PUBLICATION 75A

GUIDE TO WEED CONTROL
FIELD CROPS

2019

Ministry of Agriculture,
Food and Rural Affairs

Ontario

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Discard old editions of this publication. Each year the Ontario Weed Committee reviews the pesticides listed in this publication.

To the best knowledge of the committee, at the time of printing, the pesticide products listed in this publication were:

- federally registered
- classified by the Ministry of the Environment, Conservation and Parks (MECP)

The information in this publication is general information only. The Ontario Ministry of Agriculture, Food and Rural Affairs does not offer any warranty or guarantee, nor does it assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

This publication lists a number of brand names of pesticides. It is neither an endorsement of the product nor a suggestion that similar products are ineffective.

THE PESTICIDE LABEL

Consult each product label before you use a pesticide. The label provides specific information on how to use the product safely, hazards, restrictions on use, compatibility with other products, the effect of environmental conditions, etc.

The pesticide product label is a legal document. Follow all label directions.

REGISTRATION OF PESTICIDE PRODUCTS

The Pest Management Regulatory Agency (PMRA) of Health Canada registers pesticide products for use in Canada following an evaluation of scientific data to ensure that the product has merit and value, and the human health and environmental risks associated with its proposed use are acceptable.

1. Full Registration
Pesticide registrations are normally granted for a period of 5 years, subject to renewal.

2. Conditional Registration
Conditional registration may be granted for a specified, limited time period, where the registrant agrees to produce additional scientific or technical information.

3. Emergency Registration
An emergency registration is a temporary, time-limited registration of no more than 1 year, approved to deal with serious pest outbreaks that have limited control options.

MAXIMUM RESIDUE LIMITS

The PMRA has established maximum residue limits (MRLs) for pesticides. Processors or retailers may demand more restrictive limits. Growers should seek advice of their intended market to determine if more restrictive limitations apply. Keep accurate and up-to-date records on pesticide use in each crop.

SUPPLEMENTAL LABELS

You MUST obtain a supplemental label and follow all the label directions when PMRA approves new uses for a registered pesticide that do not appear on the current label.

Examples of when you must use a supplemental label include:

- emergency use registration
- minor use label expansion

You can obtain a copy of a supplemental label from the pesticide manufacturer or pesticide vendor, the grower association that sponsored the emergency registration or minor use, from OMAFRA or PMRA's Pest Management Information Service.

For more information on the federal registration status, check the PMRA website at www.healthcanada.gc.ca/pmra or call 1-800-267-6315.

REGULATION OF PESTICIDES IN ONTARIO

The MECP is responsible for regulating pesticide sale, use, transportation, storage and disposal in Ontario. Ontario regulates pesticides by placing appropriate education, licensing and/or permit requirements on their use, under the Pesticides Act and Regulation 63/09.

All pesticides must be used in accordance with requirements under the Pesticides Act and Regulation 63/09, which are available on the e-laws website at ontario.ca/e-laws or by calling the ServiceOntario Publications Toll-Free number: 1-800-668-9938 or 416-326-5300.

CLASSIFICATION OF PESTICIDES

The Ontario Pesticides Advisory Committee (OPAC) is responsible for reviewing and recommending to the MECP, the classification of pesticide products before they can be sold or used in Ontario. Once approved by the MECP, classified products are posted on the MECP website: ontario.ca/pesticides.

CERTIFICATION AND LICENSING

Growers and their assistants

For information about certification for growers and training for assistants, check the Ontario Pesticide Education Program website: www.opep.ca or call 1-800-652-8573.

Commercial applicators (exterminators) and their assisting technicians

For more information about exterminator licensing and technician training, visit:

- the Ontario Pesticide Training and Certification website at www.ontariopesticide.com or call 1-888-620-9999 or 519-674-1575
- the Pesticide Industry Council's Pesticide Technician Program website at www.ptppic.org or call 1-800-265-5656 or e-mail pic@hort-trades.com
- the Pesticide Industry Regulatory Council (PIRC) at www.oipma.ca.

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November, 2018

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Chapter 1: Introduction and Important Resources

CHAPTER 1: INTRODUCTION AND IMPORTANT RESOURCES

The purpose of this chapter is to provide you with a basic explanation of the information provided throughout this publication. Ideally you'll have read this section before you start reading the crop chapters.

Weed control rating tables

In each crop chapter, following a concise but critical overview of important weed control concepts, weed control rating tables are provided to aid in herbicide selection. Weed control rating tables are constructed with the following information:

TRT #	HERBICIDE TREATMENT	WSSA GROUP	bentgrass, loose silky	bluegrass	chess	downy brome	bindweed, field	canola, volunteer	carrot, wild	chamomile, scentless
15	Buctril M	4,5	–	–	–	–	–	9	–	8
17	Infinity	27,5	–	–	–	–	–	9	–	–
22	Pardner	–	–	–	–	–	–	8	–	–
24	Refine SG	2	–	–	–	–	–	8	7	9
26	Simplicity + Assist Oil	2	9	7	9	9	–	8	–	–

1) **Trt #:** Treatment number, a reference number that links the information provided in the "herbicide rates and notes" section with the weed control ratings provided in the table.

2) **WSSA Group:** An important concept to delay the selection of herbicide resistant weeds is to rotate herbicides and/or tank-mix herbicides with different modes of action but with a similar spectrum of weed control. The Weed Science Society of America (WSSA) has numerically grouped herbicides based on their mechanisms of action. The intent behind this numbering system is to clearly identify herbicides that kill weeds using a similar biological pathway so that the use of that herbicide group is not repeated year after year but rather rotated or tank mixed with herbicides that use different biological pathways. We used to make you work to find this information. Now we provide it in each rating table, within the "herbicide rates and notes" section and in Chapter 2, *Notes on Herbicides and Adjuvants*.

3) **Numeric ratings for each species:** A frequently asked question is: "How do you come up with these numbers"? A combination of methods is used. First, when a manufacturer of a herbicide gets to list a weed on their label as being controlled, they have provided data to the Pesticide Management Regulatory Agency (PMRA) that their herbicide will provide over 80% control of the species. So, by default, that weed would get an "8" rating in the appropriate table. If they wished to place a higher rating in the table, (e.g., a "9", as there are no "10" ratings issued), they would provide data to justify that rating. To get a weed listed as "suppressed" on a herbicide label, the manufacturer would generally have to provide data that would support a 60%-79% control of the species (e.g., a "6" or "7" rating). Aside from data provided by the herbicide manufacturer, there is a heavy reliance on the efficacy data generated by public institutions, specifically the University of Guelph and Agriculture and Agri-Food Canada. In general, public data is used the most since it is perceived as unbiased and often has a greater number of herbicide treatments by which to make an "apples to apples" comparison. Lastly, if a less common weed is becoming more prevalent and no Ontario data exists, then we will cite peer review scientific journals from other North American studies provided the herbicide use rates are consistent with what is available in Ontario.

CHAPTER 1: INTRODUCTION AND IMPORTANT RESOURCES

Application timing terms used throughout the crop chapters in this guide

PP or "pre-plant": Herbicide applications are made prior to planting the crop.

PPI or "pre-plant incorporated": Herbicide applications are made prior to planting the crop and are incorporated into the soil with a tillage pass that is typically not deeper than 10 cm.

PRE or "pre-emergence": Herbicide applications are made before crop and weed emergence and usually after the crop has been planted.

POST or "post-emergence": Herbicide applications are made after crop and weed emergence unless otherwise specified.

HARVEST AID: Used either to desiccate the green tissue (pods, leaves, and stems) on physiologically mature plants to improve harvest efficiency and/or used to help desiccate weeds that may interfere with harvesting.

Understanding the information presented in the "herbicide rates and notes" section

Below is an example herbicide treatment entry found in this guide:

TRT #	HERBICIDE(S) NAME (ACTIVE INGREDIENT, CONCENTRATION, RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
26	**Simplicity GoDRI (WG) + Merge:** 1) Simplicity GoDRI 2) + Merge **Active Ingredient(s), concentration, rate:** 1) pyroxsulam, (21.5%), 15.05 g a.i./ha	1) 28 g/acre 2) 5 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 2 hours **Buffer Zones:** **Terrestrial:** 2 m **Aquatic:** 1 m

EXPLANATIONS OF THE CONTENT PROVIDED

1) **Trt #:** treatment number. This is a reference number that links the weed control ratings of a given herbicide with application information provided in the "herbicide rates and notes" section. The intention of the treatment number is so that you can find or reference a herbicide treatment more efficiently.

2) **Active ingredient, concentration and rate:** For every herbicide treatment, this guide lists the active ingredient name, the amount of active ingredient contained in either a litre of a liquid herbicide (i.e. g/L) or percentage of active ingredient contained in the mass of a dry herbicide and the rate of active ingredient per hectare. You may ask yourself…why would you care about this information? Recently, I went to the pharmacy to buy medication. There were three products at three different price points and each one seemingly more amazing than the next with names like "Maximum Relief", "Ultra-Maximum Relief" and "Ultra-Maximum Relief Plus". Since all three products were the same size, I thought I wanted "Ultra-maximum Relief Plus", but it cost 30% more than the seemingly pitiful "Maximum Relief" brand. Then I looked at the medicinal ingredient of each product, which is analogous to a herbicide's active ingredient. Each product contained 20% benzocaine, making all three products equivalent to each other. With that knowledge, I chose the least expensive option. The information provided here allows you to compare the amount of active ingredient in each product and how much is applied to an area.

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3) **Product Rate:** Perhaps self-explanatory, it's the amount of herbicide that you apply on a per acre basis. For this version of the guide, the decision has been made to express rates on a per acre basis only, since the majority of farmers that we communicate with calculate all crop inputs on a per acre basis and even Statistics Canada expresses agricultural census data on a per acre basis. In the past we have published herbicide rates in both a per acre and per hectare basis, but this would often cause confusion and on occasion result in the incorrect rate being used.

   a) If you want to find the per hectare rate of herbicides you can:

      i) Multiply the per acre product rate **by 2.5**
      Example: Engenia at 100 mL/acre x 2.5 = 250 mL/ha

      or divide the products active ingredient rate per hectare by the concentration of active ingredient found in a unit of product.

      ii) $$\textit{per hectare rate} = \frac{\text{active ingredient rate/ha}}{\text{active ingredient concentration}}$$

   b) **Example 1:** (liquid herbicide): $0.25\ \textit{L per ha of Engenia} = \frac{150\text{ g a.e./ha}}{600\text{ g/L}}$

   c) **Example 2:** (dry herbicide): $36\ \textit{g per ha of Classic} = \frac{9\text{ g a.i./ha}}{0.25\ (25\%)}$

4) **WSSA Group:** Explained in detail earlier in the "Weed Control Rating " tables.

5) **REI:** Restricted Entry Interval and is the period of time 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 the REI is not stated on a label, use a 12 hour REI.

6) **PHI:** Pre-harvest interval refers to the amount of time that must lapse (in days) after a pesticide application before the crop is harvested. The PHI is a function of a pesticide's use pattern and of the amount of pesticide residues allowed on the crop at harvest. Residue levels on a crop are affected by the crop's growth, by environmental conditions (such as rain or UV radiation) and by the microorganisms on the plants and in the soil. The PHI must therefore be long enough to allow for the pesticide residues in the harvested crop to degrade to a level that is acceptable.

7) **Buffer Zones:** A spray buffer zone is defined as the distance between the point of direct pesticide application and the nearest downwind boundary of a sensitive habitat, unless otherwise specified on a product label. It mitigates non-target deposition of spray.

Tank mixing

When it comes to reliable information on tank mixing, there are many resources available. The label is, of course, your first point of reference. You can also consult a trusted point-of-sale or agrichemical representative: they know their products best and want to see you succeed. If you are considering a new tank mix, it's best not to exceed three tank partners. The more you put in, the more likely active ingredients and formulated adjuvants will be incompatible. "Compatibility" in this case means that mixing products will not cause a chemical problem (e.g., affect product efficacy) or a physical problem (e.g., products gel or fall out of suspension). In Canada, users of commercial class pest control products for crop protection or vegetation management are permitted to apply unlabeled tank mixes of registered pest control products as long as:

- Each partner is registered for use on the crop.
- The tank mix only includes an adjuvant when specifically required by one of the mix partners.
- The application timing of each partner is compatible with crop and pest staging.
- Each partner is used according to the product label.
- No partner is specifically excluded on any other partner label.

Mixing order

Even if herbicides are compatible, the order in which you add each product to the tank, or inductor, is critical. A new acronym: **W.A.M.L.E.G.S.** has been proposed as a way to provide guidance around mixing order when nothing is specified on a product label. Fill the tank half-full of water to allow products to properly hydrate, and with the agitation on, follow this order:

W.A.M.L.E.G.S. – Mixing order for tank mixes

W **W**ettable powders, flowable (DC,DF, DG, DS, F, DF, Gr, SG, SP)
A **A**gitate, **A**nti-flowing compounds, buffers
M **M**icrocapsule suspension (ME)
L **L**iquid and soluble (SN, SC, Li, Su)
E **E**mulsifiable concentrates (EC)
G High load **G**lyphosates
S **S**urfactants

When in doubt, consult the label.

Concept: BASF

CHAPTER 1: INTRODUCTION AND IMPORTANT RESOURCES

Important background information and resources

To be able to purchase herbicides for agriculture use, there are two things you need to know...

CLASSIFICATION OF PESTICIDES

Before a federally registered pesticide can be sold or used in Ontario, it must be classified under the provincial Pesticides Act. The Ontario pesticide classification system consists of 12 classes. Ontario's Pesticides Advisory Committee (OPAC) is responsible for assessing new pesticide products and recommending to the Ministry of the Environment, Conservation and Parks (MECP) the classification of these products. Pesticide products are classified on the basis of their toxicity, environmental and health hazard, persistence of the active ingredient or its metabolites, concentration, usage, federal class designation (e.g., domestic, commercial, restricted) and registration status. The provincial classification system provides the basis for regulating the distribution, availability and use of pesticide products in Ontario.

GETTING CERTIFIED TO PURCHASE AND APPLY HERBICIDES

The majority of herbicides shown in this guide are from Classes 2, 3 and 4. Growers must be certified through the Grower Pesticide Safety Course in order to buy and use Class 2 and 3 pesticides on their farms. For information about how to obtain certification, call **1-800-652-8573** or visit www.opep.ca. Certification is not required to buy and use Class 4 pesticides, however, a grower needs to provide his/her Farm Business Registration Number or a signed "Farmer Self Declaration to Enable Purchase of a Class 4 Pesticide" form to the vendor when buying Class 4 pesticides.

Important resources that are too robust to be placed in this reference guide

If you are unable to access any of the resources below, call **1-877-424-1300** and ask them to provide you with the information you're looking for.

USING PESTICIDES IN ONTARIO

Information on the regulatory requirements of using pesticides in Ontario is updated frequently, therefore the most accurate information can be found at: ontario.ca/usingpesticides.

APPLICATION TECHNOLOGY

Technical information on application technology is continually evolving, and requires a more thorough overview than what can reasonably be provided in this guide. The online resource: www.sprayers101.com describes best practices in the safe, efficient and effective operation of agricultural sprayers.

PESTICIDE LABEL SEARCH – HEALTH CANADA

The Guide to Weed Control strives to be an abbreviation of the critical components of the pesticide label along with weed control ratings that assist with herbicide selection. Of course, this guide does not replace a product label, which is the definitive source for appropriate product use patterns. Health Canada maintains a database of all pesticide labels. To find this online tool, type the term "PMRA label search" into your search engine browser (e.g., Google).

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Weed identification

- www.weedinfo.ca
- Weed ID Guide for Ontario Crops: To download or order this field guide, type the term "Weed ID Guide for Ontario Crops" into your search engine browser.
- Problem Weed Guide for Ontario Crops: To download or order this field guide, type the term "Problem Weed Guide for Ontario Crops" into your search engine browser.

Decision support tools

PESTMANAGER APP: WWW.PESTMANAGER.CA

This free app allows you to identify, map and find control options for common weeds, insects and diseases in corn, soybean and cereal crops.

Non chemical control methods

There are several resources that provide guidance on how to use mechanical (e.g., tillage) and cultural (e.g., cover crops, rotation, bio-control) methods of weed control. If you're concerned that this information doesn't exist in this guide, let us explain our rationale. The majority of Guide to Weed Control users have shared with us that they almost exclusively use the guide to assist with herbicide selection and making sure they have all the critical information needed to apply a herbicide safely. Non-chemical methods of weed control are extremely beneficial to use on one's operation, but they can be complex and nuanced. It does them a disservice to abbreviate and place them into this guide, which has been done in the past, as often the information lacks an actionable specificity. Providing a thorough overview of alternative weed control solutions that would allow the reader to weight the benefits and liabilities of each method would result in a massive guide that would be impractical to use.

Growers want access to concise, accurate information related to herbicide use in the heat of the season as a way to "double check" or provide them with confidence in their decision making. That is the focus of this guide. However, to have a successful and resilient weed management plan, other methods must be used and here are some excellent resources for you to investigate:

- Steel in the Field: A Farmer's Guide to Weed Management Tools – To find this online tool, type the term "Steel in the Field" into your search engine browser.
- Managing Cover Crops Profitably – To find this online tool, type the term "managing cover crops" into your search engine browser.
- Ontario Cover Crop Selection Tool – decision-tool.incovercrops.ca
- Weed Control section of OMAFRA Publication 811 *Agronomy Guide for Field Crops*. To find this online tool, type the term "Agronomy Guide OMAFRA" into your search engine browser.

FIELD CROPS

Chapter 2: Notes on Herbicides and Adjuvants

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

TABLE 2-1
Herbicide label status for 50 prominent Ontario weeds

50 most prominent production limiting weeds in Ontario Field Crops (according to Certified Crop Advisors) and their sensitivity to herbicides (according to the product label).

			GRASSY WEEDS																		
HERBICIDE NAME	PAGE #	ENTRY #	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
2,4-D Amine 600	24	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	TG	C[2]	C[2]	–
2,4-D Ester 700	24	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	TG	C[2]	C[2]	–
Aatrex 480	26	8	–	–	–	–	–	–	–	–	–	C[1,2]	–	–	–	–	–	–	–	C[1,2]	–	–
Accent	51	75	C[2]	–	–	–	C[2]	C[2]	–	C[2]	–	–	–	C[2]	–	–	C[2]	–	–	–	–	–
Acuron	27	10	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	–	–	S[1]	–	–	–	C[1]	–	–	C[1,2]	–	–
Aim EC	29	17	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Armezon + atrazine	62	107	S[2]	–	S[2]	–	–	S[2]	–	S[2]	–	–	–	–	–	–	–	–	–	–	–	–
Armezon Pro + atrazine	37	37	C[1,2]	–	C[1,2]	–	C[1,2]	C[1,2]	–	C[1,2]	–	–	–	–	–	–	C[1,2]	–	–	–	–	–
Arrow All-In	32	24	C	–	–	–	–	C	–	C	–	C	C	–	–	–	C	–	–	–	–	–
Assignment	46	62	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	S[2]	–	S[1,2]	–	–	–	C[1]	–	–	C[2]	–	–
Assure II	55	87	C[2]	–	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	–	–	–
Authority	96	63	–	–	C[1]	C[1]	–	–	–	–	–	–	–	–	–	–	–	–	–	C[1]	–	–
Authority Supreme	54	85	C[1]	–	C[1]	–	–	C[1]	C[1]	C[1]	–	S[1]	–	–	–	–	C[1]	–	–	C[1]	–	–
Axial	52	78	C[2]	–	–	–	–	C[2]	–	C[2]	–	C[2]	C[2]	–	–	–	–	–	–	–	–	–
Badge II	29	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Barricade M	61	106	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Basagran Forte	27	9	–	–	–	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	S[2]	–	–	–
Bengal WB	39	42	C[2]	–	–	–	–	C[2]	–	C[2]	–	C[2]	–	–	–	–	–	–	–	–	–	–
Bifecta	50	74	–	–	–	–	–	S[1]	–	S[1]	–	–	–	–	–	–	–	–	–	–	–	–

LEGEND:

C = controlled
S = suppression
TG = Top growth control only, perennial weeds will grow back from the roots.
1 = prior to weed emergence (e.g. residual weed control)
2 = weed must be emerged at time of application
3 = herbicide must be incorporated with tillage to maximize control.
4 = small young seedlings only

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																														
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	C[2]	–	C[2]	C[2]	C[2]	–	–	–	–	C[2]	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	TG	–	TG	C[2]	–	–
–	C[2]	–	C[2]	–	C[2]	–	–	–	TG	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	TG	–	TG	C[2]	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[1,2]	–	C[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	C[2]	–	–	–	C[2]	C[2]	–	–	–	–	C[2]	–	C[2]
–	S[2]	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	–	S[2]	–	–
–	S[1,2]	–	–	–	–	–		–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–		–	–	–	–	S[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	C[1,2]	–	–	–	–	–	–	–	C[1]	C[3]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	S[1]	–	–	–	–	–	–	–	–	–	C[1]	–	–	–	C[1]	C[1]	–	–	–	–	–	–	–	–	–	–	–	C[1]
–	–	C[1]	–	–	–	–	–	–	–	–	–	C[1]	–	–	S[1]	–	C[1]	S[1]	–	–	–	C[1]	–	–	–	–	–	–	C[1]
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	S[2]	–	C[2]	–	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	TG	–	TG	S[2]	–	–
–	C[2]	C[2]	–	C[2]	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	–	–	C[2]	–	C[2]	–	–	–	S[2]	–	–	–
–	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	S[2]	C[2]	C[2]	–	C[2]	C[2]	–	–	–	C[2]	C[2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	C[1]	–	–	C[1]	–	–	C[1]	–	–	–	–	C[1]	–	–	C[1]	C[1]	C[1]	C[1]	–	–	–	–	–	–	–	–	C[1]	–	C[1]

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Herbicide label status for 50 prominent Ontario weeds *continued*

			GRASSY WEEDS																		
HERBICIDE NAME	**PAGE #**	**ENTRY #**	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
Bison	62	108	C[2]	–	–	–	–	C[2]	–	C[2]	–	C[2]	–	–	–	–	–	–	–	–	–	–
Blackhawk	52	80	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
Blazer, Ultra	25	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	TG	–	–	–
Boost	61	105	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Boundary LQD	58	98	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	–	–	–	–	–	C[1]	–	–	–	–	–
Broadloam	27	9	–	–	–	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	S[2]	–	–	–
Broadstrike RC	39	44	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bolster	37	38	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	TG	C[2]	TG	C[2]	C[2]	TG	C[2]	TG	TG
Bonanza 480	63	110	C[1]	–	C[1]	C[1]	–	C[1]	–	C[1]	–	S[1]	–	–	–	–	–	–	–	S[1]	–	–
Bromax	28	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Bromotril 240	28	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Brotex 240	28	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Brotex 480	28	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Buctril M	29	16	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Caliber 625	25	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–
Callisto + Aatrex 480	49	71	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Callisto GT	50	72	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	S[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	–	C[2]	–	–
Canopy Pro	32	23	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[2]	–	–	–	–	–	C[1,2]	–	–	C[2]	–	–
Chaperone	30	18	–	–	–	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	–
Classic	30	18	–	–	–	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	–
Cleansweep	46	61	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	S[2]	–	S[1,2]	–	–	–	C[1]	–	S[2]	C[2]	–	–
Clearview	26	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–

LEGEND:

C = controlled
S = suppression
TG = Top growth control only, perennial weeds will grow back from the roots.
1 = prior to weed emergence (e.g. residual weed control)
2 = weed must be emerged at time of application
3 = herbicide must be incorporated with tillage to maximize control.
4 = small young seedlings only

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																														
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	C[2]	C[2]	C[2]	–	–	S[2]	–	–	–	–	C[2]	C[2]	–	S[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	–	–	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	TG	C[2]	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	TG	–	–	–
–	C[2]	S[2]	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	–	–	S[2]	C[2]	C[2]	S[2]	S[2]	–	S[2]	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[3]	C[1]	–	–	–	–	–	–	–	–	–	–	–	C[1]
–	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	-	S[2]	C[2]	C[2]	–	C[2]	C[2]	–	–	–	C[2]	C[2]	–	–
S[1]	C[1]	–	–	–	–	–	C[1]	–	–	–	C[1]	C[1,2]	–	–	C[1,2]	C[1]	C[1,2]	S[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	–
TG	C[2]	C[2]	C[2]	TG	TG	TG	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	TG	C[2]	C[2]	C[2]	C[2]	C[2]	TG	C[2]	C[2]	C[2]	TG	C[2]	TG	C[2]	TG	C[2]
–	C[1]	–	–	–	–	–	–	–	–	C[1]	–	C[1]	–	–	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	C[2]	–	–	–	–	C[2]	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	C[2]	–	–	–	–	C[2]	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	C[2]	–	–	–	–	C[2]	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	C[2]	–	–	–	–	C[2]	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	S[2]	–	C[2]	–	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	S[2]	–	S[2]	S[2]	–	–
–	–	–	–	S[2]	C[2]	–	–	–	S[2]	–	S[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	C[1,2]	–	–	C[1,2]	C[1,2]	C[1,2]	S[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	–
–	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	S[2]	C[2]	C[1,2]	C[1,2]	C[1,2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	–	–
S[2]	–	–	–	C[2]	–	–	C[1]	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[2]	–	–	–	–	C[1,2]	–	–
S[2]	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	–	–
S[2]	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	–	–
–	C[2]	C[1,2]	C[2]	–	–	–	–	–	–	–	C[1,2]	C[2]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S[2]	–	C[2]	C[2]	–	–	–	S[2]	C[1,2]	–	–
C[2]	C[2]	–	–	C[2]	–	–	C[2]	–	–	–	C[2]	–	C[2]	–	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	C[2]	–	C[2]	–	–	–

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

50 most prominent production limiting weeds *continued*

			GRASSY WEEDS																		
HERBICIDE NAME	**PAGE #**	**ENTRY #**	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
Cobutox 625, IPCO	25	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–
Cobutox 625, Weedaway	25	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–
Command	33	26	C[1]	–	–	–	–	C[1]	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	–
Conquest LQ	47	63	–	–	–	–	–	C[1,2]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Contender	55	87	C[2]	–	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	–	–	–
Converge XT	47	64	C[1]	–	C[1]	C[1]	–	C[1]	–	–	–	–	–	–	–	–	C[1]	–	–	–	–	–
Credit 45	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Credit Xtreme	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Destra IS	55	88	–	–	–	–	C[2]	C[2]	–	–	–	–	–	S[2]	–	–	C[2]	–	–	–	–	–
Dichlorprop-D, IPCO	36	34	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
Dichlorprop-DX, IPCO	36	33	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
Distinct	36	35	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Dual II Magnum	57	95	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[3]	–	–	–	–	–	C[1]	–	–	–	–	–
DuPont Imazethapyr	45	60	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	S[2]	–	S[1,2]	–	–	–	C[1]	–	–	C[2]	–	–
DuPont Polaris Max	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Elevore	45	58	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Embutox	25	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–
Enforcer M	40	49	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Engarde	55	88	C[1,2]	–	S[1,2]	S[1,2]	C[2]	C[1,2]	–	S[1,2]	–	–	–	S[2]	–	–	C[2]	–	–	–	–	–
Engenia	34	29	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	TG	C[1,2]	–	–
Enlist Duo	25	3	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	–	–	–	C[2]	C[2]	C[2]	–
Eptam	38	39	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	–	C[1]	C[1]	C[1]	–	C[1]	–	–	C[1]	–	–	–	–	–

LEGEND:

C = controlled
S = suppression
TG = Top growth control only, perennial weeds will grow back from the roots.
1 = prior to weed emergence (e.g. residual weed control)
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CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																													
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	–	–	–	S[2]	C[2]	–	–	–	S[2]	–	S[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	–	–	–
–	–	–	–	S[2]	C[2]	–	–	–	S[2]	–	S[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	–	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1]	C[1]	–	–	–	C[1]	S[1]	S[1]	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1]	C[1,2]	–	–	–	C[1]	C[1,2]	C[1]	–	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	C[4]	–	–	–	–	–	–	–	C[1]	–	–	C[1]	C[1]	C[1]	C[1]	–	–	–	–	C[1]	–	–	–	C[1]	–	C[1]
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[1,2]	C[1,2]	S[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	–	C[2]	–	TG	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	TG	–	TG	–	–	–
–	–	–	C[2]	–	TG	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	TG	–	TG	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	–	–	C[2]	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	C[2]
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[1]	S[1,3]	–	–	–	–	–	–	–	–	–	–	–	S[1]
–	–	–	C[1,2]	–	–	–	–	–	–	–	C[1]	C[3]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S	–	–	–	–	–	–	–	C[1,2]	–	–
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	–	C[2]	–	–	–	–	C[2]	–	–	–	–	C[2]	–	–	–	–	S[2]	C[2]	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	S[2]	C[2]	–	–	–	S[2]	–	S[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	–	–	–
–	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	S[2]	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	C[1,2]	–	–	C[1,2]	–	C[1,2]	S[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	C[1,2]	–	–	–	–	C[2]	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	TG	–	TG	C[1,2]	–	–
–	C[2]	C[2]	C[2]	–	–	–	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]
–	C[1]	–	–	–	–	–	–	C[1]	–	–	–	C[1]	–	–	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	–

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

50 most prominent production limiting weeds *continued*

			GRASSY WEEDS																		
HERBICIDE NAME	**PAGE #**	**ENTRY #**	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
Eragon LQ	56	90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Estaprop XT	36	33	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
Factor 540	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	–
FeXapan	34	30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	TG	C[1,2]	–	–
Fierce	40	47	–	–	C[1]	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	C[1]	–	–
Firstrate	34	28	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Flexstar GT	42	51	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	–	C[2]	C[2]	–	–
Focus	53	84	C[1]	–	C[1]	–	–	C[1]	S[1]	C[1]	–	S[1]	–	–	–	–	–	–	–	S[1]	–	–
Freestyle	32	22	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	C[2]	–	S[1,2]	–	–	–	C[1]	–	–	C[2]	–	–
Frontier Max	37	36	C	–	C	C	C	C	C	C	C	–	–	–	–	–	C	–	–	–	–	–
Glyfos	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Guardian	30	19	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]		–	C[2]	C[2]	–	C[2]
Guardian Plus II	31	21	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	C	–	C[2]	C[2]	–	C[2]
Gylphosate	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Halex GT	44	56	C[2]	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S[2]	C[2]	C[2]	C[2]	–	C[2]	C[1,2]	–	–	C[2]	–	–
Iginite	42	53	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Impact + Aatrex 480	62	107	S[2]	–	S[2]	–	–	S[2]	–	S[2]	–	–	–	–	–	–	–	–	–	–	–	–
Infinity	53	81	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	S[2]	–	C[2]	–	–
Infinity FX	53	82	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	S[2]	–	C[2]	–	–
Integrity	56	91	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[3]	–	–	–	–	–	C[1]	–	–	C[2]	–	–

LEGEND:

C = controlled
S = suppression
TG = Top growth control only, perennial weeds will grow back from the roots.
1 = prior to weed emergence (e.g. residual weed control)
2 = weed must be emerged at time of application
3 = herbicide must be incorporated with tillage to maximize control.
4 = small young seedlings only

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																													
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	–	–	–	S[2]	–	–	C[2]	–	–	–	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]	–	–	C[2]	–	–
–	–	–	C[2]	–	TG	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	TG	–	TG	–	–	–
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	–
–	–	C[1,2]	–	–	–	–	C[2]	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	TG	–	TG	C[1,2]	–	–
–	C[1]	–	–	C[1]	–	–	C[1]	–	–	–	–	C[1]	–	–	C[1]	C[1]	C[1]	C[1]	–	–	–	–	–	–	–	–	C[1]	–	C[1]
–	–	–	C[1,2]	–	–	–	–	–	–	–	–	C[1]	–	–	–	–	–	C[1,2]	C[2]	–	–	–	–	–	–	–	C[1,2]	–	–
C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[1,2]	C[1,2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	–
–	–	C[1]	–	–	–	–	–	–	–	–	–	S[1]	–	–	S[1]	–	C[1]	–	–	–	–	S[1]	–	–	–	–	C[1]	–	C[1]
S[2]	–	–	C[1,2]	C[2]	–	–	–	–	–	–	C[1]	C[3]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C	C	–	–	–	–	–	–	–	–	–	–	–	–
C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
C[2]	C[1,2]	C[2]	C[2]	C[1,2]	C[2]	C[2]	C[1,2]	–	–	–	C[2]	C[2]	C[1,2]	C[2]	C[2]	C[1,2]	C[1,2]	C[1,2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[1,2]
C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	C[1,2]	C[1,2]	–	S[2]	C[1,2]	C[1,2]	C[2]	C[2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[1,2]	–	–
–	C[2]	–	–	C[2]	–	–	–	–	–	–	–	C[2]	–	–	C[2]	–	C[2]	–	–	–	–	C[2]	–	–	–	–	–	–	–
–	S[2]	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	S[2]	–	–	–	–	–	–	–	S[2]	–	–
–	C[2]	C[2]	–	S[2]	–	–	C[2]	–	–	–	–	C[2]	–	–	C[2]	–	C[2]	C[2]	S[2]	–	C[2]	C[2]	C[2]	S[2]	–	S[2]	–	–	–
–	C[2]	C[2]	–	S[2]	–	–	C[2]	–	–	–	–	C[2]	–	–	C[2]	–	C[2]	C[2]	S[2]	–	C[2]	C[2]	C[2]	S[2]	–	S[2]	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–	C[2]	C[3]	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	–	–

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

50 most prominent production limiting weeds *continued*

			GRASSY WEEDS																		
HERBICIDE NAME	**PAGE #**	**ENTRY #**	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
Koril 235	27	11	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Liberty 200 SN	43	54	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–
Logic M	29	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Lontrel 360 or Lontrel XC	33	27	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Lorox L	47	65	S[1,2]	–	C[1,2]	C[1,2]	–	C[1,2]	–	C[1,2]	–	–	–	–	–	–	C[1,2]	–	–	C[1,2]	–	–
Lumax EZ	58	97	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	–	–	–	–	–	–	C[1]	–	–	C[1,2]	–	–
Marksman	35	31	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[1]	C[2]	C[1,2]	–	–
Matrix	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
MCPA Amine 500	48	66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
MCPA Amine 600	48	67	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
MCPA Ester 600	48	68	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	C[2]	–
MCPA Sodium 300	49	69	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	C[2]	–
MCPA/MCPB	49	70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–
Mextrol 450	29	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Milestone	26	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Muster	38	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nu-Image	45	60	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	S[2]	–	S[1,2]	–	–	–	C[1]	–	–	C[2]	–	–
Optill	56	92	C[1,2]	–	C[1,2]	–	–	C[1,2]	–	C[1,2]	–	–	–	–	–	–	–	–	–	C[2]	–	–
Option 2.25 OD	42	52	C[2]	–	C[2]	–	C[2]	C[2]	–	C[2]	–	–	C[2]	–	C[2]	C[2]	C[2]	–	–	–	–	–
Pardner	28	13	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–

LEGEND:

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CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																													
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	C[2]	–	–	–	–	C[2]	–	–
–	C[2]	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	S[2]	–	C[2]	–	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	S[2]	–	S[2]	S[2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	C[2]	–	–	–	C[2]	–	C[2]	–	C[2]	–
–	C[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	C[1,2]	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[1,2]	C[1,2]	–	–	–	S[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	–	–	–	–	C[1,2]	–	–
–	–	C[1,2]	C[2]	–	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	C[1,2]	–	C[1,2]	C[1,2]	–	C[1,2]
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	C[2]	C[2]	C[2]	–	C[2]	–	–	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	–
–	C[2]	C[2]	C[2]	–	C[2]	–	–	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	–
–	–	–	C[2]	C[2]	C[2]	–	–	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	–
–	C[2]	–	C[2]	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	–	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]	–	–	–	–	–	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	S[2]	–	C[2]	–	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	S[2]	–	S[2]	S[2]	–	–
–	–	–	–	S	C	–	C	–	–	–	–	–	C	–	–	–	–	C	–	C	–	–	–	C	–	C	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C	–	S	–	–	–	–	C	–	–	–	–	–	–	–
–	–	–	C[1,2]	–	–	–	–	–	–	–	C[1]	C[3]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S	–	–	–	–	–	–	–	C[1,2]	–	–
–	C[1,2]	–	–	S[1,2]	–	–	C[1,2]	–	–	–	C[2]	C[1,2]	TG	–	C[2]	–	C[1,2]	C[1,2]	C[2]	–	C[1,2]	C[2]	–	TG	–	–	–	–	–
–	C[2]	–	–	–	–	–	–	–	–	–	–	C[2]	–	–	C[2]	C[2]	C[2]	S[2]	–	–	–	–	–	–	–	–	C[2]	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	C[2]	–	–	–	–	C[2]	–	–

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

50 most prominent production limiting weeds *continued*

			GRASSY WEEDS																		
HERBICIDE NAME	**PAGE #**	**ENTRY #**	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
Peak	52	79	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Permit	45	59	–	–	–	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	S[2]
Phantom 240	45	60	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	S[2]	–	S[1,2]	–	–	–	C[1]	–	–	C[2]	–	–
Pinnacle SG	60	103	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pixxaro	44	57	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
Poast Ultra	57	93	C[2]	–	C[2]	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	–	C[2]	–	–	–	–	–
Primextra II Magnum	58	96	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[3]	–	–	–	–	–	C[1]	–	–	C[1]	–	–
Princep Nine-T	57	94	C[1]	–	C[1]	C[1]	–	–	–	C[1]	–	C[1]	–	–	–	–	–	–	–	C[1]	–	–
Prowl H20	51	77	C[1]	–	C[1]	C[1]	C[1]	C[1]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Puma 120	38	42	C[2]	–	–	–	–	C[2]	–	C[2]	–	C[2]	–	–	–	–	–	–	–	–	–	–
Puma Advance	38	41	C[2]	–	–	–	–	C[2]	–	C[2]	–	C[2]	–	–	–	–	–	–	–	–	–	–
Pursuit	45	60	C[1]	–	S[2]	–	–	C[1,2]	–	C[1,2]	S[2]	–	S[1,2]	–	–	–	C[1]	–	–	C[2]	–	–
Refine SG	60	104	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–
Reflex	41	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Reglone	37	38	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	TG	C[2]	C[2]	TG	C[2]	TG	C[2]	C[2]	TG	C[2]	TG	C[2]
Rival	63	111	C[1]	–	C[1]	C[1]	–	C[1]	–	C[1]	–	S[1]	–	–	–	–	–	–	–	S[1]	–	–
Roundup Transorb	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Roundup Weathermax	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Select	33	25	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	–	–	C[2]	–	–	–	–	–
Sencor 75 DF	50	73	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	–	–	C[1,2]	–	–	C[2]	–	–

LEGEND:

C = controlled
S = suppression
TG = Top growth control only, perennial weeds will grow back from the roots.
1 = prior to weed emergence (e.g. residual weed control)
2 = weed must be emerged at time of application
3 = herbicide must be incorporated with tillage to maximize control.
4 = small young seedlings only

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																													
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	–	–
–	C[1]	–	C[1,2]	–	–	–	C[1]	–	S[2]	–	C[1,2]	C[1]	C[1]	S[2]	C[1,2]	–	C[1,2]	C[1,2]	C[2]	C[1]	C[1]	–	–	–	–	–	C[1,2]	–	–
–	–	–	C[1,2]	–	–	–	–	–	–	–	C[1]	C[3]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S[2]	–	–	–	–	–	–	–	C	–	–
–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	–	–	–	–	–	–	–	–	–	C[2]	–	–
–	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	–	–	–	C[2]	C	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1]	C[1]	–	–	C[1]	C[1]	–	C[1]	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	C[1]	C[1]	–	–	–	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	C[1]	–	–	–	–	S[1]	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	C[1,2]	–	–	–	–	–	–	–	C[1]	C[3]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	S[2]	–	–	–	–	–	–	–	C[1,2]	–	–
–	C[2]	S[2]	–	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	–	–	S[2]	C[2]	C[2]	S[2]	S[2]	–	S[2]	–	–	–
–	–	–	C[2]	–	–	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	–	–
TG	C[2]	C[2]	C[2]	TG	TG	TG	C[2]	C[2]	–	C[2]	C[2]	C[2]	C[2]	TG	C[2]	C[2]	C[2]	C[2]	C[2]	TG	C[2]	C[2]	C[2]	TG	C[2]	TG	C[2]	TG	C[2]
–	C[1]	–	–	–	–	–	–	–	–	C[1]	–	C[1]	–	–	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	–
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	C[1,2]	–	C[1,2]	C[4]	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[2]	–	–	–	–	C[1,2]	–	–

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

50 most prominent production limiting weeds *continued*

			GRASSY WEEDS																		
HERBICIDE NAME	**PAGE #**	**ENTRY #**	barnyard grass	bluegrass, annual	crabgrass, large	crabgrass, smooth	fall panicum	foxtail, green	foxtail, giant	foxtail, yellow	nutsedge, yellow	oats, wild	proso millet	quackgrass	sandbur	wire-stemmed muhly	witch grass	atriplex, spreading	bindweed, field	buckwheat, wild	burdock (seedling)	bur cucumber
Simplicity GoDRI	54	86	C[2]	–	–	–	–	S[2]	–	C[2]	–	C[2]	–	–	–	–	–	–	–	S[2]	–	–
Squadron	50	73	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	–	–	C[1,2]	–	–	C[2]	–	–
Statue	33	25	C[2]	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	–	–	C[2]	–	–	–	–	–
Step Up	31	20	–	–	–	–	–	S[1]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tavium	35	32	C[1]	–	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	–	–	–	–	–	–	C[1]	–	TG	C[1,2]	–	–
Tiedown	59	99	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	–	–	C[1,2]	–	–	C[2]	–	–
Treflan	62	110	C[1]	–	C[1]	C[1]	–	C[1]	–	C[1]	–	S[1]	–	–	–	–	–	–	–	S[1]	–	–
Triactor	40	46	C[1,2]	–	C[1,2]	–	C[1,2]	C[1,2]	–	C[1,2]	–	–	–	–	–	–	–	–	–	C[1,2]	–	–
Triflurex	62	109	C[1]	–	C[1]	C[1]	–	C[1]	–	C[1]	–	S[1]	–	–	–	–	–	–	–	S[1]	–	–
Tricor 75 DF	50	73	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	–	–	C[1,2]	–	–	C[2]	–	–
Trophy	41	48	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	S[2]	C[2]	–
Turboprop	36	34	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	C[2]	–
Ultim	51	76	C[2]	–	–	–	C[2]	C[2]	–	S[2]	–	–	C[2]	C[2]	C[2]		C[2]	–	–	–	–	–
Valtera	39	45	–	–	–	–	–	S[1]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Varro	62	102	C[2]	–	–	–	–	C[2]	–	S[2]	–	C[2]	–	–	–	–	–	–	–	C[2]	–	–
Venture L	39	43	C[2]	–	–	–	C[2]	C[2]	–	C[2]	–	–	–	C[2]	C[2]	C[2]	C[2]	–	–	–	–	–
Vigil, IPCO	38	42	C[2]	–	–	–	–	C[2]	–	C[2]	–	C[2]	–	–	–	–	–	–	–	–	–	–
Vios G3	59	101	C[1]	–	C[1]	–	–	C[1]	–	C[1]	–	–	–	–	–	–	C[1]	–	–	C[1]	–	–
VP480	43	55	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	C[2]	C[2]	–	C[2]
Xtendimax	34	30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	TG	C[1,2]	–	–
Yuma GL	55	87	C[2]	–	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	–	–	–	–	–
Zidua	53	83	C	–	C	–	–	C	C	C	–	–	–	–	–	–	–	–	–	–	–	–

LEGEND:

C = controlled
S = suppression
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1 = prior to weed emergence (e.g. residual weed control)
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CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

BROADLEAF WEEDS																														
carrot, wild	chickweed	cleavers	cocklebur	dandelion	dock, curled	dogbane	fleabane, Canada	henbit	horsetail, field	knotweed, prostrate	lady's thumb	lamb's-quarters	lettuce, prickly	milkweed	mustard, wild	nightshade, eastern black	pigweed	ragweed, common	ragweed, giant	scentless chamomile	shepherd's-purse	stinkweed	sow-thistle, annual	sow-thistle, perennial	speedwells	thistle, Canada	velvetleaf	vetch, tufted	waterhemp
–	–	–	–	S[2]	–	–	–	–	–	–	C[2]	–	–	–	–	–	C[2]	–	–	–	C[2]	C[2]	–	–	–	S[2]	–	–	–
–	C[1,2]	–	C[1,2]	C[4]	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[2]	–	–	–	–	C[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	C	–	–	S	–	–	–	C	C	–	–	C	C	C	C	–	–	–	–	–	–	–	–	C	–	C
–		C[2]	–	–	–	–	C[2]	–	–	–	C[2]	C[1,2]	–	–	C[2]	C[1]	C[1,2]	C[1,2]	C[2]	–	–	–	–	TG	–	TG	C[2]	–	–
–	C[1,2]	–	C[1,2]	C[4]	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[1]	C[1,2]	C[1,2]	–	–	C[1,2]	–	–	–	–	–	C[1,2]	–	–
–	C[1]	–	–	–	–	–	–	–	–	C[1]	–	C[1]	–	–	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	–
–	C[1,2]	–	C[1,2]	C	–	–	S[1]	–	–	–	–	C[1,2]	–	–	C[1,2]	C[1,2]	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	–	–	–	C[1,2]	–	C[1,2]
–	C[1]	–	–	–	–	–	–	–	–	C[1]	–	C[1]	–	–	–	–	C[1]	–	–	–	–	–	–	–	–	–	–	–	–
–	C[1,2]	–	C[1,2]	C[4]	–	–	–	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	–	–	C[1,2]	C[2]	–	–	–	–	C[1,2]	–	–
–	–	C[2]	C[2]	–	–	–	–	–	–	–	–	C[2]	C[2]	–	C[2]	–	C[2]	C[2]	–	–	C[2]	C[2]	–	–	–	–	–	C[2]	–
–	–	–	C[2]	–	TG	–	–	–	–	–	C[2]	C[2]	–	–	C[2]	–	C[2]	C[2]	C[2]	–	C[2]	C[2]	C[2]	TG	–	TG	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C[2]	–	–	–	–	–	–	–	–	–	–	–	–
–	C[1]	–	–	C[1]	–	–	C[1]	–	–	–	–	C[1]	–	–	–	C[1]	C[1]	C[1]	–	–	–	–	–	–	–	–	–	–	C[1]
–	–	C[2]	–	–	–	–	–	–	–	–	–	S[2]	–	–	C[2]	–	C[2]	–	–	–	C[2]	C[2]	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	C[1]	–	–	–	–	–	–	–	–	–	C[1]	C[1]	–	–	C[1]	C[1]	C[1]	–	C[1]	–	–	–	C[1]	–	–	–	C[1]	–	C[1]
–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	[2]C	–	–	–	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]	–	–	C[2]	C[2]	C[2]	C[2]	–	C[2]	C[2]	–	C[2]
–	–	C[1,2]	–	–	–	–	C[2]	–	–	–	C[1,2]	C[1,2]	–	–	C[1,2]	–	C[1,2]	C[1,2]	C[1,2]	–	–	–	–	TG	–	TG	C[1,2]	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	C	–	–	–	–	–	–	–	–	–	–	–	C

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Herbicides available for Ontario field crops sorted by active ingredient name

ENTRY # 1

ACTIVE INGREDIENT (A.I.): **2,4-D**

Concentration: 564 g a.e./L
Formulation: liquid
WSSA Group: 4

Field Crop Registrations: cereals (barley, rye, wheat) and corn (field)
Storage Information: Cannot be stored at temperatures at or below 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control unemerged weed species.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
2,4-D AMINE 600	5931	4	12 hours	Loveland Products Canada Inc
2,4-D AMINE 6 00, IPCO	17511	4	12 hours	Interprovincial Co-op Ltd.
2,4-D AMINE 600, NUFARM	14726	4	12 hours	Nufarm Agriculture Inc.
2,4-D AMINE 600, WEEDAWAY	26163	4	12 hours	Interprovincial Co-op Ltd.

ENTRY # 2

ACTIVE INGREDIENT (A.I.): **2,4-D**

Concentration: 660 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: cereals (barley, rye, wheat), corn (field), pastures, soybean*
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control unemerged weed species.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
2,4-D ESTER 700, ADAMA	31698	3	12 hours	Adama Canada Ltd.
2,4-D ESTER 700, IPCO	20310	3	12 hours	Interprovincial Co-op Ltd.
2,4-D ESTER 700, NUFARM	27820	3	12 hours	Nufarm Agriculture Inc.
2,4-D ESTER 700, SALVO	27818	3	12 hours	Loveland Products Canada Inc
2,4-D ESTER 700, WEEDAWAY	29007	3	12 hours	Interprovincial Co-op Ltd.

*Only PCP# 27820 (NUFARM) and PCP# 31698 (ADAMA) are labelled for use as a pre-plant application to soybean

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

ENTRY # 3

ACTIVE INGREDIENT (A.I.): 2,4-D choline
Concentration: 194 g a.e./L
Formulation: solution
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): glyphosate
Concentration: 204 g a.e./L
Formulation: solution
WSSA Group: 9

Field Crop Registrations: Prior to seeding or prior to emergence of cereals (barley, rye, wheat) and corn. Pre or Post emergence to Enlist corn and soybean cultivars.
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual and perennial grass and broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ENLIST DUO	30958	4	48 hours	Dow AgroSciences Canada Inc.

ENTRY # 4

ACTIVE INGREDIENT (A.I.): 2,4-DB
Concentration: 625 g/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: alfalfa (seedling), bird's-foot trefoil (seedling), cereals (barley, oats, wheat), clovers (seedling), corn (field) and pastures
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CALIBER 625	27910	4	12 hours	Loveland Products Canada Inc
COBUTOX 625, IPCO	22404	4	12 hours	Interprovincial Co-op Ltd.
COBUTOX 625, WEEDAWAY	28346	4	12 hours	Interprovincial Co-op Ltd.
EMBUTOX	27912	4	12 hours	Nufarm Agriculture Inc.

ENTRY # 5

ACTIVE INGREDIENT (A.I.): acifluorfen
Concentration: 240 g/L
Formulation: solution
WSSA Group: 14

Field Crop Registrations: soybean
Storage Information: Cannot be stored at temperatures at or below 0°C.
Notes About Control: Controls susceptible annual broadleaf weeds when emerged and at the very small seedling stage (< 6 leaf). Will provide top growth control of some perennial weeds. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ULTRA BLAZER	32330	3	12 hours	United Phosphorus Inc.

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ENTRY # 6

ACTIVE INGREDIENT (A.I.): aminopyralid

Concentration: 240 g/L
Formulation: solution
WSSA Group: 4

Field Crop Registrations: pastures (mainly grasses)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when they are emerged, young and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MILESTONE	28517	3	12 hours	Dow AgroSciences Canada Inc.

ENTRY # 7

ACTIVE INGREDIENT (A.I.): aminopyralid

Concentration: 52.50%
Formulation: solution
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): metsulfuron-methyl

Concentration: 9.45%
Formulation: solution
WSSA Group: 2

Field Crop Registrations: pastures (mainly grasses)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when they are emerged, young and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CLEARVIEW	29752	3	24 hours	Dow AgroSciences Canada Inc.

ENTRY # 8

ACTIVE INGREDIENT (A.I.): atrazine

Concentration: 480 g/L
Formulation: liquid
WSSA Group: 5

Field Crop Registrations: corn (field, seed and sweet), sorghum and switchgrass
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds and wild oats before or after they emerge.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
AATREX LIQUID 480	18450	3	12 hours	Syngenta Canada Inc.
CONVERGE 480*	26277	3	12 hours	Bayer Crop Science Inc.

*Converge 480 only sold as part of the CONVERGE XT co-pack

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ENTRY # 9

ACTIVE INGREDIENT (A.I.): bentazon

Concentration: 480 g/L
Formulation: liquid
WSSA Group: 6

Field Crop Registrations: alfalfa (seed production), clover (seed production), corn (field, seed and sweet), dry beans, faba beans, flax, millet, sorghum and soybean

Storage Information: Does not need to be stored in a heated building, but it's preferred.

Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BASAGRAN FORTÉ	22006	4	12 hours	BASF Canada Inc.
BROADLOOM	32661		12 hours	United Phosphorus Inc.

ENTRY # 10

ACTIVE INGREDIENT (A.I.): bicyclopyrone

Concentration: 7.1 g/L
Formulation: suspension
WSSA Group: 27

ACTIVE INGREDIENT (A.I.): mesotrione

Concentration: 28.5 g/L
Formulation: suspension
WSSA Group: 27

ACTIVE INGREDIENT (A.I.): s-metolachlor

Concentration: 257 g/L
Formulation: suspension
WSSA Group: 15

ACTIVE INGREDIENT (A.I.): atrazine

Concentration: 120 g/L
Formulation: suspension
WSSA Group: 5

Field Crop Registrations: corn (field, seed and sweet)

Storage Information: Avoid storing ACURON Herbicide below -7°C.

Notes About Control: Controls susceptible broadleaf weeds before or after they emerge. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ACURON Herbicide	31846	4	12 hours	Syngenta Canada Inc.

ENTRY # 11

ACTIVE INGREDIENT (A.I.): bromoxynil

Concentration: 235 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

Field Crop Registrations: barley, corn (field and sweet), flax, rye, triticale, wheat (spring and winter)

Storage Information: Store above 7°C; DO NOT FREEZE.

Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
KORIL 235	25341	3	24 hours	Nufarm Agriculture Inc.

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ENTRY # 12

ACTIVE INGREDIENT (A.I.): **bromoxynil**

Concentration: 240 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

Field Crop Registrations: barley, corn (field and sweet), flax, millet (grain and forage), oats, sorghum (grain and forage), rye, triticale, wheat (spring and winter)

Storage Information: Store above 7°C; DO NOT FREEZE.

Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BROMOTRIL 240 EC	28276	3	24 hours	Adama Canada Ltd.
BROTEX 240, IPCO	28519	3	24 hours	Interprovincial Co-op Ltd.
BROTEX 240, WEEDAWAY	30010	4	24 hours	Interprovincial Co-op Ltd.

ENTRY # 13

ACTIVE INGREDIENT (A.I.): **bromoxynil**

Concentration: 280 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

Field Crop Registrations: barley, canola (pre-plant only), corn (field and sweet), flax, millet (grain and forage), oats, sorghum (grain and forage), rye, triticale, wheat (spring and winter)

Storage Information: Store above 7°C; DO NOT FREEZE.

Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PARDNER	18001	3	24 hours	Bayer Crop Science Inc.

ENTRY # 14

ACTIVE INGREDIENT (A.I.): **bromoxynil**

Concentration: 480 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

Field Crop Registrations: barley, corn (field and sweet), flax, millet (grain and forage), oats, sorghum (grain and forage), rye, triticale, wheat (spring and winter)

Storage Information: Store above 7°C; DO NOT FREEZE.

Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BROMAX	31431	4	24 hours	Loveland Products Canada Inc
BROTEX 480, IPCO	31348	4	24 hours	Interprovincial Co-op Ltd.
BROTEX 480, WEEDAWAY	31429	3	24 hours	Interprovincial Co-op Ltd.

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ENTRY # 15

ACTIVE INGREDIENT (A.I.): bromoxynil
Concentration: 225 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

ACTIVE INGREDIENT (A.I.): MCPA
Concentration: 225 g/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: barley, corn (field and sweet), flax, oats, rye, wheat (spring and winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BADGE II	30370	3	24 hours	Adama Canada Ltd.
LOGIC M, IPCO	28109	3	24 hours	Interprovincial Co-op Ltd.
LOGIC M, WEEDAWAY	30008	3	24 hours	Interprovincial Co-op Ltd.
MEXTROL 450	26999	3	24 hours	Nufarm Agriculture Inc.

ENTRY # 16

ACTIVE INGREDIENT (A.I.): bromoxynil
Concentration: 280 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

ACTIVE INGREDIENT (A.I.): MCPA
Concentration: 280 g/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: barley, corn (field and sweet), flax, oats, rye, wheat (spring and winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BUCTRIL M	18022	3	24 hours	Bayer Crop Science Inc.

ENTRY # 17

ACTIVE INGREDIENT (A.I.): carfentrazone-ethyl
Concentration: 240 g/L
Formulation: emulsifiable concentrate
WSSA Group: 14

Field Crop Registrations: Prior to planting barley, corn (field, popcorn and sweet), dry beans, flax, millet, mustard, oats, rye, sorghum, sunflower, triticale and wheat.
Harvest Aid In: barley, dry bean, millet, oats, sorghum and wheat
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
AIM EC	28573	3	12 hours	Nufarm Agriculture Inc.

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ENTRY # 18

ACTIVE INGREDIENT (A.I.): chlorimuron-ethyl

Concentration: 25%
Formulation: wettable granules
WSSA Group: 2

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing. This herbicide will provide limited control (suppression) of susceptible broadleaf weeds prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CLASSIC 25 DF	25433	3	12 hours	E.I. DuPont Canada Inc.
CHAPERONE	30475	3	12 hours	Nufarm Agriculture Inc.

ENTRY # 19

ACTIVE INGREDIENT (A.I.): chlorimuron-ethyl

Concentration: 25%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): glyphosate

Concentration: 540 g a.e./L
Formulation: solution
WSSA Group: 9

Field Crop Registrations: Pre-plant in all types of soybean, post-emergent in Roundup Ready or Xtend soybean.
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual and perennial grass and broadleaf weeds when they are emerged, small and actively growing. This herbicide will provide limited control (suppression) of susceptible broadleaf weeds prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CLASSIC 25 DF*	25433	3	12 hours	E.I. DuPont Canada Inc.
DUPONT POLARIS MAX*	32504	4	12 hours	E.I. DuPont Canada Inc.

*Co-pack sold under the name: GUARDIAN.

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ENTRY # 20

ACTIVE INGREDIENT (A.I.): chlorimuron-ethyl
Concentration: 25%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): flumioxazin
Concentration: 40.59%
Formulation: solution
WSSA Group: 14

Field Crop Registrations: Pre-plant in all types of soybean.
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Chlorimuron-ethyl will control susceptible broadleaf weeds when they are emerged, and limited control (suppression) of those weeds prior to their emergence. Flumioxazin will control susceptible annual grass and broadleaf weeds prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CHAPERONE*	30475	3	12 hours	Nufarm Agriculture Inc.
VALTERA*	29230	4	12 hours	Nufarm Agriculture Inc.

*Co-pack sold under the name: STEP-UP (contains Chaperone and Valtera).

ENTRY # 21

ACTIVE INGREDIENT (A.I.): chlorimuron-ethyl
Concentration: 25%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): flumioxazin
Concentration: 40.59%
Formulation: wettable granules
WSSA Group: 14

ACTIVE INGREDIENT (A.I.): glyphosate
Concentration: 360 g a.e./L
Formulation: solution
WSSA Group: 9

Field Crop Registrations: Pre-plant in all types of soybean.
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible annual and perennial broadleaf and grassy weeds when they are emerged. This herbicide provides residual control of certain annual grass and broadleaf weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
GUARDIAN PLUS WDG*	31494	3	12 hours	E.I. DuPont Canada Inc.
POLARIS LIQUID HERBICIDE*	29479	4	12 hours	Nufarm Agriculture Inc.

*Co-pack sold under the name: GUARDIAN PLUS II.

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ENTRY # 22

ACTIVE INGREDIENT (A.I.): chlorimuron-ethyl
Concentration: 25%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): imazethapyr
Concentration: 240 g/L
Formulation: solution
WSSA Group: 2

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Chlorimuron-ethyl will control susceptible broadleaf weeds when they are emerged, and limited control (suppression) of susceptible broadleaf weeds prior to their emergence. Imazethapyr will control most susceptible weed species before and after emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CLASSIC GRANDE HERBICIDE*	29416	3	12 hours	E.I. DuPont Canada Inc.
DUPONT IMAZETHAPYR 240*	31156	2	12 hours	E.I. DuPont Canada Inc.

*Co-pack sold under the name: FREESTYLE.

ENTRY # 23

ACTIVE INGREDIENT (A.I.): chlorimuron-ethyl
Concentration: 25%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): metribuzin
Concentration: 75%
Formulation: dry flowable
WSSA Group: 5

Field Crop Registrations: Pre-plant in all types of soybean.
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Chlorimuron-ethyl will control susceptible broadleaf weeds when they are emerged, and limited control (suppression) of susceptible broadleaf weeds prior to their emergence. Metribuzin will controls most susceptible weed species before and after emergence, but there are exceptions so refer to the labelled weed table at the beginning of this chapter.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CLASSIC GRANDE HERBICIDE*	29416	3	12 hours	E.I. DuPont Canada Inc.
TRICOR 75 DF HERBICIDE*	30661	3	12 hours	United Phosphorus Inc.

*Co-pack sold under the name: CANOPY PRO.

ENTRY # 24

ACTIVE INGREDIENT (A.I.): clethodim
Concentration: 120 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: alfalfa, canola, dry bean, flax, mustard and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Clethodim will control susceptible grassy weeds when they are emerged. An adjuvant is included with the formulation of this product, therefore additional adjuvants do not need to be added.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ARROW ALL-IN	33225	3	12 hours	Adama Canada Ltd.

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ENTRY # 25

ACTIVE INGREDIENT (A.I.):
clethodim

Concentration: 240 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: alfalfa, canola, dry bean, flax, mustard and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Clethodim will control susceptible grassy weeds when they are emerged. An adjuvant must be mixed with this active ingredient in order to achieve acceptable control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
SELECT	22625	3	12 hours	Arysta Life Science
STATUE	32885	3	12 hours	NuFarm Agriculture Inc.

ENTRY # 26

ACTIVE INGREDIENT (A.I.):
clomazone

Concentration: 240 g/L
Formulation: microencapsulated suspension
WSSA Group: 13

Field Crop Registrations: canola and soybean
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Control susecptible broadleaf and grassy weeds prior to their emergence. Susceptible weeds may emerge from the soil but are devoid of pigmentation and plant death occurs in a short period of time.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
COMMAND 360 ME	27827	3	12 hours	FMC Corporation

ENTRY # 27

ACTIVE INGREDIENT (A.I.):
clopyralid

Concentration: 360 g/L
Formulation: liquid
WSSA Group: 4

Field Crop Registrations: canola, spring wheat and barley
In Western Canada Lontrel 360 is also registered for use in flax and oats.
Storage Information: Store in a heated building.
Notes About Control: Clopyralid will control susceptible broadleaf weeds when they are emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
LONTREL 360	23545	3	12 hours	Dow AgroSciences Canada Inc.
LONTREL XC	32795	3	12 hours	Dow AgroSciences Canada Inc.

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ENTRY # 28

ACTIVE INGREDIENT (A.I.):
cloransulam-methyl

Concentration: 84%
Formulation: water dispersible granules
WSSA Group: 2

Field Crop Registrations: soybean
Storage Information: Store above 0°C and below 50°C.
Notes About Control: At the low rate, FirstRate controls certain susceptible broadleaf weeds when they are emerged, small and actively growing. At the high rate, FirstRate controls certain susceptible broadleaf weeds prior to emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
FIRSTRATE	26697	3	None stated	Dow AgroSciences Canada Inc.

ENTRY # 29

ACTIVE INGREDIENT (A.I.):
dicamba

Concentration: 600 g a.e./L
Formulation: solution
WSSA Group: 4

Field Crop Registrations: barley (spring), corn, oats, pastures, soybean (Xtend varieties only), wheat (spring, winter) and rye
Storage Information: Cannot be stored at temperatures at or below 0°C.
Notes About Control: Engenia will control susceptible annual and perennial broadleaf weeds when they are emerged, young and actively growing. Engenia will also control species prior to their emergence, higher rates will provide longer (~3-4 weeks) of residual weed control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ENGENIA	32220	3	12 hours	BASF Canada Inc.

ENTRY # 30

ACTIVE INGREDIENT (A.I.):
dicamba

Concentration: 350 g a.e./L
Formulation: solution
WSSA Group: 4

Field Crop Registrations: barley (spring), corn, oats, pastures, soybean (Xtend varieties only), wheat (spring, winter) and rye
Storage Information: Cannot be stored at temperatures at or below 0°C.
Notes About Control: Engenia will control susceptible annual and perennial broadleaf weeds when they are emerged, young and actively growing. Xtendimax will also control species prior to their emergence, higher rates will provide longer (~3-4 weeks) of residual weed control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
XTENDIMAX	31896	3	12 hours	Monsanto Canada Inc.
FEXAPAN	32188	3	12 hours	E.I. DuPont Canada Inc.

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ENTRY # 31

ACTIVE INGREDIENT (A.I.): dicamba
Concentration: 132 g a.e./L
Formulation: suspension
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): atrazine
Concentration: 261 g/L
Formulation: suspension
WSSA Group: 5

Field Crop Registrations: corn (field)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Most labelled weeds are controlled when Marksman is applied prior to or after their emergence. There are exceptions. Spreading atriplex is only controlled when Marksman is applied prior to its emergence, while volunteer adzuki beans, waterhemp and biennial wormwood must be emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MARKSMAN	19349	3	12 hours	BASF Canada Inc.

ENTRY # 32

ACTIVE INGREDIENT (A.I.): dicamba
Concentration: 134 g a.e./L
Formulation: capsule suspension
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): s-metolachlor
Concentration: 271 g/L
Formulation: capsule suspension
WSSA Group: 15

Field Crop Registrations: Pre-plant and pre-emergent to soybean (Xtend varieties only)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Tavium will control emerged susceptible broafleaf weeds as well as provide residual broadleaf and grassy weed control. Tavium will not control grassy weeds that are past the first leaf stage of growth.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
TAVIUM	33268	3	12 hours	Syngenta Canada Inc.

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ENTRY # 33

ACTIVE INGREDIENT (A.I.): dichlorprop-p
Concentration: 210 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): 2,4-D
Concentration: 400 g ae/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: barley (spring) and wheat (spring, winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ESTAPROP XT*	29660	3	12 hours	Nufarm Agriculture Inc.
IPCO DICHLORPROP-DX**	29664	3	12 hours	Interprovincial Co-op Ltd.

ENTRY # 34

ACTIVE INGREDIENT (A.I.): dichlorprop-p
Concentration: 300 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): 2,4-D
Concentration: 282 g ae/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: barley (spring) and wheat (spring, winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
IPCO DICHLORPROP-D	27966	3	12 hours	Interprovincial Co-op Ltd.
TURBOPROP	27967	3	12 hours	Loveland Products Canada Inc

ENTRY # 35

ACTIVE INGREDIENT (A.I.): difluenzopyr
Concentration: 20%
Formulation: wettable granules
WSSA Group: 19

ACTIVE INGREDIENT (A.I.): dicamba
Concentration: 50%
Formulation: wettable granules
WSSA Group: 4

Field Crop Registrations: corn (field)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when they are emerged, small and actively growing.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
DISTINCT	25811	2	12 hours	BASF Canada Inc.

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ENTRY # 36

ACTIVE INGREDIENT (A.I.): dimethenamid-p

Concentration: 720 g/L
Formulation: emulsifiable concentrate
WSSA Group: 15

Field Crop Registrations: corn (field, seed and sweet), dry common beans, peanuts and soybean
Storage Information: Store above 5°C.
Notes About Control: Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
FRONTIER MAX	29194	3	24 hours	BASF Canada Inc.

ENTRY # 37

ACTIVE INGREDIENT (A.I.): dimethenamid-p

Concentration: 630 g/L
Formulation: emulsifiable concentrate
WSSA Group: 15

ACTIVE INGREDIENT (A.I.): topramezone

Concentration: 12.5 g/L
Formulation: emulsifiable concentrate
WSSA Group: 27

Field Crop Registrations: corn (field, seed and sweet)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf weeds. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ARMEZON PRO	32148	3	24 hours	BASF Canada Inc.

ENTRY # 38

ACTIVE INGREDIENT (A.I.): diquat

Concentration: 240 g/L
Formulation: solution
WSSA Group: 15

Field Crop Registrations: desiccation of adzuki beans, canola, flax, kidney beans, soybean, sunflower and white bean
Storage Information: Store above 0°C. If crystallization occurs because of storage below this, warm to room temperature and agitate gently until reconstituted.
Notes About Control: Controls most emerged grass and broadleaf weeds and top growth control of perennial weeds. Effectiveness of this desiccant is improved when applications are made on cloudy days or prior to periods of darkness.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
REGLONE	26396	3	24 hours	Syngenta Canada Inc.
BOLSTER	32540	3	24 hours	Interprovincial Co-op Ltd.

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ENTRY # 39

ACTIVE INGREDIENT (A.I.): EPTC

Concentration: 800 g/L
Formulation: emulsifiable concentrate
WSSA Group: 8

Field Crop Registrations: alfalfa, bird's-foot trefoil, dry common beans, flax and sunflowers
Storage Information: Can be stored at temperatures as low as minus 45°C.
Notes About Control: Controls susceptible broadleaf and grassy weeds before they emerge.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
EPTAM LIQUID EC	11284	4	24 hours	Gowan Company LLC

ENTRY # 40

ACTIVE INGREDIENT (A.I.): ethametsulfuron-methyl

Concentration: 75%
Formulation: dry flowable
WSSA Group: 2

Field Crop Registrations: canola and sunflower
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds after they emerge.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MUSTER	23569	4	12 hours	E.I. DuPont Canada Inc.

ENTRY # 41

ACTIVE INGREDIENT (A.I.): fenoxaprop-p-ethyl

Concentration: 90 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: barley (spring), wheat (spring)
Storage Information: Cannot be stored at temperatures at or below 0°C.
Notes About Control: Controls emerged susceptible grassy weeds. Contains a safener that allows the active ingredient to be safely applied to cereals. However, corn is susceptible to this herbicide.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PUMA ADVANCE	29615	4	12 hours	Bayer Crop Science Inc.

ENTRY # 42

ACTIVE INGREDIENT (A.I.): fenoxaprop-p-ethyl

Concentration: 120 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: barley (spring), wheat (spring)
Storage Information: Cannot be stored at temperatures at or below 0°C.
Notes About Control: Controls emerged susceptible grassy weeds. Contains a safener that allows the active ingredient to be safely applied to cereals. However, corn is susceptible to this herbicide.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BENGAL WB	30843	3	12 hours	Adama Canada Ltd.
VIGIL, IPCO	29273	4	12 hours	Interprovincial Co-op Ltd.

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ENTRY # 43

ACTIVE INGREDIENT (A.I.):
fluazifop-p-butyl

Concentration: 125 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: alfalfa, bird's-foot trefoil, canola, clover (red), dry edible beans, flax, lentils, mustard, peas, soybean, sugar beets, sunflowers and tobacco
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible grassy weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
VENTURE L	21209	2	12 hours	Syngenta Canada Inc.

ENTRY # 44

ACTIVE INGREDIENT (A.I.):
flumetsulam

Concentration: 80%
Formulation: wettable granules
WSSA Group: 2

Field Crop Registrations: corn (field) and soybean
Storage Information: Do not store at temperatures above 50°C.
Notes About Control: Controls susceptible broadleaf weeds before and after their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BROADSTRIKE RC	27004	3	12 hours	Dow AgroSciences Canada Inc.

ENTRY # 45

ACTIVE INGREDIENT (A.I.):
flumioxazin

Concentration: 51.1%
Formulation: water dispersible granules
WSSA Group: 14

Field Crop Registrations: chickpea, corn (field), lentils, pea (field), soybean and wheat (spring). Harvest Aid in dry bean, dry pea and wheat
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible grass and broadleaf weeds before they emerge.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
VALTERA	29230	4	12 hours	Valent Canada Inc.

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ENTRY # 46

ACTIVE INGREDIENT (A.I.):	
flumioxazin	**Concentration:** 51.1% **Formulation:** water dispersible granules **WSSA Group:** 14
ACTIVE INGREDIENT (A.I.): metribuzin	**Concentration:** 75% **Formulation:** dry flowable **WSSA Group:** 5
ACTIVE INGREDIENT (A.I.): imazethapyr	**Concentration:** 240 g/L **Formulation:** solution **WSSA Group:** 2

Field Crop Registrations: soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible grass and broadleaf weeds before and after they have emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
VALTERA*	29230	4	12 hours	Valent Canada Inc.
TRICOR 75 DF*	30661	3	12 hours	United Phosphorus Inc.
NU-IMAGE*	30420	2	12 hours	Nufarm Agriculture Inc.

*Co-pack sold under the name: TRIACTOR.

ENTRY # 47

ACTIVE INGREDIENT (A.I.):	
flumioxazin	**Concentration:** 33.5% **Formulation:** wettable granules **WSSA Group:** 14
ACTIVE INGREDIENT (A.I.): pyroxasulfone	**Concentration:** 42.5% **Formulation:** wettable granules **WSSA Group:** 15

Field Crop Registrations: corn (field), soybean and wheat (spring)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible grass and broadleaf weeds before they emerge.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
FIERCE	31117	2	12 hours	Valent Canada Inc.

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ENTRY # 48

ACTIVE INGREDIENT (A.I.): fluroxypyr
Concentration: 180 g/L
Formulation: emulsifiable concentrate
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): MCPA
Concentration: 600 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: barley, wheat (spring and winter)
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
NUFARM FLUROXYPYR*	30194	3	12 hours	Nufarm Agriculture Inc.
MCPA ESTER 600*	27803	3	12 hours	Nufarm Agriculture Inc.

*Co-pack sold under the name: TROPHY.

ENTRY # 49

ACTIVE INGREDIENT (A.I.): fluroxypyr
Concentration: 80 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): bromoxynil
Concentration: 200 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

ACTIVE INGREDIENT (A.I.): MCPA
Concentration: 200 g/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: barley, wheat (spring and winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ENFORCER M	30691	3	24 hours	Nufarm Agriculture Inc.

ENTRY # 50

ACTIVE INGREDIENT (A.I.): fomesafen
Concentration: 240 g/L
Formulation: liquid
WSSA Group: 14

Field Crop Registrations: dry edible beans and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds when emerged and residual control of redroot pigweed and common ragweed. An adjuvant (Turbocharge) must be added to Reflex in order to achieve control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
REFLEX	24779	3	12 hours	Syngenta Canada Inc.

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ENTRY # 51

ACTIVE INGREDIENT (A.I.): fomesafen
Concentration: 67 g/L
Formulation: solution
WSSA Group: 14

ACTIVE INGREDIENT (A.I.): glyphosate
Concentration: 271 g/L
Formulation: solution
WSSA Group: 9

Field Crop Registrations: soybean (pre-plant only), glyphosate tolerant soybean (pre-plant and post)
Storage Information: Store above -10°C.
Notes About Control: Controls several emerged grass and broadleaf weeds and residual control of redroot pigweed and common ragweed.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
FLEXSTAR GT	30412	3	12 hours	Syngenta Canada Inc.

ENTRY # 52

ACTIVE INGREDIENT (A.I.): foramsulfuron
Concentration: 22.5 g/L
Formulation: liquid
WSSA Group: 2

Field Crop Registrations: corn (field)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf and grassy weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
OPTION 2.25 OD	27424	4	12 hours	Bayer Crop Science Inc.

ENTRY # 53

ACTIVE INGREDIENT (A.I.): glufosinate ammonium
Concentration: 150 g/L
Formulation: liquid
WSSA Group: 2

Field Crop Registrations: Use as a desiccant in dry common beans.
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Will uniformly dry down crops and weeds, facilitating harvest and preventing bean staining. Speed of action is reduced at cool temperatures (below 10°C), poor moisture and low humidity.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
IGINITE SN	28532	4	12 hours	Bayer Crop Science Inc.

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ENTRY # 54

ACTIVE INGREDIENT (A.I.):
glufosinate ammonium

Concentration: 200 g/L
Formulation: liquid
WSSA Group: 2

Field Crop Registrations: Only to glufosinate ammonium tolerant (Liberty-Link) canola, corn and soybean cultivars.
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls emerged susceptible broadleaf and grassy weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
LIBERTY 200 SN	25337	4	24 hours	Bayer Crop Science Inc.

ENTRY # 55

ACTIVE INGREDIENT (A.I.):
glyphosate

Concentration: 360, 450, 480, 540 g/L
Formulation: liquid
WSSA Group: 9

Field Crop Registrations: Prior to planting or the emergence of all field crops. Can be applied post-emergence to glyphosate tolerant (Roundup Ready or Enlist) corn (field, sweet) and soybean cultivars; glyphosate tolerant (Roundup Ready) alfalfa, canola and sugar beet cultivars.
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf and grassy weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
360 G/L PRODUCTS				
GLYFOS**	29124	4	12 hours	FMC Corporation
450 G/L PRODUCTS				
CREDIT 45**	29124	4	12 hours	Nufarm Agriculture Inc.
480 G/L PRODUCTS				
MATRIX**	27988	4	12 hours	Interprovincial Co-op Ltd.
VP480**	28840	4	12 hours	Dow AgroSciences Canada Inc.
540 G/L PRODUCTS				
CREDIT XTREME**	29124	4	12 hours	Nufarm Agriculture Inc.
DUPONT POLARIS MAX	32504	4	12 hours	E.I. DuPont Canada Inc.
FACTOR 540, IPCO*	27988	4	12 hours	Interprovincial Co-op Ltd.
ROUNDUP TRANSORB HC	28198	4	12 hours	Monsanto Canada Inc.
ROUNDUP WEATHERMAX	27487	4	12 hours	Monsanto Canada Inc.

*Not labelled for use on Roundup Ready alfalfa.
**Not labelled for use on Roundup Ready alfalfa and sugar beets.

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ENTRY # 56

ACTIVE INGREDIENT (A.I.):	
glyphosate	**Concentration:** 250 g/L **Formulation:** solution **WSSA Group:** 9
ACTIVE INGREDIENT (A.I.): s-metolachlor	**Concentration:** 250 g/L **Formulation:** solution **WSSA Group:** 15
ACTIVE INGREDIENT (A.I.): meostrione	**Concentration:** 25 g/L **Formulation:** solution **WSSA Group:** 27

Field Crop Registrations: glyphosate tolerant (e.g., Roundup Ready, Enlist) field corn
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf and grassy weeds before and after they have emerged. In other words, this herbicide provides both contact and residual weed control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
HALEX GT	29341	4	12 hours	Syngenta Canada Inc.

ENTRY # 57

ACTIVE INGREDIENT (A.I.):	
halauxifen	**Concentration:** 16.25 g/L **Formulation:** emulsifiable concentrate **WSSA Group:** 4
ACTIVE INGREDIENT (A.I.): fluroxypyr	**Concentration:** 250 g/L **Formulation:** emulsifiable concentrate **WSSA Group:** 4
ACTIVE INGREDIENT (A.I.): MCPA	**Concentration:** 600 g a.e./L **Formulation:** emulsifiable concentrate **WSSA Group:** 4

Field Crop Registrations: barley (spring) and wheat (spring, winter)
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PIXXARO A*	31303	3	12 hours	Dow AgroSciences Canada Inc.
MCPA ESTER 600*	27803	3	12 hours	Nufarm Agriculture Inc.

*Co-pack sold under the name: PIXXARO.

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ENTRY # 58

ACTIVE INGREDIENT (A.I.):
halauxifen

Concentration: 68.5 g/L
Formulation: suspension concentrate
WSSA Group: 4

Field Crop Registrations: pre-plant burndown ahead of field corn and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible emerged broadleaf weeds. Elevore will not control weeds that emerge after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ELEVORE	32948	3	12 hours	Gowan Canada

ENTRY # 59

ACTIVE INGREDIENT (A.I.):
halosulfuron

Concentration: 72.6%
Formulation: wettable granules
WSSA Group: 2

Field Crop Registrations: dry edible beans (PRE and POST), corn (POST: field, pop, seed and sweet)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf and grassy weeds before and after they have emerged. In other words, this herbicide provides both contact and residual weed control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PERMIT WG	31210	3	12 hours	Gowan Canada

ENTRY # 60

ACTIVE INGREDIENT (A.I.):
imazethapyr

Concentration: 240 g/L
Formulation: solution
WSSA Group: 2

Field Crop Registrations: adzuki beans, alfalfa (seed), dry edible beans, lima beans and soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: With early pre-plant and pre-emergent treatments, susceptible weeds emerge, are present as stunted plants and then die. When applied post-emergence, absorption may occur through both the roots and foliage. Susceptible weeds stop growing and eventually die.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PURSUIT	21537	2	12 hours	BASF Canada Inc.
PHANTOM 240	30017	2	12 hours	Adama Canada Ltd.
NU-IMAGE	30420	2	12 hours	Nufarm Agriculture Inc.
DUPONT IMAZETHAPYR 240	31156	2	12 hours	E.I. DuPont Canada Inc.

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ENTRY # 61

ACTIVE INGREDIENT (A.I.): imazethapyr
Concentration: 240 g/L
Formulation: solution
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): bentazon
Concentration: 480 g/L
Formulation: liquid
WSSA Group: 6

Field Crop Registrations: soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls emerged susceptible grass and broadleaf weeds and the imazethapyr component will also provide residual control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PURSUIT*	21537	2	12 hours	BASF Canada Inc.
BASAGRAN FORTÉ*	22006	4	12 hours	BASF Canada Inc.

*Co-pack sold under the name: CLEANSWEEP.

ENTRY # 62

ACTIVE INGREDIENT (A.I.): imazethapyr
Concentration: 240 g/L
Formulation: solution
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): glyphosate
Concentration: 540 g/L
Formulation: liquid
WSSA Group: 9

Field Crop Registrations: soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls emerged susceptible grass and broadleaf weeds and the imazethapyr component will also provide residual control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PURSUIT*	21537	2	12 hours	BASF Canada Inc.
ROUNDUP WEATHERMAX*	27487	4	12 hours	Monsanto Canada Inc.

*Co-pack sold under the name: ASSIGNMENT.

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ENTRY # 63

ACTIVE INGREDIENT (A.I.): imazethapyr
Concentration: 240 g/L
Formulation: solution
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): metribuzin
Concentration: 480 g/L
Formulation: liquid
WSSA Group: 5

Field Crop Registrations: soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls emerged susceptible grass and broadleaf weeds and the imazethapyr component will also provide residual control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PURSUIT*	21537	2	12 hours	BASF Canada Inc.
SENCOR FOR Soybean*	29346	3	12 hours	Bayer Crop Science Inc.

*Co-pack sold under the name: CONQUEST LQ.

ENTRY # 64

ACTIVE INGREDIENT (A.I.): isoxaflutole
Concentration: 240 g/L
Formulation: solution
WSSA Group: 27

ACTIVE INGREDIENT (A.I.): atrazine
Concentration: 480 g/L
Formulation: liquid
WSSA Group: 5

Field Crop Registrations: corn (field, seed)
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: When activated by rainfall susceptible grassy and broadleaf weed seedlings that have germinated or that are up to 5 cm in height will be controlled.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CONVERGE FLEXX*	29071	2	12 hours	Bayer Crop Science Inc.
CONVERGE 480*	26277	3	12 hours	Bayer Crop Science Inc.

*Co-pack sold under the name: CONVERGE XT.

ENTRY # 65

ACTIVE INGREDIENT (A.I.): linuron
Concentration: 480 g/L
Formulation: liquid suspension
WSSA Group: 6

Field Crop Registrations: corn (PRE/POST), oats (POST), soybean (PRE) and wheat (POST)
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: When activated by rainfall susceptible grassy and broadleaf weed seedlings that have germinated will be controlled.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
LOROX L	16279	2	12 hours	Tessenderlo Kerley Inc.

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ENTRY # 66

ACTIVE INGREDIENT (A.I.): **MCPA**

Concentration: 500 g a.e./L
Formulation: liquid
WSSA Group: 4

Field Crop Registrations: cereals (barley, oats, rye and wheat) and corn (field), flax and pastures
Storage Information: Store at temperatures above 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MCPA AMINE 500	9516	4	12 hours	Loveland Products Canada Inc
MCPA AMINE 500, IPCO	20308	4	12 hours	Interprovincial Co-op Ltd.
MCPA AMINE 500, NUFARM	14730	4	12 hours	Nufarm Agriculture Inc.
MCPA AMINE 500, WEEDAWAY	21934	4	12 hours	Interprovincial Co-op Ltd.

ENTRY # 67

ACTIVE INGREDIENT (A.I.): **MCPA**

Concentration: 600 g a.e./L
Formulation: liquid
WSSA Group: 4

Field Crop Registrations: cereals (barley, oats, rye and wheat) and corn (field), flax and pastures
Storage Information: Store at temperatures above 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MCPA AMINE 600	31432	3	12 hours	Loveland Products Canada Inc
MCPA AMINE 600, IPCO	31327	3	12 hours	Interprovincial Co-op Ltd.
MCPA AMINE 600, NUFARM	28384	3	12 hours	Nufarm Agriculture Inc.
MCPA AMINE 600, WEEDAWAY	31430	3	12 hours	Interprovincial Co-op Ltd.

ENTRY # 68

ACTIVE INGREDIENT (A.I.): **MCPA**

Concentration: 600 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: cereals (barley, oats, rye and wheat) and corn (field), flax and pastures
Storage Information: Store at temperatures above 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MCPA ESTER 600, IPCO	27802	3	12 hours	Interprovincial Co-op Ltd.
MCPA ESTER 600, NUFARM	27803	3	12 hours	Nufarm Agriculture Inc.
MCPA ESTER 600, CHECKMATE	27804	3	12 hours	Loveland Products Canada Inc
MCPA ESTER 600, WEEDAWAY	29002	3	12 hours	Interprovincial Co-op Ltd.

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ENTRY # 69

ACTIVE INGREDIENT (A.I.): MCPA

Concentration: 300 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: alfalfa, bird's-foot trefoil, cereals (barley, oats, rye and wheat) and corn (field), flax and pastures
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
MCPA SODIUM 300, NUFARM	9858	4	12 hours	Nufarm Agriculture Inc.
MCPA SODIUM 300	14718	4	12 hours	Loveland Products Canada Inc

ENTRY # 70

ACTIVE INGREDIENT (A.I.): MCPB

Concentration: 375 g a.e./L
Formulation: liquid
WSSA Group: 4

ACTIVE INGREDIENT (A.I.): MCPA

Concentration: 25 g a.e./L
Formulation: liquid
WSSA Group: 4

Field Crop Registrations: cereals (barley, oats, rye and wheat), clover (seedling), corn (field), peas and pastures
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible annual and perennial broadleaf weeds when emerged. This herbicide does not control weed species prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
TROPOTOX PLUS 400	8211	4	12 hours	Nufarm Agriculture Inc.
TOPSIDE	14718	4	12 hours	Loveland Products Canada Inc
CLOVITOX PLUS, IPCO	22003	4	12 hours	Interprovincial Co-op Ltd.
CLOVITOX PLUS, WEEDAWAY	26488	4	12 hours	Interprovincial Co-op Ltd.

ENTRY # 71

ACTIVE INGREDIENT (A.I.): mesotrione

Concentration: 480 g/L
Formulation: suspension
WSSA Group: 27

Field Crop Registrations: corn (field, seed and sweet), flax, millet (pearl) and sorghum
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Has residual soil activity that will control germinated susceptible broadleaf weed seedlings during pre-emergent applications. Is absorbed through the leaves and is rapidly translocated to the plant's growing points when applied to emerged sensitive broadleaf weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CALLISTO 480SC	27833	3	12 hours	Syngenta Canada Inc.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

ENTRY # 72

ACTIVE INGREDIENT (A.I.): mesotrione
Concentration: 45.5 g/L
Formulation: suspension
WSSA Group: 27

ACTIVE INGREDIENT (A.I.): glyphosate
Concentration: 455 g/L
Formulation: suspension
WSSA Group: 9

Field Crop Registrations: corn (field, seed and sweet), flax, millet (pearl) and sorghum
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf and grassy weeds and the mesotrione component has residual soil activity that will control germinated susceptible broadleaf weed seedlings.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
CALLISTO GT	31711	3	12 hours	Syngenta Canada Inc.

ENTRY # 73

ACTIVE INGREDIENT (A.I.): metribuzin
Concentration: 75%
Formulation: dry flowable
WSSA Group: 5

Field Crop Registrations: corn (field) and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Has residual soil activity that will control germinated susceptible broadleaf weed seedlings during pre-emergent applications. Is absorbed through the leaves and is rapidly translocated to the plant's growing points when applied to emerged sensitive broadleaf weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
SENCOR 75 DF	17242	3	12 hours	Bayer Crop Science Inc.
TRICOR 75 DF	30661	3	12 hours	United Phosphorus Inc.
SQUADRON	32081	3	12 hours	Adama Canada Ltd.

ENTRY # 74

ACTIVE INGREDIENT (A.I.): metribuzin
Concentration: 75%
Formulation: dry flowable
WSSA Group: 5

ACTIVE INGREDIENT (A.I.): flumioxazin
Concentration: 51.1%
Formulation: water dispersible granules
WSSA Group: 14

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible grass and broadleaf weeds before they have emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
TRICOR 75 DF*	30661	3	12 hours	United Phosphorus Inc.
VALTERA*	29230	4	12 hours	Valent Canada Inc.

*Co-pack sold under the name: BIFECTA (sold by Nufarm Agriculture Inc.).

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ENTRY # 75

ACTIVE INGREDIENT (A.I.): nicosulfuron

Concentration: 75%
Formulation: dry flowable
WSSA Group: 2

Field Crop Registrations: corn (field, sweet)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible grassy weeds. Weeds that emerge following application will not be controlled. An adjuvant must be added to achieve control of grassy weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ACCENT 75 DF	25116	3	12 hours	E.I. DuPont Canada Inc.

ENTRY # 76

ACTIVE INGREDIENT (A.I.): nicosulfuron

Concentration: 37.5%
Formulation: dry flowable
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): rimsulfuron

Concentration: 37.5%
Formulation: dry flowable
WSSA Group: 2

Field Crop Registrations: corn (field, sweet)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible grassy weeds. Weeds that emerge following application will not be controlled. An adjuvant must be added to achieve control of grassy weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ULTIM 75 DF	24736	3	12 hours	E.I. DuPont Canada Inc.
DUPONT ULTIM GRANDE	32709	3	12 hours	E.I. DuPont Canada Inc.

ENTRY # 77

ACTIVE INGREDIENT (A.I.): pendimethalin

Concentration: 455 g/L
Formulation: microcapsule suspension
WSSA Group: 3

Field Crop Registrations: corn (field), dry beans (adzuki, kidney, lima, snap and white) and soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible broadleaf and grassy weeds prior to their emergence. This herbicide will not controlled emerged weed species.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PROWL H2O	29542	3	12 hours	BASF Canada Inc.

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ENTRY # 78

ACTIVE INGREDIENT (A.I.): pinoxden

Concentration: 50 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: barley, wheat (spring and winter)
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible grassy weeds after they have emerged. Will not control weeds that emerge after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
AXIAL	30431	3	12 hours	Syngenta Canada Inc.

ENTRY # 79

ACTIVE INGREDIENT (A.I.): prosulfuron

Concentration: 75%
Formulation: water dispersible granular
WSSA Group: 2

Field Crop Registrations: corn (field, seed), millet, sorghum and wheat (winter)
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged. Will not control weeds that emerge after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PEAK 75WG	30431	3	12 hours	Syngenta Canada Inc.

ENTRY # 80

ACTIVE INGREDIENT (A.I.): pyraflufen-ethyl

Concentration: 6.1 g/L
Formulation: emulsifiable concentrate
WSSA Group: 14

ACTIVE INGREDIENT (A.I.): 2,4-D Ester

Concentration: 473 g a.e./L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: Prior to emergence of: barley, corn (field), rye, soybean, triticale and wheat (spring, winter).
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf weeds. Weeds that emerge following application will not be controlled.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BLACKHAWK	32111	3	12 hours	Nufarm Agriculture Inc.

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ENTRY # 81

ACTIVE INGREDIENT (A.I.): pyrasulfotole
Concentration: 37.5 g/L
Formulation: emulsifiable concentrate
WSSA Group: 27

ACTIVE INGREDIENT (A.I.): bromoxynil
Concentration: 210 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

Field Crop Registrations: Prior to emergence of: barley (spring), triticale and wheat (spring, winter).
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf weeds. Weeds that emerge following application will not be controlled.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
INFINITY	28738	3	12 hours	Bayer Crop Science Inc.

ENTRY # 82

ACTIVE INGREDIENT (A.I.): pyrasulfotole
Concentration: 31.5 g/L
Formulation: emulsifiable concentrate
WSSA Group: 27

ACTIVE INGREDIENT (A.I.): bromoxynil
Concentration: 174.3 g/L
Formulation: emulsifiable concentrate
WSSA Group: 6

ACTIVE INGREDIENT (A.I.): fluroxypyr
Concentration: 72 g/L
Formulation: emulsifiable concentrate
WSSA Group: 4

Field Crop Registrations: Prior to emergence of: barley (spring), triticale and wheat (spring, winter).
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls emerged susceptible broadleaf weeds. Weeds that emerge following application will not be controlled.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
INFINITY FX	33248	3	24 hours	Bayer Crop Science Inc.

ENTRY # 83

ACTIVE INGREDIENT (A.I.): pyroxasulfone
Concentration: 500 g/L
Formulation: suspension concentrate
WSSA Group: 15

Field Crop Registrations: corn (field) and soybean
Storage Information: Do not store at temperatures at or below 0°C.
Notes About Control: Controls susceptible grassy and broadleaf weeds before they emerge. This herbicide will not control emerged weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ZIDUA SC	32542	2	12 hours	BASF Canada Inc.

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ENTRY # 84

ACTIVE INGREDIENT (A.I.): pyroxasulfone
Concentration: 447 g/L
Formulation: suspension emulsion
WSSA Group: 15

ACTIVE INGREDIENT (A.I.): carfentrazone-ethyl
Concentration: 53 g/L
Formulation: Suspension emulsion
WSSA Group: 14

Field Crop Registrations: Prior to emergence of: corn (field), soybean and wheat (spring, winter).
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible broadleaf and grassy weeds prior to their emergence. This herbicide will not controlled emerged weed species.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
FOCUS	32292	2	12 hours	FMC Corporation

ENTRY # 85

ACTIVE INGREDIENT (A.I.): pyroxasulfone
Concentration: 250 g/L
Formulation: suspension concentrate
WSSA Group: 15

ACTIVE INGREDIENT (A.I.): sulfentrazone
Concentration: 250 g/L
Formulation: suspension concentrate
WSSA Group: 14

Field Crop Registrations: chickpeas, field pea and soybean
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grassy and broadleaf weeds before they emerge. This herbicide will not control emerged weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
AUTHORITY SUPREME	32562	2	12 hours	FMC Corporation

ENTRY # 86

ACTIVE INGREDIENT (A.I.): pyroxsulam
Concentration: 21.5%
Formulation: wettable granules
WSSA Group: 2

Field Crop Registrations: wheat (spring, winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf and grassy weeds after they have emerged. Will not control weeds that emerge after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
SIMPLICITY GoDRI	31916	3	12 hours	Dow AgroSciences Canada Inc.

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ENTRY # 87

ACTIVE INGREDIENT (A.I.): quizalofop-p-butyl

Concentration: 96 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: camelina, canola, corn (ENLIST hybrids only), dry common beans, faba beans, flax, hemp (industrial), mustard, soybean, sugarbeets and sunflower

Storage Information: Store above 5°C to keep product from freezing.

Notes About Control: Controls susceptible grassy weeds after they have emerged. Will not control weeds that emerge after application. An adjuvant must be added to this herbicide to achieve desired weed control.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ASSURE II	25462	3	12 hours	E.I. DuPont Canada Inc.
CONTENDER	32091	3	12 hours	Interprovincial Co-op Ltd.
YUMA GL	30100	3	12 hours	Gowan Canada

ENTRY # 88

ACTIVE INGREDIENT (A.I.): rimsulfuron

Concentration: 5.45%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): mesotrione

Concentration: 36.36%
Formulation: wettable granules
WSSA Group: 27

Field Crop Registrations: corn (field), a built in crop safener allows this product to be applie POST from the 3 to 8 leaf stage of corn

Storage Information: Does not need to be stored in a heated building, but it's preferred.

Notes About Control: Controls emerged susceptible grassy and broadleaf weeds. Will provide residual control of susceptible weeds prior to their emergence. This product contains a crop safener.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
DESTRA IS	32626	3	12 hours	E.I. DuPont Canada Inc.

ENTRY # 89

ACTIVE INGREDIENT (A.I.): rimsulfuron

Concentration: 5%
Formulation: wettable granules
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): mesotrione

Concentration: 40%
Formulation: wettable granules
WSSA Group: 27

Field Crop Registrations: corn (field), applied pre-emergence until the 2 leaf stage of corn

Storage Information: Does not need to be stored in a heated building, but it's preferred.

Notes About Control: Controls emerged susceptible grassy and broadleaf weeds. Will provide residual control of susceptible weeds prior to their emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ENGARDE POST	31596	3	12 hours	E.I. DuPont Canada Inc.

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ENTRY # 90

ACTIVE INGREDIENT (A.I.): saflufenacil

Concentration: 342 g/L
Formulation: suspension
WSSA Group: 14

Field Crop Registrations: pre-plant, pre-emergent in barley, corn, soybean and wheat (spring, winter); pre-harvest weed management in barley, triticale and wheat; harvest aid in canola, dry beans and soybean
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grassy weeds after they have emerged. Will not control weeds that emerge after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ERAGON LQ	31469	3	12 hours	BASF Canada Inc.

ENTRY # 91

ACTIVE INGREDIENT (A.I.): saflufenacil

Concentration: 68 g/L
Formulation: emulsifiable concentrate
WSSA Group: 14

ACTIVE INGREDIENT (A.I.): dimethenamid-P

Concentration: 600 g/L
Formulation: emulsifiable concentrate
WSSA Group: 15

Field Crop Registrations: corn (field, sweet) and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf and grassy weeds prior to their emergence. Will also provide control of emerged susceptible broadleaf weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
INTEGRITY	29371	3	12 hours	BASF Canada Inc.

ENTRY # 92

ACTIVE INGREDIENT (A.I.): saflufenacil

Concentration: 17.8%
Formulation: water dispersible granules
WSSA Group: 14

ACTIVE INGREDIENT (A.I.): imazethapyr

Concentration: 50.2%
Formulation: water dispersible granules
WSSA Group: 2

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf and grassy weeds prior to their emergence. Will also provide control of emerged susceptible broadleaf weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
OPTILL	30756	2	12 hours	BASF Canada Inc.

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ENTRY # 93

ACTIVE INGREDIENT (A.I.): sethoxydim

Concentration: 450 g/L
Formulation: emulsifiable concentrate
WSSA Group: 1

Field Crop Registrations: buckwheat, canola, chickpeas, dry common beans, faba beans, flax, mustard, safflower, soybean, sugarbeets and sunflower
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible grassy weeds after they have emerged. Will not control weeds that emerge after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
POAST ULTRA	24835	4	12 hours	BASF Canada Inc.

ENTRY # 94

ACTIVE INGREDIENT (A.I.): simazine

Concentration: 90%
Formulation: water dispersible granules
WSSA Group: 5

Field Crop Registrations: alfalfa, bird's-foot trefoil and corn
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible grassy and broadleaf weeds before they have emerged. Will not control weeds after they have emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PRINCEP NINE-T	16370	3	12 hours	Syngenta Canada Inc.

ENTRY # 95

ACTIVE INGREDIENT (A.I.): s-metolachlor

Concentration: 915 g/L
Formulation: emulsifiable concentrate
WSSA Group: 15

Field Crop Registrations: corn (field, seed and sweet), dry common beans, millet and soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible grassy and broadleaf weeds before they have emerged. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
DUAL II MAGNUM	25729	4	12 hours	Syngenta Canada Inc.

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ENTRY # 96

ACTIVE INGREDIENT (A.I.):	
s-metolachlor	**Concentration:** 400 g/L **Formulation:** liquid **WSSA Group:** 15
atrazine	**Concentration:** 320 g/L **Formulation:** liquid **WSSA Group:** 5

Field Crop Registrations: corn (field, seed and sweet)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds before or after they emerge. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PRIMEXTRA II MAGNUM	25730	3	12 hours	Syngenta Canada Inc.

ENTRY # 97

ACTIVE INGREDIENT (A.I.):	
s-metolachlor	**Concentration:** 298 g/L **Formulation:** suspension **WSSA Group:** 15
atrazine	**Concentration:** 112 g/L **Formulation:** suspension **WSSA Group:** 5
mesotrione	**Concentration:** 29.8 g/L **Formulation:** suspension **WSSA Group:** 27

Field Crop Registrations: corn (field, seed and sweet)
Storage Information: Avoid storing LUMAX EZ Herbicide below -10 °C.
Notes About Control: Controls susceptible broadleaf weeds before or after they emerge. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
LUMAX EZ	30864	3	12 hours	Syngenta Canada Inc.

ENTRY # 98

ACTIVE INGREDIENT (A.I.):	
s-metolachlor	**Concentration:** 628 g/L **Formulation:** emulsifiable concentrate **WSSA Group:** 15
metribuzin	**Concentration:** 149 g/L **Formulation:** emulsifiable concentrate **WSSA Group:** 5

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds before or after they emerge. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage. Weed control is best when this product is applied prior to weed emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BOUNDARY LQD	30812	3	12 hours	Syngenta Canada Inc.

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ENTRY # 99

ACTIVE INGREDIENT (A.I.): s-metolachlor
Concentration: 960 g/L
Formulation: emulsifiable concentrate
WSSA Group: 15

ACTIVE INGREDIENT (A.I.): metribuzin
Concentration: 75%
Formulation: dry flowable
WSSA Group: 5

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds before or after they emerge. Susceptible grassy weeds are best controlled prior to emergence but most species are susceptible up to the 2 leaf stage. Weed control is best when this product is applied prior to weed emergence.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
UPI S-MET HERBICIDE	32847	3	12 hours	United Phosphorus inc.
TRICOR 75DF	30661	3	12 hours	United Phosphorus inc.

*Co-pack sold under the name: TIEDOWN.

ENTRY # 100

ACTIVE INGREDIENT (A.I.): sulfentrazone
Concentration: 480 g/L
Formulation: suspension concentrate flowable
WSSA Group: 14

Field Crop Registrations: chickpeas, field pea, flax, mustard, soybean and sunflower
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible broadleaf weeds before they have emerged. This herbicide will not control emerged weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
AUTHORITY	29012	2	12 hours	FMC Corporation

ENTRY # 101

ACTIVE INGREDIENT (A.I.): thiencarbazone-methyl
Concentration: 10 g/L
Formulation: suspension
WSSA Group: 2

Field Crop Registrations: wheat (spring, winter), can be applied to winter wheat in the fall or spring
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: This product controls emerged susceptible grass and broadleaf weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
VIOS G3	29070	4	12 hours	Bayer Crop Science Inc.

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ENTRY # 102

ACTIVE INGREDIENT (A.I.): thiencarbazone-methyl
Concentration: 68 g/L
Formulation: suspension
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): tembotrione
Concentration: 345 g/L
Formulation: suspension
WSSA Group: 27

Field Crop Registrations: corn (field)
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: This product provides residual control of certain annual grass and broadleaf weeds. It can be tank mixed with glyphosate in "Roundup Ready" corn, or with Liberty in "Liberty-Link" corn to control emerged weeds.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
VIOS G3	29643	4	12 hours	Bayer Crop Science Inc.

ENTRY # 103

ACTIVE INGREDIENT (A.I.): thifensulfuron methyl
Concentration: 50%
Formulation: soluble granule
WSSA Group: 2

Field Crop Registrations: soybean
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged. This herbicide will not control weeds that have emerged after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
PINNACLE SG	29349	4	12 hours	FMC Corporation

ENTRY # 104

ACTIVE INGREDIENT (A.I.): thifensulfuron methyl
Concentration: 33.35%
Formulation: soluble granule
WSSA Group: 2

ACTIVE INGREDIENT (A.I.): tribenuron methyl
Concentration: 16.65%
Formulation: soluble granule
WSSA Group: 2

Field Crop Registrations: barley (spring), oats and wheat (spring, winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged. This herbicide will not control weeds that have emerged after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
REFINE SG	28285	3	12 hours	FMC Corporation

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ENTRY # 105

ACTIVE INGREDIENT (A.I.):	
thifensulfuron methyl	**Concentration:** 50% **Formulation:** soluble granule **WSSA Group:** 2
tribenuron methyl	**Concentration:** 25% **Formulation:** soluble granule **WSSA Group:** 2

Field Crop Registrations: barley (spring), oats and wheat (spring, winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged. This herbicide will not control weeds that have emerged after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BOOST	30377	3	12 hours	Nufarm Agriculture Inc.

ENTRY # 106

ACTIVE INGREDIENT (A.I.):	
thifensulfuron methyl	**Concentration:** 25% **Formulation:** soluble granule **WSSA Group:** 2
tribenuron methyl	**Concentration:** 25% **Formulation:** soluble granule **WSSA Group:** 2
fluroxypyr	**Concentration:** 333 g a.e./L **Formulation:** emulsifiable concentrate **WSSA Group:** 4
MCPA	**Concentration:** 600 g a.e./L **Formulation:** emulsifiable concentrate **WSSA Group:** 4

Field Crop Registrations: barley (spring) and wheat (spring, winter)
Storage Information: Does not need to be stored in a heated building, but it's preferred.
Notes About Control: Controls susceptible broadleaf weeds after they have emerged. This herbicide will not control weeds that have emerged after application.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BARRICADE SG*	29544	3	12 hours	FMC Corporation
PERIMETER II*	30094	3	12 hours	FMC Corporation
MCPA ESTER 600, NUFARM	27803	3	12 hours	NuFarm Agriculture Inc.

*Co-pack sold under the name: BARRICADE M.

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ENTRY # 107

ACTIVE INGREDIENT (A.I.):
topramezone

Concentration: 336 g/L
Formulation: suspension
WSSA Group: 27

Field Crop Registrations: corn (field, seed and sweet)
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grass and broadleaf weeds after they have emerged. This herbicide will not control weeds that have emerged after application. Typically, this herbicide should be tank mixed with atrazine.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
ARMEZON	30131	3	12 hours	BASF Canada Inc.
IMPACT	28141	3	12 hours	Amvac Chemical Corporation

ENTRY # 108

ACTIVE INGREDIENT (A.I.):
tralkoxydim

Concentration: 400 g/L
Formulation: suspension concentrate
WSSA Group: 1

Field Crop Registrations: barley, rye (spring, winter), triticale and wheat (spring, winter)
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grassy weeds after they have emerged. Will not control weeds that emerge after application. The adjuvant "ADDIT" must always be added at 0.5 % v/v.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BISON 400 L	29256	3	12 hours	Adama Canada Ltd.

ENTRY # 109

ACTIVE INGREDIENT (A.I.):
trifluralin

Concentration: 412 g/L
Formulation: emulsifiable concentrate
WSSA Group: 3

Field Crop Registrations: alfalfa, canola, dry beans, mustard and soybean
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grass and broadleaf weeds prior to their emergence. Will not control weeds that are emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
TRIFLUREX 40 EC	17233	4	12 hours	Adama Canada Ltd.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

ENTRY # 110

ACTIVE INGREDIENT (A.I.):
trifluralin

Concentration: 480 g/L
Formulation: emulsifiable concentrate
WSSA Group: 3

Field Crop Registrations: alfalfa, canola, dry beans, mustard and soybean
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grass and broadleaf weeds prior to their emergence. Will not control weeds that are emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
BONANZA 480	28289	4	12 hours	Loveland Products Canada Inc
TREFLAN EC	23933	4	12 hours	Dow AgroSciences Canada Inc.

ENTRY # 111

ACTIVE INGREDIENT (A.I.):
trifluralin

Concentration: 500 g/L
Formulation: emulsifiable concentrate
WSSA Group: 3

Field Crop Registrations: alfalfa, canola, dry beans, mustard and soybean
Storage Information: Store above 5°C to keep product from freezing.
Notes About Control: Controls susceptible grass and broadleaf weeds prior to their emergence. Will not control weeds that are emerged.

HERBICIDE BRAND(S)	PCP #	CLASS	RESTRICTED ENTRY INTERVAL (REI)	MANUFACTURER
RIVAL EC	18612	4	12 hours	Nufarm Agriculture Inc.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

TABLE 2-2
Re-cropping interval, in months

Re-cropping interval, in months, required after the application of field crop herbicides.

	FIELD CROPS														
HERBICIDE	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
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	✓	<1	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	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*	✓	f	9*	8	4

LEGEND:

✓ = labelled for use on this crop
*listed on product label
N = no cropping restrictions listed on label
1 = only applicable to mineral soils, if applied to muck soil a field bioassay must be done.
2 = re-cropping interval if not planting back to a cultivar that is tolerant to this herbicide.
f = field bioassay; user assumes liability for all crops not indicated on the label.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

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
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
22	10	10	22	22	22	22	22	22	0	22	22	22	22	10	22	22	22	22	22	22	10	22
22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22	22	22	22	22	22
f	f	f	f	f	10	f	f	f	f	f	f	f	f	f	f	10	f	f	f	f	10	f
f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f	f	f	f
12*	0	12*	12*	12*	12*	12*	12*	12*	0*	0*	12*	0*	12*	0*	0*	12*	0*	12*	12*	0*	0*	0*
f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f	f	f	f	f
22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22
f	f	f	f	f	f	f	f	f	0	f	f	0	f	f	f	f	0	0	f	0	f	0
36*	36*	36*	0	36*	0	36*	0	36*	24*	36*	36*	36*	36*	0	36*	0	36*	36*	36*	36*	0	36*
36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	36*	0	36*	36*	36*	36*	36*	36*	36*	36*
10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Re-cropping interval, in months *continued*

	FIELD CROPS														
HERBICIDE	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
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
Boost M	2*	✓	8*	2*	8*	8*	8*	2*	✓	8*	8*	10*	8*	✓	✓
Boundary LQD	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	16	16	10	10	16	10	10	16	16	16	✓	16	16	16*	16*
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*
Distinct	3*	3*	3*	3*	3*	✓	3*	3*	3*	3*	3*	3*	3*	3*	3*
Dual II Magnum or UPI S-Met herbicide	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	✓	✓
Engarde	11*	10*	11*	f	22	✓	10*	f	10	4	11*	f	f	10*	4*

LEGEND:

✓ = labelled for use on this crop
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N = no cropping restrictions listed on label
1 = only applicable to mineral soils, if applied to muck soil a field bioassay must be done.
2 = re-cropping interval if not planting back to a cultivar that is tolerant to this herbicide.
f = field bioassay; user assumes liability for all crops not indicated on the label.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

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
f	f	f	f	f	f	f	f	f	1	f	f	f	f	f	f	f	f	f	f	f	f	f
1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
f	10*	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
f	f	f	f	f	11	f	f	f	11	f	f	f	f	11	f	f	f	f	f	f	12	f
f	f	f	f	f	11	f	f	f	11	f	f	f	f	11	f	f	f	f	f	f	12	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	12	f
22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22
16	10	16	10	16	16	16	16	16	10	0	16	16	6	10	0	10	0	16	16	10	16	16
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	10*	f	f	f	f	10*	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*	3*
f	f	0	f	f	f	0	f	0	f	f	f	f	f	0	0	0	0	0	f	0	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Re-cropping interval, in months *continued*

	FIELD CROPS														
HERBICIDE	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
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	f	✓	✓
Freestyle	10*	10*	10*	22	22	10*	22	22	22	22	✓	22	22	10	3.3*
Frontier Max[1]	f	3.3*	✓	f	f	✓	✓	f	3.3*	3.3*	✓	11*	f	3.3*	3.3*
gylphosate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guardian	10*	10*	10*	f	f	10*	f	f	f	f	0	f	f	f	3*
Guardian Plus II	11*	11*	10*	9*	f	10*	12*	12*	12*	12*	✓	f	9*	f	3*
Halex GT	11*	f	11*	f	f	✓	0	f	f	f	11*	f	f	10*	4.5*
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
Lontrel 360	22	✓	22	✓	22	10	22	10*	✓	✓	22	0	22	✓	0

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2 = re-cropping interval if not planting back to a cultivar that is tolerant to this herbicide.
f = field bioassay; user assumes liability for all crops not indicated on the label.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

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
4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	0	f	f	f	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	22	22	22	22	22	22	22	22
11*	11*	11*	11*	11*	0	11*	11*	11*	0	11*	11*	11*	0	11*	11*	11*	11*	11*	11*	11*	11*	11*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
f	f	f	f	f	11	f	f	f	11	f	f	f	f	11	f	f	f	f	f	f	12	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f
11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	11*	22*	11*	22*	11*	11*	11*	11*	11*	11*	11*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	22	22	0	22	0	22	0	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Re-cropping interval, in months *continued*

	FIELD CROPS														
HERBICIDE	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
Lorox L	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	✓	4*	4*	4*	4*
Lumax EZ	11*	f	11*	f	f	✓	✓	f	f	f	11*	f	f	10*	4.5*
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	22*	10*	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*
Princep Nine-T (low)	f	10	22	22	22	✓	10	22	10	10	22	f	22	10	10
Princep Nine-T (high)	f	22	22	22	22	✓	22	22	22	22	22	f	22	22	22

LEGEND:

✓ = labelled for use on this crop
*listed on product label
N = no cropping restrictions listed on label
1 = only applicable to mineral soils, if applied to muck soil a field bioassay must be done.
2 = re-cropping interval if not planting back to a cultivar that is tolerant to this herbicide.
f = field bioassay; user assumes liability for all crops not indicated on the label.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

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
4*	4*	4*	4*	4*	4*	0	4*	4*	4*	4*	4*	4*	4*	4*	4*	0	4*	4*	4*	4*	4*	4*
0	f	f	f	f	f	f	f	f	0	f	f	f	f	22	f	11*	f	f	f	f	11*	f
22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22	22	22	22	22	22
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*	12*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	48	f	f	f	f	48	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	10*	f	f	f	f	f	f	f	f	10*	f	10*	f	f	f	f	10*	f
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	18*	f	15*	15*	18*	f	f	f	f	9*	18*	9*	10*	9*	9*	f	24*	9*	8*	f
1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	0	1*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f
0	0	1*	1*	0	1*	1*	1*	0	1*	0	0	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*
22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22	22	22	22	22	22
0	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
0	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Re-cropping interval, in months *continued*

	FIELD CROPS														
HERBICIDE	alfalfa	barley	beans, white	canola	clover, red	corn, field	corn, seed	flax-linseed	oats	rye, fall	soybean	sugarbeets	sunflowers	wheat, spring	wheat, winter
Prowl H20	f	10*	✓	f	f	✓	f	f	10*	10*	✓	f	f	10*	f
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*	✓	✓
Reflex	f	f	✓	f	f	10*	f	f	f	f	✓	f	f	10*	4*
Reglone or Bolster	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Select, Statue 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
Simplicity	f	11*	11*	11*	f	10*	f	f	11*	f	f	f	10*	✓	✓
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*
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	f	f	f	f	f	0	f	f	f	f	0	f	f	f	4

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N = no cropping restrictions listed on label
1 = only applicable to mineral soils, if applied to muck soil a field bioassay must be done.
2 = re-cropping interval if not planting back to a cultivar that is tolerant to this herbicide.
f = field bioassay; user assumes liability for all crops not indicated on the label.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

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
f	f	f	f	f	f	0	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f	f
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	22	22	22	22	22	22	22	22
10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
f	0	f	f	f	f	f	f	f	f	f	f	f	f	0	f	f	f	f	f	f	f	f
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
0	22*	f	f	f	f	0	f	22*	f	f	f	22*	22*	f	22*	0	22*	f	22*	22*	0	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	10*	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*
10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
0	12*	12*	0	0	0	0	0	12*	12*	0	12*	12*	0	0	12*	0	12*	12*	12*	12*	0	12*
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	22*	f	f	f	f	22*	f
f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

TABLE 2–3
Weed species in Ontario counties resistant to herbicides within a specific WSSA 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

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

#	WEED SPECIES	WSSA GROUP	COUNTIES WITH CONFIRMED POPULATIONS
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
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; Haldimond; 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; Essex; Haldimand; Lambton; Middlesex
		5	Chatham-Kent; Essex; Haldimand; Lambton; Middlesex
		9	Chatham-Kent; Essex; Lambton; Middlesex
		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.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

TABLE 2–4
Adjuvants used in Ontario

TRADE NAMES[1]	REGISTRATION (PCP) NUMBER[2]	CHEMICAL COMPOSITION
NON-IONIC SURFACTANTS		
AGRAL 90	11809	nonylphenoxy polyethyoxy ethanol
AGRAL 90	24725	nonylphenoxy polyethyoxy ethanol
CITOWETT PLUS	12766	ocylphenoxy-polyethoxy ethanol
CONTACT	28326	alkylaryl polyoxy ethylene glycols, free fatty acids and isopropyl alcohol
COMPANION	15882	ocylphenoxy-polyethoxy-(9) ethanol
ENHANCE	29270	triglyceride ethoxylate
ICON	28342	nonylphenoxy polyethyoxy ethanol
INDEX	28181	alkylaryl polyoxy ethylene glycols, free fatty acids and isopropyl alcohol
IPCO AG-SURF	15881	nonylphenoxy polyethyoxy ethanol
LI700	23026	phosphatidylcholine, methyl acetic acid, alky polyoxy ethylene ether
LIBERATE	29491	lecithin, methyl esters of fatty acids and alcohol ethoxylate
LINK	28291	alkylaryl polyoxy ethylene glycols, free fatty acids and isopropyl alcohol
NUFARM AG-SURF	27921	nonylphenoxy polyethyoxy ethanol
PRO-SURF II	28327	alkylaryl polyoxy ethylene glycols, free fatty acids and isopropyl alcohol
SENTRY	28343	nonylphenoxy polyethyoxy ethanol
SIDEKICK	25835	alkylaryl polyoxy ethylene glycols, free fatty acids and isopropyl alcohol
SIDEKICK II	28914	alkylaryl polyoxy ethylene glycols, free fatty acids and isopropyl alcohol
SUFFIX	28184	nonylphenoxy polyethyoxy ethanol
SUPER SPREADER	17402	ocylphenoxy-polyethoxy ethanol
WEEDAWAY AG SURF	22881	nonylphenoxy polyethyoxy ethanol

LEGEND:

N/A = not applicable. These types of products are not required to be classified under the Pesticide Control Product Act (PCPA).

[1] Mention of a trade name in this table does not constitute a guarantee or warranty of the product. Neither does this use signify that these products are approved to the exclusion of comparable products. All trade names are capitalized in this guide.

[2] 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 should always be used for the most accurate and current PCP number.

[3] Designated under the Pesticide Control Product Act (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. The Ontario Classification is current as of time of printing and may change over time. Refer to the Ontario Pesticide Advisory Committee Website, opac.gov.on.ca, for most current classifications.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

CONCENTRATION	ONTARIO CLASSIFICATION[3]	MANUFACTURER
90%	3	Syngenta Canada Inc.
90%	3	Norac Concepts Inc.
50%	4	BASF Canada Inc.
900 g/L	4	Norac Concepts Inc.
70%	4	Dow AgroSciences Canada Inc.
80%	4	Norac Concepts Inc.
90%	4	Norac Concepts Inc.
900 g/L	4	Norac Concepts Inc.
92%	3	Interprovincial Co-op Ltd.
80%	4	Loveland Products Canada Inc
100 g/L	3	Loveland Products Canada Inc
900 g/L	4	Norac Concepts Inc.
92%	4	NuFarm Canada Inc.
900 g/L	4	Norac Concepts Inc.
90%	4	Norac Concepts Inc.
900 g/L	4	Norac Concepts Inc.
900 g/L	4	Norac Concepts Inc.
90%	4	Norac Concepts Inc.
50%	4	United Agri Products Canada Inc.
92%	3	Interprovincial Co-op Ltd.

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Adjuvants used in Ontario *continued*

TRADE NAMES[1]	REGISTRATION (PCP) NUMBER[2]	CHEMICAL COMPOSITION
SOLVENTS (OILS)/SURFACTANTS		
ADDIT ADJUVANT	29263	surfactant
AMIGO	22644	phosphate ester surfactant
ASSIST OIL CONCENTRATE	16937	paraffin base mineral oil + surfactant blend
CARRIER	30639	mineral oil + surfactant blend
CONTENDER MSO	32198	methylated seed oil of soybean
HASTEN NT	28277	methyl and ethyl oleate
MANA X-ACT	28225	phosphate ester surfactant
MERGE	24702	surfactant blend + solvent (petroleum hydrocarbons)
MERGE 1	21058	surfactant blend + solvent (petroleum hydrocarbons)
MSO CONCENTRATE	28385	methylated seed oil of soybean
SURE-MIX	25467	paraffinic petroleum oil + surfactant blend
TURBOCHARGE	23135	paraffin base mineral oil + surfactant blend
XA OIL CONCENTRATE	11769	paraffin base mineral oil + surfactant blend
XIAMETER OFX-0309	23078	silicone polyether + surfactant blend
COMBATIBILITY AGENTS		
ALLIANCE	N/A	aliphatic phosphate ester, isopropanol and glycol ethers
UNITE	N/A	acid polyglycols and methyl alcohol
WATER BUFFERING AGENTS		
AQUA-STABLE	N/A	aliphatic polycarboxylate and calcium chloride
WATER CONDITIONING AGENTS		
AQUASOFT	N/A	hydroxy carboxylic acid, phosphoric acids and ammonium sulfate polyacrylic acid
CHOICE	N/A	polyacrylic, hydroxy carboxylic, propionic acids, phosphate ester and ammonium sulfate
N TANK	N/A	monocarbamide dihydrogen sulphate, amine phosphates and viscosity reducing agents

LEGEND:

N/A = not applicable. These types of products are not required to be classified under the Pesticide Control Product Act (PCPA).

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CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

CONCENTRATION	ONTARIO CLASSIFICATION[3]	MANUFACTURER
36.9%	4	Adama Canada Ltd.
30%	2	Bayer Crop Science Inc.
83% + 17%	4	BASF Canada Inc.
50% + 40%	4	NuFarm Agriculture Ltd.
70%	4	Interprovincial Co-op Ltd.
71.4%	4	Victoria Chemical Company Ltd.
30%	2	Adama Canada Ltd.
50% + 50%	4	BASF Canada Inc.
50% + 50%	4	BASF Canada Inc.
70%	4	Loveland Products Canada Inc
60% + 35.6%	4	E.I. DuPont Canada Inc.
50% + 39.5%	4	Syngenta Canada Inc.
83% + 17%	4	United Agri Products Canada Inc.
80% + 20%	4	Norac Concepts Inc.
69%	N/A	Norac Concepts Inc.
83.70%	N/A	United Agri Products Canada Inc.
28%	N/A	Norac Concepts Inc.
63%	N/A	Norac Concepts Inc.
50%	N/A	United Agri Products Canada Inc.
81%	N/A	Adjuvants Plus Inc.

continued

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

Adjuvants used in Ontario *continued*

TRADE NAMES[1]	REGISTRATION (PCP) NUMBER[2]	CHEMICAL COMPOSITION
DEFOAMERS (ANTI-FOAMERS)		
BREAKER	N/A	dimethylpolysiloxane
FIGHTER F	N/A	dimethylpolysiloxane
FLAT-OUT	N/A	dimethylpolysiloxane
HALT	N/A	silicone base, neutral
VALID	N/A	lecithin, emulsifiers, glycols and dimethylpolysiloxane defoamer
ZAP	N/A	proprietary blend
FOAM MARKER DYE		
IN-SIGHT	N/A	dye, surfactants, and coupling agents
TREKKER TRAX	N/A	alcohols, mixed anionic and nonionic surfactants
TRAMLINE	N/A	nonionic and anionic surfactants

LEGEND:

N/A = not applicable. These types of products are not required to be classified under the Pesticide Control Product Act (PCPA).

[1] Mention of a trade name in this table does not constitute a guarantee or warranty of the product. Neither does this use signify that these products are approved to the exclusion of comparable products. All trade names are capitalized in this guide.

[2] 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 should always be used for the most accurate and current PCP number.

[3] Designated under the Pesticide Control Product Act (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. The Ontario Classification is current as of time of printing and may change over time. Refer to the Ontario Pesticide Advisory Committee Website, opac.gov.on.ca, for most current classifications.

CHAPTER 2: NOTES ON HERBICIDES AND ADJUVANTS

CONCENTRATION	ONTARIO CLASSIFICATION[3]	MANUFACTURER
30%	N/A	United Agri Products Canada Inc.
10%	N/A	United Agri Products Canada Inc.
20%	N/A	Norac Concepts Inc.
30%	N/A	Dow AgroSciences Canada Inc.
100%	N/A	United Agri Products Canada Inc.
100%	N/A	Norac Concepts Inc.
100%	N/A	Norac Concepts Inc.
54%	N/A	United Agri Products Canada Inc.
35% + 65%	N/A	Norac Concepts Inc.

Chapter 3: Canola

CHAPTER 3: CANOLA

TABLE 3-1
Pre-plant burndown weed control ratings in canola

TRT #	HERBICIDE TREATMENT	WSSA GROUP	winter canola	Liberty-Link canola	Roundup-Ready canola	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain
Pre-plant burndown with glyphosate: **emerged** weed control ratings at **4 weeks** after application														
1	glyphosate (1x rate)	9	✓	✓	✓	9	–	9	9	7	7	7	–	8
2	glyphosate (2x rate)	9	✓	✓	✓	9	–	9	9	8	9	8	6	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																		
canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
–	7	9	7	7	9[R]	9	8[I]	–	9	9	9	9	–	9[R]	9[R]	8	7	4	9[R]
–	8	9	8	9	9[R]	9	8[I]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]

CHAPTER 3: CANOLA

TABLE 3-2
Pre-plant incorporated, Pre and Post-emergence weed control ratings in canola

TRT #	HERBICIDE TREATMENT	WSSA GROUP	winter canola	Liberty-link canola	Roundup-Ready canola	Crop Tolerance	GRASSY WEEDS							
							barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Pre-plant incorporated herbicides														
4	Treflan, Bonanza, Triflurex or Rival	3	✓	✓	✓	E	9	9	8	9	6	6	8	9
Post-emergence grass herbicides														
5	Assure II, Yuma GL or Contender	1	✓	✓	✓	E	9	8	9	9	9	9	9	9
6	Poast Ultra	1	✓	✓	✓	E	9	8	9	9	9	7	9	9
7	Select, Arrow All-In or Statue	1	✓	✓	✓	E	9	8	9	9	9	7	9	9
8	Venture L	1	✓	✓	✓	E	9	8	9	8	9	9	9	9
Post-emergence broadleaf herbicides														
9	Lontrel 360	4	✓	✓	✓	G	–	–	–	–	–	–	–	–
10	Muster	2	x	✓	✓	G	–	–	–	–	–	–	–	–
Post-emergence grass and broadleaf herbicides – "Liberty Link" varieties only														
11	Liberty	10	x	✓	x	E	9	9	9	9	9	–	8	9
Post-emergence grass and broadleaf herbicides – Roundup Ready varieties only														
12	glyphosate	9	x	x	✓	E	–	–	–	–	–	–	–	–
13	glyphosate + Lontrel 360	9, 4	x	x	✓	E	–	–	–	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weeds not emerged at time of application																					
–	–	–	–	–	–	9	–	–	–	–	8	–	–	–	8	–	–	–	–	–	8
Weeds emerged at time of application																					
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Weeds emerged at time of application																					
–	–	–	8	–	–	-	–	9	–	–	–	–	–	–	–	8	9	–	–	–	–
–	–	–	–	–	–	-	–	–	–	–	–	–	9	–	8	–	–	–	–	–	–
Weeds emerged at time of application																					
–	–	–	8	–	8	–	9	7	–	8/9	9	–	9	9	9	9	6	–	8	–	–
Weeds emerged at time of application																					
–	9	7	8	–	–	–	9	9[R]	8	9	8	6	9	8	9	9[R]	9[R]	7	9	–	9
–	9	7	8	–	–	–	9	9	8	9	8	6	9	8	9	8	9	7	9	–	9

CHAPTER 3: CANOLA

TABLE 3-3
Perennial weed and volunteer crop control ratings for herbicides in canola

TRT #	HERBICIDE TREATMENT	WSSA GROUP	winter canola	Liberty-link canola	Roundup-Ready canola	Crop Tolerance	PERENNIAL WEEDS					
							bindweed, field	carrot, wild	dandelion	horse-nettle	horsetail, field	milkweed
Post-emergence grass herbicides												
5	Assure II or Yuma GL	1	✓	✓	✓	E	–	–	–	–	–	–
6	Poast Ultra	1	✓	✓	✓	E	–	–	–	–	–	–
7	Select, Arrow All-In or Statue	1	✓	✓	✓	E	–	–	–	–	–	–
8	Venture L	1	✓	✓	✓	E	–	–	–	–	–	–
Post-emergence broadleaf herbicides												
9	Lontrel 360	4	✓	✓	✓	G	–	–	–	–	–	–
Post-emergence herbicides for Liberty-Link canola varieties only												
11	Liberty	10	x	✓	x	E	6	–	–	–	6	–
Post-emergence herbicides for Roundup Ready canola varieties only												
12	glyphosate	9	x	x	✓	E	7	–	6	8	–	9
13	glyphosate + Lontrel 360	9, 4	x	x	✓	E	7	–	6	8	–	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[R] Populations exist that are resistant to this herbicide and won't be controlled.

							VOLUNTEER CROPS											
nutsedge, yellow	quackgrass	redtop	sow-thistle, perennial	thistle, Canada	vetch	wire-stem muhly	alfalfa, volunteer	adzuki beans, volunteer	canola, volunteer	canola (LL), volunteer	canola (RR), volunteer	clover (red), volunteer	corn, volunteer	corn (LL), volunteer	corn (LL/RR), volunteer	corn (RR), volunteer	corn (Enlist), volunteer	cereals, volunteer
Weed control ratings at 4-6 weeks after application																		
–	9	6	–	–	–	7	–	–	–	–	–	–	8-9	8-9	8-9	8-9	–	9
–	6	6	–	–	–	6	–	–	–	–	–	–	6-8	6-8	6-8	6-8	6-8	9
–	7	7	–	–	–	6	–	–	–	–	–	–	7-9	7-9	7-9	7-9	7-9	9
–	8	7	–	–	–	8	–	–	–	–	–	–	7-9	7-9	7-9	7-9	–	9
Weed control ratings at 4-6 weeks after application																		
–	–	–	9	9	9	–	8	9	–	–	–	8	–	–	–	–	–	–
Weed control ratings at 4-6 weeks after application																		
6	6-7	–	8	7	–	–	–	–	9	–	9	7	9	–	–	9	–	8
Weed control ratings at 4-6 weeks after application																		
6	9	9	7-8	8	5	8	6	9	9	9	–	6	9	9	–	–	–	9
6	9	9	9	9	9	8	8	9	9	9	–	8	9	9	–	–	–	9

CHAPTER 3: CANOLA

Herbicide rates and notes

TRT #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES AND CO-PACKS			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** **1)** glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** **1)** glyphosate, (360-540 g/L), 1,800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
SOIL APPLIED HERBICIDES (PRE-PLANT INCORPORATED, PRE-EMERGENCE)			
4	**Treflan (480 g/L) or Bonanza (480 g/L);** **Triflurex 40 EC (412 g/L);** **Rival EC (500 g/L)** **Active Ingredient(s), rate:** trifluralin, 0.6-1.15 kg a.i./ha	0.5-0.96 L/acre 0.58-1.12 L/acre 0.48-0.92 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of canola. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of canola. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply PPI. Incorporate as soon as possible, within 24 hr.

continued

CHAPTER 3: CANOLA

Herbicide rates and notes *continued*

TRT #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE GRASS HERBICIDES			
5	**Assure II or Yuma GL + Adjuvant:** 1) Assure II (96 g/L)or Yuma GL (96 g/L) 2) Sure-Mix or XA Oil Concentrate **Active Ingredient(s), concentration, rate:** 1) quizalofop-p-ethyl, (96 g/L), 36-72 g a.i./ha	1) 150-300 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 64 days **Rainfast:** 1 hour
6	**Poast Ultra + Merge:** 1) Poast Ultra (450 g/L) 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150-200 g a.i./ha	1) 130-190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 70 days **Rainfast:** 1 hour
7	**Select + Amigo or Arrow + Addit:** 1) Select (240 g/L) or Arrow (240 g/L) 2) + Amigo or Arrow Adjuvant **Active Ingredient(s), concentration, rate:** 1) clethodim, (240 g/L), 30-90 g a.i./ha	1) 50-150 mL/acre 2) 5-10 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour
8	**Venture L (125 g/L)** **Active Ingredient(s), concentration, rate:** 1) fluazifop-p-butyl, (125 g/L), 75-250 g a.i./ha	243-800 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour

APPLICATION NOTES
• 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 0.15 L/acre rate for control of volunteer corn, volunteer cereals and green foxtail. • The 0.2 L/acre rate will suppress quackgrass and also control barnyard grass. • Use the 0.3 L/acre rate for control of quackgrass. • Canola is tolerant at all growth stages.
• Apply POST when annual grasses and volunteer cereals are in the 1-6 leaf stage and quackgrass is in the 1-3 leaf stage. • Canola is tolerant at all growth stages. • Use the intermediate rate of 0.19 L/acre for volunteer spring cereals. • Use the high rate of 0.45 L/acre for quackgrass. • Thorough preplant tillage will ensure more uniform quackgrass emergence. Follow with a cultivation 7 days after treatment in wide row crops.
• Canola is tolerant at all growth stages. • For control of quackgrass, apply SELECT or ARROW at 0.152 L/acre with the appropriate surfactant at 10 L/1,000 L water.
• Do NOT apply VENTURE to canola later than the 5 leaf stage of crop growth. • The 243 mL/acre rate is for the control of volunteer corn at the 2-5 leaf stage. • The 400 mL/acre rate is for the control of annual grasses at the 2-4 leaf stage. • The 800 mL/acre rate is for the control of quackgrass or wirestem muhly at the 3-5 leaf stage.

continued

CHAPTER 3: CANOLA

Herbicide rates and notes *continued*

TRT #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE BROADLEAF HERBICIDES			
9	**Lontrel 360 (360 g/L)** **Active Ingredient(s), concentration, rate:** 1) clopyralid, (360 g/L), 150-200 g a.i./ha	170-220 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 4 hours
10	**Muster (75%) + non-ionic surfactant:** 1) Muster (75%) 2) + Agral 90 **Active Ingredient(s), concentration, rate:** 1) ethametsulfuron-methyl, (75%), 11.25 g a.i./ha	1) 6 g/acre 2) 2 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours
POST-EMERGENCE GRASS AND BROADLEAF HERBICIDES ("LIBERTY-LINK" CANOLA VARIETIES ONLY)			
11	**Liberty 200 SN** **Active Ingredient(s), concentration, rate:** 1) glufosinate ammonium, (200 g/L), 500 g a.i./ha	1 L/acre **WSSA Group:** 1) 10	**REI:** 24 hours **PHI:** 70 days **Rainfast:** 4 hours
POST-EMERGENCE GRASS AND BROADLEAF HERBICIDES ("ROUNDUP READY" CANOLA VARIETIES ONLY)			
12	**glyphosate (360 g/L)** **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 297-450 g a.e./ha	0.33-0.5 L/acre 0.26-0.4 L/acre 0.25-0.38 L/acre 0.22-0.33 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
13	**glyphosate (540 g/L) + Lontrel 360:** 1) glyphosate (540 g/L) 2) + Lontrel 360 **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 450 g a.e./ha 2) clopyralid, (360 g/L), 100 g a.i./ha	1) 0.33 L/acre 2) 110 mL/acre **WSSA Group:** 1) 9 2) 4	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 4 hours

APPLICATION NOTES
• Use only on the following cultivars: CYCLONE, EBONY, JEWEL, 46A65 and HYOLA 401. • Apply one post-emergence application per season at the 2-6 leaf stage of canola. • Apply to Canada thistle at the rosette to pre-bud stage.
• Do NOT apply MUSTER to Polish varieties of canola as crop injury may result. • Apply when the wild mustard in the cotyledon to 6 leaf stages, before the crop begins to bolt. • Do NOT apply to winter planted canola. • Do NOT plant to any crop except winter wheat in the year of treatment. • Do NOT feed or graze treated crop within 60 days of application
• LIBERTY 200 SN can be applied from the cotyledon to the early bolting stage of canola. • For use only with canola seed designated as "Liberty Link" canola. • Ammonium sulphate can be applied at 2.4 L/acre or 1.3 kg/acre for improved control of specific weeds. • Do NOT add oil or any other surfactants.
• For use only with pedigreed (certified) canola seed designated as "Roundup Ready" canola. • Apply up to the 6 leaf stage of the canola. A second application may be made for later flushes emerging after the initial application and for improved results on perennial weeds. • The higher rate should be used when weeds are larger, when weed pressure is high and for perennial weeds.
• For use only with certified canola seed designated as "Roundup Ready" canola. • Provides season long top growth control of Canada thistle and control of wild buckwheat. • Apply when canola is in the 2-6 leaf stage. Apply in 40 L/acre of water. • For more information on weed controlled and rates, refer to the LONTREL and appropriate glyphosate product labels.

continued

CHAPTER 3: CANOLA

Herbicide rates and notes *continued*

TRT #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
HARVEST AID TREATMENTS			
14	**Eragon LQ + Merge:** 1) ERAGON LQ at 29.5-59 mL/acre 2) MERGE at 400 mL/acre **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha	1) 29.5-59 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3 days **Rainfast:** < 1 hour
15	**Eragon LQ + glyphosate + Merge:** 1) ERAGON LQ at 29.5-59 mL/acre 2) GLYPHOSATE (540 g/L) at 0.67 L/acre 3)MERGE at 0.4 L/acre **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha 2) glyphosate, (540 g/L), 900 g a.e./ha	1) 29.5-59 mL/acre 2) 0.67 L/acre 3) 400 mL/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
16	**glyphosate (360 g/L)** – 1x Rate or glyphosate (450 g/L) or glyphosate (480 g/L) or glyphosate (540 g/L) **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
17	**Reglone** or Bolster **Desiccant** **+ Agral 90** **Active Ingredient(s), concentration, rate:** 1) diquat, (240 g/L), 300-400 g a.i./ha	500-920 mL/acre + 1 L/1,000 L **WSSA Group:** 1) 22	**REI:** 24 hours **PHI:** 4-10 days **Rainfast:** 15 min.

APPLICATION NOTES
• Apply when 60%-75% of seeds have changed colour. • Apply in 80 L/acre of water.
• Apply when 60%-75% of seeds have changed colour and grain moisture is less than 30%. • Apply in 80 L/acre of water. • Do NOT harvest within 7 days of application or apply to crops grown for seed . • Refer to harvest aid precautions for glyphosate.
• Apply in 20-40 L/acre water when the crop is less than 30% grain moisture, when pods are green to yellow and seeds are yellow to brown and 7-14 days prior to harvest and use ground application only. • Do NOT apply to seed crops.
• Apply when crop is 80%-90% seed turn (green to brown) stage. • Harvest no later than 14 days after herbicide application to avoid pod shatter. • Use higher rate for heavy canopy and/or weedy crop. • Use minimum of 90 L/acre spray volume. • Drift will injure adjacent crops or plants.

Chapter 4: Cereals

CHAPTER 4: CEREALS

Why control weeds in winter wheat?

Yield losses from weed competition in winter wheat is often less than 5% and has ranged from 0%-55% (Scott et al. 1995, Millberg and Hallgren, 2004, Fast et al. 2009, Geier et al. 2011, Robinson et al. 2013 and Hamouz et al. 2015). The competitive nature of winter wheat and lack of yield response to weed removal is the main reason why it's estimated that herbicides are only applied to about 50% of Ontario's winter wheat acreage.

So when will weed competition affect grain yield in winter wheat? With such a wide range in the amount of yield loss observed it is logical to assume that high yield losses correspond with heavy weed pressure. Although this is probable for winter annual weed species, in weed/crop competition studies there has been little correlation between weed population density and yield loss (Scott et al. 1995, Millberg and Hallgren, 2004). What appears to be more influential is the timing of weed emergence relative to the crop, with weeds emerging before or at the time of wheat emergence causing the most damage. For winter wheat, it will be the winter annual and perennial weeds that are most likely to be up before or with the crop. For example, a yield loss of 19% was observed when chess, a fall germinating grassy weed species, was not controlled (Fast et al. 2009). When chess was controlled in the fall compared to the spring, grain yields were increased by 13%-20% (Geier et al. 2011). When winter annual weeds like chickweed, henbit and whitlow grass were controlled they significantly increased grain yields (Vrabel, 1987). Other winter annual species like Shepherd's-purse and scentless chamomile were considered the most detrimental to winter wheat yields (Millberg and Hallgren, 2004).

DOCKAGE

Although weed competition can have a nominal impact on grain yield, the presence of weeds at harvest has been shown to increase dockage, which will result in price discounts or rejection at the point of sale. Chess and wild oats are two species that have caused significant dockage resulting in grain price reductions (Fast et al. 2009).

HARVEST EFFICIENCY

When weeds are present at harvest it will slow combining speed and this is likely the biggest reason why weeds are managed in winter wheat, and for logical economic reasons. In a survey of combine operators, over 50% of respondents claimed weedy fields reduced harvest speed by more than 1 mile per hour. The financial impact of reduced harvest speed can be significant (Table 4-1). Simply put, time is money and a longer harvest period leaves a farmer vulnerable to unfavourable weather, which can result in reduced quality from sprouting or increased fusarium damaged kernels.

TABLE 4-1

Harvest cost ($/acre) as affected by harvest speed

HARVEST SPEED (MILES/HR)	HARVEST RATE (ACRE/HR) (30' HEADER)	REDUCTION IN HARVEST RATE (ACRE/HR)	INCREASE IN HARVEST COST ($/ACRE)*
4	14.5	0	$29.52
3.75	13.6	0.9	$31.47 (1.95)
3.5	12.7	1.8	$33.70 (4.18)
3.25	11.8	2.7	$36.27 (6.75)
3	10.9	3.6	$39.26 (9.74)
2.75	10	4.5	$42.80 (13.28)
2.5	7.3	7.2	$58.63 (29.11)

*Calculated using data from OMAFRA survey of Ontario Custom Farmwork Rates charged in 2015 where the average combining rate of cereals including a grain buggy in area 3 was $428/hr.

MARKETABILITY OF STRAW

It is tougher to sell straw and receive top dollar for it when it is weedy. Buyers don't wish to inherit seeds and root propagates of weeds from the seller's farm at the risk of contaminating their own. Some livestock producers also perceive weed straw as being more "dusty" and less desirable for bedding. Clean straw will always be preferred over weedy straw.

RETURNING WEED SEEDS TO THE SOIL

When excellent control of annual weed species is achieved it will reduce the amount of weed seed returned to the soil. This is important since the seed of most weed species does not germinate after dispersal, but rather will lay dormant in the soil until conditions are suitable for germination. Some species have germinated 80 years after dispersal.

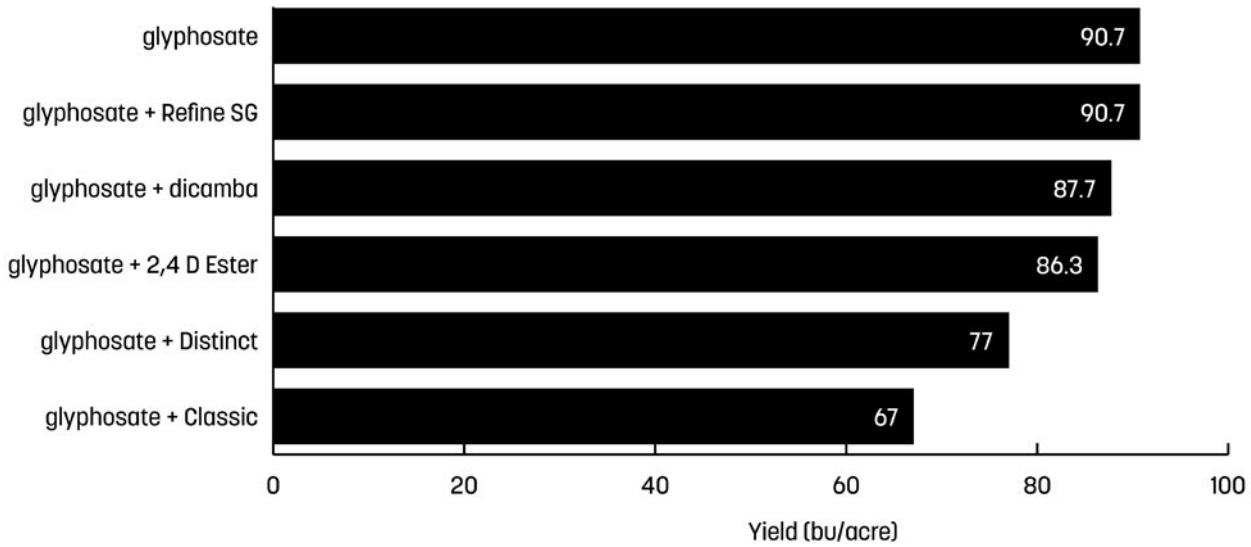
HERBICIDES TO AVOID USING PRIOR TO PLANTING

Ontario research has shown that when either Distinct (diflufenzopyr/dicamba) or Classic (chlorimuron-ethyl) are applied prior to planting cereals, significant crop injury has occurred, causing yield reductions between 15%-25%. Although 2,4-D and dicamba can result in visual crop injury, no reductions in yield loss have been observed from other labeled herbicide treatments (Figure 4-1 – Soltani et al. 2009).

FIGURE 4-1

Winter wheat yield

Winter wheat yield following pre-plant applications of six different herbicide programs.



CHAPTER 4: CEREALS

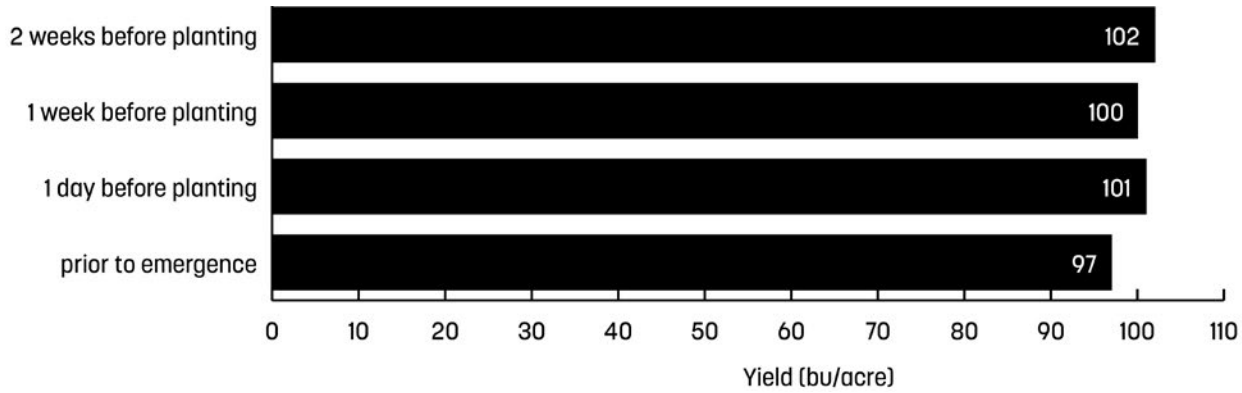
How long should I wait between the application of herbicide and planting of cereals?

Of the pre-plant herbicide options listed in this chapter, all labels state that they can be applied "prior to planting or prior to crop emergence" and there is no mention of an interval between application and planting. This is supported by Ontario research where visual crop injury and grain yield was not affected by herbicides regardless of whether they were applied 1 day, 1 week or 2 weeks prior to planting (Figure 2 – Brown et al. 2012).

FIGURE 4-2

Winter wheat yield

Winter wheat yield as influenced by application timing of herbicides relative to planting date.



HERBICIDES TO AVOID APPLYING TO EMERGED WHEAT IN THE FALL

Both 2,4-D and MCPA product labels state that they should not be applied to winter cereals in the fall. Ontario research has shown that when 2,4-D is applied to emerged wheat in the fall, head distortion can occur (Figure 3) resulting in grain yield reductions that have been as much as 24% (McNaughton et al. 2014). Although forbidden by the product label, yield response to fall applied applications of MCPA applied alone in Ontario trials, has not resulted insignificant yield reductions (McNaughton et al. 2014). MCPA at a low rate and pre-formulated with bromoxynil in herbicide products such as Buctil M, can be applied in the fall to emerged winter cereals.

Citations:

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Milberg, P. and E. Hallgren. 2004. Yield loss due to weeds in cereals and its large-scale variability in Sweden. Field Crops Research. 86:199-209

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Vrabel, T.E. 1987. Effect of fall weed control on the yield of winter wheat. Proceedings of the annual meeting – Northeastern Weed Science Society, 1987, Vol., pp. 55-58

FIGURE 4-3

Distorted wheat heads

Distorted wheat heads as a result of 2,4-D applied to emerged wheat in the fall before it had reached zadok's 30.

Perennial weeds, like dandelion are best managed in winter wheat with pre-plant applications of glyphosate or tillage with a moldboard plough.

FIGURE 4-4

Dandelion control

Control of dandelion (right) after a harvest aid application of glyphosate in soybean, prior to the planting of winter wheat compared to an un-sprayed strip (left). Photo courtesy of Mike Russell.

CHAPTER 4: CEREALS

TABLE 4-1
Pre-plant burndown weed control ratings in cereals

TRT #	HERBICIDE TREATMENT	WSSA GROUP	CROP USES				GRASSY WEEDS AT BURNDOWN					
			barley	oats	rye	wheat	bentgrass, loose-silky	bluegrass, annual	brome, downy	chess	wild oats	quackgrass
Glyphosate												
1	glyphosate (1x rate)	9	✓	✓	✓	✓	9	9	9	9	9	9
1	glyphosate (2x rate)	9	✓	✓	✓	✓	9	9	9	9	9	9
Herbicides that contain glyphosate												
2	Enlist Duo	4,9	x	x	x	✓	–	–	9	–	9	9
Selective herbicides that control emerged weeds												
3	2,4-D ester 700	4	x	x	x	✓	–	–	–	–	–	–
4	Aim EC + Merge	14	✓	✓	✓	✓	–	–	–	–	–	–
5	Blackhawk	4,14	x	x	x	✓	–	–	–	–	–	–
6	Eragon LQ + Merge	14	x	x	x	✓	–	–	–	–	–	–
Herbicides that provide residual weed control												
7	Focus	15,14	x	x	x	✓	–	8	8	7	7	–
8	Treflan	6	✓	x	x	✓	8	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																			
bindweed, field	burdock (2nd year)	Canada thistle	canola, volunteer (RR)	carrot, wild	chickweed	cleavers	dandelion	fleabane, Canada	henbit	horse-nettle	horsetail, field	lettuce, prickly	plantain, broad-leaved	shepherd's-purse	sow-thistle, perennial	speedwell species	stinkweed	vetch	violet (pre flower)
Emerged weed control ratings at **4 weeks** after application																			
7	–	7	0	7	9	9	7	9[R]	9	8[1]	–	9	8	9	8	9	9	–	7
8	6	8	0	8	9	9	9	9[R]	9	8[1]	–	9	9	9	9	9	9	6	8
Emerged weed control ratings at **4 weeks** after application																			
8	6	–	9	–	9	–	–	8	–	–	8	9	8	9	–	–	9	9[1]	6
Emerged weed control ratings at **4 weeks** after application																			
8	6	–	9	–	–	–	7	8	–	–	–	8	8	–	–	–	–	9[1]	6
–	–	–	8	–	–	9	–	–	–	–	–	7	–	9	–	–	9	–	–
8	7	–	9	–	–	9	9	9	–	–	–	–	8	9	–	–	9	–	–
–	7[1]	–	9	5	–	–	7	9	–	–	6[1]	8[1]	9	9	8[1]	–	9	6[1]	9
Weed control ratings at **6-8 weeks** after application (weeds not emerged at application)																			
–	–	–	–	–	–	8	–	–	–	–	–	–	–	–	–	–	8	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

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TABLE 4-2
Fall applied post-emergence herbicide weed control ratings in winter wheat

			GRASSY WEEDS				BROADLEAF WEEDS THAT ARE TYPICALLY EMERGED IN THE FALL																			
TRT #	HERBICIDE TREATMENT	WSSA GROUP	bentgrass, loose silky	bluegrass	chess	downy brome	bindweed, field	canola, volunteer	carrot, wild	chamomile, scentless	chickweed	cleavers	dandelion	fleabane, Canada	henbit	hemp-nettle	horsetail	lettuce, prickly	speedwell species	shepherd's-purse	sow-thistle	stinkweed	thistle, Canada	vetch	violet, field
Post-emergence herbicides (weeds emerged at time of application)																										
15	Buctril M	4,6	–	–	–	–	–	9	–	8	–	–	–	6	8	7	9[1]	8	–	9	7[1]	9	–	–	–
18	Infinity	27,6	–	–	–	–	–	9	5	–	7	8	8	9	9	9	6[1]	8	–	9	7[1]	9	7[1]	–	–
19	Infinity FX	27,6,4	–	–	–	–	–	9	5	–	7	9	8	9	9	9	6[1]	8	–	9	8[1]	9	7[1]	–	–
24	Pardner	6	–	–	–	–	–	8	–	–	–	–	–	–	–	–	–	–	–	8	6[1]	8	–	–	–
25	Peak + Pardner	2,6	–	–	–	–	–	9	8	–	8	–	5	7	8	9	9[1]	8	8	9	8[1]	9	5[1]	8[1]	6
27	Refine SG	2	–	–	–	–	–	8	7	9	7	6	6	6	9	9	–	8	9	9	8[1]	9	7[1]	–	8
29	Simplicity GoDRI + Assist Oil	2	9	7	9	9	–	8	–	–	8	8	6	–	–	8	–	–	–	8	–	8	6[1]	8[1]	–
31	Tropotox Plus	4	–	–	–	–	–	9	–	–	–	–	–	–	–	8	–	–	–	9	9[1]	9	9[1]	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur
[R] Populations exist that are resistant to this herbicide and won't be controlled.

TABLE 4-3
Grassy weed control ratings for herbicides in cereals

TRT #	HERBICIDE TREATMENT	WSSA GROUP	CROP USES							GRASSY WEEDS (ANNUAL)						
			barley	oats	rye	wheat	alfalfa under seeded	red clover under seeded	Cereal Crop Tolerance	bentgrass, loose silky	bluegrass, annual	brome, downy	chess/cheat	foxtails	fowl meadow grass	wild oats
Pre-emergence herbicides (weeds not emerged at application) – Ratings at 4-6 weeks after application																
7	Focus	14,15	x	x	x	✓	x	x	G	–	7	9	6	8	–	7
9	Valtera	14	x	x	x	✓[1]	x	x	G	–	–	–	–	–	–	–
Post-emergence herbicides (weeds emerged at application) – Ratings at 4-6 weeks after application																
33	Axial	1	✓	x	x	✓	x	x	G	–	–	–	–	9	–	9
34	Liquid Achieve/Bison 400 L	1	✓[1]	x	✓	✓	✓	✓	G	–	–	–	–	9	8	9
35	Puma Advance	1	✓[1]	x	x	✓[1]	x	x	G	–	–	–	–	9	–	9
29	Simplicity GoDRI	2	x	x	x	✓	x	x	G	8	7	8	8	7	–	8
32	Varro	2	x	x	x	✓	x	x	G	–	–	8	–	8	–	8

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Only labeled for use on spring planted varieties.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

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TABLE 4-4
Post-emergence herbicide weed control ratings in cereals

TRT #	HERBICIDE TREATMENT	WSSA GROUP	CROP USES						Cereal Crop Tolerance						
			barley	oats	rye	wheat	alfalfa under seeded	red clover under seeded		atriplex, spreading	buckwheat, wild	canola, volunteer	carrot, wild	chickweed
Pre-emergence herbicides (weeds emerged at time of application) – Ratings at 4-6 weeks after application														
6	Eragon LQ + Merge	14	✓	x	x	✓	x	x	E	9	9	9	–	–
Pre-emergence herbicides (weeds not emerged at time of application) – Ratings at 4-6 weeks after application														
7	Focus	14,15	x	x	x	✓	x	x	G	–	–	9	–	8
8	Treflan	3	✓	x	x	✓	x	x	P	–	–	–	–	–
9	Valtera	14	x	x	x	✓[1]	x	x	G	–	7	9	–	9
Post-emergence herbicides (weeds emerged at time of application) – Ratings at 4-6 weeks after application														
10	2,4-D Amine	4	✓[1]	x	✓	✓	x	x	G	–	–	9	–	–
11	2,4-D Ester	4	✓[1]	x	✓	✓	x	x	G	9	–	9	–	–
12	2,4-DB (Embutox, Caliber, Cobutox)	4	✓	✓	✓	✓	✓	✓	G	–	–	9	–	–
12	2,4-DB + MCPA	4,4	✓	✓	x	✓	✓	x	G	–	6	9	–	–
13	Barricade M	2,2,4,4	✓	x	x	✓	x	x	E	9	9	9	7	8
14	Boost M co-pack	2,4	✓[1]	✓	x	✓	x	x	G	9	9	9	7	7
15	Buctril M (bromoxynil/MCPA)	4,6	✓[1]	✓	✓	✓	x	✓	E	–	9	9	–	–
16	Estaprop XT (dichlorprop/2,4-D)	4	✓[1]	x	x	✓	x	x	G	9	8	9	–	–
17	Enforcer M	4,6,6	✓	x	x	✓	x	x	E	9	9	9	–	8
18	Infinity	27,6	✓[1]	x	x	✓	x	x	E	9	9	9	–	7
19	Infinity FX	27,6,4	✓1	x	x	✓	x	x	E	9	9	9	–	7
20	Lontrel	4	✓[1]	x	x	✓[1]	x	x	G	–	8	–	7	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop
[1] Only labeled for use on spring planted varieties.
[2]Top growth burnoff only, re-growth will occur
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS																					
cleavers	cocklebur	dandelion	fleabane, Canada	ground ivy	hemp-nettle	horsetail	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	speedwell species	shepherd's-purse	sow-thistle	stinkweed	thistle, Canada	velvetleaf	vetch	violet, field
–	–	7	9	–	–	6	9	9	9	9	–	9	9	9	–	9	8[2]	9	–	–	6[2]	9
7	–	–	–	–	–	–	–	7	–	–	–	–	–	–	–	–	–	8	–	–	–	–
–	–	–	–	–	–	–	–	8	–	–	–	8	–	–	–	–	–	–	–	–	–	–
–	–	7	–	–	–	–	7	9	–	8	9	9	7	–	–	–	–	–	–	7	–	–
–	8	–	8	7	–	9	–	9	9	9	7	9	9	9	6	9	–	9	8	8	8	–
–	8	–	9	7	–	9	–	9	9	9	7	9	9	9	8	9	–	9	8	8	8	–
–	8	–	–	–	–	–	–	7	–	7	7	9	8	–	–	8	–	6	–	8	–	–
–	8	–	–	–	–	–	–	9	–	9	7	9	8	–	–	8	–	6	–	8	–	–
9	9	–	8	6	9	9	9	9	8	9	–	9	9	9	9	9	8	9	8	8	8	8
6	7	–	6	8	9	9	9	9	9	9	7	9	9	7	9	9	8	9	7	8	6	8
–	9	–	6	9	7	9	9	9	8	9	9	8	9	7	–	9	7	9	–	9	–	–
–	–	6	9	7	7	9	8	9	9	9	–	9	9	9	9	9	8	9	8	–	7	9
9	–	6	8	8	9	7	9	9	8	9	9	9	9	7	6	9	7	9	7	9	8	–
8	–	8	9	–	9	6	9	9	8	9	9	9	9	8	–	9	7	9	7	9	–	–
9	–	8	9	–	9	6	9	9	8	9	9	9	9	8	–	9	7	9	7	9	8	–
8	–	–	9	–	–	8	–	–	–	–	–	–	7	9	–	–	9	–	9	–	9	–

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Post-emergence herbicide weed control ratings in cereals *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	CROP USES						Cereal Crop Tolerance					
			barley	oats	rye	wheat	alfalfa under seeded	red clover under seeded		atriplex, spreading	buckwheat, wild	canola, volunteer	carrot, wild	chickweed
20	Lontrel + 2,4-D	4,4	✓[1]	x	x	✓[1]	x	x	G	9	8	9	7	–
20	Lontrel + MCPA	4,4	✓[1]	x	x	✓[1]	x	x	G	9	8	9	7	–
21	MCPA Amine	4	✓[1]	✓	✓	✓	x	x	G	–	–	9	–	–
22	MCPA Ester	4	✓[1]	✓	✓	✓	x	x	G	9	–	9	–	–
23	MCPA Sodium	4	✓[1]	✓	✓	✓	x	✓	G	–	–	9	–	–
24	Pardner (bromoxynil)	6	✓[1]	✓	✓	✓	x	x	E	–	8	8	–	–
25	Peak + Pardner	2,6	x	x	x	✓	x	x	E	6	9	9	8	–
26	Pixxaro co-pack	4,4,4	✓	x	x	✓	x	x	E	–	8	9	–	8
27	Refine SG	2	✓[1]	✓	x	✓	x	x	E	–	9	8	7	7
28	Refine M co-pack	2,4	✓[1]	✓	x	✓	x	x	G	9	9	9	7	7
29	Simplicity GoDRI	2	x	x	x	✓	x	x	G	–	6	8	–	8
30	Trophy co-pack	4,4	x	x	x	✓	x	x	G	9	7	9	–	8
31	Tropotox Plus (MCPA/MCPB)	4	✓[1]	✓	✓	✓	✓	✓	G	–	7	9	–	–
32	Varro	2	x	x	x	✓	x	x	G	–	7	–	–	–

OTHER WEEDS OF SIGNIFICANCE FOUND IN CEREAL CROPS

Weed Species	Herbicide Name (Rating)
biennial wormwood:	Peak + Pardner (9)
bur cucumber:	Peak + Pardner (7)
chamomile, scentless	Barricade M (8), Boost M (8), Enforcer (8), Refine SG /Refine M (8), Buctril M (6), Estaprop XT (6)
three-seeded mercury	2,4-D Ester (8), MCPA Amine (8), MCPA Ester (8), Peak + Pardner (8), 2,4-D Amine (7)
waterhemp	PRE: Focus (8), Valtera (8) POST: Infinity (9), Trophy (9)

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BROADLEAF WEEDS																					
cleavers	cocklebur	dandelion	fleabane, Canada	ground ivy	hemp-nettle	horsetail	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	speedwell species	shepherd's-purse	sow-thistle	stinkweed	thistle, Canada	velvetleaf	vetch	violet, field
8	8	–	9	7	–	9	9	9	9	9	7	9	9	9	–	9	9	9	9	8	9	–
8	7	–	9	8	7	9	9	9	9	9	–	9	9	9	–	9	9	9	9	8	9	–
–	7	–	7	8	8	9	9	9	9	9	–	9	9	8	9	9	7	9	8	8	7	8
–	7	–	8	9	8	9	9	9	9	9	–	9	9	8	9	9	7	9	8	8	7	8
–	7	–	–	–	8	–	9	9	–	9	–	9	8	–	–	9	–	9	–	8	–	–
–	8	–	–	–	–	–	8	9	–	7	9	7	9	–	–	8	6	8	–	9	–	–
–	9	–	7	–	9	9	9	9	8	9	–	9	9	–	8	9	8	9	–	9	–	6
8	9	8	9	–	8	8	7	9	9	9	8	9	9	9	–	9	9	9	6	–	8	–
6	–	–	–	6	9	–	9	9[R]	8	8	–	9[R]	7[R]	–	9	9	8	9	7	8	–	8
6	7	–	6	8	9	9	9	9	9	9	–	9	9	7	9	9	8	9	7	9	6	8
8	–	6	–	–	9	–	9	6	–	–	–	8	–	–	–	9	–	9	6	–	–	–
9	9	–	8	–	8	9	7	9	8	9	–	9	9	9	–	9	8	9	8	–	9	–
–	–	–	–	–	8	–	–	9	–	9	–	9	9	–	–	9	9	9	9	9	–	–
8	–	–	–	–	9	–	8	7	–	9	–	8	–	–	–	8	–	8	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Only labeled for use on spring planted varieties.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

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TABLE 4-5
Harvest aid and post-harvest herbicide weed control ratings in cereals

			TIMING		GRASSY WEEDS						
TRT #	HERBICIDE TREATMENT	WSSA GROUP	Harvest Aid	Post Harvest	bentgrass, loose-silky	bluegrass, annual	brome, downy	chess	wild oats	quackgrass	volunteer cereals
HARVEST AID HERBICIDES : emerged weed control ratings at 7 days after application											
36	Aim EC + Merge		✓	✓	–	–	–	–	–	–	–
37	Eragon LQ + Merge		✓	✓	–	–	–	–	–	–	–
38	Eragon LQ + glyphosate		✓	✓	6	6	6	6	6	6	6
39	glyphosate (1x rate)		✓	✓	6	6	6	6	6	6[2]	6
POST HARVEST HERBICIDES: emerged weed control ratings at 4 weeks after application											
40	glyphosate (1x rate)	9	✓	✓	7	7	9	9	9	9	9
40	glyphosate (2x rate)	9	x	✓	9	9	9	9	9	9	9
41	2,4-D ester 700	4	x	✓	–	–	–	–	–	–	–
42	Engenia or Xtendimax	4	x	✓	–	–	–	–	–	–	–
43	Enlist Duo	4	x	✓	–	–	9	–	9	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur
[2] Pre-harvest treatments provide effective long-term management of these perennial weed species, but little visual control is observed at 7 days after application
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS(ANNUAL, BIENNIAL OR PERENNIAL)																				
bindweed, field	burdock (2nd year)	Canada thistle	carrot, wild	chickweed	cleavers	clover, red	dandelion	fleabane, Canada	henbit	horse-nettle	horsetail, field	lamb's-quarters	lettuce, prickly	pigweed	plantain, broad-leaved	ragweed, common	shepherd's-purse	sow-thistle, perennial	vetch	violet (pre flower)
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	5	6	5	6	6	5	5	6	6	6	–	6	6	6	6	6	6	6	5	6
5	5	6	5	6	6	5	5	6	6	6	–	6	6	6	6	6	6	6	5	6
3	3	3[2]	3	3	3	3	3[2]	3[R]	3	3	–	3	3	3	3	36	3	3[2]	3	3
7	7	7	7	9	9	7	7	9[R]	9	8[I]	–	9	9	9	9	9[R]	9	8	–	7
8	8	8	8	9	9	8	9	9[2]	9	8[I]	–	9	9	9	9	9[R]	9	8	–	7
8	6	–	–	–	–	6	7	8	–	–	–	8	8	8	8					
–	–	81	–	–	7	9	–	9	–	6	–	8	–	8	–	8	–	8	9	–
8	6	–	–	9	–	8	–	8	–	–	8	9	9	9	8	9	9	–	9	6

CHAPTER 4: CEREALS

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT HERBICIDES			
1	**glyphosate (360 g/L)** **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha,	1-2 L/acre 0.8-1.6 L/acre 0.75-1.5 L/acre 0.67-1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour for emerged weeds **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 15 m
2	**Enlist Duo (S)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D choline salt, (194 g/L), 432-844 g a.i./ha 2) glyphosate, (204 g/L), 454-877 g a.i./ha	0.89, 1.34 or 1.74 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 48 hours **PHI:** 30 days (grain) **Rainfast:** 2 hours for emerged weeds **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 15 m
3	**2,4-D Ester 700 (EC)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (660 g a.e./L), 528-726 g a.e./ha	0.32-0.44 L/acre **WSSA Group:** 1) 4	**REI:** 24 hours **PHI:** none stated **Rainfast:** 2 hours for emerged weeds **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m
4	**Aim EC + Merge:** 1) Aim EC 2) + Merge **Active Ingredient(s), concentration, rate:** 1) carfentrazone-ethyl, (240 g/L), 9-28.2 g a.i./ha	1) 15-47 ml/acre 2) 1 L/1,000 L **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 5 m • Aquatic: 1 m
5	**Blackhawk (EC)** **Active Ingredient(s), concentration, rate:** 1) pyraflufen-ethyl, (6.1 g /L), 4.5-6.7 g a.i./ha 2) 2,4-D ester (473 g a.e./L), 350-520 g a.e./ha	296-440 mL/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours for emerged weeds **Buffer Zones:** • Terrestrial: 2 m • Aquatic: 1 m

APPLICATION NOTES
• Apply PP or prior to the emergence of cereals. • The lower rate is used when targeting annual weeds, while the higher rate is used when targeting perennial weeds, especially dandelion when larger than 15 cm in diameter. • Allow at least 1 day after application to annual weeds, at least 3 days after application to quackgrass and allow at least 10 days after application to rosette Canada thistle before any tillage operation.
• Crops: Barley (spring), rye (spring, winter) and wheat (spring, winter). Can be applied prior to planting or before crop emergence. Only weeds emerged at application time will be controlled. • Use 0.89 L/acre when weeds are less than 8 cm tall and 1.34 L/acre when the weeds are 8-15 cm tall. • Use the 1.74 L/acre rate for perennial weeds or when applied in the fall for control of red clover. • Apply in 20-40 L/acre of spray solution.
• Crops: Barley (spring), rye (spring, winter) and wheat (spring, winter). Can be applied PP or before crop emergence. Only weeds emerged at application time will be controlled. • Use the 0.32 L/acre rate when the targeted weeds are less than 8 cm tall. • Use the 0.44 L/acre rate for difficult to control species (e.g., fleabane) or if taller than 8 cm. • Usually tank mixed with glyphosate to control a wider range of weed species.
• Crops: Barley (spring), rye (spring, winter), oats, triticale and wheat (spring, winter). Only weeds emerged at application time will be controlled. • The use rate is dependent on specific weed and weed size, please refer to the label. • Usually tank mixed with glyphosate to control a wider range of weed species. Apply in a minimum of 40 L/acre spray solution. • A non-ionic surfactant at 2.5 L/1,000 L can be substituted for Merge.
• Crops: Barley, oats, rye (spring, winter), triticale and wheat (spring, winter). Can be applied prior to planting or before crop emergence. Only weeds emerged at application time will be controlled. • Use 296 mL/acre when weeds are less than 5 cm tall or wide and 400 mL/acre rate when weeds are larger than 5 cm tall or wide, or difficult to control (e.g., fleabane, wild buckwheat). • Apply in 20-40 L/acre of spray solution. • Usually tank mixed with glyphosate to control a wider range of weed species..

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
6	**Eragon LQ (SC) + Merge:** 1) Eragon LQ (SC) 2) Merge adjuvant **Active Ingredient(s), concentration and rate:** 1) saflufenacil, (342 g/L), 49.7 g a.i./ha	1) 59 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour on emerged weeds **Buffer Zones:** • Terrestrial: 10 m
7	**Focus (SE)** **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (447 g/L), 100 g a.i./ha and carfentrazone-ethyl, (53 g/L), 12 g a.i./ha	90 mL/acre or 112 mL/acre or 134 mL/acre **WSSA Group:** 1) 15, 14	**REI:** 12 hours **PHI:** 42 days **Rainfast:** none stated **Buffer Zones:** • Terrestrial: 5 m • Aquatic: 5 m
8	**Treflan EC** **or Bonanza EC** **or Rival EC** **or Triflurex 40 EC** **Active Ingredient(s), concentration, rate:** **Treflan:** trilfuralin, (480 g/L), 576-816 g a.i./ha **Bonanza:** trilfuralin, (480 g/L), 576-816 g a.i./ha **Rival:** trilfuralin, (500 g/L), 600-800 g a.i./ha **Triflurex:** trilfuralin, (412 g/L), 576-865 g ai/ha	480-680 mL/acre 480-680 mL/acre 480-640 mL/acre 560-840 mL/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 35 m
9	**Valtera (WDG)** **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (51.1%), 71.54-107.31 g a.i./ha	56-84 g/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated **Buffer Zones:** • Terrestrial: 10 m • Aquatic: 3 m
POST-EMERGENCE BROADLEAF HERBICIDES			
10	**2,4-D Amine 600 (SN)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (564 g a.e./L), 338.4- 507.6 g a.e./ha	240-360 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m

APPLICATION NOTES
• Crops: Barley and wheat (spring, winter). Can be applied prior to planting or before crop emergence. Mainly controls emerge weeds but will suppress emergence of lamb's-quarters, pigweed, stinkweed, wild buckwheat and wild mustard. • Apply in 40-80 L/acre of spray solution. • Should be tank mixed with glyphosate to control a wider range of weed species, refer to treatment # 1 for the appropriate rate of glyphosate.
• Crops: wheat (spring, winter). Can be applied prior to planting or before crop emergence. Will control susceptible weeds only if applied before their emergence and rainfall has activated the herbicide. • Crops should be seeded a minimum of 2.5 cm deep. Shallower seeding will increase risk of crop injury. • 90 mL/acre provides early season control. Use 112 mL/acre on coarse-medium texture soils with organic matter at 1%-4%. Use 134 mL/acre on medium-fine to fine texture soils with O.M. at 4%-7%. • Apply in 40-80 L/acre of spray solution. • Should be tank mixed with glyphosate to control a wider range of weed species, refer to treatment # 1 for the appropriate rate of glyphosate.
• Crops: Barley and wheat. Must be applied after planting but incorporated with a harrow before crop emergence. Will control susceptible weeds only if applied before their emergence and rainfall has activated the herbicide. • For loose silky bentgrass control in the fall. Seed the crop approximately 5 cm deep to separate the germinating seed from the chemical. • Apply as soon as possible after planting, incorporate shallowly into the soil surface with drag harrows.
• Crops: wheat (spring) • Apply a minimum of 7 days before planting and before weed emergence. • Apply 56 g/acre on coarse textured soil (< 5% O.M.) and 84 g/acre on medium textured soil (> 5% O.M.). • Tank-mix with glyphosate if there are emerged weeds at the time of application.
• Crops: barley (spring), rye (spring, winter), wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply to emerged spring cereals from the 3 leaf to early flag leaf stage of growth. • Apply to emerged winter cereals from early tillering to just before the flag leaf stage of growth. • Do NOT apply to seedling winter cereals in the fall. • Use the lower rate when weeds are < 8 cm tall, the higher rate for harder to control species .

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
11	**2,4-D Ester 700 (EC)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (660 g a.e./L), 528-726 g a.e./ha	0.32-0.44 L/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m
12	**2,4-DB (EC)** Embutox, Caliber 625 or Cobutox 625 **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (625 g/L), 1406.25 g a.i./ha	900 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m
13	**Barricade M (co-pack):** 1) Barricade SG 2) + Perimeter II 3) + MCPA Ester 600 4) + Non-Ionic Surfactant **Active Ingredient(s), concentration, rate:** 1) thifensulfuron-methyl, (25%), 7.5 g a.i./ha and tribenuron-methyl, (25%),7.5 g a.i./ha 2) fluroxypyr, (333 g a.e./L), 69.93 g a.e./ha 3) MCPA, (600 g a.e./L), 285 g a.e./ha	40 acre per case 1) 12 g/acre 2) 84 mL/acre 3) 190 mL/acre 4) 2 L/1,000 L **WSSA Group:** 1) 2, 2 2) 4 3) 4	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 1 m
14	**Boost M (co-pack):** 1) Boost Herbicide 2) + MCPA Ester 600 3) + Non-Ionic Surfactant **Active Ingredient(s), concentration, rate:** 1) thifensulfuron-methyl, (50%), 10 g a.i./ha and tribenuron-methyl, (25%), 5 g a.i./ha 2) MCPA, (600 g a.e./L), 562.5 g a.e./ha	40 acre per case 1) 8 g/acre 2) 375 mL/acre 3) 2 L/1,000 L **WSSA Group:** 1) 2, 2 2) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 4 hours **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 15 m
15	**Buctril M (EC)** **or Badge (EC), Logic M (EC), Mextrol (EC)** **Active Ingredient(s), concentration, rate:** **1) Buctril M:** 1) bromoxynil, (280 g/L), 280 g a.i./ha and 2) MCPA, (280 g a.e./L), 280 g a.e./ha **2) Badge, Logic M, Mextrol:** 1) bromoxynil, (225 g/L), 281 g a.i./ha and 2) MCPA, (225 g a.e./L), 281 g a.e./ha	0.4 L/acre 0.5 L/acre **WSSA Group:** 1) 4 2) 5	**REI:** 24 hours **PHI:** 30 days **Rainfast:** 4 hours **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m

APPLICATION NOTES
• Crops: barley (spring), rye (spring, winter), wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply to emerged spring cereals from the 4 leaf to early flag leaf stage of growth. • Apply to emerged winter cereals from early tillering to just before the flag leaf stage of growth. • Do NOT apply to seedling winter cereals in the fall. • Use the lower rate when weeds are < 8 cm tall, the higher rate for harder to control species .
• Crops: barley, oats and wheat. Only weeds emerged at application time will be controlled. • Apply to emerged cereals from the 5 leaf to early flag leaf stage of growth. • Apply in 60-80 L/acre water. Oats may be damaged if treated before the 5 leaf stage. • Apply when the legumes are in the 1-4 trifoliate stage. • Wild mustard plants are not controlled if sprayed when they are beyond the 4 leaf stage. To improve control of wild mustard, tank-mix MCAP Amine 500 at 28 mL/acre.
• Crops: barley (spring), oats and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply to emerged cereals from 3 tillers to before the flag leaf stage of growth. • Apply once per season to young actively growing weeds that are less than 10 cm tall or across. • Barricade M will severely injure or kill emerged red clover that has been under-seeded.
• Crops: barley (spring), oats and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply to emerged cereals from 3 tillers to before the flag leaf stage of growth. • Apply in 20-80 L/acre water, once per season to young actively growing weeds < 10 cm tall or across. • Boost M will severely injure or kill emerged red clover that has been under-seeded.
• Crops: barley (spring), oats, rye and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply to emerged cereals from the 2 leaf to early flag leaf stage of growth. • Target annual weeds in the 2-6 leaf stage and winter annual weeds before flower buds appear. • Under seeded Red Clover (Winter Wheat): Apply when the red clover is in the 1st-3rd trifoliate stage. • Do NOT apply in less than 80 L/acre of spray solution.

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
16	**Estaprop XT (EC) or Dichlorprop-DX (EC) or Turboprop (EC)** **Active Ingredient(s), concentration, rate:** **1) Estaprop XT, Dichlorprop DX:** 1) dichlorprop, (210 g a.e./L), 252 g a.e/ha and 2) 2,4-D, (400 g a.e./L), 480 g a.e./ha **2) Turboprop:** 1) dichlorprop, (300 g a.e./L), 525 g a.e/ha and 2) 2,4-D, (282 g a.e./L), 493.5 g a.e./ha	0.48 L/acre 0.7 L/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m
17	**Enforcer M (EC)** **Active Ingredient(s), concentration, rate:** 1) fluroxypyr, (80 g/L), 100 g a.i./ha 2) bromoxynil, (200 g/L), 250 g a.i./ha 3) MCPA (200 g/L), 250 g a.i./ha	0.5 L/acre **WSSA Group:** 1) 4 2) 6 3) 4	**REI:** 24 hours **PHI:** 60 days **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m
18	**Infinity (EC)** **Active Ingredient(s), concentration, rate:** 1) pyrasulfotole, (37.5 g/L), 30.94 g a.i./ha 2) bromoxynil, (210 g/L), 173.25 g a.i./ha	335 mL/acre **WSSA Group:** 1) 27 2) 6	**REI:** 12 hours **PHI:** 50 days (wheat), 45 days (barley) **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 5 m • Aquatic: 1 m
19	**Infinity FX (EC)** **Active Ingredient(s), concentration, rate:** 1) pyrasulfotole, (31.1 g/L), 31.1 g a.i./ha 2) bromoxynil, (174.3g/L), 174.3 g a.i./ha 3) fluroxypyr (72 g/L), 72 g a.i./ha	400 mL/acre **WSSA Group:** 1) 27 2) 6 3) 4	**REI:** 24 hours **PHI:** 60 days (cereals), 30 days (grazing, forage) **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 5 m • Aquatic: 1 m
20	**Lontrel 360** **Active Ingredient(s), concentration, rate:** 1) clopyralid, (360 g/L), 106 -201.6-299 g a.i./ha	118 mL/acre 224 mL/acre 332 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours **Buffer Zones:** • Terrestrial: 2 m

APPLICATION NOTES
• Crops: barley (spring) and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply to emerged cereals from full tillering to early flag leaf stage of growth. • Do NOT apply to seedling winter cereals in the fall. • Do NOT use if under seeded with legumes.
• Crops: barley and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply from the 2 leaf stage to the early flag leaf stage of growth. Apply only once per growing season. • Do not harvest for forage, hay or graze for 30 days after application.
• Crops: barley (spring) and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply prior to the flag leaf stage of growth. Apply only once per growing season. • The addition of ammonium sulphate at 0.4 L/acre is required to control cleavers at the 4-6 whorl growth stage and suppression of giant ragweed and spreading atriplex. • Infinity will severely injure or kill emerged red clover that has been under-seeded.
• Crops: barley (spring) and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Crops may be treated from the 2 leaf stage of growth until the flag leaf is just visible but still rolled • Infinity FX will severely injure or kill emerged red clover that has been under-seeded. • The addition of AMS at 0.4 L/acre (49% solution) or 0.5 L/acre (40% solution) will improve efficacy on Canada fleabane, giant ragweed and spreading atriplex.
• Crops: barley (spring) and wheat (spring) . Only weeds emerged at application time will be controlled. • Apply to emerged cereals from the 3 leaf to flag leaf stage of growth. • The 118 mL/acre rate will only control vetch and clovers, while 332 mL/acre should only be used for season long control of Canada thistle which will reduce populations the following spring. • Lontrel 360 will kill red clover that has been under-seeded. • To control a wider spectrum of broadleaf weeds, tank-mix either 2,4-D or MCPA.

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
21	**MCPA AMINE 500 (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPA, (500 a.e./L), 350-850 g a.e./ha	280-680 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 4 hours **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m
22	**MCPA ESTER 500 (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPA, (500 a.e./L), 290-525 g a.e./ha	232-420 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m
23	**MCPA Sodium 300 (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPA, (300 a.e./L), 270-450 g a.e./ha	360-600 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m
24	**Pardner (EC)** **or Koril 235** **or Bromotril, Brotex 240** **or Bromax, Brotex 480** **Active Ingredient(s), concentration, rate:** 1) bromoxynil, (280 g/L), 280-336 g a.i./ha	400-480 mL/acre 490-572 mL/acre 480-560 mL/acre 240-280 mL/acre **WSSA Group:** 1) 6	**REI:** 24 hours **PHI:** none stated **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m
25	**Peak 75 (WG) + Pardner (EC):** 1) Peak 75 (WG) 2) + Pardner (EC) 3) + non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) prosulfuron, (75%), 9.975 g a.i./ha 2) bromoxynil, (280 g/L), 140 g a.i./ha	1) 5.3 g/acre 2) 200 mL/acre 3) 2 L/1,000 L **WSSA Group:** 1) 2 2) 6	**REI:** 12 hours **PHI:** 75 days **Rainfast:** 4 hours **Buffer Zones:** • Terrestrial: 22 m

APPLICATION NOTES
• Crops: barley (spring), oats, rye and wheat (spring, winter). Only weeds emerged at application time will be controlled. Apply to emerged cereals from the 3 leaf to 5 leaf stage of growth. • The maximum rate that you can apply to oats is 440 mL/acre. • A 280 mL/acre rate should be used to control susceptible weeds in the seedling stage (2-4 leaf) and then increased to 440 mL/acre if heavy infestations or poor environmental conditions exist. • A 500 mL/acre rate should be used for "hard-to-kill' weeds in the seedling stage (2-4 leaf) and then increased to 680 mL/acre if weeds are at the bud stage or poor environmental conditions exist. • Rates above 440 mL/acre may cause crop injury.
• Crops: barley (spring), oats, rye and wheat (spring, winter). Only weeds emerged at application time will be controlled. Apply to emerged cereals from the 3 leaf to 5 leaf stage of growth. • The maximum rate that you can apply to oats is 360 mL/acre. • A 232 mL/acre rate should be used to control susceptible weeds in the seedling stage (2-4 leaf) and then increased to 360 mL/acre if heavy infestations or poor environmental conditions exist. • A 420 mL/acre rate should be used for "hard-to-kill' weeds in the seedling stage (2-4 leaf).
• Crops: barley (spring), oats, rye and wheat (spring, winter). Only weeds emerged at application time will be controlled. Apply to emerged cereals up to the early flag leaf stage of growth. • For use on cereals under seeded to red clover, apply at the early stage of clover development. • Apply in 72-96 L/acre of water, the lower rate may not kill ragweed.
• Crops: barley (spring), oats and wheat (spring, winter). Only weeds emerged at application time will be controlled. Apply to emerged cereals up to the early flag leaf stage of growth. • Apply when the weeds are in the 1-4 leaf stage and cereals are in the 2 to early flag leaf stage. Use the higher rate when weeds are past the 4 leaf stage. • Winter Wheat: More effective on winter annuals when applied as a fall treatment.
• Crops: wheat (winter). Only weeds emerged at application time will be controlled. • Apply up to and including GS 32 (stem elongation). • Peak 75WG will severely injure or kill emerged red clover that has been under-seeded.

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
26	**Pixxaro (co-pack):** 1) Pixxaro A (EC) 2) MCPA Ester 600 (EC) **Active Ingredient(s), concentration, rate:** 1) halauxifen, (16.25 g/L), 5 g a.i./ha and fluroxypyr (250 g/L), 76.875 g a.i./ha 2) MCPA, (500 a.e./L), 295 g a.e./ha	40 acre per case 1) 123 mL/acre 2) 236 mL/acre **WSSA Group:** 1) 4,4 2) 4	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 2 m • Aquatic: 1 m
27	**Refine SG + non-ionic surfactant:** 1) Refine SG 2) + non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) thifensulfuron-methyl, (33.35%), 10 g a.i./ha and tribenuron-methyl, (16.65%), 5 g a.i./ha	1) 12 g/acre 2) 2 L/1,000 L **WSSA Group:** 1) 2,2	**REI:** 12 hours **PHI:** 7 days **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 1 m
28	**Refine M (co-pack) + non-ionic surfactant:** 1) Refine SG 2) + MCPA Ester 600 (EC) 3) + non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) thifensulfuron-methyl, (33.35%), 10 g a.i./ha and tribenuron-methyl, (16.65%), 5 g a.i./ha 2) MCPA, (600 g a.e./L), 285 g a.e./ha	80 acre per case 1) 12 g/acre 2) 190 mL/acre 3) 2 L/1,000 L **WSSA Group:** 1) 2,2 2) 4	**REI:** 12 hours **PHI:** 7 days **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 1 m
29	**Simplicity GoDRI (WG) + Merge:** 1) Simplicity GoDRI 2) + Merge **Active Ingredient(s), concentration, rate:** 1) pyroxsulam, (21.5%), 15.05 g a.i./ha	1) 28 g/acre 2) 5 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 2 m • Aquatic: 1 m
30	**Trophy (co-pack):** 1) Nufarm Fluroxypyr 2) MCPA Ester 600 **Active Ingredient(s), concentration, rate:** 1) fluroxpyr, (180 g/L), 108 g a.i./ha 2) MCPA, (600 g a.e./L), 562.5 g a.e./ha	20 acre per case 1) 240 mL/acre 2) 375 mL/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 2 m • Aquatic: 1 m

APPLICATION NOTES
• Crops: barley (spring) and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 3 leaf stage up to just before flag leaf emergence. • Extreme growing conditions such as drought or near freezing temperature prior to, at or following application may reduce weed control and increase the risk of crop injury at all stages of growth. • If foliage is wet at the time of application control may be decreased. • Pixxaro will severely injure or kill emerged red clover that has been under-seeded.
• Crops: barley (spring), oats and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 2 leaf stage to flag leaf stage. • Apply once per growing season, for winter wheat Refine SG can be applied in the fall or spring. • Apply to young actively growing weeds that are less than 10 cm tall or across. • Refine SG will severely injure or kill emerged red clover that has been under-seeded.
• Crops: barley (spring), oats and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 2 leaf stage to flag leaf stage. • Apply to young actively growing weeds that are less than 10 cm tall or across. • Refine M will severely injure or kill emerged red clover that has been under-seeded.
• Crops: wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 3 leaf stage up to just before flag leaf emergence. • For winter wheat: apply in the fall or spring. Control of downy brome, chess and other winter annuals is better when applied in the fall. • Near freezing temperature prior to, at or following application may reduce weed control and increase the risk of crop injury at all stages of growth. • Occasionally slight yellowing or height reduction may be observed in the treated crop. These transient symptoms disappear within 14 days with no reduction to yield.
• Crops: barley (spring), wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 3 leaf stage up to just before flag leaf emergence. • Do NOT apply to seedling winter cereals in the fall. • For control of winter annuals apply early before flower buds appear on the weeds.

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
31	**Tropotox Plus (Li) or Clovotox Plus (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPB, (375 g a.e./L), 1031.25-1593.75 g a.e./ha and MCPA (25 g a.e./L), 68.75-106.25 g a.e./ha	1.1-1.7 L/acre **WSSA Group:** 1) 4, 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m
32	**Varro (Su)** **Active Ingredient(s), concentration, rate:** 1) thiencarbazone-methyl, (10 g/L), 5 g a.i./ha	200 mL/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 60 days (cereals), 7 days (grazing), 30 days (hay) **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 1 m
POST-EMERGENCE GRASSY HERBICIDES			
33	**Axial (EC)** **Active Ingredient(s), concentration, rate:** 1) pinoxaden, (50 g/L), 1031.25-1593.75 g a.e./ha	500 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days (spring wheat), 72 days (winter wheat), 7 days (grazing), 30 days (hay) **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 1 m
34	**Liquid Achieve or Bison 400 L + Adjuvant:** 1) Liquid Achieve or Bison 400 L 2) + Turbocharge D or Addit Adjuvant **Active Ingredient(s), concentration, rate:** 1) tralkoxydim, (400 g/L), 200 g a.i./ha	1) 200 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days (cereals), 16 days (cut or grazed for forages) **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 3 m
35	**Puma Advance (EC) or Bengal (EC), Vigil (EC)** **Active Ingredient(s), concentration, rate:** **Puma Advance:** fenoxaprop-p-ethyl, (90 g/L), 92.7 g a.i./ha **Bengal, Vigil:** fenoxaprop-p-ethyl, (120 g/L), 93 g a.i./ha	412 mL/acre 310 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour **Buffer Zones:** • Terrestrial: 3 m

APPLICATION NOTES
• Crops: barley (spring), oats, rye and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 2 leaf stage to flag leaf stage. • Use if cereals are under seeded to red, alsike, ladino or white Dutch clover and grasses. • Apply in 60-80 L/acre of water and when legumes are in the unifoliate to the 4th trifoliate leaf stage.
• Crops: wheat (spring, winter). • Apply Varro from the 1 - 6 leaf stage on the main stem up to emergence of the third tiller, but before appearance of the first node (jointing) • Avoid crop injury: do not apply an ALS herbicide such as Varro following the appearance of the first node • Under drought conditions: do not spray Varro herbicide if >35 days between seeding and spraying, as drought hastens crop development • Do not spray within three days before or after cold temperatures (3°C or lower)
• Crops: barley (spring) and wheat (spring, winter). • Apply when grassy weeds are between the 1-6 leaf stage and up to the flag leaf stage of cereals. • The label warns against applying to a cereal crop that has been stressed by a frost. • Apply in 20-40 L/acre of water. • Can be tank-mixed with a number of broadleaf herbicides. The broadleaf herbicide should always be added first.
• Crops: barley, rye (spring, winter), triticale and wheat (spring, winter). Only weeds emerged at application time will be controlled. • Apply up to and including GS 32 (stem elongation). • Do NOT use on tame oats. Avoid applying when temperatures of 4°C or less up to 48 hours before or after application or crop injury may occur. • Apply at 1-6 leaf stage of wild oats in 20-40 L/acre of water. • Do NOT tank-mix with REFINE SG, BOOST, REFINE M or BOOST M. • Do NOT feed or graze under seeded forage in year of treatment. • Mature straw may be fed to livestock. One application per year.
• Crops: barley and wheat (spring). Only weeds emerged at application time will be controlled. • Apply when cereals are emerged from the 1 leaf stage to 6 leaf stage. • Do NOT use on tame oats. Avoid applying when temperatures of 4°C or less up to 48 hours before or after application or crop injury may occur. • Apply at 1-6 leaf stage of wild oats in 20-40 L/acre of water.

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
HARVEST AID HERBICIDES			
36	**Aim EC + Merge:** 1) Aim EC 2) + Merge adjuvant **Active Ingredient(s), concentration, rate:** 1) carfentrazone-ethyl, (240 g/L), 18-28.2 g a.i./ha	1) 30-47 mL/acre 2) 10 L/1,000 L **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3 days **Rainfast:** 2 hours **Buffer Zones:** • Terrestrial: 5 m
37	**Eragon LQ (SC) + Merge:** 1) Eragon LQ (SC) 2) + Merge adjuvant **Active Ingredient(s), concentration and rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha	1) 29.5-59 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3-10 days **Rainfast:** 1 hour on emerged weeds **Buffer Zones:** • Terrestrial: 10 m
38	**Eragon LQ (SC) + glyphosate (1x) + Merge:** 1) Eragon LQ (SC) 2) + glyphosate (540 g/L) 3) + Merge adjuvant **Active Ingredient(s), concentration and rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha 2) glyphosate, (540 g/L), 900 g a.e./ha	1) 29.5-59 mL/acre 2) 0.67 L/acre 3) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3-10 days **Rainfast:** 1 hour on emerged weeds **Buffer Zones:** • Terrestrial: 10 m
39	**glyphosate (360 g/L)** **or glyphosate (480 g/L)** **or glyphosate (500 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900g a.e./ha	1 L/acre 0.75 L/acre 0.72 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour for emerged weeds **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 15 m
POST HARVEST HERBICIDES			
40	**glyphosate (360 g/L)** **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1-2 L/acre 0.8-1.6 L/acre 0.75-1.5 L/acre 0.67-1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** not applicable **Rainfast:** 1 hour for emerged weeds **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 15 m

APPLICATION NOTES
HARVEST AID: • Apply to actively growing weeds, up to 10 cm. • Coverage of weed and crop foliage is essential for control. • Do NOT harvest within 3 days of application.
HARVEST AID: • Apply at hard dough stage when crop is at 30% grain moisture or less. • Apply in 80 L/acre of water. • Pre-harvest interval (PHI) is 3 days. • For use only on wheat (durum, spring, winter), barley (spring, winter, malting), and triticale.
HARVEST AID: • Apply at hard dough stage when crop is at 30% grain moisture or less. • Apply in 80 L/acre of water. • Do NOT apply to crops grown for seed. • For use only on wheat (durum, spring, winter), barley (spring, winter, malting), and triticale. • Refer to pre-harvest precautions for glyphosate and rates associated with products containing different concentrations of the active ingredient, treatment 35.
HARVEST AID: • Apply in 20-40 L/acre water when crop is at 30% grain moisture or less. • Apply at least 7 days prior to harvest and use ground application only. • Do NOT apply to seed crops.
• Apply Post harvest. • A frost of 0°C to -3°C will not usually harm the target weeds and spraying can resume later in the day if temperatures are forecast to reach 8°C or more for at least 2 hours after application. • Heavier frost (< -5°C) can cause more severe damage to target weeds so spraying should be avoided for 1-2 days to assess any injury. Spraying can resume when at least 60% of the plant is still green and actively growing, and daytime temperatures are forecast to reach 8°C or more for at least 2 hour after application. • The lower rate is used when targeting annual weeds, while the higher rate is used when targeting perennial weeds, especially dandelion when larger than 15 cm in diameter. • Allow at least 1 day after application to annual weeds, at least 3 days after application to quackgrass and allow at least 10 days after application to rosette Canada thistle before any tillage operation.

continued

CHAPTER 4: CEREALS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
41	**2,4-D Ester 700 (EC)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (660 g a.e./L), 528-726 g a.e./ha	0.32-0.44 L/acre **WSSA Group:** 1) 4	**REI:** 24 hours **PHI:** none stated **Rainfast:** 2 hours for emerged weeds **Buffer Zones:** • Terrestrial: 4 m • Aquatic: 1 m
42	**Engenia (SN)** **or Xtendimax** **Active Ingredient(s), concentration, rate:** **Engenia:** dicamba, (600 g/L), 300-600 g a.e./ha **Xtendimax:** dicamba (350 g/L), 300-600 g a.e./ha	200-400 mL/acre 340-680 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** not applicable **Rainfast:** 2 hours for emerged weeds **Buffer Zones:** • Terrestrial: 1 m • Aquatic: 0 m
43	**Enlist Duo (S)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D choline salt, (194 g/L), 844 g a.i./ha 2) glyphosate, (204 g/L), 877 g a.i./ha	1.74 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 48 hours **PHI:** not applicable **Rainfast:** 2 hours for emerged weeds **Buffer Zones:** • Terrestrial: 15 m • Aquatic: 15 m

APPLICATION NOTES
• Apply Post harvest. Typically tank mixed with glyphosate to control or suppress red clover, glyphosate resistant canada fleabane and top growth of vetch. Refer to application notes for glyphosate (trt #37) for guidelines around spraying when air temperatures are cool or when a frost event occurs. Only weeds emerged at application time will be controlled. • Use the 0.32 L/acre rate when the targeted weeds are less than 8 cm tall. • Use the 0.44 L/acre rate for difficult to control species (e.g., fleabane) or if taller than 8 cm. • Usually tank mixed with glyphosate to control a wider range of weed species.
• Apply Post harvest. Typically tank mixed with glyphosate to improve control of red clover, glyphosate resistant canada fleabane and top growth of vetch. Refer to application notes for glyphosate (trt #37) for guidelines around spraying when air temperatures are cool or when a frost event occurs. • Apply in a minimum of 40 L/acre spray solution. **OFF-TARGET DRIFT MITIGATION (SUMMARY ONLY: REFER TO THE LABEL FOR COMPLETE DETAILS)** • 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Engenia or Xtendimax.
• Apply Post harvest. Refer to application notes for glyphosate (trt # 37) for guidelines around spraying when air temperatures are cool or when a frost event occurs. • The 1.74 L/acre rate when applied in the fall will control red clover. • Apply in 20-40 L/acre of spray solution.

Chapter 5: Corn

CHAPTER 5: CORN

Weed control in field corn

BASIC PRINCIPLES

Yield losses typically exceed 50% when weeds are not managed in corn. To minimize yield losses from weed competition in corn:

Corn should be kept **weed free from emergence until the 6 leaf over stage** of growth.

To maximize weed control and minimize weed seed return to the soil:

Corn should be kept **weed free from emergence until the 8-10 leaf over stage** of growth.

"ROUNDUP READY" CORN

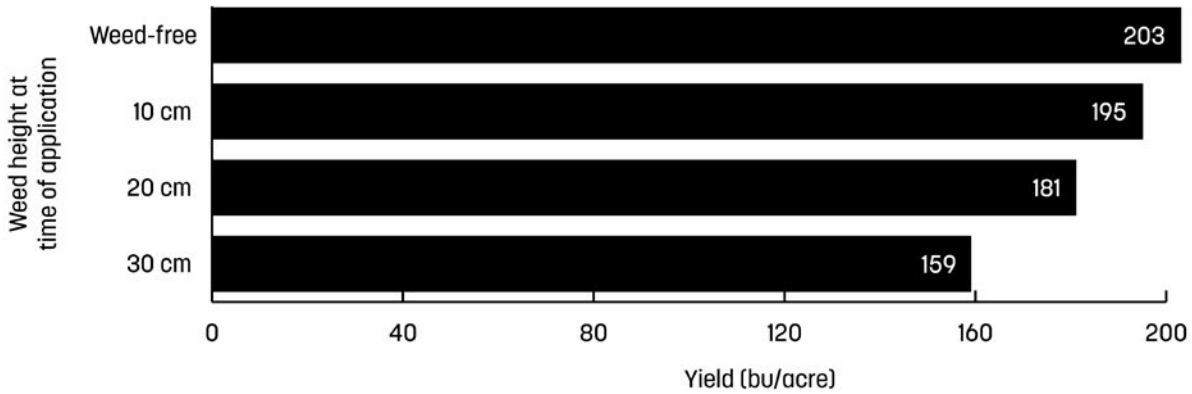
The active ingredient "glyphosate" commonly referred to as Roundup, which will kill non-tolerant corn and only controls weeds that are emerged at the time of application. Therefore it's not surprising that some farmers will wait until the majority of weeds are up before applying glyphosate. This is a risky strategy since delaying the application timing of glyphosate will do the following:

1) Reduce corn yield because of weed competition:

FIGURE 5-1

Corn yield

Corn yield (bu/acre) as affected by timing of glyphosate application at different weed heights (cm).



2) Larger weeds will be present and require a higher rate of glyphosate to achieve control. For example, when lamb's-quarters was larger than 10 cm tall at the time of application, the rate of glyphosate needed to achieve control was 43% to 114% higher than when lamb's-quarters was less than 10 cm tall (Soltani et al., 2016).

FIGURE 5-2

Most profitable weed management strategies

Profit margin over weed control costs for 4 different weed control strategies in Roundup Ready corn compared to not controlling weeds (Adapted from Soltani et al., 2012).

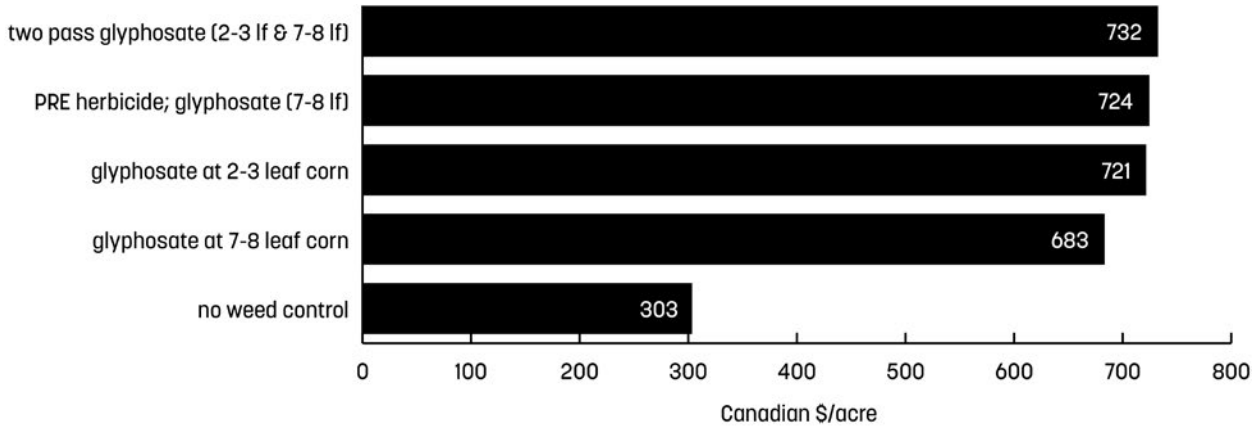
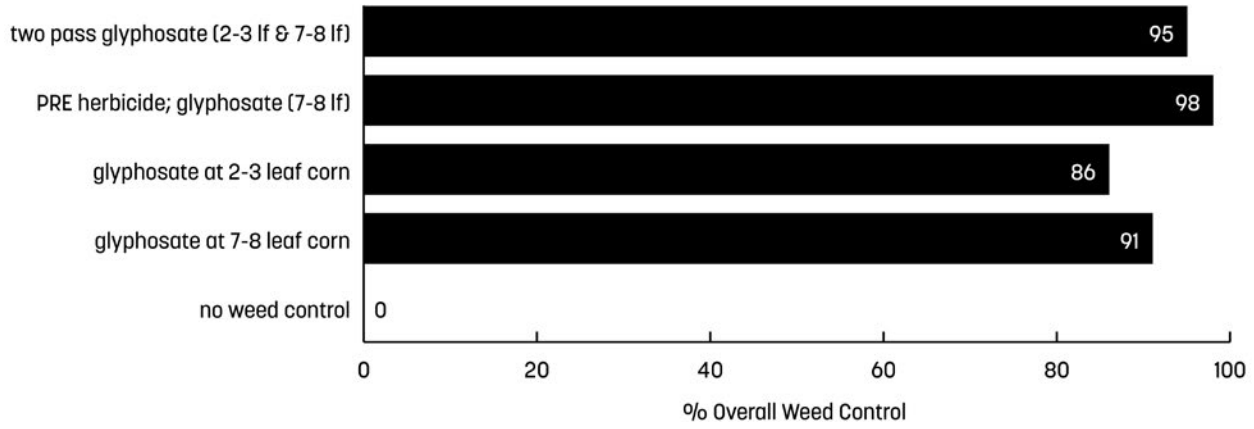


FIGURE 5-3

Maximizing weed control



CHAPTER 5: CORN

Overall weed control (%) of 4 different strategies in Roundup Ready corn compared to not controlling weeds.

"LIBERTY LINK" CORN

These hybrids are tolerant to the active ingredient "glufosinate ammonium", commonly known as Liberty 200 SN, which will kill non-tolerant corn and only controls weeds that are emerged at the time of application. Many of the principles discussed above to optimize weed control in Roundup Ready Corn, equally apply to the use of Liberty in Liberty-Link Corn.

"ENLIST" CORN

These hybrids are tolerant to glyphosate, glufosinate ammonium (Liberty 200SN) and quizalopfop-p-ethyl (e.g., Assure II) that normally would kill corn. Enlist hybrids also have increased tolerance to 2,4-D which can be applied to other field corn hybrids. Regardless, these 4 active ingredients primarily control weeds that are emerged and many of the principles discussed above to optimize weed control in Roundup Ready Corn, equally apply to Enlist corn hybrids.

NON-CHEMICAL WEED CONTROL STRATEGIES

Tillage is the most consistent non-chemical method of controlling weeds and advances in guidance systems and auto-steer make the task easier and more efficient than it once was. An in-depth overview of different tillage tools is beyond the scope of this guide. The handbook "Steel in the field – a farmer's guide to weed management tools", is a good introductory resource that profiles the strengths and weaknesses of different tillage and provides case studies of different farms and their approach to mechanical weed control.

Cover crop mulches (e.g., crimper rolled cereal rye) have been used by farmers to reduce weed populations, although in some instances the reduction in weed biomass has not been great enough to consistently minimize yield losses (Wells et al., 2016). There are many innovative farmers in Ontario who are committed to the integration of cover crops into crop production systems for improved soil health and to reduce the impact of pests. They will no doubt succeed in figuring out a way to consistently minimize yield losses in corn with the use of cover crop mulches. However, at this time, other methods of weed control should be used so as to not rely only on cover crop mulches.

CITATIONS:

Sikkema, P.H. 2012. Weed Management in Corn Questions from Ontario Farmers. Accessed on March 24, 2016: www.ridgetownc.uoguelph.ca/research/documents/sikkema_CornQuestionsII.pdf

Soltani, N., Stewart, C.L., Nurse, R.E., Van Eerd, L.L., Vyn, R.J and P.H. Sikkema. 2012. Weed Control, Environmental Impact and Profitability of Weed Management Strategies in Glyphosate-Resistant Corn. American Journal of Plant Sciences, 2012, 3, 1594-1607.

Wells, M.S., Reberg-Horton, S.C. and S.B. Miskly. 2016. Planting Date Impacts on Soil Water Management, Plant Growth, and Weeds in Cover-Crop-Based No-Till Corn Production. Agronomy Journal, Jan-Feb, Vol. 108(1), pp. 162-170.

CHAPTER 5: CORN

CHAPTER 5: CORN

TABLE 5-1
Pre-plant burndown herbicide weed control ratings in corn

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Clover – Interseeded*	Rye grass – Interseeded*	GRASSY WEEDS							
								bluegrass, annual	foxtails	quackgrass	sandbur	witchgrass	azuki bean, volunteer	alfalfa, volunteer	atriplex, spreading
Glyphosate: emerged weed control ratings at 4 weeks after application (i.e. no residual control)															
1	glyphosate (1x rate)	9	✓	✓	✓	NR	NR	9	9	9	9	9	8	7	7
2	glyphosate (2x rate)	9	✓	✓	✓	NR	NR	9	9	9	9	9	8	8	9
Tank-mix partners with glyphosate that offer enhanced control of certain emerged weeds (i.e. no residual control)															
4	Blackhawk	4,14	x	x	✓	ND	ND	–	–	–	–	–	–	8	8
5	Elevore + MSO	4	x	x	✓	ND	ND	–	–	–	–	–	–	8	–
6	Eragon LQ + Merge	14	x	x	✓	ND	ND	–	–	–	–	–	–	6	9
Common Tank-mix partners with glyphosate (1x rate) that offer residual weed control															
11	Battalion co-pack (Elim EP + Dual II Magnum + Banvel II)	2,15,4	x	x	✓	ND	ND	–	8	–	8	9	–	9	–
12	Broadstrike RC	2	x	x	✓	ND	ND	–	–	–	–	–	–	–	8
13	Callisto + Aatrex 480	27,5	✓	✓	✓	HR	MR	–	–	–	–	–	–	–	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur
[2] The addition of Merge at 0.4 L/acre is required to achieve this level of control.
[3] Two applications will be required to achieve this level of control throughout the season
[R] Populations exist that are resistant to this herbicide and won't be controlled.

*** Risk of establishing cover crops after application:** NR = no risk, LR = low risk, MR = moderate risk and HR = high risk, ND = no data
** Only applicable when using the lowest labeled rate.

BROADLEAF WEEDS FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																						
buckwheat, wild	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
9	7	–	6	–	7	9	7	7	9[R]	9	8[1]	–	9	9	9	9	5	9[R]	9[R]	8	7	–	9
9	8	6	9	–	8	9	8	9	9[R]	9	8[1]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9
Weeds emerged at time of application																							
9	–	–	–	9	–	8	–	8	7	–	–	–	7	9	9	9	–	8	9	–	–	8[1]	8
–	–	–	–	–	–	–	–	–	9	–	–	–	–	9	–	5	–	9	–	–	–	–	–
–	–	7[1]	9	9	5	–	7	7	9	–	–	6[1,2]	–	–	–	–	–	8	7	–	9[2]	6[1,2]	–
9	–	6	–	8	–	9	–	–	9	–	–	–	–	9	9	9	–	9	7	–	–	9[1]	8
9	–	–	–	8	–	8	–	–	9[R]	8	–	8	7	9[R]	9	9[R]	–	8[R]	7[R]	8	–	–	–
9	–	–	–	9	6	9	9	–	8	–	–	–	–	9	9	9	–	9	5	–	–	9[1]	9

continued

CHAPTER 5: CORN

Pre-plant burndown herbicide weed control ratings in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Clover – Interseeded*	Rye grass – Interseeded*	GRASSY WEEDS							
								bluegrass, annual	foxtails	quackgrass	sandbur	witchgrass	azuki bean, volunteer	alfalfa, volunteer	atriplex, spreading
14	Converge XT co pack (Converge Flexx + Converge 480)	27,5	x	✓	✓	MR	LR	–	9	–	7	9	–	–	8
16	Engarde	2,27	x	x	✓	HR	LR	–	8	–	8	–	–	–	–
17	Engenia or Xtendimax or FeXapan	4	x	x	✓	HR	LR	–	–	–	–	–	–	9	–
18	Focus	15,14	x	x	✓	LR	HR	8	9	–	6	9	–	–	–
20	Integrity	15,14	✓	x	✓	LR	LR**	5	9	–	6	9	–	6	8
21	Lumax EZ	15,5,27	✓	✓	✓	HR	HR	–	9	–	6	9	–	–	9
22	Marksman	4,5	x	x	✓	HR	LR	–	–	–	–	–	–	8	9
23	Primextra II Magnum	15,5	✓	✓	✓	HR	HR	–	–	–	–	–	–	–	–
25	Prowl H20 + Aatrex Liquid 480	3,5	x	x	✓	MR	MR	–	9	–	6	8	–	–	–
26	Zidua	15	x	x	✓	LR	HR	8	9	–	6	9	–	–	–
Herbicides and co-packs that contain glyphosate															
65	Enlist Duo (Low Rate)	4,9	x	x	✓	ND	LR	–	9	–	–	–	–	–	–
65	Enlist Duo (High Rate)	4,9	x	x	✓	ND	LR	–	9	9	–	–	–	–	–
61	Roundup Xtend	4,9	x	x	✓	HR	LR	9	9	9	9	9	8	8	8

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur.
[2] The addition of Merge at 0.4 L/acre is required to achieve this level of control.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

*** Risk of establishing cover crops after application:** NR = no risk, LR = low risk, MR = moderate risk and HR = high risk, ND = no data
** Only applicable when using the lowest labeled rate.

BROADLEAF WEEDS FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																							
buckwheat, wild	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
8	5	–	–	9	6	9	–	–	–	–	–	–	–	9	9	9	–	9	6	–	–	–	9
9	–	–	–	–	–	–	–	–	–	–	–	–	–	9	9	9	–	8	5	–	–	–	–
9	–	7	8	8	–	9	9	8	9	–	–	–	8	9	9	9	–	9	7	7	6	9[1]	6
8	–	–	–	9	–	–	–	–	–	–	–	–	–	8	–	9	–	7	–	–	–	–	9
9	–	7[1]	9	9	5	9	7	7	9	–	–	6[1,2]	–	9	9	9	–	8	5	–	9[2]	6[1,2]	–
9	–	–	–	9	–	9	9	–	8	–	–	–	–	9	9	9	–	9	5	–	–	9[1]	9
9	–	6	–	8	–	9	–	–	9	–	–	–	9	9	9	9	–	9	7	9	–	–	9
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	9	–	–	–	–	–	–	–	9	9	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	–	–	–	–	–	–	9
Weeds emerged at time of application																							
–	–	–	8	9	–	9	–	–	8	–	–	8	–	9	9	9	–	9	9	–	6	9[1]	–
9	–	8[1]	8	9	–	9	–	8	9	–	–	8	–	9	9	9	–	9	9	–	6	9[1]	–
9	7	–	8	–	7	9	9	7	9	9	8[1]	–	9	9	9	9	–	7	9	8	7	9[1,]	–

CHAPTER 5: CORN

TABLE 5-2
Pre-emergence herbicide weed control ratings in corn

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Clover – Interseeded*	Rye grass – Interseeded*	Tolerant Hybrids	Crop Tolerance	GRASSY WEEDS (ANNUAL)				
										barnyard grass	crabgrass	fall panicum	foxtails	proso millet
Pre-emergence Herbicides and Co-packs (weed species not emerged at time of application)														
7	Aatrex 480	5	✓	✓	✓	ND	MR	All	E	–	–	–	–	–
8	Acuron	27,15,5	✓	✓	✓	HR	MR	All	E	9	8	8	9	–
9	Armezon Pro + Aatrex 480	15,27,5	x	x	✓	ND	HR	All	E	9	8	8	9	–
10	Armezon Pro + Marksman	15,27,5,4	x	x	✓	HR	HR	All	E	9	8	8	9	–
11	Battalion co-pack (Elim EP + Dual II Magnum + Banvel II)	2,15,4	x	x	✓	HR	HR	All	G	9	8	9	8	7
12	Broadstrike RC	2	x	x	✓	ND	ND	All	E	–	–	–	–	–
13	Callisto + Aatrex 480	27,5	✓	✓	✓	HR	MR	All	E	–	7	–	–	–
14	Converge XT co-pack (Converge Flexx + Converge 480)	27,5	x	✓	✓	MR	LR	All	E	9	8	9[1]	9	8[1]
15	Dual II Magnum	15	✓	✓	✓	HR	HR	All	E	9	8[2]	8	9	–
16	Engarde WG	2,27	x	x	✓	HR	LR	All	E	9	8	9	8	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] The addition of Callisto or Callisto + Aatrex will improve control of this species.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

*** Risk of establishing cover crops after application:** NR = no risk, LR = low risk, MR = moderate risk and HR = high risk, ND = no data
** Only applicable when using the lowest labeled rate.

			BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																			
sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	jimsonweed	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
Weed control ratings at 8 weeks after application																						
–	9	–	–	–	9	5	9	–	–	–	9	9	9[R]	–	9	9	8[R]	7[R]	–	9	–	–
6	–	9	9	–	8	–	9	7	9	–	9	9	9	–	9	9	9	9	9	–	9	9
6	9	9	–	–	9	5	9	–	–	–	9	9	9[R]	–	9	9	8[R]	7[R]	–	9	–	6
6	9	9	9	–	9	5	9	6	9	–	9	9	9	–	9	9	9	9	7	9	8	6
8	–	9	–	–	9	–	9	–	9	–	9	8	9	–	8	8	9	9	7	–	8	–
–	–	–	–	9	9	–	8	7[R]	9[R]	8	–	8	9[R]	–	9	7[R]	9[R]	8[R]	7[R]	8	9	–
–	–	–	9	–	8	–	9	7	8	–	9	9	9	–	9	9	9	9	5	–	9	9
7	9	9	8	–	8	5	9	7	–	–	9	9	9	–	9	9	9	9	6	9	9	9
6	–	9	–	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
8	–	–	–	–	–	–	–	–	–	–	–	9	9	–	9	9	9	8	5	–	9	–

continued

CHAPTER 5: CORN

Pre-emergence herbicide weed control ratings in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Clover – Interseeded*	Rye grass – Interseeded*	Tolerant Hybrids	Crop Tolerance	GRASSY WEEDS (ANNUAL)				
										barnyard grass	crabgrass	fall panicum	foxtails	proso millet
17	Engenia or Xtendimax or FeXapan	4	x	x	✓	HR	LR	All	G	–	–	–	–	–
18	Focus + Aatrex 480	15,14,5	x	x	✓	LR	HR	All	E	9	8	8	9	–
19	Frontier Max	15	✓	✓	✓	ND	ND	All	E	9	8[2]	8	9	–
20	Integrity	15,14	✓	x	✓	LR	LR**	All	E	9	8	8	9	–
21	Lumax EZ	15,5,27	✓	✓	✓	HR	HR	All	E	9	9	8[1]	8	–
22	Marksman	4,5	x	x	✓	HR	MR	All	G	–	–	–	–	–
23	Primextra II Magnum	15,5	✓	✓	✓	HR	HR	All	E	9	8[2]	8	9	–
24	Princep Nine-T, Simadex or Simazine	5	✓	x	✓	ND	ND	All	E	9	9	8[1]	8	–
25	Prowl H20 + Aatrex 480	3,5	x	x	✓	MR	MR	All	G	8	7[2]	8	8	–
26	Zidua	15	x	x	✓	LR	HR	All	E	9	8	8	9	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] The addition of Callisto or Callisto + Aatrex will improve control of this species.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

*** Risk of establishing cover crops after application:** NR = no risk, LR = low risk, MR = moderate risk and HR = high risk, ND = no data
** Only applicable when using the lowest labeled rate.

			BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																			
sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	jimsonweed	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
–	–	–	8	–	8	–	9	6	9	–	8	9	9	–	6	9	9	9	7	–	8	–
6	9	9	–	–	9	5	9	–	–	–	9	9	9[R]	–	9	9	9	7	–	9	6	9
6	–	9	–	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
–	–	9	8	–	9	–	9	8	9	–	9	8	9	–	9	9	9	8	5	–	9	–
–	–	9	9	–	9	–	9	7	8	–	9	9	9	–	9	9	9	8	5	–	9	9
–	–	–	9	–	9	5	9	6	9	–	9	9	9	–	9	9	9	9	7	9	8	6
7	–	9	–	–	9	5	9	–	–	–	9	9	9[R]	–	9	9	9	7[R]	–	9	–	9
–	–	9	–	–	9	–	–	–	–	–	–	9	9[R]	–	9	9	9[R]	9[R]	–	–	7	–
6	–	8	–	–	–	–	9	–	–	–	–	–	8	–	–	–	8	–	–	–	–	7
6	–	9	–	–	–	–	–	–	–	–	–	–	–	–	–	9	9	–	–	–	6	9

CHAPTER 5: CORN

TABLE 5-3
Post-emergence herbicide weed control ratings in corn

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant Hybrids	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
								barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Post-emergence herbicides in corn (weeds emerged at the time of application)															
27	2,4-D	4	x	x	✓	All	F	–	–	–	–	–	–	–	–
28	2,4-DB	4	x	x	✓	All	F	–	–	–	–	–	–	–	–
29	Aatrex 480 + Crop Oil	5	✓	✓	✓	All	E	–	–	–	–	–	–	9	–
30	Accent	2	✓	✓	✓	All	E	9	7[2]	9	9[R]	9	8	9	9
31	Acuron	27,27,15,5	x	x	✓	All	E	9[1]	8[1]	8[1]	9[1]	–	6[1]	–	9[1]
32	Armezon Pro + Aatrex 480 + Merge/Assist + 28% UAN	15,27,5	x	x	✓	All	E	8	8[2]	8[1]	8	7	–	–	8
33	Armezon Pro + Marksman	15,27,5,4	x	x	✓	All	E	8	8[2]	8[1]	8	7	–	–	8
34	Basagran Forté	5	✓	✓	✓	All	G	–	–	–	–	–	–	–	–
35	Battalion co-pack	2,15,4	x	x	✓	All	G	9	8	9	9	9	9	9	9
36	Buctril M, Badge, Mextrol or Logic M	4,6	x	x	✓	All	P	–	–	–	–	–	–	–	–
37	Callisto + Aatrex 480	27,5	✓	✓	✓	All	E	–	8[2]	–	–	–	–	–	–
38	Converge XT co-pack	27,5	x	✓	✓	All	E	9	9	9	9	8	7	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] Large crabgrass only.
[3] Weeds cannot be emerged at time of application to achieve this level of control.
[4] Top growth control only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																						
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	jimsonweed	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weed control ratings at 4-6 weeks after application																						
7	–	–	–	–	–	–	8	8	–	–	–	9	8	9	7	9	8	9	9	8	5	–
–	–	–	–	–	–	–	8	–	–	–	–	7	8	8	7	9	8	–	–	8	–	–
–	–	9	9	5	–	9	6	–	7	–	9	9[R]	7	9[R]	9	9[R]	9[R]	7	9	–	6	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9[R]	–	–	–	–	–	–
5	–	–	8	–	–	9	8	8	–	–	9	9	–	9	9	9	9	6	–	9	–	9
–	–	–	8	–	–	7	7	6	–	–	9	9	–	9	9	9	9	5	–	7	–	6
7	–	9	9	6	–	9	9	9	9	–	9	9	9	9	9	9	9	9	9	9	–	9
–	9	7	7	–	–	–	9	5	8	–	9	8	–	9	7	7	7	6	–	9	–	–
6	–	9	9	–	–	9	9	9	9	–	9	9	8	6	9	9	9	8	7	9	–	8
–	–	–	9	–	–	–	9	6	–	–	9	9	8	9	9	8	9	7	–	9	–	–
5	–	–	8	–	–	9	8	8	–	–	9	9	–	9	9	9	9	6	–	9	–	9
7	–	–	8	5	–	9	7	6	–	–	9	9	–	9	9	9	9	7	–	9	–	9

continued

CHAPTER 5: CORN

Post-emergence herbicide weed control ratings in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant Hybrids	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
								barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
39	Destra IS	2,27	x	x	✓	All	G	9	8	9	9	9	8	9	9
40	Distinct	19,4	x	x	✓	All	G	–	–	–	–	–	–	–	–
41	Dual II Magnum	15	✓	✓	✓	All	E	9[1]	8[1]	8[1]	9[1]	–	6[1]	–	9[1]
42	Engarde	2.27	x	x	✓	All	E	9	8	9	9	9	8	9	9
43	Engenia or Xtendimax or FeXapan	4	x	x	✓	All	G	–	–	–	–	–	–	–	–
44	Frontier Max	15	✓	✓	✓	All	E	9[1]	8[1]	8[1]	9[1]	–	6[1]	–	9[1]
45	Impact or Armezon + Aatrex	27,5	✓	✓	✓	All	E	7	7[2]	7	7	7	–	–	7
46	Lumax EZ	15,5,27	x	x	✓	All	E	9[1]	8[1]	8[1]	9[1]	–	–	–	9[1]
47	Marksman	4,5	x	x	✓	All	G	–	–	–	–	–	–	–	–
48	MCPA	4	x	x	✓	All	P	–	–	–	–	–	–	–	–
49	MCPA/MCPB	4,4	x	x	✓	All	G	–	–	–	–	–	–	–	–
50	Option + Aatrex 480	2,5	x	x	✓	All	G	9	7[2]	9	9[R]	9	9	9	9
51	Pardner, Bromotril, Brotex or Koril + Aatrex 480	6,5	✓	✓	✓	All	E	–	–	–	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] Large crabgrass only.
[3] Weeds cannot be emerged at time of application to achieve this level of control.
[4] Top growth control only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																						
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	jimsonweed	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
–	–	–	9	–	–	–	5	–	–	–	9	9	–	9	9	9	8	7	–	9	–	–
7	–	9	9	–	–	9	8	8	–	–	9	9	9	6	9	9	9	7	9	9	–	8
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	–	6[1]
–	–	–	9	–	–	–	5	–	–	–	9	9	–	9	9	9	8	–	–	9	–	–
6	–	9	9	–	–	9	9	9	9	–	9	9	8	6	9	9	9	8	7	9	–	8
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	–	6[1]
–	–	–	8	–	–	–	7	6	–	–	9	9	–	9	9	9	9	5	–	7	–	–
9	–	–	9	–	–	9	7	7	–	–	9	9	–	9	9	9	8	5	–	9	–	9
7	–	9	9	6	–	9	9	9	9	–	9	9	9	9	9	9	9	9	9	9	–	9
7	–	–	–	–	–	5	7	6	–	–	–	9	8	9	–	7	9	8	–	7	–	–
–	–	–	8	–	–	–	8	–	–	–	–	7	–	8	7	9	9	–	–	9	–	–
–	–	–	9	5	–	9	6	–	7	–	9	9[R]	7	9[R]	9	9[R]	9[R]	7	9	–	6	–
7	–	9	9	8	7	9	7	8	8	–	9	9	9	8	9	8[R]	9	7	9	9	–	5

continued

CHAPTER 5: CORN

Post-emergence herbicide weed control ratings in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant Hybrids	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
								barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
52	Peak (75% WG)	2,4	x	✓	✓	All	E	–	–	–	–	–	–	–	–
53	Permit	2	✓	✓	✓	All	G	–	–	–	–	–	–	–	–
54	Primextra II Magnum	15,5	✓	✓	✓	All	E	9	8[3]	8	9	–	7	–	9
55	Prowl H2O	3	x	x	✓	All	E	8[1]	8[1]	8[1]	8[1]	–	8[1]	–	8[1]
56	Ultim	2	x	x	✓	All	G	9	7[2]	9	9[R]	9	9	9	9
57	Zidua	15	x	x	✓	All	E	9	8	–	9	–	6	–	9
Post-emergence herbicides for "Roundup Ready" Corn Hybrids															
58	glyphosate (1x rate)	9	✓	✓	✓	RR, EN	E	9	9	9	9	9	9	9	9
58	glyphosate (2x rate)	9	✓	✓	✓	RR, EN	E	9	9	9	9	9	9	9	9
Post-emergence herbicides and co-packs containing glyphosate for "Roundup Ready" Corn Hybrids															
59	Callisto GT	27,9	x	x	✓	RR, EN	E	–	8[2]	–	–	–	–	–	NC
60	Halex GT + Aatrex 480	15,27,9,5	✓	✓	✓	RR, EN	E	9	9	9	9	–	5	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] Large crabgrass only.
[3] Weeds cannot be emerged at time of application to achieve this level of control.
[4] Top growth control only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	jimsonweed	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
6	–	9	–	7	–	9	9	7	7	–	9	9	8	9	–	9	9	7	8	9	6	–
–	–	–	–	6-7	–	8[3]	8[R]	8[3,R]	8	8[3]	8	8[3]	–	8	–	8[R]	8[R]	8[R]	–	8	–	–
–	–	–	9	5	–	9	–	–	–	9	9	9[R]	–	9	9	9	7[R]	–	9	–	–	9
–	–	–	–	–	–	9	–	–	–	–	6	9	–	9[R]	8	8[R]	–	–	–	6	–	7
–	–	–	–	–	–	–	–	–	–	–	5	5	–	7	–	9[R]	–	–	–	5	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	9	–	–	–	–	–	9
Weed control ratings at 4 weeks after application																						
7/8	8	9	7/8	8	9	9	9	9[R]	9	9	7/8	9	9	9	9	9	9[R]	7[R]	8	9	7/8	9[R]
8	8	9	8	8	9	9	9	9[R]	9	9	8	9	9	9	9	9	9[R]	8[R]	9	9	8	9[R]
Weed control ratings at 8 weeks after application																						
–	–	–	8	–	9	9	8	8	–	–	9	9	–	9	9	9	9	6	–	9	–	9
5	–	–	9	–	–	9	8	6	–	–	9	9	–	9	9	9	9	6	–	9	–	9

continued

CHAPTER 5: CORN

Post-emergence herbicide weed control ratings in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant Hybrids	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
								barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
61	Roundup Xtend	4,9	x	x	✓	RR, EN	G	9	9	9	9	9	9	9	9
Post-emergence tank-mix partners with glyphosate for "Roundup Ready and Enlist" Corn Hybrids															
62	Vios G3	2,27,9	x	x	✓	RR, EN	E	9	8	9	9	7	8	9	9
Post-emergence herbicides for "Liberty-Link and Enlist" Corn Hybrids															
63	Liberty 200SN	10	x	x	✓	LL, EN	E	9	9	9	9	9	–	8	9
Post-emergence tank-mix partners with Liberty for "Liberty-Link and Enlist" Corn Hybrids															
64	Vios G3	2,27,10	x	x	✓	LL, EN	E	9	8	9	9	7	8	9	9
Post-emergence herbicides for "Enlist" Corn Hybrids															
65	Enlist Duo (Low Rate)	4,9	x	x	✓	EN	E	–	–	–	8	–	–	9	–
65	Enlist Duo (High Rate)	4,9	x	x	✓	EN	E	9	9	9	9	9	9	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] Large crabgrass only.
[3] Weeds cannot be emerged at time of application to achieve this level of control.
[4] Top growth control only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																						
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	jimsonweed	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
7/8	8	9	9	8	8	9	9	9[R]	9	9	9	9	9	9	9	9	8[1]	9	8	9	7/8	8[1]
Weed control ratings at 8 weeks after application																						
–	–	–	9	6	–	8	8	6	8	8	9	9	–	9	9	9	9	8	–	8	–	9
Weed control ratings at 4 weeks after application																						
–	–	–	8	–	–	–	9	7	–	–	8	9	8	9	9	9	9	6	–	8	–	–
Weed control ratings at 8 weeks after application																						
–	–	–	9	6	–	8	8	6	8	8	9	9	–	9	9	9	9	8	–	8	–	9
Weed control ratings at 4 weeks after application																						
–	–	–	–	–	–	9	8	8	–	–	–	9	–	9	–	9	9	9	–	–	–	–
7/8	8	9[4]	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	7/8	9

continued

CHAPTER 5: CORN

TABLE 5-4
Perennial weed and volunteer crop control ratings for post-emergence herbicides in corn

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant hybrids	Crop Tolerance	bindweed, field	carrot, wild	dandelion	horse-nettle	horsetail, field
Pre-emergence herbicides in corn (weeds emerged at time of application – except nutsedge)												
12	Broadstrike RC	2	x	x	✓	All	E	–	–	–	–	7-8
15	Dual II Magnum	15	✓	✓	✓	All	E	–	–	–	–	–
19	Frontier Max	15	✓	✓	✓	All	E	–	–	–	–	–
20	Integrity	15,14	✓	x	✓	All	E	–	6	7	–	5
Post-emergence herbicides in corn (weeds emerged at time of application)												
27	2,4-D	4	x	x	✓	All	F	7	–	–	–	–
28	2,4-DB	4	x	x	✓	All	F	7	–	–	–	–
29	Aatrex 480 + Crop Oil	5	✓	✓	✓	All	E	7	–	–	–	–
30	Accent	2	✓	✓	✓	All	E	–	–	–	–	5-9
31	Basagran Forté	6	✓	✓	✓	All	E	–	–	–	–	–
32	Battalion co-pack	2,15,4	x	x	✓	All	G	–	–	–	–	–
33	Buctril M, Badge, Mextrol or Logic M	4	x	x	✓	All	P	7	–	–	–	7

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] A tank-mix with Ultim (nicosulfuron/rimsulfuron) is required to achieve this level of control.
[2] A tank-mix with Distinct, Marksman or dicamba is required to achieve this level of control.
[3] Two applications will be required to achieve this level of control throughout the season.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

PERENNIAL WEEDS									VOLUNTEER CROPS						
milkweed	nutsedge, yellow	quackgrass	redtop	sow-thistle, perennial	swamp smartweed	thistle, Canada	vetch, tufted	wire-stem muhly	alfalfa	adzuki beans	canola	canola (LL)	canola (RR)	clover (red)	cereals
Weed control ratings at 4-6 weeks after application															
–	–	–	–	–	–	–	–	–	–	–	8	8	8	8	–
–	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	8	–	–	–	–	–	–	–	–	–	9	9	9	9	–
Weed control ratings at 4-6 weeks after application															
–	–	–	–	–	–	7-9	8	–	6	–	9	9	9	–	–
–	–	–	–	–	–	7-9	–	–	–	–	–	–	–	–	–
–	–	–	–	8	–	–	–	–	–	8-9	–	–	–	–	–
6	–	9	8	–	–	–	–	–	–	–	9	9	9	–	8
–	7	–	–	6-9	–	7-9	–	–	–	–	–	–	–	–	–
–	–	7	–	7	–	–	9	–	9	8-9	9	9	9	9	8
6	–	–	–	–	–	–	5	–	–	–	8	8	8	–	–

continued

CHAPTER 5: CORN

Perennial weed and volunteer crop control ratings for post-emergence herbicides in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant hybrids	Crop Tolerance	bindweed, field	carrot, wild	dandelion	horse-nettle	horsetail, field
37	Callisto + Aatrex 480	27,5	✓	✓	✓	All	E	–	6	6	–	–
38	Converge XT co-pack	27,5	x	✓	✓	All	E	–	–	–	–	–
40	Distinct	19,4	x	x	✓	All	G	8	7	6	8[1]	–
42	Engarde WG	2.27	x	x	✓	All	E	–	–	–	–	–
43	Engenia or Xtendimax or FeXapan	4	x	x	✓	All	G	8	–	6	8[1]	–
45	Impact or Armezon + Aatrex 480	27,5	✓	✓	✓	All	E	–	–	–	–	–
47	Marksman	4,5	x	x	✓	All	G	8	–	6	8[1]	–
48	MCPA	4	x	x	✓	All	P	7	–	–	–	7
49	MCPA/MCPB (Tropottox Plus, Clovitox Plus or Topside)	4,4	x	x	✓	All	G	8	–	–	–	–
50	Option + Aatrex 480	2,5	x	x	✓	All	G	–	–	–	–	5-9
51	Pardner, Bromotril, Brotex or Koril + Aatrex 480	6,5	✓	✓	✓	All	E	7	6	–	–	–
52	Peak (75% WG)	2,4	x	✓	✓	All	E	6	9	5	81	–
53	Permit	2	✓	✓	✓	All	G	6-7	–	–	–	6
56	Ultim	2	x	x	✓	All	G	–	–	–	8[2]	6-9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] A tank-mix with Ultim (nicosulfuron/rimsulfuron) is required to achieve this level of control.
[2] A tank-mix with Distinct, Marksman or dicamba is required to achieve this level of control.
[3] Two applications will be required to achieve this level of control throughout the season.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

PERENNIAL WEEDS									VOLUNTEER CROPS						
milkweed	nutsedge, yellow	quackgrass	redtop	sow-thistle, perennial	swamp smartweed	thistle, Canada	vetch, tufted	wire-stem muhly	alfalfa	adzuki beans	canola	canola (LL)	canola (RR)	clover (red)	cereals
–	–	–	–	–	–	–	9	–	–	8-9	9	9	9	9	–
–	–	–	–	–	–	–	–	–	–	–	9	9	9	–	–
6	–	–	–	8	5	9	9	–	8	6-9	8	8	8	9	–
–	7	7	–	–	–	–	–	–	–	8-9	9	9	9	9	8
6	–	–	–	8	6	8	9	–	8	8-9	8	8	8	9	–
–	–	–	–	6	–	–	–	–	–	–	9	9	9	9	–
6	–	–	–	9	–	8	8	–	8	9	8	8	8	9	–
6	–	–	–	–	–	7-9	7	–	–	–	8	8	8	–	–
6	–	–	–	–	–	8	–	–	–	–	–	–	–	–	–
6	–	9	9	–	–	–	–	9	–	–	9	9	9	–	8
–	–	–	–	7	–	7	–	–	–	8-9	9	9	9	–	–
6	–	–	–	8	6	5-9	7	–	7-8	6-9	9	9	9	8	–
7	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	–	9	9	–	–	–	–	6	–	–	9	9	9	–	8

continued

CHAPTER 5: CORN

Perennial weed and volunteer crop control ratings for post-emergence herbicides in corn *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Sweet corn	Seed corn	Field corn	Tolerant hybrids	Crop Tolerance	bindweed, field	carrot, wild	dandelion	horse-nettle	horsetail, field
Post-emergence herbicides for "Roundup Ready" corn hybrids (weeds emerged at time of application)												
58	glyphosate 1x	9	✓	✓	✓	RR, EN	E	7	–	6	8	–
58	glyphosate 2x	9	✓	✓	✓	RR, EN	E	8	7-9	8-9	9	6
61	Roundup Xtend	4,9	x	x	✓	RR, EN	G	8[2]	–	6	8	–
Post-emergence herbicides for "Liberty-Link" corn hybrids (weeds emerged at time of application)												
63	Liberty 200SN	10	x	x	✓	LL, EN	E	6	–	–	–	6
Post-emergence herbicides for "Enlist" corn hybrids (weeds emerged at time of application)												
65	Enlist Duo (Low Rate)	4,9	x	x	✓	EN	E	–	–	–	–	8
65	Enlist Duo (High Rate)	4,9	x	x	✓	EN	E	8[3]	–	8	8	8

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] A tank-mix with Ultim (nicosulfuron/rimsulfuron) is required to achieve this level of control.
[2] A tank-mix with Distinct, Marksman or dicamba is required to achieve this level of control.
[3] Two applications will be required to achieve this level of control throughout the season

Tolerant variety abbreviations:
All = this treatment can be applied to any corn hybrids
RR = this treatment can only be applied to "Roundup Ready" corn hybrids
LL = this treatment can only be applied to "Liberty Link" corn hybrids
EN = this treatment can only be applied to "Enlist" corn hybrids

PERENNIAL WEEDS									VOLUNTEER CROPS						
milkweed	nutsedge, yellow	quackgrass	redtop	sow-thistle, perennial	swamp smartweed	thistle, Canada	vetch, tufted	wire-stem muhly	alfalfa	adzuki beans	canola	canola (LL)	canola (RR)	clover (red)	cereals
Control ratings at 4 weeks after application															
9	6	9	9	7-8	5	8	5	8	6	9	9	9	–	6	9
9	8	9	9	8-9	–	9	7	9	7	9	9	9	–	7	9
9	8[2]	9	9	8	–	8	81	8	8	9	9	–	–	9	9
Control ratings at 4 weeks after application															
–	6	6-7	–	8	–	7	7-8	–	–	–	9	0	9	7	8
Control ratings at 4 weeks after application															
–	–	–	–	–	–	–	9	–	–	–	9	9	9	–	9
9[3]	8[3]	9	9	8[3]	5	8[3]	9	8	6	9	9	9	9	–	9

CHAPTER 5: CORN

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT HERBICIDES – CONTACT ONLY, DOES NOT PROVIDE ANY RESIDUAL WEED CONTROL			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
4	**Blackhawk** **Active Ingredient(s), concentration, rate:** 1) pyraflufen-ethyl, (6.1 g/L), 4.5-6.7 g a.i./ha 2) 2,4-D, (473 g a.e./L), 350-520 g a.e./ha	300-445 mL/acre **WSSA Group:** 1) 14 2) 4	**REI:** 12 hours **PHI:** not stated **Rainfast:** 2 hours
5	**Elevore** **+ methylated seed oil** **Active Ingredient(s), concentration, rate:** 1) halauxifen , (68.5 g/L), 5 g a.i./ha	29.5 mL/acre + 5-10 L/1,000 L **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 1 hour
6	**Eragon LQ + Merge:** 1) Eragon LQ (SU) 2) Merge adjuvant **Active Ingredient(s), concentration and rate:** 1) saflufenacil, (342 g/L), 50- 100 g a.i./ha	1) 59-118 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour on emerged weeds
PRE-PLANT, PRE-PLANT INCORPORATED AND PRE-EMERGENCE CORN HERBICIDES FOR ALL FIELD CORN HYBRIDS			
7	**Aatrex Liquid 480** **Active Ingredient(s), concentration, rate:** 1) atrazine, (480 g/L), 1490 g a.i./ha	1.24 L/acre **WSSA Group:** 1) 5	**REI:** none stated **PHI:** 60 days (grain), 45 days (sweet) **Rainfast:** none stated

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of corn. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of corn. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply PP a minimum of 7 days before planting. • Pre-plant: Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide.
• Apply PP at 5 or more days before planting and when weeds are actively growing at the 1-8 leaf stage. Plant to a minimum of 4 cm deep. • Applications made to very coarse-textured soils (e.g. sand), low in organic matter (<3%), or in fields with poor soil conditions (e.g. eroded hill tops, compacted areas) may increase the risk of crop injury. • Use the higher rate of methylated seed oil when weed populations are high or enviornmental conditions are unfavourable. • Elevore only controls weeds emerged at the time of application.
• ERAGON may be tank mixed with glyphosate and applied to corn prior to planting or after planting prior to crop emergence. Use 118 mL/acre for extended residual control of continual flushing weeds such as lamb's-quarters, redroot pigweed and common ragweed. • The lower rate will provide early season weed control to protect grain yield, but a post-emergence application will be required to provide season long control of later emerging weeds. The lower rate provides an opportunity to interseed clovers or annual rye grass.
• Apply PPI, PRE. • Weeds will normally emerge and die within a few days; atrazine can persist for varying lengths of time; longer under dry, cool weather and coarse textured soils.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
8	**Acuron (SU)** **Active Ingredient(s), concentration, rate:** 1) bicyclopyrone, (7.1 g/L), 35 g a.i./ha 2) mesotrione, (28.5 g/L), 140 g a.i./ha 3) s-metolachlor, (257 g/L), 1,262 g a.i./ha 4) atrazine, (120 g/L), 589 g a.i./ha	1.96 L/acre **WSSA Group:** 1) 27 2) 27 3) 15 4) 5	**REI:** 12 hours **PHI:** 90 days (silage), 50 days (sweet) **Rainfast:** none stated
9	**Armezon Pro (EC) + Aatrex Liquid 480** 1) Armezon Pro (EC) 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (630 g/L), 630 g a.i./ha and topramezone, (12.5 g/L), 12.5 g a.i./ha 2) atrazine, (480 g/L), 480 g a.i./ha, group 5	1) 400 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 15,27 2) 5	**REI:** 24 hours **PHI:** 80 days **Rainfast:** none stated
10	**Armezon Pro (EC) + Marksman (SU)** 1) Armezon Pro (EC) 2) + Marksman (SU) **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (630 g/L), 630 g a.i./ha and topramezone, (12.5 g/L), 12.5 g a.i./ha 2) dicamba, (132 g/L), 488 g a.i./ha, group 4 and atrazine, (261 g/L), 966 g a.i./ha, group 5	1) 400 mL/acre 2) + 1 L/acre **WSSA Group:** 1) 15,27 2) 4, 5	**REI:** 24 hours **PHI:** 80 days **Rainfast:** none stated
11	**Battalion co-pack + non-ionic surfactant** 1) Elim EP (DF) 2) Dual II Magnum (EC) 3) Banvel II (SN) 4) non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) rimsulfuron, (25%), 15 g a.i./ha 2) s-metolachlor, (915 g/L), 686 g a.i./ha 3) dicamba, (480 g/L), 360 g a.i./ha	20 acres per case 1) 24 g/acre 2) 300 mL/acre 3) 300 mL/acre 4) 2 L/1,000 L water **WSSA Group:** 1) 2 2) 15 3) 4	**REI:** 12 hours **PHI:** 85 days **Rainfast:** 4 hours for emerged weeds
12	**Broadstrike RC (80% WG)** **Active Ingredient(s), concentration, rate:** 1) flumetsulam, (80%), 78.125 g a.i./ha, group 2	25 g/acre **WSSA Group:** 1) 2	**REI:** none stated **PHI:** 90 days **Rainfast:** 1 hour

APPLICATION NOTES
• Apply PRE and early POST up to the 2 leaf stage of corn. • Do NOT apply to emerged seed or sweet corn. • No adjuvant required. • Do not mix with ammonium sulphate (AMS). • Apply in a minimum of 16 U.S. gal/acre, or 60 L/acre or 150 L/ha of water or UAN. • One application per year. • Will not control grassy weeds that are beyond the 2 leaf stage.
• Apply PRE or POST up to the 7 leaf stage of field corn. • In conventional corn, if weeds are emerged add Merge or Assist plus 28% UAN. • Grassy weeds are sensitive up to the 1-4 leaf stage and broadleaf weeds are sensitive up to the 1-8 leaf stage.
• Apply PRE or POST up to the 5 leaf stage of field corn. • Grassy weeds are sensitive up to the 1-4 leaf stage and broadleaf weeds are sensitive up to the 1-8 leaf stage.
• Apply PP or PRE. • Do NOT use on seed corn or sweet corn. • Refer to individual product labels for use precautions. • For suppression of quackgrass, apply BATTALION at the 1-6 leaf stage of quackgrass.
• Apply PP, PPI or PRE. • Do NOT use on seed corn or sweet corn. • Do NOT use where the soil pH is greater than 7.8 or where the organic matter is less than 2%. • Do NOT apply to peat or muck soils or where the soil organic matter is greater than 5%. • Do NOT apply more then once a year.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
13	**Callisto 480SC + Aatrex Liquid 480** 1) Callisto 480 SC 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) mesotrione, (480 g/L), 140 g a.i./ha 2) atrazine, (480 g/L), 1,000-1,490 g a.i./ha	1) 120 mL/acre 2) 850-1250 mL/acre **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 100 days (grain), 90 days (silage) **Rainfast:** 3 hours for emerged weeds
14	**Converge XT (co-pack), set-up rate** 1) Converge Flexx (SU) 2) Converge 480 (SU) **Active Ingredient(s), concentration, rate:** 1) isoxaflutole, (240 g/L), 53 g a.i./ha, group 27 2) atrazine, (480 g/L), 528 g a.i./ha, group 5	1) 89 mL/acre 2) 440 mL/acre **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 110 days (grain) **Rainfast:** none stated
14	**Converge XT co-pack** 1) Converge Flexx (SU) 2) Converge 480 (SU) **Active Ingredient(s), concentration, rate:** 1) isoxaflutole, (240 g/L), 79-105 g a.i./ha 2) atrazine, (480 g/L), 800-1063 g a.i./ha	1) 134 -178 mL/acre 2) 670-890 mL/acre **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 110 days (grain) **Rainfast:** None stated
15	**Dual II Magnum (EC)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 1600 g a.i./ha	700 mL/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** 85 days (grain), 45 days (sweet) **Rainfast:** not applicable
16	**Engarde (WG)** **+ non-ionic surfactant** **Active Ingredient(s), concentration, rate:** 1) rimsulfuron, (4.31%), 15 g a.i./ha 2) mesotrione, (41.38 %), 144 g a.i./ha	139 g/acre + 2 L/1,000 L **WSSA Group:** 1) 2 2) 27	**REI:** 12 hours **PHI:** 100 days (grain) **Rainfast:** 2-4 hours for emerged weeds

APPLICATION NOTES
• Apply PRE to field, seed or sweet corn. • For annual grass control, tank-mix with Dual II Magnum.
• Use for early season weed control through the critical crop establishment phase. • Do NOT use on sweet corn. • Do NOT incorporate treatments prior to planting. • Do NOT use on sands, loamy sands and/or soils with less than 2% organic matter. • The set-up rate will provide early season weed control to protect grain yield, but a post-emergence application will be required to provide season long control of later emerging weeds.
• Apply PP or PRE to seed corn. Not all seed corn inbred lines have been tested for tolerance to CONVERGE FLEXX. Use of this product must be approved by the contracting seed corn company and comply with their directions for use. • Apply PP, PRE or POST up to the 3 leaf stage of field corn. • Do NOT incorporate treatments prior to planting. • Use the higher application rates for control of fall panicum and proso millet. • Do NOT use CONVERGE XT on sands, loamy sands and/or soils with less than 2% organic matter.
• Apply PPI, PRE. • Apply POST (up to 3 leaf corn) on field corn ONLY. • For PPI timing, set incorporation equipment to work soil no deeper than 10 cm. • Improved control of yellow nutsedge is obtained when DUAL II MAGNUM is applied PPI. • Grassy weeds beyond the 2 leaf stage will not be controlled. • Optimal control of nightshade is obtained when DUAL II MAGNUM is applied PRE. • Do NOT use on muck, peat, or high organic matter soils. • This product controls a limited amount of broadleaf weeds and therefore should be tank mixed with a broadleaf herbicide for broad spectrum weed control.
• Do NOT use on seed corn or sweet corn. • Apply PRE or Early POST up to the 2 leaf stage of corn. • Engarde can be applied with 28% UAN as a carrier (PRE only). • Do NOT use corn hybrids with less than 2500 corn heat units. • Add a non-ionic surfactant at 2 L/1,000 L water to control emerged sensitive weeds. • If tank mixed with glyphosate, the addition of a non-ionic surfactant is not required.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
17	**Engenia (SN)** **or Xtendimax** or FeXapan **(SN)** **Active Ingredient(s), concentration, rate:** **Engenia:** dicamba, (600 g a.e./L), 300 g a.e./ha **Xtendimax**/FeXapan: dicamba, (350 g a.e./L), 300 g a.e./ha	200 mL/acre or 440 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days (forage) **Rainfast:** 4 hours for emerged weeds
18	**Focus (SE) + Aatrex Liquid 480** 1) Focus (SE) 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (447 g/L), 125-150 g a.i./ha 2) carfentrazone-ethyl, (53 g/L), 15-18 g a.i./ha 3) atrazine, (480 g/L), 1,000-1,490 g a.i./ha	1) 112-134 mL/acre 2) 840 -1240 mL/acre **WSSA Group:** 1) 15 2) 14 3) 5	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated
19	**Frontier Max (EC)** **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (720 g/L), 544-693 g a.i./ha	305-390 mL/acre **WSSA Group:** 1) 15	**REI:** 24 hours **PHI:** none stated **Rainfast:** none stated
20	**Integrity (EC)** **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (68 g/L), 50-75 g a.i./ha 2) dimethenamid-P, (600 g/L), 438-660 g a.i./ha	**"set-up":** 292 mL/acre **full rate:** 440 mL/acre **WSSA Group:** 1) 15, 14 2) 5	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 1 hour for emerged weeds

APPLICATION NOTES
• Apply PRE. • Do NOT use on seed corn or sweet corn. • If corn seed is less than 4 cm below the soil surface, delay application until the spike stage. • Apply to medium to fine textured soils containing more than 2.5% organic matter. • Do NOT apply to coarse (sand) textured soils with less than 2% organic matter. • Do NOT incorporate. **Off-target drift mitigation (summary only: refer to the label for complete details)** 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Engenia, Xtendimax or FeXapan.
• Do NOT use on seed or sweet corn. • Apply PP or PRE. • Do NOT use on peat or muck soils and soils with 7% or more organic matter content. • Use the lower rate on coarse/medium texture soils and they higher rate on medium/fine texture soils.
• Apply PPI or PRE to seed, sweet and field corn. • Maximum use rate for seed corn is 305 mL/acre. • Apply POST (up to 3 leaf corn) on field corn only. • For PPI timing, set incorporation equipment to work soil no deeper than 10 cm. • Improved control of yellow nutsedge is obtained when applied PPI at the highest rate. • Sensitive weeds beyond the 2 leaf stage will not be controlled. • Apply higher rates on fine textured or high organic matter soils or when targeting nightshade, nutsedge and pigweed. • Do NOT use on muck, peat, or high organic matter soils. • Consult the seed corn company for information on the tolerance of seed corn inbred lines prior to the use of FRONTIER MAX herbicide.
• Apply PPI or PRE. • A PPI application is required for the control of yellow nutsedge and Eastern black nightshade. • Do NOT incorporate greater than 3 cm deep or control will be reduced. • INTEGRITY may be used with liquid fertilizer as a carrier. Conduct a liquid fertilizer compatibility test by mixing a small quantity of herbicide with a proportional quantity of liquid fertilizer in a jar prior to loading a spray tank. • The set-up rate will provide early season weed control to protect grain yield, but a post-emergence application will be required to provide season long control of later emerging weeds.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
21	**Lumax EZ (SU)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (298 g/L), 1000 -1,400 g a.i./ha 2) atrazine, (112 g/L), 375-526 g a.i./ha 3) mesotrione, (30 g/L), 100-140 g a.i./ha	**"set-up":** 1.36 L/acre **full rate:** 1.9 L/acre **WSSA Group:** 1) 15 2) 5 3) 27	**REI:** 12 hours **PHI:** 100 days (grain), 90 days (silage), 50 days (sweet) **Rainfast:** 3 hours for emerged weeds
22	**Marksman (SU)** **Active Ingredient(s), concentration, rate:** 1) dicamba, (132 g/L), 488 g a.i./ha, group 4 2) atrazine, (261 g/L), 966 g a.i./ha, group 5	1.5 L/acre **WSSA Group:** 1) 4 2) 5	**REI:** 12 hours **PHI:** 60 days (grain) **Rainfast:** 4 hours for emerged weeds
23	**Primextra II Magnum (L) (set-up rate)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (400 g/L), 1,000 g a.i./ha 2) atrazine, (320 g/L), 800 g a.i./ha	1 L/acre **WSSA Group:** 1) 15 2) 5	**REI:** 12 hours **PHI:** 80 days (grain), 45 days (sweet) **Rainfast:** none stated
23	**Primextra II Magnum (L)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (400 g/L), 1,200-1,600 g a.i./ha 2) atrazine, (320 g/L), 960-1,280 g a.i./ha	1.2-1.6 L/acre **WSSA Group:** 1) 15 2) 5	**REI:** 12 hours **PHI:** 80 days (grain), 45 days (sweet) **Rainfast:** none stated
24	**Princep nine-T (WDG)** **Active Ingredient(s), concentration, rate:** 1) simazine, (90%), 1,350-2,000 g a.i./ha	0.6 to 1 kg/acre **WSSA Group:** 1) 5	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated
25	**Prowl H20 (ME) + Aatrex 480** (set-up rate) 1) Prowl H20 (ME) 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) pendimethalin, (455 g/L), 1,000 g a.i./ha 2) atrazine, (480 g/L), 1,000 g a.i./ha	1) 890 mL/acre 2) 830 mL/acre **WSSA Group:** 1) 3 2) 5	**REI:** 24 hours **PHI:** 100 days (grain) **Rainfast:** none stated
25	**Prowl H20 (ME) + Aatrex Liquid 480** 1) Prowl H20 (ME) at 1.48 L/acre 2) Aatrex Liquid 480 at 1.28 L/acre **Active Ingredient(s), concentration, rate:** 1) pendimethalin, (455 g/L), 1,680 g a.i./ha 2) atrazine, (480 g/L), 1,530 g a.i./ha	1) 1.48 L/acre 2) 1.28 mL/acre **WSSA Group:** 1) 3 2) 5	**REI:** 24 hours **PHI:** 100 days (grain) **Rainfast:** none stated

APPLICATION NOTES
• Apply surface pre-plant up to 7 days prior to planting, PRE or Early POST up to the 2 leaf stage of field corn. • Apply PRE to seed and sweet corn. • Grassy weeds beyond the 2 leaf stage will not be controlled. • Do NOT apply to corn treated with an or ganophosphorous insecticide. • The set-up rate will provide early season weed control to protect grain yield, but a post-emergence application will be required to provide season long control of later emerging weeds.
• Do NOT use on seed corn or sweet corn. • Application can be made up to 13 cm standing corn (5 leaf). Use the lower rate on coarse textured soils and the higher rate on medium to fine textured soils. • Do NOT use if temperature exceeds 25°C at the time of application, or if high humidity is expected, due to the possibility of dicamba volatilizing and injury to susceptible crops nearby. • Do NOT add oil or surfactant.
• The reduced rate of PRIMEXTRA II MAGNUM (1 L/acre) provides suppression of labeled weeds and is part of a planned weed management program that includes a follow-up post-emergence herbicide.
• Apply PPI, PRE or POST up to the 3 leaf stage of corn. • Use the higher rate where annual grass build up or nutsedge infestation is evident. • Grassy weeds beyond the 2 leaf stage will not be controlled. • The equivalent rate of PRIMEXTRA II MAGNUM can be achieved by adding DUAL II MAGNUM at 0.5-0.7 L/acre with AATREX at 0.84-1.24 L/acre.
• Caution is advised when considering rates beyond 0.8 kg/acre as high soil residues may be created and rotational crops may be affected.
• Do NOT use on seed corn or sweet corn. • Apply PRE or POST up to the 4 leaf stage of field corn. • This program will provide early season weed control to protect grain yield, but a post-emergence application will be required to provide season long control of later emerging weeds.
• Do NOT use on seed corn or sweet corn. • Apply PRE or POST up to the 4 leaf stage of field corn.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
26	**Zidua (SC)** **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (500 g/L), 125; 166; 208.5 or 246.5 g a.i./ha	**Coarse:** 100 mL/acre **Med:** 133 mL/acre, 167 mL/acre **Fine:** 197 mL/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated
POST-EMERGENCE HERBICIDES FOR ALL FIELD CORN HYBRIDS			
28	**2,4-D Amine 600 (L)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D Amine, (564 g/L), 564 g a.i./ha	0.4 L/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days (forage) **Rainfast:** 2 hours
29	**2,4-DB (L)-(Embutox, Caliber or Cobutox)** **Active Ingredient(s), concentration, rate:** 1) 2,4-DB, (625 g/L), 1,406 g a.i./ha	0.4 L/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days (forage) **Rainfast:** 1 hour
30	**Aatrex Liquid 480 + Crop Oil** 1) Aatrex Liquid 480 at 1.24 L/acre 2) Crop Oil at 6.8 L/acre **Active Ingredient(s), concentration, rate:** 1) atrazine, (480 g/L), 1,488 g a.i./ha	1) 1.24 L/acre 2) 6.8 L/acre **WSSA Group:** 1) 5	**REI:** none stated **PHI:** 60 days (grain), 45 days (sweet) **Rainfast:** 2 hours
31	**Accent 75 DF + non-ionic surfactant** 1) Accent 75 DF 2) Non-Ionic Surfactant **Active Ingredient(s), concentration, rate:** 1) nicosulfuron, (75%), 25 g a.i./ha	1) 13 g/acre 2) 2 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 30 days (grain), 40 days (sweet) **Rainfast:** 2 hours
32	**Acuron (SU)** **Active Ingredient(s), concentration, rate:** 1) bicyclopyrone, (7.1 g/L), 35 g a.i./ha 2) mesotrione, (28.5 g/L), 140 g a.i./ha 3) s-metolachlor, (257 g/L), 1,262 g a.i./ha 4) atrazine, (120 g/L), 589 g a.i./ha	1.96 L/acre **WSSA Group:** 1) 27 2) 27 3) 15 4) 5	**REI:** 12 hours **PHI:** 90 days (silage), 50 days (sweet) **Rainfast:** none stated
33	**Armezon Pro (EC) + Aatrex Liquid 480** 1) Armezon Pro (EC) 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (630 g/L), 630 g a.i./ha and topramezone, (12.5 g/L), 12.5 g a.i./ha 2) atrazine, (480 g/L), 480 g a.i./ha	1) 400 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 15, 27 2) 5	**REI:** 24 hours **PHI:** 80 days **Rainfast:** none stated

APPLICATION NOTES
• Do NOT use on seed corn or sweet corn. • Apply PP, PRE or early POST up to the 4 leaf stage of field corn. • Use the 100 mL/acre rate on coarse soils, 133 mL/acre on medium textured soils with < 3% organic matter, 167 mL/acre on medium textured soils with between 3 and 7% organic matter and the 197 mL/acre rate on fine textured soils. • Do NOT use on peat or muck soils with 7% organic matter content. • Can be tank mixed with glyphosate or Aatrex 480.
• Do NOT use on seed corn or sweet corn. • Apply as an overall spray until corn is 15 cm high (leaf extended); thereafter, use drop nozzles. • Do NOT add oil or surfactant.
• Do NOT use on seed corn or sweet corn. • Do NOT add oil or surfactant.
• For increased activity and extended period of activity, apply in an oil water emulsion of 4-6.8 L/acre of emulsifiable light mineral oil and 60-80 L/acre water. • Apply when most weeds have emerged and less than 10 cm tall. The low rate can be used successfully if subsequent cultivation is planned. • Apply when corn is less than 30 cm tall.
• Adding UAN will give improved control of yellow foxtail in field corn. • Adapt oil concentrate (1% v/v), Merge or Sure-Mix (0.5% v/v) can be used in place of a non-ionic surfactant (field corn only). • Always add water soluble packages to clean water with the agitator running. Corn should be within the 1-8 leaf stage of growth. Apply ACCENT when annual grasses are in the 1-6 leaf stage and quackgrass is in the 3-6 leaf stage.
• Apply PRE and early POST up to the 2 leaf stage of corn. One application per season. • Do NOT apply to emerged seed or sweet corn. • Do not mix with ammonium sulphate (AMS). • Apply in a minimum of 16 U.S. gal/acre, or 60 L/acre or 150 L/ha of water or UAN. • Will not control grassy weeds that are beyond the 2 leaf stage.
• Apply POST up to the 7 leaf stage of field corn. • In conventional corn, if weeds are emerged add Merge or Assist plus 28% UAN. • Grassy weeds are sensitive up to the 1-4 leaf stage and broadleaf weeds are sensitive up to the 1-8 leaf stage.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
33	**Armezon Pro (EC) + Marksman (SU)** 1) Armezon Pro (EC) 2) + Marksman (SU) **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (630 g/L), 630 g a.i./ha and topramezone, (12.5 g/L), 12.5 g a.i./ha 2) dicamba, (132 g/L), 488 g a.i./ha and atrazine, (261 g/L), 966 g a.i./ha	1) 400 mL/acre 2) + 1 L/acre **WSSA Group:** 1) 15, 27 2) 4, 5	**REI:** 24 hours **PHI:** 80 days **Rainfast:** none stated
34	**Basagran Forté (L)** **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 1,080 g a.i./ha	0.9 L/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** none stated **Rainfast:** 6 hours
35	**Battalion co-pack + non-ionic surfactant** 1) Elim EP (DF) 2) Dual II Magnum (EC) 3) Banvel II (SN) 4) non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) rimsulfuron, (25%), 12.5 g a.i./ha 2) s-metolachlor, (915 g/L), 572 g a.i./ha 3) dicamba, (480 g/L), 300 g a.i./ha	24 acres per case 1) 20 g/acre 2) 250 mL/acre 3) 250 mL/acre 4) 2 L/1,000 L **WSSA Group:** 1) 2 2) 15 3) 4	**REI:** 12 hours **PHI:** 85 days **Rainfast:** 4 hours for emerged weeds
36	**Buctril M (EC)** **Active Ingredient(s), concentration, rate:** 1) bromoxynil, (280 g/L), 280 g a.i./ha 2) MPCA, (280 g/L), 280 g a.i./ha	400 mL/acre **WSSA Group:** 1) 6 2) 4	**REI:** 24 hours **PHI:** 15 days (sweet) **Rainfast:** 1 hour
37	**Callisto 480SC + Aatrex Liquid 480** 1) Callisto 480 SC 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) mesotrione, (480 g/L), 100 g a.i./ha 2) atrazine, (480 g/L), 280 g a.i./ha	1) 85 mL/acre 2) 235 mL/acre **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 100 days (grain), 90 days (silage) **Rainfast:** 3 hours for emerged weeds
38	**Converge XT (co-pack)** 1) Converge Flexx (SU) at 134 -178 mL/acre 2) Converge 480 (SU) at 670-890 mL/acre **Active Ingredient(s), concentration, rate:** 1) isoxaflutole, (240 g/L), 79-105 g a.i./ha 2) atrazine, (480 g/L), 800-1063 g a.i./ha	1) 134 -178 mL/acre 2) 670-890 mL/acre **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 110 days (grain) **Rainfast:** none stated

APPLICATION NOTES
• Apply POST up to the 5 leaf stage of field corn. • Grassy weeds are sensitive up to the 1-4 leaf stage and broadleaf weeds are sensitive up to the 1-8 leaf stage.
• Top growth of nutsedge and Canada thistle are controlled and field bindweed may be suppressed by 2 applications of 0.7 L/acre (0.84 kg active/ha) applied 10 days apart. • Cool weather or drought may reduce control.
• Apply POST from the spike to 3 leaf stage of field corn. • Do NOT use on seed corn or sweet corn. • For suppression of quackgrass, apply BATTALION at the 1-6 leaf stage of quackgrass.
• Do NOT use on seed or sweet corn. • Apply from the 4-6 leaf stage of corn but injury may occur if applied after the 6 leaf stage. • Controls most annual broadleaf weeds up to the 4 leaf stage (lamb's-quarters and mustards to 8 leaf stage).
• Apply from the 3-8 leaf stage of field corn. • Apply from the 3-6 leaf stage of seed or sweet corn. • Do NOT apply to Delmonte 2038 sweet corn. • Do NOT harvest sweet corn within 50 days of treatment. • Seed corn inbred and sweet corn varieties vary in their tolerance to CALLISTO, consult your seed supplier for more information. • Apply in 40-80 L/acre of water.
• Apply POST up to the 3 leaf stage of field corn. • Apply PRE-PLANT or PRE for seed corn. • Not all seed corn inbred lines have been tested for tolerance to Converge Flexx . Use of this product must be approved by the contracting seed corn company and comply with their directions for use. • Do NOT use on sweet corn. • Do NOT incorporate treatments prior to planting. • Use the higher application rates for control of fall panicum and proso millet. • Do NOT use on sands, loamy sands and/or soils with less than 2% organic matter.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
39	**Destra IS (WG) + non-ionic surfactant** 1) Destra IS 2) non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) rimsulfuron, (5.46%), 15 g a.i./ha 2) mesotrione, (36.36%), 100 g a.i./ha	1) 110 g/acre 2) 2 L/1,000 L **WSSA Group:** 1) 2 2) 27	**REI:** 12 hours **PHI:** 100 days (grain) **Rainfast:** 2-4 hours for emerged weeds.
40	**Distinct (70% WDG) + surfactant + 28% UAN** 1) Distinct (70% WDG) at 115 g/acre 2) non-ionic surfactant at 2.5 L/1,000 L 3) 28% UAN at 12.5 L/1,000 L **Active Ingredient(s), concentration, rate:** 1) diflufenzopyr/dicamba, 70%, 200 g a.i./ha	1) 115 g/acre 2) 2.5 L/1,000 L 3) 12.5 L/1,000 L **WSSA Group:** 1) 19/4	**REI:** 12 hours **PHI:** 120 days (grain) **Rainfast:** 4 hours for emerged weeds.
41	**Dual II Magnum (EC)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 1600 g a.i./ha	700 mL/acre **WSSA Group:** 1) 27	**REI:** 12 hours **PHI:** 85 days (grain), 45 days (sweet corn) **Rainfast:** not applicable
42	**Engarde (WG) + non-ionic surfactant** **Active Ingredient(s), concentration, rate:** 1) rimsulfuron, (4.31%), 15 g a.i./ha 2) mesotrione, (41.38 %), 144 g a.i./ha	139 g/acre + 2 L/1,000 L **WSSA Group:** 1) 2 2) 27	**REI:** 12 hours **PHI:** 100 days (grain) **Rainfast:** 2-4 hours for emerged weeds
43	**Engenia (SN)** **or Xtendimax** or FeXapan **Active Ingredient(s), concentration, rate:** **Engenia:** dicamba, (600 g/L), 288-600 g a.e./ha **Xtendimax**/Fexapan: dicamba (350 g/L), 288-600 g a.e./ha	192-400 mL/acre 330-685 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days (grain) **Rainfast:** 2 hours for emerged weeds

APPLICATION NOTES
• Do NOT use on seed corn or sweet corn. • Always add water soluble packages to clean water with the agitator running. • Corn should be within the 1-6 leaf stage. • Apply Destra IS when annual grasses are in the 1-6 leaf stage, and quackgrass is in the 3-6 leaf stage. • ONLY apply Destra IS when air temperatures in the 24 hours before and after application range between 5°C and 28°C. • Can be tank mixed with glyphosate for one pass weed control in glyphosate tolerant corn (e.g., Roundup Ready or Enlist hybrids). Do not include a non-ionic surfactant when tank mixed with glyphosate.
• Do NOT use on seed corn or sweet corn. • Apply to actively growing weeds when corn is in the 2-6 leaf stage. • Apply when temperatures above 4°C are predicted for the 24 hours before and after application. • Do NOT tank-mix with glyphosate and apply to glyphosate tolerant corn (e.g., Roundup Ready or Enlist hybrids) as unacceptable crop injury may occur.
• Apply POST (up to 3 leaf corn) on field corn only . • Grassy weeds beyond the 2 leaf stage will not be controlled. • Optimal control of nightshade is obtained when DUAL II MAGNUM is applied PRE. • Do NOT use on muck, peat, or high organic matter soils. • This product controls a limited amount of broadleaf weeds and therefore should be tank mixed with a broadleaf herbicide for broad spectrum weed control.
• Do NOT use on seed corn or sweet corn. • Apply PRE or early POST up to the 2 leaf stage of corn. • Engarde can be applied with 28% UAN as a carrier (PRE only). • A rapid fluctuation in temperature (greater than 20°C difference within 24-36 hours) will stress the corn crop. For maximum crop safety, allow 48-72 hours for the corn to acclimatize before spraying early POST on emerged corn.
• Do NOT use on seed corn or sweet corn. • Apply from the spike to 5 leaf stage of corn. Use drop pipes when corn is 20-50 cm tall. • The higher rate offers a longer period of residual weed control and better control of velvetleaf, the lower rate offers better crop safety and should be used when tank mixed. • Can be tank mixed with Frontier Max, Aatrex 480, Primextra II Magnum, Prowl H2O, Ultim, Dual II Magnum. • Do NOT use dicamba if temperature exceeds 25°C at the time of application, or if high humidity is expected, due to the possibility of dicamba volatilizing and injury to susceptible crops nearby. Do NOT add crop oil. **Off-target drift mitigation (summary only: refer to the label for complete details)** 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Engenia, Xtendimax or FeXapan.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
44	**Frontier Max (EC)** **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (720 g/L), 544-693 g a.i./ha	305-390 mL/acre **WSSA Group:** 1) 15	**REI:** 24 hours **PHI:** none stated **Rainfast:** none stated
45	**Impact or Armezon + Aatrex 480 + Merge + UAN** 1) Impact (SU) or Armezon (SU) 2) Aatrex Liquid 480 3) Merge Adjuvant 4) 28% UAN **Active Ingredient(s), concentration, rate:** 1) topramezone, (336 g/L), 12.4 g a.i./ha 2) atrazine, (480 g/L), 480 g a.i./ha	1) 15 mL/acre 2) 400 mL/acre 3) 12.5 L/1,000 L 4) 12.5 L/1,000 L **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 45 days **Rainfast:** 2 hours for emerged weeds
46	**Lumax EZ (SU)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (298 g/L), 1,000 g a.i./ha 2) atrazine, (112 g/L), 375 g a.i./ha 3) mesotrione, (30 g/L), 100 g a.i./ha	1.36 L/acre **WSSA Group:** 1) 15 2) 5 3) 27	**REI:** 12 hours **PHI:** 100 days (grain), 90 days (silage), 50 days (sweet) **Rainfast:** 3 hours for emerged weeds
47	**Marksman (SU)** **Active Ingredient(s), concentration, rate:** 1) dicamba, (132 g/L), 488 g a.i./ha, group 4 2) atrazine, (261 g/L), 966 g a.i./ha, group 5	1.5 L/acre **WSSA Group:** 1) 4 2) 5	**REI:** 12 hours **PHI:** 60 days (grain) **Rainfast:** 4 hours for emerged weeds
48	**MCPA Amine 500 (L)** **Active Ingredient(s), concentration, rate:** 1) MCPA Amine, (500 g/L), 500 g a.i./ha	400 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 15 days (sweet) **Rainfast:** 2 hours for emerged weeds
49	**MCPB/MCPA (L) (Tropotox, Clovitox or Topside)** **Active Ingredient(s), concentration, rate:** 1) MCPB, (375 g/L), 1590 g a.i./ha 2) MCPA, (25 g/L), 106 g a.i./ha	1.7 L/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** 30 days (grain) **Rainfast:** 4 hours for emerged weeds

APPLICATION NOTES
• Apply POST (up to 3 leaf corn) on field corn only . • For PPI timing, set incorporation equipment to work soil no deeper than 10 cm. • Improved control of yellow nutsedge is obtained when applied PPI at the highest rate. • Sensitive weeds beyond the 2 leaf stage will not be controlled. • Apply higher rates on fine textured or high organic matter soils or when targeting nightshade, nutsedge and pigweed. • Do NOT use on muck, peat, or high organic matter soils. • Consult the seed corn company for information on the tolerance of seed corn inbred lines prior to the use of FRONTIER MAX herbicide.
• Apply to emerged grassy (up to 4 leaf) and broadleaf (up to 8 leaf) weeds. • Apply between the spike and 7 leaf stage of seed, sweet and field corn. • For seed and sweet corn: ASSIST + UAN must be used instead of MERGE at a rate of 12.5 L/1,000 L. The use of MERGE will increase the risk of crop injury to seed and sweet corn. • If using the adjuvant MERGE, Do NOT add liquid ammonium nitrate (UAN).
• Apply Early POST up to the 2 leaf stage of field corn. • Apply PRE to seed and sweet corn. • Grassy weeds beyond the 2 leaf stage will not be controlled. • Do NOT apply to corn treated with an organophosphorous insecticide.
• Do NOT use on seed corn or sweet corn. • Application can be made up to 13 cm standing corn (5 leaf). Use the lower rate on coarse textured soils and the higher rate on medium to fine textured soils. • Do NOT use if temperature exceeds 25°C at the time of application, or if high humidity is expected, due to the possibility of dicamba volatilizing and injury to susceptible crops nearby. • Do NOT add oil or surfactant.
• Do NOT use on seed corn or sweet corn. • Treat before the corn reaches 15 cm tall (leaf extended). • Use the lower rate for small, actively growing weeds and the higher rate for larger weeds or under adverse weather conditions. • Do not spray on exceptionally hot days over 27°C.
• Do NOT use on seed corn or sweet corn. • Apply when corn is 30-60 cm high, using drop pipes. • Do NOT add oil or surfactant.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
50	**Option 2.25 OD + Aatrex 480 + 28% UAN** 1) Option 2.25 OD (L) 2) Aatrex Liquid 480 3) 28% UAN at 1 L/acre **Active Ingredient(s), concentration, rate:** 1) foramsulfuron, (22.5 g/L), 35 g a.i./ha 2) atrazine, (480 g/L), 1,120 g a.i./ha	1) 0.63 L/acre 2) 0.93 L/acre 3) 1 L/acre **WSSA Group:** 1) 2 2) 5	**REI:** none stated **PHI:** 70 days (grain) **Rainfast:** 2 hours for emerged weeds
51	**Pardner (EC) + Aatrex Liquid 480** 1) Pardner (EC) 2) Aatrex Liquid 480 **Active Ingredient(s), concentration, rate:** 1) bromoxynil, (280 g/L), 280-340 g a.i./ha 2) atrazine (480 g/L), 1.01-1.49 kg g a.i./ha	1) 400-480 mL/acre 2) 0.84-1.24 L/acre **WSSA Group:** 1) 6 2) 5	**REI:** 24 hours **PHI:** none stated **Rainfast:** 1 hour for emerged weeds
52	**Peak (75% WG) + non-ionic surfactant** 1) Peak (75% WG) at 5.3 g/acre 2) non-ionic surfactant at 2 L/1,000 L **Active Ingredient(s), concentration, rate:** 1) prosulfuron, (75%), 10 g a.i./ha	1) 5.3 g/acre 2) 2 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 120 days (grain) **Rainfast:** 2 hours for emerged weeds
53	**Permit (WG) + non-ionic surfactant** 1) Permit (WG) at 19 g/acre 2) non-ionic surfactant at 2.5 L/1,000 L **Active Ingredient(s), concentration, rate:** 1) halosulfuron, (72.6%), 34-68 g a.i./ha, group 2	1) 19-38 g/acre 2) 2.5 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 120 days (grain) **Rainfast:** 2 hours for emerged weeds
54	**Primextra II Magnum (L)** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (400 g/L), 1,200-1,600 g a.i./ha 2) atrazine, (320 g/L), 960-1,280 g a.i./ha	1.2-1.6 L/acre **WSSA Group:** 1) 15 2) 5	**REI:** 12 hours **PHI:** 80 days (grain), 45 days (sweet) **Rainfast:** 2 hours for emerged weeds
55	**Prowl H20 (ME)** **Active Ingredient(s), concentration, rate:** 1) pendimethalin, (455 g/L), 1,680 g a.i./ha	1.48 L/acre **WSSA Group:** 1) 3	**REI:** 24 hours **PHI:** 100 days (grain) **Rainfast:** none stated
56	**Ultim 75DF + non-ionic surfactant** 1) Ultim 75DF at 13 g/acre 2) non-ionic surfactant at 2 L/1,000 L **Active Ingredient(s), concentration, rate:** 1) nicosulfuron, (37.5%), 12.5 g a.i./ha 2) rimsulfuron, (37.5%), 12.5 g a.i./ha	1) 13 g/acre 2) 2 L/1,000 L **WSSA Group:** 1) 2 2) 2	**REI:** 12 hours **PHI:** 120 days (grain), 75 days (silage) **Rainfast:** 2 hours for emerged weeds

APPLICATION NOTES
• Do NOT use on seed corn or sweet corn. • Apply up to the 8 leaf stage of corn.
• Apply from the 4-8 leaf stage of corn. • Do NOT add oil or surfactant. • Other products exist that contain the same active ingredient but at different concentrations, therefore different application rates. Products with bromoxynil at 240 g/L are applied at 480-560 mL/acre and products with bromoxynil 480 g/L are applied at 240-280 mL/acre. Refer to the "Notes on Herbicide" chapter for a list of specific trade names.
• Do NOT apply to sweet corn. • Apply when the corn is in the 2-7 leaf stage. • Controls most annual broadleaf weeds including triazine resistant lamb's-quarters and pigweed up to the 6 leaf stage; cocklebur and velvet leaf up to the 6 leaf stage; and ragweed up to the 8 leaf stage. • Do NOT apply to corn treated with organophosphorus insecticides.
• Apply when the corn is in the spike-10-leaf stage. • For sweet corn, the maximum use rate is 28 g/acre. • The 19 g/acre rate will control labelled broadleaf weeds and nutsedge shorter than 15 cm. • The 28-38 g/acre will control nutsedge that is 15-30 cm tall. • Permit can be applied up to twice per season, but not to exceed a total of 56 g/acre in sweet corn and 76 g/acre in seed or field corn.
• Apply POST up to the 3 leaf stage of corn. • Use the higher rate where annual grass build up or nutsedge infestation is evident. • Grassy weeds beyond the 2 leaf stage will not be controlled. • The equivalent rate of PRIMEXTRA II MAGNUM can be achieved by adding DUAL II MAGNUM at 0.5-0.7 L/acre with AATREX at 0.84-1.24 L/acre.
• Do NOT use on seed corn or sweet corn. • Apply PRE or POST up to the 4 leaf stage of field corn. • PROWL H2O alone will not control emerged weeds. Tank-mixing or use of a sequential herbicide program to achieve broad spectrum control is suggested. Plant corn at least 4 cm deep and ensure good seed coverage. PROWL H2O may be applied in water or liquid fertilizer as a carrier. Conduct a liquid fertilizer compatibility test with any of the registered PROWL H2O tank-mix combinations. If there is no rain within 7 days, rotary hoeing or shallow cultivation is required.
• Do NOT use on seed corn or sweet corn. • Always add water soluble packages to clean water with the agitator running. Corn should be within the 1-6 leaf stage. Apply ULTIM when annual grasses are in the 1-6 leaf stage, and quackgrass is in the 3-6 leaf stage. • ONLY apply ULTIM when air temperatures in the 24 hours before and after application range between 5°C and 28°C.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
57	**Zidua (SC)** **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (500 g/L), 125; 166; 208.5 or 246.5 g a.i./ha	**Coarse:** 100 mL/acre **Med:** 133 mL/acre, 167 mL/acre **Fine:** 197 mL/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated
POST-EMERGENCE HERBICIDES FOR GLYPHOSATE TOLERANT (E.G., "ROUNDUP READY" OR "ENLIST") CORN HYBRIDS			
58	**glyphosate (360 g/L)** – 1-2x Rate **or glyphosate (480 g/L)** **or glyphosate (500 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha,	1-2 L/acre 0.75-1.5 L/acre 0.72-1.44 L/acre 0.67-1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour for emerged weeds
59	**Callisto GT (SU) + non-ionic surfactant** 1) Callisto GT (SU) at 0.9 L/acre 2) non-ionic surfactant at 2 L/1,000 L **Active Ingredient(s), concentration, rate:** 1) glyphosate, (455 g/L), 1,024 g a.i./ha 2) mesotrione, (45.5 g/L), 102 g a.i./ha	1) 900 mL/acre 2) 2 L/1,000 L **WSSA Group:** 1) 27 2) 5	**REI:** 12 hours **PHI:** 100 days (grain), 90 days (silage) **Rainfast:** 3 hours for emerged weeds
60	**Halex GT (SN) + Aatrex Liquid 480** 1) Halex GT (SN) 2) Aatrex Liquid 480 3) non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) glyphosate, (250 g/L), 1,050 g a.i./ha 2) s-metolachlor, (250 g/L), 1,050 g a.i./ha 3) mesotrione, (25 g/L), 105 g a.i./ha 4) atrazine, (480 g/L), 278 g a.i./ha	1) 1.7 L/acre 2) 235 mL/acre 3) 2 L/1,000 L **WSSA Group:** 1) 9 2) 15 3) 27 4) 5	**REI:** 12 hours **PHI:** 100 days (grain), 90 days (silage) **Rainfast:** 3 hours for emerged weeds

APPLICATION NOTES
• Do NOT use on seed corn or sweet corn. • Apply early POST up to the 4 leaf stage of field corn. • Use the 100 mL/acre rate on coarse soils, 133 mL/acre on medium textured soils with < 3% organic matter, 167 mL/acre on medium textured soils with between 3 and 7% organic matter and the 197 mL/acre rate on fine textured soils. • Do NOT use on peat or muck soils with 7% organic matter content. • Can be tank mixed with glyphosate or Aatrex 480
• Can only be applied to glyphosate tolerant corn hybrids (e.g., Roundup Ready, Enlist). Applications made to non glyphosate tolerant corn will result in complete plant death. • Apply up to and including the 8 leaf stage of corn. • Applications should be timed to keep the corn crop weed-free from the 3-8 leaf stage of corn.
• Can only be applied to glyphosate tolerant corn hybrids (e.g., Roundup Ready, Enlist). Applications made to non glyphosate tolerant corn will result in complete plant death. • Apply up to and including the 8 leaf stage of corn. • CALLISTO GT will provide residual broadleaf weed control.
• Can only be applied to glyphosate tolerant corn hybrids (e.g., Roundup Ready, Enlist). Applications made to non glyphosate tolerant corn will result in complete plant death. • Apply up to and including the 6 leaf stage of corn. • The addition of atrazine improves control of wild buckwheat, cocklebur, lady's thumb, common and giant ragweed. • This treatment can be replicated by tank-mixing either TOUCHDOWN TOTAL or TRAXION at 0.72 L/acre with PRIMEXTRA II MAGNUM at 1 L/acre and CALLISTO at 84 mL/acre.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
61	**Roundup Xtend** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (240 g. a.e./L), 600-1,200 g a.e./ha 2) dicamba (120 g a.e./L), 300-600 g a.e./ha	1-2 L/acre **WSSA Group:** 1) 9 2) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 4 hours for emerged weeds
62	**VIOS G3 (SU) + glyphosate (540 g/L)** 1) VIOS G3 (SU-420 g/L) 2) glyphosate (540 g/L) **Active Ingredient(s), concentration, rate:** 1) thiencarbazone-methyl, (70 g/L), 7.7 g a.i./ha 2) tembotrione, (350 g/L), 38.5 g a.i./ha 3) glyphosate, (360 g/L), 900 g a.i./ha	1) 44 mL/acre 2) 0.67 L/acre **WSSA Group:** 1) 2 2) 27 3) 9	**REI:** 12 hours **PHI:** 89 days (grain) **Rainfast:** 2 hours for emerged weeds

APPLICATION NOTES

- Apply PP, PRE or early POST up to the 5 leaf stage of corn. If applying PRE, ensure corn seeds are placed at least 4 cm below the soil surface.
- Apply to weeds less than 10 cm tall with a minimum spray volume of 10.6 U.S. gal/acre (40 L/acre).
- The highest rate can only be used once in a season.
- Use the highest rate to enhance preplant or pre-emergence burndown activity and provide short term residual weed control.
- Do NOT apply more than 4 L/acre of Roundup Xtend in a single growing season.

Off-target drift mitigation (summary only: refer to the label for complete details)

1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Roundup Xtend.

- Can only be applied to glyphosate tolerant corn hybrids (e.g., Roundup Ready, Enlist). Applications made to non glyphosate tolerant corn will result in complete plant death.
- Apply up to and including the 6 leaf stage of corn.
- Apply only 1 application of VIOS G3 per season.

continued

CHAPTER 5: CORN

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE HERBICIDES FOR "LIBERTY-LINK AND ENLIST" CORN HYBRIDS			
63	**Liberty 200 SN** **Active Ingredient(s), concentration, rate:** 1) glufosinate ammonium, (200 g/L), 500 g a.i./ha	1 L/acre **WSSA Group:** 1) 10	**REI:** 24 hours **PHI:** 86 days **Rainfast:** 4 hours for emerged weeds
POST-EMERGENCE TANK-MIX PARTNERS WITH LIBERTY FOR "LIBERTY-LINK AND ENLIST" CORN HYBRIDS			
64	**VIOS G3 (SU) + Liberty 200 SN** 1) VIOS G3 (420 g/L) at 44 mL/acre 2) Liberty 200 SN at 1 L/acre **Active Ingredient(s), concentration, rate:** 1) thiencarbazone-methyl, (70 g/L), 7.7 g a.i./ha 2) tembotrione, (350 g/L), 38.5 g a.i./ha 3) glufosinate ammonium, (200 g/L), 500 g a.i./ha	1) 44 mL/acre 2) 1 L/acre **WSSA Group:** 1) 2 2) 27 3) 10	**REI:** 24 hours **PHI:** 86 days (grain) **Rainfast:** 4 hours for emerged weeds
POST-EMERGENCE TREATMENTS FOR "ENLIST" CORN HYBRIDS			
65	**Enlist Duo (S)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D choline salt, (194 g/L), 563-834 g a.i./ha 2) glyphosate, (204 g/L), 592-877 g a.i./ha	1.17-1.74 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 48 hours **PHI:** 30 days (grain) **Rainfast:** 2 hours for emerged weeds

APPLICATION NOTES
• Can only be applied to glufosinate tolerant corn hybrids (e.g., Liberty-Link, Enlist). Applications made to non Liberty-Link or Enlist corn will result in complete plant death. • LIBERTY 200 SN can be applied from the 1-8 leaf stage of corn. • LIBERTY 200 SN is a contact herbicide and has no residual activity. Ammonium sulphate can be applied at 6 L/ha (2.4 L/acre) (liquid) or 3.3 kg/ha (1.3 kg/acre) (dry) for improved control of lamb's-quarters and velvetleaf. • Do NOT add oil or any other surfactants.
• Can only be applied to glufosinate tolerant corn hybrids (e.g., Liberty-Link, Enlist). Applications made to non Liberty-Link or Enlist corn will result in complete plant death. • Apply up to and including the 6 leaf stage of corn. • Apply only 1 application of VIOS G3 per season.
• Only apply to Enlist Corn hybrids, apply POST up to the 8 leaf stage of Enlist corn. • Make 1-2 applications with a minimum of 12 days between applications. • Two applications may be necessary for control of perennial weeds or late weed flushes that emerged after the initial application. • Apply as a coarse to extremely coarse spray (ASABE S-572 Standard). • Do not apply more than two post emergent applications per use season. • Do not apply more than 3.44 L/acre of Enlist Duo Herbicide per use season. • Read and follow the DAS Stewardship Program (www.traitstewardship.com) that accompanies the use of field corn seed containing the DAS-40278-9 gene.

Chapter 6: Dry Edible Beans

CHAPTER 6: DRY EDIBLE BEANS

Weed control in edible beans

BASIC PRINCIPLES

Yield losses typically reach around 55% when weeds are not properly managed in edible beans. To minimize any yield losses from weed competition in edible beans they should be kept **weed free from emergence to first flower.**

Research by the University of Guelph (Ridgetown campus) has demonstrated that weed control is maximized in edible beans when a soil-applied herbicide program is used that targets the most prominent weeds in a field, followed by regular scouting commencing 10-14 days after application to look for new weed seedling emergence, so that herbicides can be applied to those weeds between the 4-8 leaf stage of growth when they are most susceptible.

Imazethapyr (e.g., Pursuit) and halosulfuron (Permit) are considered foundational soil applied herbicides in edible beans because they control a wide range of grass and/or broadleaf weeds. However, in the last 20 years, populations of weeds that are resistant to both of these "Group 2" herbicides have become more prominent, requiring other herbicides be tank mixed, or post-emergence broadleaf herbicides be applied to pick up any deficiencies in weed control.

To minimize the risk of crop injury from herbicides applied in edible beans, the University of Guelph (Ridgetown campus) has found that:

- Dual II Magnum and Frontier when applied pre-plant incorporated offer better crop safety than when applied pre-emergence.
- There is a range in sensitivity to imazethapyr among the edible bean market classes grown in Ontario. The following rates of imazethapyr have been shown in field trials to minimize crop injury while maximizing yield and weed control when tank mixed with other herbicides (e.g., Prowl, Treflan, Dual, Frontier or Eptam):
  - Adzuki beans – (Pursuit: 126 mL/acre)
  - Large seeded edible beans (e.g., cranberry, kidney, yellow-eye) – (Pursuit: 100 mL/acre)
  - Small seeded edible beans (e.g., white, black, pinto) – (Pursuit: 75 mL/acre)

You will note that the rate of imazethapyr provided in Chapter 6 – Edible beans, is the labeled rate of 126 mL/acre when tank mixed with other herbicides. When rates are used which are lower than what is on the label, the manufacturer is not responsible for any reduced weed control or any crop loss that may occur as a result. Therefore, it is recommended that you discuss herbicide programs with the organization you have contracted your edible bean crop with, as they will have the most experience with the best regional weed control strategy.

CHAPTER 6: DRY EDIBLE BEANS

CHAPTER 6: DRY EDIBLE BEANS

TABLE 6-1
Pre-plant burndown weed control ratings in edible beans

TRT #	HERBICIDE TREATMENT	WSSA GROUP	adzuki beans	black beans	cranberry beans	kidney beans	otebo beans	pinto beans	small red Mexican	white beans	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	alfalfa, volunteer
Pre-plant burndown with glyphosate															
1	glyphosate (1x rate)	9	✓	✓	✓	✓	✓	✓	✓	✓	9	–	9	9	7
2	glyphosate (2x rate)	9	✓	✓	✓	✓	✓	✓	✓	✓	9	–	9	9	8
Pre-plant burndown co-packs with glyphosate that offer residual weed control															
4	Assignment co-pack (Pursuit + RU Weathermax)	2	✓	✓	✓	✓	✓	✓	✓	✓	–	–	8	–	–
Co-packs and tank-mix partners with glyphosate that offer residual weed control															
5	Dual II Magnum	15	x	✓	✓	✓	✓	✓	✓	✓	5	–	9	–	–
8	Permit	2	x	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–
10	Pursuit, Phantom or Nu-Image	2	✓	✓	✓	✓	✓	✓	✓	✓	–	–	9	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Top growth burnoff only, re-growth will occur
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 6: DRY EDIBLE BEANS

WEED SPECIES FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																						
atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
Emerged weed control ratings at 4 weeks after application																							
7	7	–	8	–	7	9	7	7	9[R]	9	8[1]	–	9	9	9	9	–	9[R]	9[R]	8	7	4	9[R]
9	8	6	9	–	8	9	8	9	9[R]	9	8[1]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]
Weed control ratings at 8 weeks after application																							
–	–	–	–	9	6	9	–	–	–	–	–	–	8	9[R]	9	9[R]	–	–	6	–	–	–	–
Weed control ratings at 8 weeks after application																							
–	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–	8	–	–	–	–	–	–	6
–	–	–	–	–	–	–	–	–	8[R]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	–	–	–	9	6	9	–	–	–	–	–	–	–	9[R]	9	9[R]	9	8[R]	6[R]	–	–	–	–

CHAPTER 6: DRY EDIBLE BEANS

TABLE 6-2
Soil applied herbicide weed control ratings in edible beans

TRT #	HERBICIDE TREATMENT	WSSA GROUP	adzuki beans	black beans	cranberry beans	kidney beans	otebo beans	pinto beans	small red Mexican	white beans	Crop Tolerance	GRASSY WEEDS			
												barnyard grass	crabgrass	fall panicum	foxtails
Pre-plant incorporated herbicides															
5	Dual II Magnum	15	x	✓	✓	✓	✓	✓	✓	✓	G	9	9	8	9
6	Eptam	8	x	✓	✓	✓	x	✓	x	✓	E	9	9	8	9
7	Frontier Max	15	x	✓	✓	✓	✓	✓	✓	✓	G	9	9	8	9
9	Prowl H20	6	✓	✓	✓	✓	✓	✓	✓	✓	E	8	8	8	8
10	Pursuit, Phantom or Nu-Image	2	✓	✓	✓	✓	✓	✓	✓	✓	G	7	7	7	9[R]
11	Treflan, Bonanza, Triflurex or Rival	3	x	✓	x	✓	x	x	x	✓	E	9	9	8	9
Pre-plant incorporated tank-mixes															
12	Dual II Magnum + Pursuit	15,2	x	✓	✓	✓	✓	✓	✓	✓	G	9	9	8	9
13	Eptam + Treflan	8,3	x	x	x	✓	x	x	x	✓	E	9	9	8	9
14	Eptam + Permit	8,2	x	✓	✓	✓	x	✓	x	✓	E	9	9	8	9
15	Frontier Max + Pursuit	15,2	x	✓	✓	✓	✓	✓	✓	✓	G	9	9	8	9
16	Permit + Treflan	2,3	x	x	x	x	x	x	x	✓	E	9	9	8	9
17	Pursuit + Treflan	2,3	x	x	x	x	x	x	x	✓	G	7	7	7	9
Pre-emergence herbicides															
5	Dual II Magnum	15	x	✓	✓	✓	✓	✓	✓	✓	G	9	9	8	9
8	Permit	2	x	✓	✓	✓	✓	✓	✓	✓	E	–	–	–	5[R]
10	Pursuit, Phantom or Nu-Image	2	✓	✓	✓	✓	✓	✓	✓	✓	G	7	7	7	9[R]
Pre-emergence tank-mixes															
12	Dual II Magnum + Pursuit	15,2	x	✓	✓	✓	✓	✓	✓	✓	G	9	9	8	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1]Weeds with more than two leaves emerged at time of application will not be controlled.
[2]Weeds cannot be emerged at time of application to achieve this level of control.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

(ANNUAL)				BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																		
proso millet	sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
Weeds are not emerged at time of application																						
–	–	–	9	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
7	–	–	9	–	–	–	–	–	–	–	–	–	7	7	5	7	7	5	–	–	5	–
–	–	–	9	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
–	8	–	8	–	–	–	–	–	9	–	–	–	–	8	–	–	8[R]	–	–	–	–	7
7	7[2]	–	7	–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	9[R]	9[R]	8[R]	6	6	9	–
6	6	8	9	–	–	–	–	–	9	–	–	–	–	8	–	–	8	–	–	–	–	8
Weeds are not emerged at time of application																						
–	–	–	9	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
7	–	–	9	–	–	–	–	–	–	–	–	–	7	7	5	7	7	5	–	–	5	–
7	–	–	9	–	–	–	–	–	8[2]	8[R]	8[2,R]	8	8	9[R]	9	–	9[R]	9[R]	–	–	8	–
7	7[2]	–	9	–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	9[R]	9[R]	8[R]	6	6	9	6
6	6	8	9	–	–	–	–	–	8[2]	8[R]	8[2,R]	8	9[2]	9	9	–	9	8[R]	–	–	9	8
7	7[2]	–	7	–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	9[R]	8	8[R]	6	6	9	8
Weeds are not emerged at time of application																						
–	–	–	9	–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
–	–	–	–	–	–	–	–	–	8[2]	8[R]	8[2,R]	9	8[2]	9[R]	9	–	9[R]	8[R]	–	–	9	–
7	7[2]	–	7	–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	9[R]	9[R]	8[R]	6	6	9	–
Weeds are not emerged at time of application																						
7	7[2]	–	9	–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	8[1]	8[1]	8[R]	6	6	9	6

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TABLE 6-3
Post-emergence herbicide weed control ratings in edible beans

TRT #	HERBICIDE TREATMENT	WSSA GROUP	adzuki beans	black beans	cranberry beans	kidney beans	otebo beans	pinto beans	small red Mexican	white beans	Crop Tolerance	GRASSY WEEDS				
												barnyard grass	crabgrass	fall panicum	foxtails	proso millet
Post-emergence grass herbicides																
18	Assure II, Yuma GL or Contender	1	✓	✓	✓	✓	✓	✓	✓	✓	E	9	8	9	9	9
19	Poast Ultra	1	✓	✓	✓	✓	✓	✓	✓	✓	E	9	8	9	9	9
20	Select, Arrow All-In or Statue	1	x	✓	✓	✓	✓	✓	✓	✓	E	9	8	9	9	9
21	Venture L	1	x	✓	✓	✓	✓	✓	✓	✓	E	9	8	9	8	9
Post-emergence broadleaf herbicides																
22	Basagran Forté	6	x	✓	✓	✓	✓	✓	✓	✓	G	–	–	–	–	–
23	Permit	2	x	✓	✓	✓	✓	✓	✓	✓	F/G	–	–	–	–	–
24	Reflex	14	✓	✓	✓	✓	✓	✓	✓	✓	G	–	–	–	–	–
Post-emergence tank-mixes																
25	Basagran + Reflex	6,14	x	✓	✓	✓	✓	✓	✓	✓	G	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] Weeds with more than two leaves emerged at time of application will not be controlled.
[2] Weeds cannot be emerged at time of application to achieve this level of control.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

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			BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weeds emerged at time of application																								
9	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Weeds emerged at time of application																								
–	–	–	–	9	7	7	–	–	–	9	5	8	9	8	–	9	7	7	7	6	–	9	–	–
–	–	–	–	–	–	–	–	–	–	8[R]	–	8	8	–	–	8	–	8[R]	8[R]	8[R]	–	8	–	–
–	–	–	–	–	–	8	6	–	–	7	–	7	8	6	6	9	8	9	9	7	7	6	–	9
Weeds emerged at time of application																								
–	–	–	–	9	7	8	–	–	–	9	–	8	9	8	6	9	8	9	9	7	7	9	–	9

CHAPTER 6: DRY EDIBLE BEANS

TABLE 6-4
Perennial weed and volunteer crop control ratings for post-emergence herbicides in edible beans

TRT #	HERBICIDE TREATMENT	WSSA GROUP	adzuki beans	black beans	cranberry beans	kidney beans	otebo beans	pinto beans	small red Mexican	white beans	Crop Tolerance	bindweed, field	carrot, wild	dandelion
Post-emergence grass herbicides														
18	Assure II, Yuma GL or Contender	1	✓	✓	✓	✓	✓	✓	✓	✓	E	–	–	–
19	Poast Ultra	1	✓	✓	✓	✓	✓	✓	✓	✓	E	–	–	–
20	Select, Arrow All-In or Statue	1	x	✓	✓	✓	✓	✓	✓	✓	E	–	–	–
21	Venture L	1	x	✓	✓	✓	✓	✓	✓	✓	E	–	–	–
Post-emergence broadleaf herbicides														
22	Basagran Forté	6	x	✓	✓	✓	✓	✓	✓	✓	G	–	–	–
23	Permit	2	x	✓	✓	✓	✓	✓	✓	✓	F/G	6	–	–
24	Reflex	14	✓	✓	✓	✓	✓	✓	✓	✓	G	–	–	–
Post-emergence tank-mixes														
25	Basagran + Reflex	6,14	x	✓	✓	✓	✓	✓	✓	✓	G	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

✓= Can be used on this crop
x = cannot be used on this crop

[1] The highest labelled rate is required to achieve this level of control.
[2] Two applications will be required to achieve this level of control throughout the season.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

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PERENNIAL WEEDS										VOLUNTEER CROPS											
horse-nettle	horsetail, field	milkweed	nutsedge, yellow	quackgrass	redtop	sow-thistle, perennial	thistle, Canada	vetch	wire-stem muhly	alfalfa, volunteer	adzuki beans, volunteer	canola, volunteer	canola (LL), volunteer	canola (RR), volunteer	clover (red), volunteer	corn, volunteer	corn (LL), volunteer	corn (LL/RR), volunteer	corn (RR), volunteer	corn (Enlist), volunteer	cereals, volunteer
Weeds emerged at time of application																					
–	–	–	–	9	6	–	–	–	7	–	–	–	–	–	–	8-9	8-9	8-9	8-9	–	9
–	–	–	–	6	6	–	–	–	6	–	–	–	–	–	–	6-8	6-8	6-8	6-8	6-8	9
–	–	–	–	7	7	–	–	–	6	–	–	–	–	–	–	7-9	7-9	7-9	7-9	7-9	9
–	–	–	–	8	7	–	–	–	8	–	–	–	–	–	–	7-9	7-9	7-9	7-9	–	9
Weeds emerged at time of application																					
–	–	–	7[1,2]	–	–	6-9	7-9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	6	6	9	–	–	–	–	–	–	–	–	9	9	9	–	–	–	–	–	–	–
–	6	–	–	–	–	5-8	5-9	5	–	6	–	8	8	8	6	–	–	–	–	–	–
Weeds emerged at time of application																					
–	6	–	7[1,2]	–	–	6-9	7-9	–	–	6	–	8	8	8	6	–	–	–	–	–	–

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES AND CO-PACKS			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
4	**Assignment co-pack:** 1) Pursuit 2) Roundup Weathermax **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 100 g a.i./ha 2) glyphosate, (540 g/L), 1800 g a.e./ha	10 acres/case 1) 168 mL/acre 2) 1.34 L/acre **WSSA Group:** 1) 2 2) 9	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours
PRE-PLANT INCORPORATED AND/OR PRE-EMERGENCE HERBICIDES			
5	**Dual II Magnum** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 1,050-1,600 g a.i./ha	0.46-0.7 L/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of edible beans. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of edible beans. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply as a PP burndown. • Some rotational restrictions apply.
• Apply PPI or PRE on all dry common bean *(Phaseolus vulgaris)* market classes. • DUAL II MAGNUM must be applied PPI to lima beans. Do NOT apply PRE to lima beans. • Apply PPI to minimize the potential for crop injury. • Do NOT use on adzuki beans. • Do NOT use on muck, peat or high organic matter soils. • Use the low rate on coarse-textured soils low in organic matter. • Requires rainfall for activation. Rotary hoe if no rainfall occurs within 7 days. • Improved yellow nutsedge control is obtained when DUAL MAGNUM is applied PPI. • Use the higher rate for the control of nightshade.

continued

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
6	**Eptam 8-E** **Active Ingredient(s), concentration, rate:** 1) EPTC, (800 g/L), 3,400-4,400 g a.i./ha	1.7-2.2 L/acre **WSSA Group:** 1) 8	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
7	**Frontier Max** **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (720 g/L), 544-693 g a.i./ha	305-390 mL/acre **WSSA Group:** 1) 15	**REI:** 24 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
8	**Permit** **Active Ingredient(s), concentration, rate:** 1) halosulfuron, (72.6%), 26.25-35.25 g a.i./ha	14-19 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours for emerged weeds
9	**Prowl H20** **Active Ingredient(s), concentration, rate:** 1) pendimethalin, (455 g/L), 1,000 g a.i./ha	0.89 L/acre **WSSA Group:** 1) 3	**REI:** 24 hours **PHI:** 90 days **Rainfast:** rainfall needed to activate herbicide
10	**Pursuit, Phantom or Nu-Image** **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 100 g a.i./ha	168 mL/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
11	**Treflan or Bonanza;** **Triflurex 40 EC;** **Rival EC** **Active Ingredient(s), concentration, rate:** **Treflan/Bonanza:** trifluralin,(480 g/L),0.6-1.15 kg a.i./ha **Triflurex:** trifluralin,(412 g/L),0.6-1.15 kg a.i./ha **Rival:** trifluralin,(500 g/L),0.6-1.15 kg a.i./ha	0.5-0.96 L/acre 0.58-1.12 L/acre 0.48-0.92 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• Apply PPI. Incorporate immediately. • Do NOT use on adzuki, lima, otebo and small red Mexican beans. • If dry weather has preceded the application of EPTC, delay seeding 7-10 days. • Temporary injury can occur in the emerging crop. • Use the high rate for nutsedge control.
• Apply PPI on all dry common bean *(Phaseolus vulgaris)* market classes. Do NOT apply PRE, as it significantly increases the risk of crop injury. • Minimum PPI rate is 860 mL/ha (348 mL/acre). • Do NOT use on adzuki and lima beans. • Do NOT use on muck, peat or high organic matter soils. • Use the low rate on coarse-textured soils low in organic matter. • Use the higher rate of FRONTIER MAX for the control of nightshade and pigweed. • Requires rainfall for activation. Rotary hoe if no rainfall occurs within 7 days.
• Apply PRE after seeding but prior to soil cracking. Use the lower rate on lighter textured soils with low organic matter.
• PPI ONLY on adzuki, kidney and white beans. • Often tank mixed with Pursuit for broad-spectrum weed control including "group 2" resistant weed populations.
• Apply PPI or PRE to adzuki and all dry bean *(Phaseolus vulgaris)* market classes. • Must be applied PRE to lima beans. Do NOT apply PPI to lima beans. • Delayed maturity or stunting may occur if cold and/or wet conditions are experienced within first week after application. • Requires rainfall for activation. Rotary hoe if no rainfall occurs within 7 days. • Some rotational cropping restrictions apply.
• Apply PPI. Incorporate as soon as possible, within 24 hr. • Do NOT use on adzuki, Dutch brown, cranberry, otebo, pinto, small red Mexican, snap and yellow-eye beans. • **For lima beans:** Do NOT exceed 0.5 L/acre of trifluralin (480 g/L) on medium-textured soils and 0.68 L/acre on heavy-textured soils.

continued

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT INCORPORATED AND/OR PRE-EMERGENCE TANK-MIXES			
12	**Dual II Magnum + Pursuit** 1) Dual II Magnum 2) Pursuit **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 1,050-1,600 g a.i./ha 2) imazethapyr, (240 g/L), 75 g a.i./ha	1) 0.46-0.7 L/acre 2) 126 mL/acre **WSSA Group:** 1) 15 2) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
13	**Eptam 8-E + trifluralin** 1) Eptam 8-E 2) + Treflan or Bonanza **Active Ingredient(s), concentration, rate:** 1) EPTC, (800 g/L), 3,400-4,400 g a.i./ha 2) trifluralin,(480 g/L),0.6 kg a.i./ha	1) 1.7-2.2 L/acre 2) 0.5 L/acre **WSSA Group:** 1) 8 2) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
14	**Eptam 8-E + Permit** 1) Eptam 8-E 2) + Permit **Active Ingredient(s), concentration, rate:** 1) EPTC, (800 g/L), 3,400-4,400 g a.i./ha 2) halosulfuron, (72.6%), 26.25-35.25 g a.i./ha	1) 1.7-2.2 L/acre 2) 14-19 g/acre **WSSA Group:** 1) 8 2) 2	**REI:** 12 hours **PHI:** 30 days **Rainfast:** rainfall needed to activate herbicide
15	**Frontier Max + Pursuit** 1) Dual II Magnum 2) Pursuit **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 1,050-1,600 g a.i./ha 2) imazethapyr, (240 g/L), 75 g a.i./ha	1) 0.46-0.7 L/acre 2) 126 mL/acre **WSSA Group:** 1) 15 2) 2	**REI:** 24 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
16	**Permit + trifluralin** 1) Permit 2) + Treflan/Bonanza or + Triflurex or + Rival **Active Ingredient(s), concentration, rate:** 1) halosulfuron, (72.6%), 37.5 g a.i./ha 2) Treflan/Bonanza: trifluralin,(480 g/L), 840 g a.i./ha Triflurex: trifluralin,(412 g/L), 840 g a.i./ha Rival: trifluralin,(500 g/L), 840g a.i./ha	1) 21 g/acre 2) + 0.7 L/acre or + 0.82 L/acre or + 0.67 L/.acre **WSSA Group:** 1) 2 2) 3	**REI:** 12 hours **PHI:** 30 days **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• Apply PRE ONLY to cranberry or kidney beans. • Apply PPI to all dry common bean *(Phaseolus vulgaris)* market classes. • Do NOT use on adzuki and lima beans. • Do NOT use on muck, peat or high organic matter soils. • Use the low rate on coarse-textured soils low in organic matter. • Requires rainfall for activation. Rotary hoe if no rainfall occurs within 7 days. • Some rotational cropping restrictions apply.
• Apply PPI. Incorporate immediately. • Use ONLY on white bean and red kidney bean. • If dry weather has preceded the application of EPTC, delay seeding 7-10 days. • Other herbicides containing trifularlin can be used in place of Treflan or Bonanza. Specifically Rival at 0.48 L/acre or Triflurex at 0.58 L/acre. See the "Notes on herbicides" chapter for more information.
• Apply PPI to a depth of approximately 5 cm just before planting. Incorporate immediately. • Use lower rate on lighter textured soils with low organic matter. • Refer to EPTAM 8-E label for specific incorporation directions. • Rotary hoe lightly during or shortly after emergence of the beans to break any crust which occurs.
• Apply PPI on all dry common bean *(Phaseolus vulgaris)* market classes. • Do NOT use on adzuki and lima beans. • Do NOT use on muck, peat or high organic matter soils. • Use the low rate on coarse-textured soils low in organic matter. • Requires rainfall for activation. Rotary hoe if no rainfall occurs within 7 days. • Some rotational cropping restrictions apply.
• Apply PPI. Incorporate as soon as possible, within 24 hr. • This tank-mix provides broad spectrum control of both grassy and braodleaf weeds in white beans.

continued

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
17	**Pursuit + trifluralin** 1) Pursuit 2) + Treflan/Bonanza or + Triflurex or + Rival **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 75 g a.i./ha 2) Treflan/Bonanza: trifluralin,(480 g/L), 0.6-1.15 kg a.i./ha Triflurex: trifluralin,(412 g/L), 0.6-1.15 kg a.i./ha Rival: trifluralin,(500 g/L), 0.6-1.15 kg a.i./ha	1) 126 mL/acre 2) + 0.5-0.96 L/acre or + 0.58-1.12 L/acre or +0.48-0.92 L/acre **WSSA Group:** 1) 2 2) 3	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
POST-EMERGENCE GRASS HERBICIDES			
18	**Assure II, Yuma GL or Contender + Adjuvant** 1) Assure II, Yuma GL or Contender 2) Sure-Mix, XA Oil Concentrate or Contender MSO **Active Ingredient(s), concentration, rate:** 1) quizalofop-p-ethyl, (96 g/L), 36-72 g a.i./ha	1) 150-300 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 1 hour
19	**Poast Ultra + Merge** 1) Poast Ultra 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150-200 g a.i./ha	1) 130-190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
20	**Select, or Statue + Adjuvant** 1) Select or Statue 2) + Amigo or Carrier or Arrow All-In **Active Ingredient(s), concentration, rate:** 1) clethodim, (240 g/L), 45-90 g a.i./ha	1) 75-150 mL/acre 2) 5-10 L/1,000 L 152-304 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour
21	**Venture L** **Active Ingredient(s), concentration, rate:** 1) fluazifop-p-butyl, (125 g/L), 75-250 g a.i./ha	243-800 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 75 days **Rainfast:** 1 hour

APPLICATION NOTES
• Apply PPI and incorporate as soon as possible within 24 hr. • Use ONLY on white beans. • Do NOT harvest within 100 days of application. • Some rotational cropping restrictions apply.
• 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. • For use on adzuki, lima and all dry common bean *(Phaseolus vulgaris)* market classes. • Use the 0.15 L/acre rate for control of volunteer corn, volunteer cereals and green foxtail. • The 0.2 L/acre rate will suppress quackgrass and also control barnyard grass. • Use the 0.3 L/acre rate for control of quackgrass. • Yuma + XA oil concentrate and Contender + Contender MSO are both generic equivalents of Assure II + Sure-mix.
• Apply POST when annual grasses and volunteer cereals are in the 1-6 leaf stage and quackgrass is in the 1-3 leaf stage. • Apply POST to adzuki, lima and all dry common bean *(Phaseolus vulgaris)* market classes. • Use the intermediate rate of 0.19 L/acre for volunteer spring cereals. • Use the high rate of 0.45 L/acre for quackgrass. • Thorough preplant tillage will ensure more uniform quackgrass emergence. Follow with a cultivation 7 days after treatment in wide row crops.
• Apply POST to all dry common bean *(Phaseolus vulgaris)* market classes and when annual grasses and volunteer cereals are in the 1-6 leaf stage. • Do NOT use on adzuki and lima beans. • For control of quackgrass, apply at the highest rate with the appropriate adjuvant at 10 L/1,000 L water. • Arrow All-In and Statue + Carrier are generic equivalents of Select + Amigo. Arrow All-In has an adjuvant included in its formulation, therefore does not require the addition of an adjuvant that is required when using Statue or Select..
• Apply POST to adzuki and all dry common bean *(Phaseolus vulgaris)* market classes. • Do NOT apply to dry common beans past the third trifoliate leaf stage. • Do NOT use on adzuki and lima beans. • The 243 mL/acre rate is for the control of volunteer corn at the 2-5 leaf stage. • The 400 mL/acre rate is for the control of annual grasses at the 2-4 leaf stage. • The 800 mL/acre rate is for the control of quackgrass or wirestem muhly at the 3-5 leaf stage.

continued

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE BROADLEAF HERBICIDES			
22	**Basagran Forté** **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha	0.7-0.9 L/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 6 hours
22	**Basagran** **+ Assist Oil** **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha	0.7-0.9 L/acre + 400-800 mL/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 6 hours
23	**Permit** **Active Ingredient(s), concentration, rate:** 1) halosulfuron, (72.6%), 26.25-35.25 g a.i./ha	14-19 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours for emerged weeds
24	**Reflex + non-ionic surfactant** 1) Reflex 2) + Agral 90 **Active Ingredient(s), concentration, rate:** 1) fomesafen, (240 g/L), 140 g a.i./ha	1) 400 mL/acre 2) 2.5 L/1,000 L **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 84 days **Rainfast:** 4 hours
POST-EMERGENCE TANK-MIXES			
25	**Basagran + Reflex + Assist Oil** 1) Basagran 2) + Reflex 3) + Assist Oil **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha 2) fomesafen, (240 g/L), 140 g a.i./ha	1) 0.7 L/acre 2) 400 mL/acre 3) 400-800 mL/acre **WSSA Group:** 1) 6 2) 14	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 6 hours

APPLICATION NOTES
• Apply POST when beans are in the unifoliate to 4-trifoliate leaf stage. • Apply POST to all dry common bean *(Phaseolus vulgaris)* market classes. • Do NOT use on adzuki beans. • Apply when weeds are small and actively growing. • Two applications of 0.7 L/acre, 10 days apart, may be required to control perennial weeds.
• Apply POST when beans are in the unifoliate to 4-trifoliate leaf stage. • Apply POST to all dry common bean *(Phaseolus vulgaris)* market classes. • Do NOT use on adzuki beans. • Apply when weeds are small and actively growing. • Two applications of 0.7 L/acre, 10 days apart, may be required to control perennial weeds.
• Apply as a directed spray when plants have 2-4 trifoliate leaves and before flowering. Make one broadcast application. Directed sprays are recommended to limit crop injury. • Use a nonionic surfactant (NIS) at 2.5 L/1,000 L water. • Use 14-19 g/acre for broadleaved weeds. Where nutsedge is present, use up to 28 g/acre. • Make only one application per crop cycle. Apply either pre-emergence or post-emergence, but not both. Do NOT apply more than 28 g/acre of PERMIT herbicide per season. • PERMIT Herbicide will not control ALS resistant weeds.
• Apply POST when beans are in the 1-2 trifoliate leaf stage and when weeds are small and actively growing. Apply in 80-140 L/acre water. • Do NOT apply REFLEX to any field more often than once every 2 years. • Do NOT apply to crop under stress. • Some rotational cropping restrictions apply.
• Apply POST when beans are in the 1-2 trifoliate leaf stage. • Use ONLY on white and kidney beans. • Apply when weeds are small and actively growing.

continued

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
HARVEST AID TREATMENTS			
26	**Aim EC + Merge** 1) Aim EC 2) MERGE **Active Ingredient(s), concentration, rate:** 1) carfentrazone-ethyl, (240 g/L), 17.5-28 g a.i./ha	1) 30-47 mL/acre 2) 10 L/1,000 L **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 1 day **Rainfast:** 2 hours
27	**Eragon LQ + Merge** 1) ERAGON LQ 2) MERGE **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha	1) 29.5-59 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3 days **Rainfast:** <1 hour
28	**Eragon LQ + glyphosate + Merge** 1) ERAGON LQ 2) GLYPHOSATE (540 g/L) 3) MERGE **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha 2) glyphosate, (540 g/L), 900 g a.e./ha	1) 29.5-59 mL/acre 2) 0.67 L/acre 3) 400 mL/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
29	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
30	**Ignite** **Active Ingredient(s), concentration, rate:** 1) glufosinate ammonium, (150 g/L), 370-450 g a.i./ha	1-1.2 L/acre **WSSA Group:** 1) 10	**REI:** 12 hours **PHI:** 9+ days **Rainfast:** 4 hours

APPLICATION NOTES
• Apply when stems are green to brown in colour and pods are mature (yellow-brown) and 80%-90% of the original leaves have dropped.
• Apply when stems are green to brown in colour and pods are mature (yellow-brown) and 80%-90% of the original leaves have dropped. • Apply in 80 L/acre of water.
• Apply when the stems are green to brown in colour and pods are mature (yellow-brown) and 80%-90% of the original leaves have dropped. • Apply in 80 L/acre of water. • Do NOT harvest within 7 days of application or apply to crops grown for seed . • Refer to harvest aid precautions for glyphosate.
• Apply pre-harvest when the crop is 30% grain moisture or less (yellow to brown pod colour, 80%-90% leaf drop) and at least 7 days prior to harvest. • Do NOT use on snap beans, apply to crops grown for seed or apply by air. • Apply in 20-40 L/acre of water.
• Apply pre-harvest when approximately 50%-75% of the bean pods have naturally changed colour from green to yellow or brown and at least 9 days before harvest. • Do NOT use on snap beans or apply to dry beans grown for seed. • Use the higher rate when the crop canopy is dense and/or there are high populations of weeds present at application. • Apply in a minimum of 44 L/acre of water at a pressure of 40 psi. Where crop canopy is dense, or weed growth is heavy, apply 68-88 L/acre of water. Do NOT apply by air.

continued

CHAPTER 6: DRY EDIBLE BEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
31	**Reglone** or Bolster **Desiccant + Agral 90** **Active Ingredient(s), concentration, rate:** 1) diquat, (240 g/L), 300-400 g a.i./ha	500-920 mL/acre + 1 L/1,000 L **WSSA Group:** 1) 22	**REI:** 24 hours **PHI:** 4-10 days **Rainfast:** 15 min.
32	**Valtera** **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (51.1%), 53.7 g a.i./ha	42 g/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 5 days **Rainfast:** not stated
33	**Valtera + glyphosate (540 g/L)** 1) Valtera 2) + glyphosate (540 g/L) **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (51.1%), 53.7 g a.i./ha 2) glyphosate, (360-540 g/L), 900 g a.e./ha	1) 42 g/acre 2) 0.67 L/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** 5 days **Rainfast:** not stated.

APPLICATION NOTES
• Apply at 80%-90% natural leaf defoliation and at least 80% of the pods have turned yellow. • Apply within 7 days of variety maturity and harvest 5-7 days after application.
• Apply in 56-112 L/acre of water. • Do NOT harvest within 5 days of application.
• Apply in 56-112 L/acre of water. • Do NOT harvest within 5 days of application. • Refer to pre-harvest precautions for glyphosate.

Chapter 7: Flax

CHAPTER 7: FLAX

TABLE 7-1
Pre-plant burndown weed control ratings in flax

TRT #	HERBICIDE TREATMENT	WSSA GROUP	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)
Pre-plant burndown with glyphosate: **emerged** weed control ratings at **4 weeks** after application												
1	glyphosate (1x rate)	9	9	–	9	9	7	7	7	–	8	–
2	glyphosate (2x rate)	9	9	–	9	9	8	9	8	6	9	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] Top growth burnoff only, re-growth will occur.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																		
carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
7	9	7	7	9[R]	9	8[1]	–	9	9	9	9	–	9[R]	9[R]	8	7	–	9[R]
8	9	8	9	9[R]	9	8[1]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]

CHAPTER 7: FLAX

TABLE 7-2
Pre and Post-emergence herbicide weed control ratings in flax

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Crop Tolerance	GRASSY WEEDS									
				barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding
Pre-emergence herbicides													
4	Authority	14	G	–	–	–	–	–	–	–	–	–	–
5	Callisto	27	G	–	–	–	–	–	–	–	–	–	–
6	Eptam 8-E	8	G	9	9	8	9	7	–	–	9	–	–
Post-emergence grass herbicides													
7	Assure II, Yuma GL or Contender	1	E	9	8	9	9	9	9	9	9	–	–
8	Poast Ultra	1	E	9	8	9	9	9	7	9	9	–	–
9	Select, Arrow All-In or Statue	1	E	9	8	9	9	9	7	9	9	–	–
10	Venture L	1	E	9	8	9	8	9	9	9	9	–	–
Post-emergence broadleaf herbicides													
11	Basagran Forté	6	F/G	–	–	–	–	–	–	–	–	–	9
12	Bromxynil/MCPA (e.g., Buctril M)	6,4	F/G	–	–	–	–	–	–	–	–	–	–
13	MCPA	4	F/G	–	–	–	–	–	–	–	–	9	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																			
biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weeds not emerged at time of application																			
–	9	–	–	–	–	–	–	–	9	–	–	9	9	–	–	–	–	–	9
–	8	7	–	–	8	8	–	9	9	–	9	9	9	8	7	–	9	–	8
–	–	–	–	–	–	–	–	7	7	–	5	7	7	5	–	–	5	–	–
Weeds emerged at time of application																			
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Weeds emerged at time of application																			
–	7	–	–	–	9	5	8	9	8	–	9	7	7	7	6	–	9	–	–
–	8	–	–	–	9	6	–	9	9	8	9	9	8	9	7	–	9	–	–
–	–	–	–	–	–	8	–	–	–	9	9	–	8	9	8	–	8	7	8

CHAPTER 7: FLAX

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES AND CO-PACKS			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
SOIL APPLIED HERBICIDES (PRE-PLANT INCORPORATED, PRE-EMERGENCE)			
4	**Authority 480 Herbicide** **Active Ingredient(s), concentration, rate:** 1) sulfentrazone, (480 g/L), 105-140 g a.i./ha	88-117 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
5	**Callisto 480SC** **Active Ingredient(s), concentration, rate:** 1) mesotrione, (480 g/L), 140 g a.i./ha	120 mL/acre **WSSA Group:** 1) 27	**REI:** 12 hours **PHI:** non stated **Raintfast:** rainfall needed to activate herbicide; 3 hours for emerged weeds
6	**Eptam 8-E** **Active Ingredient(s), concentration, rate:** 1) EPTC, (800 g/L), 2,800-3,400 g a.i./ha	1.4-1.7 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of flax. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of flax. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply PP or PRE but no later than 3 days after planting. • Some rotational cropping restrictions apply. • Do NOT apply to flax grown on coarse-textured (sandy) soils. • Do NOT apply to soils with organic matter greater than 6%. • Do NOT apply to soils with a pH greater than 7.8. • The highest use rate should be used when applied to soils with a pH of less than 7 and with organic matter greater than 3% but less than 6%.
• Apply PRE. • If flax is emerged at time of application, severe injury will occur.
• Apply PPI. • Use the lower rate on light, sandy soils and the higher rate on heavier textured soils. Do not use on soils with less than 3% organic matter.

continued

CHAPTER 7: FLAX

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENT HERBICIDES			
7	**Assure II, Yuma GL or Contender + adjuvant** 1) Assure II, Yuma GL or Contender 2) Sure-Mix, XA Oil Concentrate or Contender MSO **Active Ingredient(s), concentration, rate:** 1) quizalofop-p-ethyl, (96 g/L), 36-72 g a.i./ha	1) 150-300 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 82 days **Rainfast:** 1 hour
8	**Poast Ultra + Merge** 1) Poast Ultra 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150-200 g a.i./ha	1) 130-190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
9	**Select or Statue + adjuvant** 1) Select or Arrow 50 to 150 mL/acre 2) + Amigo or Arrow at 5-10 L/1,000 L **or Arrow All-In** **Active Ingredient(s), concentration, rate:** 1) clethodim, (240 g/L), 30-90 g a.i./ha	1) 50-150 mL/acre 2) 5-10 L/1,000 L 152-304 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour
10	**Venture L (125 g/L)** **Active Ingredient(s), concentration, rate:** 1) fluazifop-p-butyl, (125 g/L), 75-250 g a.i./ha	243-800 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
11	**Basagran + Assist Oil** 1) Basagran 2) + Assist Oil **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha	1) 0.7-0.9 L/acre 2) + 0.8 L/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** not stated **Rainfast:** 6 hours

APPLICATION NOTES
• 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 0.15 L/acre rate for control of volunteer corn, volunteer cereals and green foxtail. • The 0.2 L/acre rate will suppress quackgrass and also control barnyard grass. • Use the 0.3 L/acre rate for control of quackgrass. • Yuma + XA oil concentrate and Contender + Contender MSO are both generic equivalents of Assure II + Sure-mix.
• Do NOT use on low-linolenic varieties. • Apply POST when annual grasses and volunteer cereals are in the 1-6 leaf stage and quackgrass is in the 1-3 leaf stage. • Use the intermediate rate of 0.19 L/acre for volunteer spring cereals. • Use the high rate of 0.45 L/acre for quackgrass. • Thorough preplant tillage will ensure more uniform quackgrass emergence. Follow with a cultivation 7 days after treatment in wide row crops.
• Apply when the annual grasses and volunteer cereals are in the 2-6 leaf stages. • Flax is tolerant at any growth stage. • For control of quackgrass, apply SELECT or ARROW at 0.38 L/ha (0.152 L/acre) with the appropriate surfactant at 10 L/1,000 L water. • Arrow All-In and Statue + Carrier are generic equivalents of Select + Amigo. Arrow All-In has an adjuvant included in its formulation, therefore does not require the addition of an adjuvant that is required when using Statue or Select.
• The 243 mL/acre rate is for the control of volunteer corn at the 2-5 leaf stage. • The 400 mL/acre rate is for the control of annual grasses at the 2-4 leaf stage. • The 800 mL/acre rate is for the control of quackgrass or wirestem muhly at the 3-5 leaf stage.
• Apply when flax is 5 cm or higher and weeds are small and actively growing. • Top growth of nutsedge and Canada thistle is controlled and field bindweed may be suppressed. Two applications of 0.7 L/acre, 10 days apart may be required. • A new flush of weeds may emerge after the first flush has been controlled. • Cool weather or drought may reduce control. • Reduce oil concentrate to 0.4 L/acre under abnormally hot and humid weather conditions or temporary crop injury may occur.

continued

CHAPTER 7: FLAX

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
12	**Buctril M (EC) or Badge (EC), Logic M (EC), Mextrol (EC)** **Active Ingredient(s), concentration, rate:** **Buctril M:** 1) bromoxynil, (280 g/L), 280 g a.i./ha and 2) MCPA, (280 g a.e./L), 280 g a.e./ha **Badge, Logic M, Mextrol:** 1) bromoxynil, (225 g/L), 281 g a.i./ha and 2) MCPA, (225 g a.e./L), 281 g a.e./ha	0.4 L/acre 0.5 L/acre **WSSA Group:** 1) 6 2) 4	**REI:** 24 hours **PHI:** 60 days **Rainfast:** 4 hours
13	**MCPA AMINE 500 (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPA, (500 a.e./L), 350-850 g a.e./ha	280-680 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 4 hours
13	MCPA ESTER 500 (Li) **Active Ingredient(s), concentration, rate:** 1) MCPA, (500 a.e./L), 290-525 g a.e./ha	232-420 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** 2 hours
HARVEST AID TREATMENTS			
14	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
14	**Reglone** or Bolster **Desiccant + Agral 90** **Active Ingredient(s), concentration, rate:** 1) diquat, (240 g/L), 300-400 g a.i./ha	500-920 mL/acre + 1 L/1,000 L **WSSA Group:** 1) 22	**REI:** 24 hours **PHI:** 4-10 days **Rainfast:** 15 min.

APPLICATION NOTES
• Apply when the flax is 5-10 cm high before weeds have developed beyond the 4 leaf stage. • Do NOT use if the daytime temperature is over 29°C.
• Flax may be treated when 5 cm tall to bud stage. • Best weed control is obtained if the application is made when the weeds are small (5 cm tall).
• Flax may be treated when 5 cm tall to bud stage. • Best weed control is obtained if the application is made when the weeds are small (5 cm tall).
• Apply Pre-harvest when the crop is 30% grain moisture or less and the majority (75%-80%) of bolls are brown colour, 80%-90% leaf drop) and at least 7 days prior to harvest. • Apply in 20-40 L/acre of water.
• Apply when the crop is at 75% boll turn stage. Harvest when flaxseed tests "dry". • Do NOT apply to immature crop. • This application reduces dry down time and eliminates the need for swathing. • Use higher rate for heavy canopy and/or weedy crop.

Chapter 8: Forages

CHAPTER 8: FORAGES

TABLE 8-1
Pre-plant incorporated and Pre-emergence herbicide weed control ratings in forage crops

TRT #	HERBICIDE TREATMENT	WSSA GROUP	alfalfa, pure stand (seedling)	alfalfa/forage grass (seedling)	alfalfa, (established)	bird's-foot trefoil, (seedling)	bird's-foot trefoil, (established)	red clovers (seedling)	red clover (established)	sorghum and millet (forage)	GRASSY WEEDS			
											barnyard grass	crabgrass	fall panicum	foxtails
Pre-plant incorporated herbicides (alfalfa and bird's-foot trefoil)														
1	Eptam	8	✓	–	–	✓	–	–	–	–	9	9	8	9
2	Treflan, Bonanza, Triflurex or Rival	3	✓	–	–	–	–	–	–	–	9	9	8	9
Pre-emergence herbicides (forage sorghum and millet)														
14	Aatrex 480	5	–	–	–	–	–	–	–	✓	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[R] Populations exist that are resistant to this herbicide and won't be controlled.

(ANNUAL)					BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																
proso millet	sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
7	–	–	9	–	–	–	–	–	–	–	–	–	7	7	5	7	7	5	–	–	5	–
6	6	8	9	–	–	–	–	–	9	–	–	–	–	8	–	–	8	–	–	–	–	8
–	–	9	–	–	–	9	5	–	9	–	–	–	9	9[R]	9[R]	9	8[R]	7[R]	–	9	–	–

CHAPTER 8: FORAGES

TABLE 8-2
Post-emergence herbicide weed control ratings in forage crops

TRT #	HERBICIDE TREATMENT	WSSA GROUP	alfalfa, pure stand (seedling)	alfalfa/forage grass (seedling)	alfalfa, (established)	bird's-foot trefoil, (seedling)	bird's-foot trefoil, (established)	clovers (seedling)	clovers (established)	sorghum and millet (forage)	GRASSY WEEDS				
											barnyard grass	crabgrass	fall panicum	foxtails	proso millet
Post-emergence grass herbicides (alfalfa, bird's foot trefoil and red clover)															
3	Assure II, Yuma GL or Contender	1	–	–	✓[1]	–	–	–	–	–	9	8	9	9	9
4	Poast Ultra	1	✓	–	✓	✓	–	✓	✓	–	9	8	9	9	9
5	Select, Arrow All-In or Statue	1	✓	–	–	–	–	–	–	–	9	8	9	9	9
6	Venture L	1	✓	–	✓	✓	✓	✓	✓	–	9	8	9	8	9
Post-emergence broadleaf herbicides (alfalfa, bird's foot trefoil and red clover)															
7	2,4-DB* (e.g., Embutox)	4	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–
8	Basagran	6	✓[1]	–	✓[1]	–	–	–	–	–	–	–	–	–	–
9	Nufarm MCPA Amine 500	4	–	–	–	–	–	✓[1]	✓[1]	–	–	–	–	–	–
10	Topotox Plus or Clovitox Plus	4	–	–	–	–	–	✓	✓	–	–	–	–	–	–
Post-emergence grass and broadleaf herbicides (alfalfa, seed production only)															
11	Pursuit, Phanthom or Nu-Image	2	✓[1]	–	✓[1]	–	–	–	–	–	8	8	6	9[R]	7
Post-emergence tank-mixes (alfalfa, bird's foot trefoil and red clover)															
12	2,4-DB* (e.g., Embutox) + MCPA*	4,4	✓	✓	–	–	–	–	–	–	–	–	–	–	–
13	2,4-DB* + MCPA Sodium*	4,4	✓	✓	–	✓	–	–	–	–	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] For seed production only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.
*Several equivalent generic products are available, refer to the "Notes on Herbicides" chapter.

			BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weeds emerged at time of application																								
9	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Weeds emerged at time of application																								
–	–	–	–	–	–	6	–	–	–	8	–	–	–	7	–	7	7	9	8	–	–	8	–	–
–	–	–	–	9	7	7	–	–	–	9	5	8	9	8	–	9	7	7	7	6	–	9	–	–
–	–	–	9	–	–	–	–	–	–	–	8	–	–	–	9	9	–	8	9	8	–	8	7	8
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Weeds emerged at time of application																								
7	8	9	–	7	–	8	–	–	9	8[R]	–	7	9	8[R]	–	9	9[R]	9[R]	9[R]	8[R]	5	9	5	–
Weeds emerged at time of application																								
–	–	–	–	–	–	6	–	–	–	8	–	–	–	7	–	9	7	9	8	–	–	8	–	–
–	–	–	–	–	–	6	–	–	–	8	–	–	–	7	–	9	7	9	8	–	–	8	–	–

continued

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Post-emergence herbicide weed control ratings in forage crops *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	alfalfa, pure stand (seedling)	alfalfa/forage grass (seedling)	alfalfa, (established)	bird's-foot trefoil, (seedling)	bird's-foot trefoil, (established)	clovers (seedling)	clovers (established)	sorghum and millet (forage)	GRASSY WEEDS				
											barnyard grass	crabgrass	fall panicum	foxtails	proso millet
Post-emergence herbicides – forage sorghum and millet. (weeds emerged at time of application)															
15	2,4-D*	4	–	–	–	–	–	–	–	✓	–	–	–	–	–
16	Aatrex 480	5	–	–	–	–	–	–	–	✓	–	–	–	–	–
17	bromoxynil* (e.g., Pardner)	6	–	–	–	–	–	–	–	✓	–	–	–	–	–
18	Peak + Banvel II	2,4	–	–	–	–	–	–	–	✓	–	–	–	–	–
Post-emergence herbicides for glyphosate tolerant (e.g., HarvXtra) alfalfa varieties only. (weeds emerged at time of application)															
19	Roundup Weathermax (1x rate)	9	✓	–	✓	–	–	–	–	–	9	9	9	9	9
19	Roundup Weathermax (2x rate)	9	✓	–	✓	–	–	–	–	–	9	9	9	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] For seed production only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.
*Several equivalent generic products are available, refer to the "Notes on Herbicides" chapter.

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			BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																						
sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
–	–	–	–	–	–	–	–	–	–	8	8	–	–	9	9	9	7	9	9	9	–	8	–	–
–	–	–	–	–	9	9	5	–	9	6	–	7	9	9R	7	9R	9	8R	7R	–	–	6	–	–
–	–	–	–	–	–	9	–	–	–	7	–	–	8	9	–	7	9	7R	9	7	–	9	–	6
–	–	–	–	–	–	–	–	–	–	9	6	–	9	9	8	9	9	9	9	7	–	9	6	–
9	9	9	7/8	8	9	7/8	8	9	9	9	9R	9	7/8	9	9	9	9	9	9R	7R	8	9	7/8	9
9	9	9	8	8	9	8	8	9	9	9	9R	9	8	9	9	9	9	9	9R	8R	9	9	8	9

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TABLE 8-3
Perennial weed and volunteer crop control ratings for post-emergence herbicides in forage crops

TRT #	HERBICIDE TREATMENT	WSSA GROUP	alfalfa, pure stand (seedling)	alfalfa/forage grass (seedling)	alfalfa, (established)	bird's-foot trefoil, (seedling)	bird's-foot trefoil, (established)	clovers (seedling)	clovers (established)	sorghum and millet (forage)	bindweed, field	carrot, wild	dandelion
Post-emergence grass herbicides (alfalfa, bird's foot trefoil and red clover)													
3	Assure II, Yuma GL or Contender	1	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–
4	Poast Ultra	1	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–
5	Select, Arrow All-In or Statue	1	–	✓	✓	✓	✓	✓	✓	✓	–	–	–
6	Venture L	1	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–
Post-emergence broadleaf herbicides (alfalfa, bird's foot trefoil and red clover)													
7	2,4-DB* (e.g., Embutox)	4	✓	✓	✓	✓	✓	✓	✓	–	7	–	–
8	Basagran	6	✓[1]	–	✓[1]	–	–	–	–	–	–	–	–
9	MCPA Amine 500*	4	–	–	–	–	–	✓[1]	✓[1]	–	7	–	–
10	Topotox Plus or Clovitox Plus	4	–	–	–	–	–	✓	✓	–	8	–	–
Post-emergence grass and broadleaf herbicides (alfalfa – seed production)													
11	Pursuit, Phanthom or Nu-Image	2	✓[1]	–	✓[1]	–	–	–	–	–	–	–	–
Post-emergence broadleaf herbicides for forage sorghum and millet													
15	2,4-D*	4	–	–	–	–	–	–	–	✓	7	–	–
17	bromoxynil* (e.g., Pardner)	6	–	–	–	–	–	–	–	✓	7	6	–
18	Peak + Banvel II	2,4	–	–	–	–	–	–	–	✓	6	9	5
Post-emergence herbicides for glyphosate tolerant (e.g., HarvXtra) alfalfa varieties only													
19	Roundup Weathermax (1x rate)	9	✓	–	✓	–	–	–	–	–	7	–	6
19	Roundup Weathermax (2x rate)	9	✓	–	✓	–	–	–	–	–	8	7-9	8-9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] For seed production only.
[R] Populations exist that are resistant to this herbicide and won't be controlled.
*Several equivalent generic products are available, refer to the "Notes on Herbicides" chapter.

PERENNIAL WEEDS										VOLUNTEER CROPS									
horse-nettle	horsetail, field	milkweed	nutsedge, yellow	quackgrass	redtop	sow-thistle, perennial	thistle, Canada	vetch	wire-stem muhly	adzuki beans, volunteer	canola, volunteer	canola (LL), volunteer	canola (RR), volunteer	corn, volunteer	corn (LL), volunteer	corn (LL/RR), volunteer	corn (RR), volunteer	corn (Enlist), volunteer	cereals, volunteer
Weed control ratings at 4-6 weeks after application																			
–	–	–	–	9	6	–	–	–	7	–	–	–	–	8-9	8-9	8-9	8-9	–	9
–	–	–	–	6	6	–	–	–	6	–	–	–	–	6-8	6-8	6-8	6-8	6-8	9
–	–	–	–	7	7	–	–	–	6	–	–	–	–	7-9	7-9	7-9	7-9	7-9	9
–	–	–	–	8	7	–	–	–	8	–	–	–	–	7-9	7-9	7-9	7-9	–	9
Weed control ratings at 4-6 weeks after application																			
–	7	–	–	–	–	–	7-9	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	7	–	–	6-9	7-9	–	–	–	–	–	–	–	–	–	–	–	–
–	7	6	–	–	–	–	7-9	7	–	–	–	8	8	8	–	–	–	–	–
–	–	6	–	–	–	–	8	–	–	–	–	–	–	–	–	–	–	–	–
Weed control ratings at 4-6 weeks after application																			
–	6	–	–	–	–	5-8	5-9	5	–	–	8	8	8	–	–	–	–	–	–
Weed control ratings at 4-6 weeks after application																			
–	–	–	–	–	–	–	7-9	8	–	–	9	9	9	–	–	–	–	–	–
–	–	–	–	–	–	7	7	–	–	–	–	9	9	9	–	–	–	–	–
8[1]	–	6	–	–	–	–	5-9	7	–	–	–	9	9	9	–	–	–	–	–
Weed control ratings at 4-6 weeks after application																			
8	–	9	6	9	9	7-8	8	5	8	9	9	9	–	9	9	–	–	–	9
9	6	9	8	9	9	8-9	9	7	9	9	9	9	–	9	9	–	–	–	9

CHAPTER 8: FORAGES

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
SOIL APPLIED HERBICIDES (PRE-PLANT INCORPORATED)			
1	**Eptam 8-E** **Active Ingredient(s), concentration, rate:** 1) EPTC, (800 g/L), 3,400 g a.i./ha	1.7 L/acre **WSSA Group:** 1) 8	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
2	**Treflan or Bonanza;** **Triflurex 40 EC;** **Rival EC** **Active Ingredient(s), concentration, rate:** **Treflan/Bonanza:** trifluralin,(480 g/L),0.6-1.15 kg a.i./ha **Triflurex:** trifluralin,(412 g/L),0.6-1.15 kg a.i./ha **Rival:** trifluralin,(500 g/L),0.6-1.15 kg a.i./ha	0.5-0.96 L/acre 0.58-1.12 L/acre 0.48-0.92 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
POST-EMERGENCE HERBICIDES (ALFALFA, BIRD'S-FOOT TREFOIL AND RED CLOVER)			
3	**Assure II, Yuma GL or Contender + adjuvant** 1) Assure II, Yuma GL or Contender 2) Sure-Mix, XA Oil Concentrate or Contender MSO **Active Ingredient(s), concentration, rate:** 1) quizalofop-p-ethyl, (96 g/L), 36-72 g a.i./ha	1) 150-300 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 1 hour
4	**Poast Ultra + Merge** 1) Poast Ultra 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150-200 g a.i./ha	1) 130-190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 70 days **Rainfast:** 1 hour
5	**Select or Statue + adjuvant** 1) Select or Statue 2) + Amigo or Carrier **or Arrow All-In** **Active Ingredient(s), concentration, rate:** 1) clethodim, (240 g/L), 45-90 g a.i./ha	1) 75-150 mL/acre 2) 5-10 L/1,000 L 152-304 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour

APPLICATION NOTES
• Apply PPI. • For pure stands of alfalfa or bird's-foot trefoil ONLY. • Apply to a dry soil surface and incorporate into the soil immediately. • Some broadleaf weeds such as ragweed, mustards, and pigweeds frequently escape.
• Apply PPI. • For pure stands of alfalfa ONLY. • Use lower rate on sandy soils, higher rate for loam to clay soils
• For seed alfalfa ONLY. • Do NOT graze or cut for hay in the year of treatment. • 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 0.15 L/acre rate for control of volunteer corn, volunteer cereals and green foxtail. • The 0.2 L/acre rate will suppress quackgrass and also control barnyard grass. • Use the 0.3 L/acre rate for control of quackgrass. • Yuma + XA oil concentrate and Contender + Contender MSO are both generic equivalents of Assure II + Sure-mix.
• Apply POST to pure stands of alfalfa, bird's-foot trefoil or clover; when annual grasses and volunteer cereals are in the 1-6 leaf stage and quackgrass is in the 1-3 leaf stage. • Use the intermediate rate of 0.19 L/acre for volunteer spring cereals. • Use the high rate of 0.45 L/acre for quackgrass. • Thorough preplant tillage will ensure more uniform quackgrass emergence. Follow with a cultivation 7 days after treatment in wide row crops.
• Apply POST to pure stands of alfalfa. • 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 adjuvant at 5 L/1,000 L of spray solution to the low herbicide rate and 10 L/1,000 L of spray solution to the high herbicide rate for quackgrass control. • Arrow All-In and Statue + Carrier are generic equivalents of Select + Amigo. Arrow All-In has an adjuvant included in its formulation, therefore does not require the addition of an adjuvant that is required when using Statue or Select.

continued

CHAPTER 8: FORAGES

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
6	**Venture L** **Active Ingredient(s), concentration, rate:** 1) fluazifop-p-butyl, (125 g/L), 75-250 g a.i./ha	243-800 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 41 days **Rainfast:** 1 hour
7	**2,4-DB (EC)** Embutox, Caliber 625 or Cobutox 625 **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (625 g/L), 1,100-1,406.25 g a.i./ha	700 -900 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours
8	**Basagran** **+ Assist Oil** **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha	0.7-0.9 L/acre + 400-800 mL/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 6 hours
9	NUFARM MCPA AMINE 500 (Li) **Active Ingredient(s), concentration, rate:** 1) MCPA, (500 a.e./L), 280 g a.e./ha	224 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** graze or feed in the following year. **Rainfast:** 4 hours
10	**Tropotox Plus (Li)** **or Clovotox Plus (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPB, (375 g a.e./L), 1031.25-1593.75 g a.e./ha and MCPA (25 g a.e./L), 68.75-106.25 g a.e./ha	1.1 to 1.7 L/acre **WSSA Group:** 1) 4, 4	**REI:** 12 hours **PHI:** none stated **Rainfast:** none stated
POST-EMERGENCE GRASS AND BROADLEAF HERBICIDES (ALFALFA – SEED PRODUCTION)			
11	**Pursuit, Phantom or Nu-Image** **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 75-100 g a.i./ha	126-168 mL/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** not stated **Rainfast:** 2 hours for emerged weeds

APPLICATION NOTES
• Apply POST to pure stands of alfalfa, bird's-foot trefoil or red clover. • VENTURE L may be tank mixed with 2,4-DB at label rates for control of a broad range of weeds. (Consult 2,4-DB label). • Do NOT feed or graze red clover or bird's-foot trefoil in the year of treatment. • The 243 mL/acre rate is for the control of volunteer corn at the 2-5 leaf stage. • The 400 mL/acre rate is for the control of annual grasses at the 2-4 leaf stage. • The 800 mL/acre rate is for the control of quackgrass or wirestem muhly at the 3-5 leaf stage.
• Apply in at least 60 L/acre water, when alfalfa, bird's-foot trefoil or clovers are in the 1-4 leaf stage and seedling forage grasses are at the 2-4 leaf stage. • Do NOT graze or cut legumes for hay within 30 days of treatment. • NOT intended for grass forage crops grown for hay or grazing in the year of application. • Do NOT apply to crops grown for seed. • Do NOT apply under drought conditions. • 2,4-DB usually suppresses legume growth for a period of 2-3 weeks. • Severe injury to legumes may occur under drought, high temperature or other stress conditions.
• For alfalfa and red clover grown for seed production ONLY. • Apply after third trifoliate stage but prior to flowering. Cool weather or drought may reduce control. • Top growth of nutsedge and Canada thistle are controlled and field bindweed may be suppressed by 2 applications of 0.7 L/acre, 10 days apart. • Reduce rate of oil concentrate to 0.4 L/acre under abnormally hot and humid weather conditions or temporary crop injury may occur.
• Apply to red clover only in the year of establishment at the 1-3 trifoliate stage. • Do not graze or cut for green feed in the first year. • Do not apply more than one treatment per year. • Clovers may be suppressed for 2-3 weeks.
• Apply POST when red clover is at the unifoliate to the 4th trifoliate leaf stage. • Clovers may be suppressed for 2-3 weeks. • Do NOT apply in less than 60 L/acre of water. • Do NOT apply when temperatures exceed 27°C. • Do NOT apply under drought conditions. • Do NOT graze or cut for forage in the year of application.
• Apply ONLY after the crop has one fully developed trifoliate leaf. • For seed alfalfa ONLY. • One application per year. Apply when weeds are less than 7.5 cm tall. • Apply in 80 L/acre water.

continued

CHAPTER 8: FORAGES

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE TANK-MIXES (ALFALFA, BIRD'S FOOT TREFOIL AND RED CLOVER)			
12	**2,4-DB (EC) + MCPA AMINE 500 (Li)** 1) Embutox, Caliber 625 or Cobutox 625 2) + MCPA Amine 500 **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (625 g/L), 1,100-1,406.25 g a.i./ha 2) MCPA, (500 g a.e./L), 35 g a.e./ha	1) 500 mL/acre 2) + 28 mL/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours
13	**2,4-DB (EC) + MCPA Sodium (Li)** 1) Embutox, Caliber 625 or Cobutox 625 2) + MCPA Sodium 300 **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (625 g/L), 1,100-1,406.25 g a.i./ha 2) MCPA, (300 g a.e./L), 34.5 g a.e./ha	1) 500 mL/acre 2) + 46 mL/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours
PRE-EMERGENCE BROADLEAF HERBICIDES (FORAGE SORGHUM AND MILLET)			
14	**Aatrex Liquid 480** **Active Ingredient(s), concentration, rate:** 1) atrazine, (480 g/L), 1,000 g a.i./ha	0.84 L/acre **WSSA Group:** 1) 5	**REI:** none stated **PHI:** 60 days **Raintfast:** none stated
POST-EMERGENCE BROADLEAF HERBICIDES (FORAGE SORGHUM AND MILLET)			
15	**2,4-D Amine 600 (SN)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (564 g a.e./L), 282-564 g a.e./ha	240-360 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours
16	**Aatrex Liquid 480** **Active Ingredient(s), concentration, rate:** 1) atrazine, (480 g/L), 1,000 g a.i./ha	0.84 L/acre **WSSA Group:** 1) 5	**REI:** none stated **PHI:** 45 days **Raintfast:** none stated
17	**Pardner (EC)** **or Koril 235** **or Bromotril, Brotex 240** **or Bromax, Brotex 480** **Active Ingredient(s), concentration, rate:** 1) bromoxynil, (280 g/L), 280-336 g a.i./ha	400-480 mL/acre 490-572 mL/acre 480-560 mL/acre 240-280 mL/acre **WSSA Group:** 1) 6	**REI:** 24 hours **PHI:** 100 days **Rainfast:** 1 hour

APPLICATION NOTES
• Apply when the legumes are in the 1-4 leaf stage. • The addition of MCPA Amine gives better control of common mustard than 2,4-DB alone. • Apply in at least 60 L/acre water.
• Apply when the legumes are in the 1-4 leaf stage. • The addition of MCPA Sodium gives better control of common mustard than 2,4-DB alone. • Apply in at least 60 L/acre water.
• Apply PRE. • Do NOT apply to soils having less than 1% organic matter, or injury may occur. • Application to sorghum growing under stress caused by minor element deficiency or to sorghum growing on highly calcareous soil may result in crop injury. • Make only one application per year.
• Apply when crop is at 4-6 leaf stage before closure of canopy. • Do NOT apply within 30 days of harvest. • Do NOT spray in hot (over 27°C), humid weather.
• Apply POST, prior to the 6 leaf stage of most susceptible broadleaf weeds. • Do NOT apply to soils having less than 1% organic matter, or injury may occur. • Application to sorghum growing under stress caused by minor element deficiency or to sorghum growing on highly calcareous soil may result in crop injury. • Make only one application per year.
• Apply when the crop is at or beyond the 4 leaf stage and less than 20 cm in height. • One application per year.

continued

CHAPTER 8: FORAGES

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
18	**Peak 75 (WG) + Banvel II (Sn)** 1) Peak 75 (WG) 2) + Banvel II (Sn) 3) + non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) prosulfuron, (75%), 9.975 g a.i./ha 2) dicamba, (480 g/L), 140 g a.i./ha	1) 5.3 g/acre 2) 200 mL/acre 3) 2 L/1,000 L **WSSA Group:** 1) 2 2) 4	**REI:** 12 hours **PHI:** 120 days **Rainfast:** 4 hours
POST-EMERGENCE HERBICIDES FOR GLYPHOSATE TOLERANT (E.G., HARVXTRA) ALFALFA VARIETIES ONLY.			
19	**glyphosate (540 g/L) – 1x to 2x Rate** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (540 g/L), 900-1,800 g a.e./ha	0.67-1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 5 days **Rainfast:** 1 hour
OPTIONS FOR TERMINATION (KILLING OFF) OF OLD STANDS OF GLYPHOSATE TOLERANT (E.G., HARVXTRA) ALFALFA.			
20	**2,4-D Ester 700** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (660 g a.e./L), 858 g a.e./ha	520 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **Rainfast:** 2 hours
21	**Engenia** **or Xtendimax/FeXapan** **Active Ingredient(s), concentration, rate:** 1) Engenia: dicamba, (600 g/L), 600 g a.e./ha or Xtendimax/FeXapan: dicamba (350 g/L), 600 g a.e./ha	400 mL/acre 680 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **Rainfast:** 4 hours
22	**2,4-D Ester 700 + Engenia or Xtendimax/FeXapan** 1) 2,4-D Ester 700 2) Engenia or Xtendimax/FeXapan **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (660 g a.e./L), 592 g a.e./ha 2) Engenia: dicamba, (600 g/L), 600 g a.e./ha or Xtendimax/FeXapan: dicamba (350 g/L), 600 g a.e./ha	1) 360 mL/acre 2) 400 or 680 mL/acre	**REI:** 12 hours **Rainfast:** 4hours

APPLICATION NOTES
• Apply when the crop is between 3-5 leaf stage. • Best results when applied to actively growing weeds in the 1-6 leaf stage. • Do NOT apply by air. • Make ONLY one application per year.
• Can only be applied to glyphosate tolerant alfalfa varieties (e.g., HarvXtra) . Applications made to non glyphosate tolerant alfalfa will result in complete plant death. • New stand establishment: Apply at or before the 4th trifoliate stage of alfalfa. • Established stand: Allow a minimum of 5 days between application and cutting. • Applications should be made at least 25 days apart. Do NOT exceed 3 application per season. • Weeds are more easily controlled and weed competition avoided when applications are made when weeds are small, although weeds up to 25 cm tall will be controlled. • Apply when milkweed, perennial sow-thistle and Canada thistle are 15-60 cm. • Apply when nutsedge is 5-15 cm in height and at the high rate. • Use 40-80 L/acre water.
• For terminating an old stand of glyphosate tolerant alfalfa. Do not harvest for feed after application. • Apply in a minimum of 40 L/acre (10 U.S. gal/acre) of water. Can be tank-mixed with glyphosate to control other perennial plants. • Apply to alfalfa anywhere from the pre-bud to start of flowering stage. Ontario field trials comparing herbicides for termination of glyphosate tolerant alfalfa have timed applications in early October with alfalfa at 10-15 cm tall. • Tillage at 2-3 weeks following herbicide application can improve control and consistency under stressed conditions (drought, frost, cold temperatures).
• For terminating an old stand of glyphosate tolerant alfalfa. Do not harvest for feed after application. • Apply in a minimum of 40 L/acre (10 U.S. gal/acre) of water. Can be tank-mixed with glyphosate to control other perennial plants. • Apply to alfalfa anywhere from the pre-bud to start of flowering stage. Ontario field trials comparing herbicides for termination of glyphosate tolerant alfalfa have timed applications in early October with alfalfa at 10-15 cm tall. • Tillage at 2-3 weeks following herbicide application can improve control and consistency under stressed conditions (drought, frost, cold temperatures).
• For terminating an old stand of glyphosate tolerant alfalfa. Do not harvest for feed after application. • Apply in a minimum of 40 L/acre (10 U.S. gal/acre) of water. Can be tank-mixed with glyphosate to control other perennial plants. • Apply to alfalfa anywhere from the pre-bud to start of flowering stage. Ontario field trials comparing herbicides for termination of glyphosate tolerant alfalfa have timed applications in early October with alfalfa at 10-15 cm tall. • Tillage at 2-3 weeks following herbicide application can improve control and consistency under stressed conditions (drought, frost, cold temperatures).

Chapter 9: Mustard (Tame)

CHAPTER 9: MUSTARD (TAME)

TABLE 9-1
Pre-plant burndown weed control ratings in tame mustard

TRT #	HERBICIDE TREATMENT	WSSA GROUP	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)
Pre-plant burndown herbicides: **emerged** weed control ratings at **4 weeks** after application												
1	glyphosate (1x rate)	9	9	0	9	9	7	7	7	–	8	0
2	glyphosate (2x rate)	9	9	0	9	9	8	9	8	6	9	0

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] Top growth burnoff only, re-growth will occur.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 9: MUSTARD (TAME)

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																		
carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
7	9	7	7	9[R]	9	8[I]	–	9	9	9	9	–	9[R]	9[R]	8	7	4	9[R]
8	9	8	9	9[R]	9	8[I]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]

CHAPTER 9: MUSTARD (TAME)

TABLE 9-2
Pre-plant incorporated, Pre and Post-emergence herbicide weed control ratings in tame mustard

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Crop Tolerance	GRASSY WEEDS									
				barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding
Pre-plant incorporated herbicides													
4	Treflan, Bonanza, Triflurex or Rival	3	E	9	9	8	9	6	6	8	9	–	–
Pre-emergence broadleaf herbicides													
5	Authority	14	G	–	–	–	–	–	–	–	–	–	–
Post-emergence grass herbicides													
6	Poast Ultra	1	E	9	8	9	9	9	7	9	9	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 9: MUSTARD (TAME)

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																			
biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weeds not emerged at time of application																			
–	–	–	–	9	–	–	–	–	8	–	–	–	8	–	–	–	–	–	8
Weeds not emerged at time of application																			
–	9	–	–	–	–	–	–	–	9	–	–	9	9	–	–	–	–	–	9
Weeds emerged at time of application																			
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

CHAPTER 9: MUSTARD (TAME)

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
PRE-EMERGENCE GRASS AND BROADLEAF HERBICIDES			
4	**Treflan (480 g/L) or Bonanza (480 g/L);** **Triflurex 40 EC (412 g/L);** **Rival EC (500 g/L)** **Active Ingredient(s), concentration, rate:** trifluralin,(412-500 g/L),0.6-1.15 kg a.i./ha	0.5-0.96 L/acre 0.58-1.12 L/acre 0.48-0.92 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall activates herbicide
PRE-EMERGENCE BROADLEAF HERBICIDES			
5	**Authority 480 Herbicide** **Active Ingredient(s), concentration, rate:** 1) sulfentrazone, (480 g/L), 105 g a.i./ha	88 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall activates herbicide

CHAPTER 9: MUSTARD (TAME)

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of mustard. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of mustard. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply PPI. Incorporate as soon as possible, within 24 hr.
• Apply PP or PRE but no later than 3 days after planting. • Some rotational cropping restrictions apply. • Do NOT apply to mustard grown on coarse-textured (sandy) soils. • Do NOT apply to soils with organic matter greater than 6%. • Do NOT apply to soils with a pH greater than 7.8. • The highest use rate should be used when applied to soils with a pH of less than 7 and with organic matter greater than 3% but less than 6%.

continued

CHAPTER 9: MUSTARD (TAME)

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENT HERBICIDES			
6	**Poast Ultra + Merge** 1) Poast Ultra 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150-200 g a.i./ha	1) 130-190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 76 days **Rainfast:** 1 hour
HARVEST AID TREATMENTS			
7	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
8	**Reglone** or Bolster **Desiccant** **+ Agral 90** **Active Ingredient(s), concentration, rate:** 1) diquat, (240 g/L), 300-400 g a.i./ha	500-920 mL/acre + 1 L/1,000 L **WSSA Group:** 1) 22	**REI:** 24 hours **PHI:** 4-10 days **Rainfast:** 15 min.

CHAPTER 9: MUSTARD (TAME)

APPLICATION NOTES
• Apply POST when annual grasses and volunteer cereals are in the 1-6 leaf stage and quackgrass is in the 1-3 leaf stage. • Use the intermediate rate of 0.19 L/acre for volunteer spring cereals. • Use the high rate of 0.45 L/acre for quackgrass. • Thorough preplant tillage will ensure more uniform quackgrass emergence. Follow with a cultivation 7 days after treatment in wide row crops.
• Apply pre-harvest when the crop is 30% grain moisture or less (pods are green to yellow; most seeds are yellow to brown) and at least 7 days prior to harvest. • Apply in 20-40 L/acre of water.
• Spray when crop is at 75% seed turn (green to brown) stage. • Combine no later than 14 days after application. • Use higher rate for heavy canopy and/or weedy crop.

Chapter 10: Grass Pastures

CHAPTER 10: GRASS PASTURES

TABLE 10-1
Susceptibility of common weeds in grass pastures to post-emergence herbicides

			PERENNIAL WEEDS									
TRT #	HERBICIDE TREATMENT	WSSA GROUP	bindweed, field	burdock (seedling)	buttercup	bull thistle	carrot, wild	chamomile, scentless	chicory	curled dock	colt's foot	daisy, ox-eye
1	2,4-D Amine 600 (1.6 L/acre)	4	S	S	–	S	–	–	S	S	–	–
2	2,4-D Ester 700 (320 mL/acre)	4	–	–	–	–	–	–	–	–	–	–
2	2,4-D Ester 700 (520 mL/acre)	4	S	S	–	S	–	–	S	S	–	–
3	2,4-DB* (e.g., Embutox)	4	S	–	–	S	–	–	S	S	–	–
4	Engenia (672 mL/acre)	4	S	–	–	–	–	–	–	S	–	–
4	Engenia (1.47 L/acre)	4	–	–	–	–	–	–	–	S	–	–
5	Engenia or Xtendimax/FeXapan + 2,4-D	4,4	S	S	–	S	–	–	S	S	–	–
6	glyphosate 540 g/L (1.87 L/acre)	9	–	–	–	S	–	–	–	S	–	–
6	glyphosate 540 g/L (3.2 L/acre)	9	S	–	–	S	–	–	–	S	S	–
7	MCPA Amine 500* (440 mL/acre)	4	–	S	–	–	–	–	–	–	–	–
7	MCPA Amine 500* (900 mL/acre)	4	S	S	S	S	–	–	S	S	–	–
8	Milestone (116 mL/acre)	4	–	–	S	S	–	–	–	–	–	–
8	Milestone (152 mL/acre)	4	–	–	S	S	–	S	–	S	–	–
9	Milestone + 2,4-D	4,4	–	–	S	S	–	S	–	S	–	–
10	Topotox Plus or Clovitox Plus	4	S	–	S	S	–	–	–	S	–	–
4	Xtendimax/FeXapan (1.15 L/acre)	4	S	–	–	–	–	–	–	S	–	–
4	Xtendimax/FeXapan (2.52 L/acre)	4	S	–	–	–	–	–	–	S	–	–

S = susceptible
– = not susceptible or not recommended.

CHAPTER 10: GRASS PASTURES

PERENNIAL WEEDS																	
dandelion	goat's beard	goldenrod	hawk's beard	horsetail, field	knapweed	milkweed	nodding thistle	nutsedge, yellow	plantain	poison ivy	sow-thistle, perennial	tansy ragwort	thistle, Canada	toadflax	vetch	water hemlock	yellow rocket
S	–	–	S	S	–	–	–	–	S	–	S	–	–	–	–	S	S
–	S	–	S	–	–	–	–	–	S	–	–	–	–	–	–	–	–
S	–	–	S	S	–	–	–	–	S	–	S	–	–	–	–	–	S
S	–	–	S	S	–	–	–	–	S	–	S	–	S	–	–	–	S
–	–	S	–	–	–	–	–	–	–	–	S	–	S	–	–	–	–
–	S	S	–	–	S	–	–	–	–	–	S	–	S	–	–	–	–
S	–	S	S	S	–	–	–	–	S	S	S	–	S	–	–	–	S
S	–	–	–	–	–	S	S	S	S	S	S	S	S	S	–	–	S
S	–	–	–	–	–	S	S	S	S	S	S	S	S	S	–	–	S
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	S	–	–
S	–	–	–	–	–	–	–	–	–	–	S	–	S	–	S	–	S
–	–	–	–	–	S	–	S	–	–	–	S	–	S	–	–	–	–
–	–	S	–	–	S	–	S	–	–	–	S	S	S	–	–	–	–
–	–	S	–	–	S	–	S	–	S	–	S	–	S	–	–	–	–
–	–	–	–	S	–	–	–	–	S	–	S	–	S	–	–	–	–
–	–	S	–	–	–	–	–	–	–	–	S	–	S	–	–	–	–
–	S	S	–	–	S	–	–	–	–	–	S	–	S	–	–	–	–

CHAPTER 10: GRASS PASTURES

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE HERBICIDES (GRASS PASTURES)			
1	**2,4-D Amine 600 (SN)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (564 g a.e./L), 2,256 g a.e./ha	1.6 L/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours
2	**2,4-D Ester 700 (EC)** **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (660 g a.e./L), 528-726 g a.e./ha	0.32 or 0.44 L/acre **WSSA Group:** 1) 4	**REI:** 24 hours **PHI:** 30 days **Rainfast:** 2 hours
3	**2,4-DB (EC)** Embutox, Caliber 625 or Cobutox 625 **Active Ingredient(s), concentration, rate:** 1) 2,4-D, (625 g/L), 1,719 g a.i./ha	1.1 L/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** 2 hours
4	**Engenia (SN)** **or Xtendimax/FeXapan** **Active Ingredient(s), concentration, rate:** **Engenia:** dicamba, (600 g/L), 1,008-2,205 g a.e./ha **Xtendimax/FeXapan:** dicamba (350 g/L), 1,008-2,205 g a.e./ha	0.67-1.47 L/acre 1.15-2.52 L/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 30 days **Raintfast:** 2 hours
5	**Engenia or Xtendimax/FeXapan + 2,4-D 600** 1) Engenia or Xtendimax**/FeXapan** 2) + 2,4-D Amine **Active Ingredient(s), concentration, rate:** **1) Engenia:** dicamba, (600 g/L), 792 g a.e./ha **or Xtendimax/FeXapan**: dicamba (350 g/L), 792 g a.e./ha 2) 2,4-D, (564 g a.e./L), 1,100 g a.e./ha	1) 528 mL/acre or 905 mL/acre 2) + 780 mL/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** 30 days **Raintfast:** 2 hours

APPLICATION NOTES
• Use this product and rate for the control of water hemlock. • Do not graze or cut treated crops for forage until 30 days after application. • Withdraw meat animals from treated fields at least 3 days before slaughter. • Do NOT spray in hot (over 27°C), humid weather.
• Apply in the early spring or fall when weeds are small and actively growing. • Do not graze or cut treated crops for forage until 30 days after application. • Withdraw meat animals from treated fields at least 3 days before slaughter. • Do NOT spray in hot (over 27°C), humid weather.
• Apply after cutting or grazing preferably when regrowth is not above 7.5 cm high. • Do not graze or cut treated crops for forage until 30 days after application. • Withdraw meat animals from treated fields at least 3 days before slaughter. • Nodding, Scotch, or bull thistles, perennial sow-thistle, and chicory: Apply to rosette stage. • Yellow rocket: apply in fall. Plantains: apply before flowering. Curled dock: apply to early growth. **Top growth only controlled for:** • Canada thistle: Apply when 15 cm high to early bud stage. Field bindweed: Apply in late summer. • Dandelion: Apply before bud stage. Horsetail: Apply at 10-12 cm tall.
• FOR ALL RATES OF DICAMBA: Meat animals may graze or feed treated pastures 30 days after dicamba application without restrictions on slaughter. If treated vegetation has been consumed by meat animals within 30 days of dicamba application, feed the animals with untreated diet for 30 days before slaughter. • For goldenrod: Apply when weed is actively growing. • For Canada thistle and field bindweed: Apply at bud stage of thistle and at flowering of bindweed. • For goat's beard: Apply when actively growing.
• For control of poison ivy and other weeds that ate susceptible to 2,4-D and dicamba. • Meat animals may graze or feed treated pastures 30 days after dicamba application without restrictions on slaughter. If treated vegetation has been consumed by meat animals within 30 days of dicamba application, feed the animals with untreated diet for 30 days before slaughter.

continued

CHAPTER 10: GRASS PASTURES

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
6	**glyphosate (360 g/L) or glyphosate (450 g/L) or glyphosate (480 g/L) or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1,710-4,320 g a.e./ha	1.9-4.8 L/acre 1.52-3.8 L/acre 1.42-3.6 L/acre 1.27-3.2 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
7	**Milestone** **Active Ingredient(s), concentration, rate:** 1) aminopyralid, (240 g/L), 60-120 g a.i./ha	100-200 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** not stated **Raintfast:** 2 hours
8	**Milestone + 2,4-D Amine 600** 1) Milestone 2) + 2,4-D Amine 600 **Active Ingredient(s), concentration, rate:** 1) aminopyralid, (240 g/L), 60-120 g a.i./ha 2) 2,4-D, (564 g a.e./L), 840-1,440 g a.e./ha	1) 100-200 mL/acre 2) 0.6-1 L/acre **WSSA Group:** 1) 4 2) 4	**REI:** 12 hours **PHI:** not stated **Raintfast:** 2 hours
9	**MCPA AMINE 500 (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPA, (500 a.e./L), 280 g a.e./ha	224 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 7 days **Rainfast:** 4 hours
10	**Tropotox Plus (Li) or Clovotox Plus (Li)** **Active Ingredient(s), concentration, rate:** 1) MCPB, (375 g a.e./L), 1593.75 g a.e./ha and MCPA (25 g a.e./L), 106.25 g a.e./ha	1.7 L/acre **WSSA Group:** 1) 4, 4	**REI:** 12 hours **PHI:** 30 days **Rainfast:** none stated

APPLICATION NOTES
Spot treatment only: • For Canada thistle, field bindweed and milkweed. • Always use high rate for milkweed. • Apply when thistle and milkweed are in the bud to full bloom stage and bindweed is flowering. • For colt's-foot: apply when leaves are fully expanded. • For tansy ragwort: apply when tansy is in bud to full bloom stage. • Wait until the treated areas have turned brown before grazing.
• Apply post-emergence. • Will control: biennial wormwood, goldenrod, knapweed, scentless chamomile, Canada thistle, yellow star thistle, nodding thistle, sulphur cinquefoil, tropical soda apple and tansy ragwort. • Will suppress: Common tansy and dandelion. • Do NOT move manure compost containing MILESTONE onto sensitive crops, flowers, gardens, etc., or injury may occur.
• Apply post-emergence. • Will control: biennial wormwood, goldenrod, knapweed, scentless chamomile, Canada thistle, yellow star thistle, nodding thistle, sulphur cinquefoil, tropical soda apple and tansy ragwort. • Will suppress: Common tansy and dandelion. • Do NOT move manure compost containing MILESTONE onto sensitive crops, flowers, gardens, etc., or injury may occur.
• For buttercup: Use 2 treatments, one in June and the second in early September. • Wait 7 days after treatment before grazing or cutting for hay. • Withdraw meat animals from treated fields at least 3 days before slaughter.
• Do not graze or cut treated crops for forage until 30 days after application. • Withdraw meat animals from treated fields at least 3 days before slaughter. • Controls top growth of weeds only. • Canada thistle: Apply when 15 cm high to early bud stage. • Curled dock, plantains and perennial sow-thistle: Apply to rosette stage. • Buttercup and field bindweed: Apply in spring. • Horsetail: Apply when 15 cm high. • This treatment has some safety on legumes. • Apply TOPSIDE after grazing or cutting when weeds are at a susceptible stage. • Do NOT apply in less than 60 L/acre of water. • Do NOT apply when temperatures exceed 27°C. • Do NOT apply under drought conditions.

Chapter 11: Sorghum and Millet (Grain)

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

TABLE 11-1
Pre-plant burndown weed control ratings in grain sorghum and millet

TRT #	HERBICIDE TREATMENT	MODE OF ACTION	bluegrass, annual	corn, volunteer (RR3)	foxtails	quackgrass	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)
Pre-plant burndown with glyphosate												
1	glyphosate (1x rate)	9	9	–	9	9	7	7	7	–	8	–
2	glyphosate (2x rate)	9	9	–	9	9	8	9	8	6	9	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] Top growth burnoff only, re-growth will occur.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																		
carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
7	9	7	7	9[R]	9	8[1]	–	9	9	9	9	–	9[R]	9[R]	8	7	4	9[R]
8	9	8	9	9[R]	9	8[1]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

TABLE 11-2
Pre and Post-emergence herbicide weed control ratings in grain sorghum and millet

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Crop Tolerance	GRASSY WEEDS									
				barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass	atriplex, spreading	beggarsticks, nodding
Pre-emergence broadleaf herbicides													
4	Aatrex 480	5	G	–	–	–	–	–	–	9	–	–	–
5	Callisto	27	G	–	–	0	–	–	–	0	–	–	–
Post-emergence grass herbicides													
6	Dual II Magnum	15	G[2]	8[1]	8[1]	7[1]	8[1]	–	–	–	8[1]	–	–
Post-emergence broadleaf herbicides													
7	Aatrex 480	5	G	–	–	–	–	–	–	9	–	–	–
8	Basagran	6	G	–	–	–	–	–	–	–	–	–	9
9	Pardner	6	G	–	–	–	–	–	–	–	–	–	–
10	Peak + Banvel II	2,4	G	–	–	–	–	–	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] Must be applied before emergence to achieve this level of control.
[2] Must be applied after grain sorghum has been emerged but prior to weed emergence.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																		
biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weeds not emerged at time of application																			
–	9	5	–	9	–	–	–	9	9[R]	–	9[R]	9	8[R]	7[R]	–	9	–	–	–
–	8	7	–	–	8	8	–	9	9	–	9	9	9	8	7	–	9	–	8
Weeds not emerged at time of application																			
–	–	–	–	–	–	–	–	–	–	–	–	7[1]	7[1]	–	–	–	–	–	–
Weeds emerged at time of application																			
9	9	5	–	9	6	–	7	9	9[R]	7	9[R]	9	8[R]	7[R]	–	–	–	6	–
–	7	–	–	–	9	5	8	9	8	–	9	7	7	7	6	–	9	–	–
–	9	–	–	–	7	–	–	8	9	–	7	9	7[R]	9	7	–	9	–	6
–	–	–	–	–	9	6	–	9	9	8	9	9	9	9	7	–	9	6	–

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES AND CO-PACKS			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
PRE-EMERGENCE BROADLEAF HERBICIDES			
4	**Aatrex Liquid 480** **Active Ingredient(s), concentration, rate:** 1) atrazine, (480 g/L), 1,000 g a.i./ha	0.84 L/acre **WSSA Group:** 1) 5	**REI:** none stated **PHI:** 90 days **Raintfast:** none stated
5	**Callisto 480SC** **Active Ingredient(s), concentration, rate:** 1) mesotrione, (480 g/L), 140 g a.i./ha	120 mL/acre **WSSA Group:** 1) 27	**REI:** 12 hours **PHI:** non stated **Raintfast:** rainfall needed to activate herbicide; 3 hours for emerged weeds
POST-EMERGENCE GRASS HERBICIDES			
6	**Dual II Magnum** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 572 g a.i./ha	253 mL/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** 130 days **Rainfast:** rainfall needed to activate herbicide

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of sorghum or millet. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of sorghum or millet. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply PRE. • Do NOT apply to soils having less than 1% organic matter, or injury may occur. • Application to sorghum growing under stress caused by minor element deficiency or to sorghum growing on highly calcareous soil may result in crop injury. • Make only one application per year.
• Apply 7-14 days prior to sorghum and pearl millet planting. • Application to emerged sorghum or pearl millet can result in severe crop injury. • Apply up to the 2 leaf stage of weeds. • Do NOT apply to pearl millet or sorghum grown in coarse textured soils or to sudangrass, or sorghum-sudangrass hybrids.
• Apply after crop emergence but before weed emergence (typically the 1-3 leaf stage of sorghum). A stale seedbed will minimize the amount of weeds emerged at time of application. • For use in pearl millet that is intended for ANIMAL FEED ONLY. Do NOT apply to grain millet that is intended for HUMAN CONSUMPTION. • Application of DUAL II MAGNUM will result in injury to the pearl millet crop which may include stand loss, delayed maturity and loss of yield. • Millet should be seeded at least 2.5 cm deep or crop injury may result.

continued

CHAPTER 11: SORGHUM AND MILLET (GRAIN)

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE BROADLEAF HERBICIDES			
7	**Aatrex Liquid 480** **Active Ingredient(s), concentration, rate:** 1) atrazine, (480 g/L), 1,000 g a.i./ha	0.84 L/acre **WSSA Group:** 1) 5	**REI:** none stated **PHI:** 90 days **Raintfast:** none stated
8	**Basagran** **+ Assist Oil** **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha	0.7-0.9 L/acre + 400-800 mL/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 6 hours
9	**Pardner (EC)** or Koril 235 or Bromotril, Brotex 240 or Bromax, Brotex 480 **Active Ingredient(s), concentration, rate:** 1) bromoxynil, (280 g/L), 280-336 g a.i./ha	400-480 mL/acre 490-572 mL/acre 480-560 mL/acre 240-280 mL/acre **WSSA Group:** 1) 6	**REI:** 24 hours **PHI:** 100 days **Rainfast:** 1 hour
10	**Peak 75 (WG) + Banvel II (Sn)** 1) Peak 75 (WG) 2) + Banvel II (Sn) 3) + non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) prosulfuron, (75%), 9.975 g a.i./ha 2) dicamba, (480 g/L), 140 g a.i./ha	 1) 5.3 g/acre 2) 120 mL/acre 3) 2 L/1,000 L **WSSA Group:** 1) 2 2) 4	**REI:** 12 hours **PHI:** 120 days **Rainfast:** 4 hours

APPLICATION NOTES
• Apply POST, prior to the 6 leaf stage of most susceptible broadleaf weeds. • Do NOT apply to soils having less than 1% organic matter, or injury may occur. • Application to sorghum growing under stress caused by minor element deficiency or to sorghum growing on highly calcareous soil may result in crop injury. • Make only one application per year.
• Apply when the crop is at the 3-6 leaf stage. • Annual weeds should be targeted at the 4-6 leaf stage. • A new flush of weeds may emerge after the first flush has been controlled. • Cool weather or drought may reduce control. • Reduce oil concentrate to 0.4 L/acre under abnormally hot and humid weather conditions or temporary crop injury may occur.
• Apply when the crop is at or beyond the 4 leaf stage and less than 20 cm in height. • One application per year.
• Apply when the crop is between 3-5 leaf stage. • Best results when applied to actively growing weeds in the 1-6 leaf stage. • Do NOT apply by air. • Make ONLY one application per year. • If Banvel II is not available, Engenia can be subsituted at 93 mL/acre or Xtendimax/FeXapan at 160 mL/acre.

Chapter 12: Soybeans

CHAPTER 12: SOYBEANS

Weed control in soybean

BASIC PRINCIPLES

Yield losses typically reach around 40% when weeds are not properly managed in soybean.

To minimize any yield losses from weed competition in soybean:

- Soybean should be kept **weed free from emergence to 3rd trifoliate** stage of growth.

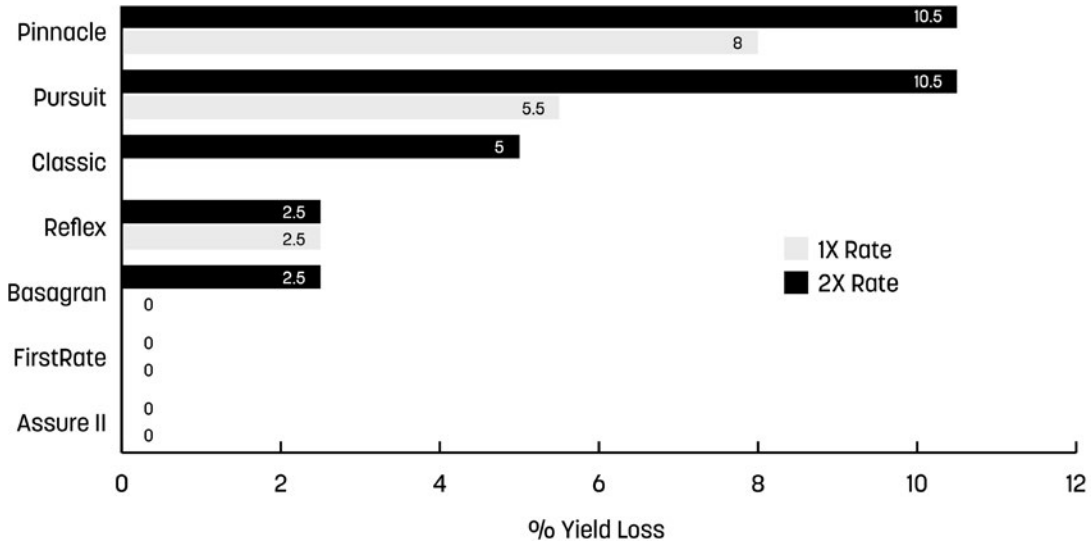
CONSIDERATIONS WHEN GROWING FOOD-GRADE (NON-GMO) SOYBEAN

Although weeds emerging after the 3rd trifoliate stage have minimal impact on soybean yield, growers may wish to control them to minimize weed seed production and prevent seed staining that can result in a loss of food grade premium. University of Guelph research evaluated the impact of "late applied" (e.g., early flowering) post-emergence herbicides on soybean yield. Of the herbicides tested, Pinnacle SG and imazethapyr (e.g., Pursuit) caused the greatest level of yield loss (Figure 12-1).

FIGURE 12-1

Soybean yield loss (%)

Soybean yield loss (%) as affected by post-emergence herbicides applied at the early flowering stage, which is later than what is recommended on most product labels, at both the labelled rate (1x) and over-lap rate (2x).



Source: Dr. P.H. Sikkema and Dr. R. Nurse

"LIBERTY LINK" SOYBEAN

These varieties are tolerant to the active ingredient "glufosinate ammonium" commonly known as Liberty 200 SN, which will kill non-tolerant soybean and only controls weeds that are emerged at the time of application. Many of the principles discussed to optimize weed control in Roundup Ready soybean, equally apply to the use of Liberty in Liberty-Link soybean.

"ENLIST" SOYBEAN

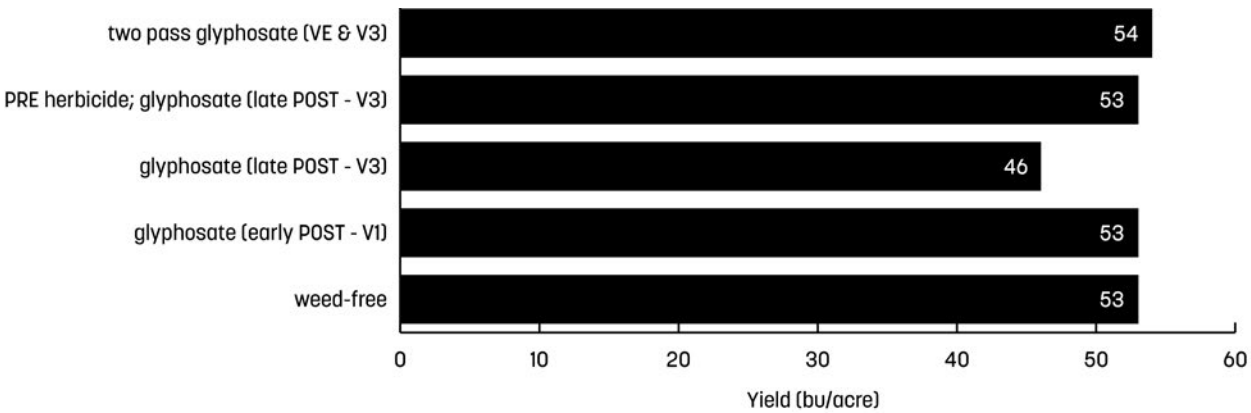
Enlist soybean varieties are tolerant to 2,4-D, glyphosate, glufosinate ammonium (Liberty 200SN) and quizalopfop-p-ethyl (e.g., Assure II). These 4 active ingredients primarily control weeds that are emerged and many of the principles discussed above to optimize weed control in Roundup Ready soybean, equally apply to Enlist soybean.

"ROUNDUP READY" SOYBEAN

FIGURE 12-2

Managing weeds in RoundUp Ready soybean

Yield (bu/acre) of 4 different strategies for managing weeds in Roundup Ready soybean compared to a weed-free control (based on 11 field studies).



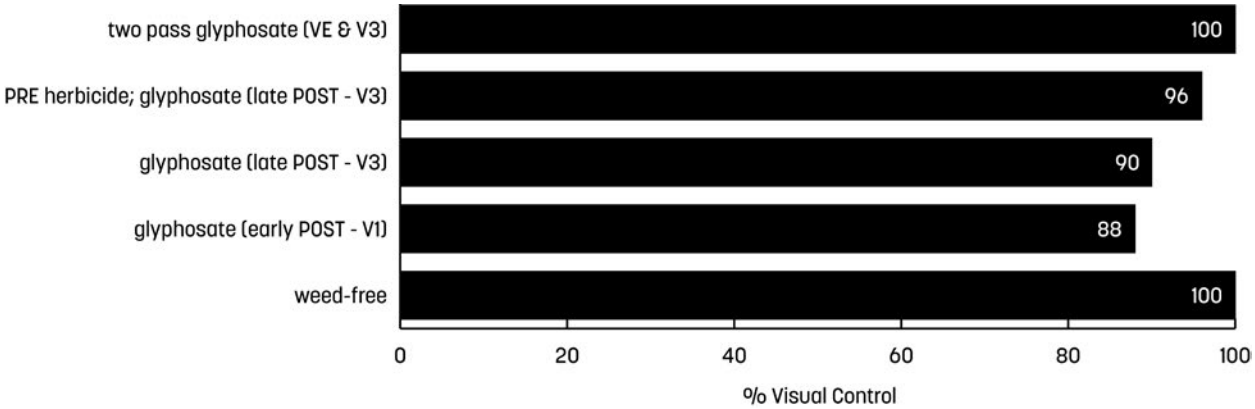
Source: Dr. P.H. Sikkema and Dr. R. Nurse

CHAPTER 12: SOYBEANS

FIGURE 12-3

Overall weed control (%)

Overall weed control (%) of 4 different strategies tom manage weeds in Roundup Ready soybean compared to the weed-free control.



Source: Dr. P.H. Sikkema and Dr. R. Nurse

"ROUNDUP READY 2 XTEND" SOYBEAN

"Xtend" soybean varieties are tolerant to glyphosate and dicamba (e.g., Engenia/Xtendimax). Dicamba provides short term residual weed control (e.g., around 2 -3 weeks). The principles discussed above to optimize weed control in Roundup Ready soybean, equally apply to "Xtend" soybean. Since non-Xtend soybean are extremely sensitive to dicamba drift, dicamba applications should be made pre-plant or pre-emergence to avoid environmental conditions, like temperature inversions, which are more prevalent later in the season during the typical post-emergence timing. There are specific guidelines to minimize off-target drift that are outlined in this guide and on the product labels of Engenia, Xtendimax and RU Xtend. They should be read and understood prior to the application of these products.

Citations: Sikkema, P.H. 2011. Weed Management in Soybean Questions from Ontario Farmers. Accessed on March 24, 2016.

CHAPTER 12: SOYBEANS

CHAPTER 12: SOYBEANS

TABLE 12-1
Pre-plant burndown weed control ratings in soybean

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	azuki bean, volunteer	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain
Pre-plant burndown with glyphosate (all soybean varieties)													
1	glyphosate (1x rate)	9	All	9	–	9	9	8	7	7	7	–	8
2	glyphosate (2x rate)	9	All	9	–	9	9	–	8	9	8	6	9
Pre-plant burndown tank-mix partners that offer enhanced contact weed control													
4	2,4-D ester 700	4	All	–	–	–	–	–	9	–	–	–	8
5	Blackhawk	4, 14	All	–	–	–	–	–	8	8	–	–	–
6	Elevore + MSO	4	All	–	–	–	–	–	8	–	–	–	–
7	Eragon LQ + Merge	14	All	–	–	–	–	–	–	9	–	7[1]	9
8	Eragon LQ + metribuzin + Merge	14,5	All	–	–	–	–	–	–	9	–	7[1]	9
Pre-plant burndown co-packs with glyphosate that offer residual weed control													
9	Assignment co-pack (Pursuit + RU Weathermax)	2, 9	All	–	–	8	–	–	–	–	–	–	–
10	Flexstar GT + Turbocharge	9, 14	All	–	–	–	–	–	–	–	–	–	–
11	Guardian co-pack (Polaris + Classic)	9, 2	All	–	–	–	–	–	–	–	–	–	8
12	Guardian Plus II co-pack (Polaris + Guardian Plus WDG)	9, 2, 14	All	–	–	7	–	–	–	–	–	–	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] Top growth burnoff only, re-growth will occur.
[2] The addition of Merge at 0.4 L/acre is required to achieve this level of control.
[3] The high rate is required to achieve this level of control.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 12: SOYBEANS

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																			
canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
Emerged weed control ratings at 4 weeks after application																			
–	7	9	7	7	9[R]	9	8[1]	–	9	9	9	9	–	9[R]	9[R]	8	7	4	9[R]
–	8	9	8	9	9[R]	9	8[1]	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]
Weed control ratings at 4 weeks after application																			
9	–	–	8	7	7	–	–	–	–	–	–	–	–	7	9	–	–	9	–
9	–	8	–	8	7	–	–	–	7	9	9	9	–	8	9	–	–	8[1]	8
–	–	–	–	–	8	–	–	–	–	9	–	5	–	9	–	–	–	–	–
9	5	–	–	7	8	–	–	6[1,2]	9	9	–	9	–	8	7	–	9[2]	6[1,2]	–
9	5	9	–	7	9	–	–	6[1,2]	9	9	–	9	–	8	7	–	9[2]	6[1,2]	–
Weed control ratings at 8 weeks after application																			
9	6	9	–	–	–	–	–	–	8	9[R]	9	9[R]	–	–	6	–	–	–	–
9	–	–	–	–	–	–	–	6	–	–	9	9	–	9	–	–	–	–	9
9	8	–	–	9	–	9	–	–	8	6	8	7	9	5	–	–	–	6	–
9	–	–	–	8	–	–	–	6[1,2]	–	7	8	8	9	–	–	–	8[1,2]	6[1,2]	9

continued

CHAPTER 12: SOYBEANS

Pre-plant burndown weed control ratings in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	azuki bean, volunteer	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain
ENLIST SOYBEAN ONLY: co-packs or tank-mixes that contain glyphosate													
13	Enlist Duo (Low Rate)	4, 9	EN	–	–	9	–	–	–	–	–	–	8
13	Enlist Duo (High Rate)	4, 9	EN	–	–	9	9	–	–	–	–	8[1]	8
ROUNDUP READY 2 XTEND SOYBEAN ONLY: co-packs or tank-mixes that contain glyphosate													
14	Engenia or Xtendimax/FeXapan + glyphosate	4, 9	XT	9	–	9	9	8	8	8	7	–	8
15	Roundup Xtend	4, 9	XT	9		9	9	8	8	8	7	–	8
ROUNDUP READY 2 XTEND SOYBEAN ONLY:co-packs and tank-mix partners with glyphosate that offer residual weed control													
14	Engenia or Xtendimax/FeXapan	4	XT	–	–	–	–	–	8	8	–	7	8
43	Tavium	15,4	XT	5	–	9	–	–	8	8	–	7	8
Co-packs and tank-mix partners that offer residual weed control when tank-mixed with glyphosate													
16	Authority	14	All	–	–	–	–	–	–	–	–	–	–
17	Authority Supreme	14, 15	All	8	–	9	–	–	–	–	–	–	–
18	Bifecta co-pack (Valtera + Tricor)	14, 5	All	–	–	5	–	–	–	–	–	–	–
19	Boundary LQD	15, 5	All	–	–	9	–	–	–	–	–	–	–
20	Broadstrike RC	2	All	–	–	–	–	–	–	8	–	–	–
21	Canopy Pro	2, 5	All	–	–	9	–	–	–	9	–	–	–
22	Classic or Chaperone	2	All	–	–	–	–	–	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] Top growth burnoff only, re-growth will occur.
[2] The addition of Merge at 0.4 L/acre is required to achieve this level of control.
[3] The high rate is required to achieve this level of control.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																			
canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
Emerged weed control ratings at 4 weeks after application																			
9	–	9	–	–	7	–	–	8	–	9	9	9	–	9	9	–	6	7[1]	8
9	–	9	–	8	8	–	–	8	–	9	9	9	–	9	9	–	6	8[1]	9
Emerged weed control ratings at 4 weeks after application																			
–	7	9	9	7	9	9	8[1]	–	9	9	9	9	–	7	9	8	7	8[1,3]	–
–	7	9	9	7	9	9	8[1]	–	9	9	9	9	–	7	9	8	7	8[1,3]	–
Weed control ratings at 8 weeks after application																			
–	–	9	9	7	9	9	–	–	–	9	9	9	–	7	5	–	–	–	6
–	–	9	9	7	9	9	–	–	–	9	9	9	–	7	5	–	–	–	8
Weed control ratings at 8 weeks after application																			
–	–	–	–	–	–	–	–	–	–	9	9	9	–	5	–	–	–	–	7
–	–	–	–	–	–	–	–	–	–	9	9	9	–	5	–	–	–	–	7
–	6	9	–	–	–	–	–	6[1,2]	–	9	9	9	9	8	7	–	8[1,2]	6[1,2]	–
8	–	9	–	–	–	–	–	–	4	7	8	7	–	6[R]	–	–	–	–	8
–	–	8	–	–	9[R]	–	–	8	7	9[R]	9	9[R]	–	8[R]	7[R]	8	–	–	–
9	8	9	–	8	9[R]	–	–	–	4	9[R]	9	9[R]	9	9[R]	6	–	–	–	-
9	8	–	–	8	8[R]	–	–	–	–	6[R]	–	7[R]	–	5[R]	–	–	–	–	-

continued

CHAPTER 12: SOYBEANS

Pre-plant burndown weed control ratings in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	bluegrass, annual	corn, volunteer (RR)	foxtails	quackgrass	azuki bean, volunteer	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain
23	Command 360 ME	13	All	–	–	9	–	–	–	–	–	–	–
24	Conquest LQ co-pack (Pursuit + Sencor 480F)	2, 5	All	–	–	9	–	–	–	9	–	–	–
25	Dual II Magnum	15	All	5	–	9	–	–	–	–	–	–	–
26	Fierce	15, 14	All	8	–	9	–	–	–	–	–	–	–
27	FirstRate	2	All	–	–	–	–	–	–	9	–	–	–
28	Focus	15, 14	All	8	–	9	–	–	–	–	–	–	–
29	Freestyle	2, 2	All	–	–	9	–	–	–	7	–	–	–
30	Frontier Max	15	All	5	–	9	–	–	–	–	–	–	–
31	Integrity	15, 14	All	–	–	8	–	–	–	9	–	7[1]	9
32	Lorox L (High rate)	5	All	–	–	9	–	–	–	–	–	–	–
33	Optill	2, 14	All	–	–	8	–	–	–	9	–	7[1]	9
34	Prowl H20	3	All	–	–	9	–	–	–	–	–	–	–
35	Pursuit, Phantom or Nu-Image	2	All	–	–	9	–	–	–	7	–	–	–
36	Sencor, Squadron or Tricor (High rate)	5	All	–	–	9	–	–	–	9	–	–	–
37	Step Up co-pack (Chaperone + Valtera)	2, 14	All	–	–	7	–	–	–	–	–	–	9
40	Valtera (High rate)	14	All	–	–	7	–	–	–	–	–	–	–
41	Zidua	15	All	8	–	9	–	–	–	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended
Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] Top growth burnoff only, re-growth will occur.
[2] The addition of Merge at 0.4 L/acre is required to achieve this level of control.
[3] The high rate is required to achieve this level of control.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 12: SOYBEANS

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																			
canola, volunteer (RR)	carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
–	–	–	–	–	–	–	–	–	–	9	–	6	–	8	–	–	–	–	–
9	–	9	–	–	–	–	–	–	8	9[R]	9	9[R]	9	8[R]	6[R]	–	7	5	–
–	–	–	–	–	–	–	–	–	–	–	–	8[3]	–	–	–	–	–	–	6
–	5	9	–	–	–	–	–	6[1,2]	–	–	–	–	–	7	–	–	8[2]	6[1,2]	9
9	6	–	–	–	8[R]	–	–	–	9	9[R]	9	9[R]	9	9[R]	8[R]	–	8	–	–
–	–	–	–	–	–	–	–	–	–	6	–	9	–	–	–	–	–	–	9
9	8	9	–	8	8[R]	–	–	–	–	9[R]	9	9[R]	9	8[R]	6[R]	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	8[3]	–	–	–	–	–	–	6
9	5	–	–	7	9	–	–	6[1,2]	–	6	–	–	–	8	6	–	9[2]	6[1,2]	–
–	4	9	–	–	–	–	–	–	4	9	9	9[R]	–	9	6	–	–	–	–
9	6	9	–	7	9	–	–	6[1,2]	–	9	9	9	–	8	7	–	9[2]	6[1,2]	–
–	–	9	–	–	–	–	–	–	–	9	9	–	–	–	–	–	–	–	–
9	6	9	–	–	–	–	–	–	–	9[R]	9	9[R]	9	8[R]	6[R]	–	–	–	–[R]
8	6	9	–	–	9	–	–	–	4	9[R]	9	9[R]	9	9[R]	6	–	–	–	–
9	–	9	–	8	5	–	–	6[1,2]	–	7	8	8	9	–	–	–	8[1,2]	6[1,2]	9
–	5	9	–	–	5	–	–	6[1,2]	–	7	–	8	9	–	–	–	8[1,2]	6[1,2]	9
–	–	–	–	–	–	–	–	–	–	–	–	9	–	–	–	–	–	–	9

CHAPTER 12: SOYBEANS

TABLE 12-2
Pre-emergence herbicide weed control ratings in soybean

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
					barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Pre-emergence herbicides and co-packs (weeds not emerged at time of application)												
9	Assignment co-pack	2,9	All	G	7	7	7	9[R]	7	7[2]	–	7
16	Authority	14	All	E	–	8	–	–	–	–	–	–
17	Authority Supreme	14,15	All	E	9	9	8	9	–	6	–	9
18	Bifecta co-pack (Tricor + Valtera)	5,14	All	G	7	6	7	5	–	–	8[2]	8
19	Boundary LQD	15,5	All	E	9	9	8	9	–	–	NC	9
20	Broadstrike RC	2	All	E	–	–	–	–	–	–	–	–
21	Canopy Pro co-pack (Classic + Tricor 75 DF)	2,5	All	G	6	6	6	6	6	–	8[2]	6
22	Classic or Chaperone	2	All	G	–	–	–	–	–	–	–	–
23	Command 360 ME	13	All	G	8	9	8	9[1]	–	6	–	8
24	Conquest LQ co-pack (Pursuit + Sencor 480F)	2,5	All	G	9	7	7	9[R]	7	7[2]	8[2]	8

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] This level of control is achieved when the weed is emerged at the time of application.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																		
atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
Weed control ratings at 8 weeks after application																		
–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	9[R]	9[R]	8[R]	6	6	9	–
–	–	9	–	–	–	–	–	–	–	9	–	9	9	5	–	–	–	7
–	–	9	–	–	–	–	–	–	–	9	–	9	9	5	–	–	–	9
–	–	7	–	8[2]	9	7	6	–	9	9	9	9	9	7	–	9	7	8
–	–	–	–	–	9	–	6	–	–	7	8	8	8	–	–	–	–	8
–	9	9	–	–	8	7[R]	9[R]	8	8	9[R]	9	7[R]	9[R]	8[R]	7[R]	8	9	–
–	–	8	–	8[2]	–	7[R]	8[R]	–	9	9[R]	9	–	9[R]	8[R]	8[R]	7	8	–
–	–	–	–	–	–	–	8[R]	–	–	6[R]	–	–	7[R]	5[R]	–	–	–	–
–	9	8	–	–	–	6	–	–	8	8	–	–	–	8	–	–	9	–
–	–	9	–	8[2]	9	8	–	–	9	9[R]	9	9[R]	9[R]	8[R]	6	5	9	–

continued

CHAPTER 12: SOYBEANS

Pre-emergence herbicide weed control ratings in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
					barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
25	Dual II Magnum	15	All	E	9	9	8	9	–	–	–	9
26	Fierce	15,14	All	G	9	9	–	9	–	6	–	–
27	FirstRate	2	All	E	–	–	–	–	–	–	–	–
28	Focus	15,14	All	E	9	9	8	9	–	6	–	9
29	Freestyle co-pack (Classic + DuPont Imazethapyr)	2,2	All	G	7	7	7	9[R]	7	7[2]	8[2]	7
30	Frontier Max	15	All	E	9	9	8	9	–	–	–	9
31	Integrity	15,14	All	E	7	7	–	7	–	–	–	–
32	Lorox L	5	All	G	5	5	5	5	5	–	–	5
33	Optill	2,14	All	E	7	7	7	9[R]	7	7[2]	–	7
34	Prowl H20	6	All	G	8	8	8	8	–	8	–	8
35	Pursuit, Phantom or Nu-Image	2	All	G	7	7	7	9[R]	7	7[2]	–	7
36	Sencor, Squadron or Tricor (low rate)	5	All	G	7	6	7	5	–	–	8[2]	8
36	Sencor, Squadron or Tricor (High rate)	5	All	G	7	6	7	5	–	–	8[2]	8
37	Step Up co-pack (Chaperone + Valtera)	2,14	All	G	–	–	–	5	–	–	–	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] This level of control is achieved when the weed is emerged at the time of application.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 12: SOYBEANS

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																		
atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
–	–	–	–	–	9	–	–	–	7	9	9	9	9	7	–	–	7	9
–	9	–	–	–	9	9[R]	9[R]	–	–	9[R]	–	–	9[R]	9[R]	9[R]	9	9	–
–	–	–	–	–	–	–	–	–	–	–	–	9	9	–	–	–	–	9
–	8	8	–	–	9	7[R]	8[R]	9	9	9[R]	–	9[R]	9[R]	8[R]	8[R]	–	9	–
–	–	–	–	–	–	–	–	–	–	–	–	8[1]	8[1]	–	–	–	–	6
–	–	–	–	–	–	–	–	–	–	6	–	–	5	7	6	–	3	5
–	9	8	–	–	9	5	–	9	9	9	9	9	9[R]	8	6	7	6	–
–	8	8	–	–	9	7[R]	9	9	9	9[R]	9	9[R]	9[R]	8[R]	7	6	9	–
–	–	–	–	–	9	–	–	–	–	8	–	–	8[R]	–	–	–	–	7
–	8	8	–	–	9	7[R]	–	9	9	9[R]	9	9[R]	9[R]	8[R]	6	6	9	–
–	–	7	–	8[2]	9	7	6	–	9	9[R]	9	–	9[R]	8[R]	7	8	7	–
–	7	7	7	8[2]	9	7	9[1]	9	9	9[R]	9	–	9[R]	8[R]	7	9	7	–
–	9	7	8	–	9	7[R]	8[R]	–	9	9	9	9	9	8[R]	8[R]	7	8	8[1,2]

continued

CHAPTER 12: SOYBEANS

Pre-emergence herbicide weed control ratings in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
					barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
38	Treflan, Bonanza, Triflurex or Rival	3	All	G	9	9	8	9	6	6	8	9
39	Triactor co-pack (Nu-Image + Tricor + Valtera)	2,5,14	All	G	7	7	7	9[R]	7	7[2]	–	8
40	Valtera	14	All	G	–	–	–	–	–	–	–	–
41	Zidua	15	All	E	9	8	8	9	–	6	–	9
ROUNDUP READY 2 XTEND SOYBEAN ONLY: co-packs and tank-mix partners with glyphosate that offer residual weed control												
42	Engenia or Xtendimax (dicamba)	4	XT	E	–	–	–	–	–	–	–	–
43	Tavium	15,4	XT	E	9	8	8	9	–	6	–	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
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XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] This level of control is achieved when the weed is emerged at the time of application.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																		
atriplex, spreading	beggarsticks, nodding	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	waterhemp
–	–	–	–	–	9	–	–	–	–	8	–	–	8	–	–	–	–	8
–	–	9	–	–	9	8	8[R]	–	9	9	9	9	9	8	6	5	9	8
–	–	7	–	–	9	–	–	–	7	9	8	9	9	7	–	9	7	8
–	–	–	–	–	–	–	–	–	–	–	–	9	9	–	–	–	6	9
Weed control ratings at 8 weeks after application																		
8	–	8	–	–	9	6	9	–	9	9	6	9	9	9	7	–	8	7
8	–	8	–	–	9	6	9	–	9	9	6	9	9	9	7	–	8	8

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TABLE 12-3
Post-emergence herbicide weed control ratings in soybean

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
					barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Post-emergence grass herbicides (weeds emerged at time of application)												
44	Assure II, Yuma GL or Contender	1	All	E	9	8	9	9	9	9	9	9
45	Poast Ultra	1	All	E	9	8	9	9	9	7	9	9
46	Select, Arrow All-In or Statue	1	All	E	9	8	9	9	9	7	9	9
47	Venture L	1	All	E	9	8	9	8	9	9	9	9
Post-emergence broadleaf herbicides (weeds emerged at time of application)												
48	Basagran Forté	6	All	G	0	0	0	0	0	0	0	0
49	Blazer, Ultra	14	All	F	0	0	0	0	0	0	0	0
50	Classic or Chaperone	2	All	G	0	0	0	0	0	0	0	0
51	FirstRate	2	All	G	0	0	0	0	0	0	0	0
52	Pinnacle SG	2	All	G	0	0	0	0	0	0	0	0
53	Reflex	14	All	F/G	0	0	0	0	0	0	0	0

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] This level of control is achieved when the weed is emerged at the time of application.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weed control ratings at 4-6 weeks after application																					
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Weed control ratings at 4-6 weeks after application																					
–	9	7	7	–	–	–	9	5	8	9	8	–	9	7	7	7	6	–	9	–	–
–	–	–	7	–	–	–	6	–	6	8	6	–	9	8	9	9	7	6	7	6	9
–	9	7	4	–	–	–	8[R]	8[R]	7	8	–	6	9	–	9[R]	8[R]	8[R]	7	8	5	–
–	9	7	7	–	–	–	9[R]	9[R]	8	–	–	6	9	–	–	9[R]	9[R]	7	9	8	–
6	8	–		–	–	–	5	–	8	8	9[R]	–	8	–	9[R]	5	–	5	8	–	–
–	–	–	8	–	–	–	7	–	7	8	6	6	9	8	9	9	7	7	6	–	9

continued

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Post-emergence herbicide weed control ratings in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
					barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Post-emergence grass and broadleaf herbicides (weeds emerged at application)												
54	Cleansweep co-pack (Pursuit + Basagran Forté)	2,6	All	G	8	8	6	9[R]	7	–	8	9
55	Pursuit or Panthom or Nu-Image	2	All	G	8	8	6	9[R]	7	7	8	9
Post-emergence grass and broadleaf herbicides for "glyphosate tolerant" soybean varieties only (weeds emerged at application)												
56	Assignment co-pack (RU Weathermax + Pursuit)	9,2	EN,RR,XT	G	9	9	9	9	9	9	9	9
57	Flexstar	9,14	EN,RR,XT	G	9	9	9	9	9	9	9	9
58	glyphosate (1x rate)	9	EN,RR,XT	E	9	9	9	9	9	9	9	9
58	glyphosate (2x rate)	9	EN,RR,XT	E	9	9	9	9	9	9	9	9
59	Guardian co-pack (Polaris + Classic)	9,2	EN,RR,XT	G	9	9	9	9	9	9	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] This level of control is achieved when the weed is emerged at the time of application.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																				
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weed control ratings at 4-6 weeks after application																					
5	9	8	8	–	–	9	9	5	8	9	8	–	9	9R	9R	9R	7R	6	9	5	–
–	7	–	8	–	–	9	8R	–	7	9	8R	–	9	9R	9R	9R	8R	5	9	5	–
Weed control ratings at 4-6 weeks after application																					
7/8	8	9	8	8	9	9	9	9R	9	8	9	9	9	9	9	9R	7R	8	9	7/8	9R
7/8	8	9	7/8	8	9	9	9	9R	9	8	9	9	9	9	9	8	7R	8	9	7/8	9R
7/8	8	9	7/8	8	9	9	9	9R	9	7/8	9	9	9	9	9	9R	7R	8	9	7/8	9R
8	8	9	8	8	9	9	9	9R	9	8	9	9	9	9	9	9R	8R	9	9	8	9R
7/8	8	9	8	8	9	9	9	9R	9	8	9	9	9	9	9	9R	7R	8	9	7/8	9R

continued

CHAPTER 12: SOYBEANS

Post-emergence herbicide weed control ratings in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	GRASSY WEEDS (ANNUAL)							
					barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Post-emergence herbicides for "Liberty-Link and Enlist" soybean varieties												
60	Liberty 200SN	10	LL, EN	E	9	9	9	9	9	–	8	9
Post-emergence herbicides for "Enlist" soybean varieties												
61	Enlist Duo (Low Rate)	4,9	EN	E	–	–	–	8	–	–	9	–
61	Enlist Duo (High Rate)	4,9	EN	E	9	9	9	9	9	9	9	9
Post-emergence herbicides for "Roundup Ready 2 Xtend" soybean varieties (weeds emerged at time of application)												
62	Engenia or Xtendimax/FeXapan	4	XT	E	–	–	–	–	–	–	–	–
63	Roundup Xtend	4,9	XT	E	9	9	9	9	9	9	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] This level of control is achieved when the weed is emerged at the time of application.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
Weed control ratings at 4-6 weeks after application																					
–	–	–	8	–	8	–	9	7	–	8/9	9	–	9	9	9	9	6	–	8	–	–
Weed control ratings at 4-6 weeks after application																					
–	–	–	–	–	9	8	–	8	–	–	9	–	9	–	9	9	9	–	–	–	–
7/8	8	9	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7/8	9
Weed control ratings at 4-6 weeks after application																					
6	–	9	9	–	–	9	9	9	9	9	9	8	6	9	9	8[1]	9	7	9	–	8[1]
7/8	8	9	9	8	8	9	9	9[R]	9	9	9	9	9	9	9	8[1]	9	8	9	7/8	8[1]

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TABLE 12-4
Perennial weed and volunteer crop control ratings for post-emergence herbicides in soybean

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	PERENNIAL WEEDS						
					bindweed, field	carrot, wild	dandelion	horse-nettle	horsetail, field	milkweed	nutsedge, yellow
Post-emergence herbicides											
44	Assure II, Yuma GL or Contender	1	All	E	–	–	–	–	–	–	–
45	Poast Ultra	1	All	E	–	–	–	–	–	–	–
46	Select, Arrow All-In or Statue	1	All	E	–	–	–	–	–	–	–
47	Venture L	1	All	E	–	–	–	–	–	–	–
48	Basagran Forté	6	All	G	–	–	–	–	–	–	7
49	Blazer, Ultra	14	All	F	–	–	–	–	6	–	–
50	Classic or Chaperone	2	All	G	–	6-9	6	–	–	9	9
51	FirstRate	2	All	G	–	2-7	–	6	–	–	–
52	Pinnacle SG	2	All	G	–	–	–	–	–	–	–
53	Reflex	14	All	F/G	–	–	–	–	6	–	–
54	Cleansweep co-pack (Pursuit + Basagran Forté)	2,6	All	G	–	2-6	–	–	–	–	7
55	Pursuit or Panthom or Nu-Image	2	All	G	–	2-7	–	–	–	–	7

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] Two applications will be required to achieve this level of control throughout the season.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

						VOLUNTEER CROPS											
quackgrass	redtop	sow-thistle, perennial	thistle, Canada	vetch	wire-stem muhly	alfalfa, volunteer	adzuki beans, volunteer	canola, volunteer	canola (LL), volunteer	canola (RR), volunteer	clover (red), volunteer	corn, volunteer	corn (LL), volunteer	corn (LL/RR), volunteer	corn (RR), volunteer	corn (Enlist), volunteer	cereals, volunteer
Weed control ratings at 4-6 weeks after application																	
9	6	–	–	–	7	–	–	–	–	–	–	8-9	8-9	8-9	8-9	–	9
6	6	–	–	–	6	–	–	–	–	–	–	6-8	6-8	6-8	6-8	6-8	9
7	7	–	–	–	6	–	–	–	–	–	–	7-9	7-9	7-9	7-9	7-9	9
8	7	–	–	–	8	–	–	–	–	–	–	7-9	7-9	7-9	7-9	–	9
–	–	6-9	7-9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	6-9	6-9	5	–	6	–	–	–	–	6	–	–	–	–	–	–
–	–	5-9	7-9	5	–	–	7.5	9	9	9	–	–	–	–	–	–	–
–	–	5-9	7-9	5	–	–	–	8	8	8	–	–	–	–	–	–	–
–	–	4-7	4-8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	5-8	5-9	5	–	6	–	8	8	8	6	–	–	–	–	–	–
–	–	6-9	7-9	–	–	–	–	9	9	9	–	–	–	–	–	–	–
–	–	4-7	5-9	–	–	–	–	9	9	9	–	–	–	–	–	–	–

continued

CHAPTER 12: SOYBEANS

Perennial weed and volunteer crop control ratings for post-emergence herbicides in soybean *continued*

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	Crop Tolerance	PERENNIAL WEEDS						
					bindweed, field	carrot, wild	dandelion	horse-nettle	horsetail, field	milkweed	nutsedge, yellow
Post-emergence herbicides for "Roundup Ready" soybean varieties											
56	Assignment co-pack (RU Weathermax + Pursuit)	9,2	EN,RR,XT	G	7	–	7	8	–	9	6
57	Flexstar	9,14	EN,RR,XT	G	7	–	7	8	6	9	6
58	glyphosate (1x rate)	9	EN,RR,XT	E	7	–	6	8	–	9	6
58	glyphosate (2x rate)	9	EN,RR,XT	E	8	7-9	8-9	9	6	9	8
58	glyphosate (2.78x rate)	9	EN,RR,XT	E	8	7-9	9	9	6	9	8
59	Guardian co-pack (Polaris + Classic)	9,2	EN,RR,XT	G	7	–	9	8	–	9	9
Post-emergence herbicides for "Liberty-Link and Enlist" soybean varieties											
60	Liberty 200SN	10	LL, EN	E	6	–	–	–	6	–	6
Post-emergence herbicides for "Enlist" soybean varieties											
61	Enlist Duo (Low Rate)	4,9	EN	E	–	–	–	–	8	–	–
61	Enlist Duo (High Rate)	4,9	EN	E	8[2]	–	8	8	8	8	8[2]
Post-emergence herbicides for "Roundup Ready 2 Xtend" soybean varieties											
62	Engenia or Xtendimax/FeXapan	4	XT	E	8[2]	–	6	8[1]	–	6	–
63	Roundup Xtend	4,9	XT	E	8[2]	–	6	8	–	9	8[2]

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

Tolerant variety abbreviations:
All = this treatment can be applied to any soybean variety
RR = this treatment can only be applied to "Roundup Ready" soybean varieties
LL = this treatment can only be applied to "Liberty Link" soybean varieties
EN = this treatment can only be applied to "Enlist" soybean varieties
XT = this treatment can only be applied to "Roundup Ready 2 Xtend" soybean varieties

[1] The highest labelled rate is required to achieve this level of control.
[2] Two applications will be required to achieve this level of control throughout the season.
[R] Populations exist that are resistant to this herbicide and won't be controlled.

						VOLUNTEER CROPS											
quackgrass	redtop	sow-thistle, perennial	thistle, Canada	vetch	wire-stem muhly	alfalfa, volunteer	adzuki beans, volunteer	canola, volunteer	canola (LL), volunteer	canola (RR), volunteer	clover (red), volunteer	corn, volunteer	corn (LL), volunteer	corn (LL/RR), volunteer	corn (RR), volunteer	corn (Enlist), volunteer	cereals, volunteer
Weed control ratings at 4-6 weeks after application																	
9	9	7-8	8	5	8	6	9	9	9	9	6	9	9	–	–	–	9
9	9	7-8	8	5	8	6	9	9	9	8	6	9	9	–	–	–	9
9	9	7-8	8	5	8	6	9	9	9	–	6	9	9	–	–	–	9
9	9	8-9	9	7	9	7	9	9	9	–	7	9	9	–	–	–	9
9	9	8-9	9	8	9	8	9	9	9	–	8	9	9	–	–	–	9
9	9	7-8	8	5	8	6	9	9	9	8	6	9	9	–	–	–	9
Weed control ratings at 4-6 weeks after application																	
6-7	–	8	7	–	–	–	–	9	–	9	7	9	–	–	–	–	8
Weed control ratings at 4-6 weeks after application																	
–	–	–	–	8[1]	–	–	–	9	9	9	–	9	–	–	–	–	9
9	9	8	8	8[1]	8	6	9	9	9	9	–	9	–	–	–	–	9
Weed control ratings at 4-6 weeks after application																	
–	–	8	8	8[1]	–	8	8-9	–	–	–	9	9	9	–	–	–	9
9	9	8	8	8[1]	8	8	9	9	–	–	9	9	9	–	–	–	9

CHAPTER 12: SOYBEANS

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES AND CO-PACKS – ALL SOYBEAN VARIETIES			
1	**glyphosate (360 g/L)**-1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)**-2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
4	**2,4-D Ester** **Active Ingredient(s), concentration, rate:** 1) 2,4-D Ester , (660 g a.e./L), 528 g a.e./ha	324 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 2 hours
5	**Blackhawk** **Active Ingredient(s), concentration, rate:** 1) pyraflufen-ethyl, (6.1 g/L), 4.5-6.7 g a.i./ha 2) 2,4-D, (473 g a.e./L), 350-520 g a.e./ha	300-445 mL/acre **WSSA Group:** 1) 14 2) 4	**REI:** 12 hours **PHI:** not stated **Rainfast:** 2 hours
6	**Elevore** **+ methylated seed oil** Active Ingredient(s), concentration, rate: 1) halauxifen , (68.5 g/L), 5 g a.i./ha	29.5 mL/acre + 5-10 L/1,000 L **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 1 hour
7	**Eragon LQ + Merge** 1) Eragon LQ 2) Merge **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25 g a.i./ha	1) 30 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of soybean. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of soybean. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Ideally apply a minimum of 7 days before planting soybean. • Pre-plant: tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Blackhawk, which contains 2,4-D Ester, can be applied up to 3 days after planting.
• Apply PP or PRE but no later than 3 days after planting. • Pre-plant: tank-mix with glyphosate to control emerged weeds not controlled by this herbicide.
• Apply PP at 7 or more days before planting and when weeds are actively growing at the 1-8 leaf stage. Plant to a minimum of 4 cm. • Applications made to very coarse-textured soils, low in organic matter (<3%), or in fields with poor soil conditions may increase the risk of crop injury. • Use the higher rate of methylated seed oil when weed populations are high or enviornmental conditions are unfavourable. • Elevore only controls weeds emerged at the time of application.
• Apply as a PP surface application up to 21 days prior to planting or PRE. • PRE: apply prior to when soybean crack through the ground and no more than 3 days after planting. DO NOT apply to coarse textured soils with less than 2% organic matter. Some soybean cultivars maybe more sensitive to ERAGON and injury might occur. • Pre-plant: tank-mix with glyphosate to control emerged weeds not controlled by this herbicide and to improve control of glyphosate resistant Canada fleabane, tank-mix herbicides that contain metribuzin at 372.5 g a.i./ha or greater.

continued

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Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
8	**Eragon LQ + metribuzin + Merge** 1) Eragon LQ 2) Sencor or Tricor 3) Merge **Active Ingredient(s), concentration, rate**: 1) saflufenacil, (342 g/L), 25 g a.i./ha 2) metribuzin, (75%), 560 g a.i./ha	1) 30 mL/acre 2) 220 g/acre 3) 400 mL/acre **WSSA Group:** 1) 14 2) 5	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour
9	**Assignment co-pack** 1) Pursuit 2) Roundup Weathermax **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 100 g a.i./ha 2) glyphosate, (540 g/L), 1800 g a.e./ha	10 acre/case 1) 168 mL/acre 2) 1.34 L/acre **WSSA Group:** 1) 2 2) 9	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours
10	**Flexstar GT** 1) Flexstar GT **Active Ingredient(s), concentration, rate:** 1) fomesafen, (67 g/L), 234.5 g a.i./ha 2) glyphosate, (271 g/L), 948.5 g a.e./ha	10 acre/case 1) 1.4 L/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 4 hours
11	**Guardian co-pack** 1) Classic 2) Polaris **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (25%), 9 g a.i./ha 2) glyphosate, (360 g/L), 900 g a.e./ha	20 acre/case 1) 14.4 g/acre 2) 1 L/acre **WSSA Group:** 1) 2 2) 9	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours
12	**Guardian Plus II co-pack** 1) Guardian Plus WDG 2) Polaris at 1 L/acre **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (5.14%), 9 g a.i./ha and flumioxazin, (40.59%), 71.4 g a.i./ha 2) glyphosate, (360 g/L), 900 g a.e./ha	10 acre/case 1) 70.4 g/acre 2) 1 L/acre **WSSA Group:** 1) 2, 14 2) 9	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours
PRE-PLANT OR PRE-EMERGENCE BURNDOWN HERBICIDES – ONLY FOR ENLIST SOYBEAN VARIETIES			
13	**Enlist Duo** **Active Ingredient(s), concentration, rate:** 1) 2,4-D choline salt, (194 g a.e./L), 562-834 g a.e./ha 2) glyphosate, (204 g a.e./L), 592-877 g a.e./ha	1.16-1.72 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 48 hours **PHI:** 90 days **Rainfast:** 2 hours

APPLICATION NOTES
• This tank-mix improves the consistency of glyphosate resistant Canada fleabane control. Typically glyphosate is also tank-mixed to control weed species not controlled by either Eragon LQ or metribuzin. • Apply as a PP surface application up to 21 days prior to planting or PRE. • PRE: apply prior to when soybean crack through the ground and no more than 3 days after planting. DO NOT apply to coarse textured soils with less than 2% organic matter. Some soybean cultivars maybe more sensitive to ERAGON and injury might occur. • Other products containing the active ingredient "metribuzin" but will provide similar activity on Canada fleabane = Boundary LQD, Bifecta, Canopy Pro and Conquest.
• Apply as a PP burndown. • Some rotational restrictions apply.
• Apply PP up to 7 days before planting or PRE. • Do NOT apply more than once per season and to any field in consecutive years.
• Apply as a pre-plant burndown. • Some GUARDIAN co-pack's may contain TOUCHDOWN TOTAL instead of POLARIS. If you have a co-pack that contains TOUCHDOWN TOTAL, it should be applied at a rate of 1.8 L/ha (0.72 L/acre). • Guardian can ONLY be applied once per growing season.
• Apply as a PP burndown. • Guardian Plus can ONLY be applied once per growing season.
• Only apply to fields planted with an Enlist soybean varieties. • Apply as a coarse to extremely coarse spray (ASABE S-572 Standard). • Do not apply more than 3.44 L/acre of Enlist Duo Herbicide per use season. • Read and follow the DAS Stewardship Program (www.traitstewardship.com) that accompanies the use of soybean seed containing the DAS-40278-9 gene.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT OR PRE-EMERGENCE BURNDOWN HERBICIDES – ONLY FOR ROUNDUP READY 2 XTEND SOYBEAN VARIETIES			
14	**Engenia or Xtendimax/FeXapan** 1) Engenia or Xtendimax/FeXapan 2) + glyphosate (540 g/L) **Active Ingredient(s), concentration, rate:** **1) Engenia:** dicamba, (600 g/L), 300-600 g a.e./ha or **Xtendimax/FeXapan:** dicamba (350 g/L), 300-600 g a.e./ha 2) glyphosate, (540 g a.e./L), 900 g a.e./ha	1) 200-400 mL/acre or 330-680 mL/acre 2) 0.67 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 12 hours **PHI:** 7-10 days (forage), 13-15 days (hay) **Rainfast:** 4 hours for emerged weeds
15	**Roundup Xtend** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (240 g. a.e./L), 600-1,200 g a.e./ha 2) dicamba (120 g a.e./L), 300-600 g a.e./ha	1–2 L/acre **WSSA Group:** 1) 9 2) 4	**REI:** 12 hours **PHI:** 7-10 days (forage), 13-15 days (hay) **Rainfast:** 4 hours for emerged weeds
SOIL APPLIED HERBICIDES – ALL SOYBEAN VARIETIES			
16	**Authority 480 Herbicide** **Active Ingredient(s), concentration, rate:** 1) sulfentrazone, (480 g/L), 105-140 g a.i./ha	88–117 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• Can only be applied to dicamba/glyphosate tolerant soybean varieties (e.g., Roundup Ready 2 Xtend). Applications made to non "Xtend" soybean will result in complete plant death. • Apply to weeds less than 10 cm tall with a minimum spray volume of 10.6 U.S. gal/acre (40 L/acre). • The highest rate can only be used once in a season. • Use the highest rate to enhance preplant or pre-emergence burndown activity and provide short term residual weed control. • Preplant: Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Do NOT apply more than 785 mL/acre of Engenia or 1.34 L/acre of XtendiMax /FeXapan in a single growing season. **Off-target drift mitigation (summary only: refer to the label for complete details):** 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding these dicamba products..
• Can only be applied to dicamba/glyphosate tolerant soybean varieties (e.g., Roundup Ready 2 Xtend). Applications made to non "Xtend" soybean will result in complete plant death. • Apply to weeds less than 10 cm tall with a minimum spray volume of 10.6 U.S. gal/acre (40 L/acre). • The highest rate can only be used once in a season. • The highest rate is used to enhance preplant or pre-emergence burndown activity and provide short term residual weed control. • Do NOT apply more than 4 L/acre of Roundup Xtend in a single growing season. Off-target drift mitigation (summary only: refer to the label for complete details): 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Roundup Xtend.
• Apply PP or PRE but no later than 3 days after planting. • Do NOT apply to coarse-textured (sandy) soils. • Do NOT apply to soils with organic matter greater than 6%. • Do NOT apply to soils with a pH greater than 7.8. • The highest use rate should be used when applied to soils with a pH of less than 7 and with organic matter greater than 3% but less than 6%.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
17	**Authority Supreme** **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (250 g/L), 105-140 g a.i./ha 2) sulfentrazone, (250 g/L), 105-140 g a.i./ha	**"setup":** 160 mL/acre **coarse:** 200 mL/acre **med/fine:** 240 mL/acre **WSSA Group:** 1) 15 2) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
18	**Bifecta co-pack** **Active Ingredient(s), concentration, rate:** 1) metribuzin, (75%), 412.5 g a.i./ha 2) flumioxazin, (51.1%), 71.5 g a.i./ha	1 case treats 40 acres 1) Tricor at 220 g/acre 2) Valtera at 56 g/acre **WSSA Group:** 1) 5 2) 14	**REI:** 12 hours **PHI:** 5 days **Rainfast:** rainfall needed to activate herbicide
19	**Boundary LQD** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (628 g/L), 1570 g a.i./ha 2) metribuzin, (149 g/L), 372.5 g a.i./ha	1 L/acre **WSSA Group:** 1) 15 2) 5	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
20	**Broadstrike RC** **Active Ingredient(s), concentration, rate:** 1) flumetsulam, (80%), 70 g a.i./ha	35 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 90 days **Rainfast:** rainfall needed to activate herbicide. 4 hours for emerged weeds.
21	**Canopy Pro co-pack** 1) Classic Grande 2) + Tricor 75DF **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (25%), 9 g a.i./ha 2) metribuzin, (75%), 412 g a.i./ha	20 acres/jug 1) 14.4 g/acre 2) 220 g/acre	**REI:** 12 hours **PHI:** 60 days **Rainfast:** rainfall needed to activate herbicide. 4 hours for emerged weeds
22	**Classic or Chaperone** **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (25%), 9 g a.i./ha	14.4 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours
23	**Command 360 ME** **Active Ingredient(s), concentration, rate:** 1) clomazone, (360 g/L), 576-846 g a.i./ha	**light soil:** 0.64 L/acre **med soil:** 0.92 L/acre **heavy soil:** 0.94 L/acre **WSSA Group:** 1) 13	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours

APPLICATION NOTES
• Apply PP or PRE but no later than 3 days after planting. • DO NOT use on peat or muck soils and soils with 7% or more organic matter content. • If adequate moisture is not received within 7 to 10 days of application, a shallow incorporation no deeper than 5 cm may be needed to obtain adequate weed control. • Soybean seeds must be planted a minimum of 2.5 cm deep.
• Apply PP or PRE but no longer than 3 days after planting. Applications made to soybean that have begun to crack or are emerged will result in severe crop injury. • The risk of crop injury is minimized when Valtera is used on well drained soils and planted to a depth of 4 cm or more. • When using no-till planters with coulters that incorporate the soil, weed control may be reduced, therefore applications should be done after planting, but within 3 days of planting.
• Apply PP or PPI. • Do NOT apply if soybean have emerged. • Do NOT apply to coarse textured soils with less than 1% organic matter. • Tank-mix with glyphosate to control emerged weeds prior to planting.
• Apply PP, PPI or PRE. • Preplant: Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Can be applied up to 21 days before planting in minimum or no-tillage systems. • Do NOT apply when soil pH is greater than 7.8 and organic matter is less than 2%. • Do NOT apply to soils containing more than 5% organic matter. • Sufficient rainfall to moisten the soil to a depth of 5 cm should be received within 7-10 days for optimum weed control. • Some rotational restrictions apply.
• Apply as a PP burndown up to 14 days before planting or pre-emergence. • Some rotational restrictions apply. • Do NOT use on sandy soils or on coarse soils with less than 2% organic matter.
• Apply as a PP burndown. • Preplant: Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Some rotational restrictions apply.
• Do NOT use on natto soybean. • Apply PRE. Do NOT incorporate. • Control of yellow foxtail is achieved when COMMAND is applied at 0.92-0.94 L/acre. • Some rotational cropping restrictions apply.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
24	**Conquest LQ co-pack** 1) Pursuit 2) Sencor 480F **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 75-100 g a.i./ha 2) metribuzin, (480 g/L), 425-542 g a.i./ha	30-40 acres/case 1) 126-168 mL/acre 2) 330-460 mL/acre **WSSA Group:** 1) 2 2) 5	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours
25	**Dual II Magnum** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (915 g/L), 1,050-1,600 g/ha	0.46-0.7 L/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
26	**Fierce** **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (33.5%), 70.35-105.5 g a.i./ha 2) pyroxasulfone, (42.5%), 89.25-134 g a.i./ha	85-128 g/acre **WSSA Group:** 1) 14 2) 15	**REI:** 12 hours **PHI:** not stated **Rainfast:** 1 hour
27	**FirstRate** **Active Ingredient(s), concentration, rate:** 1) cloransulam-methyl, (84%), 35 g a.i./ha	17 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 65 days **Rainfast:** 1 hour
28	**Focus** **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (447 g/L), 100-150 g a.i./ha 2) carfentrazone-ethyl (53 g/L), 11.87-17.8 g a.i./ha	90-136 mL/acre **WSSA Group:** 1) 15 2) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** 1 hour
29	**Freestyle co-pack** 1) Classic Grande 2) DuPont Imazethapyr **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (25%), 9 g a.i./ha 2) imazethapyr (240 g/L), 75 g a.i./ha	1) 14.4 g/acre 2) 126 mL/acre **WSSA Group:** 1) 15 2) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds

APPLICATION NOTES
• Apply PP or PPI. • For use on medium and heavy textured soils only. • Tank-mix with glyphosate to control emerged weeds prior to planting (except if applying preplant incorporate).
• Apply PP, PPI or PRE. • Control of yellow nutsedge is obtained when applied preplant incorporate. • Optimal control of nightshade is obtained when applied PRE. • Do NOT use on muck, peat or high organic matter soils. • Use the higher rate for heavier weed populations. • Incorporation depth should not exceed 10 cm.
• Apply PP or PRE but no longer than 3 days after planting. Applications made to soybean that have begun to crack or are emerged will result in severe crop injury. • Preplant: tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • The risk of crop injury is minimized when used on well drained soils and planted to a depth of 4 cm or more. • When using no-till planters with coulters that incorporate the soil, weed control may be reduced, therefore applications should be done after planting, but within 3 days of planting. • Do not use FIERCE herbicide in soybean in the same field that BOUNDARY, DUAL II MAGNUM or FRONTIER MAX will be used pre-emerge, or soybean injury may occur.
• Apply PP or PRE. • Preplant: tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Some rotational restrictions apply.
• Apply PP or PRE. • Tank-mix with glyphosate to control emerged weeds prior to planting. • Do NOT apply when soybean have emerged as crop injury will occur. • Apply the 90 mL/acre rate as a "set-up" treatment for early season weed control. A POST herbicide treatment will likely be needed. • Apply the 113 mL/acre rate on coarse/medium textured soil with 1%-4% organic matter. • Apply the 136 mL/acre rate on medium/fine textured soil with 4%-7% organic matter.
• Apply preplant up to 14 days before planting or pre-emergence. • Some rotational restrictions apply.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
30	**Frontier Max** **Active Ingredient(s), concentration, rate:** 1) dimethenamid-p, (720 g/L), 544-693 g a.i./ha	305-390 mL/acre **WSSA Group:** 1) 15	**REI:** 24 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
31	**Integrity** **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (68 g/L), 25.16 g a.i./ha 2) dimethenamid-p (600 g/L), 222 g a.i./ha	**Coarse:** 220-300 g/acre **Med:** 300-440 g/acre **Fine:** 440-600 g/acre **WSSA Group:** 1) 2 2) 15	**REI:** 12 hours **PHI:** not stated **Rainfast:** 1 hour
32	**Lorox L** **Active Ingredient(s), concentration, rate:** 1) linuron, (480 g/L), 2,160 g a.i./ha	1.8 L/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
33	**Optill + Merge** 1) Optill 2) + Merge **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (17.8%), 26.16 g a.i./ha 2) imazethapyr (50.2%), 73.79 g a.i./ha	1) 60 g/acre 2) 0.4 L/acre **WSSA Group:** 1) 14 2) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
34	**Prowl H2O** **Active Ingredient(s), concentration, rate:** 1) pendimethalin, (455 g/L), 1,000 g a.i./ha	0.89 L/acre **WSSA Group:** 1) 3	**REI:** 24 hours **PHI:** 100 days **Rainfast:** rainfall needed to activate herbicide
35	**Pursuit, Phantom or Nu-Image** **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 100 g a.i./ha	168 mL/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
36	**Sencor 75DF, Tricor or Squadran** **Active Ingredient(s), concentration, rate:** 1) metribuzin, (75%), 560-1,120 g a.i./ha	**Coarse:** 220-300 g/acre **Med:** 300-440 g/acre **Fine:** 440-600 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• Apply PP, PPI or PRE. • For preplant incorporated applications, the minimum rate is 860 mL/ha (348 mL/acre) and should be cultivated into the top 5 cm of soil within 7 days of planting. • Use higher rate for heavier weed pressure, for the control of nightshade and pigweed (preplant incorporate or PRE only) or on fine textured or high organic matter soils. • Control of nutsedge is achieved by applying FRONTIER preplant incorporate at the highest rate. • Soybean should be seeded at least 4 cm deep or crop injury may result.
• Apply PP ONLY. • Tank-mix with glyphosate and Merge to control emerged weeds prior to planting. • Do NOT use rates higher than 0.15 L/acre, as crop injury may result.
• Apply PP. • Tank-mix with glyphosate to control emerged weeds prior to planting. • Do NOT use on sands (less than 2% organic matter). • Plant soybean at least 4 cm deep. • Heavy rainfall and adverse weather conditions may result in temporary crop injury.
• Apply PP, from 21 days prior to, and up to the day of planting. • Preplant: tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Do NOT incorporate OPTILL or apply after planting as injury may result. • ONLY ONE application of OPTILL may be made during the season. • Do NOT exceed the normal application rate as higher rates may result in crop injury particularly when the crop is under stress, • OPTILL is only to be applied to soybean in no-till or minimum tillage situations.
• Apply PP. • Tank-mix with glyphosate to control emerged weeds prior to planting. • DO NOT apply PROWL H2O herbicide after planting soybean as crop injury may occur. • Provides early-season weed control only.
• Apply PP. • Addition of non-ionic surfactant and liquid fertilizer is required if emerged weeds are present at application unless tank-mixing with glyphosate.
• Apply PP, PPI or PRE. • Do NOT use on sandy or coarse soils with less than 2% organic matter. • Use the label rate for each soil types (see label), otherwise crop injury may occur. • Excessive rainfall and adverse weather conditions may result in crop injury. • Plant soybean at least 4 cm deep. • For preplant applications: Apply up to 30 days prior to seeding the crop. Use the higher rate when weeds are dense and are on soils with high organic matter (> 4%) and on soils with high clay content. If emerged weeds are taller than 4 cm, apply in tank-mix with glyphosate.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
37	**Step Up co-pack** 1) Valtera 2) Chaperone **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (51.1%), 95.8 g a.i./ha 2) chlorimuron-ethyl, (25%), 9 g a.i./ha	40 acres/case 1) 75 g/acre 2) 14.4 g/acre **WSSA Group:** 1) 14 2) 2	**REI:** 12 hours **PHI:** 60 days **Rainfast:** rainfall needed to activate herbicide, 4 hours for emerged weeds
38	**Treflan or Bonanza;** **Triflurex 40 EC;** **Rival EC** **Active Ingredient(s), concentration, rate:** **Treflan/Bonanza:** trifluralin,(480 g/L),0.6-1.15 kg a.i./ha **Triflurex:** trifluralin,(412 g/L),0.6-1.15 kg a.i./ha **Rival:** trifluralin,(500 g/L),0.6-1.15 kg a.i./ha	0.5-0.96 L/acre 0.58-1.12 L/acre 0.48-0.92 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
39	**Triactor co-pack** 1) Valtera 2) Tricor 3) Nu-Image **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (51.1%), 95.8 g a.i./ha 2) metribuzin (75%), 412.5 g a.i./ha 3) imazethapyr (240 g/L), 76.8 g a.i./ha	26 acres/case 1) 75 g/acre 2) 220 g/acre 3) 128 mL/acre **WSSA Group:** 1) 14 2) 5 3) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** rainfall needed to activate herbicide, 2 hours for emerged weeds
40	**Valtera** **Active Ingredient(s), concentration, rate:** 1) flumioxazin, (51.1%), 140-210 g a.i./ha	1) 56-84 g/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 5 days **Rainfast:** rainfall needed to activate herbicide
41	**Zidua (SC)** **Active Ingredient(s), concentration, rate:** 1) pyroxasulfone, (500 g/L), 125; 166; 208.5 or 246.5 g a.i./ha	**Coarse:** 100 mL/acre **Med:** 133 mL/acre, 167 mL/acre **Fine:** 197 mL/acre **WSSA Group:** 1) 15	**REI:** 12 hours **PHI:** none stated **Raintfast:** none stated

APPLICATION NOTES
• Apply as a PP burndown. • Tank-mix with glyphosate to control emerged weeds prior to planting. • Step Up can ONLY be applied once per growing season.
• Apply PPI only. • Conduct first incorporation as soon as possible after application, may be delayed up to 8-24 hours. • A second incorporation should occur anytime before planting.
• Apply PP or PRE but within 3 days after planting. Applications made to soybean that have begun to crack or are emerged will result in severe crop injury. • The risk of crop injury is minimized when Valtera is used on well drained soils and planted to a depth of 4 cm or more. • When using no-till planters with coulters that incorporate the soil, weed control may be reduced, therefore applications should be done after planting, but within 3 days of planting.
• Apply to coarse and medium textured soils. • Tank-mix with glyphosate to control emerged weeds prior to planting. • Apply to soybean prior to planting or within 3 days after planting but prior to soybean emergence. • Severe crop injury will result if applications are made to soybean that have begun to crack through the soil surface or have emerged. • Do NOT tank-mix with DUAL II MAGNUM, BOUNDARY or FRONTIER MAX. • Any tillage operation performed after application will reduce weed control. Apply only ONCE per growing season.
• Apply PP or PRE. • Use the 100 mL/acre rate on coarse soils, 133 mL/acre on medium textured soils with < 3% organic matter, 167 mL/acre on medium textured soils with between 3 and 7% organic matter and the 197 mL/acre rate on fine textured soils. • Do NOT use on peat or muck soils with 7% organic matter content. • Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
SOIL APPLIED HERBICIDES FOR "XTEND" SOYBEAN VARIETIES ONLY			
42	**Engenia or Xtendimax/FeXapan** 1) Engenia or Xtendimax or FeXapan **Active Ingredient(s), concentration, rate:** 1) Engenia: dicamba, (600 g/L), 600 g a.e./ha or Xtendimax/FeXapan: dicamba (350 g/L), 600 g a.e./ha	1) 400 mL/acre or 680 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 7-10 days (forage), 13-15 days (hay) **Rainfast:** 4 hours for emerged weeds but rainfall needed to activate herbicide before weed emergence.
43	**Tavium** **Active Ingredient(s), concentration, rate:** 1) s-metolachlor, (271 g. a.e./L), 1,125 g a.e./ha 2) dicamba (135.6 g a.e./L), 563 g a.e./ha	1.68 L/acre **WSSA Group:** 1) 15 2) 4	**REI:** 12 hours **PHI:** 7-10 days (forage), 13-15 days (hay) **Rainfast:** rainfall needed to activate herbicide
POST-EMERGENCE HERBICIDES FOR ALL SOYBEAN VARIETIES			
44	Assure II, Yuma GL or Contender + adjuvant 1) Assure II, Yuma GL or Contender 2) Sure-Mix, XA Oil Concentrate or Contender MSO **Active Ingredient(s), concentration, rate:** 1) quizalofop-p-ethyl, (96 g/L), 36-72 g a.i./ha	1) 150-300 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
45	**Poast Ultra + Merge** 1) Poast Ultra 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150-200 g a.i./ha	1) 130-190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
46	Select, or Statue + adjuvant 1) Select or Statue 2) + Amigo or Carrier or Arrow All-In **Active Ingredient(s), concentration, rate:** 1) clethodim, (240 g/L), 45-90 g a.i./ha	1) 75-150 mL/acre 2) 5-10 L/1,000 L 152-304 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 75 days **Rainfast:** 1 hour

APPLICATION NOTES
• Can only be applied to dicamba/glyphosate tolerant soybean varieties (e.g., Roundup Ready 2 Xtend). Applications made to non "Xtend" soybean will result in complete plant death. • Apply to weeds less than 10 cm tall with a minimum spray volume of 40 L/acre (10.6 U.S. gal/acre). • This rate provides the greatest length of residual activity but can only be used once in a season. Off-target drift mitigation (summary only: refer to the label for complete details): 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10˚C and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding a dicamba product..
• Can only be applied to dicamba/glyphosate tolerant soybean varieties (e.g., Roundup Ready 2 Xtend). Applications made to non "Xtend" soybean will result in complete plant death. • Apply PP or PRE and prior to weed emergence. Off-target drift mitigation (summary only: refer to the label for complete details): 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10˚C and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Tavium.
• 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 0.15 L/acre rate for control of volunteer corn, volunteer cereals, long spined sandbur and green foxtail. • The 0.2 L/acre rate will suppress quackgrass and also control barnyard grass. • Use the 0.3 L/acre rate for control of quackgrass. • Yuma + XA oil concentrate and Contender + Contender MSO are both generic equivalents of Assure II + Sure-mix. • Apply the 0.19 L/acre rate for wild oats or volunteer cereal control. • Apply the 0.45 L/acre rate for control of quackgrass. • 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. • Water volumes of 40-80 L/acre provide the best results.
• Soybean 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 adjuvant at 5 L/1,000 L of spray solution to the low herbicide rate and 10 L/1,000 L of spray solution to the high herbicide rate for quackgrass control. • Arrow All-In and Statue + Carrier are generic equivalents of Select + Amigo. Arrow All-In has an adjuvant included in its formulation, therefore does not require the addition of an adjuvant that is required when using Statue or Select.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
47	**Venture L** **Active Ingredient(s), concentration, rate:** 1) fluazifop-p-butyl, (125 g/L), 75-250 g a.i./ha	243-800 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 1 hour
48	**Basagran Forté** **Active Ingredient(s), concentration, rate:** 1) bentazon, (480 g/L), 840-1,080 g a.i./ha	0.7-0.9 L/acre **WSSA Group:** 1) 6	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 6 hours
49	**Blazer, Ultra** **Active Ingredient(s), concentration, rate:** 1) acifluorfen, (240 g/L), 600 g a.i./ha	1 L/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** 6 hours
50	**Classic or Chaperone** **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (25%), 9 g a.i./ha	14.4 g/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours
51	**FirstRate + non-ionic surfactant + 28% UAN** 1) FirstRate 2) non-ionic surfactant 3) 28% UAN **Active Ingredient(s), concentration, rate:** 1) cloransulam-methyl, (84%), 17.5 g a.i./ha	1) 8.5 g/acre 2) 2.5 L/1,000 L 3) 25 L/1,000L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 65 days **Rainfast:** 1 hour
52	**Pinnacle SG + non-ionic surfactant** 1) Pinnacle SG 2) + non-ionic surfactant **Active Ingredient(s), concentration, rate:** 1) thifensulfuron-methyl, (50%), 4.1-6 g a.i./ha	1) 3.3-4.8 g/acre 2) 1 L/1,000 L **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 4 hours
53	**Reflex + Turbocharge** 1) Reflex 2) + Turbocharge **Active Ingredient(s), concentration, rate:** 1) fomesafen, (240 g/L), 140 g a.i./ha	1) 400 mL/acre 2) 5 L/1,000 L **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 4 hours

APPLICATION NOTES
• The 243 mL/acre rate is for the control of volunteer corn at the 2-5 leaf stage. • The 400 mL/acre rate is for the control of annual grasses at the 2-4 leaf stage. • The 800 mL/acre rate is for the control of quackgrass or wirestem muhly at the 3-5 leaf stage.
• Apply when soybean 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 more consistent control of velvetleaf and lamb's-quarters, add 6 L/acre of 28% urea ammonium nitrate (UAN) or 2.4 L/acre of liquid ammonium sulphate. This may cause slight leaf burn, but new growth is normal and crop vigour is not reduced. • Use the higher rate of BASAGRAN FORTÉ when weed pressure is high, weeds are large or conditions for activity are unfavourable.
• Apply to emerged weeds up to 10 cm in height (refer to labels for weed heights) when soybean are in the 1-3 trifoliate leaf stage. • Do NOT apply before the first trifoliate leaf stage of the soybean. • Good spray coverage on the weeds is important for good weed control. • Soybean may exhibit speckling, bronzing and/or leaf burn. The trifoliate leaf emerging at the time of application may be distorted. Soybean 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 soybean that have been subjected to stress. • Do NOT add oils or surfactants when applying the 1 L/acre rate.
• Apply to small emerged weeds (2-6 leaf) and ideally when soybean have the 1st trifoliate leaf fully expanded. Applications may occur prior to the 1st trifoliate leaf stage if targeted weed species are at the maximum leaf stage for control. • Do NOT apply after the initiation of flowering. • Addition of 28% UAN may improve control of velvetleaf.
• 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 soybean. • Application prior to full emergence of first trifoliate may cause temporary yellowing of soybean.
• Apply to small emerged weeds (2-6 leaf) and ideally when soybean have the 1st trifoliate leaf fully expanded. Applications may occur prior to the 1st trifoliate leaf stage if targeted weed species are at the maximum leaf stage for control. • Do NOT apply to soybean, 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.
• Apply early POST (1-2 trifoliate) and when weeds are small and actively growing (2-4 leaf stage). • Use 80-140 L/acre 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 to soybean under stress. • Do NOT apply REFLEX to any field more often than once every 2 years. • Do NOT apply to soybean under stress.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
54	**Cleansweep co-pack** 1) Pursuit 2) Basagran Forté 3) non-ionic surfactant 4) 28% UAN **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 75 g a.i./ha 2) bentazon, (480 g/L), 840 g a.i./ha	1) 126 mL/acre 2) 700 mL/acre 3) 2.5 L/1,000 L 4) 800 mL/acre **WSSA Group:** 1) 2 2) 6	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 6 hours
55	**Pursuit, Phantom or Nu-Image** 1) Pursuit 2) non-ionic surfactant 3) 28% UAN **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 75-100 g a.i./ha	1) 126-128 mL/acre 2) 2.5 L/1,000 L 3) 800 mL/acre **WSSA Group:** 1) 2	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
POST-EMERGENCE HERBICIDES ONLY FOR "ROUNDUP READY, ENLIST OR XTEND" SOYBEAN VARIETIES			
56	**Assignment co-pack** 1) Pursuit at 84 mL/acre 2) Roundup Weathermax at 0.67 L/acre **Active Ingredient(s), concentration, rate:** 1) imazethapyr, (240 g/L), 100 g a.i./ha 2) glyphosate, (540 g/L), 1800 g a.e./ha	1) 84 mL/acre 2) 0.67 L/acre **WSSA Group:** 1) 2 2) 9	**REI:** 12 hours **PHI:** 100 days **Rainfast:** 2 hours for emerged weeds
57	**Flexstar GT** 1) Flexstar GT **Active Ingredient(s), concentration, rate:** 1) fomesafen, (67 g/L), 234.5 g a.i./ha 2) glyphosate, (271 g/L), 948.5 g a.e./ha	10 acre/case 1) 1.4 L/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** 90 days **Rainfast:** 4 hours

APPLICATION NOTES
• Apply POST to actively growing weeds in the 2-6 leaf stage. This often occurs at 18-22 days after planting. • Some rotational restrictions apply.
• Apply when the weeds are up to the 2-true leaf stage. • Use only ONCE per season.
• Can only be applied to glyphosate tolerant soybean varieties (e.g., Roundup Ready, Enlist, Xtend). Applications made to non glyphosate tolerant soybean will result in complete plant death. • Apply up to the 3rd trifoliate stage of soybean. • Use only ONCE per season.
• Can only be applied to glyphosate tolerant soybean varieties (e.g., Roundup Ready, Enlist, Xtend). Applications made to non glyphosate tolerant soybean will result in complete plant death. • Apply between the 1-2 trifoliate stage of soybean. • Provides residual control of common ragweed and redroot pigweed. • If weeds are large or under stress then the addition of TURBOCHARGE at 0.25% v/v is required.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
58	**glyphosate (360 g/L)**-1x to 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900-1,800 g a.e./ha	1-2 L/acre 0.8-1.6 L/acre 0.75-1.5 L/acre 0.67-1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
59	**Guardian co-pack** 1) Classic 2) Polaris **Active Ingredient(s), concentration, rate:** 1) chlorimuron-ethyl, (25%), 9 g a.i./ha 2) glyphosate, (360 g/L), 900 g a.e./ha	20 acre/case 1) 14.4 g/acre 2) 1 L/acre **WSSA Group:** 1) 2 2) 9	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 4 hours
POST-EMERGENCE HERBICIDES ONLY FOR "LIBERTY-LINK AND ENLIST" SOYBEAN VARIETIES			
60	**Liberty 200 SN** **Active Ingredient(s), concentration, rate:** 1) glufosinate ammonium, (200 g/L), 500 g a.i./ha	1 L/acre **WSSA Group:** 1) 10	**REI:** 24 hours **PHI:** 70 days **Raintfast:** 4 hours for emerged weeds
POST-EMERGENCE HERBICIDES ONLY FOR "ENLIST" SOYBEAN VARIETIES			
61	**Enlist Duo** **Active Ingredient(s), concentration, rate:** 1) 2,4-D choline salt, (194 g a.e./L), 562-834 g a.e./ha 2) glyphosate, (204 g a.e./L), 592-877 g a.e./ha	1.16-1.72 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 48 hours **PHI:** 90 days **Rainfast:** 2 hours

APPLICATION NOTES
• Can only be applied to glyphosate tolerant soybean varieties (e.g., Roundup Ready, Enlist, Xtend). Applications made to non glyphosate tolerant soybean will result in complete plant death. • Apply between the first trifoliate leaf stage and the full flower stage of the soybean. • Weeds are more easily controlled and weed competition avoided when applications are made when weeds are small, although weeds up to 25 cm tall will be controlled. • Apply when milkweed, perennial sow-thistle and Canada thistle are 15-60 cm. • Apply when nutsedge is 5-15 cm in height and at the high rate. • A second application may be made for later flushes emerging after the initial application. • Use 40-80 L/acre water.
• Can only be applied to glyphosate tolerant soybean varieties (e.g., Roundup Ready, Enlist, Xtend). Applications made to non glyphosate tolerant soybean will result in complete plant death. • Apply up to the 3rd trifoliate stage of soybean. • Use ONLY once per season.
• Can only be applied to glufosinate tolerant soybean varieties (e.g., Liberty-Link, Enlist). Applications made to non Liberty-Link or Enlist soybean will result in complete plant death. • LIBERTY 200 SN can be applied from the cotyledon to flowering stage of soybean. • LIBERTY 200 SN is a contact herbicide and has no residual activity. • Ammonium sulphate can be applied at 62.4 L/acre or 1.3 kg/acre for improved control of specific weeds. • Do NOT add oil or any other surfactants.
• Can only be applied to glufosinate toleran soybean varieties (e.g., Liberty-Link, Enlist). Applications made to non Liberty-Link or Enlist soybean will result in complete plant death. • Make 1-2 applications with a minimum of 12 days between applications. • Two applications may be necessary for control of perennial weeds or late weed flushes that emerged after the initial application. • Apply as a coarse to extremely coarse spray (ASABE S-572 Standard). • Do NOT apply more than two post emergent applications per use season. • Do NOT apply more than 3.44 L/acre of Enlist Duo Herbicide per use season. • Read and follow the DAS Stewardship Program (www.traitstewardship.com) that accompanies the use of soybean seed containing the DAS-40278-9 gene.

continued

CHAPTER 12: SOYBEANS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST EMERGENCE TREATMENTS FOR "XTEND" SOYBEAN VARIETIES			
62	**Engenia or Xtendimax/FeXapan** **Active Ingredient(s), concentration, rate**: 1) Engenia: dicamba, (600 g/L), 300-600 g a.e./ha or Xtendimax/FeXapan: dicamba (350 g/L), 300-600 g a.e./ha	200-400 mL/acre or 330-680 mL/acre **WSSA Group:** 1) 4	**REI:** 12 hours **PHI:** 7-10 days (forage), 13-15 days (hay) **Rainfast:** 4 hours for emerged weeds
63	**Roundup Xtend** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (240 g. a.e./L), 600-1,200 g a.e./ha 2) dicamba (120 g a.e./L), 300-600 g a.e./ha	1-2 L/acre **WSSA Group:** 1) 4 2) 9	**REI:** 12 hours **PHI:** 7-10 days (forage), 13-15 days (hay) **Rainfast:** 4 hours for emerged weeds
HARVEST AID TREATMENTS (ALL SOYBEAN VARIETIES)			
64	**Aim EC + Merge** 1) Aim EC at 30-47 mL/acre 2) MERGE at 400 mL/acre **Active Ingredient(s), concentration, rate:** 1) carfentrazone-ethyl, (240 g/L), 17.5-28 g a.i./ha	1) 30-47 mL/acre 2) 10 L/1,000 L **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3 days **Rainfast:** 2 hours
65	**Eragon LQ + Merge** 1) ERAGON LQ at 29.5-59 mL/acre 2) MERGE at 400 mL/acre **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha	1) 29.5-59 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** 3 days **Rainfast:** < 1 hour

APPLICATION NOTES
• Can only be applied to dicamba/glyphosate tolerant soybean varieties (e.g., Roundup Ready 2 Xtend). Applications made to non "Xtend" soybean will result in complete plant death. • Apply to weeds less than 10 cm tall with a minimum spray volume of 10.6 U.S. gal/acre (40 L/acre). • The highest rate can only be used once in a season and is typically used at the PP or PRE timing. When the highest rate is applied PP or PRE, the lower rate should be used for POST timings. • Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Do NOT apply more than 785 mL/acre of Engenia or 1.34 L/acre of XtendiMax/FeXapan in a single growing season. Off-target drift mitigation (summary only: refer to the label for complete details): 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding dicamba products.
• Can only be applied to dicamba/glyphosate tolerant soybean varieties (e.g., Roundup Ready 2 Xtend). Applications made to non "Xtend" soybean will result in complete plant death. • Apply to weeds less than 10 cm tall with a minimum spray volume of 10.6 U.S. gal/acre (40 L/acre). • The highest rate can only be used once in a season and is typically used at the PP or PRE timing. When the highest rate is applied PP or PRE, the lower rate should be used for POST timings. • Tank-mix with glyphosate to control emerged weeds not controlled by this herbicide. • Do NOT apply more than 785 mL/acre of Engenia or 1.34 L/acre of XtendiMax/FeXapan in a single growing season. • Do NOT apply more than 4 L/acre of Roundup Xtend in a single growing season. Off-target drift mitigation (summary only: refer to the label for complete details): 1) Sprayer speed should be less than 25 km/hr. 2) Use nozzles that deliver an extremely coarse to ultra coarse droplet. 3) Boom height should be 50 cm or less above the crop canopy. 4) Do not spray during fog or a temperature inversion. 5) Spray when wind speeds are between 5 and 15 km/hr. 6) Spray when air temperatures are between 10 and 25˚C. 7) Avoid spraying during high humidity. 8) Do not add any acidifying agents or ammonium sulphate (AMS) to condition water prior to adding Roundup Xtend.
• Apply when stems are green to brown in colour and pods are mature (yellow-brown) and 80%-90% of the original leaves have dropped.
• Apply when stems are green to brown in colour and pods are mature (yellow-brown) and 80%-90% of the original leaves have dropped.

continued

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
66	**Eragon LQ + glyphosate + Merge** 1) ERAGON LQ at 29.5-59 mL/acre 2) GLYPHOSATE (540 g/L) at 0.67 L/acre 3) MERGE at 0.4 L/acre **Active Ingredient(s), concentration, rate:** 1) saflufenacil, (342 g/L), 25.2-49.7 g a.i./ha 2) glyphosate, (540 g/L), 900 g a.e./ha	1) 29.5-59 mL/acre 2) 0.67 L/acre 3) 400 mL/acre **WSSA Group:** 1) 14 2) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
67	**glyphosate (360 g/L)**-1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360-540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
68	**Reglone Desiccant** **+ Agral 90** **Active Ingredient(s), concentration, rate:** 1) diquat, (240 g/L), 300-400 g a.i./ha	500-920 mL/acre + 1 L/1,000 L **WSSA Group:** 1) 22	**REI:** 24 hours **PHI:** 4-10 days **Rainfast:** 15 min.

APPLICATION NOTES
• Apply when the crop is 30% grain moisture or less. • Do not apply to crops being grown for seed, as glyphosate can negatively effect seed germination. • Apply at least 7 days prior to harvest.
• Apply when the crop is 30% grain moisture or less. • Do not apply to crops being grown for seed, as glyphosate can negatively effect seed germination. • Apply at least 7 days prior to harvest.
• Apply at 80%-90% natural leaf defoliation and at least 80% of the pods have turned yellow. • Apply within 7 days of variety maturity and harvest 5-7 days after application.

Chapter 13: Sunflowers

CHAPTER 13: SUNFLOWERS

TABLE 13-1
Pre-plant burndown weed control ratings in sunflower

TRT #	HERBICIDE TREATMENT	WSSA GROUP	bluegrass, annual	corn, volunteer (RR3)	foxtails	quackgrass	alfalfa, volunteer	atriplex, spreading	bur cucumber	burdock (2nd year)	broadleaf plantain	canola, volunteer (RR)
Pre-plant burndown herbicides: **emerged** weed control ratings at **4 weeks** after application												
1	glyphosate (1x rate)	9	9	–	9	9	7	7	7	–	8	–
2	glyphosate (2x rate)	9	9	–	9	9	8	9	8	6	9	–

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[R] Populations exist that are resistant to this herbicide and won't be controlled.

CHAPTER 13: SUNFLOWERS

WEED SPECIES TYPICALLY FOUND AT TIME OF BURNDOWN (ANNUAL, BIENNIAL OR PERENNIAL)																		
carrot, wild	chickweed	clover, red	dandelion	fleabane, Canada	flower-of-an-hour	horse-nettle	horsetail, field	lettuce, prickly	lamb's-quarters	mustards	pigweed	pineappleweed	ragweed, common	ragweed, giant	three-seeded mercury	violet (pre flower)	vetch	waterhemp
7	9	7	7	9[R]	9	8	–	9	9	9	9	–	9[R]	9[R]	8	7	4	9[R]
8	9	8	9	9[R]	9	8	–	9	9	9	9	6	9[R]	9[R]	9	8	6	9[R]

CHAPTER 13: SUNFLOWERS

TABLE 13-2
Pre and Post-emergence herbicide weed control ratings in sunflower

TRT #	HERBICIDE TREATMENT	WSSA GROUP	Tolerant Varieties	GRASSY WEEDS							
				barnyard grass	crabgrass	fall panicum	foxtails	proso millet	sandbur	wild oats	witchgrass
Pre-emergence broadleaf herbicides (weeds not emerged at time of application)											
4	Authority	14	G	–	–	–	–	–	–	–	–
Pre-emergence grass and broadleaf herbicides (weeds not emerged at time of application)											
5	Eptam 8-E	8	G	9	9	8	9	7	–	–	9
6	Treflan, Bonanza, Triflurex or Rival	3	E	9	9	8	9	6	6	8	9
Post-emergence grass herbicides (weeds emerged at time of application)											
7	Poast Ultra[1]	1	E	9	8	9	9	9	7	9	9
8	Select, Arrow All-In or Statue[1,2]	1	E	9	8	9	9	9	7	9	9
9	Venture L[1,2]	1	E	9	8	9	8	9	9	9	9

Visual weed control ratings: 9 = 90%-100%, 8 = 80%-89%, 7 = 70%-79%, 6 = 60%-69%, 5 = 50%-59%
– = less than 50% control or is not recommended

Crop Tolerance Ratings: E = Excellent, G = Good, F = Fair, P = Poor

[1] Will also control volunteer corn and cereals.
[2] Provides control of quackgrass and wire-stemmed muhley when applied at the highest rate.
[3] RR = "Roundup-Ready" (glyphosate tolerant).
[R] Populations exist that are resistant to this herbicide and won't be controlled.

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BROADLEAF WEEDS (ANNUAL, WINTER ANNUAL)																					
atriplex, spreading	beggarsticks, nodding	biennial wormwood	buckwheat, wild	bur cucumber	chamomile, scentless	chickweed	cocklebur	fleabane, Canada	flower-of-an-hour	lady's thumb	lamb's-quarters	lettuce, prickly	mustards	nightshade	pigweeds	ragweed, common	ragweed, giant	three-seeded mercury	velvetleaf	violet, field	waterhemp
–	–	–	9	–	–	–	–	–	–	–	9	–	–	9	9	–	–	–	–	–	9
–	–	–	–	–	–	–	–	–	–	7	7	–	5	7	7	5	–	–	5	–	–
–	–	–	–	–	–	9	–	–	–	–	8	–	–	–	8	–	–	–	–	–	8
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

CHAPTER 13: SUNFLOWERS

Herbicide rates and notes

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
PRE-PLANT BURNDOWN HERBICIDES AND CO-PACKS			
1	**glyphosate (360 g/L)** – 1x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360 – 540 g/L), 900 g a.e./ha	1 L/acre 0.8 L/acre 0.75 L/acre 0.67 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
2	**glyphosate (360 g/L)** – 2x Rate **or glyphosate (450 g/L)** **or glyphosate (480 g/L)** **or glyphosate (540 g/L)** **Active Ingredient(s), concentration, rate:** 1) glyphosate, (360 – 540 g/L), 1800 g a.e./ha	2 L/acre 1.6 L/acre 1.5 L/acre 1.34 L/acre **WSSA Group:** 1) 9	**REI:** 12 hours **PHI:** 7-14 days **Rainfast:** 1 hour
PRE-PLANT INCORPORATED AND PRE-EMERGENCE HERBICIDES			
4	**Authority 480 Herbicide** **Active Ingredient(s), concentration, rate:** 1) sulfentrazone, (480 g/L), 105 – 140 g a.i./ha	88 – 117 mL/acre **WSSA Group:** 1) 14	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
5	**Eptam 8-E** **Active Ingredient(s), concentration, rate:** 1) EPTC, (800 g/L), 3,400 – 4,400 g a.i./ha	1.7 – 2.2 L/acre **WSSA Group:** 1) 8	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide
6	**Treflan (480 g/L) or Bonanza (480 g/L);** **Triflurex 40 EC (412 g/L);** **Rival EC (500 g/L)** **Active Ingredient(s), rate:** trifluralin, 0.6-1.15 kg a.i./ha	0.5 – 0.96 L/acre 0.58 – 1.12 L/acre 0.48 – 0.92 L/acre **WSSA Group:** 1) 3	**REI:** 12 hours **PHI:** not stated **Rainfast:** rainfall needed to activate herbicide

APPLICATION NOTES
• For actively growing weeds prior to planting or emergence of sunflower. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• For actively growing weeds prior to planting or emergence of sunflower. • Allow at least 1 day after application to annual weeds before tillage. • Allow at least 3 days after application to quackgrass before tillage. • Allow at least 10 days after application to rosette Canada thistle before tillage. • Only weeds emerged at application time will be controlled.
• Apply PP or PRE but no later than 3 days after planting. • Some rotational cropping restrictions apply. • Do NOT apply to sunflower grown on coarse-textured (sandy) soils. • Do NOT apply to soils with organic matter greater than 6%. • Do NOT apply to soils with a pH greater than 7.8. • The highest use rate should be used when applied to soils with a pH of less than 7 and with organic matter greater than 3% but less than 6%.
• Apply PPI. • Do NOT use on light sandy soils with less than 3% organic matter.
• Apply PPI. Incorporate as soon as possible, within 24 hr.

continued

CHAPTER 13: SUNFLOWERS

Herbicide rates and notes *continued*

TRT. #	TRADE NAME (ACTIVE INGREDIENT, CONCENTRATION AND RATE)	PRODUCT RATE WSSA GROUP	RESTRICTIONS
POST-EMERGENCE HERBICIDES			
7	**Poast Ultra + Merge** 1) Poast Ultra 2) + Merge Adjuvant **Active Ingredient(s), concentration, rate:** 1) sethoxydim, (450 g/L), 150 – 200 g a.i./ha	1) 130 – 190 mL/acre 2) 400 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
8	**Select or Statue + adjuvant** 1) Select or Statue 2) + Amigo or Carrier **or Arrow All-In** **Active Ingredient(s), concentration, rate:** 1) clethodim, (240 g/L), 45 – 90 g a.i./ha	1) 75 – 150 mL/acre 2) 5 - 10 L/1,000 L 152 - 304 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 60 days **Rainfast:** 1 hour
9	**Venture L (125 g/L)** **Active Ingredient(s), concentration, rate:** 1) fluazifop-p-butyl, (125 g/L), 75 – 250 g a.i./ha	243 – 800 mL/acre **WSSA Group:** 1) 1	**REI:** 12 hours **PHI:** 80 days **Rainfast:** 1 hour
HARVEST AID			
10	**Reglone or Bolster Desiccant + Agral 90** **Active Ingredient(s), concentration, rate:** 1) diquat, (240 g/L), 300 – 400 g a.i./ha	500 – 920 mL/acre + 1 L/1,000 L **WSSA Group:** 1) 22	**REI:** 24 hours **PHI:** 15-20 days **Rainfast:** 15 min.

APPLICATION NOTES
• Apply POST when annual grasses and volunteer cereals are in the 1-6 leaf stage and quackgrass is in the 1-3 leaf stage. • Use the intermediate rate of 0.19 L/acre for volunteer spring cereals. • Use the high rate of 0.45 L/acre for quackgrass. • Thorough preplant tillage will ensure more uniform quackgrass emergence. Follow with a cultivation 7 days after treatment in wide row crops.
• 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 adjuvant at 5 L/1,000 L of spray solution to the low herbicide rate and 10 L/1,000 L of spray solution to the high herbicide rate for quackgrass control. • Arrow All-In and Statue + Carrier are generic equivalents of Select + Amigo. Arrow All-In has an adjuvant included in its formulation, therefore does not require the addition of an adjuvant that is required when using Statue or Select.
• The 243 mL/acre rate is for the control of volunteer corn at the 2-5 leaf stage. • The 400 mL/acre rate is for the control of annual grasses at the 2-4 leaf stage. • The 800 mL/acre rate is for the control of quackgrass or wirestem muhly at the 3-5 leaf stage.
• Spray when seeds reach maturity (20%-50% moisture in the seed and hull). Combine 15-20 days after spraying.

Chapter 14: Difficult to Control Weeds

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Management strategies for "difficult to control" weeds

Problem perennial and biennial weeds are challenging to control because they typically have extensive root systems that can propagate new shoots. Although difficult to eradicate, it is possible to minimize the impact perennial weeds have by eliminating top growth and providing competition from desired vegetation to exhaust the root system. An integrated approach that uses tillage, cover crops and effective herbicides has proven to be the most effective way to reduce populations of problem weeds. This chapter provides a summary of over three decades of public research that has investigated management strategies for some of the most challenging weed species.

CROP ROTATION

A number of long-term studies have demonstrated that the density of perennial weeds increases under monoculture cropping system compared to cropping rotations consisting of three or more crops.

COVER CROPS

The inclusion of cover crops such as rye, red clover, buckwheat and oilseed radish or overwintering crops like winter wheat or forages in the cropping system will suppress perennial weed growth and reduce seed production of annual and perennial weeds. Fast growing crops or crops exhibiting allelopathic properties will also suppress weed growth. It is best to kill off a lush cover crop prior to winter so that the above ground biomass can decompose prior to planting in the spring.

TILLAGE SYSTEMS

The type of tillage implement used and the depth at which the ground is tilled has been shown to influence the density of perennial and biennial weeds. No-till systems are more likely to increase perennial weed populations due to a lack of underground root disruption. Deep tillage (greater than 15 cm) with a moldboard plough has been shown to decrease populations of Canada thistle and perennial sowthistle. The choice of tillage system used on any particular field should be based primarily on the soil type and slope of the land so as to minimize erosion. Its benefits to weed control should only be taken advantage of when it has the sustainability of the top soil as the priority.

HERBICIDE SELECTION

In general, the use of post-emergence herbicides results in more successful top growth control of perennial and biennial weeds compared to pre-emergence herbicides. The strategy with in-crop post-emergence herbicides is to kill off top growth so that the perennial plant must use its root reserves to generate new top growth. Every opportunity should be made to apply a systemic herbicide (e.g., glyphosate) in the fall months, as the combination of shorter day lengths and cooler temperatures triggers many perennial weeds to begin allocating carbohydrates to the roots for over-wintering, which allows for translocation of a systemic herbicide down to the roots resulting in density reductions the next spring.

Below are the most successful herbicide strategies based on University of Guelph comparative research trials conducted over more than 20 years. Always refer to each product's label for specific details about the weed species which are controlled.

Alfalfa, volunteer (retired stand)

BEST STRATEGY

Autumn is the best time to terminate an old stand of alfalfa so that a suitable seedbed exists in the spring and volunteer plants are minimized. A moldboard plough is the most effective tillage implement. If in a minimum or no-till cropping system, glyphosate (360 g/L) at 2 L/acre tank-mixed with either 2,4-D Ester 700 at 520 mL/acre or Engenia at 400 mL/acre or Xtendimax/FeXapan at 680 mL/acre provides the most effective chemical control (>95%). If trying to terminate an old stand of glyphosate tolerant alfalfa, these tank-mixes will be equally effective. More details about these tank-mixes can be found in the forage crop section of this guide (Chapter 8).

CORN

Post-emergence applications of Engenia (200–400 mL/acre), Xtendimax (340–680 mL/acre), Distinct (115 mL/acre) or Marksman (1 L/acre). When either is tank mixed with Accent, Option or Ultim, control of volunteer alfalfa is improved. **Expectation for control:** 70%–75%.

FOR "ROUNDUP READY" CORN HYBRIDS

RU Xtend (2 L/acre) or glyphosate tank mixed with Engenia, Xtendimax or Marksman. **Expectation for control:** 80%–90%.

SOYBEAN

If fall herbicide applications have not been made in reduced tilled soybean, then the tank-mix of glyphosate (360 g/L) at 1 L/acre + 2,4-D Ester 700 at 320 mL/acre applied pre-plant provides the best control of alfalfa. **Expectation for control:** 75%–85%

Once soybean have emerged, volunteer alfalfa is virtually impossible to control. REFLEX or BLAZER will burn the leaf tissue of volunteer alfalfa but the plants will grow out of the injury in 2–3 weeks. Volunteer alfalfa is tolerant to all other post-emergence soybean herbicides. **Expectation for control:** 40%–50%

FOR "ROUNDUP READY" SOYBEAN VARIETIES

Control of volunteer alfalfa is listed on the ROUNDUP WEATHERMAX (540 g/L) label when applied at 1.87 L/acre. **Expectation for control:** 80%

FOR "ROUNDUP READY 2 XTEND" SOYBEAN VARIETIES

Control of volunteer alfalfa is listed RU Xtend label when applied at 2 L/acre. **Expectation for control:** 80%–90%.

CEREALS

In limited comparative trial work, cereal herbicides containing dichlorprop/2,4-D (e.g., ESTAPROP XT) and the PIXXARO co-pack have provided the best suppression of volunteer alfalfa. **Expectation for control:** 80%–90%

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Bindweed, field

CORN

Post-emergence with Engenia (400 mL/acre), Xtendimax (680 mL/acre) or Distinct (115 mL/acre) have provided the most consistent control of emerged field bindweed. **Expectation for control:** 75%-85%

IN "ROUNDUP READY" CORN OR SOYBEAN

Sequential applications of glyphosate (360 g/L) at 1 L/acre applied at the 2-3 leaf stage of corn and then again at the 7-8 leaf stage of corn to emerged field bindweed provided the most consistent level of control. Alternatively, a single application of glyphosate (360 g/L) at 2 L/acre provided comparable control to the sequential applications. **Expectation for control:** 75%-85%

IN "LIBERTY LINK" CORN

Suppression of top growth can be achieved when LIBERTY is applied twice, to emerged field bindweed. The first application typically being at the 3 leaf stage of corn and at a rate of 1 L/acre followed by a second application at the 7-8 leaf stage of corn at a rate of 0.8 L/acre. Alternatively you could tank-mix LIBERTY with dicamba (e.g., Engenia) and apply once to emerged field bindweed between the 2-6 leaf stage of corn.

SOYBEAN

Post-emergence applications of BLAZER at 1 L/acre or BASAGRAN FORTE at 0.9 L/acre can burn back the foliage of field bindweed when applied during periods of high heat, high humidity and adequate soil moisture. However, field bindweed will grow back. **Expectation for control:** 40%-50%

CEREALS

The challenge with field bindweed control in cereal crops is that the weed often emerges after the appropriate crop stage for herbicide applications. In winter wheat some producers have had success in applying bromoxynil/MCPA in the fall to suppress field bindweed growth the following spring. The single most important management practice that a grower can implement to reduce field bindweed is with either a pre-harvest glyphosate (360 g/L) application at 1 L/acre or an application of glyphosate (360 g/L) at 3-4 L/acre after cereal harvest, typically in mid to late September, after field bindweed has re-grown. Both application timings will decrease the level of field bindweed to manage in the following spring. A pre-harvest application is preferred if field bindweed is at a population density that is problematic for harvesting. Following cereal harvest, some farmers have had better success when tank-mixing 2,4-D Ester 700 at 0.67 L/acre with glyphosate (360 g/L) at 1.5 L/acre than using high rates of glyphosate.

Black medick

Refer to management strategies for ALFALFA, as they apply equally to Black medick.

Bur cucumber

CORN

Sequential applications provide the most consistent level of control. Either CONVERGE XT or PRIMEXTRA II MAGNUM should be applied pre-emergence followed by a post-emergence application of bromoxynil (e.g., PARDNER) + AATREX 480 or CALLISTO + AATREX 480. Bromoxynil + AATREX 480 is best applied when bur cucumber is at the 4-6 leaf stage of growth. **Expectation for control:** 85%-90%

IN "ROUNDUP READY" CORN

The most consistent bur cucumber control has been achieved when glyphosate (360 g/L) is applied twice to emerged bur cucumber, with the first application occurring at the 2-3 leaf stage of corn and the second at the 7-8 leaf stage of corn. Bur cucumber at the 4-6 leaf stage requires a glyphosate (360 g/L) rate of 2 L/acre to provide adequate control. **Expectation for control:** 85%-90%

SOYBEAN

Sequential applications provide the most consistent level of control. In comparative trials the best control of bur cucumber was achieved when SENCOR 75DF was applied pre-emergence at 0.6 kg/acre followed by an application of either CLASSIC/ CHAPERONE at 14 g/acre with a non-ionic surfactant at 0.2% v/v or PINNACLE SG at 4.8 g/acre with a non-ionic surfactant at 0.1% v/v to bur cucumber at the 4-6 leaf stage of growth. **Expectation for control:** 75%-80%

IN "ROUNDUP READY" SOYBEAN

Sequential applications of glyphosate (360 g/L) applied at the 1st trifoliate stage of soybean and then again at the 4th trifoliate stage of soybean provided the most consistent level of control. Bur cucumber at the 4-6 leaf stage requires a glyphosate (360 g/L) rate of 5 L/ha (2 L/acre) to provide adequate control. **Expectation for control:** 85%-90%

CEREALS

Typically not found in winter cereals as the crop produces enough ground cover to inhibit the germination of this summer annual weed. Cereal herbicides have not been evaluated. However in field corn, the active ingredient bromoxynil has shown to have reasonable activity on bur cucumber, therefore cereal herbicides that contain bromoxynil (e.g., BUCTRIL M, INFINITY) should provide some control of this species in cereals.

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Canada fleabane (glyphosate resistant)

CORN

Control of glyphosate resistant Canada fleabane has been most consistent with post-emergence herbicide applications but good control can be achieved with pre-emergence herbicides. Of the pre-emergence herbicides, INTEGRITY, MARKSMAN, CALLISTO + AATREX 480, BATTALION and ENGENIA/XTENDIMAX are all good options. Post-emergence applications of MARKSMAN, ENGENIA/XTENDIMAX, PARDNER + AATREX 480 and DISTINCT are also effective on glyphosate resistant Canada fleabane.

SOYBEAN

Glyphosate resistant Canada fleabane is most difficult to control in soybean because few options exist to control it once the soybean crop has emerged. Therefore it must be controlled prior to planting. When research trials were initially done, the pre-plant tank-mix of glyphosate + ERAGON + MERGE was the most effective option. However, as that treatment was evaluated over several seasons and locations, about one third of the time, glyphosate + ERAGON + MERGE failed to provide commercially acceptable control of glyphosate resistant Canada fleabane. To address this inconsistency, different tank-mix options were evaluated and over two seasons the addition of SENCOR 75 DF (metribuzin) at 215 g/acre to glyphosate + ERAGON + MERGE improved control of glyphosate resistant Canada fleabane. The equivalent rate of metribuzin in SENCOR 75 DF can also found in herbicides like CONQUEST LQ and CANOPY PRO.

IN "ROUNDUP READY 2 XTEND" SOYBEAN

The high rate of Engenia/Xtendimax or RU Xtend will provide good control of emerged Canada fleabane rosettes.

CEREALS

INFINITY is the most effective at controlling Canada fleabane in winter wheat, spring wheat and spring barley. PIXXARO and 2,4-D Ester can also provide good control. LONTREL 360 is also an effective option if growing spring wheat and barley.

POST HARVEST

Once the cereal crop is harvested, a greater amount of sunlight will hit the soil surface and will either stimulate new weed germination or growth of Canada fleabane that was suppressed by the cereal canopy. To minimize Canada fleabane seed being produced and returned to the soil, an aggressive cover crop (e.g., oats, rye, cover, oilseed radish) should be planted. Alternatively, fall tillage should be done no later than 4–6 weeks after harvest or before weed seed reaches maturity

Canada thistle

CORN

In comparative trials post-emergence applications of DISTINCT have provided excellent control of Canada thistle. ENGENIA/XTENDIMAX also have good activity on Canada thistle. CALLISTO + AATREX 480 will provide suppression. Expectation for control (with DISTINCT): 90% top growth control.

IN "ROUNDUP READY" CORN

Target actively growing Canada thistle at the rosette stage, no larger than 50 cm in height with an application of glyphosate (360 g/L) at 1 L/acre. It is not advisable to tank-mix DISTINCT + glyphosate because of increased risk of crop injury. **Expectation for control:** 90% top growth control

SOYBEAN

Consistent control of Canada thistle is difficult to obtain in non-GMO (conventional) soybean. In comparative trials CLEANSWEEP, BLAZER, PURSUIT or REFLEX + TURBOCHARGE were all capable of providing acceptable levels of top growth control when low populations of Canada thistle were present. However, all 4 products are inconsistent in their ability to deliver acceptable control with the most consistent product being CLEANSWEEP. **Expectation for control:** 55%–90% top growth control

IN "ROUNDUP READY" SOYBEAN

Target actively growing Canada thistle at the rosette stage, no larger than 50 cm in height with an application of glyphosate (360 g/L) at 1 L/acre. **Expectation for control:** 90% top growth control

CEREALS

The challenge with Canada thistle control in cereal crops is that the weed often emerges after the appropriate crop stage for herbicide applications. If emerged prior to the flag leaf stage of cereals, dichlorprop/2,4-D, TROPHY and MCPA Ester have provided the best top growth control. The single most important management practice that a grower can implement to reduce Canada thistle is with either a pre-harvest glyphosate (360 g/L) application at 1 L/acre or with an application of glyphosate (360 g/L) at 1.5 L/acre after cereal harvest, typically in mid to late September, after Canada thistle has re-grown to 20–25 cm and timed after the first light frost. Both application timings will decrease the level of Canada thistle to manage in the following spring. A pre-harvest application is preferred if Canada thistle is at a population density that is problematic for harvesting.

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Carrot, wild

CORN
PEAK applied post-emergence provides the best control of wild carrot. **Expectation for control:** 90%

IN "ROUNDUP READY" CORN OR SOYBEAN
The 2 L/acre rate of glyphosate (360 g/L) is needed to provide any meaningful control of wild carrot.
Expectation for control: 80%

SOYBEAN
GUARDIAN applied pre-plant has provided the best control of wild carrot. **Expectation for control:** 80%

CEREALS
PEAK + PARDNER or REFINE M applied post-emergence has provided the best control of wild carrot.

Chamomile, scentless

Scentless chamomile is extremely difficult to control once in its second year of growth. Successful management of this species relies on removing newly germinated plants. Since this species germinates and emerges in both the fall and spring, effective management must be initiated during both those emergence periods. Trying to control fall germinated scentless chamomile with selective herbicides in the spring often results in poor performance. Established plants are best controlled in the fall with either glyphosate (360 g/L) at 2 L/acre or tillage with a moldboard plough.

CORN
Ontario research has demonstrated that glyphosate (360 g/L) at 2 L/acre is the most effective herbicide at controlling top growth of scentless chamomile in glyphosate tolerant corn. A split application is more effective than a single application. In conventional corn, no herbicide evaluated provided over 50% control.

SOYBEAN
In limited Ontario trial work, glyphosate (360 g/L) applied pre-plant at 2 L/acre provided the best control of scentless chamomile. Certified crop advisors in the Niagara region have had success with the higher rate of glyphosate also, but two applications are required to provide season long control as one application tends to result in re-growth. Classic can also provide decent activity on scentless chamomile but has been inconsistent.

CEREALS
Refine SG has provided the best control of young seedlings in Ontario research trials followed by Buctril M, however two applications, one in the fall and the second in the spring, were needed to control newly emerged seedlings and provide season long control. New research in Western Canada has shown promising results with the combination of Pixxaro + Simplicity.

Clover, red

A lush stand of red clover, either as a cover or forage crop must be controlled in the fall if the intention is to plant a field crop in the spring. If one waits until the spring to control a stand of red clover, the level of control will not be as good and it will take that thick biomass at least 3-4 weeks to decompose enough to make a suitable seedbed. A fall moldboard plough is the only type of tillage that effectively buries a red clover stand. For minimum till cropping systems, a fall application of glyphosate (360 g/L) at 1.5 L/acre + either ENGENIA (200 mL/acre), XTENDIMAX (340 mL/acre) or DISTINCT at 115 g/acre is the most effective way to remove a red clover stand.

CORN

If glyphosate + dicamba was not applied in the fall, then it should be applied in the spring 2 weeks prior to corn planting. If red clover plants have escaped tillage treatments, such volunteer plants can be controlled with post-emergence applications of either ENGENIA (200 mL/acre), XTENDIMAX (340 mL/acre) or DISTINCT at 115 g/acre. When these broadleaf herbicides are tank mixed with ACCENT, OPTION or ULTIM, control is improved. CALLISTO + AATREX 480 when applied post-emergence can also provide good control. **Expectation for control:** 95%

IN "ROUNDUP READY" CORN

Any of the broadleaf herbicides effective on red clover in conventional corn can be tank mixed with glyphosate. It is not advisable to tank-mix DISTINCT + glyphosate because of increased risk of crop injury. **Expectation for control:** 95%

SOYBEAN

Once soybean have emerged, red clover is virtually impossible to control. REFLEX or BLAZER will burn the leaf tissue of red clover but the plants will grow out of the injury in 2-3 weeks. Red clover is tolerant to all other post-emergence soybean herbicides. **Expectation for control:** 40%-50%

IN "ROUNDUP READY" SOYBEAN

Without any fall control of red clover, glyphosate (360 g/L) at 2 L/acre applied pre-plant provides the best level of control. **Expectation for control:** 85%

If red clover escapes the pre-plant treatment, glyphosate (360 g/L) at 1.5 L/acre applied post-emergence should provide adequate control. **Expectation for control:** 80%-85%

IN "ROUNDUP READY 2 XTEND" SOYBEAN

RU Xtend or ENGENIA/XTENDIMAX + glyphosate will control emerged red clover.

CEREALS

The under-seeding of red clover in cereals has numerous benefits and is desired. Therefore if controlling weeds in a winter wheat crop under-seeded to red clover, herbicides which minimize clover injury should be used. Bromoxynil/MCPA, MCPA sodium, and MCPA/MCPB products are all registered for use on winter wheat under-seeded to red clover.

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Dandelion

CORN

A tank-mix of OPTION or ULTIM + DISTINCT has provided the best control of dandelion in comparative trials. DISTINCT applied alone provides less visual control then when tank mixed with OPTION or ULTIM. **Expectation for control:** 75%-85%

IN "ROUNDUP READY" CORN

Glyphosate (360 g/L) applied at 2 L/acre provides suppression of dandelion. The practice of tank-mixing ENGENIA/XTENDIMAX, MARKSMAN or CALLISTO + AATREX 480 with glyphosate has not improved the level of dandelion control in limited comparative trials. **Expectation for control:** 65%-70%

SOYBEAN

GUARDIAN applied pre-plant has provided the best control of dandelion in comparative trials with visual control roughly 10% higher than what GUARDIAN PLUS has provided.

CEREALS

Comparative trials have shown that INFINITY and dichlorprop/2,4-D products have provided the best control of larger dandelions; however results can be inconsistent especially under dryer soil conditions (visual control range of 50%-95%). Smaller dandelions can be suppressed with REFINE M and 2,4-D (visual control range of 40%-75%). The optimal time to control dandelions is post cereal harvest with glyphosate (360 g/L) applied typically in mid-September to early October at a rate of 2 L/acre.

Horsetail, field

CORN

The most effective herbicide treatment for field horsetail in recent University of Guelph research has been the combination of BROADSTRIKE RC at 25 g/acre + MCPA Amine (500 g/L) at 0.4 L/acre. However, this treatment MUST be applied before the 4 leaf stage of corn to minimize crop injury and yield loss. When this tank-mix combination has been applied to corn past the 4 leaf stage, significant crop injury occurs and has resulted in yield losses as great as 44 bu/acre, which was more than any yield loss associated with field horsetail competition. **Expectation for control:** 80%

SOYBEAN

Glyphosate (360 g/L) at 1 L/acre + BROADSTRIKE RC at 35 g/acre applied pre-plant to soybean has provided the best control of field horsetail. However, susceptibility of field horsetail to this treatment varies significantly by population. **Expectation for control:** 45%-99%

CEREALS

Comparative trials have shown that any cereal herbicide that contains the active ingredient MCPA will provide very effective top growth control of field horsetail.

Horse-nettle

CORN

Post-emergence applications of ULTIM tank mixed with either DISTINCT, ENGENIA/XTENDIMAX, MARKSMAN or PEAK has provided the best control in comparative trials. **Expectation for control:** 75%–95% top growth control

IN "ROUNDUP READY" CORN OR SOYBEAN

Two 1 L/acre applications of glyphosate (360 g/L), the first at the 2-3 leaf stage of corn and the second at the 7-8 leaf stage of corn provide the most consistent level of control. A single application of glyphosate (360 g/L) applied at a rate of 2 L/acre also provides control but not as consistent as the two application strategy. **Expectation for control:** 90%–95%

SOYBEAN

FIRSTRATE post-emergence is the only herbicide to provide suppression of horse-nettle in non-GMO (conventional) soybean. **Expectation for control:** 70%–85% top growth control

CEREALS

There has been no public research done on horse-nettle susceptibility to cereal herbicides. However, limited field experience would suggest that dichlorprop/2,4-D products (e.g., ESTAPROP XT) have some activity on horse-nettle. The single most important management practice that a grower can implement to reduce horse-nettle is with either a pre-harvest glyphosate (360 g/L) application at 1 L/acre or with an application of glyphosate (360 g/L) at 2 L/acre after cereal harvest, typically in mid to late September, after horse-nettle has re-grown. Both application timings will decrease the level of horse-nettle to manage in the following spring. A pre-harvest application is preferred if horse-nettle is at a population density that is problematic for harvesting.

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Nutsedge, yellow

Pre-plant incorporated (PPI) applications of either DUAL II MAGNUM at 0.7 L/acre or FRONTIER MAX at 0.56 L/acre will suppress nutsedge growth. If either product is not applied PPI, nutsedge control will be reduced. A post-emergence application of PERMIT at 28-38 g/acre + non-ionic surfactant at 0.25% v/v provides the best control of yellow nutsedge. **Expectation for control:** 60%-80%

IN "ROUNDUP READY" CORN

Nutsedge control with glyphosate is greatly affected by rate. A single application of glyphosate (360 g/L) applied at a rate of 2 L/acre will provide around 80% visual control of nutsedge whereas the 1 L/acre rate will typically provide less than 60% visual control A tank-mix of PERMIT at 19-38 g/acre + glyphosate (360 g/L) at 1 L/acre + non-ionic surfactant at 0.25% v/v provides the best control of yellow nutsedge. **Expectation for control:** 70%-80%

SOYBEAN

CLASSIC/CHAPERONE at 14 g/acre + non-ionic surfactant at 0.2% v/v applied post-emergence has provided the best control of nutsedge in comparative trials. In fields with tremendous nutsedge pressure, some producers have opted to pre-plant incorporate either DUAL II MAGNUM or FRONTIER MAX at their highest labelled rate and then apply CLASSIC/ CHAPERONE post-emergence in soybean. **Expectation for control:** 90%

IN "ROUNDUP READY" SOYBEAN

GUARDIAN applied post-emergence to nutsedge has continually provided the best visual control. A single application of glyphosate (360 g/L) applied at 2 L/acre will also provide control of nutsedge but consistently 10%-20% less than GUARDIAN. **Expectation for control:** 95%

Sow-thistle, perennial

CORN

In comparative trials post-emergence applications of ENGENIA/XTENDIMAX, MARKSMAN or PEAK have all provided good control of perennial sow-thistle. **Expectation for control:** 80%-90% top growth control

IN "ROUNDUP READY" CORN

Glyphosate (360 g/L) applied post-emergence at 2 L/acre will provide good top growth control of perennial sow-thistle. It is not uncommon for perennial sow-thistle to re-grow after an application of glyphosate, therefore requiring follow-up applications. Tank-mixing glyphosate with ENGENIA/XTENDIMAX, MARKSMAN or PEAK can deter perennial sow-thistle re-growth. **Expectation for control:** 85%-95% top growth control

SOYBEAN

In comparative trials all post-emergence soybean herbicides can periodically provide some level of perennial sow-thistle control however none do consistently. CLEANSWEEP, BLAZER at 1 L/acre, BASAGRAN FORTE at 0.9 L/acre and CLASSIC provide top growth control, but typically sow-thistle will re-grow and be present at harvest. Pre-harvest glyphosate applications will have more impact on reducing perennial sow-thistle populations than any in-crop herbicide. **Expectation for control:** 50%-70% top growth control

IN "ROUNDUP READY" SOYBEAN

Glyphosate (360 g/L) applied post-emergence at 2 L/acre will provide good top growth control of perennial sow-thistle. It is not uncommon for perennial sow-thistle to re-grow after an application of glyphosate, therefore requiring follow-up applications. **Expectation for control:** 85%–95% top growth control

CEREALS

The challenge with perennial sow-thistle control in cereal crops is that the weed often emerges after the appropriate crop stage for herbicide applications. If emerged during the tillering to nodal stage of cereals, dichlorprop/2,4-D (e.g., ESTAPROP XT), PIXXARO, TROPHY and MCPA Ester have provided good top growth control. The single most important management practice that a grower can implement to reduce perennial sow-thistle is to use either a pre-harvest glyphosate (360 g/L) application at 1 L/acre or with an application of glyphosate (360 g/L) at 2 L/acre after cereal harvest, typically in mid to late September, after perennial sow-thistle has re-grown. Both application timings will decrease the level of thistles to manage in the following spring. A pre-harvest application is preferred if perennial sow-thistle is at a population density that is problematic for harvesting.

Vetch, tufted

CORN

In comparative trials either ENGENIA/XTENDIMAX, DISTINCT or CALLISTO + AATREX have all provided good top growth control of tufted vetch. **Expectation for control:** 80%–90%

IN "ROUNDUP READY" CORN

The 2.8 L/acre maximum rate of glyphosate has only provided 70% visual control of vetch in University of Guelph dose response trials. Tank-mixes of CALLISTO + AATREX, MARKSMAN or ENGENIA/XTENDIMAX with glyphosate have provided the best level of vetch control in comparative trials. **Expectation for control:** 85%–95%

SOYBEAN

It is extremely difficult to control a perennial legume weed in an annual legume crop. Of all the herbicide programs tested over the past 10 years, a "two-pass" strategy of applying DUAL II MAGNUM + SENCOR pre-mergence followed by REFLEX post-emergence has provided the best suppression of vetch. If vetch has emerged prior to planting, University of Guelph research has shown that the addition of 2,4-D Ester 700 at 320 mL/acre tank mixed with glyphosate and applied 7 days prior to planting can provide good early season control of vetch.
Expectation for control: 50%–70%

IN "ROUNDUP READY 2 XTEND" SOYBEAN

The high rate of Engenia/Xtendimax or RU Xtend will provide good control. **Expectation for control:** 80%

CEREALS

The challenge with vetch control in cereal crops is that the weed often emerges after the appropriate crop stage for herbicide applications. If emerged during the tillering to nodal stage of cereals, TROPHY, 2,4-D Ester, MCPA Ester and dichlorprop/2,4-D (e.g., ESTAPROP XT) have all provided some level of top growth control. Post-harvest herbicide applications made before the first frost (vetch is sensitive to cold air temperatures and is one of the first species to die off in the fall) are advantageous in decreasing the level of vetch to manage in the following spring. In limited comparative trial work, glyphosate (360 g/L) at 2 L/acre tank mixed with either DISTINCT or ENGENIA/XTENDIMAX significantly reduced the amount of vetch that emerged the following spring and into the summer.

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Waterhemp (glyphosate resistant)

In both corn and soybean, control of glyphosate resistant waterhemp is best achieved with a two-pass herbicide program.

CORN

ACURON and LUMAX applied pre-emergence has provided the most consistent control. CALLISTO + AATREX 480, MARKSMAN or VIOS G3 + the low rate of ENGENIA/XTENDIMAX provide good control of emerged waterhemp. **Expectation for control:** 80%–90%

SOYBEAN

FIERCE, AUTHORITY SUPREME or BOUNDARY LQD applied pre-emergence provides good early season control of waterhemp. Post-emergence applications of BLAZER or REFLEX provide the best control of emerged waterhemp. **Expectation for control:** 80%–90%

CEREAL

INFINITY applied post-emergence has provided excellent control in limited Ontario field trials.

Wire-stemmed muhly

CORN

OPTION 2.25 OD provides the best control. **Expectation for control:** 80%–95%

IN "ROUNDUP READY" CORN OR SOYBEAN

Target actively growing wire-stemmed muhly that is 10–20 cm in height with an application of glyphosate (360 g/L) at 1 L/acre. **Expectation for control:** 80%–95%

SOYBEAN

If wire-stemmed muhly has emerged before planting, a pre-plant burndown with glyphosate (360 g/L) at 1 L/acre should be made. For wire-stemmed muhly that has emerged in the soybean crop, VENTURE at 0.8 L/acre will provide the best suppression/control of wire-stemmed muhly. **Expectation for control:** 75%–95%

CEREALS

There are no products available in cereals that will control wire-stemmed muhly. The single most important management practice that a grower can implement to reduce this weed is to use either a pre-harvest glyphosate (360 g/L) application at 1 L/acre or an application of glyphosate after cereal harvest, typically in mid to late September, after wire-stemmed muhly has re-grown. Both application timings will decrease the level of wire-stemmed muhly to manage in the following spring. A pre-harvest application is preferred if wire-stemmed muhly is at a population density that is problematic for harvesting.

CHAPTER 14: DIFFICULT TO CONTROL WEEDS

Abbreviations

ABBREVIATIONS

Abbreviations used throughout this guide

APPLICATION TIMING ABBREVIATIONS

- **PP or "pre-plant":** herbicide applications are made prior to planting the crop.
- **PPI or "pre-plant incorporated":** herbicide applications are made prior to planting the crop and are incorporated into the soil with a tillage pass that is typically not deeper than 10 cm.
- **PRE or "pre-emergence":** herbicide applications are made before crop and weed emergence and usually after the crop has been planted.
- **POST or "post-emergence":** herbicide applications are made after crop and weed emergence unless otherwise specified

HERBICIDE FORMULATION ABBREVIATIONS

- **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

ABBREVIATIONS

HERBICIDE RESTRICTION ABBREVIATIONS

- **PHI =** pre-harvest interval refers to the amount of time that must lapse (in days) after a pesticide application before the crop is harvest. The PHI is a function of a pesticide's use pattern and of the amount of pesticide residues allowed on the crop at harvest. Residue levels on a crop are affected by the crop's growth, by environmental conditions (such as rain or UV radiation) and by the microorganisms on the plants and in the soil. The PHI must therefore be long enough to allow for the pesticide residues in the harvested crop to degrade to a level that is acceptable.
- **REI =** Restricted Entry Interval and is the period of time 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 the REI is not stated on a label, use a 12 hour REI.
- **WSSA Group =** 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

OTHER HERBICIDE RELATED ABBREVIATIONS

- **a.i. =** active ingredient
- **a.e. =** acid equivalent. The acid portion of the active ingredient. Rates of acid-based herbicides (2,4-D, dicamba and glyphosate) should be expressed as acid equivalents per unit area.
- **Class =** Refers to the numeric classification of pesticides under Regulation 63/09 of the Pesticides Act (Ontario legislation). The majority of herbicides shown in this guide are from classes 2, 3 and 4. Therefore growers must be certified through the Grower Pesticide Safety Course in order to buy and use Class 2 and 3 pesticides on their farms.
- **PCP # =** 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.

Emergency and First-Aid Procedures for Pesticide Poisoning

For pesticide poisonings and pesticide injuries, call the poison Information Centre: Toronto 1-800-268-9017

PREVENT ACCIDENTS

- Read the label. Follow all the precautions the label recommends. Read the First Aid section of the label BEFORE you begin to handle any pesticide.
- Make sure that someone knows what pesticides you are working with and where you are.
- Keep a file of labels and product Material Safety Data Sheets (MSDS) for the pesticides you use.
- Make sure everyone knows where to find this in case of an emergency.
- Post emergency numbers near all telephones.
- Keep clean water, paper towels, extra gloves and clean coveralls close by in case you spill pesticide on yourself.
- If someone has been working with pesticides and you see any possible symptoms of pesticide poisoning or injury, take emergency action immediately.

IF AN ACCIDENT OR POISONING HAPPENS

- Protect yourself from injury first.
- Stop the exposure to the pesticide. Move the victim away from the contaminated area.
- Check the four basic facts– identify the pesticide, the quantity, the route of entry and time of exposure.
- Call an ambulance or the Poison Information Centre.
- Start first aid. This is not a substitute for professional medical help.
- Provide the label, MSDS sheet or container to emergency personnel at the scene– or take it with you. to the hospital. Do not transport pesticide containers in the passenger compartment of the vehicle.

FIRST AID

If a pesticide comes in contact with skin:

- remove all contaminated clothing; wash skin thoroughly with lots of soap and warm water.
- dry skin well and cover with clean clothing or other clean material.

If pesticide comes in contact with eyes:

- hold eyelids open; wash the eyes with clean running water for 15 minutes or more.

If pesticide was inhaled:

- move the victim to fresh air and loosen tight clothing.
- give artificial respiration if the victim is not breathing.

Do not breathe in the exhaled air from the victim– you could also be poisoned.

If a pesticide was swallowed:

- call the Poison Information Centre **IMMEDIATELY**. Emergency numbers are listed at the front of each Bell telephone directory.

For a major spill, a theft or a fire involving a pesticide: Call the Ministry of the Environment and Climate Change Spills Action Centre at 1-800-268-6060 (24 hr a day, 7 days a week).

Notify your municipality.

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- 416-326-5300
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Published by the Ministry of Agriculture, Food and Rural Affairs

© Queen's Printer for Ontario, 2019

ISSN 2561-5378 (Print)
ISSN 256-53386 (Online)
03-19

ontario.ca/crops

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