

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 6 for Fall or Spring Early Preplant Herbicides.

Refer to page 29-31 for additional herbicides to use in conventional or herbicide-resistant soybean.

**Soil-Applied Herbicides**

<b>Prowl</b> <b>Prowl H2O</b> (pendimethalin <sup>3</sup> )	<b>2.4 to 3.6 pt EC</b> <b>2.1 to 3 pt ACS</b> (1 to 1.5 lb)	Annual grass and some broadleaf weeds.	PPI. Fall or Spring.	Adjust rate for soil type. Do not apply PRE. Poor control of weeds with large seeds, including wild oat and wild mustard. A1-2 B1 B7 E1 E11 S3 Y15
<b>Sonalan</b> <b>Sonalan 10G</b> (ethalfluralin <sup>3</sup> )	<b>1.5 to 3 pt EC</b> <b>5.5 to 11.5 10G</b> (0.55 to 1.15 lb)			
<b>Treflan / generic</b> trifluralin <sup>3</sup>	<b>1 to 2 pt EC</b> (0.5 to 1 lb)			
<b>Valor SX</b> <b>Valor EZ</b> (flumioxazin <sup>14</sup> )	<b>2 to 3 oz WDG</b> <b>2 to 3 fl oz EZ/SC</b> (1.02 to 1.53 oz)	Small-seeded broadleaf weeds.	EPP, Shallow PPI, or PRE.	PRE requires precipitation for herbicide activation. Refer to label for tank-mix options, application information, and restriction. Commercial mixtures available (See page 30): <b>Afforia</b> = flumioxazin + thifensulfuron + tribenuron <b>Authority Assist</b> = sulfentrazone + imazethapyr <b>Authority Elite</b> = sulfentrazone + S-metolachlor <b>Authority First</b> = sulfentrazone + cloransulam <b>Authority MTZ</b> = sulfentrazone + metribuzin <b>Authority Supreme</b> = sulfentrazone + pyroxasulfone <b>BroadAxe XC</b> = sulfentrazone + S-metolachlor <b>Fierce</b> = flumioxazin + pyroxasulfone <b>Fierce MTZ</b> = flumioxazin+pyroxasulfone+metribuzin <b>Sonic</b> = sulfentrazone + cloransulam <b>Surveil</b> = flumioxazin + cloransulam A1-2 B1-2 E1 E12-13 Y15
<b>Spartan</b> (sulfentrazone <sup>14</sup> )	<b>4.5 to 12 fl oz F</b> (2.25 to 6 oz)			
Metribuzin <sup>5</sup>	Soil pH >7.5 = <b>0.33 lb DF</b> Soil pH <7.5 = <b>0.33 to 0.5 lb DF</b>			
<b>Sharpen</b> (saflufenacil <sup>14</sup> )	<b>1 to 1.5 fl oz SC</b> (0.36 to 0.54 oz)	Broadleaf weeds including winter annuals.		PRE requires precipitation for herbicide activation. Apply with MSO adjuvant at 1 to 1.5 pt/A for burndown control of emerged broadleaf weeds. Planting interval is dependant on soil texture and OM. Sharpen at 1.5 fl oz and Verdict at 7.5 fl oz require a 14 day plantback interval. Refer to label for tank-mix options. A1-2 B1-2 B12 S1-15 Y15
<b>Verdict</b> (saflufenacil <sup>14</sup> & dimethenamid <sup>15</sup> )	<b>5 to 7.5 fl oz EC</b> (1.3 to 0.53 oz & 0.9 to 1.34 lb)			
<b>Dual/II/Magnum</b> (S/metolachlor <sup>15</sup> )	<b>1 to 2 pt EC</b> (0.95 to 1.9 lb)	Annual grasses and some broadleaf weeds.	EPP, Shallow PPI, PRE and EPOST.  POST PHI: Dual = 90 days.	Requires precipitation for soil activation. Multiple rain events increase activation of pyroxasulfone. Provides 3 to 4 weeks residual weed control after activation. Adjust rate for soil type. Shallow PPI gives more consistent weed control than PRE. Use highest rates for greater and more consistent weed control. Warrant: Do not PPI. Application with other PRE or EPOST herbicides and stress environment after application may increase risk of soybean injury. Refer to labels for tank-mix options. Commercial mixtures available (See page 30): <b>Authority Elite</b> = S-metolachlor + sulfentrazone <b>Boundary</b> = S-metolachlor + metribuzin <b>BroadAxe XC</b> = S-metolachlor + sulfentrazone <b>Fierce</b> = pyroxasulfone + flumioxazin <b>Zidua Pro</b> = pyroxasulfone + saflufenacil + imazethapyr A1-2 B1-2 D5 E1 F3 S3 S11
<b>Outlook / generic</b> dimethenamid <sup>15</sup>	<b>10 to 24 fl oz EC</b> (0.47 to 1.125 lb)			
<b>Warrant</b> (acetochlor <sup>15</sup> - microencapsulated)	<b>1.25 to 2 qt ME</b> (0.94 to 1.5 lb)			
<b>Anthem Maxx</b> (pyroxasulfone <sup>15</sup> & fluthiacet <sup>14</sup> )	<b>2 to 5.5 fl oz SC</b> (1 to 2.87 oz & 0.03 to 0.087 oz)			
<b>Zidua</b> (pyroxasulfone <sup>15</sup> )	<b>2.5 to 5.75 oz SC</b> (1.3 to 3 oz)			

# SOYBEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 29-31 for additional herbicides to use in conventional or herbicide-resistant soybean.

## POST-Applied Herbicides

<b>Warrant</b> (acetochlor <sup>15</sup> - microencapsulated)	<b>1.25 to 2 qt ME</b> (0.94 to 1.5 lb)	PRE control of grass and broadleaf weeds.	POST. Soybean: After emergence until R2.	Rainfall required for PRE activation. Does not control emerged weeds. Provides residual weed control after activation. No adjuvant required. A1-2 E1 D5
<b>Basagran 5L</b> / generic bentazon <sup>6</sup> + MSO adjuvant	<b>0.4 to 1.6 pt SL / 0.5 to 2 pt applied 1 to 4 times.</b> (0.25 to 1 lb)	Some broadleaf weeds.	POST. Soybean: After emergence. Broadleaf weeds: <b>Small.</b>	Non-residual, contact herbicide requiring >15 gpa and full sunlight. Add MSO adjuvant at 1 to 1.5 pt/A. Maximum bentazon amount per season is 2 lb/A. Refer to E3 for additional information. A3 A5-6 E1 E3 F6 S6-12
<b>Cadet</b> (fluthiacet <sup>14</sup> )	<b>0.4 to 0.9 fl oz EC</b> (0.045 to 0.1 oz)	Some small broadleaf weeds including pigweed species.	POST. Soybean: 1 to 2 trifoliates.  Weeds: Small.	Contact herbicides requiring small weed size, >15 gpa, NIS or oil adjuvant at 1 to 2 pt/A, and full sunlight. May cause speckling on soybean leaves. Cadet may improve lambsquarters control. Apply Cobra with oil adjuvant at 1 to 2 pt/A. Refer to label for crop response, adjuvant type and rate, and tank-mix options. A3 E1 S11
<b>Cobra</b> (lactofen <sup>14</sup> )	<b>8 to 12.5 fl oz EC</b> (2 to 3.2 oz)			
<b>Resource</b> (flumiclorac <sup>14</sup> )	<b>2 to 8 fl oz EC</b> (0.215 to 1.72 oz)			
<b>Ultra Blazer</b> (acifluorfen <sup>14</sup> )	<b>0.5 to 1.5 pt EC</b> (0.125 to 0.375 lb)			
<b>Flexstar</b> / generic fomesafen <sup>14</sup> + oil adjuvant	<b>0.75 pt EC</b> (0.176 lb)	Many small broadleaf weeds.  Poor buckwheat, lambsquarters and hairy nightshade control.	POST Soybean: Prior to flowering. Weeds: Small.  Do not use as a rescue treatment. Contact herbicide requiring small weed size.	Apply at >15 gpa, oil adjuvant at 1 to 2 pt/A, and full sunlight. MSO at 1 to 2 pt/A + AMS at 8.5 lbs/100 gal water will increase weed control and risk of crop injury. Apply at 1 pt/A in ND east of I-29 and south of I-94. Apply at 0.75 pt/A in ND east of Hwy 281 and in the following counties west of Hwy 281: Benson, Bottineau, Burleigh, Dickey, Eddy, Emmons, Foster, Grant, Kidder, LaMoure, Logan, McHenry, McIntosh, McLean, Mercer, Morton, Oliver, Pierce, Renville, Rolette, Sheridan, Sioux, Stutsman, Towner, Ward, and Wells. West of Hwy 281: - Do not apply to soil with OM >4%. - Do not apply after June 20. Refer to product label and ND SLN label for crop rotation restrictions and other restrictions. Refer to E4 for improved broadleaf weed control. A3 E1 E5 S6 S8-11 Y10 Y15
<b>FirstRate</b> (cloransulam <sup>2</sup> )	<b>0.3 oz WDG or 10 A/pack</b> (0.25 oz)	Large-seeded broadleaf weeds.	POST. Soybean: Up to full flower stage (R2). Weeds: Small.	Add oil adjuvant at 1 to 2 pt/A + 28% UAN at 2.5% v/v. Refer to label for weed size, and tank-mix options. A3 E1 Y2 Y15
<b>Harmony</b> / generic thifensulfuron <sup>2</sup>	<b>0.083 (1/12) oz DF 0.125 (1/8) oz SG</b> (0.062 oz)	Mustard, pigweed, and lambsquarters.	POST. Soybean: 1 <sup>st</sup> trifoliolate until 60 days PHI.	Add oil additive at 1 to 2 pt/A + 28% UAN or AMS. Refer to label for tank-mix options. A3 A5-8 E1 E6 S7
<b>Pursuit</b> (imazethapyr <sup>2</sup> )	<b>2 to 3 fl oz SL</b> (0.5 to 0.75 oz)	Annual broadleaf weeds. Poor lambsquarters, ragweed,	POST. Soybean: <b>Prior to flowering.</b>	Add oil adjuvant at 1 to 2 pt/A + 28% UAN at 2.5% v/v. MSO adjuvants enhance weed control more than petroleum oil or NIS adjuvants. Refer to label for weed size and application information. Raptor has less soil residual carryover than Pursuit. A3 A5-8 E1 E8 E10 S8 Y2 Y15
<b>Raptor</b> (imazamox <sup>2</sup> )	<b>4 to 5 fl oz SL</b> (0.5 to 0.625 oz)	buckwheat and b. wormwood control.	Weeds: Small and actively growing.	
<b>Varisto</b> (bentazon <sup>6</sup> & imazamox <sup>2</sup> )	<b>11 to 27 fl oz SL</b> (0.34 to 0.84 lb + 0.26 to 0.64 oz)	Small annual grass and broadleaf weeds and suppression of Canada thistle.	Allow a 30 day PHI.	Add MSO adjuvants at 1.25 to 1.5 pt/A. Apply 11 fl oz to pre-bolt canola. Refer to E3 for additional information. A3 A5-8 E1 E3 E10 S1-13 T3 Y15

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>Refer to page 29-31 for additional herbicides to use in conventional or herbicide-resistant soybean.</b>				
<b>Assure II Targa</b> (quizalofop <sup>1</sup> )	<b>4 to 12 fl oz EC</b> (0.44 to 1.32 oz)	Annual grasses and quackgrass.	Soybean: Prior to pod set. Grass weeds: Refer to table below.	Add oil adjuvant at 1 gal/100 gal water but not less than 1.25 pt/A. Use highest rate of Assure II for yellow foxtail control. Grass control is reduced by tank mixtures or close interval application of POST broadleaf control herbicides. Antagonism generally can be avoided by applying a higher rate of grass herbicide or apply the grass control herbicide 1 or more days before or 7 days after the broadleaf control herbicide. Do not cultivate prior to 5 days before or 7 days after application. Refer to label for tank-mix options. Refer to page 113 for control of volunteer canola and corn. A3 A5-7 E1-2
<b>Fusilade DX</b> (fluazifop <sup>1</sup> )	<b>5 to 12 fl oz EC</b> (1.25 to 3 oz)			
<b>Poast</b> (sethoxydim <sup>1</sup> )	<b>0.5 to 1.5 pt EC</b> (0.1 to 0.3 lb)	Annual grasses.	Soybean: All stages. Grass weeds: Refer to table below.	
<b>Select Max 1EC</b> <b>Select 2EC</b> <b>Shadow 3EC</b> (clethodim <sup>1</sup> )	<b>9 to 16 fl oz EC</b> <b>4 to 8 fl oz EC</b> <b>2.66 to 5.33 EC</b> (1 to 2 oz)	Annual grasses and quackgrass.		

**Grass Control with POST Herbicides**

	Foxtail, green and yellow		Corn, volunteer (See page 113)		Quackgrass		Wheat, barley, oat, and sandbur		Proso millet, wild	
	inches	fl oz/A	inches	fl oz/A	inches	fl oz/A	inches	fl oz/A	inches	fl oz/A
Assure II/Targa <sup>1</sup>	2 to 4	7 to 8	6 to 30	5 to 8	6 to 10	12	2 to 6	7 to 8	2 to 6	5 to 8
Fusilade DX <sup>1</sup>	2 to 4	10 to 12	12 to 24	4 to 6	6 to 10	12	2 to 6	8	4 to 8	6
Poast <sup>1</sup>	2 to 8	1 pt	1 to 20	1 pt	6 to 8	2 pt	1 to 4	1 pt	4 to 10	0.5 pt
Select Max 1EC <sup>1</sup>	2 to 8	9 to 12	4 to 24	9 to 12	4 to 12	12	2 to 6	9	2 to 10	9
Select 2EC <sup>1</sup>	2 to 8	4 to 6	4 to 24	6	4 to 12	8	2 to 6	6	2 to 10	4 to 6
Shadow 3EC <sup>1</sup>	2 to 8	2.66-5.33	4 to 24	2.66-5.33	4 to 12	5.3-10.6	2 to 6	4 to 5.33	2 to 10	4 to 5.33

**Preharvest Application**

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Glyphosate <sup>9</sup>	Up to 1.5 lb ae <b>See Remarks.</b>	Preharvest weed control - broadcast or spot application.	Prior to harvest. Apply when soybean seed pods are a mature brown color, >75% leaf drop, and <30% seed moisture.	Add NIS plus AMS fertilizer at 8.5 lb/100 gal. <b>Do not apply on soybean grown for seed because reduced germination/vigor may occur.</b> A3-6 B8
Banvel / generic dicamba <sup>4</sup> + MSO adjuvant	<b>Up to 32 floz 4SL + 1 qt/A</b> (1 lb)			<b>Do not apply on soybean grown for seed because reduced germination/vigor may occur.</b> Add oil adjuvant at 1 to 2 pt/A. A3 A5-8 B6 E4
<b>Aim + MSO adjuvant</b> (carfentrazone <sup>14</sup> )	<b>1 to 6 oz SL + 1 qt/A</b> (0.256 to 1.5 oz)	Desiccant.	PHI: RU = 7 days Dicamba = 7 days. Paraquat = 15 days Aim = 3 days Sharpen = 3 days	Contact herbicides require >15 gpa and full sunlight. Apply at >10/>5 gpa for ground/aerial application. Apply paraquat with NIS at 2 qt/100 gal water. Sharpen requires up to 10 days for optimum desiccation. Apply dicamba, Aim, and Sharpen with AMS at 8.5 lb/100 gal water or UAN at 2.5 gal/100 gal water. <b>Do not apply Sharpen on soybean grown for seed because reduced germination/vigor may occur.</b> B11-12
Paraquat <sup>22</sup> + NIS <b>RUP</b>	<b>8 to 16 fl oz 2SL</b> <b>5.4 to 10.7 floz 3SL</b> (0.13 to 0.25 lb)			
<b>Sharpen + MSO adjuvant</b> (saflufenacil <sup>14</sup> )	<b>1 to 2 fl oz SC + 1 to 2 pt/A</b> (0.36 to 0.72 oz)			

## HERBICIDE-RESISTANT SOYBEAN

Refer to pages 29-31 for additional herbicides to use in conventional or herbicide-resistant soybean.

Refer to page 113 for control of volunteer glyphosate resistant corn, canola, and soybean.

Refer to Herbicide Resistant Weeds section (X1 - pages 98-99) for weed management strategies to delay herbicide resistant weeds.

Rule #1 - Control weeds BEFORE 2 to 4 inches tall to avoid yield loss.

Remove weeds early especially when grass weed populations are high.

### ND soybean yield loss from weeds removed at different intervals.

Weed height when weeds were removed.	Soybean stage	Soybean yield* (bu/A)
Weed free	-	44.3
2 to 4 inches	VC (cotyledon) to V1	42.1
6 to 8 inches	V2 to V4	40.8
>10 inches	V3 to R2	36.4
Weedy check	-	22.7

Soybean yield loss from weeds may be greater in dry North Dakota environments than other areas of the Midwest that receive greater precipitation.

\*Source: Greg Endres, Carrington R&E Center. 8-site years (2011-2014). Carrington, Doyon, Langdon, and Minot.

## LibertyLink Soybean

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>Liberty 280</b> (glufosinate <sup>10</sup> )	<b>32 to 43 fl oz SL</b> (0.58 to 0.72 lb)  <b>Maximum total</b> = 87 fl oz	Annual grass and broadleaf weeds including ALS and glyphosate resistant weeds.	POST. Soybean: Emergence to pre-bloom.  Weeds: Up to 3 inches tall.	<b>Apply only to LibertyLink soybean varieties.</b> Non-selective, contact, non-residual herbicide requiring thorough coverage. Apply a PRE foundation treatment prior to Liberty POST. Add AMS at 3 lb/A - do not use AMS replacement or water conditioner adjuvants. Can be applied with a registered grass herbicide. Refer to label for tank-mix options and restrictions. Most active in hot and sunny conditions. Controls weeds resistant to other herbicides. A3 A6 B9 D7 S1-15


## Roundup Ready/STS (sulfonylurea-tolerant) Soybean

Herbicide	Product/A (ae/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>Harmony/generic</b> thifensulfuron <sup>2</sup>	<b>0.33 oz DF</b> <b>0.5 oz SG</b> (0.25 oz)	Annual broadleaf weeds including wild buckwheat, lambsquarters, mustard species, and vol. RR canola.	POST. RR/STS soybean: 1 <sup>st</sup> fully expanded trifoliolate to 60 days PHI.	<b>Apply only to RR/STS soybean varieties.</b> Apply with glyphosate at 0.38 to 1.125 lb ae/A. Add NIS at 1 qt/100 gal water. Apply with AMS fertilizer at 8.5 lb/100 gal. Refer to label for weeds controlled and application information. A4-7 B8 D8 E6 S7

## Roundup Ready and Roundup Ready 2 Yield Soybean

Herbicide	Product/A (ae/A)	Weeds	When to Apply	Remarks and Paragraphs
Glyphosate <sup>9</sup>	<b>Maximum single application</b> = 1.5 lb ae  <b>Maximum in-crop</b> = 2.25 lb ae <b>See Remarks.</b>	Annual and perennial grass and broadleaf weeds.	POST. Soybean: Emergence through R2 of full flowering. Allow a 14 day PHI.	<b>Apply only to RR / RR 2 Yield soybean varieties.</b> <b>Cannot plant harvested patented soybean seed.</b> Add AMS fertilizer at 8.5 lb/100 gal. Multiple applications may be necessary for weed flushes. Refer to label for weeds controlled, application information, and tank-mix options with residual herbicides and restrictions. A4-7 B8 D8 S1-15

# Roundup Xtend Soybean

Herbicide	Product/A (ae/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>Engenia 5 SL</b> <b>FeXapan 2.9SL</b> <b>XtendiMax 2.9SL</b> (dicamba <sup>4</sup> )  <b>RUP</b> Only certified applicators may purchase and apply.	<b>Single application rate in-crop: 12.8 5SL</b> <b>22 fl oz 2.9SL</b> (0.5 lb ae) <b>Maximum total in-crop: 1 lb ae</b>  <b>Maximum total/yr: 2 lb ae</b>  <b>Do not apply less than 0.5 lb ae/A for any application.</b>	Annual and perennial broadleaf weeds.	EPP, At Planting, PRE and POST. Soybean: Emergence to pre-bloom or no more than 45 days after planting, whichever comes first.  Weeds: Less than 4 inches tall.  Do not apply by aircraft.	<b>Apply only to RU Xtend soybean varieties.</b> Drift and off-site movement may cause injury or death to susceptible plants and crops. For all application information and restrictions refer to: <a href="http://www.xtendimaxapplicationrequirements.com">www.xtendimaxapplicationrequirements.com</a> <a href="http://www.engeniatankmix.com">www.engeniatankmix.com</a> / <a href="http://www.fexapan.com">www.fexapan.com</a> web site <ul style="list-style-type: none"> <li>• Do not deviate in use from label or web sites (above).</li> <li>• Dicamba or auxin-specific training is required.</li> <li>• Apply with approved nozzles and adjuvants.</li> <li>• Do not add any product containing ammonium.</li> <li>• Do not apply before/during temperature inversion.</li> <li>• Do not apply when wind speed is &lt;3 or &gt;10 mph.</li> <li>• Maintain a 110 or 220 foot buffer depending on rate.</li> </ul> <b>A3-8 B6 B8 D1 D3 D8 E1 E4 S1-15 Y9 Y15</b>

## Dicamba Applications to DT Soybeans in 2019

ND implemented a State and Local Need (SLN), 24c label with restrictions beyond the Federal Section 3 Label in 2018. At the time of this writing, ND Department of Agriculture is CONSIDERING implementing similar restrictions for 2019. However, this is a multistep process requiring support of registrants and EPA. NDSU has established the following link to apprise applicators of developments. A link to the ND Department of Agriculture website will be provided if a SLN is implemented. Use the following link for the latest information:  
<https://tinyurl.com/ND-Dicamba2019SLN>

This summary of EPA guidelines is NOT a replacement for actual labeling, but is designed to inform users of major label changes from 2018 to 2019. Credit goes to Dr. Bob Hartzler, Iowa State University, Professor of Weed Science, for summarizing many of the major changes from 2018 to 2019.

- Dicamba specific training will be required for all applicators using the registered products on dicamba-resistant soybean.
- Co-workers under the direct supervision of a certified private applicator are NO LONGER allowed to make applications. (Commercial applicators in ND have always been prohibited from supervising RUP applications.)
- Applicators are required to complete record keeping requirements for compliance with the label within 72 hours of the application. (The previous requirement was 14 days. ND law still applies for other basic application records. They must be completed within 24 hours.)
- Applications are allowed only from 1 hour after sunrise to 2 hours before sunset. (Last year ND had a 1 hour after sunrise to 1 hour before sunset application window.)
- Applications are restricted to 45 days after planting or prior to R1 stage of soybean, whichever comes first. This is a narrowing of the application window on the Federal Section 3 label from 2018. It is similar to the 2018 ND SLN requirement.
- Applications cannot be made if precipitation is forecast within 24 hours since application may result in soil runoff. (Previously the label stated not to apply if rain is expected to occur within 24 hours).
- The label clarifies what constitutes sensitive areas and where downwind buffers are required. The applicator must survey the area for sensitive crops and residential areas, and apply product when wind is blowing away from these areas. It is up to the applicator to determine the appropriate distance between the target site and sensitive area. One of the more important changes is that the label states that managed or mowed areas adjacent to fields are now considered a non-sensitive area. Thus, highway right-of-way can be considered part of the 110 ft. downwind buffer.
- There is a new restriction regarding buffers around the entire field (57 feet minimum) in areas with endangered species. The specifics have not been posted at this time, but this probably won't impact applications in much of ND. EPA has a website identified on the label that will have bulletins related to this restriction.

### Some reasons why off-site movement of dicamba can occur:

1. Soybean can show phytotoxic symptoms from dicamba at rates as low as 0.0004 oz ae/A (0.028 g/ha). Very small amounts of dicamba from contaminated sprayers, particle drift, and volatility can cause injury symptoms on soybean. Extremely high soybean sensitivity to dicamba influences all other discussion points.
2. Dicamba rate used in DT soybean is 8 oz ae/A compared to 0.5 to 2 oz ae/A used in wheat and corn. The higher dicamba rate applied in DT soybean applied during late June and early July can result in very high release of dicamba into the environment, which could be a source for particle drift and volatility.
3. Higher temperatures occur in late June and early July. The vapor pressure of dicamba significantly increases as temperature increases.
4. Dicamba is normally applied in May and early June in wheat and corn. Dicamba in DT soybean allows application prior to R1 stage. Later applications are more prone to dicamba drift because temperatures are higher, which allows greater dicamba volatility while soybeans are more advanced in growth to intercept dicamba, express injury symptoms, and possibly reduce yield.
5. Dicamba drift is more likely to cause yield loss the closer to and including reproductive stage. Summer solstice (June 21) is the reproductive trigger in soybean.
6. Precipitation normally decreases after late June. Dicamba is highly water soluble and rain events after application can "wash" dicamba off plant leaves into the soil to trap dicamba and reduce off-target movement.

NDSU Weed Science recommends no dicamba applications after June 20 - See #3-6 above.

- This allows for PRE and Early POST applications.
- This supports the residual PRE concept for effective weed management and encourages timely applications.
- Soybeans are photoperiod sensitive: the reproductive phase begins after the longest day of the year (June 21). Off-target drift of dicamba is more likely to injure non-tolerant soybean yield when it enters the reproductive phase.
- Most off-target dicamba drift complaints result from postemergence applications. Postemergence applications have the greatest potential to contact and injure susceptible vegetation. Spraying conditions may be favorable after June 20 but average temperatures are higher, which exponentially increase the potential for dicamba volatilization. Soybean plants will be larger to intercept more herbicide.

# Roundup Ready Soybean - Herbicides to apply in tank-mix or sequentially with glyphosate for control of weeds not controlled by glyphosate.

Refer to pages 25 through 28 for additional herbicides and information.

Herbicide <sup>Site of action-pg 100-101</sup>	Rate/A	Cost/A	Buckwheat, Wild	Canola, Vol. RR <sup>b</sup>	Horseweed (Marestail)	Kochia	Lambsquarters	Nightshade species	Pigweed, Redfoot	Prickly lettuce	Ragweed, Common	Smartweed, Annual	Waterhemp / Palmer
<b>Preplant-burndown herbicides<sup>a</sup> - add AMS at 1.5-3 lb/A.</b>			<b>Weed Control Ratings<sup>c,d</sup></b>										
Glyphosate <sup>9</sup> (4.5 lb ae)+ AMS + HSOC	32-105 fl oz	\$7.00-25.00	F-E	N	P-E	P-E	E	E	E	E	P-E	E	P-E
+ 2,4-D <sup>4e</sup>	+ 1 pt	\$10.00	F-E	P-E	G-E	P-E	E	E	E	E	E	E	P-E
+ 2,4-D <sup>4e</sup> + Express	+ 1 pt + 0.3 oz	\$25.00	F-E	G-E	P-E	P-E	E	E	E	E	P-E	E	P-E
+ 2,4-D <sup>4e</sup> + Metribuzin <sup>5</sup>	+ 1 pt + 0.33 lb	\$23.00	G-E	G-E	G-E	F-E	E	G-E	E	E	E	E	F-E
+ Afforia <sup>2,14</sup>	2.5-3.75 oz WDG	\$14.00-21.00	G-E	G-E	F-G	P-G	G-E	G-E	G-E	F-E	P	F	G
+ Verdict <sup>14,15</sup>	+ 5 fl oz	\$13.00	G-E	P-G	G-E	G-E	E	G-E	E	G-E	G-E	E	E
+ Verdict <sup>14,15</sup> + Metribuzin <sup>5</sup>	+ 5 fl oz + 0.33 lb	\$22.00	E	G-E	E	E	E	E	E	E	E	E	E
+ Verdict <sup>14,15</sup> + Zidua SC <sup>15</sup>	+ 5 fl oz + 3.25 fl oz	\$52.00	E	G-E	G-E	G-E	E	E	E	E	G-E	E	G-E
Paraquat <sup>22</sup> + NIS adjuvant	3 pt 2SL + 1-2 pt	\$20.00	F	-	F-G	G-E	P-E	G-E	E	F-G	G-E	E	G-E
+ Verdict <sup>14,15</sup> + Metribuzin <sup>5</sup> + oil adj.	+ 5 fl oz + 0.33	\$35.00	G-E	E	G-E	G-E	E	G-E	E	G-E	E	E	G-E
+ 2,4-D <sup>4e</sup> +Verdict <sup>14,15</sup> +Metrib <sup>5</sup> + oil adj.	+ 5 oz + 0.33 lb	\$32.00	E	E	E	E	E	E	E	E	E	E	E

<b>PRE herbicides<sup>a</sup></b>			<b>Weed Control Ratings<sup>c,d</sup> - without glyphosate</b>										
Afforia <sup>2,14</sup>	2.5-3.75 oz WDG	\$10.00-12.00	G-E	G-E	F-G	P-G	G-E	G-E	G-E	F-E	P	F	G
Anthem Maxx <sup>14,15</sup>	2-5.5 oz WDG	\$15.00-30.00	F-E	P-F	-	F-E	F-E	F-E	G-E	-	P	F-E	G-E
Authority Assist <sup>2,14</sup>	6-9 fl oz	\$18.00-27.00	P-G	G-E	F	F-E	G-E	F-E	F-E	E	N	G-E	F-E
Authority Elite <sup>14,15</sup>	20-32 fl oz	\$22.00-35.00	P-G	P	F	G-E	G-E	G-E	G-E	P	N	G-E	G-E
Authority First <sup>2,14</sup>	4-8 oz WDG	\$22.00-44.00	P-G	E	P-G	F-E	G-E	F-E	E	P	N	G-E	F-E
Authority MTZ <sup>5,14</sup>	12-15* oz	\$21.00-26.00	F-G	E	F	F-E	G-E	G-E	G-E	G-E	P-F	G-E	F-E
Authority Supreme <sup>14,15</sup>	6-11.5 fl oz	\$21.00-40.00	P-F	P	P-F	F-E	G-E	F-E	G-E	P	N	G-E	G-E
Boundary <sup>5,15</sup>	1.6*-2.4** pt	\$18.00-27.00	F-G	E	F	F-G	G	P	G-E	G-E	P-F	G	G-E
BroadAxe XC <sup>14,15</sup>	20-32 fl oz	\$22.00-35.00	P-G	P-F	F	G-E	G-E	G-E	G-E	P	N	G-E	G-E
Fierce <sup>14,15</sup>	3 oz WDG	\$22.00	P-F	G-E	F-G	F-E	F-G	F-E	G-E	F-G	F-G	F-G	G-E
FirstRate <sup>2</sup>	0.3-0.75 WDG	\$13.00-33.00	N	E	P-E	N	P-F	N	P-F	-	P	G-E	N
Metribuzin <sup>5</sup>	0.33-0.5 lb DF	\$6.00-9.00	F-G	E	F	F-G	P-G	P	G-E	G-E	P-F	G	F-G
Prowl <sup>3</sup> (PPI)	See label	\$5.00-25.00	N	N	N	P	F-G	N	E	N	N	N-P	F-G
Panther Pro <sup>2,5,14</sup>	12* fl oz	\$ -	F-G	E	F-G	F-G	F-E	G-E	E	G-E	P-F	G	G
Pursuit <sup>2</sup>	2 fl oz	\$7.80	F-G	G-E	N	N	P	P-E	E	-	N	G	N
Sharpen <sup>14</sup>	1 fl oz	\$6.50	P-F	G-E	P-F	P	F	P	F-P	P	P	P	P-F
Sonalan <sup>3</sup> (PPI)	See label	\$5.00-25.00	P	N	N	P	F-G	N	E	N	N	N-P	F-G
Sonic <sup>2,14</sup>	4-8 oz WDG	\$22.00-44.00	F-G	E	P-G	F-E	G-E	F-E	E	P	N	G-E	F-E
Spartan <sup>14</sup>	4.5-9 fl oz	\$20.00-40.00	F-G	P	F	F-E	G-E	F-E	F-E	P	N	G-E	F-E
Surveil <sup>2,14</sup>	2.1-4.2 oz WDG	\$15.00-29.00	P	E	-	P-G	G-E	E	E	-	F-E	G-E	F-E
Treflan <sup>3</sup> (PPI)	See label	\$5.00-25.00	N	N	N	P	F-G	N	E	N	N	N-P	F-G
Valor EZ <sup>14</sup>	2-3 oz SC/WDG	\$8.00-12.00	P-F	F-E	F-G	F-G	F-E	G-E	G-E	F-E	P-F	F	G
Verdict <sup>14,15</sup>	5 fl oz	\$9.00	P-F	G-E	P-F	P	F-G	F	G	G-E	P-F	F	F-G
Zidua SC <sup>15</sup>	2.5 - 5.75 fl oz	\$14.00-32.00	F-E	P-F	-	F	F-E	F-E	G-E	-	P-F	F-E	G-E
Zidua Pro <sup>2,14,15</sup>	4.5 fl oz	\$18.00	F-E	P-F	-	F-E	F-E	F-E	G-E	-	F-G	F-E	G-E

<sup>a</sup>May carry over more than one cropping season. Follow labeled crop rotation restrictions - see Y15.

<sup>b</sup>See page 113 for control of volunteer canola and corn, and herbicide rates.

<sup>c</sup>E = Excellent (90-99%), G = Good (80-90%), F = Fair (65-80%), P = Poor (40-65%), N = None.

<sup>d</sup>Includes resistant populations.

\*Metribuzin at 0.33 lb/A DF, \*\*Metribuzin at 0.5 lb/A DF.

# Roundup Ready Soybean - Herbicides to apply in tank-mix or sequentially with glyphosate for control of weeds not controlled by glyphosate.

Refer to pages 25 through 28 for additional herbicides and information.

Herbicide <sup>Site of action-pg 100-101</sup>	Rate/A	Cost/A	Buckwheat, Wild	Canola, Vol. RR <sup>b</sup>	Horseweed (Marestail)	Kochia	Lambsquarters	Nightshade species	Pigweed, Redfoot	Prickly lettuce	Ragweed, Common	Smartweed, Annual	Waterhemp / Palmer
<b>PRE fb POST Weed Management Programs</b> - add AMS at 1.5 lb/A and see label for adjuvant requirements.			Weed Control Ratings <sup>c,d</sup>										
RP = Residual PRE listed on page 30, such as, Boundary, Fierce, Sharpen, Spartan, or Zidua, or combinations above.													
RP fb RU <sup>9</sup> (4.5 lb ae)+ AMS + HSOC	32-105 fl oz	\$7.00-25.00	PE	P-E	P-E	P-E	E	P-E	E	P-E	P-E	P-E	P-E
RP fb RU <sup>9</sup> + <b>FlexstarGT</b> <sup>9,14</sup> + HSMOC	32floz+2.68pt+1pt	\$45.00	G-E	E	P-G	G-E	E	E	E	G	E	E	P-E
RP fb RU <sup>9</sup> + <b>Marvel</b> <sup>14,14</sup> + NIS fb	32 fl oz + 7.25 fl oz	\$34.00 fb	G-E	E	P-G	F-E	E	E	E	G	E	E	P-E
RU <sup>9</sup> + <b>Cobra</b> <sup>14</sup> + NIS	fb 32floz+8-12 floz	\$20.00-28.00											
RP fb RU fb Storm + NIS fb RU if need	32 fl oz fb 1.5 pt	\$42.00 fb 7	G	F-G	P-E	F-E	G-E	G-E	E	G-E	F-E	E	F-E

**POST herbicides<sup>a</sup> - add AMS at 1.5 lb/A - see label for adjuvant requirements.**

			Weed Control Ratings <sup>c,d</sup> - <i>without glyphosate</i>										
<b>Basagran</b> <sup>6</sup> + MSO	1.5-2 pt + 1.5 pt	\$12.00-17.00	P-G	P-G	P-F	P-E	F-E	N-G	F-E	G	P-F	E	F-E
<b>Cadet</b> <sup>14</sup> + NIS	0.65-0.9 fl oz	\$8.00-11.00	N-P	-	N	P-F	F-G	-	F-G	-	N	-	P-G
<b>Cobra</b> <sup>14</sup> + PO	8-12.5 fl oz	\$16.00-24.00	P	P	N	P-F	N	G	G-E	-	P-E	P	P-G
<b>Extreme</b> <sup>2,9</sup> + HSMOC	1.5-2.25 pt	\$5.00-8.00	G	P-E	P-G	P-E	G	E	E	G-E	P-E	G-E	P-E
<b>FirstRate</b> <sup>2</sup> + PO	0.3-0.6 oz WDG	\$14.00-27.00	P-F	P-G	G-E	P	P	N	N-P	-	N	E	N
<b>Flexstar</b> <sup>14</sup> + MSO	0.75 pt + 1-1.5 pt	\$10.00	P	E	N-P	G-E	P-F	F-E	E	-	P-E	G-E	P-E
<b>Flexstar GT</b> <sup>9,14</sup> + HSMOC	2.68 pt + 1 pt	\$15.00	P-G	E	P-G	G-E	G-E	G-E	E	F-G	F-E	E	P-E
Glyphosate <sup>9</sup> (4.5 lb ae) + AMS	32 fb 32 fl oz	\$8.00 fb 8.00	G	N	P-E	P-E	E	E	E	E	P-E	E	P-E
<b>Harmony DG/SG</b> <sup>2</sup> + NIS + AMS	1/12 oz / 1/8 oz	\$2.50/\$4.00	N	P	N	N	F-G	N	G	P	N	F-G	N
<b>Marvel</b> <sup>14</sup> + NIS	5 to 7 fl oz	\$9.00-13.00	P	E	N-P	G-E	F-G	F-E	E	-	P-E	G-E	P-E
<b>Pursuit</b> <sup>2</sup> + MSO	2-3 fl oz + 1.5 pt	\$8.00-12.00	P	P-E	N	N	P	P-E	E	P-E	N	G	N
<b>Raptor</b> <sup>2</sup> + MSO	4-5 fl oz + 1.5 pt	\$22.00-28.00	P	P-E	N	N	P-F	E	E	G	N	G-E	N
<b>Resource</b> <sup>14</sup> + NIS or MSO	3 fl oz	\$6.00	-	-	N	-	F-G	-	F-G	-	N-P	-	N-P
<b>Storm</b> <sup>6,14</sup> + NIS or MSO	1.5 pt	\$20.00	P-F	P-E	N	P-E	F-E	F-G	E	G	P-F	E	F-E
<b>Ultra Blazer</b> <sup>14</sup> + NIS or MSO	1.5-2 pt	\$17.00-23.00	P	F-G	N	P-G	N	F-G	E	-	N-F	E	P-E
<b>Varisto</b> <sup>2,6</sup> + MSO	16-27 fl oz + 1.5 pt	\$25.00-40.00	P-G	P-E	P-F	P-E	F-E	E	E	G	P-F	E	F-E

## Herbicides for Liberty Link soybean ONLY

- add AMS at 3 lb/A.

			Weed Control Ratings <sup>c,d</sup> - <i>without glyphosate</i>										
<b>Liberty 280</b> <sup>10</sup> + AMS	32 - 43 fl oz	\$20.00-30.00	F-G	F-E	G-E	F-E	F-E	F-E	F-E	F-E	F-E	F-E	F-E
fb <b>Liberty</b> <sup>10</sup> + AMS	fb 32 - 43 fl oz	\$20.00-30.00	G-E	F-E	E	E	E	E	E	G-E	E	E	G-E
+ <b>Flexstar</b> <sup>14</sup> + adjuvant + AMS	+ 0.75 pt	\$32.00	G	E	G-E	E	G-E	E	E	F-E	E	E	G-E
Residual PRE fb <b>Liberty</b> <sup>10</sup> + AMS	X rate fb 36 fl oz	\$25 fb 20.00	E	E	E	E	E	E	E	E	E	E	E

<sup>a</sup>May carry over more than one cropping season. Follow labeled crop rotation restrictions - see Y15.

<sup>b</sup>See page 113 for control of volunteer canola and corn, and herbicide rates.

<sup>c</sup>E = Excellent (90-99%), G = Good (80-90%), F = Fair (65-80%), P = Poor (40-65%), N = None.

<sup>d</sup>**Includes resistant populations.**


\*Metribuzin at 0.33 lb/A DF, \*\*Metribuzin at 0.5 lb/A DF.

# DRY EDIBLE BEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 6 for Fall or Spring Early Preplant Herbicides.

## Soil-Applied and some POST-Applied Herbicides

<b>Eptam</b> (EPTC <sup>8</sup> )	<b>3.5 to 4.5 pt EC</b> <b>15 to 20 lb G</b> (3 to 4 lb)	Grass and some broadleaf weeds.	PPI.	PPI immediately after application. Apply with other soil-applied herbicides for greater weed control. A1-2 B1 F1-2 S3
<b>Prowl</b> <b>Prowl H2O</b> (pendimethalin <sup>3</sup> )	<b>2.4 to 3.6 pt 3.3EC</b> <b>2.1 to 3 pt 3.8ACS</b> (1 to 1.5 lb)	Poor wild oat and no wild mustard control.	PPI. Fall or Spring.	PPI within 24 hours after application. Apply fall applications when soil temperature is less than 45 F to reduce fall herbicide degradation. Adjust rate for soil type. Use EC formulation in spring and 10G formulation in fall for more consistent herbicide activation in soil. Refer to label for tank-mixtures. A1-2 B1-2 B7 E11 S3 Y1 Y13 Y15
Treflan / generic trifluralin <sup>3</sup>	<b>1 to 2 pt EC</b> <b>5 to 10 lb 10G</b> (0.5 to 1 lb)			
<b>Sonalan</b> (ethalfluralin <sup>3</sup> )	<b>1.5 to 4.5 pt EC</b> (0.55 to 1.69 lb) <b>5.5 to 11.5 lb 10G</b> (0.55 to 1.15 lb)			
<b>Dual/II/Magnum</b> (S/metolachlor <sup>15</sup> )	<b>1 to 2 pt EC</b> (0.95 to 1.9 lb)	Grass and some broadleaf weeds.	Shallow PPI or PRE.	Shallow PPI improves consistency of weed control. PRE requires precipitation for herbicide activation. Adjust rate for soil type and OM. Allow a 70 day PHI. A1-2 B1 F3 S3
<b>Outlook / generic dimethenamid<sup>15</sup></b>	<b>10 to 21 fl oz EC</b> (0.47 to 1 lb)			
<b>Spartan Elite</b> (s-metolachlor <sup>15</sup> & sulfentrazone <sup>14</sup> )	<b>20 to 26 fl oz EC</b> (0.98 to 1.28 lb & 1.75 to 2.25 oz)			
<b>Spartan Charge</b> (carfentrazone <sup>14</sup> & sulfentrazone <sup>14</sup> )	<b>3.75 to 5.75 floz SE</b> (0.16 to 0.25 oz & 1.48 to 2.26 oz)	Small-seeded broadleaf weeds.	Shallow PPI or PRE.	ND Section 24c label indemnification agreement required - user assumes all risk of crop injury. Do not use on coarse texture soils or soil with <1.5% OM. Adjust rate for soil type and soil pH. Rainfall required for activation. A1-2 E12 F1 S6-12 Y14-15
<b>Permit</b> (halosulfuron <sup>2</sup> ) 	<b>0.5 to 0.67 oz DF</b> (0.38 to 0.5 oz)	Many broadleaf weeds and yellow nutsedge.	Shallow PPI, PRE, or POST <b>up to dry bean flowering.</b>	PRE requires precipitation for herbicide activation. POST: Apply with NIS at 1 to 2 qt/100 gal water. Permit: PRE controls additional weeds than POST, including pigweed and lambsquarters. Refer to label when tank-mixing with other herbicides. Will not control ALS resistant weeds. A3 A5-8 E8 F1 S8-10 Y2 Y3 Y15
<b>Pursuit</b> (imazethapyr <sup>2</sup> )	<b>2 fl oz SL</b> (0.5 oz)	Small broadleaf weeds.		

## POST-Applied Herbicides

<b>Basagran 5L / generic bentazon<sup>6</sup> + MSO adjuvant</b>	<b>0.4 to 1.6 pt SL / 0.5 to 2 pt applied 1 to 4 times.</b> (0.25 to 1 lb)	Small broadleaf weeds and suppression of Canada thistle.	POST. Dry bean: After emergence. Broadleaf weeds: <b>Small.</b>	Non-residual, contact herbicide requiring >15 gpa and full sunlight. Add oil adjuvant at 1 to 2 pt/A. Maximum bentazon amount per season is 2 lb/A. Refer to E3 for additional information. A3 E3 F1 F6 S7-13 T3
<b>Raptor</b> (imazamox <sup>2</sup> )	<b>4 fl oz SL</b> (0.5 oz)	Annual grass and broadleaf weeds. No control of ALS-resistant weeds.	POST. Drybean: 1 <sup>st</sup> trifoliolate but <b>prior to flowering.</b>	Add oil additive at 1 to 2 pt/A plus 28% UAN at 2 qt/A (except during high humidity). A3 A5-8 E10 F1 S8 Y2 Y15
<b>Varisto</b> (bentazon <sup>6</sup> & imazamox <sup>2</sup> )	<b>11 to 21 fl oz SL</b> (0.34 to 0.66 lb + 0.26 to 0.5 oz)	Small annual grass and broadleaf weeds and suppression of Canada thistle.	Weeds: Small.  Allow a 30 day PHI.	Add oil adjuvant at 1 to 2 pt/A. Bentazon may be applied sequentially to improve weed control. Refer to E3 for additional information. A3 A5-8 E1 E3 S1-13 T3 Y15



# DRY EDIBLE BEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>Reflex</b> (fomesafen <sup>14</sup> )	<b>0.75 pt EC</b> (0.188 lb)	Small annual broadleaf weeds including ragweed, kochia, and nightshade.	Weeds: 1 to 3 inches tall.  PHI: 45 days.	Contact herbicide requiring small weed size, >15 gpa, oil adjuvant at 1 to 2 pt/A, and full sunlight. Oil adjuvant will increase weed control and risk of crop injury. Refer to E4 for improved weed control. See label for list of approved counties. A3 E3 E5 F1 F5 S6-11 Y10 Y15
<b>Assure II Targa</b> (quizalofop <sup>1</sup> )	<b>7 to 12 fl oz EC</b> (0.77 to 1.32 oz)	Annual grasses and quackgrass.	POST. Dry bean: PHI: Assure II, Poast, Select/Max = 30 days. Fusilade DX = 60 days.	Add oil adjuvant at 1 gal/100 gal water but not less than 1.25 pt/A. Refer to label for tank-mix options. Refer to Remarks in the POST grass herbicide section under Soybean for methods to avoid antagonism and reduced grass control from broadleaf herbicides. A3 A5-6 E1-2
<b>Fusilade DX</b> (fluazifop <sup>1</sup> )	<b>5 to 12 fl oz EC</b> 1.25 to 3 oz)		Grass: Refer to soybean section on page 27.	
<b>Poast</b> (sethoxydim <sup>1</sup> )	<b>0.5 to 1.5 pt EC</b> (0.1 to 0.3 lb)	Annual grasses.		
<b>Select Max 1EC</b> <b>Select 2EC</b> <b>Shadow 3EC</b> (clethodim <sup>1</sup> )	<b>9 to 16 fl oz EC</b> <b>4 to 8 fl oz EC</b> <b>2.66 to 5.33 EC</b> (1 to 2 oz)	Annual grasses and quackgrass.		

## NDSU Dry Bean Tank-Mix

<b>Basagran 5L / bentazon<sup>6</sup> 4L + Raptor<sup>2</sup> + Reflex<sup>14</sup> + Select/clethodim<sup>1</sup> + MSO adjuvant</b>	<b>0.4 to 0.56 pt SL / 0.5 to 0.67 pt SL + 1 fl oz SL + 2 to 4 fl oz EC + 2 fl oz EC + 1 to 1.5 pt/A</b>	Grass and broadleaf weeds, including kochia, pigweed, and nightshade. May not control wild buckwheat or ragweed >2 inches	POST. Weeds. Small. Must be less than 1 to 2 inches tall.	<b>User assumes all risk of inadequate weed control when using this reduced-rate treatment.</b> MSO adjuvant is required. Repeat application 7 to 10 days later with some or all herbicides in the tank-mix to kill uncontrolled weeds and control successive weed flushes. Reduced herbicide rates cause resistant weeds - scout weed control often and hand-pull any escaped weeds or small patches of weeds that could be resistant. Refer to E3-4 for additional information. A3 A5-8 E3 E5 E10 F1 F4-6 S1-13 Y2-3 Y10
<b>Varisto SL</b> Basagran 5L Basagran 4L Raptor	<b>5.25 fl oz contains 4.2 fl oz or 5.25 fl oz + 1 fl oz</b>			

## Dry Bean Preharvest / Desiccation Herbicides


Glyphosate <sup>9</sup>	Up to 0.75 lb ae	Harvest aid/ Weed control.	Prior to harvest. Pods = yellow and leather texture. Seed = hard dough stage with <30% moisture. PHI = 7 days.	<b>Do not apply to dry bean grown for seed because reduced germination/vigor may occur.</b> Use only labeled formulations. Add AMS at 8.5 lb/100 gal. Non-selective, non-residual, translocated, foliar herbicide. A3-7 B1 B8
<b>Aim + MSO oil adjuvant (carfentrazone)</b>	<b>1 to 6 oz SL + 1 qt/A</b> (0.256 to 1.5 oz)	Dry bean and weed desiccant.	Prior to harvest. >80% pods yellow/brown. >70% leaves lost green color.  PHI: Aim = 0 days. paraquat = 7 days. Sharpen = 2 days. Valor = 5 days.	Contact herbicides require >15 gpa and full sunlight. Apply at >10 gpa for ground and >5 gpa for aerial application. Apply Aim, Sharpen and Valor with AMS at 8.5 to 17 lb/100 gal water or UAN at 2.5 gal/100 gal water and with glyphosate or paraquat for weed desiccation. Glyphosate improves weed control from Sharpen and Valor but antagonism may occur on biennial and perennial weeds. <b>Do not apply Sharpen to dry bean grown for seed because reduced germination/vigor may occur.</b>  B11-12 E13
<b>Paraquat<sup>22</sup> + NIS</b> <b>RUP</b>	<b>1.2 to 2 pt 2SL 0.8 to 1.3 pt 3SL</b> (0.3 to 0.5 lb)			
<b>Sharpen + MSO adjuvant (saflufenacil<sup>14</sup>)</b>	<b>1 to 2 fl oz SC + 1 to 1.5 pt/A</b> (0.36 to 0.72 oz)			
<b>Valor SX Valor EZ + MSO adjuvant (flumioxazin<sup>14</sup>)</b>	<b>2 to 3 oz WDG 2 to 3 fl oz SC + 2 pt/A</b> (1 to 1.53 oz)			

# FIELD PEA

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 6 for Fall or Spring Early Preplant Herbicides.

## Soil-Applied Herbicides

<b>Far-Go</b> (triallate <sup>8</sup> ) 	<b>1.25 qt EC</b> (1.25 lb)	Wild oat.	PPI.	PPI immediately after application. Two pass incorporation improves weed control. A1-2 B1 C8 G1
<b>Prowl</b> <b>Prowl H2O</b> (pendimethalin <sup>3</sup> )	<b>1.75 to 3.6 pt EC</b> <b>1.5 to 3 pt ACS</b> (0.72 to 1.5 lb)	Grass and some broadleaf weeds.	PPI. Fall or Spring.	Fall apply when soil temperature is less than 45 F to reduce fall herbicide degradation. Adjust rate for soil type. Some pea varieties may be injured. A1-2 B1 B7 E11 G1 S3 Y13 Y15
<b>Treflan</b> / generic trifluralin <sup>3</sup>	<b>1 to 1.5 pt EC</b> <b>5 to 7.5 lb 10G</b> (0.5 to 0.75 lb)	Poor wild oat and no wild mustard control.		
<b>Sonalan</b> (ethalfluralin <sup>3</sup> )	<b>1.5 to 2 pt EC</b> <b>5.5 to 7.5 lb 10G</b> (0.55 to 0.75 lb)			
<b>Dual/II/Magnum</b> (S/metolachlor <sup>15</sup> )	<b>1 to 2 pt EC</b> (0.95 to 1.9 lb)		Shallow PPI or PRE.	PRE requires precipitation for herbicide activation. Adjust rates for soil type, OM, and pH. Refer to label for rate structure. A1-2 B1 B4 E12 F3 G1 S6-11 Y15
<b>BroadAxe XC</b> <b>Spartan Elite</b> (metolachlor <sup>15</sup> & sulfentrazone <sup>14</sup> )	<b>20 to 32 fl oz EC</b> (0.98 to 1.58 lb & 1.75 to 2.8 oz)	Annual grass and small-seeded broadleaf weeds.		
<b>Spartan Charge</b> (carfentrazone <sup>14</sup> & sulfentrazone <sup>14</sup> )	<b>3.75 to 7.75 fl oz SE</b> (0.16 to 0.34 oz & 1.48 to 3.05 oz)	Small-seeded broadleaf weeds.		
<b>Authority Supreme</b> (sulfentrazone <sup>14</sup> & pyroxasulfone <sup>15</sup> )	<b>4.3 to 10 fl oz SC</b> (1.12 to 2.6 oz & 1.12 to 2.6 oz)	Annual grass and small-seeded broadleaf weeds.		
<b>Pursuit</b> (imazethapyr <sup>2</sup> )	<b>2 fl oz SL</b> (0.5 oz)	Small broadleaf weeds. No control of ALS-resistant weeds.		Shallow PPI improves consistency of weed control. PRE requires precipitation for herbicide activation. A1-2 E8 G1 X1 Y2 Y15
<b>Sharpen</b> (saflufenacil <sup>14</sup> )	<b>1 to 2 fl oz SC</b> (0.36 to 0.72 oz)	Small broadleaf weeds including kochia, pigweed, lambsquarters, nightshade and winter annuals.	EPP, shallow PPI, or PRE.	PRE requires precipitation for herbicide activation. Provides burndown control of small emerged broadleaf weeds including winter-annual species. Refer to label for tank-mix options. A1-2 B1-2 B12 S1-15
Metribuzin <sup>5</sup>	<b>0.25 to 0.5 lb DF</b> <b>0.38 to 0.75 pt 4F</b> (0.19 to 0.38 lb) <b>0.167 to 0.33 lb DF</b> <b>0.25 to 0.5 pt 4F</b> (0.125 to 0.25 lb)	Suppression of lambsquarters, henbit, mustard, and chickweed.	Preplant or PRE.  POST. Weeds: Small.	Contact herbicide requiring small weed size, >20 gpa, and full sunlight. Use only registered formulations. Adjust rate for soil type. Refer to label for application and environment information, and special precautions that may affect weed control and crop safety. Allow a 50 day PHI. A1-2 E7 G1 S7 Y4 Y12 Y15

<b>Herbicide</b>	<b>Product/A (ai/A)</b>	<b>Weeds</b>	<b>When to Apply</b>	<b>Remarks and Paragraphs</b>
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**POST-Applied Herbicides**

<b>Basagran 5L / generic bentazon<sup>6</sup> + MSO adjuvant</b>	<b>0.4 to 1.6 pt SL / 0.5 to 2 pt applied 1 to 4 times.</b> (0.25 to 1 lb)	Small broadleaf weeds and suppression of Canada thistle.	POST. Dry pea: At least 3 pair of leaves or 4 nodes. Broadleaf weeds: <b>Small.</b>	Non-residual, contact herbicide requiring >15 gpa and full sunlight. Add oil adjuvant at 1 to 2 pt/A. Maximum bentazon amount per season is 2 lb/A. Refer to E3 for additional information. A3 E3 G1-2
<b>Pursuit (imazethapyr<sup>2</sup>)</b>	<b>2 fl oz SL</b> (0.5 oz)	Small annual broadleaf weeds.  No control of ALS-resistant weeds.	POST. Pea: At least 3 inches tall but prior to 5 nodes and <b>prior to flowering.</b>	<b>User assumes all risk of crop injury.</b> Add NIS at 1 pt/100 gal or oil adjuvant at 1 to 2 pt/A. Oil adjuvant increases weed control and risk of crop injury. Do not apply during adverse weather conditions. Risk of Raptor carryover is less than Pursuit. Bentazon may be applied sequentially to improve weed control. Refer to E3 for additional information. Bentazon antagonizes Raptor and reduces risk of injury to field pea. A3 A5-8 E3 E8 E10 F4 G1 S6 Y2 Y15
<b>Raptor + Basagran 5L / generic bentazon<sup>6</sup> (imazamox<sup>2</sup>)</b>	<b>4 fl oz SL + 0.4 to 0.8 pt/A SL / 0.5 to 1 pt/A SL</b> (0.5 oz + 0.25 to 0.5 lb)	Small annual grass and broadleaf weeds and suppression of Canada thistle.	Weeds: Small.  Allow a 60 day PHI.	
<b>Varisto (bentazon<sup>6</sup> &amp; imazamox<sup>2</sup>)</b>	<b>11 to 21 fl oz SL</b> (0.34 to 0.66 lb + 0.26 to 0.5 oz)			
<b>Thistrol (MCPB<sup>4</sup>)</b>	<b>2 to 6 pt SL</b> (0.5 to 1.5 lb ae)	Small broadleaf weeds.	POST. Pea: Prior to 6 inches tall.	Slight, temporary injury may occur. Do not apply when temperature exceeds 90 F or when peas are stressed. Suppresses Canada thistle. G1 G3
<b>Assure II Targa (quizalofop<sup>1</sup>)</b>	<b>7 to 12 fl oz EC</b> (0.77 to 1.32 oz)	Annual grasses and quackgrass.	POST. Pea: Refer to PHI. PHI: Assure = 60 days.	Add oil adjuvant at 1 gal/100 gal water but not less than 1.25 pt/A. Refer to label for tank-mix options. Refer to Remarks in the POST grass herbicide section under Soybean for methods to avoid antagonism and reduced grass control from broadleaf herbicides. Clethodim may injure pea when applied during bloom.
<b>Poast (sethoxydim<sup>1</sup>)</b>	<b>0.5 to 1.5 pt EC</b> (0.1 to 0.3 lb)	Annual grasses.	Clethodim = 21 days and prior to bloom. Poast = 30 days.	Refer to Remarks in the POST grass herbicide section under Soybean for methods to avoid antagonism and reduced grass control from broadleaf herbicides. Clethodim may injure pea when applied during bloom. A3 A5-6 E2
<b>Select Max 1EC Select 2EC Shadow 3EC (clethodim<sup>1</sup>)</b>	<b>9 to 16 fl oz EC 4 to 8 fl oz EC 2.66 to 5.33 EC</b> (1 to 2 oz)	Annual grasses and quackgrass.	Grass: Refer to soybean section on page 27.	

**Preharvest Herbicides**


<b>Glyphosate<sup>9</sup></b>	Up to 2.25 lb ae.	Emerged grass and broadleaf weeds.	Prior to harvest. Pea: >80% yellow/brown pods and <30% seed moisture. PHI: Glyphosate = 7 days. Aim = 0 days. paraquat = 7 days. Sharpen = 3 days. Valor = 5 days.	Use only registered formulations. Add AMS at 8.5 lb/100 gal. <b>Do not apply to field pea grown for seed because reduced germination/vigor may occur.</b> A4-6 B8 D8
<b>Aim + MSO adjuvant (carfentrazone)</b>	<b>1 to 6 oz SL + 1 qt/A</b> (0.256 to 1.5 oz)	Desiccant.		Contact herbicides require >15 gpa and full sunlight. Apply at >10 gpa for ground and >5 gpa for aerial application.
<b>Paraquat<sup>22</sup> + NIS</b>	<b>1.2 to 2 pt 2SL 0.8 to 1.3 pt 3SL</b> (0.3 to 0.5 lb)			Apply Aim, Sharpen and Valor with AMS at 8.5 to 17 lb/100 gal water or UAN at 2.5 gal/100 gal water and with glyphosate or paraquat for weed desiccation. Glyphosate improves weed control from Sharpen and Valor but antagonism may occur on biennial and perennial weeds.
<b>Sharpen + MSO adjuvant (saflufenacil<sup>14</sup>)</b>	<b>1 to 2 fl oz SC + 1 to 1.5 pt/A</b> (0.36 to 0.72 oz)			<b>Do not apply Sharpen to field pea grown for seed because reduced germination/vigor may occur.</b>
<b>Valor SX Valor EZ + (flumioxazin<sup>14</sup>) + MSO adjuvant</b>	<b>2 to 3 oz WDG 2 to 3 fl oz SC + 2 pt</b> (1.02 to 1.53 oz)			A4-8 B8 B11-12

# CHICKPEA/GARBANZO BEAN AND LENTIL

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 6 for Fall or Spring Early Preplant Herbicides.

## Soil-Applied Herbicides

<b>Far-Go</b> (triallate <sup>8</sup> ) 	<b>1.25 qt EC</b> (1.25 lb)	Wild oat.	PPI.	PPI immediately after application. A two pass incorporation improves weed control. A1-2 B1 C8 H1-2
<b>Prowl</b> <b>Prowl H2O</b> (pendimethalin <sup>3</sup> )	<b>1.75 to 3.6pt 3.3EC</b> <b>1.5 to 3 pt 3.8ASC</b> (0.72 to 1.5 lb)	Grass and some broadleaf weeds.	PPI. Fall or Spring.	Adjust rate for soil type. Apply in fall when soil temperature is less than 45 F to reduce fall herbicide degradation. A1-2 B1 B7 E11 H1-2 Y1 Y13 15
Treflan / generic trifluralin <sup>3</sup>	<b>1 to 1.5 pt EC</b> (0.5 to 0.75 lb)	Poor wild oat and no wild mustard control.	PPI. Fall or Spring. See Remarks for use in Lentil.	Lentil: Tolerance is marginal and injury may occur under stress conditions. Refer to label for additional information. A1-2 B1 B7 E11 H1-3 Y1 Y13 Y15
<b>Sonalan</b> (ethalfluralin <sup>3</sup> )	<b>1.5 to 2 pt EC</b> <b>5.5 to 7.5 lb 10G</b> (0.55 to 0.75 lb)			Lentil: Fall-apply Sonalan 10G just prior to snow cover into stubble on fields that have been direct-seeded with 30% or less soil disturbance for 2 to 3 years. Incorporate once using minimum soil disturbance with a rotary hoe or heavy harrow. Refer to label. A1-2 B1 B7 E11 H1-3 Y1 Y13 Y15
<b>Dual/II/Magnum</b> (S/metolachlor <sup>15</sup> )	<b>1 to 2 pt EC</b> (0.95 to 1.9 lb)		Shallow PPI or PRE.	Shallow PPI improves consistency of weed control. PRE requires precipitation to activate herbicide. Adjust rate for soil type, OM, and pH. Refer to label for tank-mix options. Do not apply products containing sulfentrazone to lentil. A1-2 B1 B4 E12 H1-2 Y14 Y15
<b>Outlook / generic dimethenamid<sup>15</sup></b>	<b>16 to 21 fl oz EC</b> (0.75 to 1 lb)			
<b>BroadAxe XC</b> <b>Spartan Elite</b> (s-metolachlor <sup>15</sup> & sulfentrazone <sup>14</sup> ) <b>Chickpea Only</b>	<b>20 to 32 fl oz EC</b> (0.98 to 1.58 lb & 1.75 to 2.8 oz)	Annual grass and small-seeded broadleaf weeds.		
<b>Spartan Charge</b> (carfentrazone <sup>14</sup> & sulfentrazone <sup>14</sup> ) <b>Chickpea Only</b>	<b>3.75 to 7.75 floz SE</b> (0.16 to 0.34 oz & 1.48 to 3.05 oz)	Small-seeded broadleaf weeds.		
<b>Authority Supreme</b> (sulfentrazone <sup>14</sup> & pyroxasulfone <sup>15</sup> ) <b>Chickpea only</b>	<b>4.3 to 10 fl oz SC</b> (1.12 to 2.6 oz & 1.12 to 2.6 oz)	Annual grass and small-seeded broadleaf weeds.		
<b>Pursuit</b> (imazethapyr <sup>2</sup> )	<b>2 fl oz SL</b> (0.5 oz)	Small broadleaf weeds. No control of ALS-resistant weeds.		E10 H1-2 Y2 Y15
<b>Sharpen</b> (saflufenacil <sup>14</sup> )	<b>Chickpea = 1 to 2 fl oz SC</b> (0.36 to 0.72 oz) <b>Lentil = 0.75 fl oz</b> (0.27 oz)	Small broadleaf weeds including winter-annual species.	Fall, EPP, shallow PPI, and PRE.	PRE requires precipitation to activate herbicide. Provides burndown control of small emerged broadleaf weeds. Refer to label for tank-mix options. A1-2 B1-2 B12 S1-13
Metribuzin <sup>5</sup> <b>Lentil Only</b>	<b>0.25 to 0.5 lb DF</b> <b>0.38 to 0.75 pt 4F</b> (0.19 to 0.38 lb) <b>0.167 to 0.33 lb DF</b> <b>0.25 to 0.5 pt 4F</b> (0.125 to 0.25 lb)	Suppression of lambsquarters, henbit, chickweed and mustard.	PRE.  POST. Weeds: Small.	Adjust rates for soil type. Refer to label for application and environment information and special precautions that may affect weed control and crop safety. Allow a 75 day PHI. A1-2 E7 H1-2 Y4 Y11 Y15

## CHICKPEA/GARBANZO BEAN AND LENTIL

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>POST-Applied Grass Herbicides</b>				
<b>Assure II Targa</b> (quizalofop <sup>1</sup> )	<b>7 to 12 fl oz EC</b> (0.77 to 1.32 oz)	Annual grasses and quackgrass.	POST. Crop: Refer to PHI. PHI: Assure = 60 days.	Add oil adjuvant at 1 gal/100 gal water but not less than 1.25 pt/A. Refer to label for tank-mix options. Refer to Remarks in the POST grass herbicide section under Soybean for methods to avoid antagonism and reduced grass control from broadleaf herbicides. A5-6 E2
<b>Poast</b> (sethoxydim <sup>1</sup> )	<b>0.5 to 1.5 pt EC</b> (0.1 to 0.3 lb)	Annual grasses.	Poast = 50 days. Clethodim = 30 days.	
<b>Select Max 1EC</b> <b>Select 2EC</b> <b>Shadow 3EC</b> (clethodim <sup>1</sup> )	<b>9 to 16 fl oz EC</b> <b>4 to 8 fl oz EC</b> <b>2.7 to 5.3 fl oz EC</b> (1 to 2 oz)	Annual grasses and quackgrass.	Grass: Refer to soybean section on page 27.	

### Preharvest Herbicides

Glyphosate <sup>9</sup>	Up to 2.25 lb ae	Emerged grass and broadleaf weeds.	Harvest aid and desiccant. PHI: 7 days	Use only registered formulations. Apply with AMS at 8.5 lb/100 gal. <b>Do not apply to crop grown for seed because reduced germination/vigor may occur.</b>
		Perennial weeds.	Spot treatment. PHI: 14 days.	For spot treatment use a 2% solution for perennial broadleaf weeds at or beyond the bud stage. Crop will be killed in treated areas. A4-6 B8
Paraquat <sup>22</sup> + NIS <b>RUP</b>	<b>1.2 to 2 pt 2SL</b> <b>0.8 to 1.3 pt 3SL</b> (0.3 to 0.5 lb)	Weed desiccant.	Prior to harvest. >80% yellow/brown pods and <40% green chickpea leaves or <30% green lentil leaves.	Contact herbicides require >15 gpa and full sunlight. Apply at >10 gpa for ground and >5 gpa for aerial application. Apply Sharpen with AMS at 8.5 to 17 lb/100 gal water or UAN at 2.5 gal/100 gal water and with glyphosate or paraquat for weed desiccation. Glyphosate improves weed control from Sharpen and Valor but antagonism may occur on biennial and perennial weeds.
<b>Sharpen +</b> MSO adjuvant (saflufenacil <sup>14</sup> )	<b>1 to 2 fl oz SC +</b> <b>1 to 1.5 pt/A</b> (0.36 to 0.72 oz)	Sharpen - not for green lentil varieties.	PHI: paraquat = 7 days. Sharpen = 2 days Valor = 5 days.	<b>Do not apply Sharpen to crop grown for seed because reduced germination/vigor may occur.</b> B11-12 E13
<b>Valor SX</b> <b>Valor EZ +</b> (flumioxazin <sup>14</sup> ) + MSO adjuvant	<b>2 to 3 oz WDG</b> <b>2 to 3 fl oz SC</b> <b>2 pt</b> (1.02 to 1.53 oz)	Valor - lentil only		

## Clearfield Lentil

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
<b>Beyond</b> (imazamox <sup>2</sup> )	<b>4 to 6 fl oz SL</b> (0.5 to 0.75 oz)	Annual grass and broadleaf weeds including wild oat, foxtail, Japanese and downy brome and Persian dandel.	POST. Lentil: 2 to 6 leaf stage.  Weeds: Small and actively growing.	<b>Apply only to Clearfield lentil varieties.</b> Add NIS at 1 qt/100 gal water + 28% UAN at 2.5 gal/100 gal water or AMS at 8.5 lbs/100 gal. Do not use PO or MSO adjuvants. Refer to label for weed size and application information. A5-8 E10 Y15