

Management of Herbicide-Resistant Giant Ragweed



Giant Ragweed Biology

- Giant ragweed is a competitive weed that is adapted to the fertile soil crop production acres of the Midwest and Eastern Corn Belt.
- This weed typically emerges early in the growing season – as early as March – although some populations have adapted to extend emergence dates into early summer. Emergence patterns will vary among fields and regions based on prior management practices and when an area was first infested.
- The seeds of giant ragweed are larger than most other weed species. The large seed size allows giant ragweed to emerge from deep burial depths with emergence often being promoted by tillage. **Long-term no-tillage, along with proper herbicide management, can reduce giant ragweed populations.**
- Seedling emergence from various depths also allows giant ragweed to escape many pre-emergence herbicides that exist in the upper soil layers.
- Giant ragweed quickly grows above crops to compete for sunlight and create a dense canopy with its 4- to 8-inch-wide leaves.
- The rapid growth habit and shading ability of giant ragweed lead to soybean yield losses, even at low densities.
- The prolific pollen production of giant ragweed largely contributes to the discomfort humans suffer from allergies.



Herbicide Resistance in Giant Ragweed

- Giant ragweed resistance first occurred to Group 2 herbicides (ALS-inhibitors) in Indiana, Illinois, Ohio and Iowa in the late 1990s and early 2000s.
- Resistance to Group 9 (glyphosate) herbicides was first confirmed in the eastern Soybean Belt and has now been confirmed in 11 states across the Midwest and southern U.S.
- Populations with resistance to both Group 2 (ALS-inhibitors) and Group 9 (glyphosate) have been found in Ohio, Minnesota, Missouri and Indiana.
- Resistance to other herbicide sites of action has not occurred, although the loss of Group 2 (ALS-inhibitors) and Group 9 (glyphosate) is significant, as these were the most effective herbicide groups for control of giant ragweed.
- Resistance to multiple herbicides has not been widely documented, although caution should be taken to avoid creating multiple-resistant populations with heavy reliance of Group 2 (ALS-inhibitors) to control Group 9 (glyphosate)-resistant populations.

Management of Giant Ragweed

Giant ragweed populations vary in their emergence patterns and herbicide resistance depending on management history. Group 2 (ALS-inhibitors) resistance is most likely to occur in fields with a history of non-GMO soybeans that depended heavily on Group 2 herbicides (ALS-inhibitors) for control. Farmers should evaluate the performance of previous herbicide applications, scout and understand emergence patterns in order to determine the best-management practices.

Farmers managing populations of weeds with Group 2 (ALS) and Group 9 (glyphosate) resistance have limited options and will likely have to emphasize the use of Group 14 (PPO-inhibitor) herbicides and Group 10 (glufosinate) in LibertyLink® soybeans. **Rotating to corn and taking advantage of effective corn herbicides may be the best option for dense infestations of Group 2 (ALS)- and Group 9 (glyphosate)-resistant populations.**

Follow the steps below for the best management of herbicide-resistant giant ragweed.

1. **Start weed-free at planting.** Take full advantage of early-emerging populations by controlling all emerged weeds prior to planting with either thorough tillage or an effective burndown.
 - a. The use of 2,4-D ester or dicamba (Group 4) in combination with glyphosate (Group 9) or paraquat (Group 22) is the most effective treatment on small

Herbicide	Group #	Rates (oz./A.)	Equivalent Rates of Classic (oz./A.) (chlorimuron)	Equivalent Rates of FirstRate (oz./A.) (cloransulam)
Authority® First/Sonic®	14 & 2	3 - 8	-	0.28 - 0.74
Authority Maxx	14 & 2	5 - 9.6	0.78 - 1.5	-
Authority XL/Zone	14 & 2	3 - 9.6	0.93 - 3	-
Canopy® EX/Cloak EX/Resist	2 & 2	1.1 - 3.3	1 - 3	-
Canopy/Cloak™ DF	5 & 2	2.25 - 7	1 - 3	-
Classic/Curio	2	1.25 - 3	1.25 - 3	-
Enlite	2, 2 & 14	2.8 - 4.25	0.31 - 0.48	-
Envive®	2, 2 & 14	2.5 - 5.3	0.92 - 1.94	-
Fierce XLT	2, 14 & 15	3.75 - 5.25	1 - 1.4	-
FirstRate®	2	0.6 - 0.75	-	0.6 - 0.75
Gangster® /Surveil Co-Pak	14 & 2	1.8 - 3.6	-	0.3 - 0.6
Surveil®	14 & 2	3.5 - 4.2	-	0.5 - 0.6
Synchrony® XP	2 & 2	1 - 3	0.85 - 2.56	-
Valor® XLT	14 & 2	2.5 - 5	1 - 2	--

Table 1. Pre-emergence herbicides containing chlorimuron or cloransulam that suppress ALS-susceptible giant ragweed. Rates are dependent on soil type, application timing and region. Always refer to the label for appropriate rates.

giant ragweed plants, regardless of the type of herbicide resistance. Be sure to observe planting-restriction intervals of at least seven days after 2,4-D application or 14-28 days plus one inch of rain for dicamba.

- b.** Products containing saflufenacil (Group 14; Sharpen®, Optill®, Verdict® and Optill PRO) can be used instead of 2,4-D ester and dicamba (Group 4). These should also be combined with glyphosate (Group 9), Liberty® (Group 10) or Liberty plus metribuzin (Group 5). The use of Liberty in a burndown program can restrict the use of post-emergence Liberty applications in LibertyLink soybeans because of the 65-ounce-per-acre growing-season maximum.

2. Suppress late-emerging weeds. The use of a residual herbicide either in combination with a burndown or at planting in a tilled seedbed will provide suppression of later-emerging giant ragweed plants, providing the soybean crop with a competitive advantage as well as relieving the selection pressure placed by postemergence herbicides.

- a.** Herbicide products containing chlorimuron or cloransulam (Table 1) applied before emergence at full rates are the most effective for reduction of giant ragweed emergence. These herbicides will only be effective on Group 2 (ALS)-sensitive populations.

- b.** Group 2 (ALS)-resistant populations can be suppressed by pre-emergence applications of products containing fomesafen (Group 14), such as Prefix™, Intimidator™, Vise® or Reflex®. These products are more variable than the products listed above and restrict the use of postemergence products containing fomesafen (Group 14).

3. Finish strong with multiple postemergence applications.

Multiple postemergence applications will likely be needed to control dense infestations of giant ragweed, especially in populations that exhibit extended emergence, even after an effective burndown and residual herbicide have been applied. Postemergence options can be limited, especially in ALS- and glyphosate-resistant populations. Use care in your postemergence product selection with attention toward using multiple sites of action and differing sites of action from the residual products to avoid selection of herbicide-resistant populations. Table 2 (page 4) lists the available postemergence programs with their appropriate rates, soybean traits, application timings and effectiveness for each type of resistance.

- a.** In a planned, two-pass postemergence program, the first application should be made according to the size of weeds listed in Table 2 (page 4). Make a second or "followed-by"

application three to four weeks after the first application to control later-emerging plants or plants that were not fully controlled by the first application.

- b. Postemergence applications of Group 14 (PPO-inhibitor) herbicides can be variable in performance and should be used with caution because over-reliance could lead to PPO-resistant giant ragweed.

4. **Consider LibertyLink.** LibertyLink soybeans provide the additional option for postemergence control of giant ragweed. LibertyLink soybeans are the best option for farmers managing ALS- and glyphosate-resistant giant ragweed. An effective burndown/tillage program, along with a residual herbicide, should still be used in a LibertyLink system to relieve selection pressure and ensure optimal giant ragweed control.

Table 2. Postemergence herbicide options for control of susceptible and herbicide-resistant giant ragweed in soybeans.

Herbicide (Group #)	Rate	Weed Size (Inches)	Soybean Traits ¹	Susceptible	Group 2 (ALS)	Group 9 (glyphosate)	Group 2 (ALS) + Group 9 (glyphosate)
FirstRate (2)	0.3 oz./A.	4 - 8	Non-GMO, RR, & LL	X ²		X	
Flexstar (14)	1.3 pt./A.	4 - 8	Non-GMO, RR, & LL	X	X	X	X
FirstRate (2) + Flexstar® (14)	0.3 oz./A. + 1 pt./A.	4 - 8	Non-GMO, RR, & LL	X	X ⁴	X	X ⁴
Glyphosate (9) fb³	1.1 - 1.5 lb. ae/A.	6 - 10	RR	X	X		
Glyphosate (9)	0.75 lb. ae/A						
Liberty (10) fb	29 oz./A.	4 - 8	LL	X	X	X	X
Liberty (10)	22 oz./A.						
Flexstar (14) fb	1.3 - 1.6 pt./A.	4 - 8	Non-GMO, RR, & LL	X	X	X	X
Cobra™ (14)	10 oz./A.						

¹ Non-GMO: Non-genetically modified or conventional, RR: Roundup Ready, LL: LibertyLink.

² "X" indicates control of giant ragweed within given susceptible or resistance category.

³ fb: followed by.

⁴ Control will be provided by the Flexstar element of the tank mix and will likely be less reliable as compared with the 1.3 pt./A. Flexstar alone or Flexstar fb Cobra programs.

For more information and links to additional resources, visit www.TakeActionOnWeeds.com.

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