

2. Weed Control

Effective weed control requires a program that emphasizes prevention and combines crop rotation with mechanical and chemical control methods.

2.1 Postharvest Perennial Weed Control

Weed seed populations in the soil should be kept to a minimum by preventing weeds from producing seed in and around vegetable fields. Destroy all weeds immediately after a crop is harvested. Consider control measures after harvest, but before the first frost, for the following weeds:

1. To suppress or control bitter nightshade, Canada thistle, field bindweed, hemp dogbane, horsenettle, or pokeweed, use a tank-mix of 1 qt Banvel plus 1 qt 2,4-D amine. Apply in late summer or early fall to healthy weed foliage for maximum effectiveness (Note. Delay seeding of winter cover crop 3 wks for each pint per acre of Banvel used). See herbicide labels for optimum treatment time for each weed.
2. To suppress brambles, horseradish (volunteer), horsenettle, milkweed, poison ivy, or sow thistle, tank-mix 1.5 lb acid equivalent glyphosate, using one of many labeled glyphosate products, plus 1 pt Banvel (see note above). Use 1 to 2 qt surfactant per 100 gal of spray mixture. Apply in late summer or early fall to healthy weed foliage for maximum effectiveness. See herbicide labels for optimum treatment time for each weed.
3. To control bermudagrass, johnsongrass or quackgrass, apply 0.75 to 1.1 lb acid equivalent glyphosate, using one of many labeled glyphosate products. Delay tillage for 7 to 10 days after application. Apply in late summer or early fall to healthy weed foliage for maximum effectiveness.
4. To control bermudagrass johnsongrass, or quackgrass in crop, apply the maximum labeled rate of Poast, Fusilade, or clethodim (Select, Select Max) early in the season. Repeat applications may be needed for the highest level of control.
5. To control yellow nutsedge foliage and suppress nutlet formation, spray with a labeled glyphosate product after flowers (seedheads) appear, but before foliage dies. Use 1.5 lb acid equivalent glyphosate. Expect only partial control of yellow nutsedge the first year after initiating the program. Plant a crop the following spring with registered herbicides recommended for yellow nutsedge control (see Table E-2). Effective yellow nutsedge control can be achieved by repeating the application for several consecutive years.

2.2 Herbicide Effectiveness on Common Weeds in Vegetables

See Table E-2 for a summary of herbicide effectiveness ratings (pages 96-97)

Notes:

1. Herbicide performance depends on herbicide selection, herbicide rate, weed pressure, weather, soil type, and other factors.
2. The ratings in Table E-2 indicate **ONLY relative effectiveness** in tests conducted by the University of Delaware, University of Maryland, University of Pennsylvania, Rutgers, The State University of New Jersey, and Virginia Polytechnic Institute and State University. **Actual performance may be better or worse than indicated in this table.**
3. **The Weed Science Society of America (WSSA) group number** indicates the chemical structure and site of action of the herbicide.
4. **For field management guidelines aimed at reducing the risk for developing herbicide-resistant weed populations see section E 2.5 Herbicide Site of Action: Reducing the Risk of Herbicide Resistance.**

2.3 Crop Rotation Planting Restrictions

See Table E-3 for a summary of crop rotation planting restrictions after certain herbicide applications have been made (pages 98-107).

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Table E-2. Herbicide Effectiveness on Common Weeds in Vegetables

See Notes in section E 2.2 on the preceding page. Abbreviations: G=good, F=fair, P=poor, N=no control, -=insufficient data.

Herbicide	WSSA Site of Action Number	Barnyardgrass	Crabgrass, Large	Fall Panicum	Foxtail sp.	Goosegrass	Johnsongrass (Seedlings)	Yellow Nutsedge	Carpetweed	Cocklebur, Common	Galinsoga, Hairy	Jimsonweed	Lambsquarters, Common	Morningglory sp.	Shepherdspurse	Pigweed sp.	Purslane, Common	Ragweed, Common	Smartweed, Pennsylvania	Nightshade, Eastern Black	Velvetleaf
Soil-Applied Herbicides (pre-plant incorporated or preemergence)																					
Acetochlor products	15	G	F/G	G	G	G	G	F	F	N	-	N	P/F	N	-	F/G	-	P	P	G	P
Atrazine	5	F	P/F	P	F	-	P	P/F	G	F/G	G	G	G	G	G	G	G	G	G	G	F
Callisto	27	N	F	N	P	N	N	P	-	P/F	G	F	G	F	G	F/G	-	P	-	P	-
Caparol	5	F	P/F	P	F	P/F	-	N	G	P	G	P/F	G	P	F	F/G	G	F	F	F	P
Chateau	14	P	P	P	P	P	P	P	G	F	G	-	G	F	G	G	G	F	G	G	-
Command	13	G	G	G	G	G	G	N	N	N/F	F	G	G	P	F	N/P	G	P/F	G	-	G
Curbit	3	F	G	G	-	G	-	N	G	N	N	N	P/F	P	-	F	F/G	N	P	P	P
Dacthal	3	F/G	G	F/G	G	F/G	-	N	P	N	N	P	G	N	P	F/G	G	N	N	N	N
Devrinol	15	G	G	G	G	G	G	N/P	G	N	F/P	N	F/G	N	-	F/G	G	P/F	P	N	N
Dual Magnum	15	G	G	G	G	G	G	F/G ¹	F	N	G	N	P	N	-	G	F/G	N	P	G	P
Eptam	8	G	G	G	G	G	G	G	G	P	N	P	F	F	-	G	G	P	P	F/G	F/G
Goal/GoalTender	14	P	P	P	P	P	P	P ²	G ²	-	G ²	-	F	-	G	G	G	F	G ²	G ²	F ²
Karmex	7	G	F/G	G	G	F/G	N	N	G	-	G	G	G	G	G	G	G	G	G	G	G
Kerb	3	G	G	G	G	G	-	N	G	N	P	N	G	-	-	G	G	P	-	-	P
Lorox/Linex	7	F	P/F	P	F	P/F	-	N	G	P	G	P/F	G	P	F	G	G	F	G	G	P
Matrix/Solida	2	G	F	F	G	-	-	F	-	-	F	-	F	P/F	-	G	G	F	F	P/F	P
Metribuzin	5	F	F	F	F	F	-	N	G	F	G	F/G	G	F/P	-	F/G	F	G	G	P	G
Micro-Tech	15	G	F/G	G	G	G	G	F	G	N	G	P	P/F	N	G	G	G	N	P	G	P
Outlook	15	G	G	G	G	G	P	P/F	-	N	G	N	P	N	-	F/G	G	N	P	F	N
Prefar	8	G	G	G	G	F/G	G	N	N	N	N	N	F/G	N	P/F	F	F	N	N	N	N
Prowl/Prowl H2O	3	G	G	G	G	-	G	N	G	N	N	N	F/G	P	N	F/G	F/G	N	F	P	G
Pursuit	2	P/F	P/F	P/F	P/F	-	N	G	F	-	F	G	F	F	G	G	P	G	F	G	G
Reflex ³	14	P	P	P	P	P	P	N	G	N	G	F/G	P	P	G	E	E	G	P	G	P
Ro-Neet	8	G	G	G	G	G	-	N/P	G	N	N	N	F	-	G	G	G	N	-	-	F
Sandea	2	N	N	N	N	N	N	F	P	G	G	G	F	F	-	G	F	G	F	N	G
Sinbar	5	F	F	-	F	F	-	P	G	-	G	G	G	G	G	P	G	G	G	G	G
Solicam	12	G	G	G	G	-	F	F	-	-	-	F	F	P	-	G	G	G	-	-	F
Spartan Charge	14+14	P	P	P	P	P	P	P	-	-	-	-	P	P	-	F/G	-	N	P	-	-
Strategy ⁴	3+13	G	G	G	G	G	G	N	G	N/F	F	G	G	P	F	F	G	F	G	P	G
Treflan	3	G	G	G	G	G	G	N	G	N	N	N	F/G	P/F	N	F	G	N	P/F	P	N
Zeus	14	P	P/F	P	P	P/F	P	P/F	G	P	-	G	F/G	F/G	F/G	-	G	G	P/F	F	F/G
Zidua	15	G	G	G	G	G	P	P	-	N	P	P	F	N	-	G	G	P	P	F/G	P

Table E-2. - continued on next page

Table E-2. Herbicide Effectiveness on Common Weeds in Vegetables - continued

Herbicide	WSSA Site of Action Number	Barnyardgrass	Crabgrass, Large	Fall Panicum	Foxtail sp.	Goosegrass	Johnsongrass (Seedlings)	Yellow Nutsedge	Carpetweed	Cocklebur, Common	Galinsoga, Hairy	Jimsonweed	Lambsquarters, Common	Morningglory sp.	Shepherdspurse	Pigweed sp.	Purslane, Common	Ragweed, Common	Smartweed, Pennsylvania	Nightshade, Eastern Black	Velvetleaf
Postemergence																					
2,4-D	4	N	N	N	N	N	N	P	G	F/G	P	F	F/G	G	G	G	G	G	F	G	G
Accent Q	2	G	P/F	G	G	P	G	P	-	P	-	F	P	F	G	G	P/F	P	F/G	N	P
Aim/Cadet	14	N	N	N	N	N	N	N	G	P	-	P	G	F	-	G	-	F	-	G	G
Assure II/Targa	1	G	G	G	G	G	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Atrazine	5	F	F	F	F	F	-	G	-	F	G	G	G	G	G	G	G	G	G	G	F/G
Banvel/Clarity	4	N	N	N	N	N	N	P	G	G	G	G	G	G	G	G	G	G	G	G	G
Basagran	6	N	N	N	N	N	N	F	N	G	F	G	F	P	-	F	F/G	G	G	P	G
Callisto	27	N	F	P	P	P	P	F	-	F/G	G	G	G	F	F/G	G	-	P	-	F/G	G
Caparol	5	F	P/F	P	F	P/F	-	N	G	P	G	P/F	G	P	F	F/G	G	F	G	G	P
Fusilade DX	1	G	F/G	G	G	G	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N
glyphosate products	9	G	G	G	G	G	G	F	G	G	G	G	G	F	G	G	G	F	G	G	G
Goal Tender	14	P	P	P	P	P	P	P	G	P	G	F	G	F	G	G	G	F	G	G	F
Gramoxone ⁵	22	F/G	F/G	F/G	G	F/G	-	G	G	G	G	G	F/G	F/G	-	G	F/G	G	P	-	-
Impact/Armezon	27	G	G	F/G	G	F	F	-	-	F/G	-	G	G	F	-	G	-	G	G	G	G
Laudis	27	G	F/G	P	G	F	G	-	-	F/G	-	G	G	F	-	G	-	F	-	-	-
Lorox	7	P	P	P	P	P	P	P	G	P/F	F/G	P/F	G	-	G	G	G	G	G	P/F	G
Maestro/Buctril	6	P	P	P	P	P	P	P	G	G	G	G	G	G	G	G	F	F	G	G	F
Matrix/Solida	2	G	P/F	F/G	G	P	-	F	-	F/G	-	F	F	F	G	G	F/G	P	P/F	P	F
Metribuzin	5	P	P	P	P	P	-	P	G	-	G	G	G	P	G	G	G	G	F	P	P/F
Poast	1	G	G	G	G	G	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Pursuit	2	F/G	F/G	F/G	F/G	P	F/G	-	G	F	G	F	G	F	P/F	G	G	P/F	-	-	G
Raptor	2	P	P	P	P	P	P	P	-	F/G	G	-	F	F	G	G	P/F	P/F	G	G	G
Reflex ³	14	P	P	P	P	P	P	P	G	F	G	G	P	F/G	G	G	-	F	P	F	P
Sandea	2	N	N	N	N	N	N	G	P	G	G	G	N	F	-	G	P	G	F	N	G
Select	1	G	G	G	G	P	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Shieldex	27	P/F	F/G	N	F/G	P/F	-	-	-	F/G	-	G	G	F	-	G	-	F	-	-	-
Sinbar	5	F	F	-	F	F	-	P	G	G	G	G	G	G	G	P	G	G	G	G	G
Spin-Aid	5	P	P	P	P	P	P	P	-	P	G	G	F	G	G	P/F	G	F/G	-	-	N
Starane Ultra	4	N	N	N	N	N	N	N	N	G	-	-	F/G	-	F	G	G	-	F	G	G
Stinger/Spur	4	N	N	N	N	N	N	N	N	G	G	P	P	N	N	N	N	G	P	P	P

¹ Control improved with a pre-plant incorporated treatment,² Control of this species based on preemergence application; control from pre-plant incorporated treatment slightly reduced.³ Reflex ratings based on 1.25 pt/A. Lower rates will result in reduced levels of weed control.⁴ Strategy is a repackaged mixture of Command and Curbit.⁵ Gramoxone: nonselective herbicide that needs to be applied with shielded application equipment to prevent spray from contacting the crop.

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Table E-3. Crop Rotation Planting Restrictions: Months After Herbicide Application Until Planting New Crop

This table summarizes the crop rotation planting restrictions after certain herbicide applications have been made. **For example**, if Devrinol was applied to tomatoes, planting sweet corn must be delayed for 12 months after the Devrinol application. **Consult the label** for a different time interval if two or more herbicides were applied in the same season. The label may also mention additional restrictions due to rainfall, soil, pH, geographical region, variety, or application rate. **This table is not a substitute for the label!** Abbreviations: AH=after harvest, B=bioassay of soil recommended before planting, NI=no information, NR=no restrictions, NS=next season, NY=next year, SY=second year following application.

Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Com. field	Com. sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter
2,4-D ¹	3	1	3	3	3	0.25-1	1	3	3	3	3	3	1	3	1	1	0.25-1 ¹	3	3	3	1
Accent/Accent Q	10 ¹	4	10-18 ¹	10	10 ²	NR	10	10 ²	10 ²	10 ²	10	10 ²	10 ¹	10 ²	4	10-18 ¹	0.5	10 ²	10 ²	10 ²	4
Acuron	18	4	18	18	18	NR	NR	18	18	18	18	18	10	18	4	10	10	18	18	18	4
Acuron Flexi ²³	10	4	18	18	18	NR	NR	18	18	18	18	18	10	18	4	10	10	18	18	18	4
Afforia (2.5 oz)	4 ²⁴	3	4 ²⁴	3	4 ²⁴	0.5 ²⁴	3	4 ²⁴	4 ²⁴	4 ²⁴	3	4 ²⁴	4 ²⁴	4 ²⁵	3	1	NR ²⁴	4 ²⁴	4 ²⁴	4 ²⁴	1 ²⁴
Aim	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Anthem Maxx (4.87 oz)	10	11 ²⁵	11	11	18	NR	NR	18	18	18	11	18	4	18	11 ²⁵	10 ²⁵	NR	18	18	18	4 ²⁵
Armezon/Impact (0.75 oz)	9	3	9	9	18	NR	NR	18	18	18	9	18	9	18	3	9	9	18	18	18	3
Armezon PRO (16-20 fl oz/A)	9	4	9 ³	9 ³	18	NR	NR	18	18	18	9 ³	18	9	18	4	9	9	18	18	18	4
Assure II	4	4	4	NR	4	4	4	4	4	4	NR	4	4	4	4	4	NR	4	4	4	4
Atrazine	SY	NY	SY	SY	SY	NR	NR	SY	SY	SY	SY	SY	SY	SY	NY	NR	NY	SY	SY	SY	NY
Authority Elite/BroadAxe XC	12	4.5	12B	12B	2 ⁹	4	12	12B	12B	12B	8	12B	4	12B	4.5	10	NR	12B	4	12B	4.5
Authority First/Sonic	12	12	12	12	30B	10-18 ¹	10-18 ¹	30B	30B	30B	9	30B	18	30B	12	12	NR	30B	30B	30B	4
Authority MTZ	12	4	18	18	18	10	18	18	18	18	18	18	12	18	4	12	NR	18	NR ⁹	18	4
Authority Supreme	12	11 ¹	9	9	18 ⁹	4	10	18	18	18	9	18	4	18	11 ¹	10 ¹	NR ¹	18	18	18	4 ¹

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Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter
Authority XL	12–18 ¹	4	36	36	18	10–18 ¹	18	18	36	36	36	36	36	18	4	10–18 ¹	NR	36	12–18 ^{1,9}	18	4
Autumn Super ¹	18B	9	18B	18B	18B	1	9	18B	18B	18B	18B	18B	18B	18B	18B	18B	2	18B	18B	18B	3
Axial Bold	3	NR	3	3	1	3	3	3	3	1	3	3	1	3	3	3	3	3	3	3	NR
Axial Star	4	NR	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	NR
Axial XL	3	NR	3	3	1	3	3	3	3	1	3	3	1	3	3	3	3	3	3	3	NR
Axiom	12	12	12B	12B	12B	NR	12B	12B	12B	18	12B	12B	1	12B	12	12	NR	12B	12B	12B	0.23–4
Balance Flexx ¹	10 ¹	6	18	18	18	NR	6	18	18	18	18	18	6	18	4	6	6	18	18	18	4
Banvel	AH	1 ⁵	AH	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	1 ⁵	NR	1 ⁵	AH	AH	AH	1 ⁵
Basagran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Basis	10 ⁶	3	18	10	18	NR	10	10	18	18	10	18	NR	18	3	10 ⁶	10 ⁶	18	1	18	3
Basis Blend ⁶	10 ⁶	3	18	10	18	NR	10	10	18	18	10	18	1	18	3	10 ⁶	10 ⁶	18	1	18	3
Beyond	3	9	NR	NR	9	8.5 ⁸	8.5	9	9	9	NR	9	9	9	4	9	NR	9	9	9	3 ⁸
Bicep products	SY	NY	SY	SY	SY	NR	NY	SY	SY	SY	SY	SY	SY	SY	NY	NR ¹⁰	NY	SY	SY	SY	NY
Boundary	4.5	4.5	12	12	12	4	4	12	12	18	8	12	NR	12	12	12	NR	12	12	12	4.5
Buctril/Maestro	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cadet	AH	AH	AH	AH	AH	NR	NR	AH	AH	AH	AH	AH	AH	AH	AH	AH	NR	AH	AH	AH	AH
Callisto	10	4	18	10 ¹	18	NR	NR	18	18	18	10 ¹	18	10	18	4	NR	10	18	18	18	4
Callisto Xtra	NY	NY	18	18	18	NR	NR	18	18	18	18	18	NY	18	18	NR	NY	18	18	18	NY
Canopy ¹	10	4	30	12	18	10	18	18	30	30	12	30	30	18	4	12	NR	30	10 ⁹	18	4

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Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter
Canopy Blend	10	4	30	18	18	10 ²⁶	18	18	30	30	12	30	30	18	30	18	NR	30	10 ⁹	18	4
Canopy EX	10	4	30	12	18	10 ¹	18	18	30	18 ¹	12	30	18 ¹	18	4	10 ¹	0.25 ¹	30	10 ⁹	18	4
Caparol	12	12	12	12	5	5	5	12	12	8	5	12	12	12	12	12	12	12	12	12	12
Capreno ¹	10-18	10	18	18	18	NR	10	18	18	18	18	18	18	18	18	10	10	18	18	18	4
Chaparral	SYB	NY	SYB	SYB	SYB	NY	SYB	SYB	SYB	SYB	SYB	SYB	SYB	SYB	NY	NY	SYB	SYB	SYB	SYB	NY
Chateau (up to 3 oz) ¹¹	5 ¹¹	4	12B	4	12B	0.5-1	4	12B	12B	12B	4	12B	5 ¹¹	12B	4	1 ¹	NR	12B	12B	12B	2
Cimarron Max/metsulfuron ¹	12 ¹	10	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	NYB	1
Cimarron Plus	4	10	B	B	B	12 ¹	B	B	B	B	B	B	B	B	NYB	B	12 ¹	B	B	B	1
Clarity	4	0.5-1.5 ⁵	4	4	4	NR	4	4	4	4	4	4	4	4	0.5-1.5 ⁵	NR	0.5-1 ⁵	4	4	4	0.5-1.5 ⁵
Classic ¹	12	3	30	9	18	9	18	18	30	30	9	30	30	18	3	9	NR	30	10 ⁹	18	3
Cobra	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Command	12	12	12	9	9	9	9	9	9	12	NR ¹	NR	9	NR ¹	12	9	NR	NR ¹	9 ⁹	9	12
Corvus	17	9	17B	17	17B	NR	9	17B	17B	17B	17B	17B	17	17B	4	17B ¹	9	17B	17B	17B	4
Crossbow ³⁰	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Curbit	AH	AH	AH	AH	AH	AH	AH	NR	NR	AH	AH	AH	AH	NR	AH	AH	NR	NR	AH	NR	AH
Curtail	10.5-18 ¹	1	10.5B	10.5B	10.5-18 ¹	1	10.5-18 ¹	10.5B	10.5B	10.5-18 ¹	18	10.5B	18	10.5B	10.5B	10.5-18 ¹	10.5-18 ¹	10.5B	10.5B	10.5B	1
Dacthal	8	8	8	8	NR ⁹ /A H	8	8	8	AH	AH	8	AH	AH	8	8	8	8	8	AH	NR	8
Degree Xtra	SY	SY	SY	SY	SY	NR	NR	SY	SY	SY	SY	SY	SY	SY	SY	NR ¹⁰	NY	SY	SY	SY	AH
Devrinol	12	6	12	12	NR	12	12	12	12	12	12	NR	12	12	6	12	12	12	NR	12	6

E 2. Weed Control

Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter	
DiFlexx	4	2	4	4	4	NR	4	4	4	4	4	4	4	4	4	2	2 ¹	4	4	4	2	
DiFlexx Duo	10	4	18B	10	18B	NR	4	18	18	8/18 ²⁷	10	18B	10	18	4	10	8	18	10	18	4	
Distinct ¹	1	1	4	4	4	0.25	4	4	4	4	4	4	4	4	1	1	1	4	4	4	1	
Dual products	4	4.5	NR	NR	2 ¹	NR	NR	12	12	2 ¹	NR	2	NR	2 ¹	4.5	NR ¹⁰	NR	12	2 ¹	12	4.5	
Elevore	9	0.5	15B	15B	15B	0.5	15B	15B	15B	15B	9	15B	15B	15B	0.5	0.5	0.5	15B	15B	15B	0.5	
Enlist Duo	NI	NS	NS	NS	NS	0.23–0.5 ³²	0.2–0.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1 ³²	NS	NS	NS	NS
Envive	10	4	30	12	18	10	18	18	30	30	12	30	30	18	4	12	NR	30	12 ⁹	18	4	
Eptam	NR	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	AH
Evik	11	3	11	11	11	11	11	11	11	11	11	11	10	11	3	11	11	11	11	11	3	
Expert	SY	NY	SY	SY	SY	NR	NY	SY	SY	SY	SY	SY	SY	SY	NY	NR ¹⁰	NY	SY	SY	SY	NY	
Extreme	4	4	NR	2	18	8.5 ⁸	18	18	18	40B	NR	189/40B	26	40B	4	18	NR	40B	18 ⁹ /40B	18	3	
Facet L	24B	10	10	10	10	10	10	10	10	10	24B	24B	24B	10	10	NR	10	10	24B	10	NR	
Fierce	10	11–12 ¹	11	11	18	0.25–1 ¹	18	18	18	18	11	18	4	18	11–12 ¹	18	NR	18	18	18	1–2 ¹	
Fierce XLT ¹	18	18	18–30	18–30	18–30	10–18	18–30	18–30	18–30	18–30	18–30	18–30	18–30	18–30	18	18	NR	18–30	18 ⁹	18–30	4	
Finesse Cereal and Fallow (0.4 oz)	B	10–16 ¹	B	B	B	18	B	B	B	B	B	B	10	B	0–4 ¹	4–18 ¹	18 ¹⁴	B	B	B	0–4 ¹	
FirstRate	9	12	9	9	18	9	18	18	18	18	9	18	18	18	18	9	NR	18	18	18	4	
Flexstar/Flexstar GT	18	4	4	NR	18	10	10	12	12	18	4	10 ⁹ /12	NR	10	4	18	NR	12	10 ⁹ /12	10	4	
FulTime/Keystone	15	15	SY	SY	SY	NR	NR	SY	SY	SY	15	SY	15	SY	15	NY	NY	SY	SY	SY	15	

E 2. Weed Control

Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter	
Fusilade/Fusion	2	2	2	1	2	2	2	2	2	NR	1	1	2	1	2	2	NR	2	2	2	2	
Glyphosate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Goal/GoalTender	2	10	1-2	2	1	10	10	2	2-3 ¹	4 ¹	2	1 ⁹	2	2	10	10	0.25	3	1 ⁹	1-2 ¹	10	
Gramoxone/paraquat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
GrazonNext HL	24B	12	24B	24B	24B	12	12	24B	24B	24B	24B	24B	24B	24B	12	24B	24B	24B	24B	24B	24B	12
Grazon P+D	B	2	B	B	B	B	B	B	B	B	B	B	B	B	2	8	B	B	B	B	B	2
Halex GT	10	4.5	18	10 ¹	18	NR	NR	18	18	18	10 ¹	18	10	18	4.5	NR ¹⁰	10	18	18	18	4.5	
Harmony Extra SG	1.5	NR	1.5	1.5	1.5	0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.5	0.25	1.5	1.5	1.5	NR	
Harmony SG	1.5	NR	1.5	1.5	1.5	NR	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	NR	NR	1.5	1.5	1.5	NR	
Harness	9	NS	SY	NS	SY	NR	NR	SY	SY	SY	NS	SY	NS	SY	NS	NR ¹⁰	NS	SY	SY	SY	4	
Harness Max	10	NY	18	18	18	NR	18	18	18	18	18	18	18	18	NY	NR ¹⁰	10	18	18	18	4	
Harness Xtra	SY	SY	SY	SY	SY	NR	NR	SY	SY	SY	SY	SY	SY	SY	SY	NS	NS	SY	SY	SY	SY	
Hornet/Stanza	10.5 ¹	4	10.5 ¹	18 ¹⁶	26B	NR	18 ¹⁶	26B	26B	26B	18 ¹⁶	26B	18	26B	4	12	10.5	26B	26B	26B	4	
Huskie	4 ¹	0.25	1	9	1	4	1	1	1	9 ¹	9	1	9	1	1	0.25	4	1	1	1	0.25	
Karmex	24	24	24	24	24	NY	24	24	24	24	24	24	24	24	24	NY	24	24	24	24	24	
Kerb ¹	NR	12	3-	3-4	3-6	12	12	3-6	3-6	3-6	3-4	3-6	3	3-6	12	12	3-4	3-6	3-6	3-6	12	
Keystone NXT	SY	15	SY	18	18	NR	NR	18	18	18	SY	18	SY	18	15	NY	NY	18	18	18	15	
Laudis	10	4	18	10	18	NR	NR	18	18	8 ¹	10	18	10	18	4	10	8	18	10	18	4	
LeadOff (1.5 oz)	10	3	18	10	18	NR	10	10	18	18	10	18	1	18	3	10	1 ¹	18	1	18	3	
Lexar/Lexar EZ	18	NY	18	18	18	NR	NR	18	18	18	18	18	18	18	NY	NR ¹⁰	NY	18	18	18	NY	

E 2. Weed Control

Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter	
Liberty	6	2.3	6	6	2.3	NR	NR	6	6	2.3	NR	6	2.3	6	2.3	6	NR	6	6	18	2.3	
Lightning	9.5	9.5	9.5	9.5	40B	8.5 ⁸	18	40B	40B	40B	9.5	40B	26	40B	4	18	9	40B	40B	40B	4	
Lorox/Linex	4	12	4	4	4	NR ¹	4	4	4	4	4	4	NR ¹	4	4	NR ¹	NR ¹	4	4	4	4	
Lumax/Lumax EZ	18	4.5	18	18	18	NR	NR	18	18	18	18	18	18	18	4.5	NR ¹⁰	NY	18	18	18	4.5	
Marvel	18	4	18	NR	18	10	18	18	18	18	10	4 ⁹	NR	18	4	18	NR	18	4 ⁹	18	4	
Matrix	4	12	10	10	12	NR	10	10	18	10	8	12	NR	12	12	18	4	18	NR	12	4	
Metribuzin	4	4 ¹	18	18	18	4	4	18	18	18	8	18	12	18	18	18	4	18	4	18	4 ¹	
Milestone	24B	12	24B	24B	24B	12	24B	24B	24B	24B	24B	24B	24B	24B	12	24B	24B	24B	24B	24B	24B	12
Optill ¹	4	9.5	4	4	40B	8.5 ⁸	18	18	40B	40B	4	18	26	40B	4-18	18	0-1	40B	18	40B	4 ⁸	
Osprey	10	1	10	10	10	3	10	10	10	10	3	10	10	10	10	3	3	10	10	10	0.25	
Outlook ¹	4-6	4	6-9	6-9	6-9	NR	NR	6-9	6-9	6-9	4	6-9	6-9	6-9	4	NR ¹⁰	NR	6-9	6-9	6-9	4	
Outrider	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	NR
Overdrive	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PastureGard	NI	4	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	4
Peak (0.25 oz) ¹	22	NR	22	10	22	1 ⁸	10	22	22	22	10	22	22	22	NR	1	10	22	22	22	NR	
Permit	9	2	NI	2	15	1 ⁸	3	2	9	18	9	10	9	9	2	2	9 ¹	9	2	9	2	
Permit Plus	9	2	NI	2	15	1	3	2	9	18	9	10	9	9	2	2	9 ^{1,14}	9	2 ⁹	9	2	
Poast	NR	30	NR	NR	NR	30	30 ³³	NR	NR	NR	NR	NR	NR	NR	30	30	NR	NR	NR	NR	30	
PowerFlex HL	9	9	12	12	12	9	9	12	12	12	9	12	9	12	12	9	3 ¹	12	12	12	1	
Prefar ¹	4	4	4	4	NR	4	4	NR	NR	NR	4	NR	4	NR	4	4	4	NR	NR	NR	4	

E 2. Weed Control

Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter
Prefix	18	4.5	4	NR	18	10	10	12	12	18	4	10 ⁹	1	10	4.5	18	NR	12	10 ⁹	10	4.5
Princep	SY	NY	SY	SY	SY	NR	NY	SY	SY	SY	SY	SY	SY	SY	NY	NY	NY ¹⁷	SY	SY	SY	NY
Prowl H2O	6 ¹	4 ¹	NR	NR	NY	NR ¹⁸	NR ¹⁸	NY	NR	NY	NR	NR ¹	NR ¹	NY	NY	NY	NR	NR	NR ¹	NR	4 ¹
Pursuit ¹	4	4 ¹	NR	2	18	8.5 ⁸	18	18	18	18	NR	18 ⁹	18 ¹	40B	4	18	NR	40B	18 ⁹	18	4
Python/Accolade	4	4	4	4 ¹	26B	NR	18 ¹	26B	26B	26B	4	26B	12	26B	4	12	NR	26B	26B	26B	4
Raptor	3	9 ¹	NR	NR	9	8.5 ⁸	8.5	9	9	9	NR	9	9 ¹	9	4	9	NR	9	9	9	3
Realm Q	10	4	18	10 ¹	18	NR	10	18	18	18	10 ¹	18	10	18	4	10	10	18	18	18	4
Reflex	18	4	4	NR	18	10	10	12	12	18	4	10 ⁹	NR	10	4	18	NR	12	10 ⁹	10	4
Remedy Ultra ³⁰	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Resicore	10.5 ²⁸	10.5 ²⁸	18	18	18	NR ²⁸	10.5	18	18	18	18	18	18	18	10.5 ²⁸	10.5 ²⁸	10.5 ²⁸	18	18	18	4
Resolve (1 oz)	10	18	18	10	18	NR	10	10	18	18	10	18	NR	18	18	10	10 ¹⁴	18	1	18	3
Resolve Q (1.25 oz)	10	3	18	10	18	NR	10	10	18	18	10	18	NR	18	3	10	2 ¹	18	1	18	3
Resource	1	1	1	1	1	NR	1	1	1	1	1	1	1	1	1	1	NR	1	1	1	1
Revulin Q	10 ¹	4	18	18	18	NR	10 ²⁰	18	18	18	18	18	10 ¹	18	4	10 ¹	10	18	18	18	4
Ro-Neet	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
Sandea	9	2	36	2	15	1 ⁸	3	2	9	18	9	10	9	9	2	2	9 ¹	9	2	9	2
Scepter ¹	18	11	11	11	18	9.5 ¹³	18	18	18	18	18	18	18	18	18	11	NR	18	18	18	3
Select/Select Max	NR	1	NR	NR	NR	0.2	1	NR	NR	NR	NR	NR	NR	NR	1	1	NR	NR	NR	NR	1
Sentrallas	4	NR	4	4	4	NR	4	4	4	4	4	4	4	4	4	NR	4 ¹	4	4	4	NR
Sequence	4	4.5	NR	NR	NY	NR	NI	NI	NI	NI	NR	NY	NY	NI	4.5	NR	NR	NI	6 ¹	NI	4.5

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Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter
Sharpen (1 oz) ¹	4	NR	4	4	4	NR	0.5	4	4	4	NR	4	4	4	NR	NR	0-1	4	4	4	NR
Shieldex	9	3	12	9	9	NR	NR	9	9	12	9	12	9	9	3	9	9	9	9	9	3
Sierra ¹	24	9	24	24	24	11	24	24	24	24	11	24	9	24	24	24	9 ¹⁴	24	24	24	NR
Sinbar	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Solicam	16	24B	24B	24B	24B	24B	24B	24B	24B	24B	24B	24B	24B	24B	24B	24B	1.5-16 ¹	24B	24B	24B	24B
Sonalan	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	NR	AH	AH	AH	AH
Spartan	12	4	NR	12B	NR	10	18	12B	12B	12B	12B	12B	12B	12B	4	10 ¹	NR	12B	NR ⁹	12B	4
Spartan Charge	12	4	12B ¹	12B	NR ⁹	4	12	12B	12B	12B	12B	12B	4	12B	4	10 ¹	NR	12B	NR ⁹	12B	4
Spin-Aid	AH	4	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	4	AH	AH	AH	AH	AH	4
Spirit	18	3	18	10	10	1 ⁸	8	18	18	18	10	18	10	18	3	10	10	18	10	18	3
Spur	10.5	NR	10.5B	10.5B	NR	NR	NR	10.5	10.5B	10.5	18	10.5B	18	10.5B	10.5B	10.5	10.5-18	10.5B	10.5B	10.5B	NR
Starane Ultra	4	NR	4	4	4	NR	NR	4	4	4	4	4	4	4	NR	NR	4 ³¹	4	4	4	NR
Status	1 ⁵	1 ⁵	4	4	4	0.25	4	4	4	4	4	4	4	4	1 ⁵	1 ⁵	1 ⁵	4	4	4	1 ⁵
Steadfast Q	10 ¹	4	10-18	10	18	NR	10 ²⁰	10-18	10-18	10-18	10	10-18	10 ¹	10-18	4	10-18	0.5	10-18	10-18	10-18	4
Stinger	10.5	NR	18B	18B	NR	NR	10.5	18B	18B	10.5	18B	18B	18B	18B	18B	10.5	10.5 ¹	18B	18B	18B	NR
Storm	3.3	1.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	1.5	3.3	NR	3.3	3.3	3.3	1.5
Stout	10 ¹	4	18	10	18	NR	10 ²⁰	18	18	18	10	18	10 ¹	18	4	10	0.5	18	18	18	4
SureStart/TripleFLEX	NY ¹	NY	26B	26B	26B	NR	18 ¹	26B	26B	26B	NY	26B	18	26B	NY	12	NY ¹	26B	26B	26B	4
Surpass NXT	9	NY	NY	NY	NI	NR	NR	NI	NI	NI	NY	NI	NY	NI	NY	NR ¹⁰	NY	NI	NY	NI	4

E 2. Weed Control

Trade Name	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Peas	Pepper	Potato, white	Pumpkin	Rye, winter	Sorghum, grain	Soybean	Squash	Tomato	Watermelon	Wheat, winter
Surveil	10	30B	9	9	30B	9	18	30B	30B	30B	9	30B	18	30B	30B	9	NR	30B	30B	30B	3
Synchrony XP ¹	12	3	30	9	18	9	18	18	30	30	9	30	30	18	3	9	NR	30	9 ⁹	18	3
Targa	4	NR	4	NR	4	4	4	4	4	4	NR	4	4	4	4	4	NR	4	4	4	NR
Tavium	6	4.5	6	6	6	4	4	12	12	6	6	6	6	6	4.5	6	1 ¹	12	6	12	4.5
Treflan	NR	NR	NR	NR	NR	NR	5	5	5	NR	NR	NR ⁹	NR	5	NR	NR	NR	5	NR	5	NR
Trivence	10	4	30	30	18	10 ¹	18	18	30	30	12	30	30	18	30	18	NR	30	12 ⁹	18	4
Ultra Blazer	3.3	1.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	1.5	3.3	NR	3.3	3.3	3.3	1.5
Valor (up to 3 oz)	5 ¹¹	4	6-12B	4	6-12B	0.5-1 ¹	4	6-12B	6-12B	6-12B	4	6-12B	5 ¹¹	6-12B	4	1	NR	12	6-12B	6-12B	2 ¹¹
Valor XLT ²²	12	4	18	12	18	10	18	18	18	18	12	18	18	18	4	10	NR	18	12-18 ⁹	18	4
Varisto	3	9 ²⁹	NR	NR	9	8.5 ²⁹	8.5	9	9	9	NR	9	9 ²⁹	9	4	9	NR	9	9	9	3 ²⁹
Verdict	7	4	7	7	7	NR	NR	7	7	7	4	7	7	7	4	NR	NR	7	7	7	4
Vida	1	1 day	1 day	1 day	1 day	NR	1	1 day	1 day	1 day	1 day	1 day	NR	1 day	1 day	1 day	NR	1 day	1 day	1 day	NR
Warrant	9	NY	NY	NY	NI	NR	NY	NI	NI	NI	SY	SY	NY	SY	NY	NR ¹⁰	NR	NI	NI	NI	4
Warrant Ultra	18	4	NY	NY	NI	10	10	NI	NI	NI	10	NI	NI	NI	4	18	NR	NI	NI	NI	4
XtendiMax ¹	4	1	4	4	4	NR	4	4	4	4	4	4	4	4	1	0.5 ¹	1	4	4	4	1
Yukon	9	2	NI	2	15	1 ⁸	3	9	9	18	9	10	9	9	2	2	9 ¹	9	2 ⁹	9	2
Zemax	18	4.5	18	18	18	NR	NR	18	18	18	18	18	NY	18	4.5	NR ¹⁰	NY	18	18	18	4.5
Zeus XC	12	4	12B	12B	NR ⁹	10	18	12B	12B	12B	12B	12B	12B	12B	4	10 ¹	NR	12B	NR ⁹	12B	4
Zidua (3 oz or 5 fl oz) ¹	10	11	11	11	18	NR	NR	18	18	18	11	18	4	18	11	10	NR	18	18	18	4

¹ Read the label for additional restrictions due to application rate, timing, geographical region, rainfall, soil pH, tillage, variety, or supplemental labeling.

² 18 months with a soil pH > 6.5. At rates greater than 2.1 oz/A, a rotation interval of 30 months and a successful field bioassay are required.

E 2. Weed Control

- ³ Rotation interval for lima bean is 18 months if Armezon PRO is applied at greater than 20 fl oz/A. Rotation interval for pea and snap bean is extended to 18 months if Armezon PRO is applied at greater than 25 fl oz/A.
- ⁴ Cotton may be planted after 12 months where Authority Elite/BroadAxe was applied at rates less than 36 oz/A, Authority MTZ DF at rates less than 17 oz/A, or Authority First/Sonic at rates less than 5 oz/A and the following conditions are met: medium and fine soils, pH < 7.2, and rainfall or irrigation must exceed 15 inches after herbicide application and prior to planting cotton.
- ⁵ Following application of Banvel/Clarity and a minimum of 1 inch of rainfall or overhead irrigation, a waiting interval of 21 days is required per 8 fluid ounces per acre applied prior to planting cotton, 30 days per pint restriction for soybean, and 20 days per pint restriction for small grains. If less than 1 inch of rainfall or irrigation is received after application and Status is applied at greater than 5 oz/A, the rotation interval is 4 months.
- ⁶ If Basis rate is 0.33 to 0.5 oz/A or Basis Blend rate is 1.25 oz/A, alfalfa, sorghum, pea = 18 months; soybean, snap bean = 10 months; STS soybean = 1 month; spring oat = 9 months; if Basis rate is greater than 0.5 oz/A or Basis Blend rate is 2.5oz/A, cotton = 10 months and 18 months if greater than and less than 15 inches of rainfall or irrigation occur after application and prior to planting, respectively; STS soybean = 4 months; if Basis rate is 0.33 oz/A or Basis Blend rate is 0.825, soybean = 0.5 month.
- ⁷ 8 months if 0.38 oz/A Beacon is applied.
- ⁸ NR for IMI (IR/IT) or Clearfield (CL) varieties.
- ⁹ Transplanted.
- ¹⁰ Use safener with seed.
- ¹¹ Cotton may be planted no-till or strip-till after 14 or 21 days when applied at 1 oz/A or 1.5 to 2 oz/A, respectively. For winter wheat, at rates up to 2 oz/A, the rotation interval is 7 days for no-till or minimum-till wheat and 30 days for conventional-till wheat. At least 1 inch of rainfall/irrigation must occur between application and cotton, field corn, grain sorghum, tobacco, or wheat planting, or crop injury may occur. For alfalfa, clover, potato, and spring oats the rotation interval is 5 months if the soil is tilled prior to planting or 10 months if no tillage is preformed prior to planting. At lower rates of Valor/Rowel/Chateau, rotation interval for many crops are reduced. Consult labels for more specific information.
- ¹² Command may be applied preemergence to cotton only if Di-Syston or Thimet insecticides are applied in furrow with the seed at planting.
- ¹³ Corn hybrids that are classified as IMI-corn or as tolerant (IT) or resistant (IR) may be planted in the spring of the year following regardless of rainfall or time interval from chemical treatment to corn planting. Rotation interval varies by tillage type and use rate. Consult the label for specific rotation intervals.
- ¹⁴ Rotation interval is shorter for STS soybean.
- ¹⁵ Transplanted tobacco = 10 months if ≤ 0.3 oz/A.
- ¹⁶ If Hornet WDG rate is < 4 oz/A, snap beans, peas, and some varieties of sweet corn = 10.5 months.
- ¹⁷ If no more than 2 lb ai applied the previous year.
- ¹⁸ Regardless of tillage, be sure to plant corn at least 1.5 inches deep and completely cover with soil.
- ¹⁹ Cotton may be planted 9.5 months following Pursuit if all of the following criteria are met: Pursuit is applied to peanuts only; soil texture is sandy loam or loamy sand only; and greater than 16 inches of rainfall/irrigation is received following application of Pursuit through October of the application year.
- ²⁰ The rotation interval for the sweet corn varieties 'Merit', 'Carnival', and 'Sweet Success' is 15 months.
- ²¹ Transplanted tobacco may be planted 10 months after application of 2.1 oz/A of Surveil. Tobacco in seeded nurseries may be planted 18 months after application of 2.1 oz/A of Surveil and following a successful field bioassay. At rates greater than 2.1 oz/A, a rotation interval of 30 months and a successful field bioassay are required.
- ²² Rotation intervals based on soil pH less than 7.0. In Pennsylvania, rotation interval for clover, lima bean, muskmelon, onion, pepper, spring oat, squash, and white potato is 18, 30, 30, 30, 30, 30, 30, and 30 months, respectively. Consult seed corn agronomist regarding inbred sensitivity to Valor XLT/Rowel FX prior to planting inbred seed corn lines.
- ²³ If applied after June 1, rotating to crops other than corn (all types) may result in crop injury.
- ²⁴ For Bolt or non-Bolt soybean and minimum- or no-till field corn, if Afforia is used on coarse textured soils, such as sands and loamy sands, or on high-pH soils (>7.9), extend time to planting by 7 additional days. For minimum- or no-till wheat in the states of DE, MD, NJ, or VA, Afforia may be applied at a minimum 7 days before planting. Do not use on Durum wheat and do not irrigate between emergence and spike. Wheat must be planted at least 1 inch deep. Do not graze until wheat has reached 5 inches in height. For conventional-till field corn, grain sorghum, cotton, and wheat, at least 1 inch of rainfall/irrigation must occur between application and planting or crop injury may occur. For alfalfa, cabbage, clover, cucumber, lima bean, muskmelon, onion, pepper, pumpkin, spring oat, squash, sweet corn, tobacco, tomato, watermelon, and white potato, the rotation interval is 4 months if the soil is tilled prior to planting. If no tillage is performed prior to planting these crops, the rotation interval is extended to 8 months.
- ²⁵ Rotation interval for spring oat, or winter barley at 5.7 oz/A or greater rates is extended to 18 months. For winter wheat, at 5.7 oz/A or greater rates, the rotation interval is extended to 6 months.
- ²⁶ Seed corn inbred lines vary in sensitivity to herbicides; therefore, users should seek advice from seed corn agronomist regarding inbred sensitivity to Canopy Blend prior to planting inbred seed corn.
- ²⁷ For onion, the rotation interval for irrigated and nonirrigated is 8 and 18 months, respectively.
- ²⁸ For corn, if the original corn crop is lost, do not make a second application. Injury may occur to soybean planted the year following application on soils having a calcareous subsurface layer if products containing atrazine were used at rates greater than 0.75 lb/ai atrazine per acre in tank mixtures and/or sequentially with Resicore. If Resicore is applied after June 1, rotating to crops other than corn or grain sorghum the next spring may result in crop injury.
- ²⁹ NR for Clearfield corn (field and seed). For wheat, planting non-Clearfield cultivars in areas receiving less than 10 inches of precipitation from time of application up until wheat planting may result in wheat injury. Injury potential increases if less than normal precipitation occurs in the 2 months just after Varisto application. For barley, the rotation interval at pH > 6.2 and > 18 inches of rainfall/irrigation, pH < 6.2 and < 18 inches of rainfall/irrigation and with moldboard plowing, and pH < 6.2 and < 18 inches rainfall/irrigation and without moldboard plowing is 9, 9, and 18 months, respectively. For potato, the rotation interval at pH > 6.2 and > 18 inches of rainfall/irrigation and pH < 6.2 and < 18 inches of rainfall/irrigation is 9 and 18 months, respectively.
- ³⁰ Rotation information is unknown for this product. Contact manufacturer for recommendations.
- ³¹ In Delaware and Virginia, a Special Local Needs Label 24(c) has approved a 3-month plant-back restriction for soybean after an application to winter wheat.
- ³² NR for Enlist varieties.
- ³³ NR for Poast-Protected hybrids.

2.4 Prepackaged Herbicide Mixtures

Table E-4. Prepackaged Herbicide Mixtures Available for Various Vegetable Crops and the Components of the Mixtures

Trade Name	Components (ai/gal or lb)	WSSA Site of Action Number	If You Apply (per acre)	You Have Applied (ai per acre)	Equivalent to a Tank Mixture of These Products (per acre)
Acuron 3.44SC	2.14 lb s-metolachlor	15	2.5 qt	1.34 lb s-metolachlor	1.4 pt Dual II Magnum 7.64E
	0.24 lb mesotrione	27		0.15 lb mesotrione	4.8 fl oz Callisto 4SC
	0.06 lb bicyclopyrone	27		0.038 lb bicyclopyrone	0.038 lb bicyclopyrone
	1 lb atrazine	5		0.625 lb atrazine	0.625 qt Atrazine 4L
Acuron Flexi 3.26SC	2.86 lb s-metolachlor	15	2 qt	1.43 lb s-metolachlor	1.5 pt Dual II Magnum 7.64E
	0.32 lb mesotrione	27		0.16 lb mesotrione	5.12 fl oz Callisto 4SC
	0.08 lb bicyclopyrone	27		0.04 lb bicyclopyrone	0.04 lb bicyclopyrone
Anthem Flex 4SE	3.733 lb pyroxasulfone	15	4.0 fl oz	0.117 lb pyroxasulfone	3.5 fl oz Zidua 4.17SC
	0.267 lb carfentrazone	14		0.008 lb carfentrazone	0.54 fl oz Aim 2EC
Armezon PRO 5.35 EC	0.1 lb topramezone	27	24 fl oz	0.017 lb topramezone	0.76 fl oz Armezon 2.8SC
	5.25 lb dimethenamid	15		0.84 lb dimethenamid	18 fl oz Outlook 6E
Authority Elite 7SE	0.7 lb sulfentrazone	14	25 fl oz	0.13 lb sulfentrazone	4.2 fl oz Zeus 4L OR 5.3 fl oz Spartan Charge 3.5EC
	6.3 lb s-metolachlor	15		1.23 lb s-metolachlor	1.29 pt Dual Magnum 7.62E
Bicep II Magnum 5.5L	2.4 lb s-metolachlor	15	2.1 qt	1.26 lb s-metolachlor	1.33 pt Dual II Magnum 7.64E
	3.1 lb atrazine	5		1.63 lb atrazine	1.63 qt Atrazine 4L
BroadAxe XC 7SE	0.7 lb sulfentrazone	14	25 fl oz	0.13 lb sulfentrazone	4.2 fl oz Zeus 4L OR 5.3 fl oz Spartan Charge 3.5EC
	6.3 lb s-metolachlor	15		1.23 lb s-metolachlor	1.29 pt Dual Magnum 7.62E
Degree Xtra 4.04ME	2.7 lb acetochlor	15	3 qt	2.03 lb acetochlor	4.3 pt Degree 3.8ME
	1.34 lb atrazine	5		1 lb atrazine	1 qt Atrazine 4L
Harness Xtra 5.6L	0.74 lb dimethenamid	15	2.5 qt	1.94 lb acetochlor	2.21 pt Harness 7E
	1.44 lb atrazine	5		1.56 lb atrazine	1.56 qt Atrazine 4L
Keystone NXT 5.6SE	3.1 lb acetochlor	15	2.5 qt	1.94 lb acetochlor	2.22 pt Surpass NXT 7E
	2.5 lb atrazine	5		1.57 lb atrazine	3.15 pt Atrazine 4L
Lexar EZ 3.7SC	1.74 lb s-metolachlor	15	3 qt	1.3 lb s-metolachlor	1.36 pt Dual II Magnum 7.64E
	0.224 lb mesotrione	27		0.168 lb mesotrione	5.36 oz Callisto 4SC
	1.74 lb atrazine	5		1.3 lb atrazine	1.3 qt Atrazine 4L
Lumax EZ 3.6SC	2.49 lb s-metolachlor	15	2.7 qt	1.67 lb s-metolachlor	1.75 pt Dual II Magnum 7.64E
	0.249 lb mesotrione	27		0.168 lb mesotrione	5.36 oz Callisto 4SC
	0.935 lb atrazine	5		0.625 lb atrazine	0.625 qt Atrazine 4L
Revulin Q 51.2WDG	0.144 lb nicosulfuron	2	4 oz	0.036 lb nicosulfuron	1.1 oz Accent Q WG
	0.368 lb mesotrione	27		0.094 lb mesotrione	3 fl oz Callisto 4SC
Spartan Charge 3.5EC	3.15 lb sulfentrazone	14	3.5 fl oz	0.09 lb sulfentrazone	2.8 fl oz Zeus 4L
	0.35 lb carfentrazone	14		0.01 lb carfentrazone	0.6 fl oz Aim 2EC
Strategy 2.1SC	1.6 lb ethalfluralin	3	3 pt	0.61 lb ethalfluralin	26 fl oz Curbit 3EC
	0.5 lb clomazone	13		0.19 lb clomazone	8 fl oz Command 3ME
Varisto 4.187SL	4 lb bentazon	6	21 fl oz	0.65 lb bentazon	21 fl oz Basagran 4L
	0.187 imazamox	2		0.03 lb imzamox	4 fl oz Raptor 1L
Verdict 5.57EC	5 lb dimethenamid	15	13 fl oz	0.5 lb dimethenamid	11 fl oz Outlook 6EC
	0.57 lb saflufenacil	14		0.058 lb saflufenacil	2.6 fl oz Sharpen 2.85L
Zemax 3.67SC	3.34 lb s-metolachlor	15	2 qt	1.67 lb s-metolachlor	1.75 pt Dual II Magnum 7.64E
	0.33 lb mesotrione	27		0.165 lb mesotrione	5.36 fl oz Callisto 4SC

2.5 Herbicide Site of Action: Reducing the Risk of Herbicide Resistance

Reducing the risk for developing herbicide-resistant weed populations requires incorporating a number of guidelines in managing your fields. These guidelines include:

- Spray only when necessary
- Use alternative methods of control whenever possible such as mechanical cultivation or using cover crops, delayed planting (row crops), mowing (forage crops), and using weed-free crop seeds
- Rotate crops and their accompanying herbicides' site of action (WSSA Group Number, see note below)
- Limit the number of applications of herbicide(s) with the same site of action in a given growing season
- Use mixtures or sequential herbicide treatments with different sites of action that will control the weeds of concern
- Scout fields after herbicide application to detect weed escapes or shifts
- Clean equipment before leaving fields infested with or suspected to have resistant weeds

Note: WSSA Group Number

A classification of herbicides based on site of action, was developed to better understand and plan for resistance management. Rotating herbicides with differing sites of action is important for minimizing the risk of developing herbicide-resistant weeds. The system was developed by the Weed Science Society of America (WSSA) (See: E. James Retzinger and Carol Mallory-Smith. 1997. Classification of Herbicides by Site of Action for Weed Resistance Management Strategies. Weed Technology volume 11, pages 384 to 393).

Table E-5. Important Herbicide Groups for Commercial Vegetables

In the table below, important herbicide groups for vegetable crops grown in the Mid-Atlantic region are listed with their sites of action. Note that more than one herbicide family may have the same site of action.

Trade Name	Active Ingredient	WSSA Group	Herbicide Class	Site of Action
2,4-D	2-4-D	4	Plant growth regulators	IAA-like
Accent Q	nicosulfuron	2	Amino acid biosynthesis	ALS (acetolactate synthase)
Aim	carfentrazone	14	Cell membrane disrupters	PPO (oxidase)
Armezon	topramezone	27	Pigment inhibitors	HPPD (4-hydroxyphenyl-pyruvatedioxygenase)
Assure II	quizalofop	1	Fatty acid (Lipid) biosynthesis inhibitors	ACCase (acetyl coA carboxylase)
Atrazine	atrazine	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Banvel	dicamba	4	Plant growth regulators	IAA-like
Basagran	bentazon	6	Photosynthesis inhibitors (non-mobile)	Photosystem II
Cadet	fluthiacet	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Callisto	mesotrione	27	Pigment inhibitors	HPPD (4-hydroxyphenyl-pyruvatedioxygenase)
Caparol	prometryn	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Chateau	flumioxazin	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Clarity	dicamba	4	Plant growth regulators	IAA-like
Command	clomazone	13	Pigment inhibitors	Diterpenes (carotenoid biosynthesis)
Curbit	ethalfluralin	3	Seedling growth inhibitors (Root)	Microtubule inhibitors
Dacthal	DCPA	3	Seedling growth inhibitors (Root)	Microtubule inhibitors
Devrinol	napropamide	15	Seedling growth inhibitors (Shoot)	mitosis inhibitor
Dimetric	metribuzin	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Dual Magnum	s-metolachlor	15	Seedling growth inhibitors (Shoot)	mitosis inhibitor
Eptam	EPTC	8	Seedling growth inhibitors (Shoot)	Lipid synthesis inhibitors
Fusilade	fluazifop	1	Fatty acid (Lipid) biosynthesis inhibitors	ALS (acetolactate synthase)
Glory	metribuzin	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Glyphosate	glyphosate	9	Amino acid biosynthesis	EPSPS-enzyme
Goal	oxyfluorfen	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Goal Tender	oxyfluorfen	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Gramoxone	paraquat	22	Cell membrane disrupters	Photosystem I
Harness	acetochlor	15	Seedling growth inhibitors (Shoot)	mitosis inhibitor

Table E-5. - continued on next page.

E 2. Weed Control

Table E-5. Important Herbicide Groups for Commercial Vegetables - continued

Trade Name	Active Ingredient	WSSA Group	Herbicide Class	Site of Action
Impact	topramezone	27	Pigment inhibitors	HPPD (4-hydroxyphenyl-pyruvatedioxygenase)
Karmex	diuron	7	Photosynthesis inhibitors (mobile 2)	Photosystem II
Kerb	pronamide	3	Seedling growth inhibitors (Shoot)	mitosis inhibitor
Laudis	tembotrione	27	Pigment inhibitors	HPPD (4-hydroxyphenyl-pyruvatedioxygenase)
Liberty	glufosinate	10	Phosphorylated amino acid (N metabolism disrupter)	Glutamine synthetase
Linex	linuron	7	Photosynthesis inhibitors (mobile 2)	Photosystem II
Lorox	linuron	7	Photosynthesis inhibitors (mobile 2)	Photosystem II
Maestro	bromoxynil	6	Photosynthesis inhibitors (non-mobile)	Photosystem II
Matrix	rimsulfuron	2	Amino acid biosynthesis	ALS (acetolactate synthase)
Metribuzin	metribuzin	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Outlook	dimethenamid	15	Seedling growth inhibitors (Shoot)	mitosis inhibitor
Permit	halosulfuron	2	Amino acid biosynthesis	ALS (acetolactate synthase)
Poast	sethoxydim	1	Fatty acid (Lipid) biosynthesis inhibitors	ALS (acetolactate synthase)
Prefar	bensulide	8	Seedling growth inhibitors (Shoot)	Lipid synthesis inhibitors
Prowl	pendimethalin	3	Seedling growth inhibitors (Root)	Microtubule inhibitors
Prowl H2O	pendimethalin	3	Seedling growth inhibitors (Root)	Microtubule inhibitors
Pursuit	imazethapyr	2	Amino acid biosynthesis	ALS (acetolactate synthase)
Raptor	imazamox	2	Amino acid biosynthesis	ALS (acetolactate synthase)
Reflex	fomesafen	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Reglone	diquat	22	Cell membrane disrupters	Photosystem I
Rely	glufosinate	10	Phosphorylated amino acid (N metabolism disrupter)	Glutamine synthetase
Ro-Neet	cycloate	8	Seedling growth inhibitors (Shoot)	Lipid synthesis inhibitors
Roundup	glyphosate	9	Amino acid biosynthesis	EPSPS-enzyme
Sandea	halosulfuron	2	Amino acid biosynthesis	ALS (acetolactate synthase)
Select	clethodim	1	Fatty acid (Lipid) biosynthesis inhibitors	ALS (acetolactate synthase)
Sharpen	saflufenacil	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Sinbar	terbacil	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Solicam	norflurazon	12	Pigment inhibitors	PDS (carotenoid biosynthesis)
Spin-Aid	phenmedipham	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Spur	clopyralid	4	Plant growth regulators	IAA-like
Starane Ultra	fluroxypyr	4	Plant growth regulators	IAA-like
Stinger	clopyralid	4	Plant growth regulators	IAA-like
Surpass	acetochlor	15	Seedling growth inhibitors (Shoot)	mitosis inhibitor
Targa	quizalofop	1	Fatty acid (Lipid) biosynthesis inhibitors	ALS (acetolactate synthase)
Thistrol	MCPB	4	Plant growth regulators	IAA-like
Treflan	trifluralin	3	Seedling growth inhibitors (Root)	Microtubule inhibitors
TriCor	metribuzin	5	Photosynthesis inhibitors (mobile 1)	Photosystem II
Valor	flumioxazin	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Weedar 64	2-4-D	4	Plant growth regulators	IAA-like
Zeus	sulfentrazone	14	Cell membrane disrupters	PPO (protoporphyrinogen oxidase)
Zidua	pyroxasulfone	15	Seedling shoot inhibitor	Mitosis inhibitor