amaranth control in Roundup Ready soybeans are detailed on the back of this sheet. Three key points should be kept in mind. First, a residual herbicide applied preplant or preemergence should always be included in a program. Additional residual control from a postemergence application is also beneficial. All of the postemergence options listed on the back, except Harmony SG, have residual activity on Palmer amaranth. The second key point is timing of application. Palmer amaranth should be treated postemergence before it exceeds 4 inches tall. If the weed is resistant to glyphosate, the material mixed with glyphosate must do all the work; hence, the treatment should be applied to weeds of the size appropriate for the tank-mix partner. Remember, this weed can grow an inch or more per day. Treating larger weeds not only results in less control, but it can also accelerate selection for resistance to PPO inhibitors (Authority, Blazer, Cobra, Envive, Flexstar, Prefix, Reflex, Valor, others), something we can ill afford. Third, fomesafen (the active ingredient in Flexstar and one of the ingredients in Prefix and Flexstar GT) behaves as a contact herbicide. That means good spray coverage is required. While lower spray volumes and air induction nozzles are fine with glyphosate alone, use of flat-fan nozzles and a spray volume of 15 gallons per acre or more will enhance Palmer amaranth control with Flexstar, Flexstar GT, and Prefix applied postemergence.

## **Palmer Amaranth Control in LibertyLink Soybeans**

Management programs for Palmer amaranth in LibertyLink soybeans are basically the same as those for Roundup Ready soybeans (detailed on the back) with the obvious exception that Liberty herbicide is used instead of glyphosate postemergence. Growers are encouraged to not abuse this herbicide. Liberty will likely be increasingly important for us in the future, hence we must avoid selection for resistance. Do not depend entirely on Liberty, do not exceed two applications per year, do not cut rates, and treat small weeds (treating large weeds is equivalent to cutting rates, which encourages resistance). A residual herbicide or herbicides applied preplant or preemergence is always recommended. Additional residual control can be obtained from Dual Magnum, Warrant, Flexstar, or Prefix mixed with Liberty. Timely application is critical for successful Palmer amaranth control with Liberty. For consistent control, Palmer amaranth must be 4 inches or less when treated. A supplemental label was recently issued for Liberty that allows higher application rates on LibertyLink soybeans. The supplemental label allows two in-crop applications, with the first application being 22 to 36 fl oz/acre, and the second application being 22 to 29 fl oz. It is suggested that no less than 29 fl oz be applied. Hit them hard, hit them small. Liberty is a contact herbicide, hence good coverage is critical. It should be applied in a spray volume of at least 15 gallons per acre using flat-fan nozzles. Air-induction nozzles generally will not provide adequate coverage for a contact herbicide.

# Programs for Glyphosate-Resistant Palmer Amaranth Control in Roundup Ready Soybeans

## Conventionally Tilled Soybeans

	Preplant Incorporated	Preemergence	Postemergence
Option 1	Prowl or Treflan	Authority MTZ <sup>1,2</sup> Authority XL or Sonic Boundary <sup>1,2</sup> Canopy <sup>1,2</sup> Envive <sup>3</sup> Gangster <sup>3</sup> Prefix <sup>4</sup> Valor SX <sup>3</sup> Valor XLT <sup>3</sup>	<b>No Palmer emerged:</b> Glyphosate + Dual Magnum or Warrant <b>Palmer 4 inches or less:</b> Extreme <sup>5</sup> Flexstar + glyphosate Flexstar GT 3.5 Harmony SG <sup>5,6</sup> + glyphosate Prefix + glyphosate Pursuit <sup>5</sup> + glyphosate
Option 2	No Preplant Herbicide	Authority MTZ <sup>1,2</sup> ± Dual Magnum, Intrro, or Prowl Authority XL or Sonic Boundary <sup>1,2</sup> Canopy <sup>1,2</sup> ± Dual Magnum, Intrro, or Prowl Envive <sup>3</sup> , Gangster <sup>3</sup> , Valor SX <sup>3</sup> , or Valor XLT <sup>3</sup> ± Prowl Prefix <sup>4</sup>	

## Full-Season No-Till Soybeans

	Early Burndown	Preemergence	Postemergence
Option 1	With residual: Glyphosate + 2,4-D <sup>7</sup> + Envive, Fierce, Gangster, Valor SX, or Valor XLT Gramoxone + 2,4-D <sup>7</sup> + Envive, Fierce, Gangster, Valor SX, or Valor XLT	Gramoxone + one of the following: Boundary <sup>1,2</sup> Canopy <sup>1,2</sup> Dual Magnum Intrro Zidua <sup>2</sup> No residual herbicide <sup>8</sup>	<b>No Palmer emerged:</b> Glyphosate + Dual Magnum or Warrant <b>Palmer 4 inches or less:</b> Extreme <sup>5</sup> Flexstar + glyphosate Flexstar GT 3.5 Harmony SG <sup>5,6</sup> + glyphosate Prefix + glyphosate Pursuit <sup>5</sup> + glyphosate
Option 2	Without residual: Glyphosate + 2,4-D <sup>7</sup> Gramoxone + 2,4-D <sup>7</sup>	Gramoxone + one of the following: Authority MTZ <sup>1,2</sup> ± Dual Magnum, Intrro, or Prowl Authority XL or Sonic ± Dual Magnum, Intrro, or Prowl Boundary <sup>1,2</sup> Canopy <sup>1,2</sup> ± Dual Magnum, Intrro, or Prowl Envive <sup>3</sup> , Gangster <sup>3</sup> , Valor SX <sup>3</sup> , or Valor XLT <sup>3</sup> ± Prowl Prefix <sup>4</sup>	

## Double-Crop No-Till Soybeans

Preemergence	Postemergence
Gramoxone + one of the following: Authority MTZ <sup>1,2</sup> ± Dual Magnum, Intrro, or Prowl Authority XL or Sonic ± Dual Magnum, Intrro, or Prowl Boundary <sup>1,2</sup> Canopy <sup>1,2</sup> ± Dual Magnum, Intrro, or Prowl Envive <sup>4,5</sup> , Gangster <sup>4</sup> , Valor SX <sup>3</sup> , or Valor XLT <sup>3,5</sup> ± Prowl Fierce <sup>2</sup> Prefix <sup>3</sup>	<b>No Palmer emerged:</b> Glyphosate + Dual Magnum or Warrant <b>Palmer 4 inches or less:</b> Extreme <sup>5</sup> Flexstar + glyphosate Harmony SG <sup>5,6</sup> + glyphosate Prefix + glyphosate Pursuit <sup>5</sup> + glyphosate

<sup>1</sup> Product contains metribuzin. Check with seed supplier to determine if your variety is metribuzin-sensitive.

<sup>2</sup> Adjust rate for soil texture and organic matter. See label for rates.

<sup>3</sup> Envive, Gangster, Valor SX, and Valor XLT labels caution against mixing Dual Magnum (s-metholachlor), Intrro (alachlor), or Outlook (dimethenamid) with Envive, Gangster, Valor SX, or Valor XLT due to potential soybean injury.

<sup>4</sup> Labels allow only one application per year of fomesafen (an active in Flexstar, Flexstar GT, Prefix, and Reflex). Do not use Prefix preemergence if plans include Flexstar, Flexstar GT, Prefix, or Reflex postemergence.

<sup>5</sup> Product contains an ALS inhibitor. ALS-resistant Palmer amaranth is common in NC. Use suggested only when there is a reasonable assurance that an ALS-resistant biotype is not present.

<sup>6</sup> Rate varies between STS and non-STS varieties; see label. Expect injury on non-STS varieties.

<sup>7</sup> Labels specify a waiting interval before planting of 15 days for 1 pt of 2,4-D amine or 7 days for 1 pt of 2,4-D ester. Higher rates of 2,4-D require a 30-day waiting interval between application and planting.

<sup>8</sup> Suggested only for fields with lighter infestations and only where a residual was included in the preplant burndown.