Field Peas – A Guide to Herbicide Carryover and Herbicide Efficacy

Figure 1. Carryover injury of atrazine (2 lb ai/ac applied in the fall) and mesotrione (applied in the spring) on field peas.

Field pea is often described as an excellent rotational crop that can be effectively integrated into a variety of crop rotations. In semiarid western Nebraska, field peas are typically a fallow alternative in a wheat-corn-fallow or wheat-fallow rotation. In more humid (or irrigated) regions of the state, field peas are grown as an alternative to soybeans, providing opportunities to double crop or to integrate a cover crop grazing operation extending into the end of the growing season. Adding field peas can help reduce soil erosion, suppress troublesome weeds (e.g., Palmer amaranth), and minimize cost of crop production inputs.

When implementing field peas into a crop rotation, some of the most important things to consider are herbicide carryover and restrictions. This problem can be two-fold:

1) The herbicides you applied in last year's crop may damage this year's field peas.
2) The herbicides you apply in this year's field peas may affect grazing of this year's grazing annual forage, cover crop, fall-planted cash crop (e.g., wheat), or next year's crop.

This guide will help you avoid these carryover injury problems and design an effective herbicide program for your weed management. Use these tables when planning herbicide programs around field peas in crop rotations:

- Table 1. Corn herbicides that can cause serious carryover injury in field peas. These herbicides should not be used or should be used with caution when field peas fallow corn.
- Table 2. Corn burndown and PRE herbicides that will not cause carryover injury in field peas.
- Table 3. Corn POST herbicides that will not cause carryover injury in field peas.
- Table 4. Wheat herbicides that will not cause carryover injury in field peas.

- Table 5. Field peas – Weed Response to selected herbicides.
- Table 6. Field peas – Rate per acre, application time and remarks for selected herbicides.
- Table 7. Field peas – Rotation restrictions for selected field pea herbicides.
- (Set of Tables 1-7)

Carryover injury in field peas following applications of commonly used corn herbicides

Although herbicide labels provide guidelines on intervals between herbicide application and the planting of susceptible crops, the potential for herbicide carryover injury in field peas depends on a complex interaction between herbicide, soil, and the susceptible crop during that interval. Many farmers have observed that despite rotation restrictions, some herbicides in Table 1 appear to be safer than others.

The most concerning corn herbicides are certainly the ones containing mesotrione (Table 1,; e.g., Callisto). If you applied any mesotrione-based product (Table 1) in last year's corn, it is almost certain that this year's field pea crop will die after emergence (Figure 1). Solubility of mesotrione is very high (up to 3000 ppm), which means that this product moves with water. In rare cases, when field peas are planted on sandy ground that received high amounts of precipitation and/or irrigation during the season, mesotrione injury may be moderated and field peas may produce reduced grain yield. On the other hand, in a heavy clay soil with limited water, mesotrione would remain in its active form for a longer time.

A somewhat less concerning corn herbicide is isoxaflutole (Table 1; e.g., Balance Flexx®). We have received farmer reports that isoxaflutole-based products (Table 1), did not cause carryover injury in field peas. Depending on the product labels, rotation restrictions are based on either a 17-18 month rotational interval or a minimum of 15-30 inches of cumulative precipitation.

The least concerning corn herbicide is atrazine. Unlike mesotrione (e.g., Calisto) and isoxaflutole (e.g., Balance Flexx), atrazine is less water soluble (30-300 ppm) and it doesn't move much with water. Atrazine, however, is prone to enhanced microbial degradation, especially in soils where atrazine has been used in the past (Kurtz et al., 2010). Many farmers reported little to no atrazine injury on field peas, especially when applied in the spring at lower rates (less than 1 lb ai/ac). According to North Dakota State University recommendations, field peas may be planted the next cropping season if atrazine rates are less than 0.38 lb ai/ac. The University of Wisconsin recommends maintaining a nine-month rotation interval for field peas following the application of Harness Extra (acetochlor + atrazine premix). Severe atrazine injury was observed in field peas receiving the full rate of atrazine (2 lbs ai/ac) in the fall after grain sorghum harvest (Figure 1). In general, most atrazine-based products have field pea rotation restrictions of two cropping seasons.

If you plan to incorporate field peas in your rotation, we encourage you to select corn and wheat herbicides that provide efficacy equivalent to mesotrione-based, isoxaflutole-based, and atrazine-based products, but do not cause the carryover injury in field peas (Tables 2-4).

Carryover injury in forages and cover crops following applications of field pea herbicides

A good PRE herbicide program is a critical part of field pea production. Using PRE herbicides to control early season weed pressure can substantially increase the competitive ability of field peas to form the canopy and avoid any POST herbicides or harvest aid applications. This is commonly done by using herbicides that provide lasting and broad spectrum weed control (Table 5). In our studies, the most

effective herbicides in achieving this goal were those that contained active ingredients for both broadleaf weeds and grasses control such as Spartan Elite®/BroadAxe XC® (Spartan® + Dual II Magnum® premix) or tank mixing Sharpen® + Prowl® (Table 5).

If your intention is to plant a multi-species cover crop after field pea harvest in mid-July, it is important to understand the components of PRE herbicides and their potential carryover injury on species in the cover crop mix (Table 7). In the aforementioned PRE herbicide mixes, Spartan® and Sharpen® typically provide broadleaf weed control while adding Dual II Magnum® and Prowl® helps control grasses; thus, the potential of carryover injury will follow the similar pattern. If you have a lot of grasses in your cover crop mix, Dual II Magnum® and Prowl® can be very damaging. Therefore, you should consider not using these two herbicide components (especially if grass pressure is low) or cutting back their rate so the carryover injury on grass species in the cover crop mix is reduced or negligent. Among the broadleaf herbicides, Spartan® has a higher potential for carryover injury in broadleaf species then Sharpen®. Table 7 provides specific rotation restrictions.

Bioassay

It is important to mention that chemical companies will often only evaluate major crops for carryover injury of a particular herbicide and will use a default interval (18 months or greater) for many minor crops. Herbicide degradation in the environment is a complex process and rotation restriction intervals may be different than labeled in your field. One of the most practical, inexpensive, and effective ways to evaluate whether herbicide carryover may affect your crop is a bioassay. In short, a bioassay includes collecting representative soil samples from the field suspected of having herbicide residue, planting and growing bioassay species, and visually evaluating herbicide injury. For more information, check this Nebraska Extension NebGuide A Quick Test for Herbicide Carry-over in the Soil (G1891).

Resources

For more information, check this Nebraska Extension NebGuide, A Quick Test for Herbicide Carry-over in the Soil (G1891).

Kurtz, J.L., D.L. Shaner, and R.M. Zablotowicz. 2010. Enhanced degradation and soil depth effects on the fate of atrazine and major metabolites in Colorado and Missisippi soils. J. Environ. Qual. 39:1369-1377. Available at https://pubag.nal.usda.gov/download/45083/PDF

North Dacota State University (NDSU) Herbicide carryover guide. Available at https://www.ag.ndsu.edu/weeds/weed-control-guides/nd-weed-control-guide-1/wcg-files/15-CO.pdf

University of Wisconsin (UW) Herbicide rotation restrictions in forage and cover cropping systems. Available at http://mccc.msu.edu/wp-content/uploads/2016/10/WI_2015_Herbicide-Rotation-Restrictions.pdf

Table 1. Corn herbicides that can cause serious carryover injury in field peas. These herbicides should not be used or should be used with caution when field peas fallow corn

Site of Action	Corn herbicide		Common name	Rotation Restiction (field peas)[1]
	Product name	Active ingreedient[2]		
PRE & Burndown				
5	Aatrex	atrazine	atrazine	2CS
14+15+5	Anthem ATZ	atrazine	pyroxasulfone + fluthiacet + atrazine	2CS
15+5	Bicep II Magnum	atrazine	S-metolachlor + atrazine + benoxacor	2CS
15+5	Breakfree ATZ	atrazine	acetochlor + atrazine	15
15+6	Cinch ATZ	atrazine	S-metolachlor + atrazine + benoxacor	2CS
15 + 5	Confidence	atrazine	acetochlor + atrazine	2CS
15+5	Degree XTRA	atrazine	acetochlor + atrazine + safener	2CS
15+5	Fulltime NXT	atrazine	encapsulated achetochlor + atrazine + safener	2CS
15+5	G-Max Lite	atrazine	dimethenamid + atrazine	2CS
15+5	Guardsman MAX	atrazine	dimethenamid-P + atrazine	2CS
15+5	Harnes Xtra	atrazine	acetochlor + MON 4660 safener + atrazine	2CS
5	Princep	atrazine	simazine	2CS
15+5	Volley ATZ	atrazine	acetochlor + dichlormid safener + atrazine	2CS
27	Balance Flexx	isoxaflutole	isoxaflutole + cyprosulfamide	18 [a]
2+27	Corvus	isoxaflutole	isoxaflutole + thiencarbazone + cyprosulfamide	17 b
2+27	Prequel	isoxaflutole	rimsulfuron + isoxaflutole	18 [b]
27	Callisto	mesotrione	mesotrione	18
27+27+15+5	Acuron	mesotrione	S-metolachlor + atrazine + mesotrione + bicylopyrone	18
27+2	Instigate	mesotrione	rimsulfuron + mesotrione + isoxadifen	18
27+15+5	Lexar EZ	mesotrione	S-metolachlor + atrazine + mesotrione	18
27+15+5	Lumax EZ	mesotrione	S-metolachlor + atrazine + mesotrione	18
15+27+4	Resicore	mesotrione	acetochlor + mesotrione + clopyralid	18
POST				
5	Aatrex/atrazine	atrazine	atrazine	2CS
15+5+9	Expert	atrazine	S-metolachlor + benoxacor + atrazine + glyphosate	2CS
15+27+9	Halex GT	mesotrione	S-metolachlor + mesotrione + glyphosate	18
2+27	Realm Q	mesotrione	rimsulfuron + mesotrione + isoxadifen	18
14+27	Solstice	mesotrione	fluthiacet methyl + mesotrione	18
2+27	Capreno	tembotrion	thiencarbazone-methyl + tembotrione	18 [b]
27	Impact	topramezone	topramezone	9/18 [c]

[1] Months unless otherwise noted. D = Days; AT = Any Time; NCS = Next Cropping Season; 2CS = Second Cropping Season; 3CS Tird Cropping Season, NTE = No Tolerance Established, NI = No information, FBA = Field Bioassay, DNR = Do not rotate.

[2] Active ingredient causing herbicide rotation restriction for field peas

[a] 15 inches of cumulative precipitation from application to planting. (No more than 7 inches from overhead irrigation. Furrow or flood not to be included in total)

[b] When soil pH is 7.5 or above, 24 month rotation intervals. Additionally, 30 inch of cumulative precipitation must occur between application and planting of rotational crop

[c] Pea rotation interval 9 months for 0.5 and 0.75 oz rate, 18 months for 1.0 oz rate

Table 2. Corn burndown and PRE herbicides that will not cause carryover injury in field peas.

Herbicide table includes rotation restrictions for field peas and efficacy rating for NE most troublesome weeds

Site of Action	Corn herbicide	Common name	Rotation Restriction for Field Peas[1]	Weed Response to Selected Herbicides					
				Kochia	Lambsquarters	Marestail	Pigweeds	Russian Thistle	Foxtail species
Burndown									
4	2,4-D ester 4L	2,4-D	NCS	7	9	7	-	9	1
14	Aim	carfentrazone-ethyl	AT	6	9	-	7-8	6	1
14+15	Anthem MAXX	pyroxasulfone + fluthiacet-methyl	6	7	9	8	-	9	1
4	Banvel/dicamba	Dimethylamine salt of dicamba	NCS [g]	9	9	8	-	5	1
2	Basis Blend	rimsulfuron + thifensulfuron	8/10 [ab]	3	7	5	9	4	7
4	Clarity	dicamba-glycolamine	180 D [m]	9	9	8	-	5	1
4+27	Diflex DUO	dicamba-glycolamine + tembotrione	10	9	9	8	-	5	2
19+4	Distinct	diflufenzopyr + dicamba	4	9	7	9	-	9	1
14+15	Fierce	flumioxazin + pyroxasulfone	6/11 [dq]	check 2018 weed guide for tank mixes					
9	Glyphosate	glyphosate	AT	8	8	8	-	9	9
22	Gramoxone SL	paraquat	AT	9	7	7	-	6	7
9+4	Land Master BW	glyphosate + 2,4-D amine	3	9	9	9	-	9	9
4	Python	flumetsulam	4	check 2018 weed guide for tank mixes					
14	Sharpen + glyphosate	saflufenacil	4-9 [cl]	9	9	10	-	10	10
14	Valor SX	flumioxazin + chlorimuron ethyl	4	check 2018 weed guide for tank mixes					
14+15	Verdict + glyphosate	saflufenacil + dimethenamid-P	NCS	9	8	9	-	10	10
PRE									
14+15	Anthem MAXX	pyroxasulfone + fluthiacet-methyl	6	6	7	-	9	5	9
15	Breakfree NXT/Harness	acetochlor	NCS	2	7	-	7	3	9
15	Surpass NXT/Confidence	acetochlor	NCS	2	7	-	7	3	9
15	Dual/Chich/Parallel	S-metolachlor + benoxacor	AT	2	7	-	7	3	9
15	Degree/Topnotch	acetochlor + safener	NCS	2	8	-	8	5	9
4+2	Hornet WDG	flumetsulam + clopyralid	10.5/18 [p]	9	9	-	9	8	1
15	Outlook	dimethenamid-P	NCS	2	7		8	3	9
3	Prowl H2O	pentimethalin	NCS	check 2018 weed guide for tank mixes					
2	Resolve SG	rimsulfuron	10	8	7	-	9	3	8
14	Sharpen	saflufenacil	4-9 [cl]	7	8	-	9	8	2
15+4+2	SureStart II/Triple Flex	acetochlor + clopyralid + flumetsulam	NCS						
14+15	Verdict	saflufenacil + dimethenamid-P	NCS	7	9	-	10	9	9
15	Zidua	pyroxasulfone	6	7	7	-	8	6	8

[1] Months unless otherwise noted. D = Days; AT = Any Time; NCS = Next Cropping Season; 2CS = Second Cropping Season; 3CS Tird Cropping Season, NTE = No Tolerance Established NI = No information, FBA = Field Bioassay, DNR = Do not rotate.

[ab] 11 months for STS varieties, 36 months or earlier with a bioassay; 14 or 26 months if pH < 7.9 and rainfall limits are followed.

[cl] Rotation interval depends upon rate applied and soil texture. See the label for detailed instructions

[dq] 6 months for field peas, 11 month for edible peas

[g] Rotation interval is 45 days per pint of Banvel applied at 23 days per pint of Banvel SGF, excluding days when the ground is frozen

[m] Applications of 24 oz/A or less = 22 days for each 8 fluid oz; 24 oz/A or more = 45 day interval for each 16 fluid oz/A applied.

Table 3. Corn POST herbicides that will not cause carryover injury in field peas.

Herbicide table includes rotation restrictions for field peas and efficacy rating for NE most troublesome weeds

Site of Action	Corn herbicide	Common name	Rotation Restriction for Field Peas[1]	Weed Response to Selected Herbicides					
				Kochia	Lambsquarters	Marestail	Pigweeds	Russian Thistle	Foxtail species
POST									
4	2,4-D ester 4L	2,4-D	NCS	5	8	6	7	4	1
2	Accent Q	nicosulfuron + isoxadifen	10	6	4	5	7	3	8
14	Aim	carfentrazone-ethyl	AT	6	9	7	8	6	1
27	Armezon	topramezone	9/18 [cb]	6	9	6	9	9	4
27+15+ 9	Armezon Pro	topronezone + dimethenamid-P	9/18 [cw]	check 2018 weed guide for tank mixes					
4	Banvel/dicamba	Dimethylamine salt of dicamba	NCS [g]	8	8	6	8	9	1
2	Basis Blend	rimsulfuron + thifensulfuron	8/10 [ab]	3	7	5	9	4	7
2	Beacon	primsulfuron	8	8	5	3	8	5	5
6	Buctril	bromoxynil	1	check 2018 weed guide for tank mixes					
14	Cadet	fluthiacet-methyl	NCS	6	8	5	6	6	1
2+27	Capreno	thiencarbazone-methyl + nicosulfuron	18 [co,cq]	8	9	6	9	9	8
4	Clarity	dicamba-glycolamine	180 D [m]	8	8	6	8	9	1
4	Diflex	dicamba-glycolamine	120 D/180 D [dw]	8	8	6	8	9	2
4+27	Diflex Duo	dicamba + tembotrione	10	8	9	8	9	9	6
9	Glyphosate	glyphosate	AT	8	8	8	9	7	10
4+2	Hornet WDG	flumetsulam + clopyralid	10.5/18 [p]	6	8	8	7	5	10
27	Impact	topramezone	9/18 [cb]	6	9	6	9	9	6
27	Laudis	tembotrione	10	7	9	6	9	9	6
10	Liberty	glufosinate-ammonium	180 D	7	7	5	9	7	8
2	Permit/Sandea	halosulfuron	9	6	5	5	9	4	1
2	Resolve Q	rimsulfuron + thifensulfuron + safener	10	8	6	8	8	3	8
2	Resolve SG/Solida	rimsulfuron	10	8	6	8	8	3	8
14	Resource	flumiclorac	1	3	7	3	5	3	1
2	Spirit	prosulfuron + primsulfuron	10	8	6	3	8	4	4
19+4	Status	diflufenzopyr + dicamba	120 D	8	8	8	8	9	6
2	Steadfast Q	nicosulfuron + rimsulfuron + isoxadifen	10	6	6	3	7	3	8
4	Starane Ultra	fluroxypyr	4	9	2	6	2	5	1
4+2	Yukon	halosulfuron-methyl + dicamba	9	7	8	6	9	7	1

[1] Months unless otherwise noted. D = Days; AT = Any Time; NCS = Next Cropping Season; 2CS = Second Cropping Season; 3CS Tird Cropping Season, NTE = No Tolerance Established NI = No information, FBA = Field Bioassay, DNR = Do not rotate.

[ab] 11 months for STS varieties, 36 months or earlier with a bioassay 14 or 26 months if pH < 7.9 and rainfall limits are followed.

[cb] Pea 9 months; snap bean 18 months

[cl] Rotation interval depends upon rate applied and soil texture. See the label for detailed instructions

[co] When soil pH is 7.5 or above, use longer rotation intervals. Consult the label; cq Additionally, 15 inch of cumulative precipitation must occur between application and planting of rotational crop

[cw] West of Hwy 83, 9 months up to 16 fl oz/A, 18 months over 16 fl oz/Al; on light textured soils such as sands and loamy sands extend time by 7 additional days, on high pH soils (>7.9), extend time to planting by 7 additional days.

[dw] 120 days and over 24 fl oz/A and over 30"rainfall annually. 180 days and over 24 fl oz/A and under 30"rainfall annually.

[g] Rotation interval is 45 days per pint of Banvel applied at 23 days per pint of Banvel SGF, excluding days when the ground is frozen

[m] Applications of 24 oz/A or less = 22 days for each 8 fluid oz; 24 oz/A or more = 45 day interval for each 16 fluid oz/A applied.

[p] Peas may be planted10.5 months following < 4 oz/A application rate; 18 monts when annual rainfall and/or irrigation is less then 15 inches on soils with less than 2% organic matter

Table 4. Wheat herbicides that will not cause carryover injury in field peas.

Herbicide table includes rotation restrictions for field peas and efficacy rating for NE most troublesome weeds

Site of Action	Wheat herbicide	Common name	Rotation Restriction for Field Peas[1]	Weed Response to Selected Herbicides					
				Horseweed	Kochia	Lambsquater	Russian Thistle	Waterhemp	Downy Brome
POST									
4	2,4-D	2,4-D	NCS	5	6	9	8	8	1
2	Affinity Broadspec	thifensulfuron + tribenuron	1.5	check 2018 weed guide for tank mixes					
2+4	Agility SG	dicamba + metsulfuron + tribenuron + thifensulfuron	10-22	6	10	10	9	9	NA
14	Aim	carfentrazone-ethyl	AT	check 2018 weed guide for tank mixes					
2	Ally Extra SG/Accurate Extra	thifensulfuron + tribenuron + metsulfuron	10/22 [ak,al]	7	6	7	6	7	NA
2	Ally XP/Accurate	metsulfuron	34 [x]	7	6	7	6	7	NA
2	Amber	tiasulfuron	4/FBA	7	7	6	6	7	3
2	Beyond (Clearfield only)	imazamox	18	1	1	1	1	1	8
4	Clarity	dicamba-glycolamine	180 D [m]	6	10	9	9	9	1
4	Curtail	clopiralid + 2,4-D	18	9	8	10	8	9	1
4	Curtail M	clopyralid + MCPA	18	9	8	8	7	7	1
4	Dicamba	Dimethylamine salt of dicamba	NCS [g]	6	10	9	9	9	1
14+15	Fierce	flumioxazin + pyroxasulfone	6/11 [dq]	7	5	8	5	7	NA
2	Fierce Cereal	flumioxazin + pyroxasulfone	-	6	9	10	8	9	NA
2+4	Harmony Extra SG	thifensulfuron + tribenuron	45 D	check 2018 weed guide for tank mixes					
27+6	Huskie	pryasulfotole + bromoxynil	9	check 2018 weed guide for tank mixes					
2	Maverick PRO (fall applied)	sulfosulfuron	12/FBA	6	3	3	3	3	8
4	MCPA	MCPA	0/3 [ae]	4	5	7	6	5	NA
2	Olympus (fall applied)	propoxycarbazone-sodium	FBA	-	-	-	-	-	8
2	Peak	prosulfuron	10 [bo]	7	5	6	6	7	NA
2	PowerFlex (fall applied)/GR1	pyroxsulam	9	-	-	-	-	-	7
2+4	Rave	triasulfuron + dicamba	4/FBA	6	10	10	9	9	NA
4	Starane NXT	flyroxypyr + bromoxynil	4	6	10	9	9	9	1
4	WideMatch	clopyralid + fluroxypyr	18	9	10	-	6	-	1

[1] Months unless otherwise noted. D = Days; AT = Any Time; NCS = Next Cropping Season; 2CS = Second Cropping Season; 3CS Tird Cropping Season, NTE = No Tolerance Established, NI = No information, FBA = Field Bioassay, DNR = Do not rotate.

[ae] Rotation interval varies with application rate

[ak] Application rate of one Soluble Pack per 10 acres on wheat, barley , or fallow on non-irrigated land

[al] Soil pH 6.8 or lower or those with a soil pH 6.9-7.9

[bo] Where soil pH is < 7.8; Maximum application rate 0.5 oz/A; Make application before July 10

[dq] 6 months for field peas, 11 months for edible peas

[g] Rotation interval is 45 days per pint of Banvel applied at 23 days per pint of Banvel SGF, excluding days when the ground is frozen

[m] Applications of 24 oz/A or less = 22 days for each 8 fluid oz; 24 oz/A or more = 45 day interval for each 16 fluid oz/A applied.

[x] At least 28 inches of cumulative precipitation during the period

Table 5. Field peas - Weed Response to selected herbicides

Site of Action	Field peas herbicide	Common name	Weed Response to Selected Herbicides													Crop Safety
			Broadleaf weeds								Grasses					
			Kochia	Lambsquarters	Lanceleaf Sage	Marestail	Redroot Pigweed	Prickly Lettuce	Russian-thistle	Wild Buckwheat	Barnyardgrass	Crabgrass	Downy Brome [1]	Fall Panicum	Millet	
	PRE															
14 + 15	BroadAxe XC / SpartanElite	sulfentrazone + S-metolachlor	9	9	4	6	9	6	9	6	9	8	9	9	8	2
15	Dual II Magnum	S-metolachlor + benoxacor	5	7	6	2	8	5	4	3	8	8	9	9	7	2
3	Prowl H2O	pendimethalin	7	7	6	6	7	7	8	5	8	7	8	8	8	2
3	Treflan (PPI)	trifluralin	7	6	3	5	6	5	7	4	8	8	8	8	8	1
14	Spartan Charge	sulfentrazone + carfentrazone	9	8	4	7	8	7	8	6	6	6	6	6	6	2
14 + 2	Optill	saflufenacil + imazethapyr	8	8	8	8	6	8	8	8	6	2	6	6	6	2
14	Sharpen	saflufenacil	8	8	7	8	5	7	8	7	2	4	3	2	2	2
14	Spartan	sulfentrazone	9	8	4	6	7	6	8	5	6	6	6	6	6	2
	POST															
1	Assure II	quizalofop-P	1	1	1	1	1	1	1	1	8	8	7	8	8	1
6	Basagran 5L	bentazon	7	7	5	4	5	7	4	6	1	1	1	1	1	2
1	Poast	sethoxydim	1	1	1	1	1	1	1	1	6	9	9	9	9	1
2	Pursuit	imazethapyr	7	4	4	5	8	7	7	7	5	6	7	1	8	3
2 + 6	Pursuit + Basagran 5L	imazethapyr + bentazon	8	7	6	6	8	8	7	6	5	5	7	5	6	2
2 + 6	Raptor + Basagran 5L	imazamox + bentazon	8	8	6	6	9	8	7	7	5	7	6	1	2	2
1	Select Max	clethodim	1	1	1	1	1	1	1	1	9	9	9	9	9	1
2 + 6	Varisto	imazamox + bentazon	8	8	6	6	9	8	7	7	5	7	6	1	2	2

[1] Field pea PRE herbicides used to control downy brome must be tank mixed with glyphosate or follow a glyphosate burndown application to obtain these levels of control.

Table 6. Field peas – Rate per acre, application time and remarks for selected herbicides

Herbicide	Rate Per Acre	Application Time	Remarks
Fall Applied			
BroadAxe XC / SpartanElite	19.0-32.0 oz	Fall	Cost: $20.75-$35.00.
Optill	1.5 oz	Fall	Can be tank mixed with other herbicides such as glyphosate for burndown. Cost: $12.00.
Spartan	3.5-8.0 oz	Fall	Application rate depends on soil type and organic matter. Cost: $16.50-$37.50.
Spartan Charge	4.0-10.0 oz	Fall	Use with other herbicides and COC for burndown purposes. Application rate depends on soil type and organic matter. Cost: $13.75-$34.50.
Valor SX	2.0-3.0 oz	Fall	Use only with appropriate tank mix partner such as 2,4-D, dicamba, or glyphosate. Cost: $15.50-$23.00.
Burndown and Preemergence			
BroadAxe XC / SpartanElite	19.0-32.0 oz	Preplant burndown, EPP, or PRE	Rate depends on soil texture, pH, and organic matter. DO NOT use on coarse textured soils with organic matter <1.5%. Cost: $20.75-$35.00.
Spartan Charge	3.0-8.0 oz	Preplant burndown, EPP, or PRE	Apply with COC, AMS, and glyphosate for burndown purposes. Application rate depends on soil type and organic matter. Cost: $10.25-$27.50.
Optill	1.5 oz	EPP, PPI, or PRE	Can be tank mixed with other herbicides such as glyphosate for burndown. Cost: $12.00.
Sharpen	1.0 oz	EPP	If needed, sequential applications can be made at least 30 days apart (no more than 4 ozs/A/plant season). Sharpen can be tank mixed with other Group 14 herbicides. Cost: $7.00.
Prowl H2O	1.5-3.2 pt	Preplant burndown	Rate based on soil texture and organic matter. Tank mix with or apply a postemergence herbicide following application. Irrigation or rainfall is required to infiltrate the herbicide into the upper soil surface. Cost: $9.75-$20.75.
Dual ll Magnum	1.0-1.67 pt	PPI, or PRE	Rate based on soil texture and organic matter. Cost: $15.00-$25.00.
Pursuit	3.0 oz	Preplant, PPI, and PRE	Must be incorporated into the soil for best results. Postemergence application require use of an adjuvant and nitrogen fertilizer. Can be tank mixed with grass herbicides. Cost: $11.50.
Postemergence			
Assure II	5.0-10.0 oz	Grasses less than 4" tall	Apply with COC. Cost: $4.00-$8.25.
Basagran 5L	1.0-2.0 pt	After 3 pairs of leaves or 4 nodes are present on peas	Best performance when daily temperatures exceed 75 degrees. Apply with UAN or AMS. May tank mix with MCPA, Pursuit, or Raptor. 30 day PHI. Cost: $10.00-$20.00.
Poast	1.0-2.0 pt	Grasses less than 4" tall	Apply with 2.5 pounds AMS or 4 to 8 pints of UAN. Maximum seasonal application rate is 4 pints per acre. PHI is 30 days. Cost: $12.00-$28.00.
Pursuit	3 oz	Peas have at least one trifoliate leaf but before 5 nodes and flowering	Apply with NIS at 2 pints/acre. Cost: $11.50.
Pursuit + Basagran 5L	3 oz + 0.8 pt	After 3 trifoliate leaves are present until 5 nodes are on the peas	Apply with 1.25 at 2.5 gallons UAN or 12 to 15 pounds per 100 gallons AMS. 30 day PHI. Cost: $11.50.
Raptor + Basagran 5L	4.0 oz + 1.0 pt	After 3 pairs of leaves are present and prior to bloom	Apply with COC at 1-2% v/v. Cost: $29.00.
Select Max	9.0-16.0 oz	Before bloom	Apply with NIS at 0.25% v/v. PHI is 21 days. Cost: $7.75-$13-75.
Varisto	16.0-21.0 oz	After 3 pairs of leaves are present and prior to bloom	Apply with COC at 1-2% v/v. PHII is 30 days. Cost: $20.75-$27.00.
Harvest Aid			
Gramoxone	1.2 - 2.0 pt	Apply when at least 80% of pods are yellowing	Apply using a minimum carrier of 20 GPA for ground or 5 GPA for air. Add NIS at 1qt/100 gal. Do not graze or harvest treated fields for 7 days after spraying.

Table 7. Field peas – Rotation restrictions for selected field pea herbicides

Site of Action	Field peas herbicide	Rotation Restrictions for selected crops																			
		Grass crops												Broadleaf crops							
		Field Corn	Seed Corn	Popcorn	Sweet Corn	Winter Wheat	Spring Wheat	Oat	Winter Barley	Spring Barley	Rye	Grain Sorghum	Proso Millet	Soybean	Canola	Buckwheat	Sunflower	Sugarbeet	Dry Bean	Potato	Alfalfa	Red Clover
	PRE																					
14+15	BroadAxe XC/SpartanElite	10	10	18	18	4.5	4.5	12	4.5	4.5	4.5	10	12	AT	NTE	12	AT	36	NTE	4	12	NTE
15	Dual II Magnum	AT	AT	AT	AT	4.5	4.5	4.5	4.5	NCS	3	7D/14D [cs]	NCS	15D/30D [cs]	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
14+2	Optil	8.5 [ck]	8.5	18	18	4 [ck]	4 ck	18	9.5	9.5	4-18	18	40	0-1	9.5 [ck]	40	9.5-18 [ck]	40	4	26	4	4
3	Prowl H2O	NCS	NCS	NCS	NCS	4 **	NCS	NCS	4 **	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
14	Sharpen	AT	AT	AT	0.5	0-3 [cl]	0-3 [cl]	0-3 [cl]	0-3 [cl]	0-3 [cl]	0-3 [cl]	0-1 [cl]	0-6 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]	4-9 [cl]
14	Spartan	10	12	12	18	18	4	4	12	4	4	10/18 [by]	12	AT	24	12/FBA	AT	36	12	12/FBA	12	12
14	Spartan Charge	4	12	12	12	4	4	12	4	3	3	10/18 [by]	12	AT	10/18 [v]	18	18	18	10/18 [v]	10/18 [v]	18	18
3	Treflan (PPI)	NCS	NCS	NCS	NCS	18	2CS	12/18 [ba]	2CS	2CS	2CS	12/18 [ba]	NCS	AT	NCS	NCS	AT	12/14 [az]	AT	AT	NCS	NCS
	POST																					
1	Assure II	4	4	4	4	4	4	4	4	4	4	4	4	AT	AT	4	4	AT	AT	4	4	4
6	Basagran 5L	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
1	Poast	4 [bf]	4	4	4	4	4	4	4	4	4	4	4	AT	4	4	AT	AT	AT	AT	AT	AT
2	Pursuit	8.5 [h]	8.5	18	18	4	4	18	9.5	4	4	12	26/FBA	AT	26/FBA	26/FBA	18	26/FBA	4	12	4	26/FBA
6	Raptor	8.5	8.5	8.5	8.5	0/3 [bv]	0/3 [bv]	9	4 [ca]	4 [ca]	3	9	9	AT	18-26	18	9	18-26 [as,bv]	AT	18	3	18
1	Select Max	6 D	1	1	1	1	1	1	1	1	1	1	1	AT	1	1	1	AT	AT	1	AT	1
2+6	Varisto [a]	8.5	8.5	8.5	8.5	3	3	9	9	9	4	9	9	AT	26	18	9	26	AT	18	3	NTE

[1] Months unless otherwise noted. D = Days; AT = Any Time; NCS = Next Cropping Season; 2CS = Second Cropping Season; 3CS Tird Cropping Season, NTE = No Tolerance Established, NI = No information, FBA = Field Bioassay, DNR = Do not rotate.

[as] 18 months in eastern Nebraska if soil pH is 6.2 or grater and 26 months if the soil pH is less than 6.2; 26 months for western Nebraska

[ba] All areas receiving more than 20 inches of rainfall and irrigation - those areas receiving less than 20 inches of rainfall and irrigation to produce a crop.

[bf] Poast protected field corn hybrids may be planted anytime

[bv] Clearfield/normal non-Clearfield)

[by] 18-month rotation for rates above 0.25 lb ai/A sulfentrazone.

[ca] Applied prior to June 1 in previous year.

[ck] Check the label for specific rotations for Clearfield crops (corn, wheat, canola, and sunflower).

[cl] Rotation interval depends upon rate applied and soil texture. See the label for detailed instructions

[cs] Rotation interval should be extended to 18 months if drought conditions prevail after application unless at least 15 inch of sprinkler irrigation has been applied

[h] Clearfield, IR, or IMR field corn hybrids may be planted "anytime".

[v] Rotation interval varies by location in Nebraska, soil pH, application rate, and cummulative precipitation