



Herbicide Options for Planting Forage Cover Crops Following Corn and Soybean

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Integrating forage cover crops into your cropping system can provide economic and agronomic benefits. To maximize these benefits, you must consider how your herbicide program might impact the use of forage cover crops in your cropping system.

Cover crop adoption is continuing to increase throughout Nebraska. Respondents to the cover crop survey conducted in 2015 during extension meetings in Nebraska indicated the top five desired benefits from cover crops: building soil organic matter, reducing soil erosion, increasing soil water holding capacity, producing forage, and improving soil microbial biomass.

All of these benefits will improve cropping system productivity and sustainability over time, but it is difficult to determine the direct economic value. For this reason, many producers are using cover crops as a forage crop to offset the expense while still capturing the benefits of cover crops. However, an important consideration when using cover crops for grazing or haying (hereon referred to as forage cover crops) following corn or soybean is that herbicide label rotation restrictions from the agronomic crop *must* be followed because of the potential carryover risk to animals consuming this forage. The recommendations presented in this publication are for forage cover crops, as requirements for their integration within a herbicide program are the most restrictive.

Most herbicide labels list crop rotation intervals or plant back restrictions that limit how soon a subsequent

crop can be planted following a herbicide application. It is important to note that this is different from the grazing or forage restrictions posted on a herbicide label for crops to which a herbicide is directly applied. When planning a fall-planted forage cover crop following corn or soybean, a herbicide crop rotation interval or plant back restriction should be short enough to allow the forage cover crop to establish. If the forage cover crop species you intend to plant is not listed on the label, you must follow the rotation restriction listed for “other crops.” In addition, the rotation restriction for a forage cover crop mixture is dictated by the species in the mixture with the longest restriction. Meeting these requirements can be challenging, as many forage cover crop species are not listed on herbicide labels and as a result replant restrictions fall outside the ideal fall planting window. Hail or other crop damage, seed corn, and silage corn all provide opportunities for earlier forage cover crop planting; however, herbicide plant back restrictions still must be observed in these situations.

Herbicide persistence in the soil is affected by several environmental factors, and ultimately herbicide residues can inhibit forage cover crop growth or cause crop failure. Furthermore, herbicide residues can be taken up into forage cover crops and either be directly toxic to livestock or accumulate in their fat, meat, milk, or other tissues and pass into the human food supply. For labeled crops, studies have been conducted to identify safe replant intervals that prevent bioaccumulation of herbicides. In the case of non-labeled crops or “other crops,” these tests were not conduct-

ed. In this case, labels list the longest plant back restriction in which herbicide companies can be confident potential herbicide carryover effects are negligible. If crop-specific tests are not conducted, the risk for herbicide toxicity to animals consuming cover crop forage or herbicide residues in human food is unknown.

As a point of clarification, if cover crops will *not* be harvested or grazed, they could be planted before the label replant restriction allows, but growers must then assume the risk for cover crop failure. However, if the cover crop *will* be used as a forage cover crop, planting before the label replant restriction permits violates federal law. An Environmental Protection Agency (EPA) registered herbicide label is a legal document and must be followed.

Plant back restrictions of forage cover crops will limit herbicides that can be used in corn and soybean cropping systems. Many pre-emergence herbicides that allow fall planting of a forage cover crop have a four-month restriction interval. To compensate for this, consider planting forage cover crops in the earliest planted, sprayed, and harvested fields. Additionally, to avoid selection for herbicide-resistant weeds due to repeated application of the same herbicide, rotate fields in which forage cover crops are

planted so that a broader range of herbicides can be used during the non-forage cover crop year.

It can be challenging to decipher herbicide label information when deciding which herbicides to use with forage cover crops. *Tables 1–4* at the end of this publication summarize the replant restrictions for several cool-season and warm-season forage cover crop species where fall planting is feasible and are listed by common pre-emergence and post-emergence corn and soybean herbicides. When tank-mixing herbicides, follow the most restrictive interval listed on all the labels. Integrating forage cover crops into your cropping system can provide economic and agronomic benefits. To maximize these benefits, it is important to consider how your herbicide program might impact the use of forage cover crops in your cropping system.

Herbicide information compiled here is intended to be as accurate as possible at the time of publication; however, refer to current herbicide labels for the latest and most detailed information. For more material on cover crop termination methods and crop insurance, see the United States Department of Agriculture’s (USDA) Risk Management Agency (RMA) website, <http://www.rma.usda.gov/help/faq/covercrops2015.html>.

Table 1. Corn Pre-emergence Herbicides

The length of time required between pre-emergence herbicide application in corn and planting of forage cover crops. A zero indicates no replant restrictions are required following herbicide application. All numbers represent months. If a box is empty for a herbicide-species combination, then the restriction is too long to allow for planting of that forage cover crop species within the same growing season as the corn crop.

Herbicide	Cool-Season Forage Cover Crop Species											Warm-Season Forage Species				
	Annual Ryegrass	Barley	Cereal Rye	Clover	Field Pea	Oats	Radish	Triticale	Turnip	Vetch	Wheat	Chick-pea	Cow-pea	Pearl Millet	Proso Millet	Sorghum
Anthem ^{aa}					4						4					
Anthem ^a Maxx ^b					4						4					
Balance ^a Flexx								4			4					
Callisto ^a		4	4			0		4			4			0		0
Cinch ^{ac}		4.5	4.5			4.5					4.5					0
Cinch ^a ATZ																0
Confidence ^a / Confidence ^a Xtra ^d											4					
Corvus ^a								4			4					
Degree ^a / Degree ^a Xtra ^e											4					0
Dual II ^a Magnum ^f	4.5	4.5	4.5			4.5	2		2		4.5					
G-Max Lite ^g																0
Guardsman ^a Max																0
Harness ^a / Harness ^a Xtra ^g											4					0

Table 1. (Cont.)

Herbicide	Cool-Season Forage Cover Crop Species											Warm-Season Forage Species				
	Annual Ryegrass	Barley	Cereal Rye	Clover	Field Pea	Oats	Radish	Triticale	Turnip	Vetch	Wheat	Chick-pea	Cow-pea	Pearl Millet	Proso Millet	Sorghum
Hornet®		4	4			4					4					
Instigate™		4	4			4		4			4			4	4	
Lumax® EZ		4.5	4.5								4.5					0
Outlook®		4	4			4					4					
Parallel®		4.5	4.5			4.5					4.5					
Prequel®											4					
Prowl® H2O ^b		4									4					
Resolve®											4					
Sharpen ^{ei}		0	0		2	0					0	2		0	0	0
SureStart® II											4					
Surpass®/ Surpass® NXT ^l											4					
TopNotch®											4					
TripleFLEX ^{ak}											4					
Valor ^{al}	4	3	3	4	3	4	4	4	4	4	1	4	3	4	4	1
Verdict™		4	4			4					4					
Zemax™™		4.5	4.5			4.5					4.5					0
Zidua ^{an}											4					

- a. Wheat may be planted as a cover crop when Anthem is applied at a rate of 9.75 oz/acre or less. Field pea may be planted when Anthem is applied at a rate of 3.25 oz/acre or less.
- b. Wheat may be planted as a cover crop when Anthem Maxx is applied at a rate of 4.875 oz/acre or less. Field pea may be planted when Anthem Maxx is applied at a rate of 1.625 oz/acre or less.
- c. To avoid injury in rotational alfalfa or clover, do not apply more than 1.9 lb active ingredient per acre (2.0 pints of Cinch) in the previous crop, and do not make lay-by or other post-emergent applications in the previous crop.
- d. Following harvest of food crops treated with Confidence/Confidence Xtra, only non-food or non-feed cover crops (with the exception of wheat) may be planted. Do not graze or harvest rotational cover crops (with the exception of wheat) for food or animal feed for 18 months following the last application of Confidence/Confidence Xtra. This prohibition does not apply to nongrass animal feeds, which may be planted 9 months after the last application of Confidence/Confidence Xtra.
- e. Following harvest of food crops treated with Degree/Degree Xtra, only non-food or non-feed cover crops (with the exception of wheat) may be planted. Do not graze or harvest rotational cover crops (with the exception of wheat) for food or animal feed for 18 months following the last application of Degree/Degree Xtra. This prohibition does not apply to nongrass animal feeds, which may be planted 9 months after the last application of Degree/Degree Xtra.
- f. Intervals are for rates of Dual II Magnum applied at not more than 1.33 pint/acre pre-emergence in corn. A second application of Dual II Magnum or other herbicides containing Dual II Magnum (S-metolachlor) is prohibited when planting forage double crops in fall.
- g. Following harvest of food crops treated with Harness/Harness Xtra, only non-food or non-feed cover crops (with the exception of wheat) may be planted. Do not graze or harvest rotational cover crops (with the exception of wheat) for food or animal feed for 18 months following the last application of Harness/Harness Xtra. This prohibition does not apply to nongrass animal feeds, which may be planted 9 months after the last application of Harness/Harness Xtra.
- h. When applied at a rate of 3.2 pts/acre.
- i. Sharpen can be applied pre-emergence in corn at 2 to 3 fl oz/acre depending on organic matter content of the soil. Crop rotation intervals listed are for a rate of 3 fl oz/acre.
- j. Following harvest of food crops treated with Surpass/Surpass NXT, only non-food or non-feed cover crops (with the exception of wheat) may be planted. Do not graze or harvest rotational cover crops (with the exception of wheat) for food or animal feed for 18 months following the last application of Surpass/Surpass NXT. This prohibition does not apply to nongrass animal feeds, which may be planted 9 months after the last application of Surpass/Surpass NXT.
- k. Following applications of TripleFLEX, when annual rainfall or irrigation is less than 15 inches on soils with less than 2 percent organic matter, alfalfa, clover, and vetch should not be planted until 18 months after treatment.
- l. When applied at a rate of 2 oz/acre or less. At least 1 inch of rainfall/irrigation must occur between application of Valor and planting of wheat or sorghum or injury may occur. Intervals for all crops marked (4) require soil be tilled prior to planting; otherwise, the interval is 8 months. See herbicide label for rotation intervals for applications greater than 2 oz/acre.
- m. Grain sorghum must be treated with a safener to tolerate S-metolachlor.
- n. When applied at a rate of 3 oz/acre or less. See herbicide label for rotation intervals for each rate of Zidua use.

Table 2. Corn Post-emergence Herbicides

The length of time required between post-emergence herbicide application in corn and planting of forage cover crops. A zero indicates no replant restrictions are required following herbicide application. All numbers represent months. If a box is empty for a herbicide-species combination, then the restriction is too long to allow for planting of that forage cover crop species within the same growing season as the corn crop.

Herbicide	Cool-Season Forage Cover Crop Species											Warm-Season Forage Species				
	Annual Ryegrass	Barley	Cereal Rye	Clover	Field Pea	Oats	Radish	Triticale	Turnip	Vetch	Wheat	Chick-pea	Cow-pea	Pearl Millet	Proso Millet	Sorghum
Aim*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armezon*	3	3	3			3		3			3			3	3	
Basis* Blend		3	3			3		3			3			3	3	
Beacon ^{aa}		3	3								3					
Buctril ^{bb}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cadet*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callisto*	0					0								0		0
Callisto* GT																0
Clarity ^{cc}	3	3				3		3			3			3	3	
Dicamba ^{dd}	3	3				3		3			3			3	3	0.5
DiFlexx ^{ee}		2				2					2					2
Expert*																0
Glyphosate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halex GT ^{mm}																0
Harmony* SG	1.5	0	1.5	1.5	1.5	0	1.5	0	1.5	1.5	0	1.5	1.5	1.5	1.5	1.5
Impact*		3	3			3					3					
Liberty* 280		2.3	2.3			2.3	2.3	2.3	2.3		2.3					
Permit*	2	2	2			2		2			2			2	2	2
Require* Q ^{ff}											3					
Resolve* Q											3					
Resource*	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Solida ^{gg}											3					
Solstice ^{hh}						0								0		0
Spirit*		3	3			3		3			3					
Status ^{hh}		1	1			1		1			1			1	1	1
Warrant ⁱⁱ																0
Yukon*	2	2	2			2		2			2			2	2	2

a. Injury may occur if dry weather prevails during much of the time between Beacon application and seeding of winter cereals or other crops.
 b. Do not cut crop for feed, fodder, or graze within 45 days of application.
 c. Sorghum may be planted 15 days after Clarity application of 8 oz/acre; all other intervals are for rates of 24 oz/acre or less. See label for rotation intervals at rates of more than 24 oz/acre.
 d. Sorghum may be planted 15 days after Dicamba application of 8 oz/acre; all other intervals are for rates of 24 oz/acre or less. See label for rotation intervals at rates of more than 24 oz/A.
 e. When applied at a rate of 24 oz/acre or less. See label for rotation intervals at rates of more than 24 oz/acre.
 f. When applied at a rate of 4 oz/acre.
 g. When applied at a rate of 1 oz/acre.
 h. If at least 1 inch of rainfall or overhead irrigation has been received following the last application of Status (less than or equal to 5 oz/acre only), alfalfa, cereal grain crops, and sorghum may be planted 30 days after the rainfall/irrigation event.
 i. When planting sorghum, use only seed properly treated with seed protectant or safener.

Table 3. Soybean Pre-emergence Herbicides

The length of time required between pre-emergence herbicide application in soybean and planting of forage cover crops. A zero indicates no replant restrictions are required following herbicide application. All numbers represent months unless otherwise indicated. If a box is empty for a herbicide-species combination, then the restriction is too long to allow for planting of that forage cover crop species within the same growing season as the soybean crop.

Herbicide	Cool-Season Forage Cover Crop Species											Warm-Season Forage Species				
	Annual Ryegrass	Barley	Cereal Rye	Clover	Field Pea	Oats	Radish	Triticale	Turnip	Vetch	Wheat	Chick-pea	Cow-pea	Pearl Millet	Proso Millet	Sorghum
Anthem ^{ea}						4					4					
Anthem ^o Maxx ^b						4					4					
Authority ^o Assist ^c			4								4					
Authority ^o Elite		4.5	4.5			0	4.5				4.5					
Authority ^o First											4					
Authority ^o Maxx		4	4								4					
Authority ^o MTZ		4	4								4					
Authority ^o XL		4									4					
Boundary ^o		4.5									4.5					
Canopy ^o	4	4	4								4					
Command ^{ed}						0/9 ^e										
Dimetric ^o DF		4									4					
Dual II Magnum ^{ef}	4.5	4.5	4.5						2		4.5	2		4.5		2
Enlite ^o		4	4								3					
Envive ^o	4	4	4								4					
FirstRate ^o											4					
Gangster ^o											3					
Optill ^o			4			4					4	4				
Optill ^o PRO			4			4					4					
Outlook ^o		4	4								4			4		
Prefix ^o		4.5	4.5								4.5			4.5		
Prowl ^o H2O ^g		4									4					
Pummel tm											4.5					
Pursuit ^{oh}			4		0	0					4	4				
Python ^o		4	4		4	4					4			4		
Rowel ^{oi}	4	3	3	4	3	3	4	1		4	1	4	4	4	4	4
Rowel ^o FX	4	4	4								4					
Sharpen ^j	4	0	0	2	4	2	0	0	4	4	4	4	4	0	0	4
Sonic tm											4					

Table 3. (Cont.)

Herbicide	Cool-Season Forage Cover Crop Species											Warm-Season Forage Species				
	Annual Ryegrass	Barley	Cereal Rye	Clover	Field Pea	Oats	Radish	Triticale	Turnip	Vetch	Wheat	Chick-pea	Cow-pea	Pearl Millet	Proso Millet	Sorghum
Surveil™ Co Pack											3					
Torment™			4				4	4			4			4	4	
Trivence™		4									4					
Valor® SX ^k		3–4	3–4		3–4	3–4		1–9			1–9		4–10	4–10		
Valor® XLT ^l		4	4								4					
Vise™		4.5	4.5								4.5			4.5		
Warrant®											4					
Warrant Ultra®		4	4								4			4		

a. Wheat may be planted when Anthem is applied at less than 9.75 oz/acre. Field pea may be planted when Anthem is applied at less than 3.25 oz/acre.

b. Wheat may be planted when Anthem Maxx is applied at less than 4.875 oz/acre. Field pea may be planted when Anthem Maxx is applied at less than 1.625 oz/acre.

c. Intervals for cereal rye and wheat are 18 months for Minnesota and North Dakota, north of Highway 210. Do NOT feed treated soybean forage or hay to livestock.

d. Do not graze or harvest for food or feed cover crops planted less than 9 months after treatment with Command.

e. Peas may be planted immediately following application when Command is applied at less than 0.5 lb/acre; otherwise, the interval is 9 months.

f. Intervals are for rates of Dual II Magnum applied at NOT more than 1.33 pint/acre. A second application or other herbicides containing S-metolachlor is prohibited when planting forage double crops in the fall.

g. When applied at a rate of 3.2 pts/acre.

h. This will restrict the post-emergence application of Pursuit in soybean if growers intend to plant alfalfa, cereal rye, clover, or wheat in the fall.

i. A rotational interval for most cover crops is 4 months if soil is tilled prior to planting, and 8 months if no tillage is performed. See herbicide label for instructions.

j. Can be applied at 1 fl oz/acre if the organic matter content of the soil is less than 2 percent. This herbicide will provide limited broadleaf control at this rate. Course soils with less than 2 percent organic matter require a minimum preplant interval of 30 days for planting soybean.

k. Rotation intervals for Valor SX vary depending on the applied rate of herbicide; see label for full restrictions.

l. Valor XLT in Nebraska can only be applied in soybean fields south of route 30 and east of route 281.

Table 4. Soybean Post-emergence Herbicides

The length of time required between post-emergence herbicide application in soybean and planting of forage cover crops. A zero indicates no replant restrictions are required following herbicide application. All numbers represent months unless otherwise indicated. If a box is empty for a herbicide-species combination, then the restriction is too long to allow for planting of that forage cover crop species within the same growing season as the soybean crop.

Herbicide	Cool-Season Forage Cover Crop Species											Warm-Season Forage Species			
	Annual Ryegrass	Barley	Cereal Rye	Clover	Field Pea	Oats	Radish	Triticale	Turnip	Vetch	Wheat	Chick-pea	Cowpea	Pearl Millet	Sorghum
Assure® II					0							0	0		
Cadet™	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Classic ^a	3	3	3			3					3				
Cobra®	2	2	2			2		2			2			2	2
Extreme®					0								0		
Fusilade® DX		2	2					2			2			2	2
Glyphosate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmony® SG	1.5	0	1.5	1.5	1.5	0	1.5	0	1.5	1.5	0	1.5	1.5	1.5	1.5
Libert®		70 days	70 days			70 days	70 days	70 days	70 days		70 days			70 days	70 days
Poast Plus®	1	1	1	0	1	1	1	1		1			1	1	1
Pursuit®					0								0		
Raptor®					0						3		0		
Resource®	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Select Max®	1	1	1	0	0	1	0	1	0	1	1	1	0	1	1
Synchrony®	3	3	3			3		3			3			3	
Targa®		0			0						0		0		
Torment™												0			
Ultra Blazer ^b	100 days	40 days	40 days	100 days	100 days	40 days	100 days	40 days	100 days	100 days	40 days	100 days	100 days	40 days	100 days

a. Classic should be applied early post-emergence to meet the three-month interval for planting listed forage cover crops in fall.

b. Application rate should not be more than 1.5 pint/acre. Soybean cannot be used for livestock grazing or feeding after application of Ultra Blazer.

Disclaimer

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