

4. HERBICIDES USED IN ONTARIO

TABLE 4–1. Herbicides Used in Ontario

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LEGEND: DC = dispersible concentrate DF = dry flowable DG = dry granules DS = dry soluble EC = emulsifiable concentrate EM = emulsion
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 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
2,4-D Amine	2,4-D AMINE 600	Sn	564 g/L	4	5931	4	B	12 hrs	2 hrs	Loveland Products
2,4-D Amine	2,4-D AMINE 600, IPCO	Sn	564 g/L	4	17511	4	B	12 hrs	2 hrs	Interprovincial Co-op
2,4-D Amine	2,4-D AMINE 600, NUFARM	Sn	564 g/L	4	14726	4	B	12 hrs	2 hrs	Nufarm
2,4-D AMINE 600	2,4-D	Sn	564 g/L	4	5931	4	B	12 hrs	2 hrs	Loveland Products
2,4-D AMINE 600, IPCO	2,4-D	Sn	564 g/L	4	17511	4	B	12 hrs	2 hrs	Interprovincial Co-op
2,4-D AMINE 600, NUFARM	2,4-D	Sn	564 g/L	4	14726	4	B	12 hrs	2 hrs	Nufarm
2,4-D Ester	2,4-D ESTER 700, ADAMA	EC	660 g/L	4	31698	3	A	12 hrs	2 hrs	Adama Canada
2,4-D Ester	2,4-D ESTER 700, IPCO	EC	660 g/L	4	20310	3	A	12 hrs	2 hrs	Interprovincial Co-op
2,4-D Ester	2,4-D ESTER 700, NUFARM	EC	660 g/L	4	27820	3	A	12 hrs	2 hrs	Nufarm
2,4-D Ester	2,4-D ESTER 700, SALVO	EC	660 g/L	4	27818	3	A	12 hrs	2 hrs	Loveland Products
2,4-D ESTER 700, ADAMA	2,4-D	EC	660 g/L	4	31689	3	A	12 hrs	2 hrs	Adama Canada
2,4-D ESTER 700, IPCO	2,4-D	EC	660 g/L	4	20310	3	A	12 hrs	2 hrs	Interprovincial Co-op
2,4-D ESTER 700, NUFARM	2,4-D	EC	660 g/L	4	27820	3	A	12 hrs	2 hrs	Nufarm
2,4-D ESTER 700, SALVO	2,4-D	EC	660 g/L	4	27818	3	A	12 hrs	2 hrs	Loveland Products
2,4-D choline/ glyphosate	ENLIST DUO	Sn	194 g/L 204 g/L	4 9	30958	3	A	48 hrs	2 hrs	Corteva
2,4-DB	CALIBER 625	EC	625 g/L	4	27910	3	A	12 hrs	2 hrs	Loveland Products
2,4-DB	COBUTOX 625	EC	625 g/L	4	28346	3	A	12 hrs	2 hrs	Interprovincial Co-op
2,4-DB	EMBUTOX	EC	625 g/L	4	19217	3	A	12 hrs	2 hrs	Nufarm

¹ The amount of active ingredient in the unit of formulated herbicide and expressed as grams active ingredient per litre of product or the percentage of active ingredient per mass of product.

² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

³ The product registration number for this trade name under the *Pesticide Control Product Act*, commonly referred to as a “PCP number”. The PCP number has been placed in the guide for convenience, but the pesticide label in possession should always be used for the most accurate and current PCP number.

⁴ Refers to the numeric classification of pesticides under Regulation 63/09 of the *Pesticides Act*. Refer to Table 4–2. *Description for Ontario Classification of Pesticide Products*, for a description of each Ontario classification.

⁵ A = Does not need to be stored in a heated building, but its preferred; B = Cannot be stored at temperatures at or below 0°C; C = Store above 5°C to keep product from freezing and D = Store above 7°C, DO NOT FREEZE.

⁶ REI = Restricted Entry Interval, and is the period of time (in hours) after a pesticide has been applied that agricultural workers or anyone else must not do hand labour tasks (e.g. scouting) in treated areas. The REI allows the pesticide residues and vapours to dissipate to safe levels for work to be done. If an REI is not stated on the label, use a 12 hour REI.

⁷ Rainfast = Is the duration (in hours) needed after application before a rain event occurs so as to ensure that the herbicide will be adequately taken up by the target weed so as to maximize control.

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TABLE 4–1. Herbicides Used in Ontario (cont'd)

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common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
AATREX LIQUID 480	atrazine	Li	480 g/L	5	18450	3	A	12 hrs	2 hrs	Syngenta
ACCENT 75 DF	nicosulfuron	DF	75%	2	25116	3	A	12 hrs	2 hrs	Corteva
acifluorfen	ULTRA BLAZER	Sn	240 g/L	14	32330	3	B	12 hrs	6 hrs	UPL AgroSolutions
ACURON	bicylopyrone	Su	7.1 g/L	27	31846	4	B	12 hrs	–	Syngenta
	mesotrione		28.5 g/L	27						
	s-metolachlor		257 g/L	15						
	atrazine		120 g/L	5						
AIM EC	carfentrazone-ethyl	EC	240 g/L	14	28573	3	A	12 hrs	2 hrs	Nufarm
aminopyralid	MILESTONE	Sn	240 g/L	4	28517	3	A	12 hrs	2 hrs	Corteva
aminopyralid/ metsulfuron-methyl	CLEARVIEW	WG	52.5% 9.45%	4, 2	29752	3	A	24 hrs	2 hrs	Corteva
ANTLER 240 EC	clethodim	EC	120 g/L	1	32880	3	A	12 hrs	1 hr	Winfield Canada
ARMEZON	topramezone	Su	336 g/L	27	30131	3	C	12 hrs	2 hrs	BASF
ARMEZON PRO	dimethenamid-P	EC	630 g/L	15	32148	3	A	24 hrs	2 hrs	BASF
	topramezone		12.5 g/L	27						
ARMORY	diquat	EC	240 g/L	22	32726	3	B	24 hrs	15 min	Adama Canada
ARROW ALL-IN	clethodim	EC	120 g/L	1	33225	3	A	12 hrs	1 hr	Adama Canada
ASSIGNMENT ⁸ (PURSUIT + ROUNDUP WEATHERMAX)	imazethapyr + glyphosate	Su	240 g/L	2	21537	2	B	12 hrs	2 hrs	BASF
		Li	540 g/L	9	27487	4				
ASSURE II	quizalofop-p-butyl	EC	96 g/L	1	25462	3	C	12 hrs	1 hr	Amvac
atrazine	AATREX LIQUID 480	Li	480 g/L	5	18450	3	A	12 hrs	2 hrs	Syngenta
atrazine	CONVERGE 480	Li	480 g/L	5	26277	3	A	12 hrs	2 hrs	Bayer CropScience

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³ The product registration number for this trade name under the *Pesticide Control Product Act*, commonly referred to as a “PCP number”. The PCP number has been placed in the guide for convenience, but the pesticide label in possession should always be used for the most accurate and current PCP number.

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AUTHORITY 480	sulfentrazone	Su	480 g/L	14	29012	2	C	12 hrs	–	FMC
AUTHORITY SUPREME	pyroxasulfone/ sulfentrazone	Su	250 g/L 250 g/L	15 14	32562	2	C	12 hrs	–	FMC
AXIAL BIA	pinoxaden	EC	50 g/L	1	30431	3	B	12 hrs	1 hr	Syngenta
BADGE II	bromoxynil/ MCPA	EC	225 g/L 225 g/L	6 4	30370	3	A	24 hrs	2 hrs	Adama Canada
BARRICADE M [®] (BARRICADE SG + PERIMETER II + MCPA ESTER 600, NUFARM)	thifensulfuron methyl tribenuron methyl fluroxypyr MCPA	SG SG EC EC	25% 25% 333 g/L 600 g/L	2 2 4 4	29544 29544 30094 27803	3 3 3 3	A	12 hrs	1 hr	FMC
BASAGRAN FORTÉ	bentazon	Li	480 g/L	6	22006	4	C	12 hrs	6 hrs	BASF
BENGAL WB	fenoxaprop-p-ethyl	EC	120 g/L	1	30843	3	B	12 hrs	1 hr	Adama Canada
bentazon	BASAGRAN FORTÉ	Li	480 g/L	6	22006	4	C	12 hrs	6 hrs	BASF
bentazon	BROADLOOM	Li	480 g/L	6	32661	4	C	12 hrs	6 hrs	UPL AgroSolutions
bentazon/ acifluorfen	HURRICANE	Li	320 g/L 160 g/L	6/14	32662	2	C	48 hrs	4 hrs	UPL AgroSolutions
bicylopyrone mesotrione s-metolachlor atrazine	ACURON	Su	7.1 g/L 28.5 g/L 257 g/L 120 g/L	27 27 15 5	31846	4	B	12 hrs	–	Syngenta
BIFECTA [®] (TRICOR 75 DF + VALTERA)	metribuzin flumioxazin	DF WDG	75% 51.1%	5 14	30661 29320	3 4	A	12 hrs	–	Nufarm
BISON	tralkoxydim	Su	400 g/L	1	29256	3	C	12 hrs	1 hr	Adama

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BLACKHAWK	pyraflufen-ethyl 2,4-D Ester	EC	6.1 g/L 473 g/L	14 4	32111	3	A	12 hrs	2 hrs	Nufarm
BOLSTER	diquat	Sn	240 g/L	22	32540	3	B	24 hrs	15 min	Interprovincial Co-op
BONANZA 480	trifluralin	EC	480 g/L	3	28289	4	C	12 hrs		Loveland Products
BOOST M ⁸ (NUFARM BOOST + MCPA ESTER 600)	thifensulfuron methyl		50%	2						
	tribenuron methyl	SG	25%	2	30377	3	A	12 hrs	2 hrs	Nufarm
	MCPA Ester	EC	600 g/L	4	27803	3				
BOUNDARY LQD	s-metolachlor	EC	628 g/L	15	30812	3	A	12 hrs	–	Syngenta
	metribuzin		149 g/L	5						
BROADLOOM	bentazon	Li	480 g/L	6	32661	4	C	12 hrs	6 hrs	UPL AgroSolutions
BROADSTRIKE RC	flumetsulam	WG	80%	2	27004	3	A	12 hrs	1 hr	Corteva
BROMAX	bromoxynil	Li	480 g/L	6	31431	3	D	12 hrs	1 hr	Interprovincial Co-op
BROMOTRIL 240 EC	bromoxynil	EC	240 g/L	6	28276	3	D	12 hrs	1 hr	Adama Canada
bromoxynil	BROMAX	Li	480 g/L	6	31431	3	D	24 hrs	1 hr	Interprovincial Co-op
bromoxynil	BROMOTRIL 240 EC	EC	240 g/L	6	28276	3	D	24 hrs	1 hr	Adama Canada
bromoxynil	BROTEX 240	Li	240 g/L	6	28519	3	D	24 hrs	1 hr	Interprovincial Co-op
bromoxynil	BROTEX 480	Li	480 g/L	6	31348	3	D	24 hrs	1 hr	Interprovincial Co-op
bromoxynil	KORIL	EC	235 g/L	6	25341	3	D	24 hrs	1 hr	Nufarm
bromoxynil	PARDNER	EC	280 g/L	6	18001	3	D	24 hrs	1 hr	Bayer CropScience
bromoxynil MCPA	BADGE II	EC	225 g/L	4	30370	3	A	24 hrs	2 hrs	Adama Canada
			225 g/L	6						

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bromoxynil MCPA	LOGIC M, IPCO	EC	225 g/L 225 g/L	4 6	28109	3	A	24 hrs	2 hrs	Interprovincial Co-op
bromoxynil MCPA	MEXTROL 450	EC	225 g/L 225 g/L	4,6	26999	3	A	24 hrs	2 hrs	Nufarm
BROTEX 240	bromoxynil	LI	240 g/L	6	28519	3	D	24 hrs	1 hr	Interprovincial Co-op
BROTEX 480	bromoxynil	LI	480 g/L	6	31348	3	D	24 hrs	1 hr	Interprovincial Co-op
BUCTRIL M	bromoxynil/ MCPA	EC	280 g/L 280 g/L	4 6	18022	3	A	24 hrs	2 hrs	Bayer CropScience
CALIBER 625	2,4-DB	EC	625 g/L	4	27910	4	A	12 hrs	2 hrs	Loveland Products
CALLISTO	mesotrione	Su	480 g/L	27	27833	3	A	12 hrs	3 hrs	Syngenta
CALLISTO GT	mesotrione glyphosate	Su	45.5 g/L 455 g/L	27 9	31711	3	A	12 hrs	3 hrs	Syngenta
CANOPY PRO ⁸ (CLASSIC + TRICOR 75DF)	chlorimuron-ethyl + metribuzin	WG DF	25% 75%	2 5	29416 30661	3 3	A	12 hrs	6 hrs	Corteva
carfentrazone-ethyl	AIM EC	EC	240 g/L	14	28573	3	A	12 hrs	2 hrs	Nufarm
CHAPERONE	chlorimuron-ethyl	WG	25%	2	30475	3	A	12 hrs	4 hrs	Nufarm
chlorimuron-ethyl	CLASSIC	WG	25%	2	29416	3	A	12 hrs	4 hrs	Corteva
chlorimuron-ethyl	CHAPERONE	WG	25%	2	30475	3	A	12 hrs	4 hrs	Nufarm
chlorimuron-ethyl/ flumioxazin	DILIGENT	WG	5.14% 40.59%	2 14	31494	3 4	A	12 hrs	4 hrs	Corteva

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chlorimuron-ethyl + glyphosate	GUARDIAN MAX ⁸ (CLASSIC + POLARIS MAX)	WG	25%	2	25433	3	A	12 hrs	4 hrs	Corteva
		Sn	540 g/L	9	32504	4				
chlorimuron-ethyl + imazethapyr	FREESTYLE ⁷ (CLASSIC + DUPONT IMAZETHAPYR 240 SL)	WG	25%	2	29416	3	A	12 hrs	4 hrs	Corteva
		Sn	240 g/L	2	31157	4				
chlorimuron-ethyl metribuzin	CANOPY PRO ⁸ (CLASSIC + TRICOR 75DF)	WG	25%	2	29416	3	A	12 hrs	6 hrs	Corteva
		DF	75%	5	30661	4				
CLASSIC	chlorimuron-ethyl	WG	25%	2	29416	3	A	12 hrs	4 hrs	Corteva
CLEANSWEEP ⁸ (PURSUIT + BASAGRAN FORTÉ)	imazethapyr + bentazon	Sn	240 g/L	2	21537	2	B	12 hrs	6 hrs	BASF
		Li	480 g/L	6	22006	4				
CLEARVIEW	aminopyralid/ metsulfuron-methyl	WG	52.5% 9.45%	4, 2	29752	3	A	24 hrs	2 hrs	Corteva
clethodim	ANTLER 240 EC	EC	240 g/L	1	32880	3	A	12 hrs	1 hr	Winfield Canada
clethodim	ARROW ALL-IN	EC	120 g/L	1	33225	3	A	12 hrs	1 hr	Adama Canada
clethodim	SELECT	EC	240 g/L	1	22625	3	A	12 hrs	1 hr	BASF
clethodim	STATUE	EC	240 g/L	1	32885	3	A	12 hrs	1 hr	NuFarm
clomazone	COMMAND 360 ME	ME	360 g/L	13	27827	3	C	12 hrs	–	FMC
clopyralid	LONTREL XC	Sn	600 g/L	4	32795	3	B	12 hrs	2 hrs	Corteva
cloransulam-methyl	FIRSTRATE	WG	84%	2	26697	3		24 hrs	2 hrs	Corteva
CLOVITOX PLUS	MCPB/MCPA	Li	375 g/L + 25 g/L	4,4	22003	3	A	12 hrs	4 hrs	Interprovincial Co-op
COBUTOX 625	2,4-DB	EC	625 g/L	4	22404	4	A	12 hrs	2 hrs	Interprovincial Co-op
COMMAND 360 ME	clomazone	ME	360 g/L	13	27827	3	C	12 hrs	–	FMC
CONQUEST LQ ⁸ (PURSUIT + SENCOR)	imazethapyr + metribuzin	Sn	240 g/L	2	21537	2	B	12 hrs	6 hrs	BASF
		Li	480 g/L	5	29346	3				

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² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

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⁶ REI = Restricted Entry Interval, and is the period of time (in hours) after a pesticide has been applied that agricultural workers or anyone else must not do hand labour tasks (e.g. scouting) in treated areas. The REI allows the pesticide residues and vapours to dissipate to safe levels for work to be done. If an REI is not stated on the label, use a 12 hour REI.

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TABLE 4–1. Herbicides Used in Ontario (cont'd)

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 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
COMMENZA ⁸ (BROADSTRIKE RC + TRICOR 75 DF + S-METLOACHLOR 960)	flumetsulam +	WG	80%	2	27004	3	B	12 hrs	–	Corteva
	metribuzin +	DF	75%	5	30661					
	s-metolachlor	EC	960 g/L	15	32847					
CONTENDER	quizalofop-p-butyl	EC	96 g/L	1	32091	3	C	12 hrs	1 hr	Interprovincial Co-op
CONVERGE XT ⁸ (CONVERGE FLEXX + CONVERGE 480)	isoxaflutole + atrazine	Sn	240 g/L	27	29071	2	B	12 hrs	–	Bayer CropScience
		Li	480 g/L	5	26277	3				
CREDIT 45	glyphosate	Sn	450 g/L	9	29124	4	A	12 hrs	1 hr	Nufarm
CREDIT XTREME	glyphosate	Sn	540 g/L	9	29888	4	A	12 hrs	1 hr	Nufarm
CRUSH'R PLUS	glyphosate	Sn	360 g/L	9	29995	4	A	12 hrs	1 hr	Agwest Inc.
DESTRA IS	rimsulfuron/ mesotrione	WG	5.45%	2	31348	3	A	12 hrs	3 hrs	Corteva
			36.36%	27	32626					
dicamba	ENGENIA	Sn	600 g/L	4	32220	3	B	12 hrs	4 hrs	BASF
dicamba	FEXAPAN	Sn	350 g/L	4	32188	3	B	12 hrs	4 hrs	Corteva
dicamba	XTENDIMAX	Sn	350 g/L	4	31896	3	B	12 hrs	4 hrs	Bayer CropScience
dicamba/ atrazine	MARKSMAN	Su	132 g/L	4	19349	3	A	12 hrs	4 hrs	BASF
			261 g/L	5						
dicamba/ s-metolachlor	TAVIUM	CS	134 g/L	4	33268	3	A	12 hrs	4 hrs	Syngenta
			271 g/L	15						
dichlorprop/ 2,4-D	DICHLORPROP DX	EC	210 g/L	4	29664	3	A	12 hrs	2 hrs	Interprovincial Co-op
			400 g/L	4						
dichlorprop/ 2,4-D	DICHLORPOP D	EC	300 g/L	4	27966	3	A	12 hrs	2 hrs	Interprovincial Co-op
			282 g/L	4						

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² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.
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TABLE 4–1. Herbicides Used in Ontario (cont'd)

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 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
dichlorprop/ 2,4-D	ESTAPROP XT	EC	210 g/L 400 g/L	4 4	29660	3	A	12 hrs	2 hrs	Nufarm
dichlorprop/ 2,4-D	TURBOPROP	EC	300 g/L 282 g/L	4 4	27967	3	A	12 hrs	2 hrs	Loveland Products
DICHLORPROP DX	dichlorprop/ 2,4-D	EC	210 g/L 400 g/L	4 4	29664	3	A	12 hrs	2 hrs	Interprovincial Co-op
DICHLORPROP D	dichlorprop/ 2,4-D	EC	300 g/L 282 g/L	4 4	27966	3	A	12 hrs	2 hrs	Interprovincial Co-op
diflufenzopyr/dicamba	DISTINCT	WDG	70%	4,19	26406	3	A	12 hrs	4 hrs	BASF
DILIGENT	chlorimuron-ethyl/ flumioxazin	WG	5.14% 40.59%	2 14	31494	3 4	A	12 hrs	4 hrs	Corteva
dimethenamid-P	FRONTIER MAX	EC	720 g/L	15	29194	3	A	24 hrs	–	BASF
dimethenamid-P topramezone	ARMEZON PRO	EC	630 g/L 12.5 g/L	15 27	32148	3	A	24 hrs	2 hrs	BASF
DISTINCT	diflufenzopyr/dicamba	WDG	70%	4,19	26406	3	A	12 hrs	4 hrs	BASF
diquat	ARMORY	EC	240 g/L	22	32726	3	B	24 hrs	15 min	Adama Canada
diquat	BOLSTER DESICCANT	Sn	240 g/L	22	32540	3	B	24 hrs	15 min	Interprovincial Co-op
diquat	REGLONE DESSICANT	Sn	240 g/L	22	26396	3	B	24 hrs	15 min	Syngenta
ELEVORE	halauxifen	SC	68.5 g/L	4	32948	3	A	12 hrs	1 hr	Corteva
EMBUTOX	2,4-DB	EC	625 g/L	4	27912	3	A	12 hrs	2 hrs	Nufarm
ENFORCER M	fluroxypyr/ bromoxynil/ MCPA	EC	80 g/L 200 g/L 200 g/L	4 4 4	30691	3	A	24 hrs	2 hrs	Nufarm

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TABLE 4–1. Herbicides Used in Ontario (cont'd)

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 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
ENGARDE	rimsulfuron/ meosotrione	WG	4.31% 41.38%	2 27	31595	3	A	12 hrs	3 hrs	Corteva
ENGENIA	dicamba	Sn	600 g/L	4	32220	3	B	12 hrs	4 hrs	BASF
ENLIST DUO	2,4-D choline/ glyphosate	Sn	194 g/L 204 g/L	2 9	30958	4	A	12 hrs	2 hrs	Corteva
EPTAM	EPTC	EC	800 g/L	8	11284	5	A	24 hrs	–	Gowan
EPTC	EPTAM	EC	800 g/L	8	11284	5	A	24 hrs	–	Gowan
ethametsulfuron-methyl	MUSTER TOSS-N-GO	DF	75%	2	23569	3	A	12 hrs	4 hrs	FMC
ERAGON LQ	saflufenacil	Su	342g/L	14	31469	3	C	12 hrs	1 hr	BASF
ESTAPROP XT	dichlorprop/ 2,4-D	EC	210 g/L 400 g/L	4 4	29660	3	A	12 hrs	2 hrs	Nufarm
EXPRESS SG	tribenuron-methyl	SC	50%	2	28262	3	A	12 hrs	4 hrs	FMC
FACTOR 540	glyphosate	Sn	540 g/L	9	27988	4	A	12 hrs	1 hr	Interprovincial Co-op
FEXAPAN	dicamba	EC	350 g/L	4	32188	3	A	12 hrs	4 hrs	Corteva
fenoxaprop-p-ethyl/safener	BENGAL	EC	120 g/L	1	29268	3	B	12 hrs	1 hr	Adama Canada
fenoxaprop-p-ethyl/safener	VIGIL	EC	120 g/L	1	29273	3	B	12 hrs	1 hr	Interprovincial Co-op
fenoxaprop-p-ethyl/safener	PUMA ADVANCE	EC	90 g/L	1	29615	3	B	12 hrs	1 hr	Bayer CropScience
FIERCE	flumioxazin/ pyroxasulfone	WG	33.5% 42.5%	14 15	31117	2	A	12 hrs	–	Valent
FIRSTRATE	cloransulam-methyl	WDG	84%	2	26697	3	B	24 hrs	2 hrs	Corteva
FLEXSTAR GT	fomesafen/ glyphosate	Sn	67 g/L 271 g/L	14 9	30412	3	B	12 hrs	4 hrs	Syngenta

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common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
fluazifop-p-butyl	VENTURE L	EC	125 g/L	1	21209	2	A	12 hrs	1 hr	Syngenta
flumetsulam	BROADSTRIKE RC	WG	80%	2	27004	3	A	12 hrs	2 hrs	Corteva
flumetsulam + metribuzin + s-metolachlor	COMMENZA ⁸ (BROADSTRIKE RC + TRICOR 75 DF + S-METLOACHLOR 960)	WG	80%	2	27004	3	B	12 hrs	–	Corteva
		DF	75%	5	30661					
		EC	960 g/L	15	32847					
flumioxazin	VALTERA	WDG	51.1%	14	29230	4	A	12 hrs	–	Valent
flumioxazin	VALTERA EZ	SC	480 g/L	14	33523	4	A	12 hrs	–	Valent
flumioxazin + metribuzin + imazethapyr	TRIACTOR ⁸ (VALTERA + TRICOR 75 DF + NU-IMAGE)	WDG	51.1%	14	29230	4	B	12 hrs	–	Nufarm
			75%	5	30661					
			240 g/L	2	30420					
flumioxazin/ pyroxasulfone	FIERCE	WDG	33.5% 42.5%	14 15	31117	4	A	12 hrs	–	Valent
fluroxypyr	TROPHY A	EC	180 g/L	4	27246	3	B	12 hrs	1 hr	Nufarm
fluroxypyr/ bromoxynil/ MCPA	ENFORCER M	EC	80 g/L	4	30691	3	A	24 hrs	2 hrs	Nufarm
			200 g/L	4						
			200 g/L	4						
FOCUS	pyroxasufone/ carfentrazone-ethyl	Su	447 g/L 53 g/L	15 14	32292	2	C	12 hrs	–	FMC
fomesafen	REFLEX	Sn	240 g/L	14	24779	3	A	12 hrs	4 hrs	Syngenta
fomesafen/ glyphosate	FLEXSTAR GT	Sn	67 g/L	14	30412	3	B	12 hrs	4 hrs	Syngenta
			271 g/L	9						
foramsulfuron	OPTION 2.25 OD	OD	22.5 g/L	2	27424	4	A	12 hrs	2 hrs	Bayer CropScience

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common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
FREESTYLE ⁸ (CLASSIC + DUPONT IMAZETHAPYR)	chlorimuron-ethyl + imazethapyr	WG	25%	2	29416	3	A	12 hrs	4 hrs	Corteva
		Su	240 g/L	2	31156	2				
FRONTIER MAX	dimethenamid-p	EC	720 g/L	15	29194	3	A	12 hrs	–	BASF
GLYFOS	glyphosate	Su	360 g/L	9	28924	4	A	12 hrs	1 hr	FMC
glufosinate ammonium	IGNITE	Sn	150 g/L	10	28532	4	B	12 hrs	4 hrs	BASF
glufosinate ammonium	LIBERTY 200SN	Sn	200 g/L	10	25337	4	B	24 hrs	4 hrs	BASF
glyphosate	CREDIT XTREME	Sn	540 g/L	9	29888	4	A	12 hrs	1 hr	Nufarm
glyphosate	CRUSH'R PLUS	Sn	360 g/L	9	29995	4	A	12 hrs	1 hr	Agwest Inc.
glyphosate	FACTOR 540	Sn	540 g/L	9	27988	4	A	12 hrs	1 hr	Interprovincial Co-op
glyphosate	GLYFOS	SC	360 g/L	9	28924	4	A	12 hrs	1 hr	FMC
glyphosate	MATRIX	Sn	480 g/L	9	29775	4	A	12 hrs	1 hr	Interprovincial Co-op
glyphosate	POLARIS MAX	Sn	540 g/L	9	32504	4	A	12 hrs	1 hr	Corteva
glyphosate	ROUNDUP TRANSORB HC	Sn	540 g/L	9	28198	4	A	12 hrs	1 hr	Bayer CropScience
glyphosate	ROUNDUP WEATHERMAX	Sn	540 g/L	9	27487	4	A	12 hrs	1 hr	Bayer CropScience
glyphosate	STONEWALL	Sn	540 g/L	9	31655	4	A	12 hrs	1 hr	Winfield Canada
glyphosate/ dicamba	ROUNDUP XTEND	Sn	240 g/L 120 g/L	9/ 4	32274	3	A	12 hrs	4 hrs	Bayer CropScience
glyphosate/ s-metolachlor/benoxacor/ mesotrione	HALEX GT	Sn	250 g/L 250 g/L 25 g/L	9 15 27	29341	4	A	12 hrs	3 hrs	Syngenta
halauxifen/fluroxypyr	PIXXARO A	EC	16.25 + 250 g/L	4	31303	3		12 hrs	1 hr	DOW

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common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
HALEX GT	glyphosate/ s-metolachlor/benoxacor/ mesotrione	Sn	250 g/L 250 g/L 25 g/L	9 15 27	29341	4	A	12 hrs	3 hrs	Syngenta
halosulfuron	PERMIT	WG	72.6%	2	31210	3	A	12 hrs	2 hrs	Gowan
HURRICANE	bentazon/ acifluorfen	Li	320 g/L 160 g/L	6/14	32662	2	C	48 hrs	4 hrs	UPL AgroSolutions
IGNITE	glufosinate ammonium	Sn	150 g/L	10	28532	4	B	12 hrs	4 hrs	BASF
imazethapyr	NU-IMAGE	Sn	240 g/L	2	30420	2	B	12 hrs	2 hrs	Nufarm
imazethapyr	PHANTOM	Sn	240 g/L	2	30017	2	B	12 hrs	2 hrs	Adama Canada
imazethapyr	PURSUIT	Sn	240 g/L	2	26287	2	B	12 hrs	2 hrs	BASF
imazethapyr	DUPONT IMAZETHAPYR 240	Sn	240 g/L	2	31156	2	B	12 hrs	2 hrs	Corteva
imazethapyr + bentazon	CLEANSWEEP ⁸ (PURSUIT + BASAGRAN FORTÉ)	Sn Li	240 g/L 480 g/L	2 6	26287 22006	2 4	B	12 hrs	6 hrs	BASF
imazethapyr + metribuzin	CONQUEST LQ ⁸ (PURSUIT + SENCOR)	Sn Li	240 g/L 480 g/L	2 5	26287 29346	2+3	B	12 hrs	6 hrs	BASF
IMPACT	topramezone	Su	336 g/L	27	28141	3	C	12 hrs	2 hrs	Amvac
INFINITY	pyrasulfotole/ bromoxynil	EC	37.5 g/L 210 g/L	27 6	28738	3	A	12 hrs	1 hr	Bayer CropScience
INFINITY FX	pyrasulfotole/ bromoxynil/ fluroxypyr	EC	31.5 g/L 174.3 g/L 72 g/L	27 6 4	33248	3	A	24 hrs	1 hr	Bayer CropScience
INTEGRITY	saflufenacil/ dimethenamid-P	EC	68 g/L 600 g/L	14 15	29371	3	A	12 hrs	1 hr	BASF

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² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

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TABLE 4–1. Herbicides Used in Ontario (cont'd)

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 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
isoxaflutole	CONVERGE FLEXX	SC	240 g/L	27	29071	2	B	12 hrs	–	Bayer CropScience
isoxaflutole + atrazine	CONVERGE XT ⁸	SC	240 g/L	27	29071	2	B	12 hrs	–	Bayer CropScience
	(CONVERGE FLEXX + CONVERGE 480)	Li	480 g/L	5	26277	3				
KOMODO (UPI S-MET)	s-metolachlor	EC	960 g/L	15	32847	3	A	12 hrs	–	UPL AgroSolutions
KORIL 235	bromoxynil	EC	235 g/L	6	25341	3	D	12 hrs	2 hrs	NuFarm
LIBERTY 200 SN	glufosinate ammonium	Li	200 g/L	10	25337	4	B	24 hrs	4 hrs	BASF
linuron	LOROX L	Li	480 g/L	7	16279	4	B	12 hrs	8 hrs	Tessenderlo Kerley
LOGIC M	bromoxynil/ MCPA	EC	225 g/L	6	28109	3	A	24 hrs	2 hrs	Interprovincial Co-op
			225 g/L	4						
LONTREL XC	clopyralid	Sn	600 g/L	4	32795	3	B	12 hrs	4 hrs	Corteva
LOROX L	linuron	Li	480 g/L	7	16279	4	B	12 hrs	8 hrs	Tessenderlo Kerley
MARKSMAN	dicamba/ atrazine	Su	132 g/L	4	19349	3	A	12 hrs	4 hrs	BASF
			261 g/L	5						
MCPA amine	MCPA AMINE 500	Sn	500 g/L	4	9516	4	B	12 hrs	4 hrs	Loveland Products
MCPA amine	MCPA AMINE 500, IPCO	Li	500 g/L	4	20308	4	B	12 hrs	4 hrs	Interprovincial Co-op
MCPA amine	MCPA AMINE 500, NUFARM	Li	500 g/L	4	14730	4	B	12 hrs	4 hrs	Nufarm
MCPA amine	MCPA AMINE 600	Li	600 g/L	4	31432	3	B	12 hrs	4 hrs	Loveland Products
MCPA amine	MCPA AMINE 600, IPCO	Li	600 g/L	4	28384	3	B	12 hrs	4 hrs	Interprovincial Co-op
MCPA amine	MCPA AMINE 600, NUFARM	Li	600 g/L	4	31327	3	B	12 hrs	4 hrs	Nufarm
MCPA AMINE 500	MCPA amine	Li	500 g/L	4	9516	4	B	12 hrs	4 hrs	Loveland Products
MCPA AMINE 500, IPCO	MCPA amine	Li	500 g/L	4	20308	4	B	12 hrs	4 hrs	Interprovincial Co-op
MCPA AMINE 500, NUFARM	MCPA amine	Li	500 g/L	4	14730	4	B	12 hrs	4 hrs	Nufarm

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² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

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TABLE 4–1. Herbicides Used in Ontario (cont'd)

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 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
MCPA AMINE 600	MCPA amine	Li	600 g/L	4	31432	3	B	12 hrs	4 hrs	Loveland Products
MCPA AMINE 600, IPCO	MCPA amine	Li	600 g/L	4	28384	3	B	12 hrs	4 hrs	Interprovincial Co-op
MCPA AMINE 600, NUFARM	MCPA amine	Li	600 g/L	4	31327	3	B	12 hrs	4 hrs	Nufarm
MCPA ester	TROPHY B	EC	500 g/L	4	27245	3	B	12 hrs	2 hrs	Nufarm
MCPA ester	MCPA ESTER 600, IPCO	EC	600 g/L	4	27802	3	B	12 hrs	2 hrs	Interprovincial Co-op
MCPA ester	MCPA ESTER 600, NUFARM	EC	600 g/L	4	27803	3	B	12 hrs	2 hrs	Nufarm
MCPA ester	MCPA ESTER 600, CHECKMATE	EC	600 g/L	4	27804	3	B	12 hrs	2 hrs	Loveland Products
MCPA ESTER 600, IPCO	MCPA ester	EC	600 g/L	4	27802	3	B	12 hrs	2 hrs	Interprovincial Co-op
MCPA ESTER 600, NUFARM	MCPA ester	EC	600 g/L	4	27803	3	B	12 hrs	2 hrs	Nufarm
MCPA ESTER 600, CHECKMATE	MCPA ester	EC	600 g/L	4	27804	3	B	12 hrs	2 hrs	Loveland Products
MCPA sodium	MCPA SODIUM 300	Sn	300 g/L	4	9858	4	B	12 hrs	6 hrs	Loveland Products
MCPA sodium	MCPA SODIUM 300, IPCO	Li	300 g/L	4	20306	4	B	12 hrs	6 hrs	Interprovincial Co-op
MCPA sodium	MCPA SODIUM 300, NUFARM	Li	300 g/L	4	14718	4	B	12 hrs	6 hrs	Nufarm
MCPA SODIUM 300	MCPA sodium	Sn	300 g/L	4	9858	4	B	12 hrs	6 hrs	Loveland Products
MCPA SODIUM 300, IPCO	MCPA sodium	Li	300 g/L	4	20306	4	B	12 hrs	6 hrs	Interprovincial Co-op
MCPA SODIUM 300, NUFARM	MCPA sodium	Li	300 g/L	4	14718	4	B	12 hrs	6 hrs	Nufarm
MCPB/MCPA	CLOVITOX PLUS	Li	375 g/L + 25 g/L	4	24336	4	B	12 hrs	4 hrs	Interprovincial Co-op
MCPB/MCPA	TOPSIDE	Li	375 g/L + 25 g/L	4	22003	4	B	12 hrs	4 hrs	Loveland products
MCPB/MCPA	TROPOTOX PLUS	Li	375 g/L + 25 g/L	4	8211	4	B	12 hrs	4 hrs	Nufarm
mesotrione	CALLISTO	SC	480 g/L	27	27833	3	A	12 hrs	3 hrs	Syngenta
mesotrione/ glyphosate	CALLISTO GT	Su	45.5 g/L 455 g/L	27 9	31711	3	A	12 hrs	3 hrs	Syngenta

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TABLE 4–1. Herbicides Used in Ontario (cont'd)

Mention of a brand or trade name in this table does not constitute a guarantee or warranty of the product. Always refer to the product label before using.

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 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
metribuzin	SENCOR 480 F	F	480 g/L	5	27091	3	A	12 hrs	6 hrs	Bayer CropScience
metribuzin	SENCOR 75 DF	DF	75%	5	17242	3	A	12 hrs	6 hrs	Bayer CropScience
metribuzin	SQUADRON 75 DF	DF	75%	5	32081	3	A	12 hrs	6 hrs	Adama Canada
metribuzin	TRICOR 75 DF	DF	75%	5	30661	3	A	12 hrs	6 hrs	UPL AgroSolutions
metribuzin flumioxazin	BIFECTA ⁷ (TRICOR 75 DF + VALTERA)	DF WDG	75% 51.1%	5 14	30661 29320	3 4	A	12 hrs	6 hrs	Nufarm
MEXTROL 450	bromoxynil/ MCPA	EC	225 g/L 225 g/L	6 4	26999	3	A	24 hrs	1 hr	Nufarm
MILESTONE	aminopyralid	Sn	240 g/L	4	28517	3	A	12 hrs	2 hrs	Corteva
MUSTER TOSS-N-GO	ethametsulfuron-methyl	DF	75%	2	23569	4	A	12 hrs	4 hrs	FMC
nicosulfuron	ACCENT	DF	75%	2	25116	3	A	12 hrs	2 hrs	Corteva
nicosulfuron/ rimsulfuron	ULTIM 75DF	DF	37.5% 37.5%	2	24736	3	A	12 hrs	2 hrs	Corteva
NUFARM TRALKOXYDIM	tralkoxydim	SC	400 g/L	1	32078	4	C	12 hrs	1 hr	Nufarm
NU-IMAGE	imazethapyr	Sn	240 g/L	2	30420	2	B	12 hrs	2 hrs	Nufarm
OPTILL	saflufenacil/ imazethapyr	WDG	17.8% 50.2%	14 2	30756	2	A	12 hrs	2 hrs	BASF
OPTION 2.25 OD	foramsulfuron	Li	22.5 g/L	2	27424	4	A	12 hrs	2 hrs	Bayer CropScience
PARDNER	bromoxynil	EC	280 g/L	6	18001	3	D	24 hrs	1 hr	Bayer CropScience
PEAK 75WG	prosulfuron	WG	75%	2	25310	3	B	12 hrs	4 hrs	Syngenta
pendimethalin	PROWL H2O	ME	455 g/L	3	29542	3	B	12 hrs		BASF
PERMIT	halosulfuron	WG	72.6%	2	31210	3	A	12 hrs	2 hrs	Gowan
PHANTOM 240	imazethapyr	Sn	240 g/L	2	30017	2	B	12 hrs	2 hrs	Adama Canada

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 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
picloram/2,4-D	TORDON 101	Sn	(1:3.7) 305 g/L	4	9007	3		12 hrs	4 hrs	DWE
PINNACLE SG TOSS-N-GO	thifensulfuron methyl	SG	50%	2	30741	4	A	12 hrs	4 hrs	FMC
pinoxaden	AXIAL	EC	50 g/L	1	30431	4	B	12 hrs	1 hr	Syngenta
PIXXARO ⁸ (PIXXARO A + MCPA ESTER 600)	halauxifen/ fluroxypyr + MCPA ester	EC + EC	16.25 g/L	4	31303	3	B	12 hrs	1 hr	Corteva
			250 g/L	4	27803	3	B			
			600 g/L	4						
POAST ULTRA	sethoxydim	EC	450 g/L	1	24835	4	A	12 hrs	1 hr	BASF
PRIMEXTRA II MAGNUM	s-metolachlor/benoxacor/ atrazine	Li	400 g/L	15	25370	3	A	12 hrs	–	Syngenta
			320 g/L	5						
prosulfuron	PEAK 75WG	WG	75%	2	25310	3	B	12 hrs	hrs	Syngenta
PROWL H2O	pendimethalin	ME	455 g/L	3	29542	3	B	12 hrs	–	BASF
PUMA ADVANCE	fenoxaprop-p-ethyl	EC	90 g/L	1	29615	4	B	12 hrs	1 hr	Bayer CropScience
PURSUIT	imazethapyr	Sn	240 g/L	2	21537	2	B	12 hrs	2 hrs	BASF
pyrasulfotole/ bromoxynil	INFINITY	EC	37.5 g/L	27	28738	3	A	12 hrs	1 hr	Bayer CropScience
			210 g/L	6						
pyrasulfotole/ bromoxynil/ fluroxypyr	INFINITY FX	EC	31.5 g/L	27	33248	3	A	24 hrs	1 hr	Bayer CropScience
			174.3 g/L	6						
			72 g/L	4						
pyroxasulfone	ZIDUA SC	SC	500 g/L	15	32542	2	B	12 hrs	–	BASF
pyroxasulfone/ carfentrazone-ethyl	FOCUS	Su	447 g/L + 53 g/L	15	32292	2	C	12 hrs	–	FMC
				14						
pyroxasulfone/ sulfentrazone	AUTHORITY SUPREME	SC	250 g/L	15	32562	2	C	12 hrs	–	FMC
			250 g/L	14						

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common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
pyroxsulam	SIMPLICITY GODRI	WG	21.5%	2	31916	3	A	12 hrs	–	Corteva
quizalofop-p-ethyl	ASSURE II	EC	96 g/L	1	25462	3	C	12 hrs	1 hr	Amvac
quizalofop-p-ethyl	CONTENDER	EC	96 g/L	1	32091	3	C	12 hrs	1 hr	Interprovincial Co-op
quizalofop-p-ethyl	YUMA GL	EC	96 g/L	1	29134	3	C	12 hrs	1 hr	Gowan
REFINE M ⁸ (REFINE SG + MCPA ESTER 600)	thifensulfuron methyl/ tribenuron methyl + MCPA ester	SG + EC	33.35% 16.65% + 600 g/L	2 2 4	28285 + 27803	3 + 3	B	12 hrs	2 hrs	FMC
REFINE SG	thifensulfuron methyl/ tribenuron methyl	SG	33.35% 16.65%	2 2	28285	3	A	12 hrs	2 hrs	FMC
REFLEX	fomesafen	Li	240 g/L	14	24779	3	A	12 hrs	4 hrs	Syngenta
REGLONE	diquat	Sn	240 g/L	22	26396	3	B	24 hrs	15 min	Syngenta
rimisulfuron/ mesotrione	ENGARDE	WG	4.31% 41.38%	2 27	31595	3	A	12 hrs	2 hrs	Corteva
rimisulfuron/ mesotrione	DESTRA IS	WG	5.45% 36.36%	2 27	32626	3	A	12 hrs	2 hrs	Corteva
rimisulfuron/ nicosulfuron	STEADFAST IS	WG	12.5% 25.2%	2 2	33369	3	A	12 hrs	2 hrs	Corteva
RIVAL EC	trifluralin	EC	500 g/L	3	18612	4	C	12 hrs	–	Nufarm
ROUNDUP TRANSORB HC	glyphosate	Sn	540 g/L	9	28198	4	A	12 hrs	1 hr	Bayer CropScience
ROUNDUP WEATHERMAX	glyphosate	Sn	540 g/L	9	27487	4	A	12 hrs	1 hr	Bayer CropScience
ROUNDUP XTEND	glyphosate/ dicamba	Sn	240 g/L 120 g/L	9/ 4	32274	3	A	12 hrs	4 hrs	Bayer CropScience

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⁸ Indicates herbicides sold as a co-pack under this trade name.

TABLE 4–1. Herbicides Used in Ontario (cont'd)

Mention of a brand or trade name in this table does not constitute a guarantee or warranty of the product. Always refer to the product label before using.

LEGEND: DC = dispersible concentrate DF = dry flowable DG = dry granules DS = dry soluble EC = emulsifiable concentrate EM = emulsion
 F = flowable Gi = gel Gr = granular Li = liquid ME = microencapsulated suspension OD = oil dispersible
 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
saflufenacil	ERAGON LQ	Su	342g/L	14	31469	3	C	12 hrs	1 hr	BASF
saflufenacil/ dimethenamid-P	INTEGRITY	EC	68 g/L 600 g/L	14 15	29371	3	A	12 hrs	1 hr	BASF
saflufenacil/ imazethapyr	OPTILL	WDG	68%	14,2	30756	3	A	12 hrs	2 hrs	BASF
SELECT	clethodim	EC	240 g/L	1	22625	3	A	12 hrs	1 hr	BASF
SENCOR 480 F	metribuzin	F	480 g/L	5	27091	3	A	12 hrs	6 hrs	Bayer CropScience
SENCOR 75 DF	metribuzin	DF	75%	5	17242	3	A	12 hrs	6 hrs	Bayer CropScience
sethoxydim	POAST ULTRA	EC	450 g/L	1	24835	4	A	12 hrs	1 hr	BASF
SHIELDEX 400 SC	tolpyralate	SC	400 g/L	27	32943	3	A	12 hrs	1 hr	Gowan
simazine	SIMAZINE 480	Su	480 g/L	5	23181	3	A	12 hrs	–	Loveland Products
SIMAZINE 480	simazine	Su	480 g/L	5	23181	3	A	12 hrs	–	Loveland Products
SIMPLICITY GODRI	pyroxsulam	WG	21.5%	2	31916	3	A	12 hrs	–	Corteva
s-metolachlor	KOMODO (UPI S-MET)	EC	960 g/L	15	32847	3	A	12 hrs	–	UPL AgroSolutions
s-metolachlor/benoxacor	DUAL II MAGNUM	EC	915 g/L	15	25729	3	A	12 hrs	–	Syngenta
s-metolachlor/benoxacor/ atrazine	PRIMEXTRA II MAGNUM	SC	400 g/L 320 g/L	15 5	25730	3	A	12 hrs	–	Syngenta
s-metolachlor + metribuzin	TIEDOWN ⁸ (UPI S-MET + TRICOR 75 DF)	EC DF	960 g/L 75%	15 5	32847 30661	3 3	A	12 hrs	–	United Phosphorus
s-metolachlor/ metribuzin	BOUNDARY LQD	EC	628 g/L 149 g/L	15 5	30812	3	A	12 hrs	–	Syngenta

¹ The amount of active ingredient in the unit of formulated herbicide and expressed as grams active ingredient per litre of product or the percentage of active ingredient per mass of product.

² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

³ The product registration number for this trade name under the *Pesticide Control Product Act*, commonly referred to as a “PCP number”. The PCP number has been placed in the guide for convenience, but the pesticide label in possession should always be used for the most accurate and current PCP number.

⁴ Refers to the numeric classification of pesticides under Regulation 63/09 of the *Pesticides Act*. Refer to Table 4–2. *Description for Ontario Classification of Pesticide Products*, for a description of each Ontario classification.

⁵ A = Does not need to be stored in a heated building, but its preferred; B = Cannot be stored at temperatures at or below 0°C; C = Store above 5°C to keep product from freezing and D = Store above 7°C, DO NOT FREEZE.

⁶ REI = Restricted Entry Interval, and is the period of time (in hours) after a pesticide has been applied that agricultural workers or anyone else must not do hand labour tasks (e.g. scouting) in treated areas. The REI allows the pesticide residues and vapours to dissipate to safe levels for work to be done. If an REI is not stated on the label, use a 12 hour REI.

⁷ Rainfast = Is the duration (in hours) needed after application before a rain event occurs so as to ensure that the herbicide will be adequately taken up by the target weed so as to maximize control.

⁸ Indicates herbicides sold as a co-pack under this trade name.

TABLE 4–1. Herbicides Used in Ontario (cont'd)

Mention of a brand or trade name in this table does not constitute a guarantee or warranty of the product. Always refer to the product label before using.

LEGEND: DC = dispersible concentrate DF = dry flowable DG = dry granules DS = dry soluble EC = emulsifiable concentrate EM = emulsion
 F = flowable Gi = gel Gr = granular Li = liquid ME = microencapsulated suspension OD = oil dispersible
 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
SQUADRON 75 DF	metribuzin	DF	75%	5	32081	3	A	12 hrs	–	Adama Canada
STATUE	clethodim	EC	240 g/L	1	22625	3	A	12 hrs	–	Nufarm
STEADFAST IS	rimsulfuron/ nicosulfuron	WG	12.5% 25.2%	2 2	33369	3	A	12 hrs	2 hrs	Corteva
STONEWALL	glyphosate	Sn	540 g/L	9	31655	4	A	12 hrs	1 hr	Winfield Canada
sulfentrazone	AUTHORITY 480	Su	480 g/L	14	29012	3	C	12 hrs	–	FMC
TAVIUM	dicamba/ s-metolachlor	CS	134 g/L 271 g/L	4 15	33268	3	A	12 hrs	–	Syngenta
tembotrione/ thiencarbazone-methyl	VIOS G3	Su	68 g/L 345 g/L	2 27	29643	4	C	12 hrs	–	Bayer CropScience
thifensulfuron-methyl	PINNACLE SG TOSS-N-GO	SG	50%	2	30741	4	A	12 hrs	4 hrs	FMC
thifensulfuron-methyl/ tribenuron-methyl	REFINE SG	SG	33.35% 16.65%	2	28286	3	A	12 hrs	2 hrs	FMC
thifensulfuron methyl tribenuron methyl fluroxypyr MCPA	BARRICADE M ⁸ (BARRICADE SG + PERIMETER II + MCPA ESTER 600, NUFARM)	SG SG EC EC	25% 25% 333 g/L 600 g/L	2 2 4 4	29544 29544 30094 27803	3 3 3 3	A	12 hrs	1 hr	FMC
thifensulfuron-methyl/ tribenuron-methyl + MCPA	BOOST M ⁸ (BOOST + MCPA ESTER 600)	SG EC	50% 25% 600 g/L	2 2 4	30377 27803	3 3	A	12 hrs	2 hrs	Nufarm
thifensulfuron-methyl/ tribenuron-methyl + MCPA	REFINE M ⁸ (REFINE SG + MCPA ESTER 600)	SG EC	33.5% 16.65% + 600 g/L	2 2 4	28286 27803	3 3	B	12 hrs	2 hrs	FMC

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² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

³ The product registration number for this trade name under the *Pesticide Control Product Act*, commonly referred to as a “PCP number”. The PCP number has been placed in the guide for convenience, but the pesticide label in possession should always be used for the most accurate and current PCP number.

⁴ Refers to the numeric classification of pesticides under Regulation 63/09 of the Pesticides Act. Refer to Table 4–2. *Description for Ontario Classification of Pesticide Products*, for a description of each Ontario classification.

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⁷ Rainfast = Is the duration (in hours) needed after application before a rain event occurs so as to ensure that the herbicide will be adequately taken up by the target weed so as to maximize control.

⁸ Indicates herbicides sold as a co-pack under this trade name.

TABLE 4–1. Herbicides Used in Ontario (cont'd)

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 PE = pellets PS = pressurized spray SC = soluble concentrate SG = soluble granules Sn = solution SP = soluble powder
 Su = suspension (flowable) WDG = wettable dry granules WG = wettable granules WP = wettable powder – = not specified on label

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
TIEDOWN ⁸ (UPI S-MET + TRICOR 75 DF)	s-metolachlor + metribuzin	EC	960 g/L	15	32847	3	A	12 hrs	–	United Phosphorus
		DF	75%	5	30661	3				
tolpyralate	SHIELDEX 400 SC	SC	400 g/L	27	32943	3	A	12 hrs	1 hr	Gowan
topramezone	ARMEZON	Su	336 g/L	27	30131	3	C	12 hrs	2 hrs	BASF
topramezone	IMPACT	SC	336 g/L	27	28141	3	C	12 hrs	2 hrs	Loveland Products
tralkoxydim	ACHIEVE LIQUID	EC	400 g/L	1	27011	4	C	12 hrs	1 hr	Corteva
tralkoxydim	BISON 400 L	SC	400 g/L	1	29256	4	C	12 hrs	1 hr	Adama Canada
tralkoxydim	NUFARM TRALKOXYDIM	SC	400 g/L	1	32078	4	C	12 hrs	1 hr	Nufarm
TRIACTOR ⁸ (VALTERA + TRICOR 75 DF + NU-IMAGE)	flumioxazin + metribuzin + imazethapyr	WDG	51.1%	14	29230	4	B	12 hrs	–	Nufarm
		DF	75%	5	30661	3				
		Sn	240 g/L	2	30420	2				
TREFLAN LIQUID EC	trifluralin	EC	480 g/L	3	23933	4	C	12 hrs	–	Gowan
tribenuron-methyl	EXPRESS SG	SC	50%	2	28262	3	A	12 hrs	4 hrs	FMC
TRICOR 75 DF	metribuzin	DF	75%	5	30661	3	A	12 hrs	6 hrs	UPL AgroSolutions
TRIFLUREX 40 EC	trifluralin	EC	412 g/L	3	17233	4	C	12 hrs	–	Adama Canada
trifluralin	BONANZA 480	Li	480 g/L	3	28289	4	C	12 hrs	–	Loveland Products
trifluralin	RIVAL EC	EC	500 g/L	3	18612	4	C	12 hrs	–	Nufarm
trifluralin	TRIFLUREX 40 EC	EC	12 g/L	3	17233	4	C	12 hrs	–	Adama Canada
trifluralin	TREFLAN LIQUID EC	EC	480 g/L	3	23933	4	C	12 hrs	–	Gowan
TROPHY ⁸ (TROPHY A + TROPHY B)	fluroxypyr + MCPA ester	EC	180 g/L	4	27246	3	B	12 hrs	2 hrs	Nufarm
		EC	600 g/L	4	27245	3				
TURBOPROP	dichlorprop/ 2,4-D	EC	300 g/L	4	27967	3	A	12 hrs	2 hrs	Loveland Products
			282 g/L	4						

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³ The product registration number for this trade name under the *Pesticide Control Product Act*, commonly referred to as a “PCP number”. The PCP number has been placed in the guide for convenience, but the pesticide label in possession should always be used for the most accurate and current PCP number.

⁴ Refers to the numeric classification of pesticides under Regulation 63/09 of the *Pesticides Act*. Refer to Table 4–2. *Description for Ontario Classification of Pesticide Products*, for a description of each Ontario classification.

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⁸ Indicates herbicides sold as a co-pack under this trade name.

TABLE 4–1. Herbicides Used in Ontario (cont'd)

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F = flowable	Gi = gel	Gr = granular	Li = liquid	ME = microencapsulated suspension	OD = oil dispersible
PE = pellets	PS = pressurized spray	SC = soluble concentrate	SG = soluble granules	Sn = solution	SP = soluble powder
Su = suspension (flowable)	WDG = wettable dry granules	WG = wettable granules	WP = wettable powder	– = not specified on label	

common name or TRADE NAME	TRADE NAME or common name	Formulation	Concentration ¹	WSSA ² Groups	PCP Number ³	Class. ⁴	Winter Storage ⁵	REI ⁶	Rain fast ⁷	Manufacturer
ULTRA BLAZER	acifluorfen	Sn	240 g/L	14	32330	3	B	12 hrs	6 hrs	UPL AgroSolutions
VALTERA	flumioxazin	WDG	51.1%	14	29230	4	A	12 hrs	–	Valent
VALTERA EZ	flumioxazin	SC	480 g/L	14	33523	4	A	12 hrs	–	Valent

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² Indicates the numeric grouping of herbicides by their site of action and by the Weed Science Society of America (WSSA). Herbicide resistant weeds have historically been selected when herbicides with the same site of action are used repeatedly. Refer to Table 4-6. *Weed Populations Confirmed Resistant to Herbicide Groups in Ontario Counties*, for a listing of herbicide resistant weeds in Ontario by WSSA group and corresponding site of action.

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⁷ Rainfast = Is the duration (in hours) needed after application before a rain event occurs so as to ensure that the herbicide will be adequately taken up by the target weed so as to maximize control.

⁸ Indicates herbicides sold as a co-pack under this trade name.

TABLE 4–2. Description for Ontario Classification of Pesticide Products

Ontario Classification	Summary*
1	Designated under the <i>Pesticide Control Product Act</i> (PCPA) as pesticides of the Manufacturing Class for use only in the manufacture of a pest control product or a product regulated under the <i>Fertilizers Act</i> .
2,3,4	Designated under the PCPA as pesticides of the Commercial Class for use in commercial activities that are specified on the label or Restricted Class when the label specifies essential conditions respecting the display, distribution or limitations on the use of, or qualifications of persons who may use the product.
5,6,7	Designated under the PCPA as pesticides of the Domestic Class to be distributed primarily to the general public for personal use in or around their homes.
8	Banned for sale in Ontario.
9	Banned for use in, on or over land unless their use is excepted.
10	Are allowed for use under the promotion of public health or safety exception.
11	Require a “green” notice sign be posted for the purposes of providing public notice when products containing these ingredients are used by any person on non-residential area land and by a licensed exterminator on residential area land in performing land exterminations.

* Detailed descriptions of each classification can be found at: ontario.ca/page/pesticide-licences-and-permits.

Notes on Herbicides

Read these notes together with the information provided in other chapters throughout this publication. Additional information on use, toxicity and safety precautions is given here. Herbicides are listed by their common (chemical) name rather than their trade (product) name. See Table 4–1. *Herbicides Used in Ontario* to determine the corresponding common name for a particular trade name. For example, Table 4–1 indicates that the trade name AATREX has a common name of atrazine; notes on AATREX are listed under atrazine in this section. See Chapter 5, Notes on Adjuvants for information on adjuvants.

Complete information on each herbicide is available on the product label located on the herbicide container. The federal Pest Management Regulatory Agency also lists pesticide labels on their website bit.ly/herbicidelabels. Many herbicide manufacturers also list product labels and/or Material Safety Data Sheets (MSDS) on their websites.

2,4-D

Trade Names: 2,4-D AMINE 600, 2,4-D ESTER 700.

Chemical Family: Phenoxy.

Crop and/or Non-Crop Registrations: Cereals, turf, pastures, non-cropland, asparagus, field corn, soybeans (preplant only), high bush blueberries, cranberries, raspberries, strawberries, bearing fruit trees including apple, pear, peach, plum, apricot and cherries, potato (preharvest) and brush.

Sensitive Weeds: annual sow-thistle, bluebur, cocklebur, daisy fleabane, false flax, flixweed, goat's beard, Kochia, lamb's-quarters, mustards, plantain, prickly lettuce, ragweeds, redroot pigweed, Russian pigweed, Russian thistle, shepherd's purse, stinging nettle, stinkweed, sweet clover, wild radish and wild sunflower.

A number of other broadleaf and woody species are listed as less susceptible or for top growth control only.

Uptake and Translocation: Readily absorbed through leaves or roots. Translocated primarily in phloem with the sugars but can also move with water in the xylem. Accumulation is primarily in the young, rapidly growing meristematic regions of roots or shoots.

Basis of Selectivity: Differences in interception, penetration, translocation, metabolism and sensitivity of active sites lead to greater activity on broadleaf weeds compared to grasses.

Application Methods: Postemergence (broadleaf weeds), stem-foliage or stem-basal (brush).

Residual Activity: Half-life in soil is usually not longer than 1 or 2 weeks during the growing season due to rapid decomposition by soil micro-organisms.

Unique Characteristics: All weeds are more easily killed when growing rapidly in moist soil. Unfortunately, some broadleaf crops, garden and ornamental plants are as sensitive to 2,4-D as many weeds and only a trace of the chemical as spray drift, vapour drift or contaminant in soil or water may cause serious damage. Even crops that can be sprayed safely can be sensitive at some stages of growth or at excessive application rates; thus follow label precautions carefully. Amines and esters are the most common formulations of 2,4-D. The esters are the most active and can be used at the lower rates and for brush control. Since vapour drift is a potential problem with the ester formulations, use only amines on lawns, or near gardens or susceptible crop areas. Low volatile esters can be used by agriculturists or licenced applicators in areas where risk of damage to sensitive non-target vegetation is low.

2,4-D CHOLINE/GLYPHOSATE

Trade Names: ENLIST DUO.

Chemical Family: Phenoxy/amino acid.

Crop and/or Non-Crop Registrations: Enlist field corn, Enlist soybeans, prior to seeding or after seeding (but before crop emergence) in spring wheat, winter wheat, barley, rye and field corn.

Sensitive Weeds: 2.9 L/ha rate: volunteer barley; lamb's-quarters; bluebur; mustards (except dog and green tansy); burdock (before 4 leaf); pigweed (Russian); canola (volunteer); pigweed (redroot); chickweed (common); plantain; common cocklebur; common ragweed; false flax; giant ragweed; Canada fleabane; Russian thistle; daisy fleabane; shepherd's purse; flixweed; stinkweed; foxtail (giant, green); sunflower; goatsbeard; sweet clover; hempnettle; vetch; hoary cress; volunteer wheat; horsetail (field); wild radish; Kochia; wild oats

4.3 L/ha rate: barnyard grass; mustard (dog); hedge bindweed; narrow-leaved hawk's beard; nightflowering catchfly; buckwheat (tartary); nightshade, (Eastern black); buckwheat (wild); oak leaf goosefoot; corn spurry; pigweed (smooth); cleavers, common; pineappleweed; cow cockle; proso millet; crabgrass (smooth); purslane, common; crabgrass (large); quackgrass; dandelion; chickweed (common); smartweed (green); smartweed (Pennsylvania); fall panicum; sow-thistle (annual); field peppergrass; hairy galinsoga; tansy (common); knotweed (before 4 leaf); velvetleaf; lady's thumb; waterhemp (common); wild tomato

Top Growth only (4.3 L/ha): leafy spurge; biennial wormwood; blue lettuce; burdock; chickweed (mouse-eared)

Two applications at 4.3 L/ha: milkweed (common); bindweed (field); nutsedge (yellow); Canada thistle; round-leaved mallow; sow-thistle (perennial); palmer amaranth

Uptake and Translocation: Enlist Duo Herbicide is a systemic herbicide and is intended for control of emerged annual and perennial weeds.

Basis of Selectivity: Enlist Duo Herbicide is specific to Enlist field corn and Enlist soybean. Enlist field corn contains an AAD-1 expressing event plus a glyphosate tolerance trait. These are patented genes that provide tolerance to Enlist Duo Herbicide. For non-Enlist field corn or any other crops not containing an AAD-1 expressing event plus glyphosate tolerance traits, foliar application of Enlist Duo Herbicide will cause serious crop

damage and yield loss. Enlist soybeans contain an AAD-12 expressing event plus a glyphosate tolerance trait. These are patented genes that provide tolerance to Enlist Duo Herbicide. For non-Enlist soybeans (i.e., soybeans that do not contain an AAD-12 expressing event plus glyphosate tolerance traits), foliar application of Enlist Duo Herbicide will cause serious crop damage and yield loss.

Application Methods: Postemergence to Enlist corn and soybean. Prior to the emergence of cereals and field corn.

Residual Activity: Half-life in soil is usually not longer than 1 or 2 weeks during the growing season due to rapid decomposition by soil micro-organisms.

Unique Characteristics: All weeds are more easily killed when growing rapidly in moist soil. Unfortunately, some broadleaf crops, garden and ornamental plants are as sensitive to 2,4-D as many weeds and only a trace of the chemical as spray drift, vapour drift or contaminant in soil or water may cause serious damage. Even crops that can be sprayed safely can be sensitive at some stages of growth or at excessive application rates; thus follow label precautions carefully. Enlist Duo Herbicide contains drift control technology. If desired, use only a Dow AgroSciences-approved drift control additive. When a drift control additive is used, read and carefully observe the precautionary statements and all other information appearing on the additive label.

2,4-DB

Trade Names: COBUTOX 625, EMBUTOX, CALIBER 625.

Chemical Family: Phenoxy.

Crop and/or Non-Crop Registrations: Seedling alfalfa, bird's-foot trefoil, clovers (except sweet) direct seeded or underseeded in spring wheat, barley or oats and corn.

Sensitive Weeds: Many small broadleaf weeds such as stinkweed, ragweed, lamb's-quarters, wild buckwheat and mustards. Top-growth control of Canada thistle, field bindweed and perennial sow-thistle.

Uptake and Translocation: Absorbed through the foliage and readily translocated to the growing points.

Basis of Selectivity: Sensitive weeds rapidly convert 2,4-DB into 2,4-D; tolerant species do not make this conversion under normal conditions.

Application Method: Postemergence.

Residual Activity: None.

Unique Characteristics: Mustards are not usually controlled by 2,4-DB alone if sprayed beyond the 4 leaf stage; a tank-mixture with MCPA will improve control of these larger mustards. Injury to alfalfa increases under drought stress or when alfalfa seedlings have more than 4 trifoliate leaves.

ACIFLUORFEN

Trade Name: ULTRA BLAZER.

Chemical Family: Diphenyl ether.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Annual broadleaf weeds including: cocklebur, jimsonweed, lady's-thumb, lamb's-quarters, wild mustard, redroot pigweed, common ragweed and eastern black nightshade. Suppression of perennial weeds including: Canada thistle, hedge bindweed, field bindweed and common milkweed.

Uptake and Translocation: Taken up through the foliage. Not readily translocated.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence when weeds are small and actively growing. Apply in 200–400 L/ha of water with a pressure of 275–400 kPa. Soybeans are tolerant after the first trifoliate-leaf stage. Thorough coverage is necessary. Do not add adjuvants to acifluorfen applied at the full rate.

Residual Activity: None.

Unique Characteristics: Acifluorfen is not volatile. Significant crop injury can be expected if acifluorfen is applied during hot, humid weather or if the crop is stressed due to previous herbicide injury, flooding, drought or cold conditions prior to the application. Cool weather or drought may delay control. Rainfall within 6 hours after application may reduce effectiveness.

ADJUVANT

See Chapter 5, *Notes on Adjuvants*.

AMINOPYRALID

Trade Name: MILESTONE HERBICIDE.

Chemical Family: Pyridine.

Crop and/or Non-Crop Registrations: Rangeland, grass pastures.

Sensitive Weeds: Milestone used alone controls: Canada thistle, spotted knapweed, Canada goldenrod, scentless chamomile, absinth wormwood, common tansy. MILESTONE can be tank mixed with 2,4-D amine for control of western snowberry, dandelion, annual sow-thistle, bluebur, bull thistle, burdock, buttercup, cocklebur, common plantain, curled dock, flixweed, goat's beard, hawkweed, hoary cress, peppergrass, perennial sow-thistle, prickly lettuce, stinging nettle, sweet clover and wild carrot.

Uptake and Translocation: Herbicide taken up primarily through the foliage, but also has soil residual activity on roots, seedlings and seeds. Strong translocation.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Postemergence when weeds are small and actively growing. Apply with ground equipment in minimum of 100 L/ha or aerial equipment in a minimum of 19 L/ha spray volumes. Good coverage is necessary.

Residual Activity: Short term soil residual activity that will control most species for two years.

Unique Characteristics: MILESTONE has no grazing restriction on livestock or lactating dairy animals grazing in treated areas. Allow 3 days of grazing on untreated pasture or untreated hay before transferring livestock to areas where sensitive broadleaf crops may be grown. Do not move manure compost containing MILESTONE onto sensitive crops, flowers, gardens, etc. Use only on well established forage grasses (secondary root development). MILESTONE Herbicide will kill legume plants including alfalfa and clover in tame pastures. Use adequate buffer

zones from sensitive crops and do not allow product spray to drift off site onto sensitive crops. Do not plant legumes crops on treated land for 48 months after application. Clean spray equipment thoroughly after use, before using spray equipment for other applications to sensitive crops. MILESTONE Herbicide cannot be applied on domestic or commercial turf grass. Rainfast period is 2 hours.

AMINOPYRALID/METSULURON-METHYL

Trade Name: CLEARVIEW HERBICIDE.

Chemical Family: Pyridine and sulfonylurea.

Crop and/or Non-Crop Registrations: Rangeland, permanent pastures.

Sensitive Weeds (135 g/ha): Ball mustard, bluebur, Canada fleabane, Canada thistle, chickweed, clover, common groundsel, common ragweed, common tansy, corn spurry, cow cockle, dandelion, field scabious, flixweed, green smartweed, hempnettle, horsenettle, kochia, lady's thumb, musk or nodding thistle, narrow-leaved hawkbeard, ox-eye daisy, perennial sow-thistle, plumeless thistle, prostrate pigweed, Russian thistle, scentless chamomile, shepherd's purse, spotted knapweed, stinkweed, stork's bill, sweet clover, tall buttercup, tartary buckwheat, volunteer canola, western snowberry, wild mustard, yellow starthistle.

Uptake and Translocation: Herbicide taken up primarily through the foliage, but also has soil residual activity on roots, seedlings and seeds. Strong -translocation.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Postemergence when weeds are actively growing. Apply with ground equipment in minimum of 110 L/ha or aerial equipment in a minimum of 30 L/ha spray volumes. Good coverage is necessary.

Residual Activity: Short term soil residual activity that will control most species for two years.

Unique Characteristics: There is no restriction on livestock or lactating dairy animals grazing in treated areas. Allow 3 days of grazing on untreated

pasture or untreated hay before transferring livestock to areas where sensitive broadleaf crops may be grown. Do not move manure compost containing CLEARVIEW onto sensitive crops, flowers, gardens, etc. Use only on well established forage grasses (secondary root development). CLEARVIEW Herbicide will kill legume plants including alfalfa and clover in tame pastures. Use adequate buffer zones from sensitive crops and do not allow product spray to drift off site onto sensitive crops. Do not plant legumes crops on treated land for 48 months after application. Clean spray equipment thoroughly after use, before using spray equipment for other applications to sensitive crops. CLEARVIEW Herbicide cannot be applied on domestic or commercial turf grass. Rainfast period is 2 hours.

ATRAZINE

Trade Names: AATREX LIQUID 480, CONVERGE 480.

Chemical Family: S-triazine.

Crop and/or Non-Crop Registrations: Corn (ensilage, field, seed and sweet), sorghum.

Sensitive Weeds: Will control a wide range of broadleaf weeds such as mustards, purslane, ragweed, smartweed, lady's-thumb, wild buckwheat, lamb's-quarters, pigweed, wild oats and volunteer clover. Populations of lamb's-quarters, pigweed, wild oats and ragweed have been found that are resistant to atrazine and are therefore not controlled.

Uptake and Translocation: Actively absorbed by roots and foliage, although foliar absorption is usually small. It is translocated to the top of the plant and accumulates in the leaf margins and the growing points.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: For corn, preplant incorporated, preemergence, or postemergence (with or without oil) usually before the annual weeds are more than 4 cm high; under dry weather conditions a shallow incorporation may enhance activity; oil or oil/surfactant blends will increase the postemergence activity.

Residual Activity: Can persist in the soil for varying lengths of time depending on rate, weather and soil conditions (longer under dry, cool weather conditions and in sandy soils). Postemergence treatments tend to persist longer than preemergence treatments. Refer to Tables 4-4 and 4-5. *Herbicide Crop Rotation and Soil pH Restrictions* for information on rotational crop restrictions.

BENTAZON

Trade Names: BASAGRAN FORTÉ, BROADLOOM.

Chemical Family: Benzothiadiazine.

Crop and/or Non-Crop Registrations: Alfalfa (seed production), clover (seed production), Corn (field, seed and sweet), dry beans (refer to Table 7-1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings*), faba beans, flax, millet, peas, sorghum and soybeans.

Sensitive Weeds: Annual broadleaf weeds including hairy nightshade, lamb's-quarters, redroot pigweed, low cudweed, purslane, common ragweed, wild radish, Russian thistle, hairy galinsoga, corn spurry, bird rape, flower-of-an-hour, buttercups, common groundsel, jimsonweed, giant ragweed, velvetleaf, lady's-thumb, wild mustard, cocklebur, stinkweed, shepherd's-purse and common chickweed. Triazine-tolerant biotypes of lamb's-quarters, redroot pigweed, common ragweed and common groundsel are also controlled. Top growth of Canada thistle and nutsedge are controlled. Field bindweed may be suppressed by 2 applications applied 10 days apart.

Uptake and Translocation: Taken up through the foliage. Not translocated.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence when weeds are small and actively growing. Apply in 100-400 L water/ha. Crop must be in a tolerant growth stage (see specific recommendations on label). Thorough spray coverage is necessary. Liquid ammonium sulphate or 28% urea ammonium nitrate may be added for improved and more consistent control of velvetleaf and lamb's-quarters in soybeans only.

Residual Activity: None.

Unique Characteristics: Corn and turf are tolerant at all stages of growth. Bentazon is not volatile. Temporary crop injury can be expected if bentazon is applied during hot, humid weather or if crop is stressed (flooding, drought, cold). Cool weather or drought may delay control. Rainfall within 6–8 hours after application may reduce effectiveness. Since there is no residual activity, a new flush of weeds may emerge after the first flush has been controlled.

BENTAZON/ACIFLUORFEN

Trade Names: HURRICANE.

Chemical Family: Benzothiadiazine, diphenyl ether.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Annual broadleaf weeds including: lamb's-quarters¹, pigweed species, common ragweed, velvetleaf², and common waterhemp. ¹ = suppression or partial control and ² = use ammonium sulphate (AMS) or urea ammonium nitrate (UAN) as the additive when velvetleaf is a target weed.

Uptake and Translocation: Taken up through the foliage. Not translocated.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence when weeds are small and actively growing. Apply in 100–200 L/ha of water with a minimum pressure of 275 kPa. Soybeans are tolerant after the first trifoliolate-leaf stage. Thorough coverage is necessary. To achieve consistent weed control, one of the following additives is recommended: ammonium sulfate, crop oil concentrate, or urea ammonium nitrate.

Residual Activity: None.

Unique Characteristics: Bentazon/acifluorfen is not volatile. Significant crop injury can be expected if acifluorfen/bentazon is applied during hot, humid weather or if the crop is stressed due to previous herbicide injury, flooding, drought or cold conditions prior to the application. Cool weather or drought may delay control. Rainfall within 4 hours after application may reduce effectiveness. Since there is no residual activity, a new flush of weeds may emerge after the first flush has been controlled.

BICYCLOPYRONE/MESOTRIONE/S-METOLACHLOR/ATRAZINE

Trade Name: ACURON HERBICIDE

Chemical Family: Triketone/Triketone/Chloracetamide/Triazine.

Crop and/or Non-Crop Registrations: Corn (field, seed and sweet)

Sensitive Weeds: Broadleaf weeds controlled (including triazine and group 2 tolerant biotypes): American nightshade; Eastern black nightshade; common ragweed; lady's thumb; lambsquarters; redroot pigweed; velvetleaf; wild buck wheat; wild mustard; Canada fleabane and waterhemp. Grass weeds controlled: barnyard grass; crab grass (smooth, hairy); fall panicum; foxtail (green, yellow, giant) and witchgrass. Grass weeds suppressed: proso millet.

Uptake and Translocation: ACURON Herbicide provides selective control of annual grass and broadleaf weeds in corn. ACURON Herbicide will not provide control of emerged grass weeds that are past the 2 leaf stage.

Application Method: Postemergence only to field corn, preemergence to field, seed and sweet corn.

Residual Activity: Activity will normally be maintained for 10–14 weeks. Late germinating fall panicum will not be controlled. Degradation is primarily by soil microbial action.

Unique Characteristics: ACURON Herbicide contains benoxacor that has been shown to enhance S-metolachlor metabolism in corn.

BROMOXYNIL

Trade Name: BROMOTRIL, BROMAX 480, BROTEX 240, BROTEX 480, KORIL, PARDNER.

Chemical Family: Hydroxybenzotrile.

Crop and/or Non-Crop Registrations: Alfalfa (seedling, established-seed), barley, canary grass (seed), corn, fall rye, flax, oats, millet, sorghum, triticale, and wheat (Durum, spring, winter).

Sensitive Weeds: Smartweed, nightshade, velvetleaf, pigweed, common ragweed, cocklebur, stinkweed, and wild mustard are killed if the chemical thoroughly contacts these plants before they have more than 4 true leaves: wild buckwheat and lamb's-quarters control to 8 leaf. Most established perennial broadleaf weeds, chickweed and grasses tolerate typical field rates of this herbicide.

Uptake and Translocation: Absorbed by plant foliage and moves very little within the plant.

Basis of Selectivity: Differential spray retention, uptake, translocation and degradation.

Application Method: Postemergence.

Residual Activity: Essentially no soil residual activity.

Unique Characteristics: Crop injury symptoms (leaf scorch) may develop if the plant is under stress within 2 or 3 days before or after spraying; this stress could be caused by high temperatures or high humidity or, in the case of corn, application following a period of cool, wet weather; such injury usually does not affect yields. Although bromoxynil is not an effective soil-applied herbicide, broadleaf crops such as turnips, peas and beans should not be seeded for a week after spray application.

BROMOXYNIL/MCPA

Trade Names: BADGE, BUCTRIL M, LOGIC M, MEXTROL.

Chemical Family: Hydroxybenzotrile/phenoxy.

Crop and/or Non-Crop Registrations: Spring and winter wheat, barley, oats, flax, fall rye, corn, timothy hay and canary grass.

Unique Characteristics: Combination of bromoxynil with MCPA provides better control of mustards than bromoxynil alone. Also see notes on BROMOXYNIL and MCPA.

CARFENTRAZONE-ETHYL

Trade Name: AIM EC.

Chemical Family: Aryl triazolinone.

Crop and/or Non-Crop Registrations: Preplant burndown (all crops– refer to product label for specific crop registrations); harvest aid treatment for potatoes, dry beans, soybeans and cereals.

Sensitive Weeds: 36.5 mL/ha rate – redroot pigweed, velvetleaf. 58 mL/ha rate – lamb’s-quarters, mallow, hairy nightshade, field pennycress, pigweed (prostrate, smooth and tumble), purslane, smartweed, tall waterhemp, tansy mustard. 73 mL/ha rate – carpetweed, cocklebur, eastern black nightshade, jimsonweed, kochia, volunteer canola. 117 mL/ha rate – burclover, prickly lettuce and corn spurry.

Uptake and Translocation: Carfentrazone-ethyl is taken up through the foliage and not readily translocated.

Basis of Selectivity: Metabolism.

Application Methods: Coverage of the weeds is essential for good control. For dessication, apply when the crop is mature and the grain has begun to dry down.

Residual Activity: None.

Unique Characteristics: AIM EC is a non-residual product and will not injure subsequent crops.

CHLORIMURON-ETHYL

Trade Name: CLASSIC, CHAPERONE.

Chemical Family: Sulfonylurea.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Common ragweed, dandelion, prickly lettuce, redroot pigweed, velvetleaf and yellow nutsedge.

Uptake and Translocation: Following foliar application, chlorimuron is rapidly absorbed through the leaves and translocated in both xylem and phloem.

Basis of Selectivity: Inhibition of acetolactate synthase (ALS) enzyme in susceptible plants leads to a rapid cessation of cell division and growth. Tolerant species rapidly convert chlorimuron to non-phytotoxic metabolites.

Application Methods: Postemergence. Preplant or post plant for control of dandelion.

Residual Activity: Chlorimuron-ethyl will provide some residual activity after application.

Unique Characteristics: A non-ionic surfactant must be added at 0.2% v/v. 28% Urea ammonium nitrate (U.A.N.) at 2 L/ha will improve the control of velvetleaf. Typical symptoms of plant death (chlorosis, necrosis) may occur from 1–3 weeks after application, depending on growing conditions. Favourable growing conditions will speed the activity while cool or dry conditions will delay it.

CHLORIMURON-ETHYL + FLUMIOXAZIN

Trade Name: DILIGENT.

Chemical Family: Sulfonylurea, Dicarboxamide.

Crop and/or Non-Crop Registrations: Preplant to soybeans.

For All Other Information: Refer to chlorimuron-ethyl, and flumioxazin alone.

CHLORIMURON-ETHYL + GLYPHOSATE

Trade Name: GUARDIAN MAX (co-pack of CLASSIC and POLARIS MAX).

Chemical Family: Sulfonylurea, Dicarboxamide, Amino acid.

Crop and/or Non-Crop Registrations: Preplant to Soybeans. Postemergence only to glyphosate tolerant (“Roundup Ready”) soybean varieties.

Sensitive Weeds: Season long control of dandelion (preplant). Season long control of annual sow-thistle, dandelion and yellow nutsedge (post).

For All Other Information: Refer to chlorimuron-ethyl and glyphosate alone.

CHLORIMURON-ETHYL + IMAZETHAPYR

Trade Name: FREESTYLE (co-pack of CLASSIC and DUPONT IMAZETHAPYR).

Chemical Family: Sulfonylurea, imidazolinone.

Crop and Non-Crop Registrations: Soybeans. Preplant or pre-emergence.

For All Other Information: refer to chlorimuron-ethyl and imazethapyr alone.

CHLORIMURON-ETHYL + METRIBUZIN

Trade Name: CANOPY PRO (co-pack of CLASSIC and TRICOR 75 DF).

Chemical Family: Sulfonylurea, imidazolinone.

Crop and Non-Crop Registrations: Soybeans. Preplant or pre-emergence.

For All Other Information: Refer to chlorimuron-ethyl and metribuzin alone.

CLETHODIM

Trade Name: ARROW ALL-IN, ANTLER, SELECT, STATUE.

Chemical Family: Cyclohexanedione.

Crop and/or Non-Crop Registrations: canola, chickpeas (Desi and Kabuli), field peas, flax, a number of different edible bean market classes, refer to Table 7–1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings*, for specific crop registrations, lentils, safflower, soybeans and sunflowers.

Sensitive Weeds: Annual grasses (wild oats, green and yellow foxtail, volunteer cereals, volunteer corn and barnyard grass).

Uptake and Translocation: Uptake through the foliage and translocated through both the phloem and xylem throughout the plant accumulating in the meristemic regions both above and below the ground.

Basis of Selectivity: Tolerant plants rapidly metabolize clethodim to several conjugated metabolites.

Application Method: Postemergent to actively growing grasses in the 2–6 true-leaf stage.

Residual Activity: Rapid degradation in both soil and water with no soil activity.

Unique Characteristics: ARROW ALL-IN includes a “built in” adjuvant whereas SELECT and STATUE are sold with an adjuvant that you must add.

CLOMAZONE

Trade Names: COMMAND 360 ME.

Chemical Family: Isoxazolidinone.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Velvetleaf, lamb's-quarters, lady's thumb, eastern black nightshade, barnyardgrass, green foxtail, yellow foxtail.

Uptake and Translocation: Primarily absorbed through the roots and is translocated through the xylem in the plant.

Basis of Selectivity: Clomazone is metalized in soybeans.

Application Methods: Preemergence.

Residual Activity: When applied at labelled rates, Command 360 ME will provide season long weed control. It is relatively immobile in soil and microbial decomposition is the principle path of dissipation. Some rotational restrictions apply, refer to Tables 4-4 and 4-5. *Herbicide Crop Rotation and Soil pH Restrictions* for more information. Soil texture impacts residual and product efficacy, see product label for appropriate rates.

Unique Characteristics: Sensitive plants in the application zone will turn white (bleached) as carotenoid biosynthesis is inhibited.

CLOPYRALID

Trade Names: LONTREL XC.

Chemical Family: Pyridine.

Crop and/or Non-Crop Registrations: canola, spring barley, spring wheat, winter wheat and field corn.

Sensitive Weeds: The 0.25 L/ha rate controls: Canada thistle (top growth), vetch (*Vicia* spp.), alsike clover. The 0.34 L/ha rate controls: Canada thistle, scentless chamomile, wild buckwheat, perennial sow-thistle (top growth), common groundsel, volunteer alfalfa, common ragweed, sheep sorrel (suppression), ox-eye daisy (suppression), kudzu (for short term suppression of top growth). The 0.5 L/ha rate controls: Canada thistle (season-long control of top growth with a reduction in population in the following year), kudzu (for up to season long suppression of top growth).

Uptake and Translocation: Rapidly absorbed by foliage and translocated readily throughout the plant via both xylem and phloem systems. Clopyralid is distributed throughout the plant to the meristem.

Basis of Selectivity: Effects on nucleic acid metabolism and growth are not observed in grasses and other tolerant species.

Application Methods: Postemergence as a broadcast or selective foliar.

Residual Activity: Half-life in soil is less than 30 days under conditions that are favourable for microbial degradation. Little to no residual activity.

Unique Characteristics: Clopyralid has little to no activity on woody vegetation, except woody species of the legume family.

CLORANSULAM-METHYL

Trade Name: FIRSTRATE.

Chemical Family: Triazolopyrimidine sulfonanilide.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Common ragweed, cocklebur, velvetleaf, and lamb's-quarters (Pre). Cocklebur, common ragweed, giant ragweed, jimsonweed and velvetleaf (Post).

Uptake and Translocation: Absorption by roots, shoots and foliage. Translocation via the xylem and phloem and accumulation in the growing points.

Basis of Selectivity: Metabolism by soybeans. Inhibition of the acetolactase synthase (ALS) enzyme in susceptible plants followed by a rapid cessation of cell division and plant growth.

Application Methods: Preemergence in both conventional and conservation tillage systems or postemergence prior to the flowering stage of soybeans.

Residual Activity: Decomposition in soils is attributed primarily to microbial degradation. Some rotational cropping restrictions apply. Refer to Tables 4-4 and 4-5, *Herbicide Crop Rotation and Soil pH Restrictions* for additional information.

Unique Characteristics: Do not apply to peat or muck soils. Preemergence or postemergence applications require an activating rainfall that moistens the soil to a depth of at least 5 cm in order to move

FIRSTRATE into the weed germination zone. If adequate rainfall is not received within 7-10 days after application, a shallow cultivation or use of a rotary hoe is suggested. Do not apply when air temperature is near freezing or when freezing conditions are expected for several days following time of application. Extended cold, wet conditions or abnormally high soil moisture conditions during emergence and early crop development may cause injury symptoms on soybeans such as temporary yellowing of the leaves and/or crop stunting. Soybeans will quickly outgrow these symptoms once normal growing conditions resume. Postemergence application prior to full emergence of the first trifoliolate leaf may cause temporary yellowing of soybeans. This effect is transient and has no effect on soybean yields. Postemergence application requires the addition of a non-ionic surfactant (Agral 90) and a liquid ammonium fertilizer (28-0-0 or 32-0-0). See label for details.

DICAMBA

Trade Names: ENGENIA, FEXAPAN PLUS VAPORGROP TECHNOLOGY, XTENDIMAX WITH VAPORGRIP TECHNOLOGY.

Chemical Family: Benzoic acid.

Crop and/or Non-Crop Registrations: Field corn, spring and winter wheat, spring barley, spring rye, oats, soybeans (Roundup Ready 2 Xtend varieties only), summer fallow and stubble, pastures, red fescue, lowbush blueberries and turf; non-crop areas such as roadsides, utility rights-of-way and railways.

Sensitive Weeds: Annual weeds: buckwheat (tartary, wild), cleavers, corn spurry, cow cockle, Canada fleabane, common ragweed, giant ragweed, lady's thumb, lamb's-quarters, mustard spp., pigweed spp., smartweed and velvetleaf. Perennial weeds: field bindweed, sow-thistle (perennial), Canada thistle. Brush weeds (when tank-mixed with 2,4-D): alder, aspen poplar, cherry, western snowberry, wolf willow, prickly rose and wild rose.

Uptake and Translocation: Readily absorbed by roots, stems or leaves and then translocated to other plant parts.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Preemergence or postemergence in field corn and soybeans (Roundup Ready 2 Xtend varieties only). For all other crops and non-crop uses, apply postemergence.

Residual Activity: Half-life in soil is approximately 30 days. Residue carryover into the next season is not a problem when applied at rates labelled for crop situations.

Unique Characteristics: Spray drift is toxic to sensitive plants in the same manner as 2,4-D, thus similar precautions should be followed. Cold weather conditions and/or subsequent high rainfall after dicamba application may lead to temporary corn injury particularly on early-season hybrids in Eastern Ontario. There is also a possibility of dicamba vapour drift from treated plant foliage during high temperatures (in excess of 25°C). At higher rates, dicamba can be toxic to trees and shrubs having roots under the treated areas.

DICAMBA/ATRAZINE

Trade Name: MARKSMAN.

Chemical Family: Benzoic acid/s-triazine.

Crop and/or Non-Crop Registrations: Field corn.

Sensitive Weeds: Buckwheat (wild, tartary), cleavers, cocklebur (emerged only), corn spurry, cow cockle, field bindweed, green smartweed, lady's thumb, lamb's-quarters, mustards, pigweed (redroot, Russian), ragweed (common and giant), sow-thistle (perennial), Canada thistle, velvetleaf, volunteer adzuki beans, waterhemp.

Application Methods: Preemergence and Postemergence until the standing height of the corn is 13 cm (5 leaf stage).

Unique Characteristics: Provides season long broadleaf weed control in corn. Provides excellent control of triazine-resistant broadleaf weeds and is particularly effective in controlling velvetleaf and other later-germinating deep-rooted annuals.

DICAMBA/S-METOLACHLOR

Trade Name: TAVIUM.

Chemical Family: Benzoic acid/s-triazine.

Crop and/or Non-Crop Registrations: Soybean (Xtend varieties), other varieties that are not dicamba tolerant will be killed.

Sensitive Weeds: annual grasses (not emerged): crabgrass (smooth, hairy); barnyard grass; fall panicum; foxtail (green, yellow, giant); old witchgrass. annual broadleaves (not emerged): american nightshade, eastern black nightshade. annual broadleaves (emerged): canada fleabane; cleavers; common ragweed; corn spurry; cow cockle; false ragweed; giant ragweed; green smartweed; hare's-ear mustard; indian mustard; lady's-thumb; lamb's-quarters; redroot pigweed; russian pigweed; tartary buckwheat; tumble mustard; velvetleaf; wild buckwheat; wild mustard; wormseed mustard. perennial weeds (emerged): canada thistle; perennial sow thistle; field bindweed. residual (short term) broadleaf weeds: lamb's-quarters; redroot pigweed; common ragweed; wild buckwheat and velvetleaf (suppression only)

Application Methods: Pre-plant or Preemergence only to Roundup Ready 2 Xtend soybean varieties. This product will cause severe crop injury or destruction if applied to soybeans that are not dicamba tolerant, including soybeans with a trait engineered to confer tolerance to other growth regulator herbicides other than dicamba.

Unique Characteristics: Do not tank mix products containing ammonium salts such as ammonium sulfate (AMS), urea ammonium nitrate, foliar fertilizers or glyphosate present as an ammonium salt. Do not add acidifying buffering agents, acidic pH adjusting agents or adjuvants. Do not use crop oil concentrates (COC) and methylated seed oils (MSO) as adjuvants when this product is applied with glyphosate-based agricultural herbicides.

DICHLORPROP/2,4-D

Trade Names: DICHLORPROP D, DICHLORPROP DX, ESTAPROP XT, TURBOPROP.

Chemical Family: Phenoxy/phenoxy.

Crop and/or Non-Crop Registrations: Spring and fall wheat and barley; perennial weed and brush control on non-cropland.

Sensitive Weeds: 2.75 L/ha – annual sow-thistle, bluebur, burdock, common ragweed, Canada thistle, cocklebur, curled dock, dandelion, dog mustard, flixweed, giant ragweed, kochia, lady's thumb, lamb's-quarters, night-flowering catchfly, oak-leaved goosefoot, perennial sow-thistle, prickly lettuce, mustard spp., pigweed (redroot, Russian), round leaved mallow, Russian thistle, shepherd's-purse, smartweed spp., spreading atriplex, stinkweed, stork's-bill, volunteer canola, volunteer sunflower and wild buckwheat.

Unique Characteristics: Most properties of dichlorprop are very similar to those of 2,4-D. Do not use on oats.

DIFLUFENZOPYR/DICAMBA

Trade Name: DISTINCT.

Chemical Family: Semicarbazone/Benzoic acid.

Crop and/or Non-Crop Registrations: Field corn (silage and grain).

Sensitive Weeds: Redroot pigweed, common ragweed, lamb's-quarters, wild buckwheat, lady's-thumb, Canada thistle, cocklebur (emerged), waterhemp (tall) and , velvetleaf. Controls horsetail and horsetail when tank-mixed with nicosulfuron/ rimsulfuron. Control is best when weeds are actively growing.

Uptake and Translocation: Readily absorbed by roots, stems or leaves and then translocated to other plant parts.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Apply postemergence from the 2 to 6 leaf stage of corn.

Residual Activity: Half-life in soil is approximately 30 days. Residue carryover into the next season is not a problem when applied at registered rates.

Unique Characteristics: This product has a wider application window, a lower use rate and has better activity on perennial weeds than dicamba alone. Spray drift is toxic to sensitive plants in the same manner as 2,4-D, thus similar precautions should be followed. The auxin transport inhibitor, diflufenzopyr, will also be active with other growth hormone herbicides such as 2,4-D and clopyralid and may cause crop injury if tank-mixed. Do not use additives such as oils, ionic surfactants, wetting agents, sticking agents, etc. Do not apply when there is a risk of severe drop in night temperature. Do not spray when temperatures are expected to exceed 27°C. Do not spray in high humidity or fog. Do not apply preemergence on sandy or sandy loam soils. Do not till or cultivate treated area for at least 7 days following application. Adding a non-ionic surfactant at 0.25% v/v plus liquid nitrogen fertilizer 28-0-0 at 1.25% is suggested for postemergence applications.

DIMETHENAMID-P

Trade Name: FRONTIER MAX.

Chemical Family: Chloroacetamide.

Crop and/or Non-Crop Registrations: Corn (field, seed and sweet), dry beans (kidney, otebo and white), peanuts, soybeans.

Sensitive Weeds: Green and yellow foxtail, barnyard grass, fall panicum, witchgrass, large and smooth crabgrass, redroot pigweed, eastern black nightshade, and tall waterhemp. Yellow nutsedge can be controlled with a preplant incorporated application.

Uptake and Translocation: Absorbed through shoots and roots of germinating grass and broadleaf weeds but primarily via plant coleoptile.

Basis of Selectivity: Not established.

Application Method: 1) preplant incorporated – incorporate with vibrating shank cultivator, harrow or other implement capable of giving uniform shallow incorporation into the top 5 cm of the soil within 7 days of planting; 2) preemergence – rainfall is needed within 10 days of application to achieve sufficient herbicide activation; 3) early postemergence

(corn only) – apply at the spike to 3 leaf stage of corn and up to the 2 leaf stage of annual grass weeds.

Residual Activity: Provides season-long weed control. Length of residual activity depends upon soil and moisture factors, application rate and timing. Heavy rainfall following an incorporated treatment may reduce weed control.

Unique Characteristics: No recropping restrictions in the fall or spring application in corn or soybeans. Application flexibility; there are many tank-mix and sequential treatment options for broad-spectrum weed control in corn and soybeans in all tillage systems (zero tillage to conventional tillage). Mixes well with bulk liquid and dry fertilizers.

DIMETHENAMID-P/TOPRAMEZONE

Trade Name: ARMEZON PRO

Chemical Family: Chloroacetamide/ Pyrazolone.

Crop and/or Non-Crop Registrations: Corn (field, seed and sweet)

Sensitive Weeds: Green foxtail, yellow foxtail, large crabgrass, barnyard grass, old witchgrass, redroot pigweed, common ragweed, lamb's-quarters, wild mustard, stinkweed

Application Methods: pre- emergence up to and including the 3 leaf stage of field corn.

For All Other Information: Refer to dimethenamid-P and topramzone alone.

DIQUAT

Trade Name: ARMORY, BOLSTER, REGLONE DESICCANT.

Chemical Family: Bipyridylum.

Crop and/or Non-Crop Registrations: Desiccation of canola, flax, dry beans, dry peas, mustard, sunflowers, soybeans, adzuki beans, legume seed crops. Vine killing of potatoes. Control of corn spurry in oats. Stale seedbed and inter-row weeding.

Sensitive Weeds: Any foliage contacted by diquat will be killed.

Uptake and Translocation: Rapidly absorbed by foliage. Limited translocation.

Basis of Selectivity: None.

Application Methods: Postemergence.

Residual Activity: Essentially none due to adsorption of chemical to soil particles.

Unique Characteristics: Must be used with clean (non-turbid) water as the soil particles in muddy water drastically reduce the effectiveness of diquat. Apply in weather conditions that will not promote drift. For aerial application suggested conditions for good application are moderate temperatures (less than 25°C), humidity (greater than 40%) and wind (3.6–10 km/h). Do not apply in dead calm conditions or when temperature inversion is likely (e.g., morning or evening when warm air is rising from crop). To avoid spray drift, use flat fan or hollow cone nozzles and a pressure of 140–210 kPa. For aerial application point the nozzles back 130°–180°. For further information on aerial application see product label.

EPTC

Trade Name: EPTAM.

Chemical Family: Thiocarbamate.

Crop and/or Non-Crop Registrations: Alfalfa, bird's-foot trefoil, flax, potatoes, sunflowers, sugar beets, turnips, and annual flowers. EPTAM is registered for use dry on a number of different edible bean market classes, refer to Table 7–1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings, page 74* for specific crop registrations.

Sensitive Weeds: Annual grasses such as crabgrass, barnyard grass, fall panicum, wild oats, green foxtail and yellow foxtail, yellow nutsedge, some annual broadleaf weeds such as corn spurry, lamb's-quarters, nightshade, pigweed and chickweed if conditions are favourable for germination and growth.

Uptake and Translocation: Uptake by underground plant parts (roots, hypocotyl and seed). Upward translocation to the growing tip.

Basis of Selectivity: Metabolized by tolerant species at the seed germination stage through enzymatic breakdown of the chemical. Seed food reserves also permit seedling to outgrow chemical effect.

Application Methods: Preplant incorporated or postplant incorporated. May be applied using water or liquid fertilizers as the carrier. Dry fertilizers may also be used as a carrier when impregnated by licenced fertilizer dealers. To prevent chemical loss and reduced weed control, EPTC should be uniformly incorporated in the soil by setting the incorporation equipment (i.e., tandem disks, field cultivator with sweep teeth, or vibrating shank S-tine cultivator) to work the soil approximately 10 cm deep, followed by a levelling device. Irrigation (approximately 0.6 cm) can also be used to incorporate. When application and incorporation are done in separate operations, application should be on a dry soil surface.

Residual Activity: Applied in the spring preplant, EPTC provides season-long weed control with no soil residues the following year to prevent crop rotation.

Unique Characteristics: EPTC does not need rainfall to activate and will not leach significantly under heavy rainfall. Under unfavourable germination conditions, leaf crinkling or leaf sealing may be observed on certain crops but usually without adverse effects on yield. May be tank-mixed with metribuzin for additional broadleaf weed control in potatoes. May be tank-mixed with ethalfuralin or trifluralin for additional broadleaf weed control in beans (white, snap and kidney). See label for other tank-mix combinations and information on less conventional application methods.

ETHAMETSULFURON-METHYL

Trade Name: MUSTER TOSS-N-GO.

Chemical Family: Sulfonyl urea.

Crop and/or Non-Crop Registrations: Spring canola, sunflower.

Sensitive Weeds: Wild mustard, flixweed, green smartweed, hemp-nettle and stinkweed.

Uptake and Translocation: Following foliar application, is rapidly absorbed and translocated in both xylem and phloem.

Basis of Selectivity: Inhibition of acetolactate synthase in susceptible plants leads to a rapid cessation of cell division and growth. Tolerant species rapidly convert etha-metsulfuron-methyl to non-phytotoxic metabolites.

Application Methods: Postemergence.

Residual Activity: Rapid soil microbial degradation.

Unique Characteristics: A non-ionic surfactant must be added. Typical symptoms of plant death (leaf crinkling, curling, chlorosis) occur 5–10 days after application depending on growing conditions.

FENOXAPROP-P-ETHYL/SAFENER

Trade Name: BENGAL, PUMA ADVANCE, VIGIL.

Chemical Family: Aryloxyphenoxypropionate.

Crop and/or Non-Crop Registrations: Spring wheat, spring barley (PUMA ADVANCE only).

Sensitive Weeds: Wild oats, foxtail (green, yellow) and barnyard grass.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence, apply to wild oats at the 1–6 leaf stage (plus 3 tillers) and prior to flag leaf emergence of spring wheat. For best results, apply when weeds are young and actively growing.

Residual Activity: Essentially none.

Unique Characteristics: PUMA ADVANCE can be tankmixed with BUCTRIL M for broad-spectrum annual broadleaf weed control in spring wheat. Treatment at the 3–4 leaf stage of crops and weeds usually combines maximum crop tolerance and weed susceptibility. Under stressed conditions and/or heavy crop canopy, earlier application will result in improved grassy weed control. PUMA ADVANCE contains a safener which allows spring cereals to metabolize fenoxaprop-p-ethyl.

FLUAZIFOP-P-BUTYL

Trade Names: VENTURE L.

Chemical Family: Aryloxyphenoxypropionate.

Crop and/or Non-Crop Registrations: Flax, canola, soybeans, sugar beets, sunflowers, tobacco, forage legumes (alfalfa, red clover and bird's-foot trefoil),

asparagus, cabbage, broccoli, Brussels sprouts, cauliflower, cucumber, ginseng, onions, peanut, potatoes, rutabagas, lupins, tomatoes, lowbush and highbush blueberries, raspberries, strawberries, non-grassy ornamental plants, poplars, shrubs, trees, apples, apricots, cherries, cranberries, grapes, peaches, pears and plums, forest and ornamental nurseries.

Sensitive Weeds: Barnyard grass, crabgrass, fall panicum, foxtail (giant, green, yellow), Johnson grass, volunteer corn, wheat and barley, wild oats, wirestem muhly, witchgrass, and quackgrass.

Uptake and Translocation: Absorbed primarily by leaves. Translocated to roots and rhizomes.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence. Apply when grasses are actively growing, and annual grasses are in the 2–5 leaf stage and quackgrass is in the 3–5 leaf stage.

Residual Activity: Essentially none.

Unique Characteristics: Preplant tillage to break up rhizomes will improve control of quackgrass. Except as noted on the label, apply broadleaf herbicides separately at least 3 days after fluzifop-p-butyl. Do not cultivate for 5 days after applying fluzifop-p-butyl. When plants are stressed (lack of moisture, excessive humidity, low temperature and/or very low relative humidity), fluzifop-p-butyl is less effective. Regrowth by tillering may occur if application is made under any of the above conditions. Since there is no residual activity, a new flush of weeds may emerge after the first flush has been controlled.

FLUMETSULAM

Trade Name: BROADSTRIKE RC.

Chemical Family: Triazolopyrimidine sulfonanilide.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Common lamb's-quarters, redroot pigweed, eastern black nightshade, and velvetleaf are controlled. Cocklebur, green foxtail, and lady'sthumb are suppressed.

Uptake and Translocation: Flumetsulam is absorbed by both roots and shoots of germinating broadleaf weeds.

Basis of Selectivity: Selectivity of flumetsulam in soybeans is based on metabolism.

Application Methods: Surface preplant, preplant incorporated or preemergence.

Residual Activity: The most significant means of dissipation of flumetsulam is microbial degradation. Provides season-long residual control of annual broadleaf and grass weeds. Rotational crops are winter wheat, spring wheat, spring barley, soybeans, common beans (dry, snap), lima beans, peas, field corn, seed corn.

Unique Characteristics: Can be applied up to 21 days before planting. Rainfall within 7–10 days is required for maximum activity of a preemergence application. Do not apply to areas where the soil pH is more than 7.8 and organic matter is less than 2%. Do not apply to soils containing more than 5% organic matter. Suspension concentrate formulation separates into 2 phases over time. Shake container well before using.

FLUMETSULAM + METRIBUZIN + S-METOLACHLOR

Trade Name: COMMENZA (co-pack of BROADSTRIKE RC + TRICOR + S-METOLACHLOR 960).

Chemical Family: Triazolopyrimidine sulfonanilide, S-triazine, Acetanilide.

Crop and/or Non-Crop Registrations: Soybeans

Application Methods: Apply pre-plant, pre-plant incorporated or pre-emergence.

For all other information: Refer to flumetsulam, metribuzin and s-metolachlor alone.

FLUMIOXAZIN

Trade Name: VALTERA, VALTERA EZ.

Chemical Family: Dicarboxamide.

Crop and/or Non-Crop Registrations: Celery, dry bulb onion, potato, pome fruit (apple and pear), grape, strawberry, highbush blueberry, stone fruit (peach,

cherry, nectarine, plum and apricot), asparagus, field-grown woody ornamentals, peppermint, soybeans, spearmint, tree nuts, edible bean desiccant and non-crop areas.

Sensitive Weeds: Hairy bittercress, liverwort, pigweed spp., common ragweed, lamb's-quarters, hairy nightshade, eastern black nightshade. Suppression of green foxtail, common groundsel and common chickweed.

Uptake and Translocation: Primarily taken up by the roots of treated plants following soil applications. Movement in the phloem is limited because of the rapid foliar desiccation caused by the herbicide.

Application Methods: See label for specific timing in each registered crop. In general, flumioxazin must be applied prior to weed emergence.

Residual Activity: Generally will provide 4–6 weeks of broadleaf weed control, however the length of residual control is dependent on application rate, rainfall and temperature conditions following application.

Unique Characteristics: Flumioxazin is a soil applied herbicide providing residual control of annual broadleaf weeds and suppression of grassy weeds. Moisture is necessary for effective residual weed control. Dry weather following applications of flumioxazin may reduce effectiveness. Flumioxazin will not control emerged weeds and may not control weeds that germinate after application but before an activating rainfall or weeds that germinate through cracks resulting from dry soil. Disturbing soil surfaces may reduce efficacy.

FLUMIOXAZIN + METRIBUZIN + IMAZETHAPYR

Trade Name: TRIACTOR (co-pack of VALTERA, TRICOR and NU-IMAGE).

Chemical Family: Dicarboxamide. S-triazine, Imidazolinone.

Crop and/or Non-Crop Registrations: Soybeans

Application Methods: Apply pre-plant or pre-emergence but no longer than 3 days after planting.

For all other information: Refer to flumioxazin, metribuzin and imazethapyr alone.

FLUMIOXAZIN/PYROXASULFONE

Trade Name: FIERCE.

Chemical Family: Dicarboxamide and Isoxazoline/Aryl triazolinone.

Crop Registrations: Soybeans.

Sensitive Weeds: lamb's-quarters, Common ragweed, Common Waterhemp, Dandelion, Eastern black nightshade, Green foxtail, Green pigweed, Hairy nightshade, Large crabgrass, Palmer amaranth, Pennsylvania smartweed, Redroot pigweed, Velvetleaf, Wild buckwheat, Wild mustard, Kochia, Canada fleabane

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Early preplant and preemergence. Rainfall within 10 days is required for maximum activity of the preemergent application.

Residual Activity: Provides season long control of labeled weeds and is dependent on soil type, moisture and rate of application.

Unique Characteristics: The rate of application depends on weed pressure. Lack of moisture or too much moisture can affect activity. Winter cereals may be planted 4 months after application.

FLUROXYPYR

Trade Name: TROPHY A.

Chemical Family: Pyridine.

Crop and/or Non-Crop Registrations: Winter wheat, spring wheat, barley and oats.

Sensitive Weeds: Cleavers, kochia, round-leaved mallow, volunteer flax. Suppression of chickweed, hempnettle, stork's bill and wild buckwheat.

Application Methods: Postemergence from the 3 leaf to flag leaf stage of winter wheat.

Residual Activity: Half life ranges from 11–38 days. Fluroxypyr provides very little residual weed control.

Unique Characteristics: This product was specifically brought to the Ontario marketplace for the control of cleavers in winter wheat. Trophy A is one component of the Trophy co-pack, the second component is Trophy B (MCPA). Field experience has shown that it also provides suppression of tufted vetch, an increasingly problematic species in Ontario.

FLUROXYPYR/BROMOXYNIL/MCPA

Trade Name: ENFORCER M.

Chemical Family: Pyridine, hydroxybenzotrile/phenoxy.

Crop and/or Non-Crop Registrations: Spring barley, spring and winter wheat.

Sensitive Weeds: Kochia (up to 5 cm tall), wild buckwheat (suppression), lamb's quarters, wild mustard, American nightshade (up to 4-leaf), redroot pigweed (suppression), ball mustard (up to 4-leaf), Russian thistle (up to 4-leaf, < 5 cm tall), bluebur (up to 4-leaf), scentless chamomile (up to 4-leaf), Canada thistle (top growth control only), shepherd's purse (up to 4-leaf), chickweed, stinkweed, cleavers (up to 6 whorls), stork's bill (suppression), cocklebur (up to 4-leaf), tartary buckwheat, common buckwheat, triazine resistant pigweed (up to 4-leaf), common groundsel, velvetleaf (up to 4-leaf), common ragweed, volunteer canola (up to 4-leaf), cow cockle (up to 4-leaf), volunteer flax, flixweed (up to 4-leaf), volunteer rapeseed (up to 4-leaf), green smartweed (up to 4-leaf), volunteer sunflower (up to 4 leaf), hemp-nettle, wild buckwheat, lady's thumb (up to 4-leaf), wormseed mustard, night flowering catchfly (up to 4-leaf), perennial sow thistle (top growth control only), pale smartweed (up to 4-leaf)

Application Methods: Postemergence from the 2 leaf to early flag leaf stage of cereals.

Residual Activity: Half life ranges from 11–38 days. Fluroxypyr provides very little residual weed control.

FOMESAFEN

Trade Name: REFLEX.

Chemical Family: Diphenyl ether.

Crop Registrations: Cucumber, soybeans, and is registered for use on a number of different edible bean market classes, refer to Table 7–1. *Beans Adzuki, Dry, Lima and Snap Weed Control Ratings*, for specific crop registrations.

Sensitive Weeds: Redroot pigweed, common ragweed, wild mustard, lady's-thumb, eastern black nightshade, cocklebur; suppression of velvetleaf, lamb's-quarters, tall waterhemp.

Uptake and Translocation: Taken up through foliage.

Not readily translocated.

Mode of Action: Cell-membrane disrupter.

Method of Selectivity: Beans metabolize fomesafen.

Some initial bronzing of crop leaves may occur, but plants normally outgrow this condition without any effect on maturity or yield.

Application Method: Early postemergence to weeds and crop. Apply when beans are 1–2 trifoliolate and weeds are at the 2–4 leaf stage. Good coverage is essential for optimum weed control. Apply in 200–350 L of water/ha at a pressure between 245–420 kPa. Always add an adjuvant such as AGRAL 90 (0.25% v/v) or TURBOCHARGE (0.5% v/v). PINNACLE or VENTURE may be tank-mixed for additional weed control.

Residual Activity: Persistence depends on weather and soil conditions (more persistent under dry conditions). Rotation to field corn, dry beans or soybeans the following year. Winter wheat may be planted 90 days after treatment. All other crops require a field bioassay.

Unique Characteristics: Do not apply REFLEX to any field more than once every 2 years.

FOMESAFEN/GLYPHOSATE

Trade Name: FLEXSTAR GT.

Chemical Family: Amino acid/Diphenyl ether.

Crop Registrations: Soybeans.

Sensitive Weeds: All weed species listed on glyphosate labels at comparable use rates in addition to residual control of common ragweed and redroot pigweed.

Uptake and Translocation: Absorbed through the foliage of emerged plants. Glyphosate component is readily translocated throughout the plant while the fomesafen component is not readily translocated. Selected broadleaf residual weed control provided by shoot uptake.

Basis of Selectivity: Metabolized by glyphosate tolerant soybean species when applied postemergence. Some initial bronzing of crop leaves may occur after postemergence application, but plants normally outgrow this condition without any

effect of maturity or yield. When applied surface preplant or preemergence, the soybeans safely metabolize the fomesafen component.

Application Methods: Surface preplant (up to 7 days prior to planting) and preemergence across all types of soybeans. Postemergence: from the 1–2 trifoliolate stage of only glyphosate tolerant soybeans.

Residual Activity: 3–4 weeks residual activity (control) of redroot pigweed and common ragweed. Winter wheat may be planted 4 months after application.

Unique Characteristics: Do not apply FLEXSTAR GT to any field more than once every 2 years. Add Turbocharge if weeds are stressed (hardened off from drought) or are at the maximum leaf stage specified on the product label

FORAMSULFURON

Trade Name: OPTION 2.25 OD.

Chemical Family: Sulfonylurea.

Crop and/or Non-Crop Registrations: Field Corn, lowbush blueberries.

Sensitive Weeds: Quackgrass, green, yellow and bristly foxtail, fall panicum, proso millet, barnyard grass, witchgrass, large crabgrass, redroot pigweed, common lamb's-quarters, velvetleaf, eastern black nightshade, common chickweed, wild and wormseed mustard.

Uptake and Translocation: Foramsulfuron is quickly absorbed through leaves and rapidly translocated throughout the plant.

Basis of Selectivity: Inhibition of acetolactate synthase (ALS) enzyme in susceptible plants. Tolerant species rapidly metabolize foramsulfuron.

Application Methods: Postemergent from the 1–8 leaf stage of corn, emerged grassy weeds up to the early tillering stage, emerged broadleaf weeds.

Residual Activity: Essentially none.

Unique Characteristics: Addition of the safener isoxadifen in the formulated product maximizes crop tolerance, enhances crop recovery under severe environmental conditions and allows the use of an ethylated/methylated seed oil based adjuvant system.

GLUFOSINATE AMMONIUM

Trade Name: IGNITE, LIBERTY 200SN.

Chemical Family: Phosphinic acid.

Crop and/or Non-Crop Registrations: IGNITE –

Desiccation of dry beans; directed applications in apples, apricots, highbush blueberries, sweet and sour cherries, grapes, nectarines, peaches, pears and plums, raspberries and tree nuts; stale seedbed techniques in asparagus, carrots, lettuce and onions; ground crack application in potatoes. LIBERTY 200SN – Corn hybrids, soybean and canola varieties specially developed to be tolerant to Liberty 200SN herbicide. Glufosinate-ammonium tolerant inbred lines grown for seed corn production.

Sensitive Weeds: Non-selective – affects all actively growing green plants; regrowth of perennial species may occur.

Uptake and Translocation: Absorbed through foliage; minimal translocation – dependent on application rate and species treated.

Basis of Selectivity: IGNITE – All green plant tissue is sensitive; safe on mature (non-green) bark of woody plants. LIBERTY 200SN – All green plant tissue is sensitive except for field corn, seed corn, soybeans and canola plants that have been specially developed to be tolerant.

Application Methods: IGNITE – Postemergence; broadcast or directed spray to avoid contact with leaves or green bark of desirable plants; thorough coverage of the plant tissue to be controlled is essential. LIBERTY 200SN – Postemergence. Can be broadcast in “Liberty Link” corn at the 1–8 leaf stage, apply with drop nozzles to later corn growth stages; cotyledon to flowering stage in “Liberty Link” soybeans and cotyledon to early bolting stage in InVigor canola.

Residual Activity: None; there are no cropping or rotational restrictions after application.

Unique Characteristics: Speed of action is influenced by environmental factors; at cool temperatures, poor moisture and low humidity, speed of action may be reduced. Heavy dew at time of application may reduce control of certain weed species.

GLYPHOSATE

Trade Names: CREDIT XTREME, CRUSH'R 540, FACTOR 540, GLYFOS, MATRIX, POLARIS MAX, ROUND-UP TRANSORB HC, ROUNDUP WEATHERMAX, STONEWALL, VP480.

Chemical Family: Amino acid.

Crop and/or Non-Crop Registrations: Preplant or postharvest with no cropping restrictions. Preharvest in wheat, barley, soybeans, canola, flax, lentils, peas and forages. “Roundup Ready” Crops – refer to Table 4–3. *Glyphosate Products, Registered Uses and Rates Needed to Control Specific Weed Species in Glyphosate Tolerant Crops*

Sensitive Weeds: Annual grasses; perennial weeds (quackgrass, Canada thistle, sow-thistle, field bindweed, milkweed, cattails, nutsedge, poison-ivy etc.); brush (birch, alder, poplar, raspberry, willow and maple).

Uptake and Translocation: Absorbed through foliage and translocated throughout the plant.

Basis of Selectivity: Non-selective for agricultural crops. Conifers are tolerant at some stages but the basis has not been established.

Application Methods: Postemergence, usually at the bud to bloom stage of growth for most perennial weeds. Canada thistle should be at least in early flower bud, milkweed at flower bud and bindweed at full flower. Quackgrass can be treated in the spring or fall when it is actively growing with at least 3–4 new leaves on each emerged shoot; in the fall, remove crop refuse but do not till prior to application; fall or spring tillage prior to spring application may reduce control; wait at least 3–5 days after application before working the area; for maximum control it is advisable to till before the quackgrass turns completely brown. (See Preplant Weed Control and Wick Wiper and Roller Application).

Residual Activity: None – crops can be planted or seeded directly into treated areas following application. Other herbicides are required to control weeds emerging after the application.

Unique Characteristics: Rainfall within 6 hours after application or heavy frost within 24 hours may reduce control for 356 g/L formulations. 360 g/L formulations are rainfast as soon as 4 hours after application. Glyphosate (540 g/L) formulations are rainfast as soon as 1 hour after application.

GLYPHOSATE/DICAMBA

Trade Name: ROUNDUP XTEND

Chemical Family: Amino acid, Benzoic acid.

Crop and Non-Crop Registrations: Soybeans (Roundup Ready 2 Xtend Varieties only), corn applied pre-plant, preemergence or postemergence.

For All Other Information: Refer to glyphosate and dicamba alone.

GLYPHOSATE/MESOTRIONE/S-METOLACHLOR/BENOXACOR

Trade Name: HALEX GT.

Chemical Family: Amino acid, triketone and acetanilide.

Crop and/or Non-Crop Registrations: Glyphosate tolerant (“Roundup Ready”) corn only.

Sensitive Weeds: Emerged annual grass and broadleaf weeds controlled by glyphosate and residual control of unemerged annual grass and broadleaf weeds (see residual activity for specific species).

Uptake and Translocation: Refer to glyphosate, meotrione and s-metolachlor/benoxacor.

Basis of Selectivity: Refer to glyphosate, meotrione and s-metolachlor/benoxacor.

Application Methods: Postemergence from the spike to 6 leaf stage of glyphosate tolerant corn.

Residual Activity: HALEX GT will provide residual control of eastern black nightshade, lady's thumb, lamb's-quarters, pigweed spp. mustard (wild), velvetleaf, barnyardgrass, crabgrass (smooth and large), fall panicum, foxtails (green, yellow and giant), witchgrass.

HALAUXIFEN/FLUROXYPYR

Trade Name: Pixxaro A.

Chemical Family: Synthetic auxins (Picolinic and Carboxylic acids).

Crop and/or Non-Crop Registrations: spring barley, spring wheat, winter wheat.

Sensitive Weeds: postemergent control of alfalfa (volunteer), chickweed, cleavers, flixweed, hemp-nettle, kochia, lamb's-quarters, redroot pigweed, ragweed (common), round-leaved mallow, shepherd's-purse and wild buckwheat.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Postemergent from 3 leaf to just prior to flag leaf emergence of barley and wheat.

Residual Activity: Does not provide significant residual weed control.

Unique Characteristics: 1 hour rainfast. Sold only in a co-pack called PIXXARO which contains PIXXARO A and MCPA ESTER 600.

HALOSULFURON

Trade Name: Permit.

Chemical Family: Sulfonylurea.

Crop and/or Non-Crop Registrations: Permit- Dry Beans, Field corn (including seed), Sweet Corn, Popcorn, Grain Sorghum.

Sensitive Weeds: Canada fleabane, Chickweed (common), Cocklebur, Common groundsel, Corn spurry, Creeping yellowcress, Flower-of-an-hour, Fringed (Northern) willowherb, Hairy galinsoga, Horsetail, Jimsonweed, Lamb's-quarters, Plantain, broadleaf, Prickly lettuce, Ragweed (common and giant), Redroot pigweed, Round-leaved mallow, Shepherd's-purse, Smartweed (Lady's-thumb, Pennsylvania), Smooth pigweed, Spiny amaranth, Stinking chamomile, Velvetleaf, Wild mustard, Wild radish and Yellow nutsedge. For certain weeds, activity may be greater as a pre or post emergent treatment. Will not control Group 2 resistant weed populations. Refer to label for application timing and use rate for specific weed control recommendations.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Soil applications (Preplant incorporated and preemergent) and postemergent foliar application timings in dry beans, poatemergence only in corn. Refer to label for specific crop staging recommendations.

Residual Activity: Generally will provide 4–6 weeks of control. Length of residual control is dependent on soil and moisture factors, application rate and timing. Refer to label for rotation crop guidelines.

Unique Characteristics: Heavy infestations of nutsedge may require sequential applications. An earlier treatment may be required to prevent nutsedge from competing with the crop. Refer to label for other weeds suppressed. Refer to label for specific crop directions for pre-emergent rates. Refer to label for rotation crop guidelines.

IMAZETHAPYR

Trade Name: CONQUEST B (Available only in CONQUEST LQ co-pack), NU-IMAGE, PHANTOM, PURSUIT, DUPONT IMAZETHAPYR.

Chemical Family: Imidazolinone.

Crop and/or Non-Crop Registrations: Soybeans, a number of different edible bean market classes, refer to Table 7–1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings* for specific crop registrations, processing peas, snow peas and alfalfa for seed production.

Sensitive Weeds: Soil applications – green foxtail, yellow foxtail, witchgrass, barnyard grass, lamb's-quarters, redroot pigweed, smartweed, lady's-thumb, wild mustard, velvetleaf, common ragweed and reduced competition from eastern black nightshade and proso millet. Postemergence application – green foxtail, yellow foxtail, witchgrass, barnyard grass, redroot pigweed, velvetleaf, wild mustard, cocklebur, eastern black nightshade, ragweed and reduced competition from proso millet, large crabgrass, lamb's-quarter's, wild buckwheat and yellow nutsedge. Late postemergence application – green

and yellow foxtail (up to 4 leaf stage), barnyard grass (up to 6 leaf stage), redroot pigweed (up to 12 leaf stage) and velvetleaf (up to 8 leaf stage), giant ragweed (up to 6 leaf stage).

Uptake and Translocation: Absorbed by both roots and foliage. Translocation in both xylem and phloem.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Early preplant (up to 30 days before planting), preplant incorporated, preemergence and postemergence up to the 2 leaf stage of weeds.

Residual Activity: Persistence depends on weather and soil conditions (more persistent under dry conditions). Some rotational restrictions apply, refer to Tables 4–4 and 4–5. *Herbicide Crop Rotation and Soil pH Restrictions* for more information.

Unique Characteristics: Can be applied up to 30 days prior to planting. Registered for use in reduced and no-till situations. Heavy infestations of ragweed or barnyard grass require a tank-mix with a herbicide that is effective on those species. Postemergence application requires the addition of AGRAL 90, AGSURF or ENHANCE surfactant and liquid fertilizer solution. Temporary soybean discoloration and/or shortening may occur with postemergence applications. A period of 100 days is required between application and planting winter wheat.

IMAZETHAPYR + BENTAZON

Trade Name: CLEANSWEEP (co-pack of PURSUIT + BASAGRAN FORTÉ).

Chemical Family: Imidazolinone+ benzothiadiazine.

Crop and/or Non-Crop Registrations: Soybeans.

Sensitive Weeds: Annual grass (barnyard grass, green and yellow foxtail) and broadleaf (cocklebur, flower-of-an-hour, lady's-thumb, lamb's-quarters, pigweed, ragweed, shepherd's-purse, stinkweed, velvetleaf, wild mustard, eastern black nightshade) species including triazine resistant biotypes and reduced competition from yellow nutsedge, Canada thistle and field bindweed.

Uptake and Translocation: Contact and systemic. Absorption occurs through foliage and roots.
Basis of Selectivity: Metabolism by soybeans.
Application Methods: Postemergence.
Unique Characteristics: A liquid ammonium fertilizer solution (such as UAN) must be added at 2 L/ha. Some rotational restrictions apply. See label for details. Refer to notes on imazethapyr and BENTAZON for additional information on each component.

IMAZETHAPYR + METRIBUZIN

Trade Name: CONQUEST LQ (co-pack of CONQUEST A + CONQUEST B).
Chemical Family: Imidazolinone+s-triazine.
Crop and/or Non-Crop Registrations: Soybeans.
Sensitive Weeds: Annual grass and broadleaf species. See label for specific species controlled.
Application Methods: Early preplant incorporated and preemergence.
Unique Characteristics: Some rotational restrictions apply. See label for details. Refer to notes on imazethapyr and metribuzin for additional information on each component.

ISOXAFLUTOLE + ATRAZINE

Trade Name: CONVERGE XT (co-pack CONVERGE FLEXX + CONVERGE 480), or tank-mix of CONVERGE FLEXX + atrazine 480.
Chemical Family: Isoxazole + s-triazine.
Crop and/or Non-Crop Registrations: Corn, field and seed.
Sensitive Weeds: Annual grasses and broadleaf weeds including triazine and ALS inhibitor tolerant biotypes: green, yellow and giant foxtail, barnyard grass, witchgrass, large and smooth crabgrass, lamb's-quarters, pigweed, common ragweed, eastern black nightshade, velvetleaf, wild mustard, wormseed mustard, wild buckwheat, lady's-thumb, sow-thistle (annual and spiny annual) seedling dandelion and seedling plantain.
Uptake and Translocation: Absorbed by roots and shoots of germinating weeds.

Basis of Selectivity: Metabolized by tolerant species. Preemergence and early postemergence up to the 3 leaf stage of corn. Provides season long weed control. Winter wheat can be grown 4 months after application, corn, soybeans, spring cereals, alfalfa, spring canola and processing peas can be grown the following year. Weed seedlings that emerge prior to activation of herbicide by rainfall can be controlled if less than 5 cm in height. NOT for use on sandy loam or finer textured soils with a minimum of 2% organic matter.

LINURON

Trade Name: LOROX L.
Chemical Family: Substituted urea.
Crop and/or Non-Crop Registrations: Corn, soybeans, carrots, celery, dill, parsnips, potatoes, asparagus, caraway, coriander, sweet white lupins, wheat, oats, barley, gladioli, fruit trees.
Sensitive Weeds: Annual weeds such as barnyard grass, common chickweed, corn spurry, crabgrass, velvetleaf, fall panicum, foxtail, goosefoot, goose grass, groundsel, knotweed, lamb's-quarters, redroot pigweed, purslane, common ragweed, shepherd's-purse, smartweed, stinkweed, wild buckwheat, witchgrass, wormseed mustard, triazine-resistant weeds; seedlings only of dandelion, plantain and sow-thistle.
Uptake and Translocation: Readily absorbed through roots, less so through foliage; translocation primarily upwards in xylem.
Basis of Selectivity: Differential metabolism often coupled with differential uptake and translocation.
Application Methods: Preemergence, postemergence, directed postemergence, pre plus postemergence.
Residual Activity: Does not pose a problem for subsequent crops since phytotoxic residues from applications at agricultural rates disappear within 4 months.
Unique Characteristics: Do not use on sandy or coarse-textured soils having less than 2% organic matter. If unusually heavy rains follow application, severe injury may occur to corn, soybeans, carrots and potatoes.

MCPA

Trade Names: MCPA ESTER 600, MCPA ESTER 500, MCPA SODIUM 300, MCPA AMINE 500, MCPA AMINE 600, TROPHY B.
Chemical Family: Phenoxy.
Crop and/or Non-Crop Registrations: Cereal crops, turf, non-crop sites.
Sensitive Weeds: Many broadleaf weeds, especially buttercup, hemp-nettle, field horsetail (top growth only), seedling dock.
Uptake and Translocation: Absorbed through leaves or roots. Translocates to, and accumulates at, growing points of shoots and roots.
Basis of Selectivity: Differences in interception, penetration, translocation, metabolism and sensitivity of active sites leads to greater activity in broadleaf weeds than grasses.
Application Methods: Postemergence.
Residual Activity: Some soil residues can be detected for up to 1 month under moist conditions and 6 months in drier climates.
Unique Characteristics: MCPA is available in amine ester or sodium salt formulations. It is safer than 2,4-D for use on oats, flax and peas. As with 2,4-D, there is a potential drift hazard to nearby susceptible crops such as grapes, turnips, tobacco and cabbage.

MCPB/MCPA

Trade Name: CLOVITOX PLUS, TOPSIDE, TROPOTOX PLUS.
Chemical Family: Phenoxy/phenoxy.
Crop and/or Non-Crop Registrations: Seedling white, ladino, alsike or red clovers direct seeded or underseeded in wheat, oats, barley, rye, pastures, field corn, peas, grapes (not TOPSIDE).
Sensitive Weeds: Small emerged mustards, stinkweed, ragweed, lamb's-quarters, redroot pigweed, shepherd's-purse, volunteer rapeseed, wild radish, hemp-nettle, annual sow-thistle; top-growth control of bull thistle, Canada thistle, curled dock, plantain, perennial sow-thistle, field bindweed, horsetail, buttercup.

Uptake and Translocation: Absorbed through the foliage and readily translocated, especially to the growing points.

Basis of Selectivity: MCPB is not directly toxic to plants. Susceptible weeds convert MCPB to MCPA.

Application Methods: Postemergence. In cereals, clovers and peas, apply as an overall spray. In corn, apply with drop pipes after the corn reaches 45 cm before the beginning of tasselling. Apply to pastures after grazing or cutting.

MESOTRIONE

Trade Name: CALLISTO.

Chemical Family: Triketone.

Crop and/or Non-Crop Registrations: Asparagus, corn (field, seed and sweet), highbush blueberries, cranberries and sod production.

Sensitive Weeds (when tank-mixed with atrazine): Cocklebur (emerged), common ragweed, giant ragweed (emerged), lamb's-quarters, redroot pigweed, tall waterhemp, velvetleaf, volunteer adzuki bean (emerged).

Uptake and Translocation: Readily absorbed by, shoots, roots, stems and leaves and then translocated to other plant parts.

Basis of Selectivity: Inhibits the HPPD enzyme found in photosynthetic cells of susceptible species. Symptoms on susceptible plants are bleaching followed by necrosis. Tolerant species rapidly metabolize mesotrione.

Application Methods: Preemergence and postemergence up to the 8 leaf stage of field, seed and sweet corn. Postemergence applications to corn require the addition of a non-ionic surfactant. Apply to blueberries and cranberry beds preemergence and postemergence to weeds.

Residual Activity: Degradation primarily by soil microbial action. Mesotrione will provide residual control of annual broadleaf weeds.

Unique Characteristics: When mesotrione is tank-mixed with atrazine there is a synergistic effect and improved control of broadleaf weed species. Mesotrione can be tank-mixed with either a soil applied or postemergence grass herbicide for one-pass weed control. Mesotrione has low volatility and poses a reduced risk to nearby sensitive crops.

MESOTRIONE/GLYPHOSATE

Trade Name: CALLISTO GT.

Chemical Family: Triketone, Amino acid.

Crop and/or Non-Crop Registrations: Corn (glyphosate tolerant hybrids only)

Application Methods: Preemergence and postemergence up to the 8 leaf stage of corn.

Unique characteristics: In addition to broad-spectrum burn-down of emerged weeds, CALLISTO GT will provide residual control of Eastern Black Nightshade, redroot pigweed, velvetleaf and suppression of common ragweed.

For all other information: Refer to mesotrione and glyphosate alone.

METOLACHLOR, see S-METOLACHLOR

METOLACHLOR/ATRAZINE, see S-METOLACHLOR/ATRAZINE.

METRIBUZIN

Trade Names: CONQUEST A (Available only in CONQUEST LQ co-pack), SENCOR 480 F, SENCOR 75 DF, SQUADRON, TRICOR 75DF.

Chemical Family: S-triazine.

Crop and/or Non-Crop Registrations: corn (field), faba beans, soybeans.

Sensitive Weeds: Lamb's-quarters, wild mustard, redroot pigweed, common ragweed, shepherd's-purse, lady's-thumb, velvetleaf, jimsonweed, prostrate pigweed, Russian thistle, yellow wood-sorrel, prickly mallow, chickweed, cocklebur, carpetweed, dandelion seedlings, barnyard grass, crabgrass, foxtail, fall panicum, witchgrass, Johnson grass seedlings and cheat grass.

Uptake and Translocation: Some uptake through the foliage but the major route is via the roots. Translocation upwards in the xylem.

Basis of Selectivity: Degradation by tolerant species.

Application Methods: Preplant incorporated, surface pre-plant, burndown or preemergence soybeans.

Residual Activity: Varies with the climate. At normal-use rates the half-life is 1–2 months.

Unique Characteristics: Heavy rainfall following application may cause crop damage. Some varieties of potato, soybean and tomato are less tolerant than others. Triazine-resistant weeds are not controlled. Do not use on muck soils.

METRIBUZIN + FLUMIOXAZIN

Trade Name: BIFECTA (co-pack of VALTERA and TRICOR).

Chemical Family: Dicarboxamide. S-triazine.

Crop and/or Non-Crop Registrations: Soybeans

Application Methods: Apply pre-plant or pre-emergence but no longer than 3 days after planting.

For all other information: Refer to flumioxazin and metribuzin alone.

NICOSULFURON

Trade Name: ACCENT.

Chemical Family: Sulfonylurea.

Crop and/or Non-Crop Registrations: Field corn, certain varieties of sweet corn (refer to product label), and seed corn (contact seed source for details on specific inbreds).

Sensitive Weeds: Quackgrass, proso millet, green and yellow foxtail, fall panicum, barnyard grass, witchgrass. Control of yellow foxtail is only achieved with either the addition of MERGE or the addition of 28% UAN at a rate of 5 L/ha along with a labelled non-ionic surfactant.

Uptake and Translocation: Following foliar absorption, nicosulfuron is rapidly absorbed through the leaves and translocated in both xylem and phloem.

Basis of Selectivity: Inhibition of acetolactate synthase (ALS) enzyme in susceptible plants leads to a rapid cessation of cell division and regrowth. Tolerant species rapidly convert nicosulfuron to non-phytotoxic metabolites.

Application Method: Postemergent within the 1–8 leaf stage of corn.

Residual Activity: No soil residual activity.

Unique Characteristics: Emerged grasses will be controlled by nicosulfuron but subsequent germinating grasses will not be controlled. A non-ionic surfactant must be added at 0.2% v/v. Typical symptoms of plant death (chlorosis, necrosis) occur 5–10 days after application, depending on growing conditions. Do not apply to corn that has been treated with an organophosphorus soil insecticide.

NICOSULFURON/RIMSULFURON

Trade Name: ULTIM, STEADFAST IS.

Chemical Family: Sulfonylurea/Sulfonylurea.

Crop and/or Non-Crop Registrations: Field corn. Not for use on sweet or seed corn.

Sensitive Weeds: Quackgrass, proso millet, green and yellow foxtail, fall panicum, barnyard grass, witchgrass, redroot pigweed (incl. triazine-resistant).

Uptake and Translocation: Following foliar application, nicosulfuron/rimsulfuron rapidly absorbed through the leaves and translocated in both xylem and phloem.

Basis of Selectivity: Inhibition of acetolactate synthase (ALS) enzyme in susceptible plants leads to a rapid cessation of cell division and growth. Tolerant species rapidly convert nicosulfuron/rimsulfuron to non-phytotoxic metabolites.

Application Method: Postemergence, within the 1–6 leaf stage of corn.

Residual Activity: Rapid soil microbial degradation of nicosulfuron. Refer to notes on rimsulfuron for information on its soil residual activity.

Unique Characteristics: Emerged grasses will be controlled by nicosulfuron/rimsulfuron, but subsequent germinating grass weeds will not be controlled. A non-ionic surfactant must be added

at 0.2% v/v. Typical symptoms of plant death (chlorosis, necrosis) occur 5–10 days after application, depending on growing conditions. Do not use on corn hybrids with a crop heat unit (CHU) rating of 2,500 or less, or in geographic regions with 2,500 or less average seasonal CHU.

PENDIMETHALIN

Trade Name: PROWL H2O.

Chemical Family: Dinitroaniline.

Crop and/or Non-crop Registrations: edible beans (snap, lima and adzuki), field corn, and soybean.

Sensitive Weeds: Green foxtail, crabgrass, barnyard grass, fall panicum, lamb's-quarters and pigweed (suppression).

Uptake and Translocation: Weeds are controlled as they germinate. Translocation is not significant and emerged weeds are not controlled.

Basis of Selectivity: No significant uptake or translocation by the crop.

Application Methods: Field corn: preemergence and early postemergence. For preemergence application, pendimethalin may be applied in water or liquid fertilizer. Conduct a fertilizer compatibility test using pendimethalin and any of its registered tank-mix partners. Early postemergence application may only use water as a carrier.

Residual Activity: Persistence depends on weather conditions (more persistent under dry conditions). Only registered crops may be planted in the year of application. Soybeans and corn may be planted the year following application in corn. Days to harvest restriction: 100 days.

Unique Characteristics: Strongly adsorbed to soil particles. Most effective when rain is received within 7 days of application. For onions, apply at both growth stages for season-long control. Tank-mixes in corn or sequential application of other herbicides in onions and corn are required for broad-spectrum weed control. Registered for dry bulb onions grown on muck and mineral soils. Do not graze treated fields or feed treated foliage to livestock prior to 100 days after PROWL application.

PINOXADEN

Trade Name: AXIAL BIA.

Chemical Family: Phenylpyrazolin.

Crop and/or Non-Crop Registrations: Spring wheat, winter wheat, spring barley.

Sensitive Weeds: Wild oats, green foxtail, yellow foxtail, barnyard grass, volunteer oats, volunteer canary seed, proso millet

Uptake and Translocation: Absorbed through foliage and translocates to the site of action in the meristematic growing tissue.

Application Methods: Postemergence from the 1 leaf to flag leaf stage of cereals.

Residual Activity: Essentially none.

PROSULFURON

Trade Name: PEAK 75WG.

Chemical Family: Sulfonyl urea.

Crop and/or Non-Crop Registrations: Corn (field and seed), sorghum, millet and wheat (winter).

Sensitive Weeds: Lamb's-quarters (including triazine tolerant), redroot pigweed, cocklebur, lady's thumb, wild buckwheat, wild mustard, velvetleaf, common ragweed.

Uptake and Translocation: Following foliar application and uptake, prosulfuron is translocated through phloem to meristematic tissues. Growth of susceptible species ceases rapidly, followed by discoloration of leaves; death takes 1–3 weeks to occur.

Basis of Selectivity: Inhibition of the enzyme acetolactate synthase. Tolerant species rapidly metabolize prosulfuron.

Application Methods: Postemergent, corn (2–7 leaf stage), sorghum and millet (3–5 leaf stage) and winter wheat (up to stem elongation).

Residual Activity: Degradation primarily by soil microbial action. Prosulfuron will provide a sufficient degree of control of later germinating broadleaf weeds. Approved rotational crops are soybeans, dry beans, peas, cereals, and corn. See the label and Tables 4–4 and 4–5. *Herbicide Crop Rotation and Soil pH Restrictions* for information on rotational crop restrictions.

Unique Characteristics: Prosulfuron must be applied in a tank-mix combination with a reduced rate of dicamba in corn (field and sweet), millet and sorghum. Prosulfuron must be tank-mixed with bromoxynil in winter wheat. Refer to each crop section for more information on applicable rates and adjuvants.

PYRASULFOTOLE/BROMOXYNIL

Trade Name: INFINITY.

Chemical Family: Benzoylpyrazole and hydroxybenzotrile.

Crop and/or Non-Crop Registrations: Wheat (spring, durum winter), barley, triticale and timothy (seed production only).

Sensitive Weeds: Annual broadleaf weeds including ALS (Group 2) resistant biotypes: annual sow-thistle, chickweed, cleavers, common ragweed, flixweed, hemp-nettle, kochia, lamb's-quarters, pale smartweed, redroot pigweed, suppression of round-leaf mallow giant ragweed and spreading atriplex, Russian thistle, shepherd's purse, stinkweed, volunteer canola (conventional and herbicide tolerant), wild buckwheat and wild mustard. Suppression of perennial weeds including: Canada thistle, dandelion, perennial sow-thistle.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence – Apply to emerged, young, actively growing weeds. Under cool and/or dry conditions activity may be reduced or delayed. Weed control may also be reduced if application is made when weeds are dust covered or in the presence of heavy dew, fog, or mist/rain. Apply in a minimum of 46.8 L of water/ha at a pressure of 275 kPa. Crops may be treated from the 1 leaf stage of growth until the flag leaf is just visible but still rolled.

Residual Activity: Essentially none.

Unique Characteristics: Application beyond emergence of the flag leaf may result in crop injury. Do not apply to a crop that is stressed by severe weather conditions, frost, low fertility, drought, water-saturated soil, disease or insect damage, as crop injury may result. Do not apply to crops under-seeded with legume species. Do not store below -20°C.

PYRASULFOTOLE/BROMOXYNIL/ FLUROXYPYR

Trade Name: INFINITY FX.

Chemical Family: Benzoylpyrazole, hydroxybenzotrile, pyridine.

Crop and/or Non-Crop Registrations: Wheat (spring, durum, winter), barley, triticale and timothy (seed production only).

Sensitive Weeds: annual sow-thistle, chickweed, cleavers, canada fleabane, canada thistle (suppression), common ragweed, dandelion (suppression), flixweed, giant ragweed, hemp-nettle, kochia, lamb's-quarters, narrow-leaved hawk's-beard, pale smartweed, perennial sow-thistle (suppression), redroot pigweed, round-leaved mallow, russian thistle, shepherd's purse, spreading atriplex (suppression), stinkweed, stork's-bill, volunteer canola, volunteer flax, volunteer soybean, wild buckwheat and wild mustard

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence – Apply to emerged, young, actively growing weeds. Under cool and/or dry conditions activity may be reduced or delayed. Weed control may also be reduced if application is made when weeds are dust covered or in the presence of heavy dew, fog, or mist/rain. Apply in a minimum of 46.8 L of water/ha at a pressure of 275 kPa. Crops may be treated from the 1 leaf stage of growth until the flag leaf is just visible but still rolled.

Residual Activity: Essentially none.

Unique Characteristics: Application beyond emergence of the flag leaf may result in crop injury. Do not apply to a crop that is stressed by severe weather conditions, frost, low fertility, drought, water-saturated soil, disease or insect damage, as crop injury may result. Do not apply to crops under-seeded with legume species. Do not store below -20°C.

PYROXASULFONE

Trade Name: ZIDUA SC.

Chemical Family: Isoxazoline.

Crop Registrations: Field corn and soybeans.

Sensitive Weeds: barnyard grass, common waterhemp, crabgrass (large), redroot pigweed, foxtail (green, yellow, giant), ryegrass (Italian).

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: : Early preplant, preplant shallow incorporated and preemergence. Rainfall within 10 days is required for maximum activity of the preemergent application.

Residual Activity: Provides season long control of labeled weeds and is dependent on soil type, moisture and rate of application.

Unique Characteristics: The rate of application depends on weed pressure. Lack of moisture or too much moisture can affect activity. Winter cereals may be planted 4 months after application. Good tank mix partner with other herbicides.

PYROXASULFONE/CARFENTRAZONE-ETHYL

Trade Name: FOCUS.

Chemical Family: Isoxazoline/ Aryl triazolinone.

Crop Registrations: Spring wheat, winter wheat, field corn and soybeans.

Sensitive Weeds: Control of: green foxtail, yellow foxtail, barnyardgrass, downy brome, Japanese brome, Italian ryegrass, large crabgrass, redroot pigweed, green pigweed, cleavers, common waterhemp, velvet leaf, wormseed mustard. Suppression of: wild oats, giant foxtail, foxtail barley, kochia, stinkweed, lamb's quarters, wild buckwheat, wild mustard.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Preplant or preemergence. Rainfall within 10 days is required for maximum activity of the preemergent application.

Residual Activity: Provides season long control of labeled weeds and is dependent on soil type, moisture and rate of application.

Unique Characteristics: The rate of application depends on weed pressure. Lack of moisture or too much moisture can affect activity. Winter cereals may be planted 4 months after application. Good tank mix partner with other herbicides.

PYROXASULFONE/SULFENTRAZONE

Trade Name: AUTHORITY SUPREME.

Chemical Family: Isoxazoline/ Dicarboxamide.

Crop Registrations: Soybeans, field pea and chickpea.

Sensitive Weeds: Controls: barnyardgrass, brome (Downy, Japanense), crabgrass (large, smooth), foxtail (green, yellow, giant), witchgrass, cleavers, cowcockle, wild mustard, groundsel, common, kochia, lamb's quarters, nightshade (Eastern black), pigweed (green, redroot, powell), Purslane, common, stinkweed, waterhemp (common), wild buckwheat and yellow woodsorrel. Suppression of: wild oats, common ragweed.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: : Preplant and preemergence.

Rainfall within 10 days is required for maximum activity of the preemergent application.

Residual Activity: Provides season long control of labeled weeds and is dependent on soil type, moisture and rate of application.

PYROXSULAM

Trade Name: SIMPLICITY GODRI.

Chemical Family: Triazolopyrimidine

Crop Registrations: Spring wheat, winter wheat.

Sensitive Weeds: Controls: barnyard grass (1–5 leaf), Japanese brome (1–6 leaf), canola (volunteer) (1–6 leaf), chickweed (common - up to 10 cm), cleavers (up to 6 whorl), corn spurry (up to 2 whorl stage, <10 cm in height), cow cockle (up to 8 leaf), flixweed (up to 10 cm), foxtail, yellow (1–5 leaf), hemp nettle (1–8 leaf), oats (wild – up to 4 leaf or 2 tiller), pigweed, (redroot- 1–8 leaf), round-leaved mallow (up to 6 leaf stage, <10 cm in size), smartweed (lady's-thumb, 1–5 leaf), shepherd's

purse (up to 30 cm tall), stinkweed (up to 30 cm tall). Suppresses: downy brome (2–6 leaf, 4 tillers), dandelion (seedlings and over-wintered rosettes less than or equal to 20 cm), green foxtail (1–5 leaf), white cockle (up to the first flower stage, less than 20 cm in height), wild buckwheat (1–4 leaf), Canada thistle (up to 30 cm tall, prebud), Russian thistle (up to 10 cm tall), Persian darnel (1 leaf to 4 leaf, 2 tiller)

Application Methods: : Postemergence to spring wheat in the spring and to winter wheat in the fall or spring.

Residual Activity: Provides little to no residual weed control.

QUIZALOFOP-P-ETHYL

Trade Name: ASSURE II, CONTENDER, YUMA.

Chemical Family: Aryloxyphenoxypropionate.

Crop and/or Non-Crop Registrations: canola, clover (red and alsike), flax, a number of different edible bean market classes, refer to Table 7–1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings*, for specific crop registrations, faba beans, mustard, peas, industrial fibre hemp, seed alfalfa, soybeans and sunflower.

Sensitive Weeds: Green foxtail, barnyard grass, fall panicum, foxtail barley, witchgrass, proso millet, wild oats, volunteer cereals and volunteer corn.

Uptake And Translocation: Rapidly absorbed and readily translocated in both the xylem and phloem from the treated foliage to the root system and growing points of the plant.

Basis of Selectivity: Disruption of fatty acid biosynthesis leading to increased permeability and cellular disruption in sensitive plants. Rapid metabolism of the active herbicide in tolerant species.

Application Methods: Postemergence.

Residual Activity: Rapid microbial degradation and essentially no soil activity.

Unique Characteristics: Apply with SURE-MIX at 5 L/1,000 L of spray solution.

RIMSULFURON/MESOTRIONE

Trade Name: ENGARDE

Chemical Family: Sulfonylurea + Triketone.

Crop Registrations: Corn.

Sensitive Weeds: Barnyard grass, crabgrass (large), foxtail (green, yellow), common ragweed, lamb's-quarters, wild mustard, velvetleaf and redroot pigweed.

Application Methods: Preemergence and postemergence up to the 2 leaf stage of corn.

Residual Activity: Degradation primarily by soil microbial action. Mesotrione will provide residual control of annual broadleaf weeds.

Unique Characteristics: Some corn hybrids with corn-heat-unit (CHU) ratings of 2500 or less have shown some sensitivity to postemergent applications of Engarde™ Herbicide. DO NOT APPLY Engarde™ Herbicide as an Early postemergent application on corn hybrids with chu ratings of 2500 or less or in geographic regions having 2500 or less average seasonal corn heat units.

RIMSULFURON/MESOTRIONE/SAFENER

Trade Name: DESTRA IS

Chemical Family: Sulfonylurea + Triketone.

Crop Registrations: Corn.

Sensitive Weeds: Fall panicum, green foxtail, old witch grass, quackgrass, common ragweed, lamb's-quarters, eastern black nightshade, volunteer canola, velvetleaf, green and redroot pigweed.

Application Methods: Postemergence up to the 8 leaf stage of corn.

Residual Activity: Degradation primarily by soil microbial action. Mesotrione will provide residual control of annual broadleaf weeds.

Unique Characteristics: Contains a crop safener that allows DESTRA IS to be applied up to the 8 leaf stage of corn and without the hybrid restrictions that exist with ENGARDE.

SAFLUFENACIL

Trade Names: ERAGON LQ.

Chemical Family: Pyriminedione.

Crop and/or Non-Crop Registrations: Barley, corn (field and sweet), soybean and wheat. Dessicant in edible beans and soybean.

Sensitive Weeds: Canada fleabane, common ragweed, lamb's-quarters, redroot pigweed, stinkweed, velvetleaf, wild buckwheat, wild mustard and dandelion (suppression).

Uptake and Translocation: Emerged plants will take product up primarily by the foliage but sensitive non-emerged species will take up product through the roots and shoots. ERAGON LQ is translocated mainly in the xylem and has limited mobility in the phloem.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Preplant (soybean), preplant and preemergence (barley, wheat, corn and sweet corn), preharvest dessicant in edible beans and soybean.

Residual Activity: Dependent on rate, the 36–71 g/ha rate provides limited residual activity while the 107–143 g/ha rate provides much longer residual activity.

Unique Characteristics: Sensitive weed species will begin to show injury symptoms within hours and will typically die within 3 days, depending on environmental conditions. Any crop can be safely grown the year following applications of ERAGON LQ at the 36 g/ha rate. A number of crops can be grown the year following applications of ERAGON LQ at the high rate, refer to Tables 4–4 and 4–5, *Herbicide Crop Rotation and Soil pH Restrictions* and the product label for more specific direction.

SAFLUFENACIL/DIMETHENAMID-P

Trade Names: INTEGRITY.

Chemical Family: Pyriminedione and chloroacetamide.

Crop and/or Non-Crop Registrations: Corn (field and sweet) and soybean.

Sensitive Weeds: Barnyard grass, crabgrass (smooth, large), eastern black nightshade, fall panicum, foxtails (green, yellow and giant), witchgrass, common ragweed, lamb's-quarters, redroot pigweed, velvetleaf, wild buckwheat, wild mustard and yellow nutsedge (PPI only). Refer to saflufenacil for other sensitive species.

Uptake and Translocation: Absorbed through shoots and roots of germinating grass and broadleaf weeds.

Basis of Selectivity: Unknown for dimethenamid-P, saflufenacil is metabolized by tolerant species.

Application Methods: Preplant incorporated and preemergence.

Residual Activity: Provides season-long weed control. Length of residual activity depends upon soil and moisture factors, application rate and timing. Heavy rainfall following an incorporated treatment may reduce weed control.

Unique Characteristics: A number of crops can be grown the year following applications of INTEGRITY, refer to Tables 4–4 and 4–5, *Herbicide Crop Rotation and Soil pH Restrictions* and the product label for more specific direction.

SAFLUFENACIL/IMAZETHAPYR

Trade Names: OPTILL.

Chemical Family: Pyriminedione and imidazolinone.

Crop and/or Non-Crop Registrations: Soybean.

Sensitive Weeds: Barnyard grass, broadleaf plantain, Canada fleabane, common chickweed, common ragweed, crabgrass (large), dandelion (suppression), foxtail (green, yellow), lamb's-quarters, prickly lettuce, redroot pigweed, shepherd's-purse, stinkweed, velvetleaf, wild buckwheat and wild mustard.

For More Information: Refer to SAFLUFENACIL and IMAZETHAPYR.

S-METOLACHLOR

Trade Names: DUAL II MAGNUM, KOMODO/ UPI S-MET.

Chemical Family: Acetanilide.

Crop and/or Non-Crop Registrations: Corn, soybeans, a number of different edible bean market classes, refer to Table 7–1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings* for specific crop registrations, edamame.

Sensitive Weeds: Large and smooth crabgrass, witchgrass, barnyard grass, fall panicum, foxtails (green, yellow and giant), yellow nutsedge, American nightshade, eastern black nightshade and tall waterhemp.

Uptake and Translocation: Absorbed by germinating grasses mainly through the shoot just above seed. Absorbed by germinating broadleaf weeds through roots and shoots.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Early preplant, preplant incorporated and preemergence. Early postemergence on corn (spike to 2 leaf stage of corn). Incorporation equipment should be set to work the soil 10 cm deep with a disc operating at 6–10 km/h or a vibrating shank cultivator at 10–13 km/h; 1 incorporation is sufficient and need not be immediate. Rainfall within 10 days is required for maximum activity of the preemergence application.

Residual Activity: Activity will normally be maintained for 10–14 weeks.

Unique Characteristics: The rate required depends on weed pressure (higher rate for heavier weed pressure). Yellow nutsedge control requires a preplant incorporated application. Winter cereals may be planted 4–5 months after metolachlor application. Many tank-mix combinations are registered on various crops. Do not use on muck soils or coarse-textured soils low in organic matter. DUAL II MAGNUM contains benoxacor, a chemical that enhances the corn plant's ability to metabolize s-metolachlor, thereby preventing corn injury even under adverse environmental conditions.

S-METOLACHLOR/ATRAZINE

Trade Name: PRIMEXTRA II MAGNUM.

Chemical Family: Acetanilide/s-triazine.

Crop and/or Non-Crop Registrations: Corn (ensilage, field, seed and sweet).

Sensitive Weeds: Germinating annual broadleaf weeds and annual grasses such as American nightshade, eastern black nightshade, lady's-thumb, lamb's-quarters, wild mustard, purslane, prostrate pigweed, redroot pigweed, wild buckwheat, smartweed, ragweed, crabgrass, barnyard grass, green foxtail, yellow foxtail, giant foxtail, witchgrass and fall panicum. Yellow nutsedge can be controlled with a preplant incorporated application.

Uptake and Translocation: Absorbed by germinating grasses mainly through shoot just above seed. Absorbed by germinating broadleaf weeds through roots and shoot.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Early preplant, preplant incorporated, and preemergence. Early postemergence on corn (spike to 2 leaf stage of corn). Incorporation equipment should be set to work the soil 10 cm deep with a disc operating at 6–10 km/h or a vibrating shank cultivator at 10–13 km/h. One incorporation is sufficient and need not be immediate. Rainfall within 10 days is required for maximum activity of the preemergence application. S-metolachlor/atrazine may be applied in nitrogen solutions or liquid fertilizers for preplant incorporated or preemergence weed control. Dry bulk granular fertilizers may be impregnated with metolachlor/atrazine for preplant incorporation.

Residual Activity: Activity will normally be maintained for 10–14 weeks; late-germinating fall panicum will not be controlled. Soybeans, white beans, oats or barley may be planted the following spring.

Unique Characteristics: The rate required depends on weed pressure (higher rate for heavier weed pressure). Yellow nutsedge control requires a preplant incorporated application. Will not control triazine-resistant weed species. Contains atrazine in low amounts, which may carry over in a dry year. Is effective over a wide range of soil types and has a good margin of crop safety. Perennial weeds are not controlled. Primextra II MAGNUM contains benoxacor, a chemical that enhances the corn plant's ability to metabolize s-metolachlor, thereby preventing corn injury even under adverse environmental conditions.

S-METOLACHLOR/BENOXACOR+ METRIBUZIN

Trade Name: TIEDOWN (co-pack of KOMODO/ UPI S-MET and TRICOR 75 DF).

Chemical Family: Acetanilide/S-triazine.

Crop Registrations: Soybeans.

For All Other Information: Refer to s-metolachlor and metribuzin.

S-METOLACHLOR/BENOXACOR/ METRIBUZIN

Trade Name: BOUNDARY LQD.

Chemical Family: Acetanilide/S-triazine.

Crop Registrations: Soybeans, tomato and potato.

Sensitive Weeds: Large and smooth crabgrass, witchgrass, barnyardgrass, fall panicum, giant, green and yellow foxtail, yellow nutsedge, American nightshade, Eastern black nightshade, redroot pigweed and tall waterhemp.

Uptake and Translocation: Absorbed by germinating grasses mainly through the shoot just above the seed. Broadleaf weed uptake is mainly through the roots but can also be through the shoots.

Basis of Selectivity: Metabolized by tolerant species.

Application Methods: Surface preplant, preplant incorporated and preemergence in soybeans; preplant incorporated in tomato and preemergence in potato. Rainfall within 10 days is required for maximum activity of the preemergence application.

Residual Activity: Activity will normally be maintained for 10–14 weeks depending upon use rate.

Unique Characteristics: The rate required depends on weed pressure (higher rate for heavier weed pressure). Yellow nutsedge control requires a preplant incorporated application. Do not use on muck soils or coarse textured soils low in organic matter. Do not use on potato varieties Belleisle, Tobique or Superior.

SETHOXYDIM

Trade Name: POAST ULTRA.

Chemical Family: Cyclohexanedione.

Crop and/or Non-Crop Registrations: Canola, flax, soybeans, a number of different edible bean market classes, refer to Table 7–1. *Beans (Adzuki, Dry, Lima and Snap) Weed Control Ratings, page 74* for specific crop registrations peas, onions, tomatoes, potatoes, sweet potato, pumpkin, squash, cucumbers, alfalfa, buckwheat, creeping red fescue, garlic, broccoli, brussels sprouts, cabbage, cauliflower, chicory, peppermint, spearmint, snow peas, apples, apricots, cherries, peaches, pears, plums, highbush blueberries, cranberries, strawberries and sethoxydim-resistant corn.

Sensitive Weeds: Wild oats, foxtails, barnyard grass, large crabgrass, proso millet, fall panicum, witchgrass, volunteer corn and cereals and quackgrass.

Uptake and Translocation: Absorbed by foliage. Translocated upwards and downwards in plant.

Basis of Selectivity: Degraded by tolerant species (broadleaf plants).

Application Methods: Postemergence to actively growing annual grasses in the 1–6 leaf stage and quackgrass in the 1–3 leaf stage. Use flat fan nozzles and add MERGE adjuvant to the spray mix. Alternatively, ASSIST OIL CONCENTRATE or Ammonium sulphate plus ASSIST OIL CONCENTRATE may be used. Other postemergence herbicides not recommended as tank-mix combinations on the label must be applied at least 4 days before or after sethoxydim application. Aerial application is also registered.

Residual Activity: Essentially none. A second application and/or cultivation may be necessary to control grasses that emerge after treatment.

Unique Characteristics: Susceptible grasses, when sprayed, stop growing immediately and then gradually turn yellow to purple to brown over a period of 7–21 days, depending on growing conditions and crop competition. Rainfall within 1 hour after application may reduce effectiveness. If treated grasses are stressed (drought, flooding, prolonged cool temperatures) control will be delayed or reduced.

SIMAZINE

Trade Names: SIMAZINE 480.

Chemical Family: S-triazine.

Crop and/or Non-Crop Registrations: Corn, bird's-foot trefoil, alfalfa.

Sensitive Weeds: Annual broadleaf weeds such as pigweed, lady's-thumb, lamb's-quarters, purslane, ragweed, volunteer clover, wild buckwheat, smartweed, plantain and groundsel; annual grasses such as barnyard grass, crabgrass, wild oats and yellow foxtail (triazine-resistant biotypes of foxtail, lamb's-quarters, pigweed and groundsel will not be controlled); most perennial species starting freshly from seed.

Uptake and Translocation: Absorbed by roots; little or no foliar absorption; translocated upwards in xylem, accumulating in apical meristem and leaves with napropamide on new plantings of apples, apricot, cherries, plums, peaches and pears.

Basis of Selectivity: Some species, such as corn, metabolize simazine. In most crops, selectivity is based on the roots of the crop plants being deeper than the depth to which simazine leaches.

Application Methods: Preplant incorporated (to a depth of 2.5 cm) or preemergence in corn; preemergence in other crops. Broadcast or band application. In fruit crops, apply a 1 m wide band under the plants; cultivate or sod the area between the rows. For aquatic weed control, apply as a draw-down treatment or water-volume application in drainage ditches and ponds with no water flow-through.

Residual Activity: Soil residues may persist for more than 1 season. After spraying with simazine, do not plant any crop in the treated area in the same year except corn. Where rates in excess of 2 kg/ha have been applied, do not plant rotational crops in the following year; soils should be tested if there is any question of excessive residues remaining.

Unique Characteristics: Needs sufficient moisture to be activated. Should be applied only once per season. To avoid build-up of resistant weeds, simazine should be rotated with other non-triazine residual herbicides. Simazine is more persistent than atrazine. Where rainfall is sufficient to cause erosion, soil containing simazine may wash to lower areas of land and injure existing or subsequent crops.

SULFENTRAZONE

Trade Name: AUTHORITY 480.

Chemical Family: Dicarboxamide.

Crop and/or Non-Crop Registrations: Chickpeas, field peas, flax, sunflower and soybean.

Sensitive Weeds: Controls kochia, redroot pigweed, lamb's-quarters, wild buckwheat, eastern black nightshade, common waterhemp, smooth crabgrass, large crabgrass, yellow woodsorrel, common groundsel, powell pigweed and common purslane. Suppression of cleavers.

Uptake and Translocation: Primarily taken up by the roots of treated plants following soil applications. Movement in the phloem is limited because of the rapid foliar desiccation caused by the herbicide.

Application Methods: Pre-plant or preemergence up to 3 days after planting.

Residual Activity: Provides about 4–6 weeks of residual weed control for sensitive species.

Unique characteristics: Will not control emerged weed species.

SURFACTANT

See Chapter 5, *Notes on Adjuvants*.

TEMBOTRIONE/THIENCARBAZONE-METHYL

Trade Names: VIOS G3.

Chemical Family: Triketone/sulfonylaminocarbonyltriazolinones.

Crop and/or Non-Crop Registrations: Glyphosate tolerant ("Roundup Ready") or Glufosinate-ammonium tolerant ("Liberty Link") corn only.

Sensitive Weeds: Emerged annual grass and broadleaf weeds controlled by glyphosate or Liberty herbicide and residual control of weeds specified in Table 9–6. *Glyphosate Tolerant ("Roundup Ready") Corn Herbicide Weed Control Ratings*.

Uptake and Translocation: Tembotrione – foliar uptake, Thiencarbazone-methyl – foliar and soil uptake.

Basis of Selectivity: Metabolism by tolerant species.

Application Methods: Postemergence from the 1–6 leaf stage of “Roundup Ready” or “Liberty Link” field corn.

Residual Activity: VIOS G3 will provide residual control of lamb’s-quarters, redroot pigweed, wild buckwheat, lady’s thumb, wild mustard, common hempnettle, common chickweed, spiny annual sowthistle, common ragweed, velvetleaf, eastern black nightshade, green foxtail, yellow foxtail, barnyard grass, witchgrass and large crabgrass.

Unique Characteristics: VIOS G3 has a very low use rate and convenient packaging. It must always be tank-mixed with either glyphosate or LIBERTY 200SN.

THIFENSULFURON-METHYL

Trade Name: PINNACLE SG TOSS-N-GO.

Chemical Family: Sulfonyl urea.

Crop and/or Non-Crop Registrations: Soybeans, tomatoes.

Sensitive Weeds: Redroot pigweed, lamb’s-quarters, velvetleaf, lady’s-thumb and wild mustard.

Uptake and Translocation: Following foliar application, the herbicide is rapidly absorbed and translocated in both the xylem and phloem to growing points of sensitive weeds.

Basis of Selectivity: Inhibition of acetolactase synthase (ALS) enzyme in susceptible plants that leads to a rapid cessation of cell division and plant growth. Tolerant species rapidly metabolize the herbicide into non-phytotoxic metabolites.

Application Method: Postemergence.

Residual Activity: Rapid soil microbial degradation. Half-life of 5 days at 25°C soil temperatures.

Unique Characteristics: Labelled species can be controlled up to 10 cm in height. Redroot pigweed is very sensitive. Typical symptoms of plant death (leaf crinkling, curling, chlorosis) occur 5–10 days after application depending

on the growing conditions. Inclusion of either a non-ionic surfactant at 0.1% v/v or a crop oil concentrate at 0.5% v/v is required for weed control. Velvetleaf control is greatly enhanced by the inclusion of an ammonium containing fertilizer (such as a UAN solution).

THIFENSULFURON-METHYL/ TRIBENURON-METHYL

Trade Name: REFINE SG. REFINE M (co-pack of REFINE SG + MCPA) BOOST M (co-pack of BOOST + MCPA Ester).

Chemical Family: Sulfonyl urea.

Crop and/or Non-Crop Registrations: Wheat (spring, winter, Durum), barley, oats not underseeded to legumes or grasses. Refine SG can be applied to winter wheat in the fall or the spring.

Sensitive Weeds: Lamb’s-quarters, annual smartweed (green smartweed, lady’s-thumb), chickweed, hempnettle, wild buckwheat, cow cockle, stinkweed, Canada thistle, sow-thistle, round-leaved mallow.

Uptake and Translocation: Following foliar application, is rapidly absorbed and translocated in both xylem and phloem.

Basis of Selectivity: Inhibition of acetolactate synthase in susceptible plants leads to a rapid cessation of cell division and growth. Tolerant species rapidly convert to non-phytotoxic metabolites.

Application Method: Postemergence.

Residual Activity: Rapid soil microbial degradation.

Unique Characteristics: A non-ionic surfactant must be added. Typical symptoms of plant death (leaf crinkling, curling, chlorosis) occur 5–10 days after application depending on growing conditions. Tank-mixes with MCPA and 2,4-D for control of ragweed and mustards.

TOLPYRALATE

Trade Name: SHIELDEX 400 SC.

Chemical Family: Pyrazolone.

Crop and/or Non-Crop Registrations: Corn (field, seed, popcorn and sweet).

Sensitive Weeds: amaranth (palmer), amaranth (powell), cocklebur (common), lamb’s quarters (common), pigweed (redroot), pigweed (smooth), purslane (common), ragweed (common), ragweed (giant), shepherd’s purse, smartweed (pennsylvania), waterhemp (common), waterhemp (tall), barnyardgrass, crabgrass (large), foxtail (giant, green and yellow).

Basis of Selectivity: Inhibits the HPPD enzyme found in photosynthetic cells of susceptible species. Symptoms on susceptible plants are bleaching followed by necrosis. Tolerant species rapidly metabolize topramezone.

Application Methods: Postemergence to corn until the the V6 (6 leaf collar) stage and to emerged weeds prior to 10 cm in height.

Residual Activity: Degradation primarily by soil microbial action. Topramezone provides soil residual activity against broadleaf weeds.

Unique Characteristics: The activity of tolypyralate is significantly enhanced by atrazine.

TOPRAMEZONE

Trade Name: ARMEZON, IMPACT.

Chemical Family: Pyrazolone.

Crop and/or Non-Crop Registrations: Corn (field, seed and sweet).

Sensitive Weeds: Annual broadleaf and grassy weeds, including triazine and group 2 resistant biotypes.

Basis of Selectivity: Inhibits the HPPD enzyme found in photosynthetic cells of susceptible species. Symptoms on susceptible plants are bleaching followed by necrosis. Tolerant species rapidly metabolize topramezone.

Application Methods: Postemergence in field corn between the 1–8 leaf stage for broadleaf weeds and 1–4 leaf stage of grassy weeds.

Residual Activity: Degradation primarily by soil microbial action. Topramezone provides soil residual activity against broadleaf weeds.

Unique Characteristics: The activity of topramezone is significantly enhanced by atrazine. A tank mix of Topramezone with atrazine and dimethenamid-P provides a one-pass, postemergence weed control program with residual activity against grass and broadleaf weeds.

TRALKOXYDIM

Trade Name: ACHIEVE LIQUID, BISON 400 L, NUFARM TRALKOXYDIM.

Chemical Family: Cyclohexanedione.

Crop and/or Non-Crop Registrations: Wheat (Durum, spring and winter), spring barley, rye (spring and winter), triticale, crested wheatgrass, creeping red fescue, meadow and smooth brome grass, northern wheatgrass, slender wheatgrass and western wheatgrass.

Sensitive Weeds: Wild oats, volunteer oats, green and yellow foxtail.

Uptake and Translocation: Uptake through the leaves, translocated to growing points of roots, shoots and leaves.

Basis of Selectivity: Metabolized in tolerant species.

Application Methods: Postemergence to actively growing wild oats at 1–5 leaf stage. Rainfast in 1 hour.

Residual Activity: None.

Unique Characteristics: Safe on all varieties of spring wheat and barley. May be applied to cereal crops underseeded to legumes such as clover, alfalfa, sainfoin or bird's-foot trefoil. Do not feed or graze forage in year of treatment.

TRIBENURON-METHYL

Trade Names: EXPRESS SG.

Chemical Family: Sulfonyl urea.

Crop and/or Non-Crop Registrations: Soybeans, spring wheat, winter wheat, spring barley, oats and dry beans.

Sensitive Weeds: none listed

Uptake and Translocation: Following foliar application, is rapidly absorbed and translocated in both xylem and phloem.

Basis of Selectivity: Inhibition of acetolactate synthase in susceptible plants leads to a rapid end to cell division and growth. Tolerant species rapidly convert acetolactate synthase into non-phytotoxic metabolites.

Application Method: Preplant, a minimum of 1 day prior to planting.

Residual Activity: Rapid soil microbial degradation.

TRIFLURALIN

Trade Names: BONANZA 480, RIVAL, TREFLAN EC, TRIFLUREX 40 EC.

Chemical Family: Dinitroaniline.

Crop and/or Non-Crop Registrations: Soybeans, winter wheat, black, kidney, lima, snap and white beans, faba beans, snap beans, lima beans, black beans, canola forage kale, sunflowers, turnips, peas (field and canning), mustard, direct-seeded alfalfa; transplants of tomatoes, peppers, Brussels sprouts, broccoli, cabbage and cauliflower; carrots, crambe, direct-seeded cabbage and cauliflower, annual flowers, woody ornamental plantings and field-grown nursery stock, perennials, established shelterbelts, strawberries.

Sensitive Weeds: Most annual grasses, pigweed and lamb's-quarters, including the triazine-tolerant biotypes.

Uptake and Translocation: No significant absorption or translocation of trifluralin in crops grown in soil treated with trifluralin. Susceptible weeds are controlled as they germinate. Established weeds are not controlled.

Basis of Selectivity: Physiological growth processes associated with seed germination.

Application Methods: Preplant incorporated. Apply in 100–300 L of water/ha. Use lower rate of the chemical on sandy soils and increased rate for loam-to-clay soils. Do not use on highly organic soils (muck, peat or black sands above 15% organic matter). Incorporate twice in cross directions using a tandem disc (7–10 km/h) or tine cultivator (10–13 km/h) set to work 8–10 cm deep. The first incorporation should be done as soon as possible after application, but may be delayed 8–24 hours, depending on label directions. The second incorporation should take place anytime before planting. Activated upon incorporation; rainfall is not required.

Residual Activity: Labelled application rates provide season-long weed control. Succeeding crops, even fall-seeded grain crops planted in soil that received trifluralin the preceding spring, will not be injured under normal conditions.

Unique Characteristics: Strongly adsorbed to soil particles and shows negligible leaching. Organic matter and clay content influence application rate. Does not control ragweed, annual nightshades or mustards; lady's-thumb may escape.

TABLE 4–3. Glyphosate Products, Registered Uses and Rates Needed to Control Specific Weed Species in Glyphosate Tolerant Crops

LEGEND: ✓ = registered for use on glyphosate tolerant canola, corn, soybeans and sugarbeets ✕ = not indicated for use on this crop

Trade Name	Concentration	GLYPHOSATE TOLERANT CROPS				WEED SPECIFIC GLYPHOSATE PRODUCT RATES (L/acre) ¹ IN GLYPHOSATE TOLERANT CORN, SOYBEAN AND SUGARBEETS									
		Canola	Field Corn	Soybean	Sugarbeets	Annual Weeds	Alfalfa (Volunteer)	Dandelions (>15 cm)	Canada Thistle	Field Bindweed	Horse Nettle	Yellow Nutsedge	Perennial Sow-thistle	Wire-stemmed Muhly	Quackgrass (3–4 leaf)
CREDIT XTREME	540 g/L	✓	✓	✓	✕	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
CRUSH'R 540	540 g/L	✓	✓	✓	✕	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
FACTOR 540	540 g/L	✓	✓	✓	✕	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
GLYFOS	356 g/L	✓	✕	✓	✕	2.5 L/ha 1 L/acre	7 L/ha 2.8 L/acre	5 L/ha 2 L/acre	2.5 L/ha 1 L/acre	5 L/ha 2 L/acre	5 L/ha 2 L/acre	5 L/ha 2 L/acre	2.5 L/ha 1 L/acre	2.5 L/ha 1 L/acre	2.5 L/ha 1 L/acre
MATRIX	480 g/L	✓	✓	✓	✕	1.87 L/ha 0.75 L/acre	5.25 L/ha 2.1 L/acre	3.75 L/ha 1.5 L/acre	1.87 L/ha 0.75 L/acre	3.75 L/ha 1.5 L/acre	3.75 L/ha 1.5 L/acre	3.75 L/ha 1.5 L/acre	1.87 L/ha 0.75 L/acre	1.87 L/ha 0.75 L/acre	1.87 L/ha 0.75 L/acre
POLARIS MAX	540 g/L	✓	✓	✓	✕	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
ROUNDUP TRANSORB HC	540 g/L	✓	✓	✓	✓	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
ROUNDUP WEATHERMAX	540 g/L	✓	✓	✓	✓	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
STONEWALL	540 g/L	✓	✓	✓	✕	1.67 L/ha 0.67 L/acre	4.68 L/ha 1.87 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	3.33 L/ha 1.34 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre	1.67 L/ha 0.67 L/acre
VP 480	480 g/L	✓	✓	✓	✕	1.87 L/ha 0.75 L/acre	5.25 L/ha 2.1 L/acre	3.75 L/ha 1.5 L/acre	1.87 L/ha 0.75 L/acre	3.75 L/ha 1.5 L/acre	3.75 L/ha 1.5 L/acre	3.75 L/ha 1.5 L/acre	1.87 L/ha 0.75 L/acre	1.87 L/ha 0.75 L/acre	1.87 L/ha 0.75 L/acre

¹ The maximum rate of glyphosate (540 g/L) that can be used on glyphosate tolerant Canola is 0.5 L/acre. Refer to the glyphosate tolerant Canola section in Chapter 12 for weeds that are sensitive at that rate.

TABLE 4–4. Herbicide Crop Rotation and Soil pH Restrictions – Field Crops

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.
 * = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)
 N = no cropping restrictions listed on the product label.

HERBICIDE	FIELD CROPS														
	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
	Number of months between application and planting														
2,4-D AMINE 600	8	✓	8	8	8	✓	8	8	8	✓	8	f	8	✓	✓
2,4-D ESTER 700	4	✓	4	4	4	✓	4	4	4	✓	✓	f	4	✓	✓
AATREX 480 < 840 ML/ACRE	10	10	10	22	10	✓	✓	10	10	10	10	22	22	10	10
AATREX 480 > 840 ML/ACRE	22	10	22	22	22	✓	✓	10	22	10	10	22	22	10	22
ACCENT	10*	10*	10*	10*	10*	✓	✓	f	f	f	10*	f	f	f	10*
ACURON	f	f	f	f	f	f	✓	f	f	f	11*	f	f	10*	4.5*
AIM	12*	12*	0*	12*	12*	0*	0*	0*	0*	0*	0*	12*	0*	0*	0*
ARMEZON OR IMPACT	10*	f	10*	10*	f	✓	✓	f	f	f	10*	f	f	10*	4*
ARMEZON PRO	10*	f	10*	10*	f	✓	✓	f	f	f	10*	f	f	10*	4*
ASSIGNMENT	0	10	0	22	22	10*	22	22	22	22	✓	22	22	10	3.3*
ASSURE II, CONTENDER OR YUMA GL	0	< 1	✓	✓	0	< 1	< 1	✓	< 1	< 1	✓	✓	✓	< 1	< 1
AUTHORITY 480	12*	12*	f	12*	f	12*	24	✓	f	f	✓	36*	0	12*	4*
AUTHORITY SUPREME	f	f	f	f	f	12*	f	f	f	f	✓	36*	12*	12*	4*
AXIAL	8*	✓	8*	8*	8*	8*	8*	8*	8*	8*	8*	10*	8*	✓	8*
BARRICADE M	2*	✓	8*	2*	8*	8*	8*	2*	0	8*	8*	10*	8*	✓	✓
BASAGRAN FORTE OR BROADLOAM	✓	< 1	✓	< 1	✓	✓	✓	< 1	< 1	< 1	✓	< 1	< 1	< 1	< 1
BENGAL WB OR VIGIL	N	✓	N	N	N	N	N	N	N	N	N	N	N	✓	N
BIFECTA	11*	11*	9*	22	12*	0	12*	12*	12*	12*	v	f	9*	8	4
BISON 400 L	< 1	✓	< 1	< 1	< 1	1*	1*	< 1	1*	✓	< 1	f	< 1	✓	0
BLACKHAWK	1*	✓	1*	1*	1*	✓	1*	1*	0	✓	✓	1*	1*	✓	✓
BLAZER, ULTRA	8	8	8	8	8	8	8	8	8	8	✓	f	8	8	8

TABLE 4–4. Herbicide Crop Rotation and Soil pH Restrictions – Field Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	FIELD CROPS														
	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
	Number of months between application and planting														
BOOST M	2*	✓	8*	2*	8*	8*	8*	2*	✓	8*	8*	10*	8*	✓	✓
BOUNDARY LQD OR TIEDOWN	8	8	8	22	8	0	8	8	8	4	✓	22	8	8	4
BROADSTRIKE RC	10	10*	10*	26	10	✓	10*	f	f	f	✓	f	f	10*	4*
BUCTRIL M	8	✓	8	8	8	✓	8	✓	✓	8	8	f	8	✓	✓
CALLISTO	11*	10	11*	f	22	✓	✓	f	10	4	11*	f	f	10*	3*
CALLISTO GT	11*	10	11*	f	22	✓	✓	f	10	4	11*	f	f	10*	3*
CANOPY PRO	10*	10*	10*	22	8	10*	8	8	8	8	✓	f	8	8	4
CLASSIC (PH <7.4)	10*	10*	10*	f	f	10*	f	f	f	f	✓	f	f	f	3*
CLASSIC (PH > 7.8)	22	22	22	f	f	22	f	f	f	f	✓	f	f	f	4*
CLEANSWEEP	10	10	10	22	22	10	22	22	22	22	✓	22	22	10	22
COMMAND 360 ME	16*	16*	10*	10*	16*	10*	10	16	16	16	✓	16	16	10*	16*
COMMENZA	10	10*	10*	26	10	10	10*	f	f	f	✓	f	f	10*	4*
CONQUEST LQ	22	10	22	22	22	10*	22	22	22	22	✓	22	22	10*	4*
CONVERGE XT	10*	10*	22*	10*	f	✓	10*	f	10*	f	10*	f	f	10*	4*
DESTRA IS	11*	10*	11*	f	22	✓	10*	f	10	4	11*	f	f	10*	4*
DILIGENT	11*	11*	10*	9*	f	10*	12*	12*	12*	12*	✓	f	9*	f	3*
DISTINCT	3*	3*	3*	3*	3*	✓	3*	3*	3*	3*	3*	3*	3*	3*	3*
DUAL II MAGNUM OR KOMODO (UPI S-MET)	4	4	✓	4	4	✓	✓	4	4	4	✓	0	4	4	4
ELEVORE	10*	10*	10*	10*	f	✓	f	10*	10*	f	✓	f	10*	10*	4*
ENFORCER M	10	✓	f	10	10	10	10	10	10	10	f	f	f	✓	✓

TABLE 4–4. Herbicide Crop Rotation and Soil pH Restrictions – Field Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.
 * = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)
 N = no cropping restrictions listed on the product label.

HERBICIDE	FIELD CROPS														
	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
	Number of months between application and planting														
ENGARDE	11*	10*	11*	f	22	✓	10*	f	10	4	11*	f	f	10*	4*
ENGENIA OR FEXAPAN OR XTENDIMAX	4*	✓	4*	4*	4*	✓	4*	4*	✓	✓	4*	4*	4*	✓	✓
ENLIST DUO	4	0	4	4	4	0	4	4	4	0	< 1	f	4	0	0
EMBUTOX	✓	✓	4	4	✓	✓	✓	4	✓	✓	4	f	4	✓	✓
EPTAM	✓	10	✓	10	10	10	10	✓	10	10	10	f	✓	10	10
ERAGON LQ	f	✓	8*	8*	f	✓	8	8*	✓	8	✓	f	f	✓	✓
ESTAPROP XT OR DICHLORPROP DX	1*	✓	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	✓	✓
FIERCE	f	f	f	f	f	0.25*	f	f	f	f	✓	f	f	0.25*	0.25
FIRSTRATE	9	f	9	26	f	9*	f	f	f	f	✓	f	30	4*	4*
FLEXSTAR GT	f	f	10*	f	f	f	f	f	f	f	✓	f	f	10*	4*
FOCUS	f	f	f	f	f	✓	f	f	f	f	✓	f	12*	✓	✓
FREESTYLE	10*	10*	10*	22	22	10*	22	22	22	22	✓	22	22	10	3.3*
FRONTIER MAX1	f	3.3*	✓	f	f	✓	✓	f	3.3*	3.3*	✓	11*	f	3.3*	3.3*
GYPHOSATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUARDIAN MAX	10*	10*	10*	f	f	10*	f	f	f	f	0	f	f	f	3*
HALEX GT	11*	f	11*	f	f	✓	0	f	f	f	11*	f	f	10*	4.5*
HURRICANE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
INFINITY OR INFINITY FX	10*	✓	f	10*	f	10*	f	10*	10*	f	10*	f	10*	✓	✓
INTEGRITY (CORN RATE)	11*	4*	11*	11*	11*	✓	11*	11*	4*	4*	11*	22*	11*	4*	11*
LIBERTY 200 SN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 4–4. Herbicide Crop Rotation and Soil pH Restrictions – Field Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	FIELD CROPS														
	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
	Number of months between application and planting														
LONTREL XC	22	✓	22	✓	22	10	22	10*	✓	✓	22	0	22	✓	0
LOROX L	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	✓	4*	4*	4*	4*
MARKSMAN	10	10	10	22	10	✓	4*	10	10	10	10	22	22	10	10
MCPA AMINE 500	N	✓	N	N	N	✓	N	✓	✓	N	N	N	4	✓	✓
MCPA ESTER 600	N	✓	N	N	N	✓	N	✓	✓	N	N	N	4	✓	✓
MCPA SODIUM 300	N	✓	N	N	N	✓	N	✓	✓	N	N	N	4	✓	✓
MCPA/MCPB	12*	✓	12*	12*	12*	✓	12*	✓	✓	12*	12*	12*	12*	✓	✓
MILESTONE	48	10	48	10	48	10	10	10	10	10	48	f	48	10	10
MUSTER TOSS-N-GO	22*	10*	22*	22*	22*	f	f	10*	10*	f	10*	f	f	10*	10
OPTILL	10	10	10	22	22	10	22	22	22	22	✓	f	22	10	3.3*
OPTION 2.25 OD	10*	10*	10*	10*	10*	✓	10*	f	10*	f	10*	10*	f	10*	4*
PARDNER, BROMAX, BROTEX OR KORIL	N	✓	N	0	N	✓	N	✓	✓	✓	N	N	N	✓	✓
PEAK	22*	10*	10*	f	f	✓	f	f	10*	f	10*	f	f	f	f
PERMIT	9*	2*	✓	15*	f	✓	2*	f	f	2*	9*	36*	18*	2*	2*
PINNACLE SG	1	0	1*	1*	1*	1*	1*	1*	1*	1*	✓	1*	1*	0	0
PIXXARO A	10*	✓	10*	10*	f	f	f	10*	f	f	10*	f	10*	✓	✓
POAST ULTRA	1*	0.5*	1*	1*	1*	1*	1*	1*	0.5*	0.5*	1*	1*	1*	0.5*	0.5*
PRIMEXTRA II MAGNUM	10	10*	10*	22	10	✓	✓	10	10*	10	10	f	22	10*	10*
PROWL H2O	f	10*	✓	f	f	✓	f	f	10*	10*	✓	f	f	10*	f

TABLE 4–4. Herbicide Crop Rotation and Soil pH Restrictions – Field Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.
 * = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)
 N = no cropping restrictions listed on the product label.

HERBICIDE	FIELD CROPS														
	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
	Number of months between application and planting														
PUMA ADVANCE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PURSUIT	✓	10	✓	22	22	10*	22	22	22	22	✓	22	22	10	3.3*
REFINE SG OR BOOST	2*	✓	8*	2*	8*	8*	8*	2*	✓	8*	8*	10*	8*	✓	✓
REFINE M OR BOOST M	2*	✓	8*	2*	8*	8*	8*	2*	✓	8*	8*	10*	8*	✓	✓
REFLEX	f	f	✓	f	f	10*	f	f	f	f	✓	f	f	10*	4*
REGLONE, BOLSTER OR ARMORY	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SELECT, STATUE, ANTLER OR ARROW ALL-IN	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SENCOR, TRICOR OR SQUADRON	8	8	8	22	8	✓	8	8	8	8	✓	22*	8	8	4
SHIELDEX	9*	9*	9*	9*	12*	✓	✓	12*	9*	3*	9*	18*	9*	9*	3*
SIMAZINE 480 (LOW)	f	10	22	22	22	✓	10	22	10	10	22	f	22	10	10
SIMAZINE 480 (HIGH)	f	22	22	22	22	✓	22	22	22	22	22	f	22	22	22
SIMPLICITY	f	11*	11*	11*	f	10*	f	f	11*	f	f	f	10*	✓	✓
STEADFAST IS	f	10*	10*	10*	f	✓	10*	10*	10*	f	10*	f	10*	10*	4*
STEP UP	11*	11*	10*	9*	f	10*	12*	12*	12*	12*	✓	f	9*	f	3*
TAVIUM	4*	4.5*	4*	4*	4*	0*	4*	4*	4.5*	4*	4* ²	4*	4*	4.5*	4.5*
TREFLAN, BONANZA OR RIVAL	✓	10*	✓	✓	10*	10*	10*	10*	22*	10*	✓	22*	0	10*	0
TRIACTOR	11*	11*	12*	11*	22	10*	22	22	22	22	✓	f	22	10	3.3*
TROPHY	f	✓	f	10*	f	f	f	10*	10*	10*	f	f	f	✓	✓
ULTIM	f	10*	10*	10*	10*	✓	f	f	f	f	10*	f	f	f	4*

TABLE 4–4. Herbicide Crop Rotation and Soil pH Restrictions – Field Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	FIELD CROPS														
	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
	Number of months between application and planting														
VALTERA (56 G/ACRE)	11*	11*	9*	9*	f	✓	f	f	f	f	✓	f	9*	✓	0.25*
VALTERA (84 G/ACRE)	11*	11*	f	11*	f	✓	f	f	f	f	✓	f	9*	✓	4*
VARRO	10*	10*	10*	10*	f	10*	10	10*	10*	10	10*	f	10*	✓	✓
VENTURE L	✓	12*	✓	✓	✓	12*	12*	✓	12*	3	✓	✓	✓	12*	3
VIOS G3	10*	10*	10*	10*	f	0	f	f	f	f	10*	22*	f	10*	4*
ZIDUA SC	f	f	f	f	f	0	f	f	f	f	0	f	f	f	4

TABLE 4–5. Herbicide Crop Rotation and Soil pH Restrictions – Horticulture Crops

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	HORTICULTURE CROPS																						
	asparagus	beans, snap	beets, red	broccoli	brussels sprouts	cabbage	carrot	cauliflower	celery	corn, sweet	cucumber	garlic	muskmelon	onions	peas	peppers	potato	pumpkins	rutabaga	spinach	squash	tomato	watermelon
	Number of months between application and planting																						
ACCENT	f	f	f	f	f	10	f	f	f	f	f	f	f	f	f	f	10	f	f	f	f	10	f
ACURON	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f	f	f	f
AIM	12*	0	12*	12*	12*	12*	12*	12*	12*	0*	0*	12*	0*	12*	0*	0*	12*	0*	12*	12*	0*	0*	0*
ARMEZON or IMPACT	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f	f	f	f
ARMEZON PRO	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f	f	f	f
ASSIGNMENT	22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22
ASSURE II, CONTENDER or YUMA GL	f	f	f	f	f	f	f	f	f	0	f	f	0	f	f	f	f	0	0	f	0	f	0
AUTHORITY 480	36*	36*	36*	0	36*	0	36*	0	36*	24*	36*	36*	36*	36*	0	36*	0	36*	36*	36*	36*	0	36*
AUTHORITY SUPREME	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	0	36*	36*	36*	36*	36*	36*	36*	36*
AXIAL	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
BARRICADE M	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
BASAGRAN FORTE or BROADLOAM	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
BENGAL WB or VIGIL	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
BIFECTA	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
BISON 400 L	f	f	f	f	f	f	f	f	f	1	f	f	f	f	f	f	f	f	f	f	f	f	f
BLACKHAWK	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*
BLAZER, ULTRA	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
BOOST M	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
BOUNDARY LQD OR TIEDOWN	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
BROADSTRIKE RC	f	10*	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f	f	f
BUCTRIL M	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

TABLE 4–5. Herbicide Crop Rotation and Soil pH Restrictions – Horticulture Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	HORTICULTURE CROPS																						
	asparagus	beans, snap	beets, red	broccoli	brussels sprouts	cabbage	carrot	cauliflower	celery	corn, sweet	cucumber	garlic	muskmelon	onions	peas	peppers	potato	pumpkins	rutabaga	spinach	squash	tomato	watermelon
	Number of months between application and planting																						
CALLISTO	0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
CALLISTO GT	0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
CANOPY PRO	f	f	f	f	f	11	f	f	f	11	f	f	f	f	11	f	f	f	f	f	f	12	f
CLASSIC (PH <7.4)	f	f	f	f	f	11	f	f	f	11	f	f	f	f	11	f	f	f	f	f	f	12	f
CLASSIC (PH > 7.8)	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	12	f
CLEANSWEEP	22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22
COMMAND 360 ME	16	10*	16	10*	16	16	16	16	16	10*	10*	16	16*	6*	10*	10*	10*	10*	16	16	10*	16	10*
COMMENZA	f	22*	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
CONQUEST LQ	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
CONVERGE XT	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	10*	f	f	f	f	10*	f
DESTRA IS	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
DISTINCT	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*
DUAL II MAGNUM or KOMODO (UPI S-MET)	f	f	0	f	f	f	0	f	0	f	f	f	f	f	0	0	0	0	0	f	0	f	f
ELEVORE	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
ENFORCER M	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
ENGARDE	f	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
ENGENIA or FEXAPAN or XTENDIMAX	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*
ENLIST DUO	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
EMBUTOX	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
EPTAM	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f
ERAGON LQ	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

TABLE 4–5. Herbicide Crop Rotation and Soil pH Restrictions – Horticulture Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	HORTICULTURE CROPS																							
	asparagus	beans, snap	beets, red	broccoli	brussels sprouts	cabbage	carrot	cauliflower	celery	corn, sweet	cucumber	garlic	muskmelon	onions	peas	peppers	potato	pumpkins	rutabaga	spinach	squash	tomato	watermelon	
	Number of months between application and planting																							
ESTAPROP XT or DICHLORPROP DX	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	
FIERCE	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
FIRSTRATE	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
FLEXSTAR GT	f	0	f	f	f	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	
FOCUS	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
FREESTYLE	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	22	22	22	22	22	22	22	22	
FRONTIER MAX ¹	11*	11*	11*	11*	11*	0	11*	11*	11*	0	11*	11*	11*	0	11*	11*	11*	11*	11*	11*	11*	11*	11*	
GYLPHOSATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GUARDIAN	f	f	f	f	f	11	f	f	f	11	f	f	f	f	11	f	f	f	f	f	f	f	12	f
GUARDIAN PLUS II	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
HALEX GT	0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f	
HURRICANE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
INFINITY or INFINITY FX	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f	
INTEGRITY (CORN RATE)	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	22*	11*	22*	11*	11*	11*	11*	11*	11*	11*	
LIBERTY 200 SN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LONTREL XC	22	22	22	0	22	0	22	0	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	
LOROX L	4*	4*	4*	4*	4*	4*	0	4*	4*	4*	4*	4*	4*	4*	4*	4*	0	4*	4*	4*	4*	4*	4*	
MARKSMAN	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22	22	22	22	22	22	
MCPA AMINE 500	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
MCPA ESTER 600	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
MCPA SODIUM 300	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
MCPA/MCPB	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	

TABLE 4–5. Herbicide Crop Rotation and Soil pH Restrictions – Horticulture Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	HORTICULTURE CROPS																							
	asparagus	beans, snap	beets, red	broccoli	brussels sprouts	cabbage	carrot	cauliflower	celery	corn, sweet	cucumber	garlic	muskmelon	onions	peas	peppers	potato	pumpkins	rutabaga	spinach	squash	tomato	watermelon	
	Number of months between application and planting																							
MILESTONE	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	48	f	f	f	f	48	f
MUSTER	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
OPTILL	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
OPTION 2.25 OD	f	f	f	f	f	10*	f	f	f	f	f	f	f	f	10*	f	10*	f	f	f	f	10*	f	f
PARDNER, BROMAX, BROTEX OR KORIL	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
PERMIT	f	f	f	18*	f	15*	15*	18*	f	f	f	f	9*	18*	9*	10*	9*	9*	f	24*	9*	8*	f	f
PINNACLE SG	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	0	1*	1*
PIXXARO A	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f	f
POAST ULTRA	0	0	1*	1*	0	1*	1*	1*	0	1*	0	0	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*
PRIMEXTRA II MAGNUM	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22	22	22	22	22	22	22
PROWL H2O	f	f	f	f	f	f	0	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f
PUMA ADVANCE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PURSUIT	22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22	22
REFINE SG or BOOST	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
REFLEX	f	0	f	f	f	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f
REGLONE, BOLSTER or ARMORY	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SELECT, STATUE, ANTLER OR ARROW ALL-IN	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SENCOR, TRICOR OR SQUADRON	0	22*	f	f	f	f	0	f	22*	f	f	f	22*	22*	f	22*	0	22*	f	22*	22*	0	f	f
SHIELDX	12*	9*	12*	12*	12*	9*	12*	12*	12*	12*	9*	12*	12*	12*	9*	12*	9*	12*	12*	12*	12*	9*	12*	12*

TABLE 4–5. Herbicide Crop Rotation and Soil pH Restrictions – Horticulture Crops (cont'd)

LEGEND: ✓ = Registered for application on this crop f = Field bioassay; user assumes liability for all crops not indicated on the label.

* = re-crop restriction (in months) is listed on the product label. (Other numbers based on the best available information. Contact the manufacturer of the product for more information.)

N = no cropping restrictions listed on the product label.

HERBICIDE	HORTICULTURE CROPS																							
	asparagus	beans, snap	beets, red	broccoli	brussels sprouts	cabbage	carrot	cauliflower	celery	corn, sweet	cucumber	garlic	muskmelon	onions	peas	peppers	potato	pumpkins	rutabaga	spinach	squash	tomato	watermelon	
	Number of months between application and planting																							
SIMAZINE	0	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
SIMPLICITY	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f	
STEADFAST IS	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	10*	f	f	f	f	f	f	
STEP UP	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
TAVIUM	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	
TREFLAN, BONANZA OR RIVAL	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	
TRIACTOR	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
TROPHY	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
ULTIM	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
VALTERA (56 G/ACRE)	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
VALTERA (84 G/ACRE)	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
VARRO	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	
VENTURE L	0	12*	12*	0	0	0	0	0	12*	12*	0	12*	12*	0	0	12*	0	12*	12*	12*	12*	12*	0	12*
VIOS G3	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	22*	f	f	f	f	f	22*	f
ZIDUA SC	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

TABLE 4–6. Weed Species in Ontario Counties Resistant to Herbicides within a Specific WSSA Herbicide Group

#	Weed Species	WSSA Group	Counties with confirmed populations
1	barnyard grass	5	Waterloo
2	Canada fleabane	2	Brant; Chatham-Kent; Elgin; Essex; Frontenac; Haldimand; Halton; Hamilton; Huron; Lambton; Lennox and Addington; Niagara; Norfolk; Northumberland; Oxford; Peel; Perth; Peterborough; Stormont, Dundas and Glengarry; Waterloo; Wellington and York
		9	Brant; Bruce; Chatham-Kent; Dufferin; Durham; Elgin; Essex; Frontenac; Haldimand; Halton; Hamilton; Hastings; Huron; Lambton; Lennox and Addington; Middlesex; Niagara; Norfolk; Northumberland; Ottawa; Oxford; Peel; Perth; Peterborough; Prince Edward; Simcoe; Stormont, Dundas and Glengarry; Waterloo; Wellington and York
		22	Essex
3	carrot, wild	4	Halton; Wellington
4	cocklebur	2	Lambton
5	crabgrass, large	1	Chatham-Kent; Essex
6	foxtail, green	2	Huron; Kawartha Lakes; Lambton; Oxford; Perth; Wellington; Victoria
7	foxtail, giant	2	Elgin; Essex; Lambton; Oxford
8	foxtail, yellow	5	York
9	goosefoot, late flowering	5	Brant
10	groundsel, common	5	York
11	lamb's-quarters	2	Chatham-Kent; Elgin; Essex; Lambton; Middlesex; Simcoe; Stormont, Dundas and Glengarry
		5	Widespread throughout Ontario
12	mustard, wild	5	Stormont, Dundas and Glengarry
13	nightshade, eastern black	2	Bruce; Carleton; Elgin; Huron; Middlesex; Ottawa; Oxford; Perth; Simcoe; Stormont, Dundas and Glengarry; Wellington
		22	Chatham-Kent
14	peppergrass, field	22	Essex
15	pigweed, green	2	Chatham-Kent; Elgin; Essex; Haldimand; Hamilton; Huron; Lambton; Lennox and Addington; Middlesex; Oxford; Perth; Simcoe; Stormont, Dundas and Glengarry; Wellington
		5	Documented in every county except Hastings and Prince Edward. Populations have not been documented in any of the districts.
		7	Middlesex; Simcoe
16	pigweed, redroot	2	Bruce; Chatham-Kent; Elgin; Essex; Haldimand; Hamilton; Huron; Lambton; Lennox and Addington; Middlesex; Oxford; Perth; Simcoe; Stormont, Dundas and Glengarry; Wellington
		5	Chatham-Kent; Simcoe; Stormont, Dundas and Glengarry; Waterloo
		6	Chatham-Kent
		7	Chatham-Kent; Lambton; Middlesex; Simcoe
17	pigweed, smooth	6	Essex

TABLE 4–6. Weed Species in Ontario Counties Resistant to Herbicides within a Specific WSSA Herbicide Group (cont'd)

#	Weed Species	WSSA Group	Counties with confirmed populations
18	ragweed, common	2	Bruce; Carleton; Chatham-Kent; Elgin; Essex; Haldimand; Huron; Lambton; Middlesex; Niagara; Norfolk; Ottawa; Oxford; Perth; Prexcott-Russell; Simcoe; Stormont, Dundas and Glengarry; Wellington
		5	Brant; Bruce; Essex; Haldimand; Hamilton; Lambton; Lennox and Addington; Niagara; Norfolk; Wellington
		9	Essex
19	ragweed, giant	2	Essex; Chatham-Kent; Lambton;
		9	Essex; Chatham-Kent; Lambton; Lennox; Addington
20	waterhemp	2	Bruce; Chatham-Kent; Elgin; Essex; Haldimand; Lambton; Middlesex; Norfolk; Northumberland
		5	Chatham-Kent; Essex; Haldimand; Lambton; Middlesex
		9	Bruce; Chatham-Kent; Elgin; Essex; Lambton; Middlesex; Norfolk; Northumberland
		14	Essex; Lambton
21	witchgrass	5	Grey; Haldimon; Norfolk; Leeds and Grenville; Prescott-Russell; Wellington

IF YOU SUSPECT THAT YOU HAVE RESISTANT WEEDS, THEY CAN BE TESTED:

1. Collect mature seed at harvest. Make sure to get multiple plants from different locations. Remember that weed seeds typically have dormancy and only a small percentage of seed will germinate after maturity.
2. Place seed in a brown paper bag along with information such as the county and township the seed was taken from, your contact number and herbicides that you want tested.
3. Courier or mail the sample to: Crop Science Building (Building #69), University of Guelph, 50 Stone Road East, Guelph, ON, N1G 2W1. Attention: Peter Smith.
4. If you have questions, contact the lab at 519-824-4120 Ext. 58372.