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**A GUIDE TO POST EMERGENT WEED CONTROL
IN NON-GMO SOYBEANS**

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The pesticide product label is a legal document. It is against the law to use the product in any other way.

OVERVIEW

In recent years, Ontario acreage of glyphosate tolerant (Roundup Ready) soybeans has steadily increased. However, in 2009, high premium were being offered to grow non-GMO soybeans. This has resulted in a substantial increase in soybean acres that will be treated with conventional herbicide programs. Conventional herbicides can provide effective weed control, but they are not as forgiving as glyphosate when dealing with large weeds or adverse environmental conditions. Application timing is critical to success.

OBJECTIVE OF THIS GUIDE:

To ensure that weed control is maximized in non-GMO soybeans by:

- 1) Summarizing weed efficacy of the main postemergence conventional herbicide according to the product label, as well as field and research experience.
- 2) Summarizing all conventional soybean herbicide research trials conducted by University of Guelph researchers Dr. Peter Sikkema, Dr. Clarence Swanton and Dr. François Tardif. The intent is to provide context for how these herbicides perform under variable conditions such as heavy weed pressure or larger weed stages than what are listed on the label. It is not intended to dispute current labeled instructions and guidelines.

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IMPORTANT NOTES ON WEED CONTROL RATING TABLES: Weed control ratings in the two tables provided are subjective values based on the best available information from the product label, from public research trials and from grower and agronomist experience in the field. Efficacy of products on weeds that are at growth stages larger than what is specified on the product label, are at very high densities and are subjected to adverse weather conditions (i.e. dry soil conditions) will be lower than what is presented in the rating tables. The product profile summaries in this document will provide insight into the variability of their performance in University of Guelph research trials. Ratings in a **bold font** indicate that the weed is listed as being control or suppressed on the product label.

Crop tolerance ratings: E – Excellent, G – Good, F – Fair and P – Poor.

Table I. Grassy Weed Control Ratings for Post Emergent Soybean Herbicides

	barnyard grass	cereals, volunteer	corn, volunteer *	crabgrass, Large	fall panicum	foxtail, giant	foxtail, giant (group 2 resistant)	foxtail, green	foxtail, green (group 2 resistant)	foxtail, yellow	proso millet	quackgrass **	sandbur	stinkgrass	witch grass	wire stem muhly **	Crop tolerance
ASSURE II (Page 21)	9	9	9	8	9	8	8	9	9	9	8	9	9	9	9	7	E
CLEANSWEEP (Page 11)	8	3	3	7	6	8	0	9	0	9	6	2	8	?	9	?	G
EXCEL SUPER (Page 23)	9	9	9	9	6	8	8	8	8	8	9	4	9	9	9	6	E
POAST ULTRA (Page 25)	9	8	8	8	8	8	8	8	8	9	9	7	7	9	9	6	E
PURSUIT (Page 17)	8	3	3	7	6	8	0	9	0	9	7	2	9	?	9	?	G
SELECT (Page 27)	9	9	8	8	6	8	8	8	8	8	8	7	7	7	9	5	E
VENTURE L (Page 28)	9	9	9	8	8	8	8	8	8	8	8	8	9	9	9	8	E

Footnotes:

* Volunteer corn ratings based on a 100 ml/ac rate of Assure II, the 130 ml/ac rate of Poast Ultra and the 243 ml/ac rate for Venture.

** Quackgrass and wire stem muhly ratings based on the highest labeled rate of all products in Table I

Table 2. Broadleaf (and Sedge) Weed Control Ratings for Post Emergent Soybean Herbicides

	adzuki beans (volunteer)	atriplex, spreading	biennial wormwood	beggarticks, tall	buckwheat, wild	burcucumber (P)	carrot, wild	cocklebur	fleabane, Canada	horsenettle (P)	horsetail, field (P)	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshades, annual	nutsedge, yellow (P)	pigweeds	ragweed, common	ragweed, giant	sow-thistle, annual	sow-thistle, perennial (P) *	thistle, Canada (P) *	velvetleaf	waterhemp	Crop tolerance
BASAGRAN FORTÉ (Page 5)	1	4	6	9	5	3	2	4	5	?	1	2	8	8	4	9	5	4	6	8	6	6	6	7	9	3	G
BLAZER (Page 7)	1	1	?	4	7	4	1	3	2	?	5	1	8	5	5	9	9	2	9	8	7	7	7	7	7	9	F
CLASSIC (Page 9)	7	1	6	9	4	5	8	7	8	?	1	7	4	3	5	9	0	8	9	8	6	8	7	7	8	2	G
CLEAN SWEEP ¹ (Page 11)	1	6	7	9	8	4	5	7	5	?	2	3	9	8	2	9	9	6	9	8	6	6	6	6	9	2	G
FIRSTRATE (Page 13)	1	1	6	9	7	5	5	9	9	6	?	7	4	2	5	9	0	?	2	9	9	8	7	7	9	2	G
PINNACLE (Page 15)	2	6	?	8	6	4	1	1	2	?	2	8	8	9	3	8	0	2	9	3	1	4	6	1	8	2	G
PURSUIT (Page 17)	1	1	?	9	8	4	6	7	2	?	2	5	9	8	3	9	9	6	9	7	7	4	2	2	9	1	G
REFLEX (Page 19)	1	1	?	4	8	2	1	3	2	?	5	6	8	6	7	9	9	?	8	8	6	6	6	7	6	9	G

Footnotes:

* Control of any perennial weed in non-GMO soybeans will be very difficult. Expectations for controlling perennial sow-thistle and Canada thistle should be low. (P) = Perennial life cycle.

BASAGRAN FORTÉ (2.25 L/ha or 0.9 L/ac)
GROUP 6 PCP # 22006

CLASSIFICATION: 4

RAINFEST: 6-8 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
WEED SPECIES	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, Spreading	Not labeled	45	15 (20+ leaf)	75 (6 leaf)	2
Bur Cucumber	Not labeled	31	31 (8 leaf)	31 (8 leaf)	1
buckwheat, Wild	Not labeled	54	50 (2-4 leaf)	58 (2-4 leaf)	2
carrot, Wild	Not labeled	17	0 (large rosette)	34 (seedling)	4
Cocklebur	Control up to 10 leaf stage	44	9 (16 leaf)	90 (2-4 leaf)	7
Dandelion	Not labeled				
fleabane, Canada	Not labeled				
horsetail, Field	Not labeled	8	8 (10 cm)	13 (10 cm)	2
Horsenettle	Not labeled				
Lamb's-quarters	Control up to 8 leaf stage	82	70 (8 leaf)	100 (2-6 leaf)	7
Lady's Thumb	Control up to 10 leaf stage	43	43 (2-8 leaf)	43 (2-8 leaf)	1
lettuce, Prickly	Not labeled	43	24 (20 leaf)	63 (2-4 leaf)	3
nightshade, Eastern Black	Not labeled	46	0 (2-4 leaf)	80 (2 leaf)	9
nutsedge, yellow**	Top growth (20 cm)	43	43 (2-14 leaf)	43 (2-14 leaf)	1
Pigweed species	Suppression (4 leaf stage)	56	15 (20 leaf)	74 (2-4 leaf)	8
Prostrate knotweed	Not labeled	20	20 (6-20 leaf)	20 (6-20 leaf)	1
ragweed, Common	Control up to 6 leaf stage	49	13 (14 leaf)	89 (2-4 leaf)	7
ragweed, Giant	Control up to 4 leaf stage	34	5 (10 leaf)	66 (4 leaf)	3
sowthistle, Annual***	Not labeled	65	33 (10 leaf)	97 (7 leaf)	2
sowthistle, Perennial***	Not labeled	72	72 (20 leaf)	72 (20 leaf)	1
thistle, Canada	Top growth (20 cm)	69	10 (6 leaf)	100 (6 leaf)	4
Velvetleaf	Control up to 4 leaf stage				
Waterhemp	Not labeled	28	0 (18 leaf)	25 (4 leaf)	6
Wild Mustard	Control up to 10 leaf stage	85	51 (bolting)	95 (4-6 leaf)	5

*Weed leaf stage at time of application

** Nutsedge needs to be emerged for Basagran Forte to provide top growth control

*** Control of this weed with Basagran Forte is significantly reduced under high weed populations

BASAGRAN FORTÉ (2.25 L/ha or 0.9 L/ac)**GROUP 6****PCP # 22006****CLASSIFICATION: 4****RAINFEST: 6-8 hrs**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
BASAGRAN FORTÉ (480 g/L)	2.25 L/ha	0.9 L/ac	<ul style="list-style-type: none"> • Apply when soybeans are in unifoliate to 4th trifoliate leaf stage and when weeds are small and actively growing. • Temporary crop injury may occur under abnormally hot, humid conditions. • Cool weather or drought may delay control. • For improved and more consistent control of velvetleaf and lamb's-quarters, 10 L/ha of 28% urea ammonium nitrate (UAN) or 6 L/ha of liquid ammonium sulphate may be added. The addition of either nitrogen source may cause slight leaf burn, but new growth is normal and crop vigour is not reduced.
<i>bentazon</i>	1.08 kg/ha		

Tank-mix Partners:

- **Assure II** at **250 mL/ac** and **Sure Mix** at **5 L/1,000 L H₂O** for grassy weed control.
- **Blazer** at **0.5 L/ac** + **Basagran** at **0.5 L/ac** for improved **ragweed** and **nightshade** control
- **Excel Super** at **268 mL/ac** for grassy weed control.
- **Pinnacle SG** at **3.3 g/ac** for improved **pigweed** control and at **4.8 g/ac** improved **lamb's-quarters** and **pigweed** control.
- **Pursuit** at **125 ml/ac** for broad-spectrum weed control (see Cleansweep Product Profile on page XX).
- **Pinnacle SG (3.3 – 4.8 g/ac) + Assure II (250 mL/ac)** - broad-spectrum weed control. Weaknesses: **Nightshade, Ragweed.**
- **Pinnacle SG + Excel Super (268 mL/ac)** - broad-spectrum weed control. Weaknesses: **Nightshade, Ragweed.**
- **Venture** for grassy weed control.

Other Weeds Controlled (According to the BASAGRAN FORTÉ Label):

Bird rape (6 leaf), Buttercup (6 leaf), Chickweed (1-3 weeks after emergence), Corn spurry (10 cm), Flower-of-an-hour (10 leaf), Groundsel (10 cm), Hairy galinsoga (6 leaf), Jimsonweed (10 leaf), Lady's thumb (10 leaf), low cudweed (6 leaf), Nightshade (Hairy – 6 leaf), Purslane (6 leaf), Radish (wild – 6 leaf), Shephard's purse (6 leaf), Stinkweed (6 leaf), Thistle (Russian – 4 leaf).

Researcher Insight:

This product works well when weeds are very small and environmental conditions are hot and humid. Unfortunately, such environmental conditions will also cause leaf burn on annual grasses which can reduce the control of Assure II or Excel Super if tank-mixed. If such conditions are present, it may be appropriate to apply the grass herbicide first, followed by Basagran Forté.

Resistant Weed Populations: Pigweed spp.

BLAZER (2.5 L/ha or 1 L/ac)

GROUP 14

PCP # 23315

CLASSIFICATION: 3

RAINFEST: 6 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
WEED SPECIES	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	9	0 (20+ leaf)	18 (5 leaf)	2
buckwheat, wild	Not labeled	95	95 (2 leaf)	95 (6 leaf)	2
Bur-Cucumber	Not labeled	39	39 (4-8 leaf)	39 (4-8 leaf)	1
Carrot, Wild	Not labeled	6	0 (rosette)	19 (rosette)	4
Cocklebur	Control up to 4 leaf stage	26	0 (16 leaf)	89 (cotyledon)	7
horsetail, Field	Not labeled	16	11 (10 cm)	21 (10 cm)	2
Lettuce, Prickly	Not labeled	54	29 (11 leaf)	99 (2-4 leaf)	4
Lamb's-quarters	Control up to 2 leaf stage	53	38 (8 leaf)	60 (2 leaf)	5
Nightshade, Eastern Black	Control up to 6 leaf stage	87	68 (5 leaf)	100 (1 leaf)	7
Pigweed species	Control up to 6 leaf stage	86	59 (20 leaf)	100 (2-6 leaf)	6
Prostrate knotweed	Not labeled	13	13 (6-20 leaf)	13 (6-20 leaf)	1
Ragweed, Common	Control up to 8 leaf stage	61	35 (16 leaf)	83 (4 leaf)	7
Ragweed, Giant	Not labeled	30	18 (10 leaf)	43 (cotyledon)	3
sow-thistle, Annual**	Not labeled	79	65 (20 leaf)	97 (7 leaf)	2
sow-thistle, Perennial**	Not labeled	96	96 (20 leaf)	96 (20 leaf)	1
thistle, Canada	Suppression of Top growth	87	65	100	3
Waterhemp**	Not labeled	88	66 (18 leaf)	100 (4 leaf)	6
Wild Mustard	Control up to 10 leaf stage	99	99 (cotyledon)	99 (8 leaf)	2
Velvetleaf	Not labeled				

*Weed leaf stage at time of application

** Control of this weed with Blazer significantly reduced under high weed populations

BLAZER (2.5 L/ha or 1 L/ac)**GROUP 14****PCP # 23315****CLASSIFICATION: 3****RAINFAST: 6 hrs**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
BLAZER (240 g/L)	2.5 L/ha	1 L/ac	<ul style="list-style-type: none"> • Do NOT apply before the first trifoliolate leaf stage of the soybeans. • Good spray coverage on the weeds is important for good weed control. • Soybeans may exhibit speckling, bronzing and/or leaf burn. The trifoliolate leaf emerging at the time of application may be distorted. Soybeans usually outgrow these conditions and continue to grow at a normal rate with no adverse effect on vigour, maturity, or crop yield. • Do NOT apply BLAZER to soybeans that have been subjected to stress (see product label). • Do NOT add oils or surfactants to applications of BLAZER at 2.5 L/ha alone.
<i>acifluorfen</i>	<i>0.6 kg/ha</i>		

Tank-mix Partners:

- **Basagran Forté** at **0.7 L/ac** + **Blazer** at **0.25 L/ac** for improved **lamb's-quarters** control.

Researcher Insight:

Spray coverage is important with this herbicide. Reductions in spray water volume that reduces coverage can dramatically decrease efficacy.

Resistant Weed Populations: Currently none.

CLASSIC (36 g/ha or 14.4 g/ac) + Non Ionic Surfactant (2 L/1000 L H₂O)

GROUP 2

PCP # 25433

CLASSIFICATION: 3

RAINFEST: 2-4 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
WEED SPECIES	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	12	8 (20+ leaf)	15 (5 leaf)	2
Bur Cucumber	Not labeled	50	20 (25 leaf)	92 (2-4 leaf)	5
buckwheat, Wild	Not labeled	69	69 (un-emerged)	69 (un-emerged)	1
carrot, Wild	Not labeled	79	60 (large rosette)	94 (seedling)	5
Cocklebur	Not labeled	70	34 (16 leaf)	86 (2-4 leaf)	7
Dandelion	Pre-Bloom (15 cm)				
fleabane, Canada	Not labeled	61	30 (large rosette)	93 (small rosette)	3
horsetail, Field	Not labeled	10	9 (10 cm)	11 (10 cm)	2
Horsenettle	Not labeled				
Lamb's-quarters	Not labeled	35	0 (12 leaf)	73 (2 leaf)	5
Lady's Thumb	Not labeled	46	46 (2-8 leaf)	46 (2-8 leaf)	1
lettuce, Prickly	Not labeled	53	21 (20 leaf)	92 (2-4 leaf)	6
nightshade, Eastern Black	Not labeled	0	0	0	3
nutsedge, yellow**	Control up to 8 leaf stage	87	71 (2 leaf)	97 (8 leaf)	
Pigweed species	Control up to 8 leaf stage	85	71 (14 leaf)	100 (2 leaf)	3
Prostrate knotweed	Not labeled	75	75 (6-20 leaf)	75 (6-20 leaf)	1
ragweed, Common	Control up to 6 leaf stage	86	86 (2-4 leaf)	86 (2-4 leaf)	1
ragweed, Giant	Not labeled	61	49 (10 leaf)	72 (4 leaf)	3
sowthistle, Annual	Not labeled	91	79 (20 leaf)	98 (5 leaf)	3
sowthistle, Perennial***	Not labeled	75	51 (20 leaf)	98 (8-9 leaf)	2
thistle, Canada	Not labeled	68	2 (6 leaf)	90	4
Velvetleaf	Control up to 4 leaf stage	93	93 (2-4 leaf)	93 (2-4 leaf)	1
Waterhemp	Not labeled	17	0 (18 leaf)	52 (4 leaf)	6
Wild Mustard	Not labeled	100	100 (4 leaf)	100 (4 leaf)	1

*Weed leaf stage at time of application

** Nutsedge needs to be emerged for Classic to provide top growth control

*** Control of this weed with Classic is significantly reduced under high weed populations

CLASSIC (36 g/ha or 14.4 g/ac) + Non Ionic Surfactant (2 L/1000 L H₂O)**GROUP 2****PCP # 25433****CLASSIFICATION: 3****RAINFAST: 2-4 hrs**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
CLASSIC (25 DF) plus non-ionic surfactant	36 g/ha 2 L/1,000 L	14 g/ac 2 L/1,000 L	<ul style="list-style-type: none"> • Do NOT use on soils with pH \geq 7.8. • Optimal timing for broadleaf control is typically when the soybeans are in the 1–3 trifoliolate stage of growth. • Do NOT apply before the first trifoliolate is fully expanded or after the initiation of flowering. • Addition of 28% UAN is recommended for improved control of velvetleaf.
<i>chlorimuron-ethyl</i> plus non-ionic surfactant	9 g/ha 0.2% v/v		

Tank-mix Partners:

- **Assure II** at 250 mL/ac + **Sure Mix** at 5 L/1,000 L H₂O for grassy weed control. There is no need to add a non-ionic surfactant with this tank-mix partner. Main weaknesses: **nightshade** and **lamb's-quarters** control.

Researcher Insight: There have been a number of occasions in the past 5 years when labeled weeds have approached their maximum stage for control, yet the soybean crop was not yet at the 1st trifoliolate stage. A two year trial (2006-2007) conducted by the University of Guelph evaluated the impact of Classic application timing on soybean injury and yield. When Classic was applied prior to the 1st trifoliolate stage, there was no difference in crop injury and yield compared to applications made from the 1-3 trifoliolate stage.

Resistant Weed Populations: common ragweed, Pigweed spp.,

CLEANSWEEP (Co-Pack of Pursuit and Basagran Forté)

PURSUIT (312 mL/ha or 125 mL/ac) + BASAGRAN FORTÉ (1.75 L/ha or 0.7 L/ac) + 28% UAN (2 L/ha or 0.8 L/ac)

GROUP 2, 6

PCP # 26287 & 22006

CLASSIFICATION: 3 & 4

RAINFEST: 6-8 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
BROADLEAF WEEDS	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	58	58 (5 leaf)	58 (5 leaf)	1
Bur Cucumber	Not labeled	91	90 (8 leaf)	91 (8 leaf)	2
buckwheat, Wild	Control up to 2 leaf stage	99	99 (6 leaf)	99 (3 leaf)	2
carrot, Wild	Not labeled	48	25 (large rosette)	60 (seedling)	5
Cocklebur	Control up to 6 leaf stage	82	69 (16 leaf)	96 (2-4 leaf)	7
Dandelion	Not labeled				
fleabane, Canada	Not labeled	40	35 (large rosette)	45 (small rosette)	2
horsetail, Field	Not labeled	21	21 (10 cm)	21 (10 cm)	1
Horsenettle	Not labeled				
Lamb's-quarters	Control up to 6 leaf	91	64 (8 leaf)	100 (2 leaf)	13
Lady's Thumb	Control up to 6 leaf	95	95 (2-8 leaf)	95 (2-8 leaf)	1
lettuce, Prickly	Not labeled	15	0 (20 leaf)	32 (2-4 leaf)	5
nightshade, Eastern Black	Control up to 4 leaf stage	99	99 (2 leaf)	99 (2 leaf)	2
nutsedge, yellow***	Top Growth (20 cm)				
Pigweed species	Control up to 12 leaf stage	91	64 (8 leaf)	100 (2 leaf)	12
Prostrate knotweed	Not labeled	29	29 (6-20 leaf)	29 (6-20 leaf)	1
ragweed, Common	Control up to 6 leaf stage	81	35 (8 leaf)	100 (2 leaf)	8
ragweed, Giant	Not labeled	73	76 (10 leaf)	83 (4 leaf)	3
sow-thistle, Annual**	Not labeled	68	53 (20 leaf)	87 (5 leaf)	3
sow-thistle, Perennial**	Not labeled	74	64 (20 leaf)	83 (8-9 leaf)	2
thistle, Canada	Top Growth (20 cm)	99	98	100	3
Velvetleaf	Control up to 8 leaf stage	91	74 (6 leaf)	100 (2 leaf)	3
Waterhemp	Not labeled	15	0 (18 leaf)	32 (4 leaf)	6
Wild Mustard	Control up to 6 leaf stage	96	86 (8 leaf)	100 (2-4 leaf)	5

*Weed leaf stage at time of application

** Control of this weed with Pursuit is significantly reduced under high weed populations

*** Nutsedge needs to be emerged for Pursuit to provide top growth control

CLEANSWEEP (Co-Pack of Pursuit and Basagran Forté)

PURSUIT (312 mL/ha or 125 mL/ac) + BASAGRAN FORTÉ (1.75 L/ha or 0.7 L/ac) + 28% UAN (2 L/ha or 0.8 L/ac)

GROUP 2, 6

PCP # 26287 & 22006

CLASSIFICATION: 3 & 4

RAINFAST: 6-8 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass**	Control up to 6 leaf stage	67	48 (5 leaf)	84 (2-4 leaf)	3
corn, Volunteer	Not labeled				
crabgrass, Large	Not labeled	95	93 (4 leaf)	97 (2 leaf)	2
Fall panicum	Not labeled				
foxtail, Giant	Not labeled				
foxtail, Green	Control up to 4 leaf stage	91	84 (4 leaf)	100 (2 leaf)	8
foxtail, Yellow	Control up to 4 leaf stage	95	88 (6 leaf)	100 (2 leaf)	4
Proso millet	Not labeled				
Quackgrass	Not labeled				
Sandbur	Not labeled	86	79 (8 leaf)	93 (3 leaf)	2
Stinkgrass	Not labeled				
Witch grass	Not labeled	100	100 (2 leaf)	100 (2 leaf)	3
Wire stem muhly	Not labeled				

*Weed leaf stage at time of application

** Control of this weed with Pursuit is significantly reduced under high weed populations

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
CLEAN SWEEP ¹ (PURSUIT (240 g/L) + BASAGRAN FORTÉ (480 g/L) + plus liquid fertilizer 28-0-0, 10-34-0 or 32-0-0	0.312 1.75 L/ha 2 L/ha	0.125 + 0.7 L/ac 0.8 L/ac	<ul style="list-style-type: none"> • Available as a co-pack containing PURSUIT and BASAGRAN FORTÉ. • Apply postemergence to actively growing weeds in the 2–6 leaf stage for broadleaf weeds and 2-4 leaf stage for annual grass weeds. • Some rotational cropping restrictions apply (refer to label).

Researcher Insight: Weed efficacy is maximized with Cleansweep when it is applied around 14-20 days after planting (about the 1-2 trifoliolate stage). Too early (i.e. 10 days) and lamb's-quarters is poorly controlled as it is not yet up. Too late (i.e. more than 20 days) and lamb's-quarters is too big for the Basagran Forté component to work, plus annual grasses have emerged and if beyond the 4 leaf stage will be difficult to control.

Resistant Weed Populations: common ragweed, green and giant foxtail, eastern black nightshade, pigweed spp.

FIRSTRATE (20.8 g/ha or 8.5 g/ac) + Non Ionic Surfactant (2.5 L/1000 L H₂O) + 28% UAN (25 L/1000 L H₂O)

GROUP 2

PCP # 26697

CLASSIFICATION: 3

RAINFEST: 2-4 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
WEED SPECIES	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	12	8 (20+ leaf)	15 (5 leaf)	2
Bur Cucumber	Not labeled	54	53 (25 leaf)	55 (2-4 leaf)	2
buckwheat, Wild	Not labeled	90	90 (un-emerged)	90 (un-emerged)	1
carrot, Wild	Not labeled	52	18 (large rosette)	75 (seedling)	5
Cocklebur	Control at 4-8 leaf stage	92	72 (16 leaf)	96 (2-4 leaf)	7
Dandelion	Not labeled				
fleabane, Canada	Not labeled	95	89 (large rosette)	98 (small rosette)	3
horsetail, Field	Not labeled				
Horsenettle	Not labeled				
Lamb's-quarters	Not labeled	38	18 (8 leaf)	70 (2 leaf)	5
Lady's Thumb	Not labeled	46	46 (2-8 leaf)	46 (2-8 leaf)	1
lettuce, Prickly	Not labeled	53	16 (20 leaf)	94 (2-4 leaf)	6
nightshade, Eastern Black	Not labeled	0	0	0	3
nutsedge, yellow	Not labeled				
Pigweed species	Not labeled	34	20 (8 leaf)	48 (2 leaf)	3
Prostrate knotweed	Not labeled	78	78 (6-20 leaf)	78 (6-20 leaf)	1
ragweed, Common	Control at 4-8 leaf stage	99	99 (8 leaf)	99 (4 leaf)	2
ragweed, Giant	Control at 4-8 leaf stage	98	96 (10 leaf)	99 (4 leaf)	3
sow-thistle, Annual**	Not labeled	82	74 (20 leaf)	97 (5 leaf)	3
sow-thistle, Perennial**	Not labeled	76	53 (20 leaf)	98 (8-9 leaf)	2
thistle, Canada	Not labeled	71	15 (6-20 leaf)	100 (6-20 leaf)	4
Velvetleaf	Control at 2-4 leaf stage				
Waterhemp	Not labeled	15	0 (18 leaf)	41 (4 leaf)	6
Wild Mustard	Not labeled	97	97 (8 leaf)	97 (4 leaf)	1

*Weed leaf stage at time of application

** Control of this weed with FirstRate is significantly reduced under high weed populations

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
FIRSTRATE (84 WG) plus non-ionic surfactant plus liquid fertilizer (28-0-0 or 32-0-0)	20.8 g/ha 2.5 L/1,000 L 25 L/1,000 L	8.5 g/ac 2.5 L/1,000 L 25 L/1,000 L	<ul style="list-style-type: none"> • Apply up to the 8-leaf stage for common ragweed and cocklebur, 6-leaf stage for giant ragweed, and 4-leaf stage for velvetleaf. • Apply any time prior to flowering stage of soybeans. • Application prior to full emergence of first trifoliolate may cause temporary yellowing of soybeans.
<i>cloransulam-methyl</i> <i>plus non ionic surfactant</i> <i>plus liquid fertilizer</i>	<i>17.5 g/ha</i> <i>0.25% v/v</i> <i>2.5% v/v</i>		

Tank-mix Partners:

- **Pursuit at 125 mL/ac** for broad-spectrum weed control and to improve control of common ragweed and cocklebur of Pursuit.

Researcher Insight: The most effective herbicide for the control of cocklebur in soybeans. It is also a very effective herbicide on common and giant ragweed. Unfortunately there are several populations of group 2 resistant common ragweed and cocklebur in the province.

Resistant Weed Populations: cocklebur, common ragweed

PINNACLE SG (12 g/ha or 4.8 g/ac) + Non Ionic Surfactant (1 L/1000 L H₂O)

GROUP 2

PCP # 22002

CLASSIFICATION: 4

RAINFEST: 4 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
WEED SPECIES	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	63	35 (20+ leaf)	91 (5 leaf)	2
Bur Cucumber	Not labeled	38	3 (25 leaf)	71 (2-4 leaf)	5
buckwheat, Wild	Not labeled	62	35 (6 leaf)	90 (2-4 leaf)	8
carrot, Wild	Not labeled	13	3 (large rosette)	24 (seedling)	4
Cocklebur	Not labeled	8	0 (16 leaf)	24 (2-4 leaf)	7
Dandelion	Not labeled				
fleabane, Canada	Not labeled	41	20 (large rosette)	59 (small rosette)	3
horsetail, Field	Not labeled	35	29 (10 cm)	41 (10 cm)	2
Horsenettle	Not labeled				
Lamb's-quarters	Control up to 10 cm	97	91 (8 leaf)	100 (2 leaf)	5
Lady's Thumb	Control up to 10 cm	90	90 (2-8 leaf)	90 (2-8 leaf)	1
lettuce, Prickly	Not labeled	29	5 (20 leaf)	53 (2-4 leaf)	5
nightshade, Eastern Black	Not labeled	0	0	0	3
nutsedge, yellow	Not labeled				
Pigweed species	Control up to 10 cm	91	74 (6 leaf)	100 (2 leaf)	5
Prostrate knotweed	Not labeled	80	80 (6-20 leaf)	80 (6-20 leaf)	1
ragweed, Common	Not labeled	28	28 (8 leaf)	28 (8 leaf)	1
ragweed, Giant	Not labeled	12	0 (10 leaf)	35 (4 leaf)	3
sow-thistle, Annual**	Not labeled	41	40 (20 leaf)	41 (5 leaf)	2
sow-thistle, Perennial**	Not labeled	77	53 (20 leaf)	98 (20 leaf)	2
thistle, Canada	Not labeled	61	15 (6-20 leaf)	100 (6-20 leaf)	4
Velvetleaf	Control up to 10 cm	97	97 (2-4 leaf)	97 (2-4 leaf)	2
Waterhemp	Not labeled	18	0 (18 leaf)	61 (4 leaf)	6
Wild Mustard	Control up to 10 cm	72	55 (bolting)	100 (2-4 leaf)	8

*Weed leaf stage at time of application

** Control of this weed with Pinnacle is significantly reduced under high weed populations

PINNACLE (8 g/ha or 3.2 g/ac) + Non Ionic Surfactant (1 L/1000 L H₂O)**GROUP 2****PCP # 22002****CLASSIFICATION: 4****RAINFAST: 4 hrs**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
PINNACLE SG (50%) plus non ionic surfactant	8.25 to 12 g/ha 1 L/1,000 L	3.3 to 4.8 g/ac 1 L/1,000 L	<ul style="list-style-type: none"> • Apply to emerged weeds up to 10 cm in height when soybeans have the first trifoliolate leaf fully expanded. • Do NOT apply to soybeans, which have initiated flowering. • Use the higher rate for lamb's-quarters and velvetleaf. • The addition of UAN (28-0-0) at 4% v/v will enhance the control of velvetleaf.
<i>thifensulfuron-methyl</i> <i>plus surfactant</i>	<i>4.1 to 6 g/ha</i> <i>0.1% v/v</i>		

Tank-mix Partners:

- **Assure II** at **250 mL/ac** + **Sure Mix** at **5 L/1,000 L H₂O** for grassy weed control. There is no need to add a non-ionic surfactant with this tank-mix partner. Main weaknesses: **nightshade** and **ragweed** control.
- **Excel Super** at **268 mL/ac** for grassy weed control. There is no need to add a non-ionic surfactant with this tank-mix partner. Main weaknesses: **nightshade** and **ragweed** control.
- **Basagran Forté** at **0.7 – 0.9 L/ac**. For improved broadleaf weed control. There is no need to add a non-ionic surfactant with this tank-mix partner. Main weaknesses: **nightshade** control.
- **Reflex** at **0.4 L/ac**. For improved broadleaf weed control.

Researcher Insight: There have been a number of occasions in the past 5 years when labeled weeds have approached their maximum stage for control, yet the soybean crop was not yet at the 1st trifoliolate stage. A two year trial (2006-2007) conducted by the University of Guelph evaluated the impact of Pinnacle application timing on soybean injury and yield. When Pinnacle was applied prior to the 1st trifoliolate stage, there was no difference in crop injury and yield compared to applications made from the 1-3 trifoliolate stage.

Resistant Weed Populations: lamb's-quarters, pigweed spp.

PURSUIT (420 mL/ha or 168 mL/ac) + Non Ionic Surfactant (1 L/1000 L H₂O)

GROUP 2

PCP # 26287

CLASSIFICATION: 3

RAINFEST: 4 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
BROADLEAF WEEDS	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	8	2 (20+ leaf)	15 (5 leaf)	2
Bur Cucumber	Not labeled	48	48 (8 leaf)	48 (8 leaf)	1
buckwheat, Wild	Control up to 2 leaf stage	76	56 (6 leaf)	90 (un-emerged)	3
carrot, Wild	Not labeled	56	20 (large rosette)	74 (seedling)	4
Cocklebur	Control up to 2 leaf stage	62	0 (16 leaf)	91 (2-4 leaf)	7
Dandelion	Not labeled				
fleabane, Canada	Not labeled	37	23 (large rosette)	50 (small rosette)	2
horsetail, Field	Not labeled	18	10 (10 cm)	26 (10 cm)	2
Horsenettle	Not labeled				
Lamb's-quarters	Partial control (2 leaf stage)	66	13 (14 leaf)	89 (2 leaf)	10
Lady's Thumb	Not labeled				
lettuce, Prickly	Not labeled	26	19 (11 leaf)	32 (2-4 leaf)	2
nightshade, Eastern Black	Control up to 2 leaf stage	93	85 (6 leaf)	100 (2 leaf)	2
nutsedge, yellow***	Partial control	60	55(3-8 leaf)	64 (2-14 leaf)	
Pigweed species	Control up to 2 leaf stage	87	68 (20 leaf)	100 (2-4 leaf)	5
Prostrate knotweed	Not labeled	50	50 (6-20 leaf)	50 (6-20 leaf)	1
ragweed, Common	Control up to 2 leaf stage	57	22 (16 leaf)	79 (2-4 leaf)	5
ragweed, Giant	Not labeled	86	77 (10 leaf)	93 (4 leaf)	3
sow-thistle, Annual**	Not labeled	75	74 (20 leaf)	75 (5 leaf)	2
sow-thistle, Perennial**	Not labeled	38	38 (20 leaf)	38 (20 leaf)	1
thistle, Canada	Not labeled	85	55	100	3
Velvetleaf	Control up to 2 leaf stage	91	75 (6 leaf)	100 (2 leaf)	3
Waterhemp	Not labeled	10	0 (18 leaf)	39 (4 leaf)	6
Wild Mustard	Control up to 2 leaf stage	100	100 (2-4 leaf)	100 (2-4 leaf)	1

*Weed leaf stage at time of application

** Control of this weed with Pursuit is significantly reduced under high weed populations

*** Nutsedge needs to be emerged for Pursuit to provide top growth control

PURSUIT (420 mL/ha or 168 mL/ac) + Non Ionic Surfactant (1 L/1000 L H₂O)

GROUP 2

PCP # 26287

CLASSIFICATION: 3

RAINFEST: 4 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass	Control up to 2 leaf stage	81	64 (tillering)	84 (2-4 leaf)	3
corn, Volunteer	Not labeled				
crabgrass, Large	Partial control	76	64 (20 leaf)	88 (2 leaf)	2
Fall panicum	Not labeled	73	62 (tillering)	94 (3 leaf)	3
foxtail, Giant	Not labeled				
foxtail, Green	Control up to 2 leaf stage	91	84 (4 leaf)	100 (2 leaf)	8
foxtail, Yellow	Control up to 2 leaf stage	98	95 (4 leaf)	100 (2 leaf)	5
Proso millet	Partial control	31	31 (4 leaf)	31 (4 leaf)	1
Quackgrass	Not labeled				
Sandbur	Not labeled	91	83 (8 leaf)	96 (3 leaf)	4
Stinkgrass	Not labeled				
Witch grass	Control up to 2 leaf stage	100	100 (2 leaf)	100 (2 leaf)	2
Wire stem muhly	Not labeled				

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
PURSUIT (240 g/L)	0.312 to 0.42 L/ha	0.125 to 0.168 L/ac	<ul style="list-style-type: none"> • Apply when the weeds are up to the 2-true leaf stage. • Some rotational cropping restrictions apply (see label). • Use only once per season.
plus non-ionic surfactant (NIS)	2.5 L/1,000 L	2.5 L/1,000 L	
plus liquid fertilizer			
28-0-0, 10-34-0, or 32-0-0	2 L/ha	0.8 L/ac	

Tank-mix Partners:

- **Reflex** at **0.4L/ac** + **Pursuit** at **0.125 L/ac** + NIS and 28% UAN for improved lamb's-quarter and common ragweed control.
- **FirstRate** at **8.5 g/ac** + **Pursuit** at **0.125 L/ac** **Excel Super** at **268 mL/ac** for improved cocklebur, common and giant ragweed control.
- **Basagran Forté** at **0.7 L/ac**

Researcher Insight: A very good broad-spectrum herbicide but is better suited as a preemergence herbicide as it will not control any weeds larger than 2 leaf. Struggles with high populations of large stemmed annual grasses (barnyardgrass & fall panicum). Weak on proso millet.

Resistant Weed Populations: cocklebur, common ragweed, green & giant foxtail, eastern black nightshade, lamb's-quarters, pigweed spp.

REFLEX (1 L/ha or 0.4 L/ac) + Turbocharge (5 L/1000 L H₂O)

GROUP 14

PCP # 24779

CLASSIFICATION: 3

RAINFEST: 4 hrs

		% CONTROL VISUAL RATINGS – 8 weeks after treatment			
		Based on University of Guelph Research Trials from 1998-2008			
WEED SPECIES	LABEL SAYS:	AVERAGE	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
atriplex, spreading	Not labeled	9	0 (20+ leaf)	18 (5 leaf)	2
Bur Cucumber	Not labeled	21	21 (4-8 leaf)	21 (4-8 leaf)	1
buckwheat, Wild	Not labeled	65	54 (6 leaf)	76 (2-4 leaf)	2
carrot, Wild	Not labeled	8	1 (large rosette)	20 (seedling)	4
Cocklebur	Control up to 4 leaf stage	36	25 (16 leaf)	53 (2-4 leaf)	7
Dandelion	Not labeled				
fleabane, Canada	Not labeled	29	14 (large rosette)	43 (small rosette)	2
horsetail, Field	Not labeled	7	5 (10 cm)	8 (10 cm)	2
Horsenettle	Not labeled				
Lamb's-quarters	Control up to 3 leaf stage	54	14 (20 leaf)	93 (2 leaf)	7
Lady's Thumb	Control up to 4 leaf stage				
lettuce, Prickly	Not labeled	71	46 (20 leaf)	100 (cot-4 leaf)	6
nightshade, Eastern Black	Control up to 4 leaf stage	85	56 (6 leaf)	100 (2-4 leaf)	7
nutsedge, yellow	Not labeled				
Pigweed species	Control up to 4 leaf stage	81	55 (20 leaf)	100 (2 leaf)	7
Prostrate knotweed	Not labeled	63	63 (6-20 leaf)	63 (6-20 leaf)	1
ragweed, Common	Control up to 4 leaf stage	74	43 (20 leaf)	92 (2-4 leaf)	8
ragweed, Giant	Not labeled	50	13 (10 leaf)	76 (4 leaf)	3
sow-thistle, Annual**	Not labeled	64	54 (20 leaf)	93 (5 leaf)	3
sow-thistle, Perennial**	Not labeled	94	94 (20 leaf)	94 (20 leaf)	1
thistle, Canada	Not labeled	82	51	100	3
Velvetleaf	Suppression up to 10 cm				
Waterhemp	Not labeled	85	60 (18 leaf)	100 (4 leaf)	6
Wild Mustard	Control up to 4 leaf stage	100	99 (8 leaf)	100 (4-8 leaf)	3

*Weed leaf stage at time of application

** Control of this weed with Reflex + Turbocharge is significantly reduced under high weed populations

REFLEX (1 L/ha or 0.4 L/ac) + Turbocharge (5 L/1000 L H₂O)**GROUP 14****PCP # 24779****CLASSIFICATION: 3****RAINFAST: 4 hrs**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
REFLEX (240 g/L) plus TURBOCHARGE	1 L/ha 5 L/1,000 L	0.4 L/ac 5 L/1,000 L	<ul style="list-style-type: none"> • Apply early postemergence at 1–2 trifoliolate to crop when weeds are small and actively growing (2–4 leaf stage). • Use 200–350 L/ha (80–140 L/ac) water. Use higher rates of water and pressure for a heavy weed or crop canopy. • Some bronzing may occur to soybean leaves at the time of application, but plants outgrow these effects without harming maturity or yield. • Do NOT apply Reflex to any field more often than once every 2 years. • Do NOT apply to soybeans under stress. • Some rotational cropping restrictions apply (see label).
<i>fomesafen</i> or plus mineral oil/surfactant	<i>0.24 kg/ha</i> <i>0.5% v/v</i>		

Tank-mix Partners:

- **Pinnacle SG** at **4.8 g/ac** + **Non-Ionic Surfactant** at **2.5 L/1,000 L H₂O** for improved **lamb’s-quarters** and **velvetleaf** control. Do NOT use the **Turbocharge** adjuvant with this tank-mix.
- **Venture** at 0.4 to 0.8 L/ac for grassy weed control.

Researcher Insight: There have been a number of occasions in the past 5 years when labeled weeds have approached their maximum stage for control, yet the soybean crop was not yet at the 1st trifoliolate stage. A two year trial (2006-2007) conducted by the University of Guelph evaluated the impact of Reflex application timing on soybean injury and yield. When Reflex was applied prior to the 1st trifoliolate stage, there was no difference in crop injury and yield compared to applications made from the 1-3 trifoliolate stage. Spray coverage is important with this herbicide. Reductions in spray water volume that reduces coverage can dramatically decrease efficacy.

ASSURE II (375 – 750 mL/ha or 150 - 300 mL/ac) + Sure Mix (5 L/1000 L H₂O)

GROUP I

PCP # 25462

CLASSIFICATION: 3

RAINFAST: 1 hr

			% CONTROL VISUAL RATINGS – 8 weeks after treatment Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	RATE	LABEL SAYS:	AVG.	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass	200 ml/ac	control up to early tillering				
corn, Volunteer	100 ml/ac	control up to 6 leaf	93	81 (30 cm)	100 (15 cm)	5
cereals, Volunteer	150 ml/ac	control up to early tillering	100	100	100	2
crabgrass, Large	150 ml/ac	Not labeled	89	74 (tillering)	96 (2-4 leaf)	7
Fall panicum	200 ml/ac	control up to early tillering	92	87 (2-4 leaf)	97 (2-4 leaf)	2
foxtail, Giant		Not labeled				
foxtail, Green	150 ml/ac	control up to early tillering	87	74 (tillering)	95 (2-4 leaf)	4
foxtail, Yellow**	200 ml/ac	control up to early tillering	98	93 (5-6 leaf)**	100 (2-4 leaf)**	3
Proso millet	200 ml/ac	control up to early tillering	84	33 (tillering)	100 (3-4 leaf)	6
Quackgrass	300 ml/ac	control up to 6 leaf				
Sandbur	150 ml/ac	Not labeled	95	95 (3-8 leaf)	95 (3-8 leaf)	5
Stinkgrass	150 ml/ac	Not labeled	99	99 (3-5 leaf)	99 (3-5 leaf)	2
Witch grass	200 ml/ac	control up to early tillering	99	99 (2-4 leaf)	99 (2-4 leaf)	1
Wire stem muhly	300 ml/ac	Not labeled	77	60 (2-tillering)	93 (2-tillering)	2

*Weed leaf stage at time of application

** University of Guelph trial results based on a 300 ml/ac rate

ASSURE II (375 – 750 mL/ha or 150 - 300 mL/ac) + Sure Mix (5 L/1000 L H₂O)

GROUP I

PCP # 25462

CLASSIFICATION: 3

RAINFAST: 1 hr

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
ASSURE II (96 g/L) plus SURE-MIX	0.38 to 0.75 L/ha 5 L/1,000 L	0.15 to 0.3 L/ac 5 L/1,000 L	<ul style="list-style-type: none"> • Apply to emerged annual grasses and volunteer cereals in 2-leaf to tillering stage and volunteer corn and quackgrass in the 2–6 leaf stage. • Use the 0.38 L/ha (0.15 L/ac) rate of ASSURE II for control of volunteer corn, volunteer cereals, long spined sandbur and green foxtail. • The 0.5 L/ha (0.2 L/ac) rate of ASSURE II will suppress quackgrass and also control barnyard grass. • Use the 0.75 L/ha (0.3 L/ac) rate of ASSURE II for control of quackgrass. • Do NOT apply to soybeans within 80 days of harvest.
<i>quizalofop-p-ethyl</i> <i>plus oil concentrate</i>	<i>0.036 to 0.072 kg/ha</i> <i>0.5% v/v</i>		

Tank-mix Partners:

- **Basagran** at **0.7 to 0.9 L/ac** for broad-spectrum control. Main weaknesses: **nightshade, ragweed** and **pigweed** control.
- **Classic** at **14.4 g/ac** for broad-spectrum control. Main weaknesses: **nightshade** and **lamb’s-quarters** control.
- **Pinnacle SG** at **3.3 g/ac** to **4.8 g/ac**. Main weaknesses: **nightshade** and **ragweed** control.

Researcher Insight: One of the best products for the control of volunteer corn at a rate of 100 ml/ac. Grass control with any group I herbicide can be antagonized when tank-mixed with broadleaf herbicides. Tank-mixing Assure II at a rate of 250 ml/ac will often reduce the chances of poor grass control that can result from antagonism.

EXCEL SUPER (670 mL/ha or 268 mL/ac)**GROUP I****PCP # 22205****CLASSIFICATION: 3****RAINFEST: 1 hr**

			% CONTROL VISUAL RATINGS – 8 weeks after treatment Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	RATE	LABEL SAYS:	AVG.	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass	268 ml/ac	Control up to 6 leaf				
corn, Volunteer	268 ml/ac	Control up to 25 cm	87	74 (30 cm)	90 (15 cm)	5
cereals, Volunteer	268 ml/ac	Not labeled	98	97	99	2
crabgrass, Large	268 ml/ac	Control up to 6 leaf	88	84 (tillering)	95 (3-5 leaf)	6
Fall panicum	268 ml/ac	Not labeled	62	32 (3-6 leaf)	91 (2-4 leaf)	2
foxtail, Giant		Not labeled				
foxtail, Green	268 ml/ac	Control up to 6 leaf	68	68 (2-5 leaf)	68 (2-5 leaf)	1
foxtail, Yellow	268 ml/ac	Control up to 6 leaf	77	68 (6 leaf)	85 (6 leaf)	2
Proso millet	268 ml/ac	Control up to 6 leaf	88	71 (tillering)	100 (3-4 leaf)	6
Quackgrass		Not labeled				
Sandbur	268 ml/ac	Not labeled	91	88 (3-8 leaf)	95 (3-8 leaf)	5
Stinkgrass	268 ml/ac	Not labeled	90	87 (3-5 leaf)	93 (3-5 leaf)	2
Witch grass	268 ml/ac	Control up to 6 leaf	99	99 (2-4 leaf)	99 (2-4 leaf)	1
Wire stem muhly	268 ml/ac	Not labeled	58	25 (2-tillering)	91 (2-tillering)	2

*Weed leaf stage at time of application

EXCEL SUPER (670 mL/ha or 268 mL/ac)**GROUP I****PCP # 22205****CLASSIFICATION: 3****RAINFAST: 1 hr**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
ASSURE II (96 g/L) plus SURE-MIX	0.38 to 0.75 L/ha 5 L/1,000 L	0.15 to 0.3 L/ac 5 L/1,000 L	<ul style="list-style-type: none"> Apply to emerged annual grasses and volunteer cereals in 2-leaf to tillering stage and volunteer corn and quackgrass in the 2–6 leaf stage. Use the 0.38 L/ha (0.15 L/ac) rate of ASSURE II for control of volunteer corn, volunteer cereals, long spined sandbur and green foxtail. The 0.5 L/ha (0.2 L/ac) rate of ASSURE II will suppress quackgrass and also control barnyard grass. Use the 0.75 L/ha (0.3 L/ac) rate of ASSURE II for control of quackgrass. Do NOT apply to soybeans within 80 days of harvest.
<i>quizalofop-p-ethyl</i> <i>plus oil concentrate</i>	<i>0.036 to 0.072 kg/ha</i> <i>0.5% v/v</i>		

Tank-mix Partners:

- **Basagran** at **0.7 to 0.9 L/ac** for broad-spectrum control. Main weaknesses: **nightshade**, **ragweed** and **pigweed** control.
- **Basagran** at **0.7 to 0.9 L/ac + Pinnacle SG** at **3.3 g/ac** to **4.8 g/ac**. for broad-spectrum control. Main weaknesses: **nightshade** and **ragweed** control.
- **Pinnacle SG** at **3.3 g/ac** to **4.8 g/ac**. Main weaknesses: **nightshade** and **ragweed** control.

Researcher Insight: One of the more consistent group I herbicides on Large crabgrass. Grass control with any group I herbicide can be antagonized when tank-mixed with broadleaf herbicides. If extremely hot and humid weather conditions are forecasted, it may be advantageous to split apply the tank-mix components, applying the grass herbicide first.

POAST ULTRA (420 mL/ha or 268 mL/ac) + Merge (1 L/ha or 0.4 L/ac)

GROUP I

PCP # 24835

CLASSIFICATION: 4

RAINFEST: 1 hr

			% CONTROL VISUAL RATINGS – 8 weeks after treatment			
			Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	RATE	LABEL SAYS:	AVG.	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass	130 ml/ac	Control up to 6 leaf				
corn, Volunteer	130 ml/ac	Control up to 6 leaf	77	66 (30 cm)	87 (15 cm)	5
cereals, Volunteer	130 ml/ac	Control up to 4 leaf	92	90	93	2
crabgrass, Large	130 ml/ac	Control up to 6 leaf	81	72 (tillering)	97 (3-5 leaf)	6
Fall panicum	130 ml/ac	Control up to 6 leaf	68	40 (3-6 leaf)	96 (2-4 leaf)	2
foxtail, Giant		Not labeled				
foxtail, Green	130 ml/ac	Control up to 6 leaf	84	84 (2-5 leaf)	84 (2-5 leaf)	1
foxtail, Yellow**	130 ml/ac	Control up to 6 leaf	98	98 (6 leaf)	98 (6 leaf)	1
Proso millet	130 ml/ac	Control up to 6 leaf	88	56 (tillering)	100 (3-4 leaf)	6
Quackgrass	440 ml/ac	Control up to 3 leaf				
Sandbur	190 ml/ac	Not labeled	76	49 (tillering)	96 (3-8 leaf)	5
Stinkgrass	190 ml/ac	Not labeled	91	89 (3-5 leaf)	93 (3-5 leaf)	2
Witch grass		Not labeled				
Wire stem muhly	266 ml/ac	Not labeled	64	31 (2-tillering)	96 (2-tillering)	2

*Weed leaf stage at time of application

** University of Guelph trial results based on a 190 ml/ac rate

POAST ULTRA (420 mL/ha or 268 mL/ac) + Merge (1 L/ha or 0.4 L/ac)

GROUP I

PCP # 24835

CLASSIFICATION: 4

RAINFAST: 1 hr

TRADE NAME (Concentration) active ingredient	PRODUCT RATE PER HA active rate per ha	PRODUCT RATE PER ACRE	PRECAUTIONS
POAST ULTRA (450 g/L) plus ASSIST or MERGE	0.32 to 0.47 L/ha 2 L/ha 1 L/ha	0.13 to 0.19 L/ac 0.8 L/ac 0.4 L/ac	<ul style="list-style-type: none"> • Apply the 0.47 L/ha (0.19 L/ac) rate for wild oats or volunteer cereal control. • Apply POAST ULTRA to emerged grasses in the 1–6 leaf stage during active growth while crop is small enough to permit thorough spray coverage. • Complete control is normally obtained 7–21 days after application. A second application may be necessary to control grasses that emerge after the first treatment. • Use MERGE for conditions or weeds requiring medium to high rates of POAST ULTRA. • Water rates of 100–200 L/ha (40–80 L/ac) provide the best results.
<i>sethoxydim</i> plus oil concentrate or plus surfactant/solvent	<i>0.15 to 0.2 kg/ha</i> 2 L/ha 1 L/ha		
POAST ULTRA (450 g/L) plus MERGE	1.1 L/ha 1 to 2 L/ha	0.45 L/ac 0.4 to 0.8 L/ac	<ul style="list-style-type: none"> • Apply at 1–3 leaf stage of actively growing quackgrass in 110–200 L/ha (44–80 L/ac) water. • Thorough preplant tillage will result in more uniform quackgrass emergence. • Crop competition and inter-row cultivation 7–14 days after application will assist in quackgrass control for 6–8 weeks.
<i>sethoxydim</i> plus surfactant/solvent	<i>0.5 kg/ha</i> 1 to 2 L/ha		

Tank-mix Partners:

- No registered tank-mix partners.

SELECT (420 mL/ha or 268 mL/ac) + Non Ionic Surfactant (1 L/1000 L H₂O)

GROUP I

PCP # 22625

CLASSIFICATION: 3

RAINFAST: 1 hr

			% CONTROL VISUAL RATINGS – 8 weeks after treatment Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	RATE	LABEL SAYS:	AVG.	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass	76 ml/ac	Control up to 6 leaf				
corn, Volunteer	76 ml/ac	Control up to 6 leaf	84	70 (30 cm)	93 (15 cm)	5
cereals, Volunteer	76 ml/ac	Control up to 6 leaf	97	96	98	2
crabgrass, Large	76 ml/ac	Control up to 6 leaf	83	65 (tillering)	91 (3-5 leaf)	6
Fall panicum	50 ml/ac	Control up to 6 leaf	55	40 (3-6 leaf)	70 (2-4 leaf)	2
foxtail, Giant		Not labeled				
foxtail, Green	76 ml/ac	Control up to 6 leaf				
foxtail, Yellow	76 ml/ac	Control up to 6 leaf				
Proso millet	76 ml/ac	Control up to 6 leaf	84	35 (tillering)	100 (3-4 leaf)	6
Quackgrass	152 ml/ac	Control up to 6 leaf				
Sandbur	76 ml/ac	Not labeled	71	55 (tillering)	86 (3-8 leaf)	5
Stinkgrass	76 ml/ac	Not labeled	75	71 (3-5 leaf)	78 (3-5 leaf)	2
Witch grass	76 ml/ac	Control up to 6 leaf				
Wire stem muhly	152 ml/ac	Not labeled	50	34 (2-tillering)	65 (2-tillering)	2

*Weed leaf stage at time of application

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
SELECT (240 g/L) plus AMIGO	0.125 to 0.375 L/ha 5 to 10 L/1,000 L	0.05 to 0.15 L/ac 5 to 10 L/1,000 L	<ul style="list-style-type: none"> Soybeans are tolerant at any growth stage. Apply when annual grasses and volunteer cereals are in the 2–6 leaf stage. Use the higher rate for quackgrass control. Apply to quackgrass in the 2–5 leaf stage. Add the surfactant AMIGO at 5L/1,000 L of spray solution to the low herbicide rate and 10L/1,000 L of spray solution to the high herbicide rate for quackgrass control.
<i>clethodim</i> <i>plus surfactant</i>	<i>0.03 to 0.09 kg/ha</i> <i>0.5% to 1% v/v</i>		

Tank-mix Partners:

- No registered tank-mix partners.

VENTURE (0.6-2 L/ha or 0.243 – 0.8 L/ac)

GROUP I

PCP # 21209

CLASSIFICATION: 2

RAINFAST: 1 hr

			% CONTROL VISUAL RATINGS – 8 weeks after treatment Based on University of Guelph Research Trials from 1998-2008			
GRASSY WEEDS	RATE	LABEL SAYS:	AVG.	MIN (leaf stage)*	MAX (leaf stage)*	# OF TRIALS
Barnyardgrass	400 ml/ac	control at 2 to 5 leaf				
corn, Volunteer	243 ml/ac	control at 2 to 5 leaf	89	73 (30 cm)	95 (15 cm)	5
cereals, Volunteer	400 ml/ac	control at 2 to 5 leaf	100	100	100	2
crabgrass, Large	400 ml/ac	control at 2 to 5 leaf	79	50 (tillering)	96 (3-5 leaf)	6
Fall panicum	400 ml/ac	control at 2 to 5 leaf	74	70 (3-6 leaf)	78 (2-4 leaf)	2
foxtail, Giant	400 ml/ac	control at 2 to 4 leaf				
foxtail, Green	400 ml/ac	control at 2 to 4 leaf	78	78 (2-5 leaf)	78 (2-5 leaf)	1
foxtail, Yellow	400 ml/ac	control at 2 to 4 leaf	61	51 (6 leaf)	71 (2 leaf)	2
Proso millet	400 ml/ac	control at 2 to 5 leaf	82	34 (tillering)	100 (3-4 leaf)	6
Quackgrass	800 ml/ac	control at 3 to 5 leaf				
Sandbur	400 ml/ac	Not labeled	88	81 (tillering)	93 (3-8 leaf)	3
Stinkgrass	400 ml/ac	Not labeled	97	97 (3-5 leaf)	97 (3-5 leaf)	2
Witch grass	400 ml/ac	control at 2 to 5 leaf				
Wire stem muhly	800 ml/ac	control at 3 to 5 leaf	88	78 (2-tillering)	99 (2-tillering)	2

*Weed leaf stage at time of application

VENTURE (0.6-2 L/ha or 0.243 – 0.8 L/ac)**GROUP I****PCP # 21209****CLASSIFICATION: 2****RAINFAST: 1 hr**

TRADE NAME (Concentration) <i>active ingredient</i>	PRODUCT RATE PER HA <i>active rate per ha</i>	PRODUCT RATE PER ACRE	PRECAUTIONS
VENTURE L (125 g/L) <i>fluazifop-P-butyl</i>	0.6 L/ha <i>0.075 kg/ha</i>	0.243 L/ac	<ul style="list-style-type: none"> Apply at the 2–5 leaf stage of volunteer corn. Do NOT apply to soybeans within 80 days of harvest.
VENTURE L (125 g/L) <i>fluazifop-P-butyl</i>	1 to 2 L/ha <i>0.125 to 0.25 kg/ha</i>	0.4 to 0.8 L/ac	<ul style="list-style-type: none"> Apply at the 2–4 leaf stage of annual grasses and the 3–5 leaf stage of quackgrass or wirestem muhly. Use the 2 L /ha rate of VENTURE for wirestem muhly. Use the 0.8 L/ac rate when tank-mixing with Basagran Forte or Reflex Do NOT apply to soybeans within 80 days of harvest.

Tank-mix Partners:

- **Basagran** at **0.7 to 0.9 L/ac** for broad-spectrum control. Main weaknesses: **nightshade, ragweed** and **pigweed** control.
- **Reflex** at **0.4 L/ac + Turbocharge (5 L/1000 L H₂O)** for broad-spectrum control. Main weaknesses: **lamb's-quarter** control.

Researcher Insight: The product of choice for wire stem muhly, although expectations should be for suppression and not control. Grass control with any group I herbicide can be antagonized when tank-mixed with broadleaf herbicides. The highest rate of Venture should be used when tank-mixing with broadleaf herbicides. If extremely hot and humid weather conditions are forecasted, it may be advantageous to split apply the tank-mix components, applying the grass herbicide first.