

Soybean Herbicide Management Strategies

A number of broad-spectrum preemergence (PRE) and postemergence (POST) herbicides are available for use in soybeans. In OSU research, almost any type of approach to herbicide management can be used in fields with low weed pressure with little risk of crop yield loss. These approaches include: total PRE, PRE followed by POST, and total POST. However, the biology of some weeds that occur in soybean fields, in addition to the slow early development of no-till soybeans, can make it difficult to achieve effective weed control with a single application of PRE or POST herbicides. For this reason, a PRE followed by POST program or a two-pass POST program often provides the most consistent control.

Weeds that are especially problematic in a total PRE herbicide program, depending upon their population, include annual grasses, giant ragweed, ALS-resistant common ragweed, marestalk, annual morningglory, cocklebur, waterhemp, and most perennial weeds. Another major drawback to PRE herbicides applied at planting is the narrow window of time in which at least 0.5 to 1 inch of rain must occur to move herbicide into the soil. In early May when soybeans are often planted, weeds will typically start to emerge within 8 to 10 days after tillage or an application of glyphosate or paraquat. Rain is needed before these weeds emerge in order for PRE herbicides to be effective. Applying herbicides several weeks or more before planting of no-till soybeans often results in more consistent weed control initially, although herbicide activity may not last as long after planting, compared to application at the time of planting.

Weeds that can be problematic in a one-pass, total POST herbicide program, depending upon their population, include annual grasses, giant ragweed, waterhemp, lambsquarters, marestalk, and some perennials (because they may be too small at the time of an early POST application). Most POST soybean herbicides should be applied before weeds exceed 3 to 6 inches in height for consistent control and to avoid crop yield loss. Glyphosate application can be timed for weed heights of 4 to 8 inches, although velvetleaf, lambsquarters and some other weeds are more easily controlled when less than 6 inches tall. Problems with proper timing of a single postemergence application include: 1) giant ragweed grows at approximately twice the rate of most annual weeds, and is likely to be 8 to 12 inches tall when other weeds are 3 to 6 inches tall; 2) wet and/or cold weather can prevent timely application and result in the need to treat many acres within a short period of time once favorable weather returns, and 3) when weed populations continue to emerge after the POST application and are not suppressed by the soybean leaf canopy, a second POST application may be needed.

A planned PRE plus POST approach will provide more consistent weed control than any one-pass approach in many fields, and help solve some of the problems in management of POST herbicides. The most complete PRE plus POST program includes use of a PRE herbicide with activity on key broadleaf weeds that also provides at least some early-season control of grasses, followed by a POST treatment with activity on grass and broadleaf weeds. In many cases, early-spring application of a PRE herbicide with 2,4-D ester in no-tillage fields can reduce or eliminate the need for glyphosate or paraquat, in addition to providing residual weed control. The PRE herbicide can control or reduce the population of some problem broadleaf weeds, such as lambsquarters, waterhemp, and giant ragweed, making it relatively easy to control any later-emerging weeds with the POST treatment. A major advantage of the PRE plus POST approach, compared to total POST, is that the PRE herbicide will often provide enough weed control to prevent major problems if weather delays the POST application. Use of the PRE plus POST approach to allow for a slightly delayed POST application can result in more consistent control of late-emerging weeds such as foxtails, giant ragweed, black nightshade, waterhemp, and perennials.

Preemergence Soybean Herbicide Programs

Total preemergence (PRE) herbicide programs fit fields with:

- low annual grass populations
- low to moderate populations of annual broadleaf weeds, including common ragweed, smartweed, pigweed, and velvetleaf
- most populations of lambsquarters

Total preemergence programs do not fit fields with:

- moderate to high annual grass populations
- giant ragweed, cocklebur, burcucumber, marestalk, annual morningglory, or waterhemp
- biennial and perennial weeds

Advantages:

- one-pass, can apply while planting
- with adequate rain, provides control through the first 6 weeks, and later-emerging weeds have much reduced impact on soybean yields

Disadvantages:

- dependence upon adequate rain within narrow period of time
- not effective enough on tough broadleaf or perennial weeds or in moderate to high grass populations
- soybeans need to be competitive earlier in season compared to PRE plus POST programs

Approaches:

The most broad-spectrum programs include mixtures of a grass herbicide (Command, Dual, Outlook, Prowl, etc) with Canopy XL, FirstRate, Gangster, or Scepter. Python, Valor, and Sencor have less activity on giant ragweed and other tough broadleaf weeds compared to the previously listed products. OSU research results suggest the following ranking of preemergence grass herbicides (Axiom not included because rates labeled for soybeans are too low for season-long control):

For longevity of grass control:

Command > Dual II Magnum/Parallel > Outlook > Prowl = alachlor

Amount of rain needed for activity:

Command < Outlook < Dual II Magnum/Parallel = alachlor < Prowl

Preemergence plus Postemergence Soybean Herbicide Programs

Pre plus Post herbicide programs fit any field, but are especially well-suited for fields with:

- moderate to high annual grass populations
- moderate to high giant ragweed, cocklebur, and annual morningglory populations
- waterhemp and marehail
- biennial and perennial weeds
- burcucumber
- no-tillage

Advantages:

- very consistent, as long as some rain on PRE
- creates wider window for POST application, compared to total POST programs
- good on many tough weeds

Disadvantages:

- dependence upon rain for PRE activity (although have planned POST backup)
- two-pass

Approaches:

In fields with low grass populations, using preemergence grass or grass plus broadleaf herbicides followed by postemergence broadleaf herbicide is one approach. Examples:

- Command followed by Flexstar
- Prowl followed by Pursuit + Cobra

In fields with moderate to high grass populations, using a preemergence broadleaf herbicide that also has some grass activity followed by a postemergence grass or grass plus broadleaf herbicide treatment is another approach. Choice of preemergence herbicide would vary with type of broadleaf weeds present – problem weeds such as giant ragweed would require preemergence use of Canopy XL, FirstRate, or a Scepter product. Examples:

- Canopy XL followed by Flexstar plus Fusion
- Sencor followed by Synchrony STS + Select (STS soybeans)
- Boundary followed by glyphosate (RR soybeans)

Total Postemergence Soybean Herbicide Programs

Total postemergence herbicide programs (one application) can be used in fields with:

- low to moderate populations of most annual weeds
- low to moderate populations of giant ragweed

Avoid use in fields with:

- moderate to high lambsquarters or grass populations
- high giant ragweed populations
- marehail
- late-season perennials such as hemp dogbane

Advantages:

- one-pass, can plant first and apply later (except for burndown in no-till soybeans)
- not dependent upon rainfall for postemergence activity (although soil moisture status affects weed response to herbicides)
- consistent control of low to moderate annual weed populations

Disadvantages:

- narrow window of application depending upon weather should be applied before weeds exceed about 6 inches in height to avoid yield loss
- a second POST application may be needed for late-emerging weeds that are not suppressed by the soybean leaf canopy
- application may be too early for best perennial weed control

Approaches:

Apply a herbicide treatment with activity on grass and broadleaf weeds before weeds exceed 3 to 6 inches in height (4 to 8 inches for Roundup Ready soybean program). Examples:

Glyphosate (Roundup Ready soybeans)
Synchrony STS + Select (STS soybeans)
Flexstar + Harmony GT + Fusion
Raptor

Table 13. Weed Response to Herbicides in Soybeans

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables.

Weed control rating:
 9 = 90% to 100% control
 8 = 80% to 90% control
 7 = 70% to 80% control
 6 = 60% to 70% control

Crop tolerance rating:
 0 = Excellent
 1 = Good
 2 = Fair
 3 = Poor

Weed control rating of 5 or less is rarely significant. Crop injury of 1 or less is rarely significant.
 - = no information

Mode of Action	Crop Tolerance	Grasses											Broadleaf Weeds																
		Barnyardgrass	Crabgrass	Fall Panicum	Giant Foxtail	Yellow Foxtail	Shattercane	Seedling Johnsongrass	Rhizome Johnsongrass	Quackgrass	Volunteer Corn	Yellow Nutsedge	Annual Morningglory	Black Nightshade	Burcucumber	Cocklebur	Common Ragweed	ALS-resistant common ragweed	Giant Ragweed	ALS-resistant giant ragweed	Jimsonweed	Lambsquarters	Triazine-Resistant Lambsquarters	Pigweed	Smartweed	Velvetleaf	Waterhemp		
Preplant																													
Incorporated Only																													
Trifluralin	R	1	9	9	9	9	9	7	7	3	0	5	0	4	0	0	0	2	2	0	0	2	8+	8+	9	4	3	8	
Preplant or Preemergence																													
Alachlor ¹	S	1	8	9	8	8	8	5	4	0	0	0	8	0	8	0	0	5	5	2	2	4	6	6	8	4	0	7	
Boundary	P/S	2	8	9	8+	8+	8+	5	4	0	0	0	8+	3	8	0	5	7	7	5	5	7+	9	6	9	9	7	7	
Canopy XL	A/D	2	7	7	7	7	7	2	2	0	0	4	7	8	9	7	8	9	3	8	2	9	9	9	9	9	8+	8	
Command	M	0	9	9	9	9	9	6	6	2	2	5	3	0	6	0	6	7	7	5	5	8	9	9	2	8	9	2	
FirstRate/Amplify	A	0	5	5	5	5	5	0	0	0	0	2	0	8	0	-	8	9	0	8	0	-	9	9	9	8	8+	5	
Gangster	A/D	2	5	5	5	5	5	0	0	0	0	2	0	8	9	-	8	9	7	8	3	9	9	9	9	9	8+	8	
Metolachlor ¹	S	1	8	9	8+	8+	8+	5	4	0	0	0	8+	0	8	0	0	5	5	2	2	4	6	6	8	4	0	7	
s-Metolachlor ¹	S	1	8	9	8+	8+	8+	5	4	0	0	0	8+	0	8	0	0	5	5	2	2	4	6	6	8	4	0	7	
Outlook	S	1	8	9	8	8	8	5	4	0	0	0	8	0	8	0	0	5	5	2	2	4	6	6	8	4	0	7	
Prowl /Pendimax	R	2	8	9	9	8	8	7	7	3	0	4	0	4	0	0	0	2	2	0	0	2	8+	8+	9	4	4	7	
Pursuit	A	1	6	7	7	7	7	7	7	3	0	5	4	7	9	4	7	6	0	6	0	8	9	9	9	9	8	5	
Python	A	1	3	3	3	3	3	0	0	0	0	0	0	5	8	3	7	7	0	5	0	7	9	9	9	8	8+	5	
Scepter	A	1	5	5	5	5	5	5	2	0	5	6	7	9	7	8	8	0	8	0	9	9	9	9	9	9	7	5	
Sencor	P	2	6	5	6	6	6	2	2	0	0	2	2	3	4	4	5	7	7	5	5	7	9	0	9	9	7	7	
Valor	D	2	3	3	3	5	5	0	0	0	0	0	0	7	9	-	4	7	7	3	3	-	9	9	9	7	7	8	
Preemergence Only																													
Lorox/Linex	P	2	5	5	5	5	5	0	0	0	0	3	0	2	7	0	6	8	8	5	5	6	9	9	9	9	9	6	8

¹Alachlor, metolachlor and s-metolachlor are available from a number of manufacturers - see soybean herbicide descriptions for more information. Metolachlor products have undergone limited testing at their labeled rates in OSU and Purdue University research.

Table 13. Weed Response to Herbicides in Soybeans—Continued

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables.

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	Mode of Action	Grasses											Broadleaf Weeds																		
		Crop Tolerance	Barnyardgrass	Crabgrass	Fall Panicum	Giant Foxtail	Yellow Foxtail	Shattercane	Seedling Johnsongrass	Rhizome Johnsongrass	Quackgrass	Volunteer Corn	Yellow Nutsedge	Annual Morningglory	Black Nightshade	Burcucumber	Cocklebur	Common Ragweed	ALS-resistant common ragweed	Giant Ragweed	ALS-resistant giant ragweed	Jimsonweed	Lambsquarters	Triazine-Resistant Lambsquarters	Pigweed	Smartweed	Velvetleaf	Waterhemp			
Postemergence																															
Aim	D	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Basagran	P	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Classic	A	2	0	0	0	0	0	0	0	0	0	0	2	8	7	3	8+	9	8	0	8	0	8+	2	2	9	8	8	5		
Cobra	D	3	2	3	2	3	3	0	0	0	0	2	0	7	8+	7	8	9	9	8	8	9	4	4	9	6	7	9			
Extreme	E/A	1	9	8+	9	9	9	9	9	8+	8+	9	7	8	9	8	9	8+	8+	8+	8+	9	8+	8+	9	9	9	9	8		
FirstRate/Amplify	A	1	0	0	0	0	0	0	0	0	0	2	6	8	0	8+	9	9	0	9	0	8	0	0	5	8	9	5			
Flexstar	D	2	0	0	0	6	5	0	0	0	0	2	0	8	9	7	8+	9	9	8+	8+	9	7	7	9	9	8	9			
Glyphosate ²	E	0	8+	8+	8+	9	9	9	9	9	9	9	7	6	8	8	9	8+	8+	8+	8+	9	8+	8+	9	8	8	8	8	8	
Harmony GT	A	2+	0	0	0	0	0	0	0	0	0	0	0	4	4	1	6	4	0	3	0	4	8	8	9	8	9	5			
Pursuit	A	1	6	7	7	8	7	8	8	5	0	5	5	7	9	6	9	6	0	7	0	8+	6	6	9	9	9	5			
Raptor	A	2	6	7	7	8+	7	-	-	-	0	9	4	7	9	6	8	7	0	8	0	8	8	8	9	8	9	5			
Reflex	D	2	2	5	2	5	5	0	0	0	0	2	0	8	8	6	7	8+	8+	8	8	9	5	5	9	7	6	9			
Resource	D	2	0	0	0	0	0	0	0	0	0	0	0	6	5	6	7	7	7	5	5	7	7	7	7	5	9	7			
Stellar	D/D	3	0	0	0	0	0	0	0	0	0	0	0	7	8	7	8	9	9	7	7	8	7	7	9	7	9	8			
Storm	P/D	2	3	5	3	5	5	0	0	0	0	2	7	8+	7	6	8+	9	9	7+	7+	9	6	6	9	9	8	8+			
Synchrony STS ¹	A/A	0	0	0	0	0	0	0	0	0	0	2	8	8	4	8+	9	8	0	8	0	9	8	8	9	9	9	5			
Ultra Blazer	D	2	3	6	3	6	6	0	0	0	0	3	0	8	8	6	7	9	9	7	7	9	5	5	9	9	6	9			
Assure II	C	0	8+	8+	9	9	8	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fusilade DX	C	0	8	8	8	8	8	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fusion	C	0	9	8+	9	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poast/Poast Plus	C	0	9	8	9	9	9	8	8	7	7+	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Select/Arrow	C	0	9	8+	9	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

¹ Ratings are for 0.5 oz/A applied to STS soybeans.

² Apply to Roundup Ready soybeans only.

Mode of action: A= ALS inhibitor; C= ACCase inhibitor; D= cell membrane disruptor; M = pigment inhibitor; P= photosynthesis inhibitor; S= shoot meristem inhibitor; R= root meristem inhibitor; E = EPSP-synthase inhibitor.

Herbicide	Formulation
Treflan/Trifluralin	4EC, HFP, HF 10G

Tank-mix with: Most other preplant soybean herbicides.

- Treflan (trifluralin) controls annual grasses, pigweed, waterhemp, and lambsquarters and helps control smartweed, morningglory, and johnsongrass.
- Mode of action: root meristem inhibitor.
- Incorporate 2 to 3 inches deep within 24 hours. For best results, make two incorporation passes in different directions.

Treflan HFP Use Rates (pt/A)	
Soil Textural Group ^a	pt/A
Coarse	1.0
Medium	1.5
Fine	2.0

a. For coarse and medium soils with 2% to 5% organic matter use 1.5 pints. For fine soils with 2% to 5% organic matter use 2.0 pints. For soils with 5% to 10% organic matter use 2.0 to 2.5 pints.

Herbicide	Formulation
Alachlor	Various

Soybeans: Soil-Applied Herbicides — Preplant or Preemergence

Tank-mix with: Trifluralin, Lorox, Sencor, Scepter, Command, pendimethalin, Canopy XL, Pursuit.

- Alachlor is sold under various trade names, including Lasso, Intro, and Micro-Tech.
- Alachlor controls annual grasses and pigweed and helps control yellow nutsedge and black nightshade. Use the higher rates for control of yellow nutsedge and black nightshade.
- Mode of action: shoot meristem inhibitor.
- Incorporate (no deeper than 2 inches) to improve yellow nutsedge control and to reduce dependence upon rainfall.

Lasso Use Rates (qt/A)		
Soil Textural Group	Less Than 3% OM	Greater Than 3% OM
Coarse	2 to 2.25	2 to 2.25
Medium	2 to 2.75	2 to 2.75
Fine	2 to 2.75	2.5 to 3

a. Use higher rate in the recommended range for areas with heavy weed infestations. Use a minimum of 2.5 qt/A on coarse soils and 3 qt/A on medium and fine soils to control black and hairy nightshade. When applied through center pivot irrigation or under sprinkler irrigation systems on coarse soils, use a minimum of 3 qt/A.

Herbicide	Formulation	Product Rate Range
Axiom	68DF	7 - 13 oz

Tank-mix with: Canopy XL, Command, FirstRate, pendimethalin, Sencor, Scepter, trifluralin.

- Axiom is a premix of flufenacet (Define) plus metribuzin (Sencor) for preplant and preemergence control of annual grasses, and early-season suppression of lambsquarters, pigweed, waterhemp, common ragweed, and smartweed. Rates labeled for use in soybeans are too low to provide season-long weed control.
- Mode of action: shoot meristem inhibitor (thiaflumide), photosynthesis inhibitor (metribuzin).
- Can be applied up to 30 days before planting as a single application.

Herbicide	Formulation
Boundary	7.8EC

Tank-mix with: Python, Scepter, Canopy XL, FirstRate, Command, pendimethalin.

- Boundary is a premix of s-metolachlor (Dual II Magnum) plus metribuzin (Sencor) for annual grass and broadleaf control in soybeans. Weeds controlled include most annual grasses, lambsquarters, pigweeds, waterhemp, black nightshade, Pennsylvania smartweed, and yellow nutsedge. See Sencor and Dual II Magnum descriptions for guidelines on use.
- Mode of action: photosynthesis inhibitor (metribuzin), shoot meristem inhibitor (s-metolachlor).
- Can be applied up to 30 days before planting. Preplant applications can provide limited burndown of small annual weeds when applied with 2,4-D ester and crop oil concentrate.
- Can be applied at reduced rates when followed with a planned postemergence herbicide program.

Boundary Use Rates (pt/A)	
Soil Texture	Reduced or No-tillage
Coarse	1.0 to 1.75
Medium	1.75 to 2.5
Fine	2.25 to 3.0

Herbicide	Formulation
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Soybeans: Soil-Applied Herbicides — Preplant or Preemergence

Canopy XL

56DF

Tank-mix with: Most other soybean herbicides - see labels.

- Canopy XL is a premix of chlorimuron (Classic) plus sulfentrazone that controls many annual broadleaf weeds, including ragweeds, black nightshade, annual morningglory, cocklebur, velvetleaf, Pennsylvania smartweed, pigweeds, waterhemp, lambsquarters, and marestail (emerging from seed - high rates only). Control of cocklebur and giant ragweed varies with rainfall, population, and application method; early preplant application will provide most effective control of these weeds. Can provide partial control of giant foxtails, barnyardgrass, and yellow nutsedge. Does not control ALS-resistant common or giant ragweed.
- Mode of action: ALS inhibitor (chlorimuron), cell membrane disruptor (sulfentrazone).
- Use 3.6 to 7.9 oz/A only on soils with pH of 6.8 or less. Canopy XL may be applied at a rate of 2.5 oz/A regardless of soil pH. The 2.5 oz/A rate will aid in burndown of small broadleaf weeds and provide limited residual control.
- Expect best control of giant ragweed, velvetleaf, and other large-seeded weeds when high-rainfall conditions occur following application. For effective weed control, 1 inch of rain is required on moist soils, and 1 to 2 inches of rain is required on dry soils within 7 to 10 days of application. Soybean stunting may occur when rainfall results in prolonged wet soil conditions.
- Preplant applications can provide burndown of small, emerged annual weeds up to 3 inches tall, including prickly lettuce, wild garlic (at high rates), common ragweed, lambsquarters, and mustard species. Canopy XL will control small annual grasses (up to 1 inch tall). Apply with crop oil concentrate (1 gallon/100 gallons spray) for best control of emerged weeds. Tank-mixing with 2,4-D ester or another burndown herbicide will improve control of most annual weeds.
- Can be applied to no-till or conservation tillage fields in the fall for burndown of existing vegetation and limited residual control into the following growing season. Rates range from 3.5 to 7 oz/A where soil pH is 6.8 or less, depending upon the length of residual activity desired. Apply 2.5 oz/A where soil pH is greater than 6.8. 2,4-D should be included with all fall-applied treatments. Apply with Express or glyphosate for control of chickweed. Do not apply to frozen ground.
- To avoid carryover, follow the pH restriction closely and do not apply later than early June.

Canopy XL Use Rates (oz/A)			
Soil Texture	Soil Organic Matter Content ^a		
	pH greater than 6.8 and variable pH soils	Organic Matter 1/2 → 4%	
Coarse	2.5	5 ^b	6
Medium	2.5	6	7
Fine	2.5	6	8

- a. Use highest rate when heavy residues exist; early applications are planned; or heavy weed pressures are known to exist.
- b. Coarse soils with organic matter from _ to 2%, use 5.5-6.0 oz/A for morningglory, cocklebur, and improved suppression of yellow nutsedge.

Herbicide	Formulation	Product Rate Range
Command/Commit	3ME	1 1/3 - 2 2/3 pt

Tank-mix with: Sencor, Scepter, Lasso, Dual II Magnum, pendimethalin, Outlook, MicroTech, Lorox, Canopy XL.

- Command (clomazone) controls annual grasses, velvetleaf, lambsquarters, and smartweed, and controls or suppresses jimsonweed and common ragweed. The lower rates control velvetleaf and suppress grasses and some broadleaf weeds.
- Mode of action: pigment inhibitor.
- Many ornamental, vegetable, and agronomic crops are sensitive to Command spray drift and vapors moving outside the target area. Chlorosis or bleaching of sensitive plants may occur. Do not apply within 1200 feet of the following areas: towns and housing developments, commercial fruit or vegetable production, commercial greenhouses or nurseries. Do not apply within 300 feet of other desirable plants. Do not apply in winds above 10 mph, do not exceed a spray pressure of 30 psi, and do not rinse spray equipment near desirable plants. Do not apply to fence rows, waterways, ditches and roadsides.

Soybeans: Soil-Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation	Product Rate Range
Domain	60DF	9 - 16 oz

Tank-mix with: Most other soybean herbicides - see label.

- Domain is a premix of flufenacet (Define) plus metribuzin (Sencor) for early-season control of annual grass and small-seeded broadleaf weeds, including lambsquarters, pigweeds, waterhemp, and Pennsylvania smartweed. Preplant or preemergence application of Domain should be followed by a planned postemergence herbicide for adequate full-season weed control.
- Mode of action: shoot meristem inhibitor (flufenacet), photosynthesis inhibitor (metribuzin).
- Preplant applications can provide burndown of small, emerged annual weeds when applied with crop oil concentrate and 2,4-D.

Herbicide	Formulation
FirstRate/Amplify	84DF

Tank-mix with: See label.

- FirstRate/Amplify (cloransulam-methyl) controls many annual weeds, including ragweeds, velvetleaf, lambsquarters, pigweed, and cocklebur. Control of waterhemp is usually inadequate. Does not control ALS-resistant weeds.
- Control of giant ragweed, morningglory, and cocklebur varies with rainfall, population, and application method. Moderate to high population densities of giant ragweed will require an additional application of a postemergence herbicide.
- Mode of action: ALS inhibitor.
- For best results, apply within 2 weeks before planting. Do not apply earlier than 4 weeks before planting.
- Preplant applications with crop oil concentrate plus fertilizer solution or AMS can control small emerged annual broadleaf weeds, including ragweeds and annual smartweeds. Tank-mixing with 2,4-D ester or other burndown herbicides will improve control of most annual weeds.

FirstRate Use Rates (oz/A) ^a		
Area of Use	Soil Organic Matter Levels	oz./A
OH + north of I-64 in IN	3.0% or less	0.6
OH + north of I-64 in IN	Greater than 3.0%	0.75
IN- south of I-64	All organic matter levels	0.75

a. Soil applications of 0.75 oz/A FirstRate on soils with greater than 5% organic matter may result in reduced weed control.

Herbicide	Formulation	Product Rate Range
Gangster	Co-pack	1.8 - 3.6 oz

- Gangster is a co-pack of flumioxazin (Valor) plus cloransulam (FirstRate/Amplify) for annual broadleaf weed control and limited grass suppression in soybeans. Spectrum of control is similar to Canopy XL, but can be more effective for ragweed control. Does not control ALS-resistant giant ragweed, and provides partial control of ALS-resistant common ragweed. See Valor and FirstRate descriptions for guidelines and precautions on use.
- Mode of action: cell membrane disruptor (flumioxazin), ALS inhibitor (cloransulam).
- Lower labeled rates are intended for use in a planned preemergence followed by postemergence herbicide program (Example: Gangster followed by glyphosate in Roundup Ready soybeans).
- Do not apply Gangster after soybean emergence.

Herbicide	Formulation	Product Rate Range
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Soybeans: Soil-Applied Herbicides — Preplant or Preemergence

s-Metolachlor 7.64E
Metolachlor 7.8E

Tank-mix with: Trifluralin, Lorox, Sencor, Scepter, Canopy XL, pendimethalin.

- S-metolachlor (Dual II Magnum/Cinch) and metolachlor (Parallel) control annual grasses and pigweed, and control or suppress yellow nutsedge and black nightshade.
- Mode of action: shoot meristem inhibitor.
- May be applied up to 30 days before planting as a single application.
- Incorporation to a depth of 2 inches will improve yellow nutsedge control and reduce dependence upon rainfall.

Dual II Magnum/Parallel Use Rates (pt/A)		
Soil Textural Group	Less than 3% OM	3% or more OM
	Coarse	1.0 to 1.33
Medium	1.33 to 1.67	1.33 to 1.67
Fine	1.33 to 1.67	1.67 to 2.0

Herbicide	Formulation
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Outlook 6EC

Tank-mix with: Canopy XL, Command, Lorox, Sencor, pendimethalin, Pursuit, Scepter, trifluralin.

- Outlook (dimethenamid-P) controls annual grasses and pigweed, and control or suppress yellow nutsedge and black nightshade.
- Mode of action: shoot meristem inhibitor.
- Application rates vary with soil texture, organic matter content, and CEC. Can be applied early postemergence on soybeans up to the third trifoliolate stage, but will not control emerged grasses.
- Can be incorporated into the upper 1 to 2 inches of soil up to 2 weeks before planting. Incorporation will improve yellow nutsedge control.
- Can be applied up to 30 days before planting as a single application.

Outlook Use Rates (fl oz/A)		
Soil Texture ^a	Soil Organic Matter Content	
	Less than 3%	More than 3%
Coarse	12 to 14	14 to 18
Medium and Fine	14 to 18	18 to 21

a. Not recommended on soils with CEC values less than 5 or coarse soils with less than 1.5% organic matter.

Herbicide	Formulation
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Prowl/Pendimax 3.3EC
Prowl H2O 3.8CS

Tank-mix with: Scepter, Sencor, Lorox, alachlor, Dual II Magnum, Command, Pursuit, Canopy XL, Outlook.

- Prowl/Pendimax (pendimethalin) controls annual grasses, pigweed, and lambsquarters and helps control smartweed and velvetleaf.
- Mode of action: root meristem inhibitor.
- Preplant applications should be incorporated within 7 days of application. Incorporation may not be necessary if sufficient rainfall occurs.
- When applied without incorporation, apply from 15 days before planting up to 2 days after planting.
- Application close to or after planting may result in soybean injury, including stem swelling and brittleness. To reduce the risk of injury, apply early preplant or incorporate prior to planting.

Prowl H2O Use Rates (pt/A)		
Soil Texture	Soil Organic Matter Content ^a	
	Less than 3%	More than 3%
Coarse	1.5	1.5
Medium	2.0	2.0
Fine	2.0	2.0

Prowl/Pendimax Use Rates (pt/A)		
Soil Texture	Soil Organic Matter Content ^a	
	Less than 3%	More than 3%
Coarse	1.2 to 1.8	1.8
Medium	1.8 to 2.4	1.8 to 2.4
Fine	1.8 to 2.4	2.4 to 3

a. The high rates for each soil texture above should be used if heavy weed populations are anticipated, extensive crop residues were present prior to seedbed preparation, or in no-till.

Herbicide	Formulation
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Soybeans: Soil-Applied Herbicides — Preplant or Preemergence

Product Rate Range

Pursuit	2S	4 oz
	70DG	1.44 oz

Tank-mix with: Pendimethalin, trifluralin, alachlor, Dual II Magnum, Outlook, Sencor.

- Pursuit (imazethapyr) controls annual broadleaf weeds and controls or suppresses annual grasses. Grass control is more consistent when tank-mixed with a grass herbicide. Pursuit is weak on common and giant ragweed. Does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Pursuit may be applied preplant (up to 45 days before planting), preplant incorporated, preemergence, or postemergence. Postemergence applications provide more consistent control than soil-applied treatments.
- Preplant application of Pursuit plus surfactant and fertilizer solution can provide burndown of small, emerged, annual weeds, especially when applied with 2,4-D ester and other burndown herbicides.

Herbicide	Formulation
Python	80WDG

Tank-mix with: Most other soybean herbicides.

Python Use Rates (oz/A)	
Soil Textural Group	Ounces per acre
Coarse	0.80 to 1.0
Medium or Fine	0.89 to 1.33

- Python (flumetsulam) controls annual broadleaf weeds, including velvetleaf, lambsquarters (including triazine-resistant), and pigweeds. Control of common ragweed is variable. Python does not adequately control cocklebur, giant ragweed, or annual morningglory. Does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- May be applied up to 30 days before planting. Rates increase when applied early, compared to application at planting. Preplant application of Python will control small mustards, and field pennycress when applied with crop oil concentrate and 2,4-D.
- Do not apply to soils with the combination of pH less than 5.9 and organic matter content greater than 5%. Do not apply where soil pH is greater than 7.8.

Herbicide	Formulation	Product Rate Range
Scepter	70DG	2.8 oz

Tank-mix with: Most other soybean herbicides - see labels.

- Scepter (imazaquin) controls many annual broadleaf weeds, including lambsquarters, Pennsylvania smartweed, pigweeds, black nightshade, ragweeds, and cocklebur. Control of velvetleaf and annual morningglory is variable. Apply with reduced rates of Command to improve velvetleaf control. Scepter does not control of ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Residual control of large-seeded broadleaf weeds (cocklebur, giant and common ragweed) varies with rainfall, population, and application method; early preplant application will provide most effective control of these weeds.
- Imazaquin may persist for long periods in soil, especially where excessive rates occur from misapplication or streaked incorporation. Accurate application and uniform incorporation are important for follow-crop safety. Carryover is more likely in soils high in organic matter and clay, especially where soil pH is less than 6, and when droughty conditions occur during the season of application.
- Corn may be planted 9 1/2 months after application if at least 15 inches of rain is received between 2 weeks before application and November 15 of the same year. If this condition is not met, plant only imidazolinone-tolerant (Clearfield) corn the next year.

Soybeans: Soil-Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation	Sencor DF Use Rates (lb/A)																					
Sencor	4F	<table border="1"> <thead> <tr> <th rowspan="2">Soil Texture</th> <th colspan="3">Soil Organic Matter Content^a</th> </tr> <tr> <th>Less than 2%</th> <th>2% to 4%</th> <th>More than 4%</th> </tr> </thead> <tbody> <tr> <td>Coarse</td> <td>Do not use</td> <td>0.5</td> <td>0.75</td> </tr> <tr> <td>Medium</td> <td>0.5 to 0.75</td> <td>0.75 to 0.83</td> <td>0.83 to 1</td> </tr> <tr> <td>Fine</td> <td>0.75 to 0.83</td> <td>0.83 to 1</td> <td>1 to 1.17</td> </tr> </tbody> </table>			Soil Texture	Soil Organic Matter Content ^a			Less than 2%	2% to 4%	More than 4%	Coarse	Do not use	0.5	0.75	Medium	0.5 to 0.75	0.75 to 0.83	0.83 to 1	Fine	0.75 to 0.83	0.83 to 1	1 to 1.17
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Fine	0.75 to 0.83	0.83 to 1	1 to 1.17																				
	75DF																						
Tank-mix with: Alachlor, Dual II Magnum, pendimethalin, trifluralin, Command, Scepter, Lorox, Pursuit, Outlook, Python.																							

- Sencor (metribuzin) controls annual broadleaf weeds, including Pennsylvania smartweed, pigweeds, waterhemp, lambsquarters, and marestail (emerging from seed). Control of common ragweed and velvetleaf is variable. Sencor does not adequately control annual morningglory, giant ragweed, cocklebur, or black nightshade.
- Mode of action: photosynthesis inhibitor.
- Preplant applications can provide burndown of small, emerged annual weeds when applied with crop oil concentrate.
- May injure soybeans when applied at high rates. Injury may be greater where soil pH is over 7.5, and where seedling diseases, weather stress, or atrazine carryover occur. Soybean varieties vary in tolerance to Sencor. Selection of a variety with above-normal tolerance to Sencor will reduce the risk of crop injury.
- To avoid soybean injury, accurately apply the correct rate based on soil type. Do not use on sandy soil that is low in organic matter.
- Can be applied in the fall with 2,4-D ester for control of winter annual weeds, including marestail, mustards, purple deadnettle, and common chickweed.

Herbicide	Formulation	Valor Use Rates (oz/A) ^a												
Valor	51WDG	<table border="1"> <thead> <tr> <th rowspan="2">Soil Texture</th> <th colspan="2">Organic Matter Content</th> </tr> <tr> <th>Less than 3%</th> <th>3% or more</th> </tr> </thead> <tbody> <tr> <td>Coarse or medium</td> <td>2 to 2.5</td> <td>2 to 2.5</td> </tr> <tr> <td>Fine</td> <td>2 to 2.5</td> <td>2 to 3</td> </tr> </tbody> </table>		Soil Texture	Organic Matter Content		Less than 3%	3% or more	Coarse or medium	2 to 2.5	2 to 2.5	Fine	2 to 2.5	2 to 3
					Soil Texture	Organic Matter Content								
Less than 3%	3% or more													
Coarse or medium	2 to 2.5	2 to 2.5												
Fine	2 to 2.5	2 to 3												
Tank-mix with: Sencor, FirstRate, Lorox, Pursuit, Python, Scepter, Command, pendimethalin.														

- Valor (flumioxazin) can be applied preplant or preemergence for control of lambsquarters (including triazine-resistant), black nightshade, pigweeds, waterhemp, and marestail (emerging from seed). Valor suppresses or provides partial control of common ragweed, morningglory, velvetleaf, smartweed, and some annual grasses.
- Mode of action: cell membrane disruptor.
- Do not incorporate Valor into the soil following application.
- In OSU research, Valor has occasionally stunted and slowed the growth of soybeans when high rainfall conditions occur following soybean planting. The label states that risk of crop injury can be minimized by avoiding use of Valor on poorly drained soils, planting at least 1 1/2 inches deep, and completely covering seeds with soil. To avoid severe injury, do not use Valor in the same field with Axiom, Define, alachlor, Dual II Magnum, or Outlook.
- Valor has limited foliar activity on emerged weeds, and should generally be applied with 2,4-D and glyphosate for most effective control of emerged weeds.

^a A rate of 2.0 oz/A can be used on any soil type.

Soybeans: Soil-Applied Herbicides — Preemergence Only

Herbicide	Formulation	Product Rate Range
Lorox/Linex	50DF 4L	2/3 - 1 2/3 lb 2/3 -1 2/3 pt

Tank-mix with: Alachlor, Dual II Magnum, pendimethalin, Sencor, Pursuit Plus, Outlook.

- Lorox/Linex (linuron) controls many annual broadleaf weeds, including Pennsylvania smartweed, pigweeds, lambsquarters, and common ragweed. Helps suppress black nightshade and cocklebur, but does not control giant ragweed or annual morning-glory.
- Mode of action: photosynthesis inhibitor.
- Best-suited for use on medium-textured soils with 1 percent to 3 percent organic matter. Do not use on very sandy soils.
- Can provide burndown of small, emerged annual weeds present at application.
- May occasionally injure soybeans. Accurate application of the correct rate based on soil type is important to reduce the risk of injury.

Soybeans: Postemergence Herbicides — Contact

Herbicide	Formulation	Product Rate Range
AimEW	1.9L	0.25 oz

Tank-mix with: See labels.

- Aim (carfentrazone) is a contact herbicide that controls velvetleaf at 1/6 oz/A, the maximum rate labeled for broadcast application to soybeans. Aim can be tank-mixed with other herbicides to improve velvetleaf control. Refer to product labels for specific directions on tank-mixing.
- Apply up to the third trifoliolate of soybean growth.
- Apply with nonionic surfactant (0.25% v/v) in a spray volume of 10 to 20 gpa.
- Always add Aim to the spray tank first when tank-mixing with other herbicides.
- Application of Aim is likely to cause soybean leaf burn.

Herbicide	Formulation	Product Rate Range
Basagran	4L	1 - 2 pt

Tank-mix with: Ultra Blazer, Reflex, 2,4-DB, Scepter, Cobra, Harmony GT, Pursuit, Select, Poast Plus, Poast, Assure II, Classic, Flexstar, Synchrony STS.

- Basagran (bentazon) is a contact herbicide that controls many annual broadleaf weeds, but is weak on pigweed, ragweeds, and annual morningglories. At higher rates, controls or suppresses yellow nutsedge and Canada thistle.
- Mode of action: photosynthesis inhibitor.
- Basagran should be applied with crop oil concentrate (1.25% v/v) and/or nitrogen fertilizer (UAN or ammonium sulfate). The label suggests the use of UAN (1/2 to 1 gallon/A) or ammonium sulfate (2.5 pound/A) in place of crop oil concentrate where velvetleaf is the primary target weed. Crop oil concentrate must also be used if common ragweed and lambsquarters are present. Additive recommendations vary when tank-mixing with other herbicides; see the label for additional information.
- Apply in a spray volume of at least 20 gpa with a minimum pressure of 40 psi. Increasing spray volume (up to 50 gpa) will improve control when crop and weed foliage is dense.
- Application with Flexstar will improve control of morningglory, giant ragweed, and pigweed.
- The addition of 2 fluid ounces of 2,4-DB will improve morningglory control. Do not add crop oil or 28% nitrogen solution when applying with 2,4-DB.
- May cause temporary soybean leaf burn, but is less injurious to soybeans than most other postemergence herbicides.

Herbicide	Formulation	Product Rate Range
Cobra	2L	10 - 12.5 oz

Tank-mix with: Classic, Basagran, Pursuit, Select, Assure, Fusilade DX, Harmony GT, Stellar, Resource, Assure II, Synchrony STS.

- Cobra (lactofen) is a contact herbicide that is similar to Flexstar in weeds controlled. In OSU research, Flexstar has been more consistently effective than Cobra on giant and common ragweed and annual morningglory. Cobra can suppress some perennial weeds, including climbing milkweed and bigroot morningglory. Low rates of Cobra (4 to 6 ounces/A) are often mixed with other broadleaf herbicides to improve control of giant and common ragweed or black nightshade.
- Mode of action: cell membrane disruptor.
- For best results, apply with crop oil concentrate (0.25 to 1%, v/v) up to the 4- to 6-leaf stage of weeds. Surfactant, 28% nitrogen solution, or ammonium sulfate may be substituted for crop oil concentrate when weeds are actively growing under high temperature, high humidity, and high soil moisture conditions. Do not use surfactant when relative humidity is less than 80 percent.

Soybeans: Postemergence Herbicides — Contact

- Cobra can be applied late in the season for suppression of tall weeds, including black nightshade (up to 16 inches), velvetleaf and ragweeds (up to 36 inches), and pigweed (up to 24 inches). Use a rate of 12.5 ounces/A plus 1 quart/A of crop oil concentrate for this type of application. Apply at least 45 days prior to harvest.
- Apply in a spray volume of 20 to 30 gallons per acre at a spray pressure of 40 to 60 psi using flat fan or hollow cone nozzles.
- Causes more severe soybean leaf burn than other postemergence herbicides.

Herbicide	Formulation	Product Rate Range
Flexstar	1.88L	1 - 1.6 pints

Tank-mix with: Assure II, Fusilade DX, Fusion, Select, Poast, Poast Plus, Basagran, Classic, Harmony GT, Synchrony STS, 2,4-DB, Pursuit, Resource, Raptor.

- Flexstar (fomesafen) controls annual broadleaf weeds, including ragweeds, cocklebur, pigweeds, waterhemp, annual morning-glories, velvetleaf, Pennsylvania smartweed, and black nightshade. Flexstar will suppress Canada thistle, bindweeds, and climbing milkweed, but does not control lambsquarters.
- Mode of action: cell membrane disruptor.
- Maximum rates of Flexstar: north of I-70 - 1.3 pints; south of I-70 - 1.6 pints.
- Apply in a spray volume of 15 to 20 gpa (use 20 gpa in dense foliage) with a spray pressure of 30 to 60 psi.
- Apply with crop oil concentrate or methylated seed oil (0.5 to 1% v/v) or nonionic surfactant (0.25 to 0.5%), plus liquid nitrogen fertilizer (minimum of 1% v/v) or AMS (minimum of 4 lbs/100 gallons). Methylated seed oil is the preferred adjuvant.
- Flexstar may reduce the activity of postemergence grass herbicides, especially under drought-stress conditions. To avoid a reduction in grass control, apply Flexstar 2 to 3 days after the postemergence grass herbicide is applied, or wait about 7 days after Flexstar is applied before applying the grass herbicide. See label for more information on tank-mixing.
- Flexstar often causes temporary soybean leaf burn.
- Do not apply Flexstar or Reflex more than once every two years.

Herbicide	Formulation	Product Rate Range
Reflex	2LC	1 1/2 pt

Tank-mix with: Basagran, 2,4-DB, Fusilade DX, Classic, Pursuit, Select, Fusion, Resource, Synchrony STS, Assure II, Poast, Poast Plus..

- Reflex (fomesafen) is a contact herbicide that is similar to Blazer in weeds controlled, but is generally more effective for control of giant ragweed. Reflex can suppress bindweeds and climbing milkweed.
- Mode of action: cell membrane disruptor.
- Maximum rate of Reflex: north of I-70 - 1 1/4 pints; south of I-70 - 1 1/2 pints.
- Apply when weeds are less than 4 inches tall and actively growing. Do not apply to weeds growing under drought stress or when maximum daytime temperatures are less than 70 degrees..
- Apply with crop oil concentrate (0.5 percent to 1 percent v/v) or nonionic surfactant (0.25 percent to 0.5 percent v/v). Liquid fertilizer solutions (10-34-0 or 28%) can be added to the spray mixture along with oil concentrate or surfactant, which may improve control of velvetleaf and other weeds. Do not substitute liquid fertilizer solution for oil concentrate or surfactant.
- Apply in a spray volume of at least 10 gpa with a pressure of 40 to 60 psi. When weed foliage is dense use a spray volume of at least 20 gpa with a pressure of 60 psi.
- Application in combination with Basagran will improve control of velvetleaf, cocklebur, giant ragweed, and some other weeds.
- The addition of 2 to 3 fluid ounces of 2,4-DB will improve morningglory, giant ragweed, and cocklebur control.
- Often causes temporary soybean leaf burn.

Soybeans: Postemergence Herbicides — Contact

Herbicide	Formulation	Product Rate Range
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Resource	0.86EC	4 - 12 oz
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Tank-mix with: Basagran, Classic, Cobra, Pursuit, Select, Synchrony STS, Raptor, Ultra Blazer, Flexstar, FirstRate, Harmony GT.

- Resource (flumiclorac) is a contact herbicide that controls velvetleaf and pigweeds. Control of lambsquarters is variable, and some other broadleaf weeds will be suppressed.
- Mode of action: cell membrane disruptor.
- Apply 4 to 8 ounces/A when broadleaf weeds are in the 2- to 3-leaf stage for best results. The 8 ounce rate will control velvetleaf up to 24 inches tall. Use 12 ounces /A for velvetleaf up to 30 inches tall.
- Apply in a spray volume of at least 10 gpa with a spray pressure of 30 to 60 psi.
- Resource applied alone and in most tank-mixes requires the use of crop oil concentrate (1 quart/A) . The addition of liquid nitrogen fertilizer may enhance control of tall velvetleaf and is required in some tank-mixes. See the label for more information.

Herbicide	Formulation	Product Rate Range
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Rezult	Co-pack	3.25 pts
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Tank-mix with: Ultra Blazer, Classic, Reflex, 2,4-DB.

- Rezult is a co-pack of Poast Plus (premix of sethoxydim plus Dash) plus Basagran (bentazon) for postemergence use in soybeans. The use rate contains the equivalent of 1.6 pints of Poast Plus and 1.6 pints of Basagran. See Poast Plus and Basagran descriptions and product labels for more information.
- Mode of action: photosynthesis inhibitor (bentazon), ACCase inhibitor (sethoxydim).
- Apply when most weeds are 2 to 4 inches tall in a spray volume of 10 to 20 gpa with a spray pressure of at least 40 psi (60 psi where foliage is dense).
- Include UAN (28, 30, or 32% - 2 quarts/A) in the spray mix when applied alone or in combination with Classic. Apply with a silicon adjuvant (1 to 2 pints/100 gallons spray) when applied with Blazer or Reflex.

Herbicide	Formulation	Product Rate Range
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Stellar	3.1EC	5 oz
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Tank-mix with: Select, Cobra, Basagran, Pursuit, Harmony GT, Classic, FirstRate, Flexstar, Raptor.

- Stellar is a premix of Resource (flumiclorac) plus Cobra (lactofen) that controls small annual broadleaf weeds, including velvetleaf, ragweeds, pigweed, waterhemp, and black nightshade. Control of lambsquarters and other broadleaf weeds may be variable. See the Cobra and Resource descriptions for more information.
- Mode of action: cell membrane disruptor.
- Stellar causes more severe soybean leaf burn than most other soybean herbicides.
- Apply in a spray volume of 10 to 30 gpa with a pressure of 30 to 60 psi. Include crop oil concentrate at a rate of 1/2% v/v (and not less than 1 pint/A).
- Allow one hour between application and rainfall.

Soybeans: Postemergence Herbicides — Contact

Herbicide	Formulation	Product Rate Range
Storm	4S	1 1/2 pt

Tank-mix with: Pursuit, 2,4-DB, Harmony GT, Assure II, Classic, FirstRate, Fusion, Raptor, Resource, Select, Synchrony STS, Poast.

- Storm is a 2:1 premix of bentazon (Basagran) plus acifluorfen (Ultra Blazer) for control of broadleaf weeds. The recommended rate of Storm (1 1/2 pt) is equivalent to 1 pint of Basagran and 1 pint of Ultra Blazer.
- Mode of action: cell membrane disruptor (acifluorfen), photosynthesis inhibitor (bentazon).
- Apply Storm in a spray volume of 10 to 20 gpa. Use a minimum pressure of 40 psi. Increasing the spray volume (up to 50 gpa) will improve control when crop and weed foliage is dense.
- Apply Storm with crop oil concentrate (1 to 2 pints/A), UAN (1/2 to 1 gallon/A), or nonionic surfactant (1 to 2 pints/100 gallons), depending upon weed species present and tank-mix partners. See label for specific directions.
- Apply early when weeds are small (2 to 4 inches) for best results. Control is reduced when weeds exceed maximum size stated on the label.

Herbicide	Formulation	Product Rate Range
Ultra Blazer	2L	1/2 - 1 1/2 pt

Tank-mix with: Most other soybean herbicides - see labels.

- Ultra Blazer (acifluorfen) is a contact herbicide that controls many annual broadleaf weeds, including pigweed, waterhemp, annual morningglory, common ragweed, and black nightshade. Control of giant ragweed is variable. Cocklebur, velvetleaf, and lambsquarters are not adequately controlled.
- Mode of action: cell membrane disruptor.
- Apply when weeds are in the 2- to 4-inch stage and actively growing.
- Standard adjuvant recommendation is nonionic surfactant (1 to 2 pints per 100 gallons spray). Various rates and combinations of surfactant or crop oil concentrate and nitrogen fertilizer solutions are allowed depending upon weed species and environmental conditions. Application with crop oil concentrate will increase crop injury.
- Apply in a spray volume of at least 20 gpa with a minimum pressure of 40 psi. Increasing spray volume (up to 50 gpa) will improve control when crop and weed foliage is dense.
- Application in combination with Basagran will improve control of velvetleaf, cocklebur, giant ragweed and some other weeds.
- The addition of 2 fluid ounces of 2,4-DB will improve morningglory, giant ragweed, and cocklebur control.
- Often causes soybean leaf burn. Soybeans usually recover within a few weeks.

Soybeans: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Assure II	0.88EC	5 - 10 oz

Tank-mix with: Basagran, Classic, Harmony GT, Cobra, Pursuit, Synchrony STS, Flexstar.

- Assure II (quizalifop) is a translocated herbicide that controls many annual and perennial grasses, including giant foxtail, johnsongrass, shattercane, quackgrass, and volunteer corn. Assure II is often less effective than other postemergence grass herbicides for control of yellow foxtail, barnyardgrass, and crabgrass, especially in tank-mixes with broadleaf herbicides.
- Mode of action: ACCase inhibitor.
- Apply 7 to 8 ounces per acre for control of foxtails (2 to 8 inches tall), and fall panicum, barnyardgrass, and crabgrass (2 to 6 inches tall). Lower rates may be used for control of volunteer corn, shattercane, seedling johnsongrass, and small giant foxtail.
- For perennial grass control, application is delayed until grass reaches a height of at least 4 to 10 inches, depending upon the target weed. Two applications may be needed for perennial grass control.
- Apply with crop oil concentrate (1 to 2 gallons/100 gallons spray) for best results. Nonionic surfactant (2 pints/100 gallons spray) may be used instead of crop oil if required in a tank-mix with other herbicides. Petroleum-based crop oil concentrates are preferred over methylated seed oils.
- In OSU studies, Assure II has been one of the more effective grass herbicides to mix with glyphosate for control of volunteer Roundup Ready corn. The addition of nonionic surfactant at the rate of 2 pints per 100 gallons spray is recommended in this mixture. If the glyphosate product contains a surfactant package, add nonionic surfactant at the rate of 1 pint per 100 gallons.
- Apply in a spray volume of 10 to 40 gpa with a pressure of 25 to 60 psi.
- A reduction in the control of grasses may occur when Assure II is applied to moisture-stressed plants or tank-mixed with Classic, Harmony GT, or Basagran. The reduction due to tank-mixing is not usually observed for volunteer corn, giant foxtail, shattercane, and johnsongrass control, and no increase in Assure II rate is required for control of these grasses in tank-mixes. To maintain control of other grasses, increase the Assure II rate by 2 ounces in tank-mixes. Do not tank-mix Assure II with Basagran, Classic, or Harmony GT when the target grass is barnyardgrass, quackgrass, crabgrass, yellow foxtail, or wirestem muhly.
- For sequential applications of Assure II and broadleaf herbicides, wait at least 24 hours after Assure II application before applying the broadleaf herbicide. If the broadleaf herbicide is applied first, do not apply Assure II until grass plants begin to develop new leaves.

Herbicide	Formulation	Product Rate Range
Classic	25DF	1/4 - 3/4 oz

Tank-mix with: Ultra Blazer, 2,4-DB, Cobra, Flexstar, Reflex, Harmony GT, Assure II, Select, Poast Plus, Synchrony STS, FirstRate, glyphosate (RR soybeans)

- Classic (chlorimuron) is a translocated sulfonylurea herbicide that controls many annual broadleaf weeds, including velvetleaf, annual morningglory, burcucumber, pigweed, cocklebur, Pennsylvania smartweed, yellow nutsedge, and ragweeds. Classic does not control lambsquarters or black nightshade, and control of giant ragweed that are 4 to 8 inches tall is variable. Does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Apply with nonionic surfactant (0.125% v/v or greater) or crop oil concentrate (1% v/v) plus 28 percent nitrogen solution (2 - 4 quarts/A) or ammonium sulfate (2 - 4 lbs/A). Crop oil concentrate provides better control than surfactant under hot, dry conditions and is suggested for control of pigweed and giant ragweed.
- Most weeds up to 2 inches tall can be controlled with a rate of 1/2 ounce per acre. Rate increases with weed size and leaf stage. Velvetleaf and common ragweed control require a minimum rate of 2/3 ounce per acre, and the minimum rate for large giant ragweed and Jerusalem artichoke is 3/4 ounce per acre. Classic will control cocklebur up to 12 inches tall at the rate of 3/4 ounce per acre.
- May be applied with 1 to 2 fluid ounces of 2,4-DB for improved morningglory control. Soybean must be at least 8 inches tall before this tank-mix is applied.
- Split applications of Classic 14 to 21 days apart will improve control of morningglory, giant ragweed, burcucumber, and Jerusalem artichoke.
- Apply in a minimum spray volume of 10 gallons per acre at a minimum pressure of 25 psi.
- May cause temporary yellowing and stunting of soybeans, especially when applied with crop oil concentrate.

Soybeans: Postemergence Herbicides — Systemic

- Apply any time after the first trifoliolate has opened, but no later than 60 days before soybean maturity.
- Treating weeds under stress from abnormally cold or hot weather or dry soil conditions may result in only partial control. To maintain effective control, delay application until stress passes and weeds resume active growth.

Herbicide	Formulation	Rate Range
FirstRate/Amplify	84DF	0.3 - 0.6 oz

Tank-mix with: Basagran, Ultra Blazer, Cobra, Harmony GT, Flexstar, Reflex, Pursuit, Select, Poast Plus, Assure II, Fusion, glyphosate (Roundup Ready soybeans).

- FirstRate/Amplify (cloransulam-methyl) is a translocated sulfonamide herbicide that controls ragweeds, velvetleaf, annual morningglory, and cocklebur. Does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Apply with nonionic surfactant (0.125 to 0.25% v/v) plus 28% UAN solution (2.5% v/v) or AMS (2 lbs/A); or with crop oil concentrate or methylated seed oil (1.2% v/v). Crop oil concentrate or methylated seed oil plus UAN or AMS can increase crop injury and should only be used under adverse weed control conditions. The spray mix should include UAN or AMS if velvetleaf is a target weed.
- Control of giant ragweed may be reduced when air temperature remains below 55 degrees for significant periods within 2 days before or after application.
- Apply in a spray volume of 10 to 40 gpa with a pressure of 20 to 40 psi.
- Tank-mixing a full rate of Harmony GT with FirstRate/Amplify may occasionally cause unacceptable soybean injury, especially when crop oil concentrate is used.
- Tank-mixing FirstRate/Amplify with a grass herbicide, especially Assure II or Fusion, may result in reduced grass control. Increase the grass herbicide rate or apply separately to avoid this problem.

Herbicide	Formulation	Product Rate Range
Fusilade DX	2E	6 - 12 oz

Tank-mix with: Reflex, Ultra Blazer, Basagran, Classic, Pursuit.

- Fusilade DX (fluazifop) is a translocated herbicide that controls annual and perennial grasses.
- Mode of action: ACCase inhibitor.
- Tank-mixes with Pursuit and Classic are labeled for control of volunteer corn and shattercane only.
- For sequential applications of Fusilade and broadleaf herbicides, the minimum time interval that must occur between applications varies with the herbicides sprayed and the order of application. See the label for additional information.
- Apply 12 oz per acre to actively growing giant foxtail (2 to 6 inches tall) or other annual grasses (2 to 4 inches tall) before grass has tillered. The rate for shattercane and volunteer corn is 6 - 8 ounces per acre. Apply with crop oil concentrate (0.5 - 1.0% v/v) or nonionic surfactant (0.25 - 0.5% v/v) in a minimum spray volume of 5 gallons per acre. Fertilizer solution can also be added.
- For control of certain grasses, rate may be reduced by 1 to 2 oz when applied to small, actively growing grass using crop oil concentrate as the adjuvant. See label for additional details.
- For perennial grass control, use 12 oz and delay application until grass reaches a height of at least 4 to 8 inches, depending upon the target weed. A second application of 8 ounces/A may be needed for complete control.

Soybeans: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Fusion	2.66E	6 - 14 oz

Tank-mix with: Basagran, Flexstar, Classic, Harmony GT, Pursuit, Storm, Ultra Blazer, Synchrony STS, 2,4-DB, Cobra, FirstRate, Reflex, Pursuit.

- Fusion is a premix of fluazifop-P (Fusilade) plus fenoxaprop-ethyl, translocated herbicides that control annual and perennial grasses, including foxtails, barnyardgrass, johnsongrass, shattercane, volunteer corn, and quackgrass.
- Mode of action: ACCase inhibitor.
- Tank-mix with Pursuit is labeled for control of volunteer corn and shattercane only.
- When applied alone, the rate is 6 to 8 ounces per acre for control of foxtails, fall panicum, and many other annual grasses, 6 ounces per acre for control of seedling johnsongrass and shattercane, and 4 to 8 ounces for volunteer corn. The lower rates may be used when grasses are actively growing and are at the earliest growth stages indicated on the label, soybeans are planted in narrow rows or cultivation is planned, weed densities are light to moderate, and crop oil concentrate is used. The Fusion rate may need to be increased to 12 ounces when tank-mixed with broadleaf herbicides, depending upon grass size and environmental conditions at the time of application.
- Can be applied at 8 to 14 ounces/A as a rescue treatment for control of giant foxtail up to 16 inches tall. Use 12 to 14 ounces/A if grass is drought- or temperature-stressed. Do not mix with broadleaf herbicides when applying rescue treatments.
- Do not tank-mix with Classic, Harmony GT, or Synchrony STS if conditions are dry and target grasses include yellow foxtail, barnyardgrass, or crabgrass.
- For perennial grass control, application is delayed until grass reaches a height of at least 4 to 6 inches, depending upon the target weed. Two applications may be needed for perennial grass control.
- For sequential applications of Fusion and broadleaf herbicides, the minimum time interval that must occur between applications varies with the herbicides sprayed and the order of application. See the label for additional information on sequential applications.
- Apply with crop oil concentrate (2 to 4 quarts/100 gallons spray) for best results. Nonionic surfactant (1 to 2 quarts/100 gallons spray) may be used instead of crop oil if required in a tank-mix with other herbicides. Liquid nitrogen fertilizer can be added to the spray mixture, but should not be used as a substitute for crop oil concentrate or surfactant.
- Apply in 5 to 40 gpa at a spray pressure of 40 to 60 psi. Use 60 psi and a minimum volume of 20 gpa where grass foliage is dense.

Herbicide	Formulation	Product Rate Range
Harmony GT	75DF	1/12 oz

Tank-mix with: Classic, Basagran, Assure II, Cobra, Reflex, Ultra Blazer, Flexstar, Stellar.

- Harmony GT (thifensulfuron) is a translocated sulfonylurea herbicide that controls velvetleaf, pigweed, lambsquarters, and Pennsylvania smartweed. Harmony GT is often included in tankmixes with other broadleaf herbicides to improve lambsquarter and velvetleaf control. Does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Treating weeds under stress from abnormally cold or hot weather or dry soil conditions may result in only partial control. To maintain effective control, delay application until stress passes and weeds resume active growth.
- Apply with 0.125 to 0.25 percent nonionic surfactant (v/v) when weeds are less than 4 inches tall and actively growing. Liquid nitrogen fertilizer or ammonium sulfate should also be included in the spray mix at the following rates: 28% - 2 to 4 quarts/A; 10-34-0 - 2 to 4 pints/A; or ammonium sulfate - 2 to 4 pounds/A. Under dry conditions, Harmony GT can be applied with crop oil concentrate, but soybean injury is likely to be more severe. To avoid injury when tank-mixing with other products, follow label directions closely regarding spray additives.
- The label advises against tank-mixing Harmony GT with Pursuit, or applying Harmony GT after a postemergence Pursuit application due to the risk of crop injury.
- Apply with flat fan nozzles in a spray volume of 10 to 25 gpa at a pressure of 25 to 60 psi.
- Apply after the first trifoliolate soybean leaf has fully expanded up to 60 days before harvest.
- Application of Harmony GT may cause temporary wilting, leaf yellowing, and/or growth retardation (shortened internode spacing). These symptoms are most likely to occur when applied during periods of hot and humid weather.

Soybeans: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Poast	1.5E	12 - 24 oz
Poast Plus	1E	12 - 36 oz

Tank-mix with: Basagran, Synchrony STS, Ultra Blazer, Classic, FirstRate, Pursuit, Raptor, Resource, Stellar.

- Poast (sethoxydim) controls annual grasses and controls or suppresses perennial grasses. Poast Plus is a premix of sethoxydim plus Dash.
- Mode of action: ACCase inhibitor.
- For control of most annual grasses, apply 16 ounces of Poast or 24 ounces of Poast plus before weeds are 8 inches tall. Control of volunteer cereals (prior to overwintering) requires higher rates. The label allows for reductions in rate when applied to small actively growing grass. Reduced-rate recommendations apply only to barnyardgrass, fall panicum, giant and green foxtails, and volunteer corn. See label for more information.
- Apply with 2 pints of oil concentrate or 1 pint of Dash per acre. Include UAN (1/2 to 1 gallon/A) or AMS (2 1/2 lb/A) for control of crabgrass, volunteer corn, or volunteer wheat. When tank-mixing with Basagran, include UAN or ammonium sulfate in the spray mix. Rates and additive recommendations vary when tank-mixing with Basagran, depending upon the target grasses. See label for more information.
- Use a rate of 24 oz/A (Poast) or 36 oz/A (Poast Plus) as a rescue treatment for control of foxtails up to 16 inches tall, barnyardgrass and fall panicum up to 12 inches tall, and crabgrass up to 8 inches tall. Add UAN or ammonium sulfate for control of crabgrass.
- Poast and Poast Plus are generally less effective than other postemergence grass herbicides for perennial grass control. Two applications may be necessary for perennial grass control.
- Optimum spray volume is 10 gallons per acre, but spray volumes of 5 to 20 gallons per acre may be used. Apply with a spray pressure of 40 to 60 psi.
- Poor control may result when applied to weeds under stress from hot, dry conditions or herbicide injury.

Herbicide	Formulation	Product Rate Range
Pursuit	2S	4 oz
	70 DG	1.44 oz

Tank-mix with: Basagran, Ultra Blazer, Storm, Cobra, Reflex, Fusilade DX, Assure II, Fusion, Select, FirstRate.

- Pursuit (imazethapyr) is a translocated imidazolinone herbicide that controls annual broadleaf weeds and controls or suppresses grasses. Pursuit also provides some residual control of grass and broadleaf weeds. Control of common and giant ragweeds and lambsquarters is variable. Tank-mix with reduced rates of Flexstar or Cobra for improved control of ragweeds. Pursuit does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Apply with nonionic surfactant (2 pints/100 gallons spray) or a crop oil concentrate (1 1/2 to 2 pints/A) plus 10-34-0 or 28 percent fertilizer solution (1 to 2 quarts per acre). Ammonium sulfate (2 1/2 pounds/A) may be substituted for liquid fertilizer in the spray mix. Control of large or drought-stressed weeds will be maximized when the higher rates of fertilizer are used in combination with a seed oil-based crop oil concentrate (Meth Oil or Sun-It II, for example).
- For control of most annual grass and broadleaf weeds, apply before weeds are 3 inches tall and before soybeans bloom. Pursuit should be applied before lambsquarters and morningglory are 2 inches tall. Cocklebur, pigweed, shattercane, and seedling johnsongrass can be controlled up to 8 inches tall. For control or suppression of Jerusalem artichoke, apply when artichokes are 6 to 10 inches tall.
- Control may be reduced when weeds are growing slowly under cold or dry conditions. If possible, wait for rain and resumption of active weed growth before applying Pursuit. If air temperatures reach or stay below 50 F for 10 or more hours, delay application for 48 hours from the time temperatures increase above 50 F.
- Combinations of Pursuit plus Harmony GT can cause severe injury and yield loss under environmental conditions that predispose soybeans to herbicide injury.
- Apply in a spray volume of at least 10 gallons per acre with a spray pressure of 20 to 40 psi. Flat fan spray nozzles are recommended for adequate plant coverage. Allow 1 hour between application and rainfall.
- Tank-mixes of Pursuit with postemergence grass herbicides are generally labeled for control of volunteer corn and shattercane only.

Soybeans: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Raptor	1AS	4 to 5 oz

Tank-mix with: See label.

- Raptor (imazamox) is a translocated imidazolinone herbicide that controls annual broadleaf and grass weeds. Raptor generally provides better control of lambsquarters and annual grasses than Pursuit. Control of common and giant ragweeds and waterhemp is variable. Raptor provides a shorter period of residual control compared to Pursuit. Raptor does not control ALS-resistant weeds.
- Mode of action: ALS inhibitor.
- Apply with nonionic surfactant (2 pints/100 gallons spray) or a crop oil concentrate (1% v/v) plus 10-34-0 or 28 percent fertilizer solution (1 to 2 quarts per acre) or ammonium sulfate (2 1/2 pounds/A). Ammonium sulfate is generally the preferred nitrogen source over UAN or 10-34-0. Control of large or drought- or temperature-stressed weeds will be maximized when the higher rates of fertilizer are used in combination with a seed oil-based crop oil concentrate (Meth Oil or Sun-It II, for example).
- For control of most annual grass and broadleaf weeds, apply before weeds are 4 to 5 inches tall and before soybeans bloom.
- Control may be reduced when weeds are growing slowly under cold or dry conditions. If possible, wait for rain and resumption of active weed growth before applying Raptor. If air temperatures reach or stay below 50 F for 10 or more hours, delay application for 48 hours from the time temperatures increase above 50 F.
- Raptor is more injurious to soybeans than Pursuit. Internode shortening and/or temporary yellowing of plants may occur following application, especially when applied with a crop oil concentrate or methylated seed oil.
- Apply in a spray volume of at least 10 gallons per acre with a spray pressure of 20 to 40 psi. Flat fan spray nozzles are recommended for adequate plant coverage.

Herbicide	Formulation	Product Rate Range
Select/Arrow	2EC	4 - 16 oz

Tank-mix with: Basagran, Ultra Blazer, Classic, Cobra, Reflex, Storm, Synchrony STS, Stellar, Harmony GT, Flexstar, Resource, FirstRate, Raptor, Pursuit.

- Select/Arrow (clethodim) is a translocated herbicide for control of annual and perennial grasses, including foxtails, barnyardgrass, fall panicum, johnsongrass, shattercane, quackgrass, and volunteer corn.
- Mode of action: ACCase inhibitor.
- Apply 6 oz/A when giant foxtail is 2 to 12 inches tall, shattercane and seedling johnsongrass are 4 to 10 inches tall, volunteer corn is 12 to 18 inches tall, and most other annual grasses are 2 to 6 inches tall. A rate of 4 ounces per acre may be used to control volunteer corn that is 4 to 12 inches tall. Lower rates may be used for control of small giant foxtail that are actively growing under favorable environmental conditions.
- Control of perennial grasses requires higher rates and possibly sequential applications. Application should be delayed until perennial grasses are at least 4 to 12 inches tall, depending upon the target weed.
- Apply with crop oil concentrate (1% v/v and not less than 1 pint/A) in a spray volume of 10 to 40 gpa at a pressure of 30 to 60 psi. Do not apply with flood nozzles.
- Increase the Select/Arrow rate by 2 ounces per acre when tank-mixing with Classic, Synchrony STS, or Basagran. Tank-mixing with other broadleaf herbicides may reduce grass control, especially under dry conditions. When making separate applications of grass and broadleaf herbicides, allow at least one day between applications if the grass herbicide is applied first.

Soybeans: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Synchrony STS	42DF	0.25 - 0.5 oz

Tank-mix with: Assure II, Poast Plus, Select, Fusion, Fusilade DX, Cobra, 2,4-DB, Ultra Blazer, Reflex, Flexstar, Classic, FirstRate.

- Synchrony STS is a 3:1 premix of chlorimuron (Classic) plus thifensulfuron (Harmony GT) for use only on STS soybeans (sulfonyleurea tolerant soybeans). At the use rate of 1/2 oz/A, Synchrony provides the equivalent of 0.64 oz Classic plus 0.07 oz Harmony GT. Application of Synchrony at 0.5 oz/A to non-STS soybeans can result in severe crop injury and yield loss.
- Mode of action: ALS inhibitor.
- Synchrony controls many annual broadleaf weeds, including lambsquarters, velvetleaf, cocklebur, morningglory, burcucumber, pigweed, Pennsylvania smartweed, yellow nutsedge, and ragweeds. Control of giant ragweed that are 4 to 8 inches tall is variable. Black nightshade is not controlled. Synchrony will suppress or control small perennial sowthistle, dandelion, common milkweed, pokeweed, and Jerusalem artichoke. Does not control ALS-resistant weeds.
- Mixing with Cobra or Flexstar Reflex will improve control of giant ragweed, common ragweed, black nightshade, and water-hemp.
- Apply after the first trifoliolate soybean leaves have opened but no later than 60 days before soybean maturity. Weeds should be 2 to 4 inches tall and actively growing for best results. Cocklebur, pigweed, velvetleaf, and smartweed can be controlled up to 8 inches tall.
- Apply with crop oil concentrate (1% v/v) plus an ammonium nitrogen fertilizer at the following rates: 28% - 2 to 4 quarts/A; 10-34-0 - 1 to 2 quarts/A; or ammonium sulfate - 2 to 4 pounds/A. Use the lower fertilizer rates for spray volumes of less than 15 gpa.
- At a reduced rate of 0.25 oz/A, Synchrony STS can be applied to non-STS soybeans for control of small cocklebur, pigweed, and sunflower and suppression of other weeds. Use nonionic surfactant instead of crop oil concentrate on non-STS soybeans. This Synchrony rate can be tank-mixed with Flexstar, FirstRate, or Harmony GT.
- Apply in a minimum spray volume of 10 gpa at a pressure of at least 25 psi using flat fan nozzles.
- Synchrony STS may reduce the activity of a grass herbicide in tank-mixtures. Increase the rate of the grass herbicide or apply separately to maintain effective control.

Roundup Ready Soybeans: Postemergence Herbicides

Herbicide	Formulation	Product Rate Range
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Extreme	2.17L	3 pints
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- Extreme is a premix of imazethapyr (Pursuit) plus glyphosate for postemergence plus residual grass and broadleaf weed control in Roundup Ready soybeans. Does not provide residual control of ALS-resistant weeds. The use rate provides the equivalent of 1.44 oz/A of Pursuit 70DG plus 0.56 lb of glyphosate acid. See Pursuit and glyphosate description for guidelines and restrictions on use.
- Extreme can be more effective than glyphosate on black nightshade, due to the residual control of later-emerging nightshade plants.
- Apply when weeds are less than 8 inches in height with nonionic surfactant (1 pint/100 gallons) plus ammonium sulfate (2.5 lbs/A) or nitrogen fertilizer solution (UAN or 10-34-0 - 1 to 2 qts/A).
- Do not apply more than once per growing season.

Herbicide	Formulation	Product Rate Range
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Glyphosate	Various	0.56 - 1.5 lbs acid/A
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Tank-mix with: See labels.

- Glyphosate is a nonselective, translocated herbicide that controls emerged annual and perennial grass and broadleaf weeds. Table 22 contains a list of currently available glyphosate products. Application rates, adjuvant recommendations, rainfall intervals, tank-mix recommendations, and other guidelines for use vary among glyphosate products, and users should consult labels and local product use guides for more specific information. The following comments are meant as general guidelines for the use of glyphosate except where a product name is listed.
- Glyphosate can be applied broadcast from cracking through flowering to Roundup Ready soybeans only.
- Mode of action: EPSP synthase inhibitor.
- The general recommendation on most labels for the initial postemergence application is a rate of 0.75 lbs of glyphosate acid per acre when weeds are less than 4 to 8 inches tall (see Table 22 for product rates). Rate should be increased for larger weeds. Sequential applications are allowed.
- Roundup WeatherMax and Original Max rate varies with weed species and size, but the label specifies the following for most annual weeds: 4 to 8 inches - 22 oz; 8 to 18 inches - 33 oz; and greater than 18 inches - 44 oz. Sequential applications are allowed, and the rate for second applications varies with weed size.
- Apply Touchdown Total at a rate of 24 oz/A with ammonium sulfate (8.5 to 17 lbs/100 gallons) within 30 days of planting when weeds are up to 6 inches tall. Make a second application as necessary to control later-emerging weeds. The Touchdown label allows tank-mixtures with a number of other herbicides.
- Glyphomax Plus, Glyfos X-TRA, and Mirage rates vary with weed species and size, but the labels specify the following for most annual weeds: 4 to 8 inches - 32 oz; and 8 to 18 inches - 48 oz. Sequential applications are allowed, and the rate for second applications varies with weed size.
- Cornerstone rate varies with weed species and size, but the label specifies the following for most annual weeds: 3 to 6 inches - 24 oz; 6 to 12 inches - 32 oz, and 12 to 18 inches - 48 oz. Sequential applications are allowed, and the rate for second applications varies with weed size.
- OSU research indicates that weeds should be no larger than 6 to 8 inches tall at the time of postemergence glyphosate application to avoid yield loss from weed interference. A single application of glyphosate is most effective in narrow-row (15 inches or less) soybeans. In wide row soybeans, the slower crop canopy development may allow late weed escapes, and there is likely to be a greater need for a second application.
- Velvetleaf and common lambsquarters are most easily controlled when less than 6 inches tall and actively growing. Large velvetleaf and lambsquarters can be difficult to control with glyphosate, especially when drought-stressed.
- The addition of ammonium sulfate will improve control of velvetleaf and some other weeds. Ammonium sulfate will also improve control when using hard water or when daytime air temperatures are 55 degrees or less.
- OSU research has shown one of the following strategies provides the most consistent control of a dense giant ragweed population: (1) Make a first postemergence application when giant ragweed are not more than 8 inches tall, and follow with a second application approximately 2 weeks later, or (2) apply a preplant herbicide with activity on giant ragweed and follow with a postemergence application of glyphosate, or (3) apply a tank-mix of glyphosate plus FirstRate/Amplify (0.3 oz/A) when giant

Roundup Ready Soybeans: Postemergence Herbicides

ragweed are less than 8 inches tall - the FirstRate/Amplify improves control of emerged plants and provides some residual control of ragweed.

- Application of a combination of glyphosate plus FirstRate/Amplify can improve control of marestalk. However, OSU research indicates that many marestalk populations in Ohio could be ALS-resistant, and FirstRate/Amplify will not improve control of ALS-resistant populations. Resistance to glyphosate has developed in marestalk populations in other areas of the United States.
- Annual morningglory, groundcherry, ladythumb, velvetleaf, marestalk, and Pennsylvania smartweed should be less than 6 inches tall at the time of application.
- Best control of perennials will occur at higher labeled rates. Application when perennials are in the bud to bloom stage (or boot to seedhead for grasses) will provide the most complete control of the entire plant. Minimum size of various perennial weeds for most effective control through the growing season: quackgrass, Canada thistle, wirestem muhly, and yellow nutsedge - 6 inches; field bindweed and common milkweed - 12 inches; johnsongrass and hemp dogbane - 18 inches.
- Apply in a spray volume of 5 to 20 gpa. Take precautions to reduce spray drift. Corn, soybeans, and other sensitive crops are likely to be growing in areas surrounding treated fields. Using 15 to 20 gpa and flat fan or drift-control nozzles at low pressure will reduce the potential for spray drift.
- Volunteer corn observed in Roundup Ready soybean fields is likely to be tolerant to glyphosate, if the field was planted with Roundup Ready corn the previous year. Postemergence grass herbicides (Select, Fusion, etc) should be used to control glyphosate-tolerant volunteer corn. Assure II has been one of the more effective grass herbicides in mixtures with glyphosate for control of volunteer Roundup Ready corn. Consult labels and local recommendation guides for information in mixing glyphosate with postemergence grass herbicides.
- Roundup Ready soybeans have excellent tolerance to glyphosate. Soybeans in a number of Roundup Ready fields have been injured following herbicide application, and symptoms were indicative of the herbicide applied previously using the same sprayer. It is essential to follow proper spray tank cleanout procedures before using a sprayer to apply glyphosate, especially if a corn herbicide was last applied.

Soybeans: Selective Application of Glyphosate

Herbicide	Formulation	Product Rate Range
Glyphosate	Various	See comments

- Glyphosate can be applied to weeds growing above the soybean canopy through selective applicators such as rope-wicks or sponge wipers. This application is useful for control of volunteer corn, shattercane, johnsongrass, hemp dogbane, and common milkweed. Table 22 contains a list of currently available glyphosate products.
- Mode of action: EPSP synthase inhibitor.
- Weeds should be at least 6 inches taller than the soybeans. Avoid contact of herbicide with the crop. Adjust equipment so that the lowest wiper contact is at least 2 inches above the soybeans.
- For mixing instructions and equipment calibration, refer to directions on labels.

Soybeans: Harvest Aid

Herbicide	Formulation	Product Rate Range
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Gramoxone Max	3L	10.7 oz
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- Gramoxone Max (paraquat) may be used for drying weeds in soybeans just before harvest. For indeterminate soybean varieties, apply when 65 percent of the seed pods have reached a mature brown color or when seed moisture is 30 percent or less. For determinate varieties, apply when at least one-half of the leaves have dropped and the rest of the leaves are turning yellow.
- Mode of action: cell membrane disruptor.
- Mature cocklebur and lambsquarters are tolerant of Gramoxone and may not desiccate completely.
- For aerial application, use a spray volume of 5 gallons per acre; for ground application, use 20 gallons per acre. Add nonionic surfactant (0.25% v/v) or crop oil concentrate (1% v/v).
- Apply at least 15 days before harvest. Do not graze or harvest for forage or hay.

Herbicide	Formulation	Product Rate Range
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Glyphosate	Various	0.75 lb acid/A (aerial application) up to 4.5 lbs acid/A (ground application)
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- Table 20 contains a list of currently available glyphosate products. Application rates, adjuvant recommendations, rainfast intervals, application parameters, and other guidelines for use vary among glyphosate products, and users should consult labels and local product use guides for more specific information. The following comments are meant as general guidelines for the use of glyphosate except where a product name is listed.
- Can be applied as a preharvest treatment to control perennial and annual weeds in soybeans. Dessication from glyphosate application is less rapid than that from Gramoxone. Preharvest applications of glyphosate may provide a good opportunity to control perennial weeds because their growth is undisturbed compared to postharvest applications.
- Mode of action: EPSP synthase inhibitor.
- Apply after pods have set and lost all green color, and at least 7 or 14 days before harvest, depending upon the product used. Do not graze or harvest the treated crop for livestock feed (Roundup brand labels allow use of soybeans for livestock feed when harvested at least 25 days after the last preharvest application).
- Do not use a preharvest glyphosate application in soybeans grown for seed, due to the potential for a reduction in viability or vigor.

Table 14. Rainfast Intervals and Spray Additive Recommendations for Postemergence Soybean Herbicides

This table shows the required time interval between herbicide application and rainfall and summarizes label recommendations for spray additives. Check herbicide labels for additive rates. Use the following key for spray additives:

SURF = nonionic surfactant
 COC = crop oil concentrate
 DASH = BASF spray adjuvant
 UAN = 28% nitrogen solution
 AMS = ammonium sulfate
 MSO = methylated seed oil

Herbicide	Rainfast Interval (hours)	Spray additives
Aim	1	SURF
Assure II	1	SURF, COC, OR MSO. COC is preferred.
Basagran	8	MSO, COC, UAN or AMS; or COC or MSO + UAN or AMS
Basagran + 2,4-DB	8	MSO, COC, UAN or AMS, or COC or MSO + UAN or AMS
Basagran + Ultra Blazer	8	MSO, COC, UAN, or AMS
Basagran + Reflex	8	SURF, COC or MSO
Basagran + Cobra	8	SURF, COC or MSO
Classic	1	SURF, COC, MSO or SURF + UAN or 10-34-0
Cobra	1/2	MSO, COC or UAN. SURF may be used under conditions of high humidity.
Cobra + Classic	1	SURF
Extreme	1	SURF + UAN, 10-34-0 or AMS.
FirstRate/Amplify	2	SURF, COC, or MSO, + UAN or AMS, or COC or MSO alone.
Flexstar	1	MSO, COC, or SURF + UAN or AMS
Flexstar + Harmony GT	1	SURF, MSO, or COC + UAN or AMS
Fusilade DX	1	MSO, SURF or COC. UAN or 10-34-0 may be added.
Fusion	1	MSO, SURF or COC. UAN or AMS may be added.
Glyphomax, Glyphomax Plus	1	AMS may be added.
Harmony GT	1	SURF + UAN, 10-34-0, or AMS. COC may be used instead of SURF under dry conditions.
Harmony GT + Classic	1	SURF + UAN, 10-34-0, or AMS. COC may be used instead of SURF under dry conditions.
Harmony GT + Basagran	8	SURF + UAN or 10-34-0.
Poast/Poast Plus	1	MSO, COC or Dash. UAN or AMS may be added.
Pursuit	1	MSO, SURF or COC, + UAN, 10-34-0, or AMS.
Pursuit + Cobra	1	MSO, SURF or COC, + UAN, 10-34-0, or AMS.
Raptor	1	COC, MSO, or SURF + UAN, 10-34-0, or AMS
Reflex	1	MSO, SURF or COC. UAN or 10-34-0 may be added.
Resource	1	MSO or COC. UAN OR AMS may be added to improve control of certain weeds.
Roundup WeatherMax	0.5	AMS may be added.
Select/Arrow	1	COC or MSO. UAN or 10-34-0 may be added.
Stellar	1	MSO or COC. UAN OR AMS may be added to improve control of certain weeds.
Storm	8	MSO, SURF, COC, or UAN.
Synchrony STS	1	MSO or COC + UAN, 10-34-0, or AMS.
Synchrony STS + Cobra	1	COC or MSO + UAN, 10-34-0, or AMS.
Touchdown	1	SURF and/or AMS may be added
Ultra Blazer	4	SURF or COC. UAN or 10-34-0 may be added to improve control of certain weeds.

Table 15. Harvest and Feeding Intervals for Postemergence Soybean Herbicides

Soybean Herbicides	Days to Harvest	
	Grain	Forage
Aim	Apply up to third trifoliolate	Do not feed
Assure II	80	Do not feed
Basagran	30	30
Basagran + 2,4-DB	60	60
Basagran + Blazer	50	Do not feed
Basagran + Pinnacle	60	Do not feed
Basagran + Reflex	Apply prior to bloom	Do not feed
Basagran + Cobra	90	Do not feed
Classic	Apply 60 days before maturity	Do not feed
Cobra	45	Do not feed
Cobra + 2,4-DB	90	Do not feed
Extreme	Apply prior to bloom and 85 days before harvest	Do not feed
FirstRate/Amplify	65	14
Flexstar	Apply prior to bloom	Do not feed
Fusilade DX	Apply prior to bloom	Do not feed
Fusion	Apply prior to bloom	Do not feed
Glyphomax	14	14
Harmony GT	60	Do not feed
Poast	75	Do not feed ¹
Poast/Poast Plus	75	Do not feed ¹
Pursuit	85	Do not feed
Raptor	85 and apply prior to bloom	Do not feed
Reflex	Apply prior to bloom	Do not feed
Reflex + 2,4-DB	Apply prior to bloom	Do not feed
Resource	60	Do not feed
Roundup WeatherMax	7	14
Select/Arrow	60	Do not feed
Stellar	60	Do not feed
Storm	50	Do not feed
Synchrony STS	Apply 60 days before maturity	Do not feed
Touchdown	7	Do not feed.
Ultra Blazer	50	Do not feed

¹ Soybean hay may be fed.

Table 16. Labeled Tank Mixes of Postemergence Grass and Broadleaf Herbicides in Soybeans¹

	Assure II	Fusilade DX	Fusion	Poast/Poast Plus	Select/Arrow
Basagran	Y ²	Y	Y	Y ⁵	Y ⁶
Classic	Y ²	Y ³	Y ⁴	-	Y ⁶
Cobra	Y ²	Y	Y	-	Y ⁶
Extreme	-	-	-	-	-
Firstrate/Amplify	Y ⁶	-	Y ⁶	Y ⁶	Y ⁶
Flexstar	Y	Y	Y	Y	Y
Glyphomax	-	-	-	-	-
Harmony GT	Y ²	-	Y ⁴	-	-
Pursuit	Y ³	Y ³	Y ³	-	Y ³
Raptor	Y ⁷	Y ⁷	Y ⁷	Y ⁷	Y ⁷
Reflex	Y	Y	Y	Y	Y ⁶
Resource	-	-	-	-	Y
Roundup WeatherMax	Y ⁸	Y ⁸	Y ⁸	-	Y ⁸
Stellar	-	-	-	-	Y
Storm	-	-	Y	-	Y ⁶
Synchrony STS	Y ²	Y ³	Y ⁴	Y ⁵	Y ⁶
Touchdown	-	Y	Y	-	-
Ultra Blazer	-	Y	Y	-	Y ⁶

¹ The Y= the products may be tank-mixed. The - = the tank-mix is not legally labeled or is not recommended

² Do not tank-mix when the target grass is barnyardgrass, crabgrass, quackgrass, wirestem muhly, or yellow foxtail.

³ Volunteer corn and shattercane only.

⁴ Do not tank-mix for control of perennial grasses or when conditions are dry and the target grass is yellow foxtail, barnyardgrass, or crabgrass.

⁵ Do not tank-mix if the target grass is quackgrass or johnsongrass.

⁶ A reduction in grass control may occur in tank-mixes.

⁷ Add SUN-IT II or a crop oil concentrate AND liquid fertilizer to tank-mixture or apply separately as grass control may be reduced.

⁸ Do not add crop oil concentrate or methylated seed oil. The addition of ammonium sulfate is recommended.