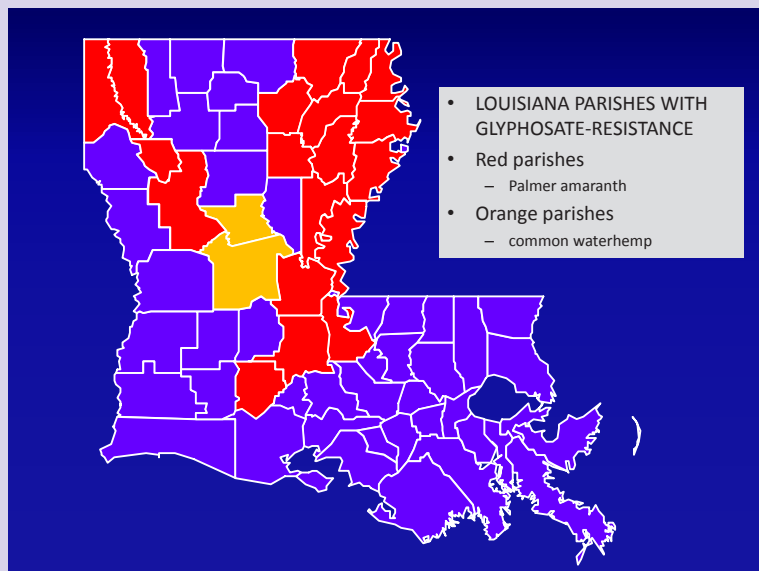


# Herbicide Programs for Managing Glyphosate-Resistant Palmer Amaranth and Common Waterhemp in Louisiana Corn, Cotton and Soybean



Palmer amaranth and common waterhemp are extremely troublesome weeds in corn, cotton and soybean. They have the potential to substantially reduce crop yield and harvesting efficiency. Glyphosate-resistant Palmer amaranth and common waterhemp were documented in Louisiana in 2010 and 2015, respectively. Currently, Palmer amaranth has spread to essentially all crop-producing parishes in Louisiana, while glyphosate-resistant common waterhemp has only been documented in two parishes. Utilization of herbicides with differing modes of action (how they kill) for soil residual activity is vital for management of these two pigweed species. In addition, these herbicides typically need to be applied multiple times during the growing season. It is very important to control glyphosate-resistant Palmer amaranth and common waterhemp at germination or before they reach 3 inches in height. Timely applications are crucial because control with many herbicides is poor if they are applied after glyphosate-resistant Palmer amaranth height is taller than 3 inches.

In addition to use of herbicides with differing modes of action, herbicide rotation in conjugation with crop rotation is a good way to avoid and/or manage glyphosate-resistant Palmer amaranth. For example, if a corn and cotton rotation is used, herbicides with identical modes of action use in both crops should be applied sparingly. The same can be applied to corn/soybean or cotton/soybean rotations. It is important to also remember that numerous herbicides have a rotation interval restriction for a following crop. Please refer to the “Recrop Intervals for Various Herbicides” section of the Louisiana Suggested Chemical Weed Management Guide and the herbicides label for direction.



*Palmer amaranth - female plant inflorescence*



*Palmer amaranth - male plant inflorescence*

The following three charts list suggested herbicides to be applied at multiple application timings for management of glyphosate-resistant Palmer amaranth.

### Herbicide Programs to Manage Glyphosate-Resistant Palmer Amaranth and Common Waterhemp in Corn

Technology <sup>1</sup>	Preemergence <sup>2,3</sup>	Postemergence over-the-top <sup>3</sup>
Roundup Ready	Bicep II Magnum, Cinch ATZ, Lexar EZ, Corvus plus atrazine or Zidua plus atrazine	Halex GT plus atrazine, glyphosate plus Capreno plus atrazine, glyphosate plus atrazine plus Zidua plus Armezon/Impact or Callisto, or glyphosate plus Lexar EZ
Liberty Link / Roundup Ready	Bicep II Magnum, Cinch ATZ, Lexar EZ, Corvus plus atrazine, or Zidua plus atrazine	Liberty or glyphosate plus Capreno plus atrazine, Liberty or glyphosate plus atrazine plus Zidua plus Armezon/Impact or Callisto, Liberty or glyphosate plus Lexar EZ, or Halex GT plus atrazine

### Herbicide Programs to Manage Glyphosate-Resistant Palmer Amaranth and Common Waterhemp in Cotton

Technology <sup>1</sup>	Preplant <sup>2,4</sup>	Preemergence <sup>2</sup>	Postemergence over-the-top <sup>5,7</sup>	Postemergence-directed <sup>5</sup>	Layby <sup>5,6</sup>
Roundup Ready Flex	Valor, Reflex or trifluralin	Cotoran	Glyphosate plus Dual Magnum or Sequence	MSMA plus Caporal or Cotton Pro	MSMA plus diuron, Valor or Reflex
Liberty Link	Valor, Reflex or trifluralin	Cotoran	Liberty plus Dual Magnum	MSMA plus Caporal or Cotton Pro	MSMA plus diuron, Valor or Reflex
GlyTol/Liberty Link	Valor, Reflex or trifluralin	Cotoran	Liberty plus Dual Magnum	MSMA plus Caporal or Cotton Pro	MSMA plus diuron, Valor or Reflex

### Herbicide Programs to Manage Glyphosate-Resistant Palmer amaranth and Common Waterhemp in Soybean

Technology <sup>1</sup>	Preplant Incorporated <sup>2</sup>	Preplant/Preemergence <sup>2,9</sup>	Postemergence over-the-top <sup>7,8,9</sup>
Roundup Ready	Pendimethalin or trifluralin	Authority Elite/BroadAxe, Authority MTZ, Boundary, Valor, Valor XLT, Fierce, Sonic/Authority First, Envive, Zidua, Canopy plus Dual Magnum	Glyphosate plus Dual Magnum or Zidua, glyphosate plus Prefix, Flexstar GT 3.5, glyphosate plus Cobra, Flexstar/Reflex, Ultra Blazer or Classic
Liberty Link	Pendimethalin or trifluralin	Authority Elite/BroadAxe, Authority MTZ, Boundary, Valor, Valor XLT, Fierce, Sonic/Authority First, Envive, Zidua, Canopy plus Dual Magnum	Liberty plus Dual Magnum or Zidua, Liberty plus Prefix, Liberty plus Cobra, Flexstar/Reflex, Ultra Blazer or Classic
Conventional	Pendimethalin or trifluralin	Authority Elite/BroadAxe, Authority MTZ, Boundary, Valor, Valor XLT, Fierce, Sonic/Authority First, Envive, Zidua, Canopy plus Dual Magnum	Cobra, Flexstar/Reflex, Prefix, Ultra Blazer or Classic

1. Planting into a weed-free seedbed is crucial. Burndown herbicide applications should be applied 4-6 weeks prior to planting.
2. Incorporation via rainfall or irrigation is required for soil applications of residual herbicides. The level of glyphosate-resistant Palmer amaranth control and the length of residual will vary with rainfall amounts. Residuals, when properly activated by timely rainfall or irrigation, can provide Palmer amaranth control for 2 to 3 weeks, depending upon the time of year, soil moisture and weed pressure. Paraquat plus a surfactant should be added to residual herbicides if glyphosate-resistant Palmer amaranth emerges before application.
3. In corn, postemergence over-the-top applications should be made when weeds are 2 to 3 inches tall, but prior to corn reaching 12 inches tall.
4. In cotton, preplant application of Valor at 2 ounces per acre should be applied at least 30 days prior to planting. Preplant application of Reflex requires 14 to 21 days plus 0.5 inches of rainfall before planting. Control from Valor or Reflex will be compromised if beds are disturbed prior to planting. Trifluralin should be mechanically incorporated with 24 hours of application.
5. In cotton, the first postemergence over-the-top application should be made when cotton is at the one- to two-leaf growth stage. If needed, a second postemergence over-the-top application can be applied depending upon glyphosate-resistant Palmer amaranth growth and environmental conditions. Postemergence over-the-top, postemergence-directed and layby applications of Liberty, MSMA, Caporal or Cotton Pro, diuron, Valor or Reflex will not control Palmer amaranth greater than 3 inches tall. Be sure to use a proper spray nozzle to achieve excellent coverage.





6. In cotton, diuron should be applied after cotton is 15 inches tall. Valor should be applied after cotton is 16 inches tall. Reflex should be applied after cotton has 4 inches of bark.
7. Glyphosate plus Dual Magnum or Sequence or glyphosate plus Zidua will not offer postemergence control of glyphosate-resistant Palmer amaranth.
8. For soybeans, all postemergence over-the-top applications should be applied when Palmer amaranth are 2 to 3 inches tall. Spray coverage is critical for control with contact herbicides, such as Liberty, Cobra, Flexstar/Reflex and Ultra Blazer.
9. Resistance to PPO-inhibitors (Authority products, Envive, Valor products, Flexstar/Reflex, Cobra and Ultra Blazer) has been documented in other states. If Valor, Valor XLT, Fierce, Envive, Authority Elite or Authority MTZ are used preemergence, do not apply Flexstar GT 3.5, Flexstar/Reflex, Cobra or Ultra Blazer postemergence if possible. This will help to protect this valuable herbicide chemistry.



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