


SOYBEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 12 for Fall or Spring Early Preplant Herbicides.

Refer to page 35 for additional herbicides to use in conventional or herbicide resistant soybean.

Soil-Applied Herbicides

Prowl Prowl H2O (pendimethalin)	2.4 to 3.6 pt EC 2.1 to 3 pt ACS (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 wild oat and no wild mustard control. Green foxtail has become resistant to dinitroaniline (DNA) herbicides in North Dakota. A1-2 B1 B6 E1 E10 S7 X1 Y14. Pages: 78-80, 82-83.
Sonalan Sonalan 10G (ethalfuralin)	1.5 to 3 pt 5.5 to 11.5 10G (0.55 to 1.15 lb)			
trifluralin	1 to 2 pt (0.5 to 1 lb)			
metribuzin	Soil pH >7.5 = 0.25 lb DF Soil pH <7.5 = 0.33 to 0.5 lb DF	Broadleaf weeds including wild mustard.	PPI.	Sencor may injure certain soybean varieties. E1 E6 S7 Y4 Y13. Pages: 78-80, 82-83.
metolachlor S-metolachlor	1 to 2 pt (0.95 to 1.9 lb)	Grass and some broadleaf weeds.	PPI or PRE.	S-metolachlor may give greater weed control than metolachlor at equal product rates. Poor wild oat control and wild mustard control. Shallow PPI gives more consistent control than PRE. PRE requires precipitation for herbicide activation. Adjust rate for soil type and OM. Outlook gives greater nightshade control. A1-2 B1 E1 E5
Intro (alachlor) RUP	2 to 3 qt (2 to 3 lb)			
dimethenamid-P	16 to 21 fl oz (0.75 to 1 lb)		PPI, PRE or EPOST.	
Valor (flumioxazin)	2 to 3 oz WDG (1 to 1.5 oz)	Small-seeded broadleaf weeds including pigweed, nightshade, kochia lambsquarters, and B. wormwood. Python does not control ALS resistant kochia.	EPP, Shallow PPI, and PRE.	PRE requires precipitation for herbicide activation. Refer to label for tank-mix options, application information, and rate structure. A1 B1-2 E1 E13 S3-5 S7 A1 B1-2 E1 E11 S3-5 S7 X1 Y15. Pages: 78-80. A1 E1 E8 S4 S7 Y2. Pages: 78-80, 120-121.
Spartan (sulfentrazone)	3 to 8 fl oz F (1.5 to 4 oz)			
Python (flumetsulam) 	0.8 to 1.33 oz DG or 5 to 3 A/pack (0.64 to 1.06 oz)			

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 35 for additional herbicides to use in conventional or herbicide resistant soybean.

POST-Applied Herbicides

Basagran	0.5 to 2 pt applied 1 to 4 times. (0.25 to 1 lb)	Some broadleaf weeds.	POST. Soybean: After emergence. Broadleaf weeds: Small.	Non-residual, contact herbicide requiring thorough coverage. Most active in hot and sunny conditions. Add oil adjuvant at 1 to 2 pt/A. Allow a 30 day PHI. A3 A7 E1 E3 S1 S3-5 S7-8
Rezult + MSO oil adjuvant (bentazon & sethoxydim)	1.6 + 1.6 pt or 0.8 + 0.8 pt 2X or 0.56 + 0.56 pt 3X or 0.4 + 0.4 pt 4X + 1.25 pt/A (1 + 1 lb or 0.5 + 0.5 lb or 0.38 + 0.38 lb or 0.25 + 0.25 lb)	Small grass and broadleaf weeds including pigweed, ragweed, kochia, lambsquarters, wild buckwheat, biennial wormwood and Canada thistle	First application: Weeds: 1 inch or less. Make consecutive applications 7 to 10 days later.	Weeds must be small at application. Refer to E3 for additional information. MSO enhances weed control more than petroleum adjuvants. Sequential applications at a 7 to 10 day intervals improves overall weed control. Tank-mix with Raptor at 2 fl oz/A for improved weed control. Allow 30 day PHI. A3 A7 E1-3 S1 S3-5 S7-8 T2
Ultra Blazer (acifluorfen)	0.5 to 1.5 pt (0.125 to 0.375 lb)	Small broadleaf weeds including pigweed and common lambsquarters.	POST. Soybean: 1 to 2 trifoliates. Weeds: Small.	Contact, non-residual herbicides requiring thorough coverage. Most active in hot and sunny conditions. May cause speckling on soybean leaves. Refer to label for crop response, adjuvant type and rate, and tank-mix options. A3 E1 S3 X1
Cadet (fluthiacet)	0.4 to 0.9 fl oz EC (0.045 to 0.1 oz)			
Cobra (lactofen)	6 to 12.5 fl oz (1.5 to 3.2 oz)			
Resource (flumiclorac)	2 to 3 fl oz EC (0.215 to 0.32 oz)			
Flexstar (fomesafen + adjuvants)	0.75 to 1 pt (0.176 to 0.24 lb)	Broadleaf weeds including pigweed, cocklebur, Venice mallow, mustard, ragweed, kochia, smartweed, EB nightshade. Poor hairy nightshade control.	POST. Soybean: Prior to flowering. Weeds: 2- to 4-leaf stage.	Contact herbicide requiring thorough coverage. Most active in hot and sunny conditions. Apply at 1pt/A in ND east of I-29 and south of I-94 and at 1 pt/A in MN south of I-94. Use 0.75 pt/A in ND east of Hwy 281 and in MN south of US Hwy 2. Add MSO at 1% v/v + AMS at 10 lb/100 gal water. Refer to label for crop rotation restrictions and restrictions for each geographic region. Refer to E4 for improved broadleaf weed control. A3 E1 E4 S3-5 S8 Y11. Pages: 78-80.
FirstRate (cloransulam)	0.3 oz WDG or 10 A/pack (0.25 oz)	Venice mallow, cocklebur, horseweed, ragweed, sunflower, and wild mustard.	POST. Soybean: Up to 50% of plants flowering. Weeds: Up to 10 inches tall.	Add NIS at 0.125% v/v or oil adjuvant at 1.25% v/v alone + 28% UAN at 2.5% v/v. Refer to label for weed size, and tank-mix options. A3 E1 X1 Y2. Pages: 78-80, 120-121.
thifensulfuron DF Harmony SG	0.083 (1/12) oz DF 0.125 (1/8) oz SG (0.062 oz)	Wild mustard, pigweed, and lambsquarters. No ALS-resistant kochia control.	POST. Soybean: Fully expanded 1st trifoliolate leaf until 60 days PHI.	Add NIS at 0.25% v/v or oil additive + 28% UAN or AMS. Refer to label for tank-mix options. A3 A5-7 E1 E12 S1 S5 X1. Pages: 82-83, 120-121.
Pursuit (imazethapyr)	3 fl oz (0.75 oz ae)	Annual broadleaf weeds. Poor common lambsquarters, ragweed, wild buckwheat and biennial wormwood control. No control of ALS-resistant kochia.	POST. Soybean: Fully expanded first trifoliolate leaf but prior to flowering.	Add NIS at 0.25% v/v or 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. Refer to label for application information and weed size. Raptor has less soil residual carryover than Pursuit. A3 A5-7 E7 E9 S4 X1 Y2 Y17. Pages: 78-80, 120-121.
Raptor (imazamox)	4 to 5 fl oz (0.5 to 0.625 oz ae)		Weeds: Small and actively growing.	

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

SOYBEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Refer to page 35 for additional herbicides to use in conventional or herbicide resistant soybean.				
Assure II Targa (quizalofop)	4 to 10 fl oz (0.44 to 1.1 oz)	Annual grasses and quackgrass.	Soybean: Prior to pod set.	Add oil adjuvant at 1% v/v but not less than 1.25 pt/A. Oil adjuvant at more than 1 qt/A is not needed. See Select Max label for detailed adjuvant recommendations. 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 74 for control of volunteer corn. A3 A5-7 E1-2 X1. Pages: 82-83, 120-121.
Fusilade DX (fluazifop-P)	5 to 12 fl oz (1.25 to 3 oz)		Grass weeds: Refer to table below.	
Fusion (fluazifop-P & fenoxaprop)	4 to 12 fl oz (1 to 3 oz & 0.32 to 0.96 oz)			
Poast (sethoxydim)	0.5 to 1.5 pt (0.1 to 0.3 lb)	Annual grasses.	Soybean: All stages.	
clethodim	4 to 16 fl oz (1 to 4 oz)	Annual grasses and quackgrass.	Grass weeds: Refer to table below.	
Select Max (clethodim)	9 to 32 fl oz (1.125 to 4 oz)			

GRASS CONTROL WITH POST HERBICIDES

Herbicide	Grass size (inches)	Rate (fl oz/A)	Herbicide	Grass size (inches)	Rate (fl oz/A)	Herbicide	Grass size (inches)	Rate (fl oz/A)
Green and yellow foxtail			Wild-proso millet			Volunteer corn		
Assure II/Targa	2 to 4	7 to 8	Assure II/Targa	2 to 6	5 to 8	Assure II/Targa	6 to 30	5 to 8
Fusilade DX	2 to 4	10 to 12	Fusilade DX	4 to 8	6	Fusilade DX	12 to 24	4 to 8
Fusion	2 to 4	8	Fusion	4 to 8	6	Fusion	12 to 24	6
Poast	1 to 8	1 pt	Poast	4 to 10	0.5 pt	Poast	1 to 20	1 pt
clethodim	2 to 8	4 to 6	clethodim	1 to 10	4 to 6	clethodim	4 to 12	4
Select Max	2 to 6	9	Select Max	2 to 6	9	Select Max	1 to 12 12 to 24 24 to 36	6 9 12
	6 to 8	12		6 to 8	12			
Wild oat, vol. small grains, sandbur			Quackgrass					
Assure II/Targa	2 to 6	7 to 8	Assure II/Targa	6 to 10	12			
Fusilade DX	2 to 6	8	Fusilade DX	6 to 10	12			
Fusion	2 to 6	8	Fusion	6 to 10	12			
Poast	1 to 4	1 pt	Poast	6 to 8	2 pt			
clethodim	2 to 6	6	clethodim	4 to 12	8	Refer to page 74 for control of volunteer corn.		
Select Max	2 to 6	9	Select Max	4 to 12	12			
	6 to 8	12						

Preharvest Application

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
glyphosate	Up to 0.75 lb ae See Remarks.	Preharvest weed control.	Prior to harvest. Apply after pods have set and lost all green color. Allow a 7 day PHI.	Add AMS fertilizer at 4 lb/100 gal, or more for hard water. Refer to label for adjuvant use. Do not apply on soybean grown for seed because reduced germination/vigor may occur. A4-6 B2 X1. Pages: 82-83, 120-121.
paraquat	8 to 12 fl oz 2SL RUP 5.6 to 8.4 fl oz 3SL (0.13 to 0.188 lb)	Desiccant.	Prior to harvest. Allow a 15 day PHI.	Add NIS at 0.125% v/v. Most active in hot and sunny conditions. Apply when at least 65% of seed pods are a mature brown color or when seed moisture is 30% or less.
Aim (carfentrazone)	1 to 1.5 oz (0.256 to 0.384)		Allow a 3 day PHI.	A3 B4 B8. Pages: 82-83.

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

HERBICIDE RESISTANT SOYBEAN

Refer to page 35 for additional herbicides to use in conventional or herbicide resistant soybean.

LibertyLink Soybean

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Ignite 280 (glufosinate)	22 fl oz (0.4 lb)	Annual grass and broadleaf weeds including ALS and glyphosate resistant weeds.	POST. Soybean: Emergence up to bloom. Weeds: 1 to 3 inches tall.	Apply only to LibertyLink soybean varieties. Non-selective, contact, non-residual herbicide requiring thorough coverage. Add AMS at 3 lb/A. Apply 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 A5-6 D13 S2 S7 X1. Pages: 120-121.

Roundup Ready Soybean

Herbicide	Product/A (ae/A)	Weeds	When to Apply	Remarks and Paragraphs																					
glyphosate	Maximum single application = 1.5 lb ae Maximum in-crop = 2.25 lb ae See Remarks.	Annual and perennial grass and broadleaf weeds.	POST. Soybean: Emergence through R2 of full flowering. The R2 stage ends when a pod 3/16 inch long at one of the four uppermost nodes appears on the main stem along with a fully developed leaf (R3 stage). Allow a 14 day PHI.	Apply only to Roundup Ready soybean varieties. <table style="display: inline-table; border: none;"> <tr> <td></td> <td>Maximum -</td> <td>Maximum -</td> </tr> <tr> <td></td> <td>single appl.</td> <td>in-crop</td> </tr> <tr> <td><u>lb ae/gal</u></td> <td><u>lb ai/gal</u></td> <td><u>1.5 ae</u></td> </tr> <tr> <td>3</td> <td>4</td> <td>= 64 fl oz</td> </tr> <tr> <td>4/4.17</td> <td>5.4/5.1</td> <td>= 48 fl oz</td> </tr> <tr> <td>4.5</td> <td>5.5</td> <td>= 44 fl oz</td> </tr> <tr> <td>5</td> <td>6.1</td> <td>= 40 fl oz</td> </tr> </table> Add AMS fertilizer at 4 lb/100 gal, or more for hard water. Multiple applications may be necessary for weed flushes. Drift and off-site movement may cause injury or death to other plants and crops. Refer to label for weeds controlled, application information, adjuvant use, tank-mix options with residual herbicides and restrictions. Cannot plant harvested patented soybean seed. A4-6 B2 D14 S4 X1. Pages: 82-83, 120-121.		Maximum -	Maximum -		single appl.	in-crop	<u>lb ae/gal</u>	<u>lb ai/gal</u>	<u>1.5 ae</u>	3	4	= 64 fl oz	4/4.17	5.4/5.1	= 48 fl oz	4.5	5.5	= 44 fl oz	5	6.1	= 40 fl oz
	Maximum -	Maximum -																							
	single appl.	in-crop																							
<u>lb ae/gal</u>	<u>lb ai/gal</u>	<u>1.5 ae</u>																							
3	4	= 64 fl oz																							
4/4.17	5.4/5.1	= 48 fl oz																							
4.5	5.5	= 44 fl oz																							
5	6.1	= 40 fl oz																							

Refer to page 74 for control of volunteer Roundup Ready corn and canola in Roundup Ready soybean.

Roundup Ready/STS (sulfonyleurea-tolerant) Soybean

Herbicide	Product/A (ae/A)	Weeds	When to Apply	Remarks and Paragraphs
thifensulfuron DF Harmony SG	0.33 oz DF 0.5 oz SG (0.25 oz)	Annual broadleaf weeds including, wild buckwheat, lambsquarters, mustard species, and volunteer RR canola.	POST. RR/STS soybean: 1 st fully expanded trifoliolate to 60 days PHI.	Apply only to RUR/STS soybean varieties. Apply with glyphosate at 0.38 to 1.125 lb ae/A. Add NIS at 0.125 to 0.25% v/v to non-loaded glyphosate. Refer to label for adjuvant use. Apply with AMS at 4 lb/100 gal water, or more for hard water. Refer to label for weeds controlled and application information. A4-7 D14 D16 S1 X1. Pages: 74, 82-83, 120-121.

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

WEED MANAGEMENT IN ROUNDUP READY SOYBEAN

NDSU recommends using herbicides with different modes of action and different weed control management practices in Roundup Ready soybean production to delay development of glyphosate resistant weeds. See pages 120-121 for more information on weed resistance.

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

Remove weeds early especially when grass weed populations are high. Some data from the mid-west indicate that soybean yield may not be reduced by delaying glyphosate application until weeds are up to 6 inches tall. However, data from the northern Plains show that, especially under dry conditions, soybean yield loss will occur if weeds become greater than 4 inches tall prior to glyphosate application.

Glyphosate at 1.5 oz ae/A controls foxtail, 2.25 oz ae/A controls volunteer small grain, and 3 oz ae/A controls wild oat and downy brome. Use higher rates on broadleaf weeds, larger weeds, tolerant weeds, or if weeds are under environmental stress. See glyphosate section A4 for more information about increasing weed control from glyphosate.

Three Systems of Weed Control in RR Soybean

1. PRE followed by glyphosate POST: All PRE herbicides require rain for activation.

Page 30 lists many registered PRE soybean herbicides that can be used in herbicide resistant soybean. PRE herbicides at 2/3 the labeled rate may give 60 to 90% control of some grass and broadleaf weeds, will reduce weed infestations emerging with soybean, will allow more flexibility in application of POST herbicides, and will help protect yield from early season weed competition.

2. Glyphosate + POST broadleaf herbicide (different mode of action):

Several herbicides listed in the following table will improve control of weeds not controlled by glyphosate. Glyphosate has no soil residual and will not control weeds emerging after application. Glyphosate may not control some weed species or biotypes. Many POST herbicides listed will give residual weed control. Follow label directions for tank-mix and application information.

3. Glyphosate (EPOST = 2 to 4 inch tall weeds) followed by glyphosate (POST = 14 to 21 days later):

This program will increase the risk of weed resistance unless other strategies are used in rotational crops - see Herbicide Resistant Weed Section, page 120-121.

The following table shows herbicides to apply in tank-mix or sequentially with glyphosate in RR soybean for control of weeds not controlled by glyphosate. Weed ratings are control without glyphosate. Refer to label for tank-mix and specific application information. Residual weed control listed in the table refers to control of subsequent flushes of weeds after herbicide application.

Herbicides to apply in tank-mix or sequentially with glyphosate in RR soybean for control of weeds not controlled by glyphosate. Refer to page 30 through 33 for additional herbicides.

				Buckwheat, Wild	Canola, Vol. RR ¹	Horseweed (Marestail)	Kochia	Lambsquarters	Mallow, Common	Nightshade species	Prickly lettuce	Ragweed, Common	Smartweed, Annual	Waterhemp
Rate/A	Cost/A													
Preplant or PRE herbicides - no residual weed control														
Weed Control Ratings ³														
2,4-D ester	Plant >7 d	0.5 - 1 pt	\$1.13 - 2.25	P	P-G	E	P	E	P	N	E	E	F	G
Aim		0.5 - 1 fl oz	\$3.00 - 6.00	P	N-P	N	F-E	F-G	-	N	F	N	N	E
thifensulfuron	0.33 oz DF / 0.5 oz SG		\$6.30	E	G-E	F	E ⁴	E	G-E	N	E ⁴	G	E ⁴	E ⁴
Rage D-tech	Plant >14 d	8 - 24 fl oz	\$3.35 - 10.00	E	G-E	N	E ⁴	E	G-E	N	E ⁴	G	E ⁴	E ⁴

Preplant or PRE herbicides - with residual weed control - See Combination herbicides for soybean.

Prowl, Sonalan, Treflan ² - PPI	See label	\$3.00 - 9.00	N	N	N	P	F-E	N	N	N	N	P	F-E
Python ²	0.8 - 1 oz DG	\$8.80 - 11.00	F-G	E	E	E ⁴	E	-	E	-	P	G-E	E ⁴
Spartan ²	3 - 4.5 fl oz	\$10.00 - 15.00	P-F	P	E	E	E	-	F-E	P	P	E	E
Valor	2 - 2.5 oz WDG	\$9.40 - 11.75	P-F	G-E	E	E	E	E	E	E	P	F	E

POST herbicides - See Combination herbicides for soybean.

FirstRate ²	<50% flower	0.3 oz WDG	\$9.00	P-F	P-G	E ⁴	P ⁴	P	-	N	-	E	E	N
Flexstar ²	< Flowering	0.5 - 0.75 pt	\$7.20 - 10.80	P	E	N	G-E	P-F	G-E	F-E	-	G-E	G-E	E
Harmony SG	60 day PHI	1/8 oz SG	\$1.20	P	P-F	P	N	G	N	N	P ⁴	N	G-E	N
thifensulfuron	60 day PHI	1/12 oz DF	\$3.75	P	P-F	P	N	G	N	N	P ⁴	N	G-E	N
Pursuit ²	< Flowering	2 - 3 fl oz	\$8.60 - 12.90	P	E	N	E ⁴	P-F	P	E	E ⁴	P	G	N
Raptor ²	< Flowering	2 - 3 fl oz	\$8.60 - 12.90	P	E	N	E ⁴	F	P	E	G ⁴	P	G-E	N

¹See page 74 for size of volunteer canola and herbicide rates.

²May carry over more than one cropping season. Follow labeled crop rotation restrictions. See pages 120-121.

³E = Excellent (90-99%), G = Good (80-90%), F = Fair (65-80%), P = Poor (40-65%), N = None.

⁴Except where resistant populations have developed.

⁵Registration Pending

Combination Herbicides for Soybean:

Trade Name	Manufacturer	Applied at (Prod/A)...	Cost/A	Gives the equivalent product rates of:
Authority Assist	FMC	4 fl oz 6 fl oz	\$ 8.60 \$12.90	- fl oz Spartan + - fl oz Pursuit - fl oz Spartan + - fl oz Pursuit
Authority First / Sonic	FMC	2.4 oz 3.2 oz	\$ 9.60 \$12.80	3 fl oz Spartan + 0.2 oz FirstRate 4 fl oz Spartan + 0.3 oz FirstRate
Authority MTZ	FMC	8 oz 12 oz	\$ 8.25 \$12.40	3.6 fl oz Spartan + 3.6 oz Sencor 4.33 fl oz Spartan + 4.33 oz Sencor
Boundary Domain	Syngenta Bayer	1.2 pt 9 oz	\$11.70 \$ 7.65	0.83 pt Dual Magnum + 4 oz Sencor 4.33 fl oz Define + 4.33 oz Sencor
Extreme	BASF	1.5 pt 2.25 pt	\$ 6.75 \$ 9.00	2 fl oz Pursuit + 12 fl oz glyphosate-ipa (3 lb ae/gal) 3 fl oz Pursuit + 18 fl oz glyphosate-ipa (3 lb ae/gal)
Gangster (co-pack)	Valent	1.8 oz	\$12.50	1.5 oz Valor + 0.3 oz FirstRate
Pursuit Plus	BASF	20 fl oz 1.8 pt	\$ 8.60 \$12.40	0.88 pt Prowl H ₂ O + 2 fl oz Pursuit 1.28 pt Prowl H ₂ O + 2.9 fl oz Pursuit
Rage D-Tech*	FMC	8 fl oz 16 fl oz	\$ 3.35 \$ 6.65	0.5 fl oz Aim + 0.5 pt 2,4-D ester - apply at least 7 days prior to planting. 1 fl oz Aim + 1 pt 2,4-D ester - apply at least 7 days prior to planting.
Sequence	Syngenta	1.5 pt	\$10.35	18 fl oz glyphosate-ipa (3 lb ae/gal) + 0.6 pt Dual II Magnum
Spartan Advance	FMC	24 fl oz	\$18.75	3.4 fl oz Spartan + 24 fl oz glyphosate-ipa (3 lb ae/gal)
Spartan Charge ⁵	FMC	5.75 fl oz	\$ -	4.5 fl oz Spartan + 1 fl oz Aim


* Plant no earlier than 14 days after application.

DRY EDIBLE BEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 12 for Fall or Spring Early Preplant Herbicides.

Soil-Applied Herbicides

Eptam (EPTC)	3.5 to 4.5 pt 15 to 20 lb G (3 to 4 lb)	Grass and some broadleaf weeds.	PPI.	PPI immediately after application. Consult label for rate range for specific tank mix. A1-2 B1 F1-2 S4
Prowl Prowl H2O (pendimethalin)	2.4 to 3.6 pt 3.3EC 2.1 to 3 pt 3.8ACS (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. Adjust rate for soil type. Use EC formulation in spring and 10G formulation in fall. Refer to label for tank-mixtures. A1-2 B1 B6 E10 F1 S7 X1 Y1 Y14. Pages: 78-80, 82-83.
trifluralin	1 to 2 pt EC 5 to 10 lb 10G (0.5 to 1 lb)			
Sonalan (ethalfluralin)	1.5 to 4.5 pt EC (0.55 to 1.69 lb) 5.5 to 11.5 lb 10G (0.55 to 1.15 lb)			
metolachlor S-metolachlor	1 to 2 pt (0.95 to 1.9 lb)	Grass and some broadleaf weeds.	Spring: PPI or PRE.	S-metolachlor may give greater weed control than metolachlor at equal product rates. Poor wild mustard and wild oat control. Adjust rate for soil type and OM. Shallow PPI improves consistency of weed control. Outlook provides greater nightshade control. A1-2 B1 E5 F1 S4. Pages: 82-83.
dimethenamid-P	16 to 21 fl oz (0.75 to 1 lb)		PPI, PRE, or EPOST.	
Intrado (alachlor) RUP	4 to 6 pt (2 to 3 lb)		PPI.	
Permit (halosulfuron) 	0.5 to 0.67 oz DF (0.38 to 0.5 oz)	Most large-seeded broadleaf weeds including ragweed, cocklebur, and sunflower.	PPI or PRE.	Refer to label for tank-mix options and other restrictions. The most effective herbicide on yellow nutsedge. A3 A5-6 F1 Y3. Pages: 78-80, 120-121.
Pursuit Plus (imazethapyr & pendimethalin)	20 fl oz (0.5 oz ae & 0.42 lb)	Broadleaf weeds including wild buckwheat.	PPI. Up to 1 week before planting.	May be tank-mixed with other labeled herbicides including Prowl H ₂ O. No kochia control. A1 A7 E7 F1 F4 S4-5 S7 X1 Y2 Y17. Pages: 78-80, 120-121.

POST-Applied Herbicides

Pursuit (imazethapyr)	2 fl oz (0.5 oz ae)	Annual broadleaf weeds. No control of ALS-resistant kochia.	POST. Drybean: After 1 st trifoliolate but prior to flowering.	User assumes all risk of crop injury. Do not apply prior to or during adverse weather conditions. Allow a 60 day PHI. Refer to label for tank-mix options, application information, and weed size. A1 A3 A5-7 E7 F1 F4 S4-5 X1 Y2. Pages: 78-80, 120-121.
Raptor (imazamox)	4 fl oz (0.5 oz ae)	Annual grass and broadleaf weeds. No control of ALS-resistant kochia.	POST. Drybean: After 1 st trifoliolate but prior to flowering.	Add NIS or oil additive plus 28% UAN. Do not use oil adjuvant + 28% UAN during high temperature and humidity. Refer to label for use information and restrictions. A3 A5-7 E9 F1 S4 X1 Y2 Y17. Pages: 78-80, 120-121.
Reflex (fomesafen)	0.75 pt (0.19 lb)	Annual broadleaf weeds including ragweed, kochia, and nightshade.	POST. Dry bean: 1 st trifoliolate to bloom. Weeds: 1 to 4 inches.	Add NIS at 0.125 to 0.25% v/v or oil adjuvant at 0.5 to 1% v/v. Allow a 30 day PHI. Oil adjuvant may increase risk of crop injury. Most active in hot and sunny conditions. Refer to label for weeds controlled, application information, and risk of crop injury. Refer to E4 for improved broadleaf weed control. A3 E4 F1 F5 S3-5 Y11. Pages: 78-80, 120-121.

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

DRY EDIBLE BEAN

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Basagran	0.5 to 2 pt applied 1 to 4 times. (0.25 to 1 lb)	Some broadleaf weeds and suppression of Canada thistle.	POST. Dry bean: After emergence. Broadleaf weeds: Small.	Non-residual, contact herbicide requiring thorough coverage. Most active in hot and sunny conditions. Add oil adjuvant at 1 to 2 pt/A. Allow a 30 day PHI. A3 E3 F1 F6
Rezult + MSO oil adjuvant (bentazon & sethoxydim)	1.6 + 1.6 pt or 0.8 + 0.8 pt 2X or 0.56 + 0.56 pt 3X or 0.4 + 0.4 pt 4X + 1.25 pt/A (1 + 1 lb or 0.5 + 0.5 lb or 0.38 + 0.38 lb or 0.25 + 0.25 lb)	Small grass and broadleaf weeds including pigweed, ragweed, kochia, lambsquarters, wild buckwheat, biennial wormwood and Canada thistle	First application: Weeds: 1 inch or less. Weeds must be small. Make consecutive applications 7 to 10 days later.	Refer to E3 for additional information. MSO enhances weed control more than petroleum adjuvants. Sequential applications at a 7 to 10 day intervals improves overall weed control. Tank-mix with Raptor, Reflex, and a POST grass herbicide for improved weed control - See NDSU Micro-rate below. Allow 30 day PHI. A3 E1-3 F1 F6 S1 S3-5 S7-8 T2 X1
Assure II Targa (quizalofop)	7 to 10 fl oz (0.77 to 1.1 oz)	Annual grasses and quackgrass.	POST. Dry bean: Allow a 30 day PHI.	Add oil adjuvant at 1% v/v but not less than 1 pt/A. Oil adjuvant at more than 1 qt/A is not needed. See Select Max label for detailed adjuvant recommendations. Refer to label and soybean section for tank-mix options, possible grass antagonism with broadleaf herbicides, and methods to avoid reduced grass control. A3 A5-6 E1-2 S2 S6 X1. Pages: 82-83, 120-121.
Poast (sethoxydim)	0.5 to 1.5 pt (0.1 to 0.3 lb)	Annual grasses.	Grass: Refer to soybean section on page 26.	
clethodim	4 to 8 fl oz (1 to 2 oz)	Annual grasses and quackgrass.		
Select Max (clethodim)	9 to 32 fl oz (1.125 to 4 oz)			

NDSU Micro-rate

Rezult B & Rezult G + Raptor + Reflex + clethodim + MSO adjuvant	0.5 to 0.6 pt & 0.5 to 0.6 pt + 1 fl oz + 2 to 4 fl oz + 2 fl oz (optional) + 1.25 pt/A	Grass and broadleaf weeds, including kochia, pigweed, and nightshade. May not control wild buckwheat.	POST. Weeds. Small. Must be less than 1 to 2 inches tall.	User assumes all risk of inadequate weed control when using this reduced-rate treatment. Must be applied with MSO or MSO & basic pH blend adjuvants. Clethodim can be excluded if grass infestation is low. Refer to E3, E6, and Rezult section above. A3 A5-7 E2-4 E9 F1 F4-6 S1-8 X1 Y2-3 Y11. Pages: 78-80, 82-83, 120-121.
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Preharvest Application

glyphosate	Up to 0.75 lb ae	Harvest aid/ Weed control.	After dry bean pods have turned yellow and leather texture. At hard dough bean seed stage and 30% or less seed moisture.	USE ONLY AS CROP DESICCANT. Use only labeled formulations. Non-selective, non-residual, translocated, foliar herbicide. Allow a 7 day PHI. Do not apply to dry bean grown for seed because reduced germination/vigor may occur. A3-7 B1 X1. Pages: 82-83, 120-121.
paraquat RUP	1.5 to 2 pt 2SL 1 to 1.3 pt 3SL (0.375 to 0.5 lb)	Desiccant.	At least 80% pods are yellow/brown.	Contact herbicides requiring thorough coverage. Most active in hot and sunny conditions. Sequential applications may be needed. Valor can be applied with paraquat + MSO adjuvant for weed desiccation. Allow a 7 day PHI for paraquat. Allow a 3 day PHI for Aim. Allow a 5 day PHI for Valor. B4 B8 Pages: 82-83, 120-121.
Aim + MSO adjuvant (carfentrazone)	2 to 6 fl oz EC + 1 qt/A (0.53 to 1.5 oz)		Apply when no more than 40% (bush type beans) or 30% (vine type) of the leaves are still green.	
Valor + MSO adjuvant (flumioxazin)	1.5 to 2 fl oz + 1 qt/A (0.77 to 1.53 oz)			

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

FIELD PEA

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 12 for Fall or Spring Early Preplant Herbicides.

Soil-Applied Herbicides

Far-Go (triallate)	1.25 qt EC (1.25 lb)	Wild oat.	PPI.	PPI immediately after application. A two pass incorporation is recommended. A1-2 B1 C11 G1
Prowl Prowl H2O (pendimethalin)	1.75 to 3.6 pt EC 1.5 to 3 pt ACS (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. Adjust rate for soil type. Poor wild oat and no wild mustard control. Some pea varieties may be injured. A1-2 B1 B6 E10 G1 S7 Y14. Pages: 78-80, 82-83.
trifluralin	1 to 1.5 pt 5 to 7.5 lb 10G (0.5 to 0.75 lb)			
Sonalan (ethalfluralin)	1.5 to 2 pt 5.5 to 7.5 lb 10G (0.55 to 0.75 lb)			
metolachlor S-metolachlor	1 to 2 pt (0.95 to 1.9 lb)			
Spartan (sulfentrazone)	2.25 to 8 fl oz F (1.125 to 4 oz)	Small-seeded broadleaf weeds including kochia, pigweed species, lambsquarters, and nightshade.	Fall, EPP, shallow PPI, and PRE.	Adjust rates for soil type and OM. Requires precipitation to activate herbicide. Refer to label for rate structure. A1-2 B1 E11 G1 S1 S3-5 S7 Y15. Pages: 78-80.
Pursuit Plus (imazethapyr & pendimethalin)	20 fl oz (0.5 oz ae & 0.42 lb)	Broadleaf weeds including redroot pigweed, mustard, and nightshade.	PPI. Up to 1 week before planting.	Refer to label for tank-mix options. Additional Prowl/H ₂ O may be added. May control wild buckwheat and ALS resistant kochia. A1 A7 B1 B6 E7 G1 S4-5 S7 X1 Y2 Y14. Pages: 78-80, 120-121.
metribuzin	0.25 to 0.5 lb DF 0.38 to 0.75 pt 4F (0.19 to 0.38 lb)	Suppression of lambsquarters, henbit, mustard, and chickweed.	PRE.	Use only registered formulations. Adjust rate for soil type. Apply at 20 gpa. Refer to label for application and environment information, and special precautions that may affect weed control and crop safety. Allow a 50 day PHI. E6 G1 S7 Y4 Y13. Pages: 78-80, 82-83.
	0.167 to 0.33 lb DF 0.25 to 0.5 pt 4F (0.125 to 0.25 lb)		POST. Weeds: Small.	

POST-Applied Herbicides

Thistrol (MCPB)	2 to 6 pt (0.5 to 1.5 lb ae)	Broadleaf weeds: Small.	POST. Pea: 3 nodes until prior to flowering.	Slight, temporary injury may occur. Do not apply when temperature exceeds 90 F or when peas are stressed. Suppresses Canada thistle. G1 G3
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Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Basagran	0.5 to 2 pt applied 1 to 4 times (0.25 to 1 lb)	Some broadleaf weeds and suppression of Canada thistle.	POST. Dry pea: At least 3 pair of leaves or 4 nodes. Broadleaf weeds: Small.	Non-residual, contact herbicide requiring thorough coverage. Most active in hot and sunny conditions. Add oil adjuvant at 1 to 2 pt/A. Allow a 30 day PHI. A3 A7 E3 F6 G1-2
Rezult + MSO oil adjuvant (bentazon & sethoxydim)	1.6 + 1.6 pt or 0.8 + 0.8 pt 2X or 0.56 + 0.56 pt 3X or 0.4 + 0.4 pt 4X + 1.25 pt/A (1 + 1 lb or 0.5 + 0.5 lb or 0.38 + 0.38 lb or 0.25 + 0.25 lb)	Small grass and broadleaf weeds including pigweed, ragweed, kochia, lambsquarters, wild buckwheat, biennial wormwood and Canada thistle	First application: Weeds: 1 inch or less. Weeds must be small. Make consecutive applications 7 to 10 days later.	Refer to E3 for additional information. MSO enhances weed control more than petroleum adjuvants. Sequential applications at a 7 to 10 day intervals improves overall weed control. Tank-mix with Raptor and a POST grass herbicide for improved weed control - See NDSU Micro-rate in dry bean section. Allow 30 day PHI. A3 A7 E1-3 F6 G1 S1-8 T2
Pursuit (imazethapyr)	2 fl oz (0.5 oz ae)	Annual broadleaf weeds. No control of ALS-resistant kochia.	POST. Pea: At least 3 inches tall but prior to 5 nodes and prior to flowering.	User assumes all risk of crop injury. Apply only with NIS at 0.25% v/v. Do not apply during adverse weather conditions or when stress conditions are predicted within one week of application. Allow a 60 day PHI. Refer to label for application information and weed size. Risk of Raptor carryover is less than Pursuit. Basagran or Rezult antagonizes Raptor and reduces risk of injury to field pea. A3 A7 E3 E9 F4 G1 S4 X1 Y2. Pages: 78-80, 120-121.
Raptor + Basagran or Result (imazamox + bentazon/ sethoxydim)	4 fl oz + 6 to 16 fl oz (0.5 oz ae + 3 to 8 oz bentazon)	Annual grass and broadleaf weeds.	Weeds: 2 to 6 inches.	
Assure II Targa (quizalofop)	7 to 10 fl oz (0.77 to 1.1 oz)	Annual grasses and quackgrass.	POST. Pea: Refer to PHI.	Apply with oil adjuvant at 1% v/v but not less than 1 pt/A. Oil adjuvant at more than 1 qt/A is not needed. Refer to soybean section for information on broadleaf herbicide tank-mix antagonism and methods to avoid reduced grass control. Refer to label for tank-mix options.
Poast (sethoxydim)	0.5 to 1.5 pt (0.1 to 0.3 lb)	Annual grasses.	Grass: Refer to soybean section on page 26.	Refer to label for tank-mix options. Allow a 60 day PHI following Assure II.
clethodim	4 to 8 fl oz (1 to 2 oz)	Annual grasses and quackgrass.		Allow a 30 day PHI following clethodim and Poast. A5-6 E2 X1. Pages: 82-83, 120-121.
Select Max (clethodim)	9 to 16 fl oz (1.125 to 2 oz)			

Preharvest Herbicides

glyphosate	Up to 2.25 lb ae.	Emerged grass and broadleaf weeds. (0.75 ae)	Weed control and harvest aid. Pea: 30% or less seed moisture.	Use only registered formulations. Add AMS at 4 lb/100 gal, or more for hard water. Refer to label for adjuvant use. For spot treatment use a 2% solution, on perennial broadleaf weeds at or beyond the bud stage. Crop will be killed in treated areas.
		Perennial weeds. (1.5 ae)	Spot treatment.	Allow a 7 day PHI for broadcast and 14 day PHI for spot treatment. Do not apply on field pea grown for seed because reduced germination/vigor may occur. A5-6 B2 X1. Pages: 82-83, 120-121.
Aim (carfentrazone) + MSO adjuvant	2 to 6 fl oz EC (0.53 to 1.5 oz)	Desiccant.	Harvest aid and desiccant for all pea varieties.	Non-residual, contact herbicides requiring thorough coverage. Most active in hot and sunny conditions. Add NIS at 0.25% v/v.
paraquat RUP	1.5 to 2 pt 2SL 1 to 1.3 pt 3SL (0.37 to 0.5 lb)			Allow 7 days for PHI and before grazing. Refer to label for application information and weed size. B4 B8. Pages: 82-83.


Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

CHICKPEA/GARBANZO BEAN AND LENTIL

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
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Refer to page 12 for Fall or Spring Early Preplant Herbicides.

Soil-Applied Herbicides

Far-Go (triallate) 	1.25 qt EC (1.25 lb)	Wild oat.	PPI.	PPI immediately after application. A two pass incorporation is recommended. A1-2 B1 C11 H1-2
Prowl Prowl H2O (pendimethalin)	1.75 to 3.6pt 3.3EC 1.5 to 3 pt 3.8ASC (0.72 to 1.5 lb)	Grass and some broadleaf weeds.	PPI. Fall or Spring.	Adjust rate for soil type. Poor wild oat and no wild mustard control. Apply in fall when soil temperature is less than 45 F. A1-2 B1 B6 E10 Y1 Y14. Pages: 78-80, 120-121.
Trifluralin (trifluralin)	1 to 2 pt 5 to 10 lb 10G (0.5 to 1 lb)		PPI. Fall or Spring. See Remarks for use in Lentil.	Lentil: Tolerance is marginal and injury may occur under stress conditions. Apply at 1 to 1.5 pt or 5 to 7.5 lb 10G. Refer to label for additional information. A1-2 B1 B6 E10 Y1 Y14. Pages: 78-80, 82-83.
Sonalan (ethalfluralin)	1.5 to 2 pt 5.5 to 7.5 lb 10G (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 B6 E10 Y1 Y14. Pages: 78-80, 82-83.	
metolachlor S-metolachlor	1 to 2 pt (0.95 to 1.9 lb)		PPI or PRE.	S-metolachlor may give greater weed control than metolachlor at equal product rates. Shallow PPI improves consistency of weed control. A1-2 B1 E5 F3 H1-2. Pages: 82-83.
dimethenamid-P	16 to 21 fl oz (0.75 to 1 lb)		Shallow PPI, PRE, or EPOST to third leaf lentil.	Poor wild oat and wild mustard control. Adjust rate for soil type and OM. Shallow incorporation improves consistency of weed control. Refer to label for tank-mix options. A1-2 B1 E5 F3 H1-2.
Pursuit Plus (imazethapyr & pendimethalin)	20 fl oz (0.5 oz ae & 0.42 lb)	Broadleaf weeds including redroot pigweed, mustard, and nightshade.	PPI. Up to 1 week before planting.	Refer to label for tank-mix options. Additional Prowl/H ₂ O may be added. May control wild buckwheat and ALS resistant kochia. A1 A7 B1 B6 E7 S4-5 S7 X1 Y2 Y14. Pages: 78-80, 120-121.
Spartan (sulfentrazone) Chickpea Only	2.25 to 8 fl oz F (1.125 to 4 oz)	Small-seeded broadleaf weeds including kochia, pigweed species, lambsquarters, nightshade, and b. wormwood.	Fall, EPP, shallow PPI, and PRE.	Do not apply to lentil. Adjust rate for soil type and OM. Do not use on sandy soil with < 1% OM. Requires precipitation to activate herbicide. Refer to label for tank-mix options, application information, rate structure, and crop rotation restrictions. A1-2 B1 E11 H1-2 S1 S3-5 S7 Y15. Pages: 78-80.
metribuzin Lentil Only	0.33 to 0.5 lb DF 0.5 0.75 pt 4F (0.25 to 0.38 lb) 0.167 to 0.33 lb DF 0.25 to 0.5 pt 4F (0.125 to 0.25 lb)	Suppression of lambsquarters, henbit, chickweed and mustard.	PRE.	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. E6 H1-2 Y4 Y13. Pages: 78-80, 82-83.
			POST. Weeds: Small.	

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.

CHICKPEA/GARBANZO BEAN AND LENTIL

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
POST-Applied Grass Herbicides				
Assure II Targa (quizalofop)	7 to 10 fl oz (0.77 to 1.1 oz)	Annual grasses and quackgrass.	POST. Crop: Refer to PHI.	Add oil adjuvant at 1% v/v but not less than 1.25 pt/A. Oil adjuvant at more than 1 qt/A is not needed. See Select Max label for detailed adjuvant recommendations. Refer to section in soybean for information on broadleaf herbicide tank-mix antagonism and method to avoid reduced grass control. Allow a 60 day PHI for Assure II. Allow a 50 day PHI for Poast. Allow a 30 day PHI for Clethodim. A5-6 E2 X1. Pages: 82-83, 120-121.
Poast (sethoxydim)	0.5 to 1.5 pt (0.1 to 0.3 lb)	Annual grasses.	Grass: Refer to soybean section on page 26.	
clethodim	4 to 8 fl oz (1 to 2 oz)	Annual grasses and quackgrass.		
Select Max (clethodim)	9 to 16 fl oz (1.125 to 2 oz)			
Preharvest Herbicides				
glyphosate	Up to 2.25 lb ae	Emerged grass and broadleaf weeds.	Harvest aid and desiccant.	Use only registered formulations. Apply with AMS at 4 lb/100 gal, or more for hard water. Allow a 7 day PHI for broadcast and 14 day PHI for spot treatment. Refer to label for adjuvant use. Do not apply on field pea grown for seed because reduced germination/vigor may occur. For spot treatment: Use a 2% solution, apply to perennial broadleaf weeds at or beyond the bud stage, and crop will be killed in treated areas. A5-6 B2 X1. Pages: 82-83, 120-121.
		Perennial weeds.	Spot treatment.	
paraquat RUP	1.5 to 2 pt 2SL 1 to 1.3 pt 3SL (0.37 to 0.5 lb)	Desiccant.	POST. Allow a 7 days PHI.	Non-residual, contact herbicide requiring thorough coverage. Most active in hot and sunny conditions. Apply when at least 80% of the pods are mostly ripe with no more than 40% (bush type beans) or 30% (vine type) of the leaves still green. B8. Pages: 82-83.

Pages 78-80 = Crop rotation restrictions, Pages 82-83 = Generic and commercial names, Pages 120-121 = Herbicides resistant weeds.