



## Common Ragweed (*Ambrosia artemisiifolia*) Control in Soybeans

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Common ragweed (*Ambrosia artemisiifolia*) is one of the most troublesome weeds in row crops of the mid-Atlantic region. Common ragweed can reach up to 6 feet in height with plants producing up to 62,000 seeds per plant and seed that can remain viable even after 39 years of burial in soil (Dickerson and Sweet 1971; Bassett and Crompton 1975). The majority of common ragweed emergence occurs in early spring, typically starting in mid-March and ending by June 1 (Meyers et al. 2004). Two common ragweed plants per 3 feet of row can result in soybean yield losses of 40-76% (Barnes et al. 2018). This publication will discuss common ragweed identification, resistance status as well as integrated weed management tactics and herbicide programs for effective, long term control.

Glyphosate (e.g. Roundup) and ALS-inhibiting (such as Classic, FirstRate, etc.) herbicides have traditionally been used by Virginia soybean growers to control common ragweed. Currently glyphosate (group 9)- and ALS (group 2)-resistant common ragweed occurs throughout the soybean growing regions of Virginia. If unknown, growers should assume all populations are resistant to herbicide groups 2 and 9. In soybeans without alternative herbicide tolerance traits, this leaves only PPO-inhibiting herbicides (Flexstar, Cobra, etc.; group 14) as an effective postemergence options. Reliance on these herbicides alone is not sustainable, as shown by the recent confirmation of PPO-resistant common ragweed populations in

North Carolina, Maryland, and Delaware. For long-term, effective control of common ragweed, Integrated Weed Management tactics such as cultural and mechanical control must be utilized in conjunction with multiple, effective herbicide sites of action (SOA), which are easily recognized on product labels by group number.

### Identification

Common ragweed possesses oval to spatulate shaped cotyledons (Figure 1) with a purple underside. Leaves are fernlike, hairy, and alternate although lower leaves may be opposite (Figure 2). Other characteristics can be seen in Figures 3 & 4.



Figure 1. Common ragweed in the 2-leaf stage with cotyledons visible.



Figure 2. A young common ragweed plant.



Figure 3. Common ragweed in an advanced growth stage.



Figure 4. Common ragweed flower.

## Integrated Weed Management Tactics

### Prevention

The prevention of weed infestations is essential to a cost-effective weed management program. Prevention tactics include equipment sanitation, such as thorough cleaning of harvest and tillage equipment. It is also vital to ensure weed seed is not introduced through other carriers such as manure and seed.

### Cultural

Cultural weed management practices help to increase crop competitiveness against weeds. Such tactics include maintaining optimum fertility, utilizing narrow row spacing (15-inch rows or less), and ensuring a weed-free field at planting.

Cover crops are most effective for weed suppression when high biomass levels are achieved (Mirsky et al. 2011) (Figure 5). To ensure high biomass levels, early planting of fall cover crops is crucial. Delayed cover crop termination can also help to increase biomass levels. Research in Virginia indicates fall planted cereal rye alone can reduce common ragweed densities up to 33% when planted between mid-October and mid-November (Beam and Flessner 2019). Termination of cereal rye cover crop about May 1 typically maximizes biomass production.

Delayed planting date and crop rotation are also very effective strategies. Since common ragweed emergence is mostly complete by June 1, planting into a weed-free field after that time will greatly reduce common ragweed competition. Therefore, delayed planting, or better yet, double cropping soybeans after wheat or barley are effective cultural practices for common ragweed management. Research in Virginia indicates double cropping soybeans behind wheat can reduce common ragweed density 47% on average

prior to planting compared to full season planting timing (Beam and Flessner 2019).



Figure 5. Comparison of weed control from no-cover (left) vs. fall-planted cereal rye cover (right) in June, 8 weeks after termination with glyphosate.

## Mechanical

Mechanical tactics for weed control include tillage, harvest weed seed control, and hand pulling.

Tillage can be extremely effective at reducing common ragweed densities prior to planting. A tillage pass utilizing a disc or chisel plow will control emerged common ragweed prior to planting (Barnes et al. 2017). Additionally, deep tillage with a moldboard plow once every 3-6 years can bury weed seeds to a depth where they are unable to germinate. Common ragweed germination is reduced when buried 1.5 inches and no germination was observed when buried at a depth of 3 inches or greater (Guillemin and Chauvel 2011). Frequent use of a moldboard plow is not as effective since previously buried weed seeds from earlier passes will be uncovered.

Harvest weed seed control has become increasingly popular in Australia where growers are dealing with multiple herbicide resistance

issues. Methods of harvest weed seed control include windrow burning, chaff lining, chaff carting, and the Harrington Seed Destructor - an implement which destroys weed seeds exiting the rear of a combine (Walsh et al. 2012). Research in Virginia has shown a 20-28% reduction in common ragweed densities with harvest weed seed control when compared to conventional harvest (Beam et al. n.d.). For more information on harvest weed seed control, see Virginia Cooperative Extension Publication [SPES-135NP](#).

## Herbicide Programs

The basis of any weed control program is to start clean and stay clean. This begins with an effective burndown application as close as possible to planting. Burndown applications should include at least two effective sites of action for herbicide resistance management.

To stay clean, a pre-emergence application, either applied at planting or with burndown, should be followed with a post-emergence application before weeds reach 4 inches in height. These applications should also include multiple, effective sites of action on common ragweed whenever possible.

All herbicide applications should follow label directions and utilize adjuvants, nozzles, and spray volume listed on the label. Herbicides must be applied at the full labeled rate to ensure control and reduce the possibility of escapes and resistance. Care must be taken with respect to rotation restrictions for future crops. The following herbicide programs were developed assuming glyphosate and ALS-resistant common ragweed, but these herbicides may be utilized for control of other weed species in an herbicide program. Weed control ratings are based on data from the 2019 Field Crops Pest Management Guide (Virginia Cooperative Extension Publication [456-016](#)). Please consult this publication for more information.

## Pesticide Precautions

Select and use all pesticides carefully. Before using any pesticide, read the instructions printed on the label of its container; follow those instructions, heed all cautions and warnings, and note precautions about residues. Store pesticides in their original containers. Store them where children and animals cannot get to them — away from food, feed, seed, and other materials that could become harmful if contaminated. Dispose of

empty pesticide containers in the manner specified on their labels. See your doctor if symptoms of illness occur during or after use of any pesticide.

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### Preplant Burndown<sup>1</sup>

Apply (SOA #):	With One of the Following (SOA #):	Weed Control Rating (1 to 10):
<b>Gramoxone</b> (22)		8
	Enlist One/Enlist Duo/Other 2,4-D formulations (4) <sup>2</sup>	9
	Xtendimax/Engenia/FeXapan/Other dicamba formulations (4) <sup>3</sup>	9
<b>Liberty</b> (10) <sup>4</sup>		8
	Enlist One/Enlist Duo/Other 2,4-D formulations (4) <sup>2</sup>	9
	Xtendimax/Engenia/FeXapan/Other dicamba formulations (4) <sup>3</sup>	9
<b>Sharpen</b> (14) <sup>5</sup>		9
	Enlist One/Enlist Duo/Other 2,4-D formulations (4) <sup>2</sup>	9
	Xtendimax/Engenia/FeXapan/Other dicamba formulations (4) <sup>3</sup>	9

1. Follow label instructions for rates, adjuvants, timing, soybean size, and rotational restrictions.
2. For full season plantings: There is no planting restriction for Enlist soybeans following applications of Enlist One or Enlist Duo herbicides. For non-Enlist soybeans and other 2,4-D formulations, planting restrictions are 1.0 pt/A: 15 days, 1 qt/A: 30 days.
3. For full season plantings: There is no planting restriction for Xtend soybeans following applications of new dicamba formulations. For non-Xtend soybeans and other dicamba formulations (Clarity, etc.) planting restriction is 1 inch of rain/irrigation and 14 days at 0.5 pt/A of Clarity.
4. Liberty should be applied 2 hours after sunrise and prior to 2 hours before sunset on hot, humid days. Therefore, Liberty is not typically recommended for use in April.
5. Make no more than two applications of a PPO-inhibiting (group 14) herbicide per season. Do not tank-mix with other group 14 herbicides. Allow 14 days or more between Sharpen and other group 14 herbicide applications.

## Preemergence<sup>1</sup>

Choose One of the Following (SOA #):	Weed Control Rating (1 to 10):
<b>Command</b> (13) <sup>2</sup>	8
<b>Reflex</b> (14) <sup>4,6</sup>	9
<b>Valor</b> (14) <sup>4</sup>	8+
<b>Zidua</b> (15)	7
<b>Consider adding Metribuzin</b> (5) <sup>5</sup> to the products above to increase control.	7
<b>Or Choose a Premix (SOA #):</b>	
<b>Afforia</b> (2/2/14) <sup>3,4</sup>	8
<b>Anthem</b> (14/15) <sup>4</sup>	7
<b>Anthem Maxx</b> (14/15) <sup>4</sup>	7
<b>Authority Elite</b> (14/15) <sup>4</sup>	7
<b>Authority First</b> (14/2) <sup>3,4</sup>	8+
<b>Authority MTZ</b> (14/5) <sup>4,5</sup>	8
<b>Authority Supreme</b> (14/15) <sup>4</sup>	8
<b>Authority XL</b> (2/14) <sup>3,4</sup>	8
<b>Boundary</b> (5/15) <sup>5</sup>	7
<b>BroadAxe</b> (14/15) <sup>4</sup>	7
<b>Canopy</b> (2/5) <sup>3,5</sup>	7+
<b>Envive</b> (2/2/14) <sup>3,4</sup>	8
<b>Fierce</b> (14/15) <sup>4</sup>	7
<b>Fierce XLT</b> (2/14/15) <sup>3,4</sup>	8
<b>Prefix</b> (14/15) <sup>4,6</sup>	7+
<b>Sonic</b> (2/14) <sup>3,4</sup>	8+
<b>Surveil</b> (2/14) <sup>3,4</sup>	9
<b>Trivence</b> (2/5/14) <sup>3,4,5</sup>	8
<b>Valor XLT</b> (2/14) <sup>3,4</sup>	8
<b>Warrant Ultra</b> (14/15) <sup>4</sup>	7+
<b>Zidua PRO</b> (2/14/15) <sup>3,4,7</sup>	8

1. Follow label instructions for rates, adjuvants, timing, soybean size, and rotational restrictions. If weeds were not completely controlled or have emerged since preplant burndown, add Gramoxone (22) or Liberty (10) to the options listed.
2. 2.66 pt/A of Command 3E must be applied for effective common ragweed control.
3. Only one application of an ALS-inhibiting (2) herbicide is allowed per year.
4. Only two applications of PPO-inhibiting (14) herbicides are allowed per year.
5. Product contains metribuzin; some soybean varieties are sensitive to metribuzin.
6. Fomesafen is an active ingredient in Prefix and Reflex. Only one application of fomesafen is allowed every other year.
7. This product should not be applied if Sharpen was applied as a burndown.

## Postemergence<sup>1</sup>

Conventional Soybeans	<b>Apply (SOA #):</b>		<b>Consider adding a Residual Herbicide (SOA #)<sup>2</sup>:</b>
	Reflex (14) <sup>3</sup>		Dual (15)
	Flexstar (14) <sup>3</sup>		Outlook (15)
			Zidua (15)
Roundup Ready Soybeans	<b>Apply (SOA #):</b>		<b>Consider adding a Residual Herbicide (SOA #)<sup>2</sup>:</b>
	Reflex (14) <sup>3</sup>		Dual (15)
	Flexstar (14) <sup>3</sup>		Outlook (15)
	Flexstar GT (9/14) <sup>3</sup>		Zidua (15)
Liberty Link Soybeans	<b>Apply (SOA #):</b>	<b>With one of the following (SOA #):</b>	<b>Consider adding a Residual Herbicide (SOA #)<sup>2</sup>:</b>
	Liberty (10)	Reflex (14) <sup>3</sup>	Dual (15)
			Outlook (15)
			Zidua (15)
Xtend Soybeans	<b>Apply (SOA #):</b>	<b>With one of the following (SOA #):</b>	<b>Consider adding a Residual Herbicide (SOA #)<sup>2</sup>:</b>
	Xtendimax (4) or	Reflex (14) <sup>3</sup>	Dual (15)
	Engenia (4) or	Flexstar GT (9/14) <sup>3</sup>	Outlook (15)
	FeXapan (4)		Zidua (15)
LLGT27 Soybeans	<b>Apply (SOA #):</b>	<b>With one of the following (SOA #):</b>	<b>Consider adding a Residual Herbicide (SOA #)<sup>2</sup>:</b>
	Liberty (10)	Reflex (14) <sup>3</sup>	Dual (15)
		Flexstar GT (9/14) <sup>3</sup>	Outlook (15)
			Zidua (15)
Enlist E3 Soybeans	<b>Apply (SOA #):</b>	<b>With one of the following (SOA #):</b>	<b>Consider adding a Residual Herbicide (SOA #)<sup>2</sup>:</b>
	Enlist One (4) or	Liberty (10)	Dual (15)
	Enlist Duo (4) <sup>4</sup>	Reflex (14) <sup>3</sup>	Outlook (15)
		Flexstar GT (9/14) <sup>3</sup>	Zidua (15)
<p>1. Follow label instructions for rates, adjuvants, timing, soybean size, and rotational restrictions. Make only one application of ALS-inhibiting (2) herbicide and no more than two applications of a PPO-inhibiting (14) herbicide per season.</p> <p>2. Not necessary for common ragweed control but a good management practice for control of other troublesome weeds such as Palmer amaranth.</p> <p>3. Fomesafen is an active ingredient in Flexstar GT and Reflex. Only one application of fomesafen is allowed every other year. Only two applications of a PPO-inhibiting (14) herbicide are allowed per year.</p> <p>4. Enlist Duo cannot be tank-mixed with Liberty.</p>			



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