

# Guide to Crop Protection 2018

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**Table 1: Metric Conversion Factors\* (Approximate)**

Metric Unit	Metric to Imperial	Imperial Unit	Imperial to Metric	Metric Unit
Linear centimetre (cm)	x 0.39	Linear inch	x 2.54	Linear centimetre (cm)
Area square metre (m <sup>2</sup> ) hectare (ha)	x 1.2 x 2.5	Area square yard acres	x 0.84 x 0.4	Area square metre (m <sup>2</sup> ) hectare (ha)
Volume litre (L)	x 0.22	Volume gallon	x 4.55	Volume litre (L)
Pressure kilopascals (kPa)	x 0.14	Pressure psi	x 6.9	Pressure kilopascals (kPa)
Weight gram (g) kilogram (kg)	x 0.04 x 2.2	Weight ounce (oz) pound (lb)	x 28.35 x 0.454	Weight gram (g) kilogram (kg)
Agricultural litres per hectare (L/ha) litres per hectare (L/ha) litres per hectare (L/ha) millilitres per hectare (mL/ha) kilograms per hectare (kg/ha) grams per hectare (g/ha)	x 0.089 x 0.357 x 0.71 x 0.014 x 0.89 x 0.014	Agricultural gallons/acre quarts/acre pints/acre fluid ounces (fl. oz)/acre pounds (lb)/acre ounces (oz)/acre	x 11.23 x 2.81 x 1.41 x 70.22 x 1.12 x 70	Agricultural litres per hectare (L/ha) litres per hectare (L/ha) litres per hectare (L/ha) millilitres per hectare (mL/ha) kilograms per hectare (kg/ha) grams per hectare (g/ha)

\*EXAMPLE: To convert centimetres to inches, multiply by 0.39; conversely, to convert inches to centimetres, multiply by 2.54.

CAUTION: Herbicide labels are in metric units only. Conversion between the Metric and Imperial system may result in confusion. It is recommended to use metric units only.

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# Introduction

## How to Use This Book

This publication is only a guide. Always refer to the product label for application details and precautions. If the information in this publication differs from the label information, follow label instructions.

The *Guide to Crop Protection* is divided into five chapters: (1) Introduction; (2) Weed Control; (3) Foliar Fungicides; (4) Seed Treatments; and (5) Insect Control.

To use the information in each of these sections, use the following process:

1. Turn to the charts at the beginning of each section. There is a set of charts for weeds, plant diseases and insect control. Select the chart for the crop you want or plan to grow. Use the chart to match your weed, disease or insect problems with the products available for that crop.
2. Once you have narrowed your product choices down to a few candidates, go to the recommendation section for that product. Products are listed alphabetically. Read the recommendations thoroughly for each product you are considering.
3. Read the product label attached to the container for detailed instructions on application.

This publication is intended to be used as a guide only. Information contained herein is that available at time of printing.

While every effort has been made to ensure accuracy, the provincial government does not accept responsibility for label changes. When more than one trade name is listed, not all weeds or tank mixes may appear on all labels. Consult product labels attached to pesticide containers for final detailed instructions.

Certain recommendations in this publication are given in quantity of commercial product per acre (mL, L, g or kg/acre). Product labels are given in quantity of product per hectare (mL, L, g or kg/ha). To avoid application errors be sure to read and understand label recommendations.

The *Guide to Crop Protection* includes the most recent recommendations for weed, plant disease and insect control in field and forage crops. These recommendations are based on the uses registered under the Pest Management Regulatory Agency's *Pest Control Products Act*. It is an offence under *The Pest Control Products Act* to apply any chemical in a manner not consistent with the product label. If you have any doubts regarding the instructions in this publication, or on the product label, contact the company representative, your local agricultural office or the Pest Management Regulatory Agency for further advice.

## Product Labels and PCP Numbers

On each Product Page you will see a Registration or PCP number, so named because it is mandated by the *Pest Control Products Act*. Under the Act, every pesticide requires a unique identifier – the product's Registration or PCP number. That number must also appear on the product's label.

**The pesticide label packaged with the product** is the authoritative source of information on use of the product and will contain more detailed information than is included in this Guide. Some products have a number of trade names for the same active ingredient. However, each product will have its own Registration (PCP) number and these appear next to the registrants' names. Users who are seeking more detailed information than is provided in this guide, prior to purchase, can use the Registration (PCP) number to access a sample product label online through the Pest Management Regulatory Agency's (PMRA) website or they can contact the PMRA Hotline by phone at 1-800-267-6315.

Visit <http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php> to access the Electronic Label Search Tool. The PMRA Product Information database can be searched by a product's trade name, active ingredient, company name or Registration (PCP) number. Since several products can contain the same active ingredient and there are often several versions of the same or similar labels on this database, using the PCP number is the most direct route to finding the label that links to the product page in this Guide. **There may be some differences between a label found on the package and the sample labels found on the PMRA-Label Search web site so always refer to the packaged product label when applying the product.**

Once the product is located, you may click on its number to view an Adobe Acrobat (PDF) document containing the label and any supplemental registrations. Some of these documents run to many pages but you can use the 'Find' capabilities of the Acrobat Reader plug-in for your browser to jump to specific areas of interest. If you do not have Adobe Acrobat Reader installed on your computer, you can download a free version from [www.adobe.com](http://www.adobe.com).

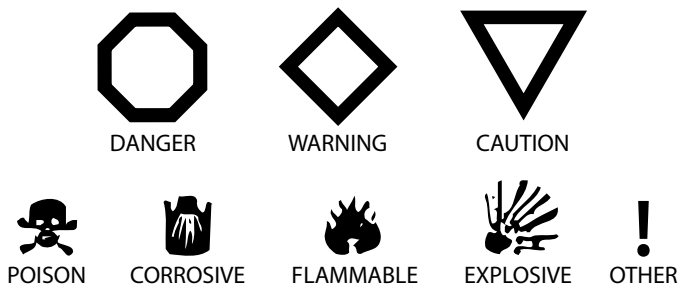
## Safe Use of Herbicides, Fungicides and Insecticides

Herbicides, fungicides and insecticides are classified according to the use hazard and risk involved. The categories of hazard are:

- toxicity
- flammability
- explosive potential
- corrosivity
- other




The degree of risk is represented by symbols taken from common traffic sign shapes represented by the stop, caution and yield signs. The signal word for each of the signs is danger (high risk), warning (moderate risk) and caution (low risk). Where the risk is minimal, no designation is required. The label on the container will carry the appropriate signs for the protection of the user. Degree of risk symbols for herbicides, insecticides and fungicides used in field and forage crops are included in the product directory. The symbols are illustrated in Figure 1.

Figure 1. Degree of Risk and Hazard Symbols



LD<sub>50</sub> values are used to rate the toxicity of pesticides. The LD<sub>50</sub> refers to the dose of pesticide (in mg per kg of the test animal's body weight) that is lethal to 50 percent of the group of test animals. For example, if a pesticide has an LD<sub>50</sub> value of 10 mg/kg, and the test animals each weigh 1 kg, then 50 percent of the animals would die if they each ate 10 mg of the pesticide.

Table 2. Oral LD<sub>50</sub> Values as they relate to the Risk/Hazard Symbols

 <b>DANGER POISON</b> LD <sub>50</sub> less than 500 mg/kg Indicates high toxicity	 <b>WARNING POISON</b> LD <sub>50</sub> 500-1,000 mg/kg Indicates moderate toxicity
 <b>CAUTION POISON</b> LD <sub>50</sub> 1,000-2,500 mg/kg Indicates low toxicity	<b>SYMBOL ABSENT</b> LD <sub>50</sub> greater than 2,500 mg/kg Indicates very low toxicity

Different types of protective equipment are required for pesticides that differ in toxicity. Special equipment requirements are described on the product label, but in general the following precautions must be taken when using pesticides of different hazard ratings.

- **Danger Poison** – requires goggles, respirator, gloves and skin protection, avoid fumes and spray mist.
- **Warning Poison** – requires goggles, gloves and skin protection, avoid fumes and spray mist.
- **Caution Poison** – requires gloves and skin protection, avoid fumes and spray mist.

The absence of a hazard symbol on a pesticide label indicates low toxicity to mammals. Nevertheless, protective clothing should be worn when using pesticides that do not have a hazard symbol.

## Protecting Yourself from Exposure to Herbicides, Fungicides and Insecticides

The use of protective equipment and sound safety procedures will help minimize your exposure to herbicides, fungicides and insecticides. Follow the 10 rules for safe application listed below, and wear the safety equipment recommended.

### 10 Rules for Safe Application

1. Never smoke or eat while applying pesticides.
2. Avoid inhaling sprays or dusts. Wear protective clothing and a respirator.
3. Sprayer lines carrying chemicals should not enter the operator's cab.
4. Have soap, water and a towel available. Should concentrated product spill on skin, hands, face or eyes, wash immediately.
5. Wash hands and face when leaving the treated area, before break periods, lunch or urination.
6. Bathe or shower and change into clean clothing after working with pesticides. Wash clothing each day before re-use.
7. Call a physician or get the patient to a hospital immediately if symptoms of illness occur during or shortly after pesticide application. Be sure to take along the product label or container.
8. Store pesticides out of reach of children and where there is no chance of contact with human food or livestock feeds. Do not store herbicides with insecticides and avoid cross-contamination. Storage areas should be locked.
9. Keep chemicals in their original containers, never in unmarked containers or bottles used for food or drink.
10. Follow proper container disposal methods. All containers should be triple rinsed or pressure rinsed, punctured to render the container non-reusable, and delivered to designated disposal sites.



## Protective Clothing

Wear protective equipment as described in the chart to reduce exposure.

EQUIPMENT	PROTECTION	HOW TO WEAR IT
Coveralls	<p>There are two types of coveralls: disposable and reusable.</p> <p>Disposable coveralls are lightweight and comfortable on warm days. They can be worn for mixing and applying pesticides, then discarded at the day's end. If they become contaminated, they should be discarded at once.</p> <p>The second type of coverall is made of washable fabric and may be reused many times. These fabric coveralls are adequate for use with all but the most highly toxic and concentrated pesticides.</p>	<p>Button (or zip) right up to the neck. Loose coveralls around the neck will suck and blow pesticide in and out of the interior of the coveralls as you bend and move.</p> <p>Wear coveralls over a long-sleeved shirt and pants.</p>
Aprons	<p>When pouring or otherwise handling concentrated pesticides, it makes good sense to wear protection in the form of an apron. The apron protects the front of your body from spills or splashes of the concentrate.</p> <p>The apron should be made of rubber or synthetic liquid-proof material that will resist the solvents.</p>	<p>Make sure the apron covers your body from your chest to your boots.</p>
Gloves	<p>Protect your hands by wearing chemical-resistant gloves. Neoprene gloves provide the best protection. Natural rubber gloves may be used when handling organo-phosphorus or carbamate pesticides. Be sure that they are designed for use with solvents and pesticides. Never use lined gloves, gloves with wristbands or leather gloves.</p>	<p>Put gloves on and roll up the first inch or two of the cuff. That way when you lift your hands, any liquid on the gloves won't drip down your arms.</p>
Hats	<p>Use a chemical-resistant hat, preferably made of washable plastic. The hat may be a hard hat or made of flexible plastic. In either case, it should have a plastic sweatband. Wash and dry entire hat after each use and before storing. Ordinary baseball caps with cloth sweatbands are dangerous as they absorb the pesticide and recontaminate the forehead each time you wear them. Even small amounts of moderately or slightly toxic pesticides may cause severe skin irritation or other illness if exposure continues for several days.</p>	
Boots	<p>Wear chemical-resistant, unlined boots. These boots are available in a variety of styles and materials.</p> <p>Neoprene boots are the best. Knee-length boots offer greater protection because they extend above the lower end of the apron. Avoid leather or fabric boots and shoes because these will absorb pesticides and cannot be cleaned effectively.</p>	<p>Wear your pant legs outside the top of your boots. This will prevent spills and splashes from running into the boot and onto your leg.</p>

## Protecting Your Eyes, Face and Lungs

Wear the following equipment to protect your facial area from exposure.

EQUIPMENT	PROTECTION	HOW TO WEAR IT
Goggles	<p>Chemical-resistant goggles keep your eyes safe from both splashing and, if using dry formulations, dusts or granules. Don't use goggles with cloth or elastic headbands as these will absorb pesticides.</p>	<p>Wear goggles snugly on your face so that the sides of your head are protected from splashes. If you wear glasses, make sure you purchase goggles that fit snugly over them. Never wear contact lenses when working around pesticides.</p>

Respirators	Only NIOSH-approved respirators should be used. Do not exchange parts of different respirators. (For example, do not use a cartridge produced by Company "A" with a respirator produced by Company "B" as the combination may not provide adequate protection to the user). Dust masks are ineffective in protecting against herbicide vapours. Similarly, the filters on tractor cabs are intended to remove dust and are not designed to protect against herbicide vapours or mists. Chemical cartridge respirators are recommended for outdoor use when mixing and applying herbicides.	When carrying out operations, change filters each day. The cartridge should be replaced when chemical odour becomes apparent or when breathing becomes difficult. New cartridges should always be installed at the beginning of the spray season. Prior to commencing work, check the face seal while the respirator is on the wearer's face. Regardless of design, respirators cannot be worn securely by people wearing beards, moustaches or sideburns.
Face Shields	Goggles offer some protection, but frequently full-face protection is advised or required according to the pesticide label. It is especially important to protect your eyes and face when pouring or mixing liquid concentrates. Effective face shields are made of clear plastic.	Since the shield attaches to the hard hat, you can raise or lower it as needed.

## Understanding Maximum Residue Limit Statements in the Guide

To ensure the safety of Canadian food, maximum residue limits (MRLs) set the maximum allowable amount of a pesticide residue on a crop or in a processed crop product (e.g. oil or flour). Residue levels are typically assessed for pesticides registered on crops grown for food. MRLs even exist on imported food for pesticides or pesticide uses not registered in Canada.

Health Canada's Pest Management Regulatory Agency (PMRA) is responsible for setting MRLs in Canada. Similarly, importing countries set their own MRLs (also referred to as 'import tolerances') that Canadian crop exports are subject to. Trade issues between importing and exporting countries can arise due to variability in MRLs or a lack of established MRLs.

Crop pesticide uses that may contribute to trade irritations have been flagged on product pages in the Guide to Crop Protection with the statement: **'Note: As of January 1, 2018 <http://keepingitclean.ca> indicates that grain from crops treated with this product may have market access concerns. Please see pg 10 for more information AND consult potential grain buyer(s) before using this product.'** Manitoba Agriculture and Saskatchewan Ministry of Agriculture have included such statements on products uses with known or potential MRL issues. However, this may not be a complete list of product uses with potential trade issues.

Producers can follow these practices to help prevent exceeding MRLs:

- Read and follow product labels, especially with respect to registered crops, maximum application rates, maximum number of applications per season, crop stage and pre-harvest intervals.
- Talk to your commodity buyer before applying a pesticide, especially for new pesticide chemistries, new products and products registered on new crops.

More information on MRLs and 'flagged' products is available at <http://keepingitclean.ca/>.

## Avoiding Spray Drift

To minimize the risk of drift, follow these guidelines:

1. Do not spray in winds above 16 km/hr (10 m/hr).
2. Do not spray under dead calm conditions in early morning, night, or late evening. These are often associated with temperature inversions, and the combination of these factors can result in long-distance spray drift (2 km or more). Fog or dust that seems to hang in the air is a good indicator of an inversion.
3. Avoid nozzle pressures above 45 psi (310 kPa) for conventional flat fan tips.
4. Use a minimum of 45 L/acre water for all pesticides unless otherwise specified for the product.
5. Take note of buffer zones identified in the "Restrictions" section of this guide. Do not spray when the wind is blowing towards a nearby sensitive crop, shelterbelt, garden, or water body.
6. Use amine formulations of 2,4-D or MCPA where possible. Use special care when applying volatile herbicides (most herbicides in Group 3 and Group 4, particularly ester formulations). Avoid spraying these products on or immediately before hot days.
7. Ensure that air flow from air assisted sprayers is properly set to minimize airblast rebound and drift for different crop canopies.
8. Operate nozzles at their minimum recommended height. For 80° tips, this is 18" (45 cm), and for 110° tips, this is 12" (35 cm). Orienting nozzles forward allows further height reductions.
9. Special nozzles are now available that create coarse, low-drift sprays. Pre-orifice, Turbo-TeeJet, or venturi-type nozzles are available from a number of manufacturers, and these reduce drift by 50 to 95 percent. (Refer to the section entitled **Herbicide Efficacy with Low-Drift Nozzles**).
10. Consider equipping your sprayer with protective shrouds. A number of different designs are available that can reduce drift between 35 and 75 percent.
11. Reduce travel speeds. Rapid air movement over nozzle tips increases the risk of fine droplets prone to drift and turbulence from the sprayer itself can increase the uncertainty of spray deposition.

For more information on reducing drift, see the website: [www.Sprayers101.com](http://www.Sprayers101.com).

## Herbicide Efficacy with Low-drift Nozzles

A number of low-drift nozzles are now available from different suppliers. Well established nozzles, such as the Turbo TeeJet, reduce drift by about 50 percent and provide equivalent efficacy to a standard flat fan nozzle. Newer nozzles (“venturi” types) are best known for their dramatic ability to reduce drift (50 to 95 percent). Research suggests that these nozzles perform well at conventional carrier volumes, travel speeds, and product rates. Some aspects require special attention:

**Pressure:** Some venturi-type nozzles require higher pressures to operate properly. Below 40 psi (275 kPa), patterns for these designs may deteriorate rapidly resulting in poor overlaps and erratic control. Design improvements have resulted in venturi nozzles that require less pressure to operate effectively. When using automatic rate controllers, make sure your pressures match the recommended pressure ranges for good nozzle performance.

**Water Volume:** Droplet size becomes more important at lower water volumes. Little is known about low-drift nozzle performance at or below 5 gal/acre (23 L/acre). Since low-drift nozzles generate fewer droplets than conventional nozzles, ensure that water volumes are high enough for coverage when using coarse sprays.

**Weed Type:** Difficult-to-wet weeds, such as wild oats, green foxtail, lamb’s-quarters, and cleavers, typically require finer sprays for effective coverage. When using venturi nozzles on these weeds, make sure your pressure is high enough to achieve good coverage. Larger weeds and reduced product rates typically make chemical control more difficult, and these conditions may also reveal some performance differences between nozzles.

**Herbicide Type:** Herbicides that belong to herbicide Groups 2, 4, and 9 perform well with venturi nozzles, even at normal pressures (40 psi). Application of herbicides in Groups 1, 6, 8, 10 and 14 may require higher pressures with venturi nozzles to maintain good performance, especially under challenging conditions. Wild oat control may be reduced with the coarsest sprays, even when applied at high pressure.

Check with your chemical representative to see if the manufacturer supports the use of low-drift nozzles with their products.

More information is available in the factsheet “Pesticide Application and Choosing the Right Nozzles,” available from your local extension office or at the Saskatchewan Ministry of Agriculture Website: [Saskatchewan.ca/agriculture](http://Saskatchewan.ca/agriculture).

## Handling a Drift Complaint

When spray drift occurs, it is important to take the right steps to resolve the complaint. If you suspect that your crop or property has been damaged because of spray drift, use the following guidelines for resolving the situation.

1. Contact the suspected applicator as soon as possible. View the damage with the suspected applicator and determine if that person did, in fact, cause the damage.
2. Are you sure that the symptoms or damage you see has been caused by spray drift? Contact your local agriculture office or agronomist to discuss the injury symptoms.
3. If the damage was caused by the applicator, determine the extent of the damage and the level of compensation (if any) with the applicator.
4. If the situation cannot be resolved quickly because of disagreements on the extent of damage, cause of the

damage, or level of compensation, contact your local agricultural office to discuss options on how to proceed. Documentation will be required, particularly if insurance companies are involved.

5. The involvement of a private consultant is recommended if documentation is required. Required documentation often includes samples of the damaged plants, photographs, and yield comparisons to determine losses. Your agricultural office can provide you with a list of private consultants in your area.
6. The best approach is to start an open and honest line of communication with the suspected applicator. The majority of drift complaints are resolved quickly and efficiently by communicating with the applicator, without the involvement of outside parties.

## Mixing Pesticides

The ability to control a broad range of weeds or other pests in one pass is the advantage that a mix of two or more products allows. If tank mixing is not done in the correct order, the result could be a tank-load of material that may not control the target pests, cause injury to the crop, plug nozzles, or leave an undesirable residue in the tank that will require extensive cleaning. Mistakes like these are costly, could put the user at unnecessary risk of exposure to the products, or create an environmental disposal problem.

To avoid mixing that may result in incompatibilities, **always consult the label of the products that are being used** to learn the correct order. **Remember to add all like components at the same stage of mixing.** The list below is a general rule-of-thumb for mixing pesticides:

1. Fill the spray tank with 1/4 to 3/4 the amount of water required for the application and turn on the sprayer agitation. Check the products that are being used for the correct amount to add. Once agitation has begun, maintain until the tank is emptied.
2. Add any water conditioner (fertilizer or pH adjuster) additives to the tank.
3. Add any wettable powders, or water dispersible granules (DF, DG, or WDG). Add dry products slowly to prevent clogged return lines. Allow sprayer to agitate for a few minutes, allowing the product to become completely suspended in the tank, before adding the next component.
4. Shake any containers of liquid pesticide thoroughly before adding to ensure they are well mixed.
5. Add any oil dispersions (OD) or flowable liquid suspensions (F, SC) to the tank. Allow to mix.
6. Add emulsifiable concentrates (EC) or emulsions (ME, SE) to the tank and allow to mix.
7. Add any pesticides that are solutions (SN) (i.e. amines and salts)
8. Add any surfactants or other adjuvants.

Remember to always consult the label for compatible mixes and recommended mixing order.

Many pesticides will break down if left in the tank for an extended period. Try not to mix any more than you can spray at one time. If you need to stop spraying for a short time, leave the sprayer agitation running to keep products from settling or separating in the tank.

## Container Disposal

Proper disposal of used containers and unused pesticides is important to protect the environment and prevent contamination of soil and water resources. Rinse all containers prior to disposal to reduce environmental contamination caused by open dumping of unwanted containers. Only mix as much pesticide solution as is needed to treat the desired area.

### Triple Rinsing

Triple rinsing renders used pesticide containers (metal, plastic, glass) more than 99.9 percent free of residues, in most cases. Here are the steps that should be followed:

1. Empty contents of the container into the spray tank and drain in a vertical position for 30 seconds.
2. Add a measured amount of rinse water or other diluent until container is about one-fifth full.
3. Rinse the container thoroughly and pour the rinsate into the spray tank.
4. Repeat the procedure twice (it should take only about 5 minutes in total).
5. Puncture or break triple rinsed containers to render them non-reusable. Paper bags should be rinsed once prior to disposal.

### Pressure Rinsing

Pressure rinsers can be used to rinse any size of empty pesticide container that can be lifted into position over the spray tank. A 30 second rinse with a pressure rinser is convenient and just as effective as triple rinsing. Pressure rinsers are constructed to be thrust into the bottom of a metal can or plastic jug. Holes, situated laterally in the rinser tip, direct water from a pressurized source against the inner sides of the container and effectively wash the residual pesticide into the spray tank. Some farmers have found it convenient to attach a rinser to the pump on their large water storage tank to minimize container handling. Pressure rinsers have the added advantage of rendering containers useless by automatically puncturing them.

### Disposal of Containers

Properly rinsed containers should be delivered to a designated pesticide container disposal site. Contact your ag Provincial Agriculture Office, municipal office or weed supervisor for the locations of pesticide container disposal sites in your municipality for more information on pesticide container recycling see [www.cleanfarms.ca](http://www.cleanfarms.ca).

## Sprayer Cleaning

When pesticide application is completed each day it is important to empty and clean the sprayer thoroughly to prevent the breakdown of certain pesticides, prevent adhesion of the pesticide to the sprayer, and to maintain the sprayer parts in good condition. Certain pesticides break down very quickly when left in solution, and several pesticide solutions can be corrosive to sprayer parts. Sprayer cleaning is especially important when changing from one crop to another or from one pesticide to another. Each year several reports are logged of herbicide damage cause by carryover of product residue in the tank. To avoid the risk of contamination, sprayers should be cleaned as soon as possible after application is completed.

Do not clean sprayers where rinsate can run off into ditches or other water bodies, near sensitive plants or shelterbelts, or where other people or animals are likely to walk, to avoid unnecessary exposure to people, animals and the environment.

There are three basic types of rinse solution for cleaning sprayer tanks. Their recipes and basic procedures are outlined below:

- **The Ammonia Rinse** – Fill spray tank and add 1 L of household ammonia (3%) for every 100 L of clean water needed for the rinse and begin agitation. Allow solution to flush through the booms until the boom is completely filled with ammonia solution and top up the tank with water. Circulate the ammonia solution through the tank and pump system for 15 minutes. Flush hoses and booms with ammonia rinse solution again (minimum 5 minutes) before emptying. Remove nozzles and screens and scrub with 0.1 L household ammonia per 10 L clean water and an old toothbrush. Perform clean water rinse to remove ammonia solution prior to next spray load. Some herbicides recommend leaving the ammonia rinse in the tank over night to improve cleaning potential.
- **The Fresh Water Rinse** – The spray tank cleaning should begin and end with a fresh water rinse to remove the majority of potential contaminants prior to the cleansing process or prior to the next round of spraying. Drain the tank of its previous contents and fill the tank with clean water. Open nozzle valves and pump clean water through the booms and hoses. Top up the tank with more clean water and circulate/agitate for at least 10 minutes and empty the tank of waste water. If this is the first rinse after spraying, a high pressure hose could be used to clean residue from all surfaces in the tank. Do not enter the tank during the cleaning process.
- **The Detergent Rinse** – After rinsing with clean water, fill spray tank and add a heavy-duty detergent at 0.25 L per 100 L of water (some suggest a non-ionic surfactant such as Agral 90 or Agsurf at 0.6 L per 100 L of water). Circulate the mixture for a minimum of 5 minutes and spray out through sprayer nozzles. Nozzles and screens are removed and cleaned individually with the same detergent solution in a small container. Soaking in this solution for several hours also helps to loosen any deposits.

The above solutions are just components of the overall sprayer cleaning process. Typical rinse instructions will repeat a combination of one or two or all of these basic rinses. Below we will give some generic rinse instructions utilizing the basic rinses as components of the larger cleaning procedure. Never enter the tank during the cleaning process as some cleansers may release dangerous gases.

- **Method A** – Drain contents of tank – 1 to 2X Water Rinse – 2X Ammonia Rinse – 2X Water Rinse (one just prior to the next spraying event)
- **Method B** – Drain contents of tank – 2X Water Rinse – 2X Detergent Rinse – 2X Water Rinse
- **Method C** – Drain contents of tank – Several repetitions of the Water Rinse with nozzles and screens removed and checked for debris. Products: Adrenalin, Altitude, Amitrol 240, Ares.

The above directions are general processes based on the similarities of tank cleaning recommendations between products

in each of the herbicide groupings. Always follow the specific instructions on the product label.

Several products in the guide do not have label instructions regarding tank cleaning. In the case of products that have no cleaning recommendations on the label, there are some basic principals that can be applied. Products that are water based formulations can usually be cleaned from spray tanks using **Method C** above. Products that are formulated as an EC, SC or F (flowable) or use a petroleum based adjuvant should at least use **Method B**. The detergent breaks down the oil that may be sticking to the side of the tank. Products in Group 2 (most will already have a recommendation), with the exception of the 'IMI' products (see Table 8 on page 45), will require the use of **Method A**. The ammonia in **Method A** either increases the solubility of the product allowing it to be easily removed from the tank surfaces or speeds the breakdown of these products in water. If the product that is to be cleaned out of the tank is a combination of these elements, use a combination of Methods to clean the tank. In these cases, use a good commercial tank-cleaning product from a recognized source, with both ammonia and detergent as components.

Group 2 compounds are highly active on sensitive plants so even a small amount remaining in the sprayer can present a risk of injury. They can also occasionally be trapped on the tank walls and plumbing by petroleum based formulations or adjuvants when tank mixed with other products, resulting in tank residues that may be tougher to remove. A way to reduce the chance of this occurring is to add detergent at 0.25 L per 100 L to the Ammonia Rinse portion to assist with the breakdown of the petroleum coating so that the ammonia may rid the tank of Group 2 product.

It is very important to clean sprayers immediately after every use. With a more diverse rotation, the likelihood of damage from lack of care increases dramatically.

## How to Identify Crop and Weed Leaf Stages

Recognition of plant growth stages is essential for effective weed and disease control. Many herbicides and fungicides are safe on a crop only when applied at a specific growth stage. Similarly, weeds are controlled only when they are at certain growth stages.

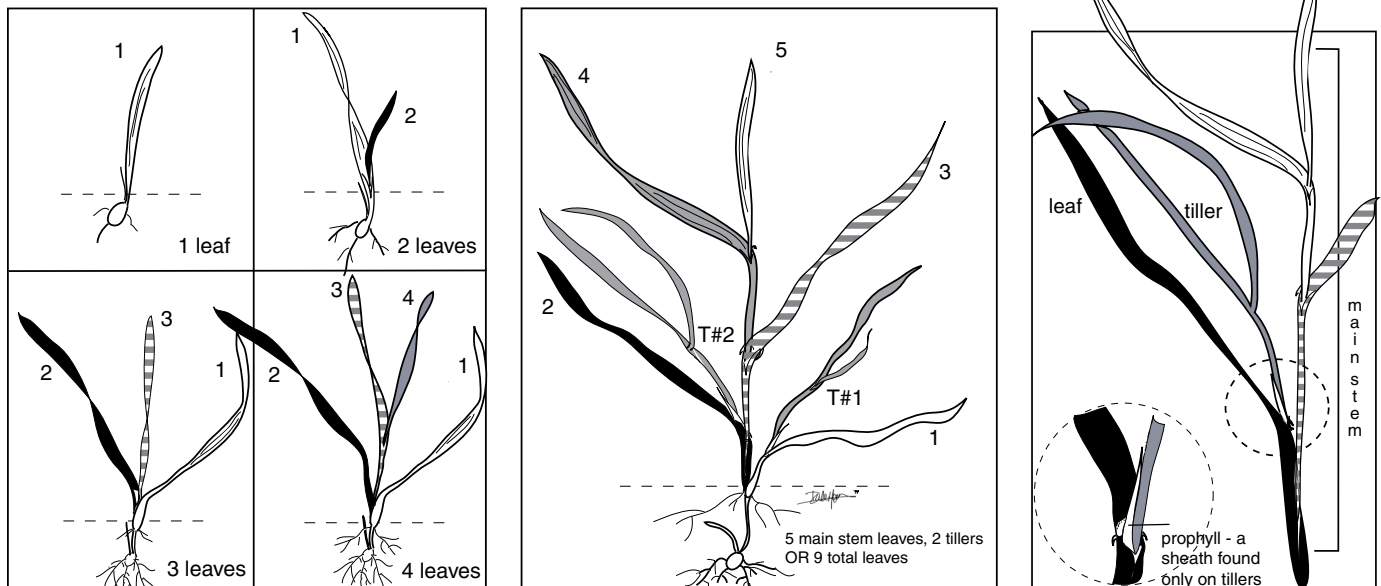
For most post-emergent products, growth stages are described by the number of leaves. The following is a description of how to count leaves for staging.

### Cereals and Annual Grass Weeds

Manufacturers generally use two different systems of staging for grasses. The minimum stages of application are similar, while the later stages may differ.

Some manufacturers use "Total Leaf Count" stages based on the number of leaves on the entire plant, including tillers or secondary shoots. Most recommendations are based on the number of main stem leaves and tillers. Tillers or stools are the secondary shoots or stems of a grass plant. Similar to the branches of a broadleaf plant, tillers will emerge from the axils between the leaf and main shoot. Tillers usually begin to appear at the 3 or 4 leaf stage. When staging a plant in this manner, be sure to identify the tillers first, then count only leaves that originate from the main shoot.

Figure 2. Leaf Stages of Cereals and Annual Grass Weeds

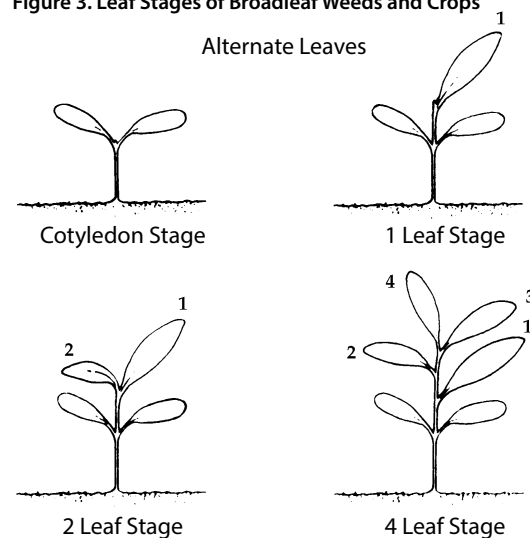


## Broadleaf Weeds

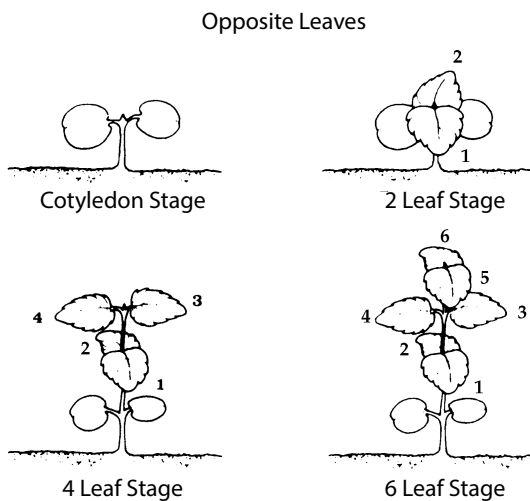
*Cotyledons* – These are the seed leaves that usually emerge above ground. On some plants, such as faba beans, lentils and peas, they stay below the soil surface. Cotyledons are not true leaves and are not counted when determining leaf number. They are a different shape than the true leaves and may dry up and disappear at an early stage.

*Alternate leaves* – Some plants have one leaf at each node on the stem. The next leaf emerges at the next higher node and extends away from the stem in the opposite direction. These plants (lamb's quarters and wild mustard are good examples) are said to have alternate leaves. To determine the leaf stage, simply count the number of leaves present (Figure 3).

Figure 3. Leaf Stages of Broadleaf Weeds and Crops



*Opposite leaves* – Plants with two leaves at each node, one on each side of the stem, are said to have opposite leaves. The next pair of leaves on the next node are rotated about 45° so that they are not directly over the previous pair. Plants with opposite leaves have even-leaf numbers only. When counting, the leaf number progresses from cotyledons to 2 leaf, 4 leaf, etc. These plants generally appear shorter than plants with alternate leaves at a similar leaf stage. **Be sure to count each pair as two leaves.** Hemp nettle is a weed that has opposite leaves (Figure 3).



*Whorled leaves* – More complex plants like cleavers may have whorled leaves. These plants have three or more leaves at each node on the stem. The leaf number in each whorl may vary, so be sure to count each individual leaf unless the Guide or label recommendation refers to the number of leaf whorls (Figure 3).

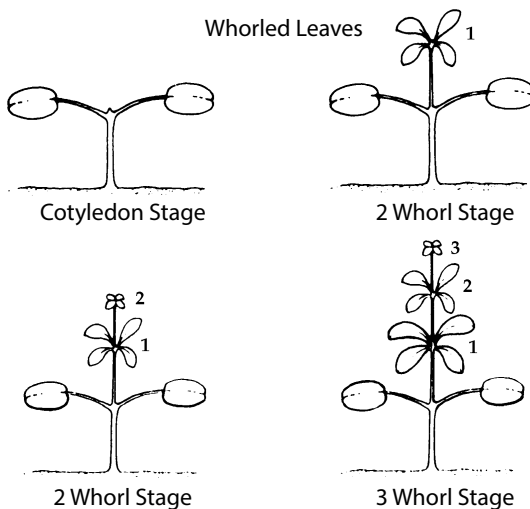
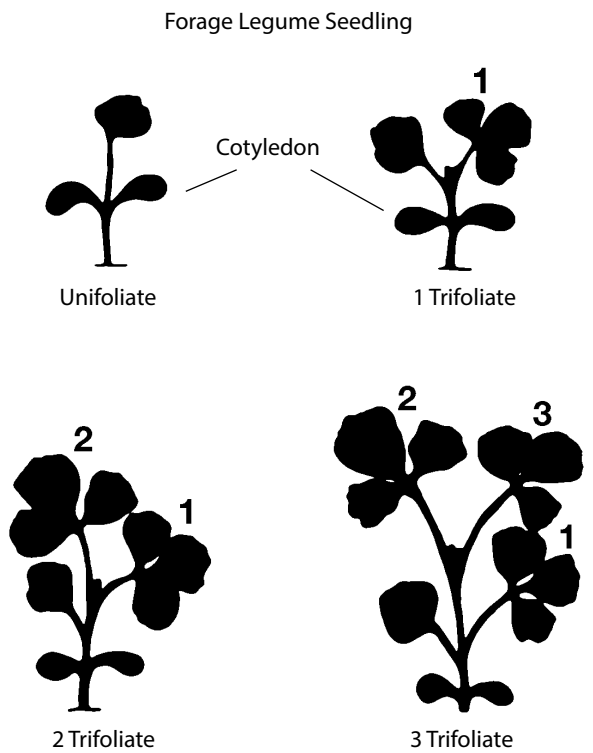
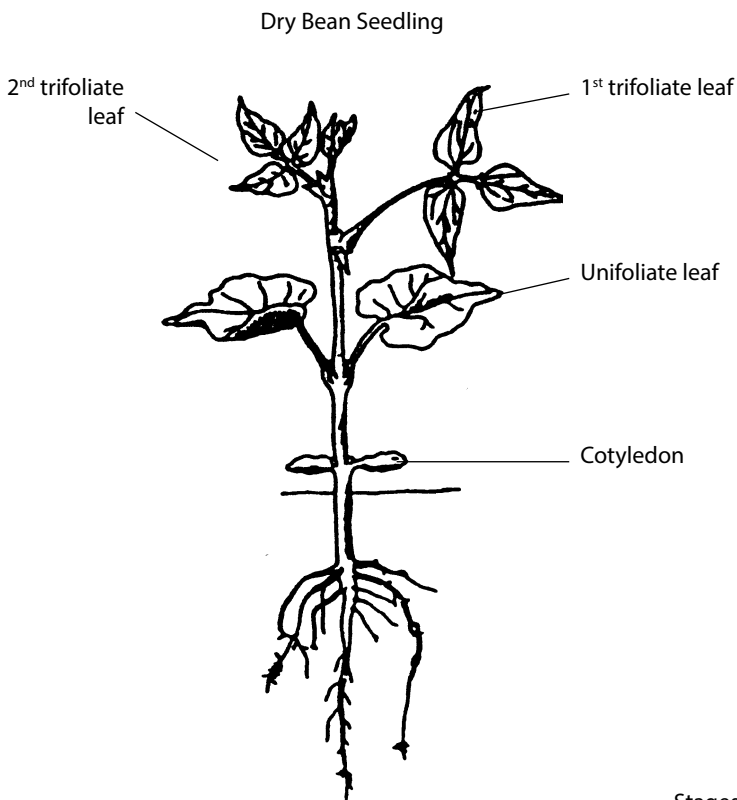
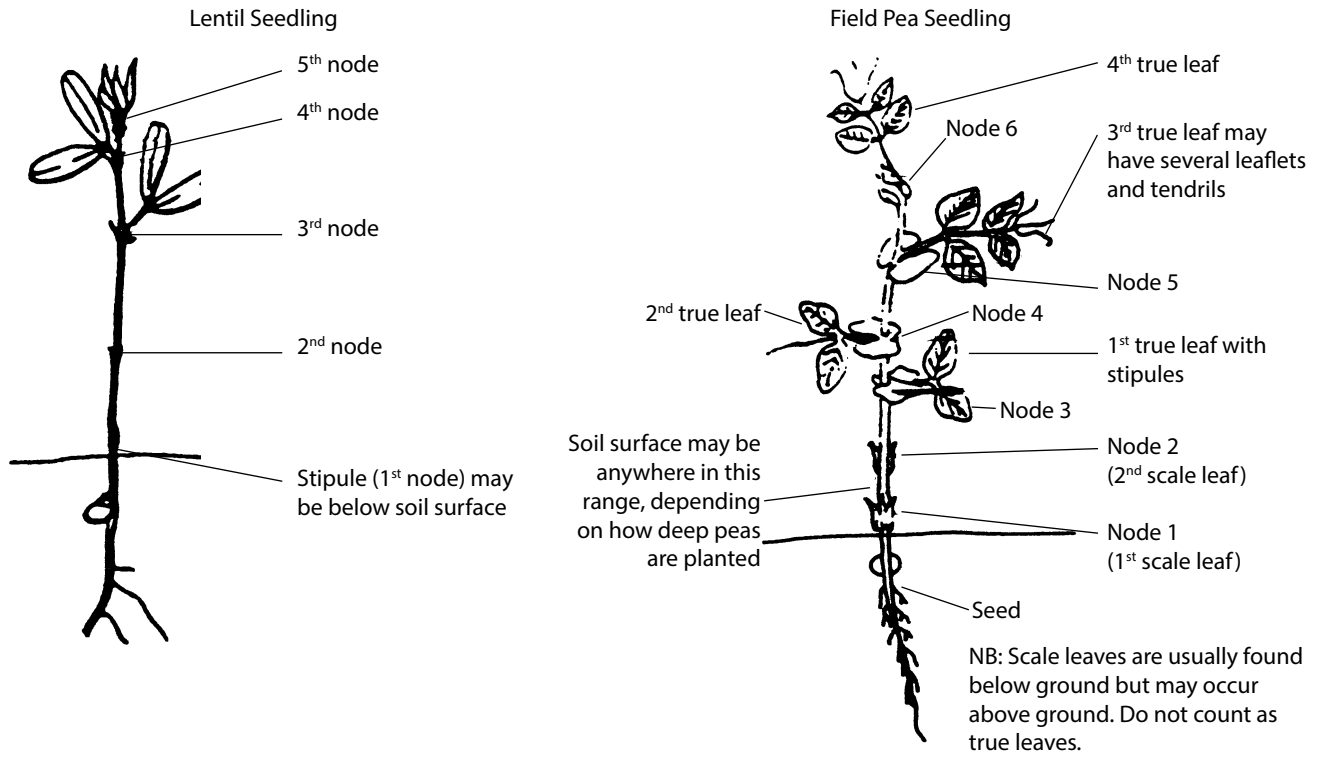




Figure 4. Leaf Stages of Certain Special Crops and Forages



Stages of alfalfa, red clover and alsike clover leaf development

## Trade Names, Active Ingredients and Formulations

Legend: (F) = formulated component; (B) = blended granules; (DC) = divided container

WP	wettable powder	EC	emulsifiable concentrate	SP	water soluble powder	SL	soluble concentrate	A	amine
WG	water dispersible granule	G	granule	EW	emulsion, oil in water	OD	oil dispersion	E	ester
TB	Tablet	SC	suspension concentrate	DS	powder/dust for dry seed treatment	FS	flowable concentrate for seed treatment	LS	solution for seed treatment
SG	water soluble granule	AS	aqueous suspension						

## Herbicides

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
2,4-D Amine - 600, 700 g/L SL				2,4-D Amine or Ester	Various
2,4-D Ester - 660 g/LEC				Salvo	UAP
2,4-D Amine - 200 g/L SL (F)				Restore II	Dow AgroSciences
2,4-D Ester - 660 g/LEC	aminopyralid - 40 g/L SL (F)			Reclaim II	Dow AgroSciences
2,4-D Ester - 225 g/LEC (F)	aminopyralid - 52.5% WG (F)			Approve	Nufarm Agriculture
2,4-D Ester - 225 g/LEC (F)	bromoxynil - 225 g/LEC (F)			Leader	IPCO
2,4-D Ester - 225 g/LEC (F)	bromoxynil - 225 g/LEC (F)			Thrasher II	ADAMA Canada
2,4-D Ester - 225 g/LEC (F)	bromoxynil - 225 g/LEC (F)			Thumper	Bayer CropScience
2,4-D Ester - 280 g/LEC (F)	bromoxynil - 280 g/LEC (F)			Enforcer D	Nufarm Agriculture
2,4-D Ester - 240 g/LEC (F)	bromoxynil - 90 g/LEC (F)			BlackHawk (old)	Nufarm Agriculture
2,4-D Ester - 660 g/LEC	carfentrazone - 240 g/LEC			DyVel DSp	BASF Canada
2,4-D Amine - 295 g/L SL (F)	dicamba - 110 g/L SL (F)			Dichlorprop-D	IPCO
2,4-D Ester - 282 g/LEC (F)	dichlorprop - 300 g/LEC (F)			Turboprop	UAP
2,4-D Ester - 282 g/LEC (F)	dichlorprop - 300 g/LEC (F)			Dichlorprop-DX	IPCO
2,4-D Ester - 400 g/LEC (F)	dichlorprop-P - 210 g/LEC (F)			Estaprop XT	Nufarm Agriculture
2,4-D Ester - 400 g/LEC (F)	dichlorprop-P - 210 g/LEC (F)			OcTtain XL	Dow AgroSciences
2,4-D Ester - 360 g/LEC (F)	fluroxypyr - 90 g/LEC (F)			Traxostwo	Syngenta Canada
2,4-D Ester - 360 g/LEC (F2)	fluroxypyr - 90 g/LEC (F2)			Flurox-24	Nufarm Agriculture
2,4-D Ester - 660 g/LEC	fluroxypyr - 180 g/LEC			Rush 24	ADAMA Canada
2,4-D Ester - 660 g/LEC	fluroxypyr - 180 g/LEC			Attain XC	Dow AgroSciences
2,4-D Ester - 660 g/LEC	fluroxypyr - 333 g/LEC			Frontline 2,4-D XC	Dow AgroSciences
2,4-D Ester - 660 g/LEC	florasulam - 50 g/L SC			Grazon XC	Dow AgroSciences
2,4-D Ester - 360 g/L SL (F)	picloram - 97.5 g/L SL (F)			BlackHawk (new)	Nufarm Agriculture
2,4-D ester - 473 g/L (F)	pyraflufen - 6.1 g/L (F)			Rexade	Dow AgroSciences
2,4-D Ester - 660 g/LEC	pyraflufen - 6.1 g/L (F)			Retain SG (old)	Loveland Products
2,4-D Ester - 564 g/LEC	pyraflufen - 6.1 g/L (F)			Retain SG (new)	Loveland Products
2,4-D Ester - 660 g/LEC	thifensulfuron:tribenuron - 33.3%:16.7% SG			Ko-Act	Nufarm Agriculture
2,4-D Ester - 564 g/LEC	thifensulfuron:tribenuron - 33.3%:16.7% SG			Triton K	FMC
2,4-D Ester - 660 g/LEC	tribenuron - 75% WG			Caliber	Loveland Products
2,4-DB Ester - 625 g/LEC	tribenuron - 8.25% WG (F)			Cobutox 625	IPCO
2,4-DB Ester - 625 g/LEC				Embutox 625	Nufarm Agriculture
2,4-DB Ester - 625 g/LEC				Ultra Blazer	United Phosphorus Inc.
acifluorfen - 240 g/L SL				Restore II	Dow AgroSciences
aminopyralid - 40 g/L SL (F)	2,4-D Amine - 200 g/L SL (F)			Reclaim	Dow AgroSciences
aminopyralid - 52.5% WG (F)	metsulfuron - 9.45% WG (F)			Reclaim II	Dow AgroSciences
aminopyralid - 52.5% WG (F)	metsulfuron - 9.45% WG (F)			Navius	Bayer CropScience
aminocyclopyrachlor - 39.5% WG (F)	metsulfuron - 12.6% WG (F)			Amitrol 240	Nufarm Agriculture
amitrole - 231 g/L SL				AAAtrex Liquid	Syngenta Canada
atrazine - 480 g/L SC					



(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
atrazine - 320 g/L SC (F)	metolachlor - 400 g/L SC (F)			Primextra II Magnum	Syngenta Canada
bentazon - 480 g/L SL				Basagran	BASF Canada
bentazon - 480 g/L SL				Basagran Forté	BASF Canada
bentazon - 480 g/L SL				Benta Super	Sharda CropChem
bentazon - 429 g/L SL (F)	imazamox - 20 g/L SL (F)			Viper ADV	BASF Canada
bromoxynil - 235g/L EC				Koril 235	Nufarm Agriculture
bromoxynil - 240 g/L EC				Bromotril II	ADAMA Canada
bromoxynil - 240 g/L EC				Brotox	IPCO
bromoxynil - 280 g/L EC				Pardner	Bayer CropScience
bromoxynil - 480 g/L SL				Brotox 480	IPCO
bromoxynil - 225 g/L EC (F)	2,4-D Ester - 225 g/L EC (F)			Loveland Bromax	Loveland Products
bromoxynil - 225 g/L EC (F)	2,4-D Ester - 225 g/L EC (F)			Approve	Nufarm Agriculture
bromoxynil - 225 g/L EC (F)	2,4-D Ester - 225 g/L EC (F)			Leader	IPCO
bromoxynil - 280 g/L EC (F)	2,4-D Ester - 280 g/L EC (F)			Thrasher II	ADAMA Canada
bromoxynil - 275g/L EC	carfentrazone - 240 g/L EC			Thumper	Bayer CropScience
bromoxynil - 87.5 g/L EC (F)	fenoxaprop-p - 46 g/L EC (F)	pyrasulfotole - 15.5 g/L EC (F)		Conquer	Nufarm Agriculture
bromoxynil - 240 g/L EC	florasulam - 50 g/L SC			Tundra	Bayer CropScience
bromoxynil - 90 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	2,4-D Ester - 240 g/L EC (F)		Hot Shot	ADAMA Canada
bromoxynil - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	MCPE Ester - 225 g/L EC (F)		Enforcer D	Nufarm Agriculture
bromoxynil - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	MCPE Ester - 200 g/L EC (F)		Enforcer M	Nufarm Agriculture
			thifensulfuron:tribenuron - 50%:25% SG	Enforcer MSU	Nufarm Agriculture
bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			Badge	ADAMA Canada
bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			MPower Buck M	Agriacty
bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			Logic M	IPCO
bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			Mextrol 450	Nufarm Agriculture
bromoxynil - 280 g/L EC (F)	MCPA Ester - 280 g/L EC (F)			Bucril M	Bayer CropScience
bromoxynil - 225g/L EC (F)	MCPA Ester - 225 g/L EC (F)	fluroxypyr - 180 g/L EC		ForceFighter	ADAMA Canada
bromoxynil - 210 g/L EC (F)	pyrasulfotole - 37.5 g/L EC (F)			Infinity	Bayer CropScience
bromoxynil - 210 g/L EC (F)	pyrasulfotole - 37.5 g/L EC (F)	fluroxypyr - 180 g/L EC		Infinity FX	Bayer CropScience
bromoxynil - 210 g/L EC (F)	pyrasulfotole - 37.5 g/L EC (F)	pinoxaden - 50 g/L EC		Axial/Pak	Syngenta Canada
bromoxynil - 175 g/L EC (F)	pyrasulfotole - 31.3 g/L EC (F)	thiencarbazone - 5 g/L SC (F)		Velocity m3	Bayer CropScience
carfentrazone - 240 g/L EC				Aim	FMC
carfentrazone - 240 g/L EC	2,4-D ester - 660 g/L EC			BlackHawk (old)	Nufarm Agriculture
carfentrazone - 240 g/L EC	bromoxynil - 235g/L EC			Conquer	Nufarm Agriculture
carfentrazone - 240 g/L EC	glyphosate - 356 g/L SL			Cleanstart	Nufarm Agriculture
carfentrazone - 240 g/L EC	pyroxasulfone - 85% WG			Focus (co-pack)	FMC
carfentrazone - 53 g/L SE (F)	pyroxasulfone - 447 g/L SE (F)			Focus	FMC
carfentrazone - 240 g/L EC	sulfentrazone - 480 g/L SC			Authority Charge	FMC
chlormequat chloride - 620 g/L SL				Manipulator	Engage Agro
clethodim - 240 g/L EC				Antler	Winfield United
clethodim - 240 g/L EC				Arrow	ADAMA Canada
clethodim - 240 g/L EC				Centurion	Bayer CropScience
clethodim - 240 g/L EC				MPower Independence	Agriacty
clethodim - 240 g/L EC				Patron 240EC	IPCO
clethodim - 240 g/L EC				Select	Arysta LifeScience
clethodim - 240 g/L EC				Shadow RTM	Loveland Products
clodinafop - 60 g/L EC				Footills NG	Loveland Products
clodinafop - 60 g/L EC				Horizon NG	Syngenta Canada
clodinafop - 60 g/L EC				NextStep NG	Arysta LifeScience
clodinafop - 80 g/L EC				Cadillac One	Winfield United
clodinafop - 240 g/L EC				Ladder All In	ADAMA Canada
				Aurora	Agriacty

(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
clodinafop - 240 g/L EC	fluroxypyr - 217 g/L EC (F)	thienculfuron:tribenuron - 50%:25% SG		Cadillac	Winfield United
clodinafop - 240 g/L EC	pinoxaden - 25 g/L EC (F)	2,4-D Ester - 360 g/L EC (F2)	fluroxypyr - 90 g/L EC (F2)	Foax	Great Northern Growers
clodinafop - 240 g/L EC	pinoxaden - 25 g/L EC (F1)			Ladder	ADAMA Canada
clodinafop - 240 g/L EC	thienculfuron:tribenuron - 33.3%:16.7% SG			Signal	Nufarm Agriculture
clodinafop - 240 g/L EC	thienculfuron:tribenuron - 7.7%:3.9% WG	dicamba - 54% WG		Slam R	AgriStar
clodinafop - 112 g/L (F)				Signal FSU	Nufarm Agriculture
clodinafop - 25 g/L EC (F)				Traxos	Syngenta Canada
clodinafop - 25 g/L EC (F1)				TraxosTwo	Syngenta Canada
clodinafop - 128 g/L EC				Harmony SG	FMC
clodinafop - 128 g/L EC				Harmony K	FMC
clomazone - 360 g/L ME				Command 360 ME	FMC
clopyralid - 360 g/L SL				Lontrel 360	Dow AgroSciences
clopyralid - 360 g/L SL				Pyralid	Sharda CropChem
clopyralid - 600 g/L SL				Lontrel XC	Dow AgroSciences
clopyralid - 50 g/L EC (F)	florasulam - 50 g/L SC	MCPA Ester - 280 g/L EC (F)		Spectrum	Dow AgroSciences
clopyralid - 90 g/L SL (F)	fluroxypyr - 90 g/L EC (F)			Momentum	Loveland Products
clopyralid - 50 g/L EC (F)	fluroxypyr - 333 g/L EC	MCPA Ester - 280 g/L EC (F)		Prestige XC	Dow AgroSciences
clopyralid - 61 g/L EC (F)	fluroxypyr - 61 g/L EC (F)	MCPA Ester - 224 g/L EC (F)		Hat Trick	Loveland Products
clopyralid - 360 g/L SL	glyphosate - 480 g/L SL	florasulam - 20% WG (F)		Eclipse III	Dow AgroSciences
clopyralid - 360 g/L	hauloxifen - 16.2 g/L EC (F)	florasulam - 20% WG (F)		Cirpreme	Dow AgroSciences
clopyralid - 600 g/L SL	hauloxifen - 16.2 g/L EC (F)	florasulam - 20% WG (F)		Cirpreme XC	Dow AgroSciences
clopyralid - 75% WG	imazamox - 70% WG	imazamox - 33 g/L SL (F)		Tensile	BASF Canada
clopyralid - 75% WG	imazapyr - 15 g/L SL (F)			Salute	Dow AgroSciences
clopyralid - 50 g/L EC (F)	MCPA Ester - 280 g/L EC (F)			Curtail M	Nufarm Agriculture
dicamba - 350 g/L SL				Xtendimax	Monsanto Canada
dicamba - 480 g/L SL				Banvel II	BASF Canada
dicamba - 480 g/L SL				Banvel VM	BASF Canada
dicamba - 480 g/L SL				Oracle	Gharda (UAP)
dicamba - 600 g/L SL				Engenia	BASF Canada
dicamba - 54% WG				Harmony K	FMC
dicamba - 50% WG (F)	clodinafop - 128 g/L EC	thienculfuron:tribenuron - 7.7%:3.9% WG		Distinct	BASF Canada
dicamba - 50% WG (F)	diflufenzopyr - 20% WG (F)			Overdrive	BASF Canada
dicamba - 480 g/L SL	diflufenzopyr - 20% WG (F)			Korrex II	Dow AgroSciences
dicamba - 87 g/L EC (F)	florasulam - 25% WG			Pulsar	Syngenta Canada
dicamba - 46 g/L (F)	fluroxypyr - 113 g/L EC (F)			Glykamba	Nufarm Agriculture
dicamba - 120 g/L SL (F)	glyphosate - 194 g/L SL (F)			Roundup Xtend	Monsanto Canada
dicamba - 84 g/L SL (F)	glyphosate - 240 g/L SL (F)			DyVel	BASF Canada
dicamba - 110 g/L SL (F)	MCPA K+ - 336 g/L SL (F)			DyVel DSp	BASF Canada
dicamba - 62.5 g/L SL (F)	mecoprop-P - 80 g/L SL (F)	2,4-D Amine - 295 g/L SL (F)		Sword	Loveland Products
dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		Target	Syngenta Canada
dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		Tracker XP	IPCO
dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		Express FX	FMC
dicamba - 480 g/L SL	tribenuron - 50% SG			Triton K	FMC
dicamba - 58.45% WG (F)	tribenuron - 8.25% WG (F)	2,4-D ester - 660g/L EC		Casoron	Arysta LifeScience
dichlobenil - 4% G				Turboprop	UAP
dichlorprop - 300 g/L EC (F)	2,4-D Ester - 282 g/L EC (F)			Dichlorprop-DX	IPCO
dichlorprop-P - 210 g/L EC (F)	2,4-D Ester - 400 g/L EC (F)			Estaprop XT	Nufarm Agriculture
dichlorprop-P - 210 g/L EC (F)	2,4-D Ester - 400 g/L EC (F)			Optica Trio	UAP
dichlorprop-P - 310 g/L SL (F)	MCPA Amine - 160 g/L SL (F)	mecoprop-P - 130 g/L SL (F)		Distinct	BASF Canada
diflufenzopyr - 20% WG (F)	dicamba - 50% WG (F)			Overdrive	BASF Canada
diflufenzopyr - 20% WG (F)	dicamba - 50% WG (F)				



(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
fluroxypyr - 180 g/L EC	2,4-D Ester - 660 g/L EC			Rush 24	ADAMA Canada
fluroxypyr - 333 g/L EC	2,4-D E - 660 g/L EC			Attain XC	Dow AgroSciences
fluroxypyr - 90 g/L EC (F)	2,4-D Ester - 360 g/L EC (F)			OcTtain XL	Dow AgroSciences
fluroxypyr - 80 g/L EC (F)	2,4-D Ester - 240 g/L EC (F)			Enforcer D	Nufarm Agriculture
fluroxypyr - 90 g/L EC (F2)	2,4-D Ester - 360 g/L EC (F2)			Traxostwo	Syngenta Canada
fluroxypyr - 80 g/L EC (F)	bromoxynil - 200 g/L EC (F)			Enforcer MSU	Nufarm Agriculture
fluroxypyr - 217 g/L EC (F)	clodinafop - 112 g/L (F)		clodinafop - 25 g/L EC (F1) thiencarbazon:tribenuron - 50%:25% SG	Signal FSU	Nufarm Agriculture
fluroxypyr - 90 g/L EC (F)	clopyralid - 90g/L SL (F)			Momentum	Loveland Products
fluroxypyr - 333 g/L EC	clopyralid - 50 g/L EC (F)			Prestige XC	Dow AgroSciences
fluroxypyr - 113 g/L EC (F)	dicamba - 87 g/L EC (F)			Pulsar	Syngenta Canada
fluroxypyr - 100 g/L SC (F)	florasulam - 2.5 g/L SC (F)			Outshine	ADAMA Canada
fluroxypyr - 100 g/L SC (F)	florasulam - 2.5 g/L SC (F)			Stellar	Dow AgroSciences
fluroxypyr - 100 g/L SC (F)	florasulam - 2.5 g/L SC (F)			Stellar XL	Dow AgroSciences
fluroxypyr - 180 g/L EC	flucarbazone - 66% WG			Everest GBX	Arysta LifeScience
fluroxypyr - 180 g/L	imazamox - 120 g/L SL			Altitude FX2	BASF Canada
fluroxypyr - 180 g/L	MCPA ester - 600 g/L EC			Rush M	ADAMA Canada
fluroxypyr - 180 g/L	MCPA ester - 600 g/L EC			Trophy	Nufarm Agriculture
fluroxypyr - 80 g/L EC (F)	MCPA - 200 g/L EC (F)			Enforcer M	Nufarm Agriculture
fluroxypyr - 180 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			ForceFighter	ADAMA Canada
fluroxypyr - 61 g/L EC (F)	MCPA ester - 224 g/L EC (F)			Hat Trick	Loveland Products
fluroxypyr - 250 g/L EC (F)	MCPA ester - 600 g/L EC			Pixxaro	Dow AgroSciences
fluroxypyr - 87.5 g/L EC (F)	pinoxaden - 50 g/L EC (F)			Axial Xtreme	Syngenta Canada
fluroxypyr - 180 g/L EC	pyrasulfotole - 37.5 g/L EC (F)			Infinity FX	Bayer CropScience
fluroxypyr - 333 g/L EC	pyroxulam - 30 g/L OD			Tandem	Dow AgroSciences
fluroxypyr - 150 g/L SC (F)	thiencarbazon - 30 g/L SC (F)			Travallas	Dow AgroSciences
fluroxypyr - 180 g/L EC	thiencarbazon:tribenuron - 33.3%:16.7% SG			Retain SG (old)	FMC
fluroxypyr - 333 g/L EC	thiencarbazon:tribenuron - 33.3%:16.7% SG			Retain SG (new)	Loveland Products
fluroxypyr - 333 g/L EC	thiencarbazon:tribenuron - 50%:50% SG			Barricade II	FMC
fluroxypyr - 333 g/L EC	thiencarbazon:tribenuron - 50%:50% SG			Predicade	FMC
fomesafen - 240 g/L SL	glyphosate - 271 g/L SL (F)			Reflex	Syngenta Canada
fomesafen - 67 g/L SL (F)				FlexStar GT	Syngenta Canada
foramsulfuron - 22.5 g/L OD				Option 2.25 OD	Bayer CropScience
foramsulfuron - 35% WG				Option 35 DF	Bayer CropScience
glufosinate - 150 g/L SL				GoodHarvest	AgriCity
glufosinate - 150 g/L SL				Liberty 150 SN	Bayer CropScience
glufosinate - 200 g/L SL				Liberty 200 SN	Bayer CropScience
glyphosate - 356 g/L SL				Sharpshooter	Loveland Products
glyphosate - 360 g/L SL				ClearOut 41 Plus	AgriCity
glyphosate - 360 g/L SL				Crush'R Plus	AgriStar
glyphosate - 360 g/L SL				MPower Glyphosate	AgriCity
glyphosate - 360 g/L SL				Sharda Glyphosate	Sharda CropChem
glyphosate - 360 g/L SL				Sharpshooter Plus	Loveland Products
glyphosate - 360 g/L SL				Smoke	Great Northern Growers
glyphosate - 450 g/L SL				Credit 45	Nufarm Agriculture
glyphosate - 480 g/L SL				Glyphosate 480	AgriStar
glyphosate - 480 g/L SL				Matrix	IPCO
glyphosate - 480 g/L SL				VP480	Dow AgroSciences
glyphosate - 480 g/L SL				Vector	Federated Co-op

(Component 1)  
Active Ingredient\*\* -  
Formulation

(Component 2)  
Active Ingredient\*\* -  
Formulation

(Component 3)  
Active Ingredient\*\* -  
Formulation

(Component 4)  
Active Ingredient\*\* -  
Formulation

Product

Company

glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 540 g/L SL  
glyphosate - 356 g/L SL  
glyphosate - 480 g/L SL  
glyphosate - 194 g/L SL (F)  
glyphosate - 240 g/L SL (F)  
glyphosate - 480 g/L SL  
glyphosate - 271 g/L SL (F)  
halosulfuron - 72.6% WG  
hauoxifen - 20% WG (F)  
hauoxifen - 16.2 g/L EC (F)  
hauoxifen - 16.2 g/L EC (F)  
hauoxifen - 5% WG (F)  
hauoxifen - 16.2 g/L EC (F)  
hexazinone - 7.5% WG  
imazamethabenz - 300 g/L SC  
imazamethabenz - 300 g/L SC  
imazamox - 70% WG  
imazamox - 70% WG  
imazamox - 25 g/L SL  
imazamox - 25 g/L SL  
imazamox - 20 g/L SL (F)  
imazamox - 70% WG  
imazamox - 120 g/L SL  
imazamox - 33 g/L SL (F)  
imazamox - 33 g/L SL (F)  
imazamox - 35% WG (F)  
imazamox - 35% WG (F)  
imazamox - 35% WG (F)  
imazamox - 35% WG (F)  
imazamox - 35% WG (F)  
imazamox - 35% WG (F)  
imazapyr - 15 g/L SL (F)  
imazapyr - 15 g/L SL (F)  
imazethapyr - 240 g/L SL  
imazethapyr - 240 g/L SL  
imazethapyr - 240 g/L SL  
imazethapyr - 240 g/L SL  
imazethapyr - 240 g/L SL  
imazethapyr - 35% WG (F)  
imazethapyr - 35% WG (F)  
imazethapyr - 35% WG (F)  
imazethapyr - 35% WG (F)  
imazethapyr - 35% WG (F)  
imazethapyr - 35% WG (F)  
linuron - 400 g/L SC  
linuron - 480 g/L SC  
MCPA Amine - 500, 600 g/L SL  
MCPA Ester - 500, 600 g/L EC  
MCPA K+ - 400 g/L SL

carfentrazone - 240 g/L EC  
cloprralid - 360 g/L SL  
dicamba - 46 g/L (F)  
dicamba - 120 g/L SL (F)  
florasulam - 50 g/L SC  
fomesafen - 67 g/L SL (F)  
florasulam - 20% WG (F)  
florasulam - 20% WG (F)  
florasulam - 20% WG (F)  
pyroxsulam - 15% WG (F)  
fluroxypyr - 250 g/L EC (F)

clopyralid - 360 g/L SN  
clopyralid - 600 g/L SN  
2,4-D Ester - 660 g/L EC  
MCPA ester - 600 g/L EC

Credit Xtreme  
Crush'R 540  
Guardsman Glyphosate  
R/T 540  
Roundup Transorb HC  
Roundup WeatherMax  
Start Up  
Vector 540  
Cleanstart  
Eclipse III  
Glykamba  
Roundup Xtend  
PrePass XC  
FlexStar GT  
Permit  
Paradigm  
Cipreme  
Cipreme XC  
Rexade  
Pixxaro  
Velpar DF CU  
Assert 300 SC  
Avert  
Solo  
Mizuna  
Solo ADV  
Solo Ultra  
Viper ADV  
Tensile  
Altitude FX2  
Ares  
Salute  
Odyssey  
Duet  
Odyssey NXT  
Odyssey Ultra  
Odyssey Ultra NXT  
Ares  
Salute  
Gladiator  
MPower Kamikaze  
MultiStar  
Phantom  
Pursuit  
Odyssey  
Duet  
Odyssey NXT  
Odyssey Ultra  
Odyssey Ultra NXT  
Limuron 400  
Lorox L  
MCPA Amine  
MCPA Ester  
MCPA K+

Nufarm Agriculture  
AgriStar  
Univar Canada  
Monsanto  
Monsanto  
Loveland Products  
Federated Co-op  
Nufarm Agriculture  
Dow AgroSciences  
Nufarm Agriculture  
Monsanto Canada  
Dow AgroSciences  
Syngenta Canada  
Gowan Canada  
Dow AgroSciences  
Dow AgroSciences  
Dow AgroSciences  
Dow AgroSciences  
Dow AgroSciences  
Tessenderlo Kerley Inc.  
Nufarm Agriculture  
Loveland Products  
BASF Canada  
Loveland Products  
BASF Canada  
BASF Canada  
BASF Canada  
BASF Canada  
BASF Canada  
BASF Canada  
Dow AgroSciences  
BASF Canada  
Loveland Products  
BASF Canada  
BASF Canada  
BASF Canada  
BASF Canada  
Dow AgroSciences  
Univar Canada  
Agracity  
Loveland Products  
ADAMA Canada  
BASF Canada  
BASF Canada  
Loveland Products  
BASF Canada  
BASF Canada  
BASF Canada  
BASF Canada  
UAP  
Tessenderlo Kerley Inc.  
Various  
Various  
Various

(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
MCPA Na+ - 300 g/L SL				MCPA Na	Various
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			Badge	ADAMA Canada
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			Logic M	IPCO
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			Mextrol 450	Nufarm Agriculture
MCPA Ester - 280 g/L EC (F)	bromoxynil - 280 g/L EC (F)			Buctril M	Bayer CropScience
MCPA Ester - 200 g/L EC (F)	bromoxynil - 200 g/L EC (F)			Enforcer M	Nufarm Agriculture
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			ForceFighter	ADAMA Canada
MCPA ester - 200 g/L EC (F)	bromoxynil - 200 g/L EC (F)		thifensulfuron:tribenuron - 50%:25% SG	Enforcer MSU	Nufarm Agriculture
MCPA Ester - 280 g/L EC (F)	clopyralid - 50 g/L EC (F)			Curtail M	Nufarm Agriculture
MCPA Ester - 224 g/L EC (F)	clopyralid - 61 g/L EC (F)			Hat Trick	Loveland Products
MCPA K+ - 336 g/L SL (F)	dicamba - 84 g/L SL (F)			DyVel	BASF Canada
MCPA amine - 275 g/L SL (F)	dicamba - 62.5 g/L SL (F)			Sword	Loveland Products
MCPA amine - 275 g/L SL (F)	dicamba - 62.5 g/L SL (F)			Target	Syngenta Canada
MCPA amine - 275 g/L SL (F)	dicamba - 62.5 g/L SL (F)			Tracker XP	IPCO
MCPA ester - 280 g/L EC (F)	florasulam - 4 g/L EC (F)			Frontline XL	Dow AgroSciences
MCPA Ester - 600 g/L EC	florasulam - 50 g/L SC			Topline	ADAMA Canada
MCPA ester - 600 g ae/L	florasulam - 2.5 g/L SC (F)			Outshine	ADAMA Canada
MCPA ester - 600 g/L	florasulam - 2.5 g/L SC (F)			Stellar	Dow AgroSciences
MCPA ester - 350 g/L (F)	fluroxypyr - 100 g/L SC (F)			Stellar XL	Dow AgroSciences
MCPA Ester - 280 g/L EC (F)	florasulam - 50 g/L SC			Spectrum	Dow AgroSciences
MCPA Ester - 280 g/L EC (F)	fluroxypyr - 333 g/L EC			Prestige XC	Dow AgroSciences
MCPA ester - 600 g/L EC	fluroxypyr - 180 g/L			Rush M	ADAMA Canada
MCPA ester - 600 g/L EC	fluroxypyr - 180 g/L			Trophy	Nufarm Agriculture
MCPA ester - 600 g/L EC	hauloxifen - 16.2 g/L EC (F)			Pixxaro	Dow AgroSciences
MCPA K+ - 25 g/L SL (F)	MCPB - 375 g/L SL (F)			Topside	Loveland Products
MCPA K+ - 25 g/L SL (F)	MCPB - 375 g/L SL (F)			Tropotox Plus	Nufarm Agriculture
MCPA Na+ - 25 g/L SL (F)	MCPB - 375 g/L SL (F)			Clovitox Plus	IPCO
MCPA Amine - 160 g/L SL (F)	mecoprop-P - 130 g/L SL (F)			Optica Trio	UAP
MCPA ester - 420 g/L (F)	pyraflufen - 13.5 g/L (F)			Goldwing	Nufarm Agriculture
MCPA ester - 500 or 600 g/L EC	thifensulfuron:tribenuron - 33.3%:16.7% SG			BroadSide	Loveland Products
MCPA ester - 500 or 600 g/L EC	thifensulfuron:tribenuron - 50%:50% SG			Refine M	FMC
MCPA ester - 600 g/L EC	thifensulfuron:tribenuron - 50%:50% SG			Predicade	FMC
MCPB - 375 g/L SL (F)	MCPA K+ - 25 g/L SL (F)			Topside	Loveland Products
MCPB - 375 g/L SL (F)	MCPA K+ - 25 g/L SL (F)			Tropotox Plus	Nufarm Agriculture
MCPB - 375 g/L SL (F)	MCPA Na+ - 25 g/L SL (F)			Clovitox Plus	IPCO
mecoprop-P - 150 g/L SL				Mecoprop-P	UAP
mecoprop-P - 80 g/L SL (F)	dicamba - 110 g/L SL (F)			DyVel DSp	BASF Canada
mecoprop-P - 62.5 g/L SL (F)	dicamba - 62.5 g/L SL (F)			Sword	Loveland Products
mecoprop-P - 62.5 g/L SL (F)	dicamba - 62.5 g/L SL (F)			Target	Syngenta Canada
mecoprop-P - 62.5 g/L SL (F)	dicamba - 62.5 g/L SL (F)			Tracker XP	IPCO
mecoprop-P - 130 g/L SL (F)	MCPA Amine - 160 g/L SL (F)			Optica Trio	UAP
metolachlor - 915 g/L EC				Dual II Magnum	Syngenta Canada
metolachlor - 400 g/L SC (F)	atrazine - 320 g/L SC (F)			Primextra II Magnum	Syngenta Canada
metribuzin - 480 g/L SC				Matrix SC	Sharda CropChem
metribuzin - 70% WG				Buzzin	Sharda CropChem
metribuzin - 75% WG				Sencor	Bayer CropScience
metribuzin - 75% WG				Squadron	ADAMA Canada
metribuzin - 75% WG				TriCor	United Phosphorus Inc.
metulfururon - 60% WG				Accurate	FMC

(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
metsulfuron - 60% WG				Escort	Bayer Environmental Sciences
metsulfuron - 60% SG				Ally Toss-N-Go	FMC
metsulfuron - 9.45% WG (F)	aminopyralid - 52.5% WG (F)	2,4-D Ester - 564 g/L EC		Reclaim	Dow AgroSciences
metsulfuron - 9.45% WG (F)	aminopyralid - 52.5% WG (F)	2,4-D Ester - 660 g/L EC		Reclaim II	Dow AgroSciences
metsulfuron - 12.6% WG (F)	aminocyclopyrachlor - 39.5% WG (F)			Navius	Bayer Environmental Sciences
metsulfuron - 3 g/L SC (F)	thifensulfuron - 30 g/L SC (F)	fluroxypyr - 150 g/L SC (F)		Travallas	FMC
metsulfuron - 8.6% SG (B)	tribenuron - 42.9% SG (B)			Express Pro	FMC
metsulfuron - 8.6% SG (B)	tribenuron - 42.9% SG (B)			Nuance Pro	FMC
nicosulfuron - 75% WG	rimsulfuron - 37.5% WG (F)			Accent	E. I. duPont Canada
nicosulfuron - 37.5% WG (F)				Ultim	E. I. duPont Canada
paraquat - 200 g/L SL				Gramoxone	Syngenta Canada
picloram - 240 g/L SL				Tordon 22K	Dow AgroSciences
picloram - 97.5 g/L SL (F)	2,4-D Ester - 360 g/L SL (F)			Grazon XC	Dow AgroSciences
pinoxaden - 50g/L EC				Axial	Syngenta Canada
pinoxaden - 25 g/L EC (F)	clodinafop - 25 g/L EC (F)			Traxos	Syngenta Canada
pinoxaden - 25 g/L EC (F1)	clodinafop - 25 g/L EC (F1)			TraxosTwo	Syngenta Canada
pinoxaden - 92.7 g/L EC (F)	florasulam - 7.7 g/L EC (F)	fluroxypyr - 90 g/L EC (F2)	2,4-D Ester - 360 g/L EC (F2)	Broadband	Syngenta Canada
pinoxaden - 50 g/L EC (F)	fluroxypyr - 87.5 g/L EC (F)			Axial Xtreme	Syngenta Canada
pinoxaden - 50 g/L EC	pyrasulfotole - 37.5 g/L EC (F)	bromoxynil - 210 g/L EC (F)		Axial iPak	Syngenta Canada
propyzamide - 400 g/L SC				Kerb SC	Dow AgroSciences
propyzamide - 50% WSP	2,4-D ester - 473 g/L (F)			Kerb 50WSP	Dow AgroSciences
pyraflufen - 6.1 g/L (F)	MCPA ester - 420 g/L (F)			BlackHawk (new)	Nufarm Agriculture
pyraflufen - 13.5 g/L (F)	bromoxynil - 210 g/L EC (F)			Goldwing	Nufarm Agriculture
pyrasulfotole - 37.5 g/L EC (F)	bromoxynil - 210 g/L EC (F)			Infinity	Bayer CropScience
pyrasulfotole - 37.5 g/L EC (F)	fenoxaprop-p - 46 g/L EC (F)	fluroxypyr - 180 g/L EC		Infinity FX	Bayer CropScience
pyrasulfotole - 15.5 g/L EC (F)	pinoxaden - 50 g/L EC (F)	bromoxynil - 87.5 g/L EC (F)		Tundra	Bayer CropScience
pyrasulfotole - 37.5 g/L EC (F)	thiencarbazone - 5 g/L SC (F)	bromoxynil - 210 g/L EC (F)		Axial iPak	Syngenta Canada
pyrasulfotole - 31.3 g/L EC (F)	carfentrazone - 240 g/L EC	bromoxynil - 175 g/L EC (F)		Velocity m <sup>3</sup>	Bayer CropScience
pyroxasulfone - 85% WG	carfentrazone - 53 g/L SE (F)			Focus (co-pack)	FMC
pyroxasulfone - 447 g/L SE (F)	flumioxazin - 33.5% WG (F)			Focus	FMC
pyroxasulfone - 44.5% WG (F)	sulfentrazone - 250 g/L SC (F)			Fierce	Valent Canada
pyroxasulfone - 250 g/L SC (F)				Authority Supreme	FMC
pyroxulam - 21.5% WG	fluroxypyr - 333 g/L EC	2,4-D Ester - 660 g/L EC		Simplicity GoDRI	Dow AgroSciences
pyroxulam - 30 g/L SC	hauloxifen - 5% WG (F)			Simplicity OD	Dow AgroSciences
pyroxulam - 30 g/L OD				Tandem	Dow AgroSciences
pyroxulam - 15% WG (F)				Rexade	Dow AgroSciences
quinclorac 180 g/L SN				Facet L	BASF Canada
quinclorac - 75% WDG	thifensulfuron:tribenuron - 10.3%:5.2% SG (B)			Clever	Great Northern Growers UAP
quinclorac - 75% WDG				Ingenious	Univar Canada
quinclorac - 75% WDG				Masterline Quinclorac	Univar Canada
quinclorac - 51.55% SG (B)				Triton C	FMC
quizalofop-p - 96 g/L EC				Assure II	E. I. duPont Canada
quizalofop-p - 96 g/L EC				Contender	IPCO
quizalofop-p - 96 g/L EC				Yuma GL	Gowan Canada
rimsulfuron - 20% WG				Sortan IS	E. I. DuPont Canada
rimsulfuron - 25% WG				Prism SG	E. I. DuPont Canada
rimsulfuron - 37.5% WG (F)	nicosulfuron - 37.5% WG (F)			Ultim 75DF/Grande	E. I. DuPont Canada
saffluenacil - 342 g/L SC				Heat LQ	BASF Canada
saffluenacil - 70% SG				Heat WG	BASF Canada
sethoxydim - 450 g/L EC	imazamox - 25 g/L SL			Poast Ultra	BASF Canada
sethoxydim - 450 g/L EC				Solo Ultra	BASF Canada

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
sethoxydim - 450 g/L EC	imazamox - 35% WG (F)	imazethapyr - 35% WG (F)	Odyssey Ultra		BASF Canada
sethoxydim - 450 g/L EC	imazamox - 35% WG (F)	imazethapyr - 35% WG (F)	Odyssey Ultra NXT		BASF Canada
simazine - 480 g/L SC			Simazine 480		Loveland Products
simazine - 90% WG			Princep Nine T		True North
sulfentrazone - 480 g/L SC	carfentrazone - 240 g/L EC		Authority		FMC
sulfentrazone - 480 g/L SC	pyroxasulfone - 250 g/L SC (F)		Authority Charge		FMC
sulfentrazone - 250 g/L SC (F)			Authority Supreme		FMC
thiencarbazono - 10 g/L SC	fluroxypyr - 333 g/L EC	thiencarbazono:tribenuron - 50%:50% SG	Varro		Bayer CropScience
thiencarbazono - 10 g/L SC			Predicade		FMC
thiencarbazono - 5 g/L SC (F)	pyrasulfotole - 31.3 g/L EC (F)	bromoxynil - 175 g/L EC (F)		Velocity m <sup>3</sup>	Bayer CropScience
thiencarbazono - 10 g/L SC	tribenuron - 50% SG			Luxxur	Bayer CropScience
thiencarbazono - 50% SG				Pinnacle SG	FMC
thiencarbazono - 30 g/L SC (F)	fluroxypyr - 150 g/L SC (F)	metasulfuron - 3 g/L SC (F)		Travallas	FMC
thiencarbazono:tribenuron - 33.3%:16.7% SG				Refine SG	FMC
thiencarbazono:tribenuron - 50%:25% SG (F)				Deploy	Arysta LifeScience
thiencarbazono:tribenuron - 50%:25% SG (F)				MPower R	Agricity
thiencarbazono:tribenuron - 50%:25% SG (F)				Nimble	FMC
thiencarbazono:tribenuron - 50%:25% SG (F)				Enforcer MSU	Nufarm Agriculture
thiencarbazono:tribenuron - 50%:25% SG	bromoxynil - 200 g/L EC (F)	MCPA ester - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	Harmony SG	FMC
thiencarbazono:tribenuron - 33.3%:16.7% SG	clodinafop - 128 g/L EC			Harmony K	FMC
thiencarbazono:tribenuron - 7.7%:3.9% WG (B)	clodinafop - 128 g/L EC	dicamba - 54% WG (B)		Signal FSU	Nufarm Agriculture
thiencarbazono:tribenuron - 50%:25% SG	clodinafop - 112 g/L (F)	fluroxypyr - 217 g/L EC (F)		Barricade II	FMC
thiencarbazono:tribenuron - 50%:50% SG (F)	fluroxypyr - 333 g/L EC			Retain SG (old)	Loveland Products
thiencarbazono:tribenuron - 33.3%:16.7% SG	fluroxypyr - 180 g/L EC	2,4-D Ester - 564 g/L EC		Retain SG (new)	Loveland Products
thiencarbazono:tribenuron - 33.3%:16.7% SG	fluroxypyr - 333 g/L EC	2,4-D Ester - 564 g/L EC		Predicade	FMC
thiencarbazono:tribenuron - 50%:50% SG	fluroxypyr - 333 g/L EC	thiencarbazono - 10 g/L SC	MCPA ester - 600 g/L EC	BroadSide	Loveland Products
thiencarbazono:tribenuron - 33.3%:16.7% SG	MCPA ester - 500 or 600 g/L EC			Refine M	FMC
thiencarbazono:tribenuron - 33.3%:16.7% SG	MCPA Ester - 500 or 600 g/L EC			Triton C	FMC
thiencarbazono:tribenuron - 33.3%:16.7% SG	quinclorac - 51.55% SG (B)			Armezon	BASF Canada
10.3%:5.2% SG (B)				Impact	UAP
topremazone - 336 g/L SC				Achieve (Liquid Achieve)	Dow AgroSciences
topremazone - 336 g/L SC				Bison	ADAMA Canada
tralkoxydim - 400 g/L SC				Marengo	Loveland Products
tralkoxydim - 400 g/L SC				Nufarm Tralkoxydim	Nufarm Agriculture
tralkoxydim - 400 g/L SC				Avadex MicroActiv	Gowan Canada
tralkoxydim - 400 g/L SC				Avadex Liquid EC	Gowan Canada
trallate - 10% G					
trallate - 480 g/L EC					



(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
trifluralin - 10% G (F)	trifluralin - 4% G (F)			Fortress MicroActiv	Gowan Canada
tribenuron - 25% WG (F)	flucarbazone - 45 %WG (F)			Inferno Duo	Arysta LifeScience
tribenuron - 50% SG				Express SG	FMC
tribenuron - 75% WG				Inferno	Arysta LifeScience
tribenuron - 75% WG				MPower X	Agricity
tribenuron - 75% WG				Nuance	FMC
tribenuron - 75% WG				Spike	Nufarm Agriculture
tribenuron - 75% WG	2,4-D ester - 660 g/L EC			Ko-Act	Nufarm Agriculture
tribenuron - 50% SG	dicamba - 480 g/L SL			Express FX	FMC
tribenuron - 8.25% WG (F)	dicamba - 58.45% WG (F)	2,4-D ester - 660g/L EC		Triton K	FMC
tribenuron - 42.9% SG (B)	metsulfuron - 8.6% SG (B)			Express Pro	FMC
tribenuron - 42.9% SG (B)	metsulfuron - 8.6% SG (B)			Nuance Pro	FMC
tribenuron - 50% SG	thiencarbazone - 10 g/L SC			Luxxur	Bayer CropScience
trifluralin - 10% G				Bonanza 10G	UAP
trifluralin - 10% G				Rival 10G	Nufarm Agriculture
trifluralin - 10% G				Treflan MicroActiv	Gowan Canada
trifluralin - 480 g/L EC				Bonanza 480 Liquid	UAP
trifluralin - 480 g/L EC				Treflan Liquid EC	Gowan Canada
trifluralin - 500 g/L EC				Rival EC	Nufarm Agriculture

## Foliar Fungicides

(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
ametoctradin - 300 g/L SC (F)	dimethomorph - 225 g/L SC (F)			Zampiro	BASF Canada
azoxystrobin - 75 g/L SC (F)	propiconazole - 125g/L SC (F)			Trivaprio	Syngenta Canada
azoxystrobin - 75 g/L SC (F)	propiconazole - 125 g/L SC (F)	benzovindiflupyr - 100 g/L EC		Quilt	Syngenta Canada
azoxystrobin - 143 g/L SC (F)	propiconazole - 124 g/L SC (F)			Topnotch	ADAMA Canada
azoxystrobin - 200 g/L SC (F)	difenconazole - 125 g/L SC (F)			Quadrifis Top	Syngenta Canada
azoxystrobin - 250 g/L SC	benzovindiflupyr - 100 g/L EC			Elatus	Syngenta Canada
azoxystrobin - 250 g/L SC				Azoshy 250SC	Sharda Crop Chem
azoxystrobin - 250 g/L SC				Quadrifis	Syngenta Canada
<i>Bacillus amyloliquifaciens</i> - 5x10 <sup>10</sup> spores/mL AS				Double Nickel LC	UAP
<i>Bacillus amyloliquifaciens</i> - 1x10 <sup>10</sup> spores/mL AS				Double Nickel 55	UAP
<i>Bacillus mycooides</i> - 40% WG				LifeGard WG	UAP
<i>Bacillus subtilis</i> - 1.34% SC				Serenade CPB	Bayer CropScience
<i>Bacillus subtilis</i> - 14.6% WP				Serenade Max	Bayer CropScience
benzovindiflupyr - 78 g/L EC (F)	difenoconazole - 117g/L EC (F)			Aprovia Top	Syngenta Canada
benzovindiflupyr - 100 g/L EC	azoxystrobin - 75 g/L SC (F)			Trivaprio	Syngenta Canada
benzovindiflupyr - 100 g/L EC	azoxystrobin - 250 g/L SC	propiconazole - 125g/L SC (F)		Elatus	Syngenta Canada
boscalid - 250 g/L SC (F)	prothioconazole - 150 g/L SC (F)			Cotegra	BASF Canada
boscalid - 70% WG	pyraclostrobin - 250 g/L EC			Lance AG	BASF Canada
boscalid - 70% WG				Cantus WDG	BASF Canada
boscalid - 70% WG				Lance WDG	BASF Canada
chlorothalonil - 500 g/L SC				Bravo 500	Syngenta Canada
chlorothalonil - 500 g/L SC				Bravo ZN	Syngenta Canada
chlorothalonil - 720 g/L SC				Echo 720	UAP





## Seed Treatments

(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
azoxystrobin - 143 g/L SC azoxystrobin - 1.33% FS azoxystrobin - 1.33% FS	fludioxonil - 143 g/L SC fludioxonil - 3.32% FS fludioxonil - 3.32% FS	difenoconazole - 112 g/L SC metalaxyl-m+s - 2.65% FS metalaxyl-m+s - 2.65% FS	thiabendazole - 26.5% FS thiabendazole: thiamethoxam - 26.5:47.6% FS	Stadium Maxim Quattro Cruiser Maxx Corn	Syngenta Canada Syngenta Canada Syngenta Canada
captan - 30% FS carbathiin - 50 g/L FS carbathiin - 133.33 g/L FS	metalaxyl - 5.36 g/L FS metalaxyl - 13.33 g/L FS	clothianidin - 285.7 g/L FS ipconazole - 5.0 g/L FS	trifloxystrobin - 7.14 g/L FS	Agrox FL Prosper FX Rancona Trio	Norac Concepts Bayer CropScience Arysta LifeScience Canada Arysta LifeScience Canada
carbathiin - 15.59% FS	thiram - 13.25% FS		Vitaflo 280		
carbathiin - 15.59% FS carbathiin - 15.59% FS carbathiin - 47.6 g/L FS clothianidin - 600 g/L FS	thiram - 13.25% FS thiram - 13.25% FS thiram - 95.3 g/L FS	imidacloprid - 285.7 g/L FS	Vitaflo SP Fungicide Vitaflo Fungicide Gaucho CS FL NipsIt INSIDE 600		IPC IPC Bayer CropScience Valent Canada
clothianidin - 600 g/L FS clothianidin - 600 g/L FS clothianidin - 30.7 g/L FS	metalaxyl - 9.24 g/L FS	metconazole - 4.92 g/L FS	Insecticide Poncho 600FS Titan NipsIt SUITE Cereals OF Seed Protectant		Bayer CropScience Bayer CropScience Valent Canada
clothianidin - 285.7 g/L FS clothianidin - 290 g/L FS clothianidin - 600 g/L FS cyantraniliprole - 200 g/L FS cyantraniliprole - 600 g/L FS cyantraniliprole - 625 g/L FS difenoconazole - 19.4 g/L FS difenoconazole - 112 g/L SC difenoconazole - 36.8 g/L FS difenoconazole - 123 g/L FS	metalaxyl - 5.36 g/L FS metalaxyl - 7.15 g/L FS penflufen - 100 g/L FS  fludioxonil - 19.4 g/L FS fludioxonil - 143 g/L SC fludioxonil - 7.6 g/L FS fludioxonil - 62.5 g/L FS	trifloxystrobin - 7.14 g/L FS trifloxystrobin - 7.15 g/L FS prothioconazole - 18 g/L FS  azoxystrobin - 143 g/L SC metalaxyl-m+s - 9.2 g/L FS thiamethoxam - 250 g/L FS	carbathiin - 50 g/L FS penflufen - 10.7 g/L FS  sedaxane - 15.4 g/L FS	Prosper FX Prosper EverGol Titan Emesto Verimark Fortenza Lumiderm Maxim D Stadium Vibrance Quattro Cruiser Maxx Potato Extreme Helix Vibrance	Bayer CropScience Bayer CropScience Bayer CropScience E.i. duPont Canada Syngenta Canada E.i. duPont Canada Syngenta Canada Syngenta Canada Syngenta Canada Syngenta Canada Syngenta Canada
difenoconazole - 16 g/L FS	fludioxonil - 1.7 g/L FS	thiamethoxam - 269 g/L FS	metalaxyl- m+s:sedaxane-5:3.4 g/L FS		Syngenta Canada
difenoconazole - 36.9 g/L FS	fludioxonil - 7.7 g/L FS	thiamethoxam - 61.5 g/L FS	metalaxyl-m+s: sedaxane-9:2:15.4 g/L FS sedaxane:sulfloxaflor-3:4: 500 g/L FS	Cruiser Vibrance Quattro	Syngenta Canada
difenoconazole - 16 g/L FS	fludioxonil - 1.7 g/L FS	thiamethoxam:metalaxyl- m+s-269:5 g/L FS		Visivio	Syngenta Canada
dimethyl benzyl ammonium chloride - 10% Liquid ethaboxam - 383 g/L FS ethaboxam - 383 g/L FS	fludioxonil - 25 g/L FS	metalaxyl-m+s - 37.5 g/L	sedaxane - 50 g/L FS	General Storage Disinfectant INTEGO Solo Fungicide Vibrance Maxx with INTEGO Seed Treatment Maxim PSP Maxim D Stadium Cruiser Maxx Potato Extreme	Ag-Services Valent Canada Syngenta Canada Valent Canada Syngenta Canada Syngenta Canada Syngenta Canada
fludioxonil - 0.5% DS fludioxonil - 19.4 g/L FS fludioxonil - 143 g/L SC fludioxonil - 62.5 g/L FS	difenoconazole - 19.4 g/L FS difenoconazole - 112 g/L SC difenoconazole - 123 g/L FS	azoxystrobin - 143 g/L SC thiamethoxam - 250 g/L FS			Syngenta Canada Syngenta Canada Syngenta Canada Syngenta Canada
fludioxonil - 0.5% DS fludioxonil - 0.73% FS fludioxonil - 25 g/L FS	mancozeb - 5.7% DS metalaxyl-m+s - 1.10% FS metalaxyl-m+s - 37.5 g/L FS	sedaxane - 50 g/L FS		Maxim MZ PSP Apron Maxx RTA Vibrance Maxx RFC	Syngenta Canada Syngenta Canada Syngenta Canada

(Component 1) Active Ingredient** - Formulation	(Component 2) Active Ingredient** - Formulation	(Component 3) Active Ingredient** - Formulation	(Component 4) Active Ingredient** - Formulation	Product	Company
fludioxonil - 0.73% FS	metalaxyl-m+s - 1.10% FS	sedaxane - 500 g/L FS	difenoconazole - 36.8 g/L FS	<i>Vibrance Maxx RTA</i>	Syngenta Canada
fludioxonil - 7.6 g/L FS	metalaxyl-m+s - 9.2 g/L FS	sedaxane - 15.4 g/L FS	ethaboxam - 383 g/L FS	<i>Vibrance Quattro</i>	Syngenta Canada
fludioxonil - 25 g/L FS	metalaxyl-m+s - 37.5 g/L FS	sedaxane - 50 g/L FS		<i>Vibrance Maxx RFC with INTEGO Seed Treatment</i>	Valent Canada
fludioxonil - 25 g/L FS	metalaxyl-m+s - 20 g/L FS	thiabendazole - 150 g/L FS	azoxystrobin - 1.33% FS	<i>Apron Advance</i>	Syngenta Canada
fludioxonil - 3.32% FS	metalaxyl-m+s - 2.65% FS	thiabendazole - 26.5% FS		<i>Maxxim Quattro</i>	Syngenta Canada
fludioxonil - 1.12% FS	metalaxyl-m+s - 1.7% FS	thiamethoxam - 22.6% FS	azoxystrobin:	<i>Cruiser Maxx Beans</i>	Syngenta Canada
fludioxonil - 3.32% FS	metalaxyl-m+s - 2.65%	thiamethoxam - 47.6%	thiabendazole -	<i>Cruiser Maxx Corn</i>	Syngenta Canada
fludioxonil - 0.73% FS	metalaxyl-m+s - 1.1% FS	thiamethoxam - 47.6%	1.33:26.5% FS		
fludioxonil - 1.12% FS	metalaxyl-m+s - 1.7% FS	thiamethoxam - 22.6% FS	sedaxane - 500 g/L FS	<i>Cruiser Maxx Vibrance Pulses</i>	Syngenta Canada
fludioxonil - 1.7 g/L FS	metalaxyl-m+s - 5 g/L FS	thiamethoxam - 269 g/L FS	sedaxane - 500 g/L FS	<i>Cruiser Maxx Vibrance Beans</i>	Syngenta Canada
fludioxonil - 7.7 g/L FS	metalaxyl-m+s - 9.2 g/L FS	thiamethoxam - 61.5 g/L FS	sedaxane: difenoconazole-3.4:16 g/L FS	<i>Helix Vibrance</i>	Syngenta Canada
fludioxonil - 1.7 g/L FS	metalaxyl-m+s - 5 g/L FS	thiamethoxam:	sedaxane: difenoconazole-15.4:36.9 g/L FS	<i>Cruiser Vibrance Quattro</i>	Syngenta Canada
fluxapyroxad - 17 g/L FS	metalaxyl - 10 g/L FS	pyraclostrobin - 17 g/L FS	difenoconazole:	<i>Visivio</i>	Syngenta Canada
hydrogen peroxide - 27% LS			sulfoxaflor - 16:500 g/L FS		
imidacloprid - 240 g/L FS				<i>Insure Pulse</i>	BASF Canada
imidacloprid - 240 g/L FS				<i>StorOx</i>	Biosafe Systems
imidacloprid - 600 g/L FS				<i>Admire SPT</i>	Bayer CropScience
imidacloprid - 600 g/L FS				<i>Alias 240SC</i>	ADAMA Canada
imidacloprid - 600 g/L FS				<i>Sombrero 600FS</i>	ADAMA Canada
imidacloprid - 285.7 g/L FS	carbathiin - 47.6 g/L FS	thiram - 95.3 g/L FS		<i>Stress Shield 600</i>	Bayer CropScience
imidacloprid - 600 g/L FS	metalaxyl - 6.6 g/L FS	tebuconazole - 5 g/L FS		<i>Gaucha CS FL</i>	Bayer CropScience
imidacloprid - 600 g/L FS	metalaxyl - 6.2 g/L FS	tebuconazole - 3.0 g/L FS		<i>Raxil WW</i>	Bayer CropScience
imidacloprid - 600 g/L FS			prothioconazole -	<i>Raxil PRO Shield</i>	Bayer CropScience
imidacloprid - 600 g/L FS	metalaxyl - 317 g/L FS	penflufen - 154 g/L FS	15.4 g/L FS		
ipconazole - 9.38 g/L FS	carbathiin - 87.5 g/L FS		trifloxystrobin - 154 g/L FS	<i>Triflex EverGol Shield</i>	Bayer CropScience
				<i>Rancona RS</i>	Arysta LifeScience
ipconazole - 5.0 g/L FS	carbathiin - 133.33 g/L FS	metalaxyl - 13.33 g/L FS			Canada
ipconazole - 6.15 g/L FS				<i>Rancona Trio</i>	Arysta LifeScience
mancozeb - 16% DS	metalaxyl - 4.61 g/L FS			<i>Rancona Pinnacle</i>	Canada
mancozeb - 16% DS					Canada
mancozeb - 16% DS				<i>Solan MZ</i>	Norac Concepts
mancozeb - 5.7% DS	fludioxonil - 0.5% DS			<i>Tubeal</i>	Norac Concepts
mandipropamid - 250 g/L FS				<i>Potato ST16</i>	Wilbur-Ellis Co.
metalaxyl - 317 g/L FS				<i>Maxxim MZ PSP</i>	Syngenta Canada
metalaxyl - 317 g/L FS				<i>Revus</i>	Syngenta Canada
				<i>Allegiance FL</i>	Bayer CropScience
				<i>Belmont 2.7FS</i>	Arysta LifeScience
metalaxyl - 317 g/L FS	ipconazole - 6.15 g/L FS				Canada
metalaxyl - 4.61 g/L FS				<i>Trilex Component B</i>	Bayer CropScience
	ipconazole - 5.0 g/L FS			<i>Rancona Pinnacle</i>	Arysta LifeScience
metalaxyl - 13.33 g/L FS					Canada
metalaxyl - 46.5 g/L FS	metconazole 23.2 g/L FS			<i>Rancona Trio</i>	Arysta LifeScience
				<i>Metlock CT</i>	Canada
					Valent Canada

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
metalaxyl - 9.24 g/L FS	metconazole - 4.92 g/L FS	clothianidin - 30.7 g/L FS		Nipsit SUITE Cereals OF Seed Protectant	Valent Canada
metalaxyl - 61.4 g/L FS	prothioconazole - 76.8 g/L FS	penflufen - 38.4 g/L FS		EverGol Energy	Bayer CropScience
metalaxyl - 10 g/L FS	pyraclostrobin - 17 g/L FS	triticonazole - 17 g/L FS		Insure Cereal	BASF Canada
metalaxyl - 10 g/L FS	pyraclostrobin - 17 g/L FS	fluxapyroxad - 17 g/L FS		Insure Pulse	BASF Canada
metalaxyl - 10.8 g/L FS	trifloxystrobin - 13.5 g/L FS		carbathiin - 50 g/L FS	Trilex AL	Bayer CropScience
metalaxyl - 5.36 g/L FS	trifloxystrobin - 7.14 g/L FS	clothianidin - 285.7 g/L FS	penflufen - 10.7 g/L FS	Prosper FX	Bayer CropScience
metalaxyl - 7.15 g/L FS	trifloxystrobin - 7.15 g/L FS	clothianidin - 290 g/L FS		Prosper EverGol	Bayer CropScience
metalaxyl - 317 g/L FS	trifloxystrobin - 154 g/L FS	penflufen - 154 g/L FS		Trilex EverGol	Bayer CropScience
metalaxyl - 6.6 g/L FS	trifloxystrobin - 154 g/L FS	penflufen - 154 g/L FS		Trilex EverGol Shield	Bayer CropScience
metalaxyl - 6.2 g/L FS	tebuconazole - 5 g/L FS	imidacloprid - 600 g/L FS		Raxil MD	Bayer CropScience
metalaxyl - 6.2 g/L FS	tebuconazole - 3.0 g/L FS	imidacloprid - 600 g/L FS	prothioconazole - 15.4 g/L FS	Raxil PRO Shield	Bayer CropScience
metalaxyl - 6.6 g/L FS	tebuconazole - 5 g/L FS	imidacloprid - 600 g/L FS		Raxil WW	Bayer CropScience
metalaxyl - 6.2 g/L FS	tebuconazole - 3.0 g/L FS	prothioconazole - 15.4 g/L FS		Raxil PRO	Bayer CropScience
metalaxyl-m+s - 1.10% FS	fludioxonil - 0.73% FS			Apron Maxx RTA	Syngenta Canada
metalaxyl-m+s - 37.5 g/L FS	fludioxonil - 25 g/L FS	sedaxane - 50 g/L FS		Vibrance Maxx RFC	Syngenta Canada
metalaxyl-m+s - 1.10% FS	fludioxonil - 0.73% FS	sedaxane - 500 g/L FS		Vibrance Maxx RTA	Syngenta Canada
metalaxyl-m+s - 9.2 g/L FS	fludioxonil - 7.6 g/L FS	sedaxane - 15.4 g/L FS	difenoconazole - 36.8 g/L FS	Vibrance Quattro	Syngenta Canada
metalaxyl-m+s - 37.5 g/L FS	fludioxonil - 25 g/L FS	sedaxane - 50 g/L FS	ethaboxam - 383 g/L FS	Vibrance Maxx RFC with INTEGO Seed Treatment	Syngenta Canada
metalaxyl-m+s - 20 g/L FS	fludioxonil - 25 g/L FS	thiabendazole - 150 g/L FS		Apron Advance	Valent Canada
metalaxyl-m+s - 2.65% FS	fludioxonil - 3.32% FS	thiabendazole - 26.5% FS		Maxxim Quattro	Syngenta Canada
metalaxyl-m+s - 1.7% FS	fludioxonil - 1.12% FS	thiamethoxam - 22.6% FS	azoxystrobin - 1.33% FS	Cruiser Maxx Beans	Syngenta Canada
metalaxyl-m+s - 2.65% FS	fludioxonil - 3.32% FS	thiamethoxam - 47.6% FS	azoxystrobin: thiabendazole - 1.33:26.5% FS	Cruiser Maxx Corn	Syngenta Canada
metalaxyl-m+s - 5 g/L FS	fludioxonil - 1.7 g/L FS	thiamethoxam - 269 g/L FS	sedaxane: difenoconazole- 3.4:16 g/L FS	Helix Vibrance	Syngenta Canada
metalaxyl-m+s - 9.2 g/L FS	fludioxonil - 7.7 g/L FS	thiamethoxam - 61.5 g/L FS	sedaxane: difenoconazole- 15.4:36.9 g/L FS	Cruiser Vibrance Quattro	Syngenta Canada
metalaxyl-m+s - 5 g/L FS	fludioxonil - 1.7 g/L FS	thiamethoxam: sedaxane - 269:3.4 g/L FS	difenoconazole: sulfoxaflor- 16:500 g/L FS	Visivio	Syngenta Canada
metalaxyl-m+s - 1.1% FS	fludioxonil - 0.73% FS	thiamethoxam - 47.5% FS	sedaxane - 500 g/L FS	Cruiser Maxx Vibrance	Syngenta Canada
metalaxyl-m+s - 1.7% FS	fludioxonil - 1.12% FS	thiamethoxam - 22.6% FS	sedaxane - 500 g/L FS	Pulses	Syngenta Canada
metconazole - 23.2 g/L FS	metalaxyl - 46.5 g/L FS	clothianidin - 30.7 g/L FS		Beans	Syngenta Canada
metconazole - 4.92 g/L FS	metalaxyl - 9.24 g/L FS			Metlock CT	Valent Canada
mono/di-potassium salts of phosphorous acid - 53% SC				Nipsit SUITE Cereals OF	Valent Canada
mono/di-potassium salts of phosphorous acid - 53% SC				Seed Protectant	Winfield Solutions
penflufen - 10.7 g/L FS	metalaxyl - 7.15 g/L FS			Confine Extra	Winfield Solutions
penflufen - 154 g/L FS	metalaxyl - 317 g/L FS			Rampart	Loveland Products Canada
penflufen - 154 g/L FS	prothioconazole - 18 g/L FS			Prosper EverGol	Bayer CropScience
penflufen - 100 g/L FS	prothioconazole - 76.8 g/L FS	trifloxystrobin - 7.15 g/L FS	clothianidin - 290 g/L FS	Trilex EverGol	Bayer CropScience
penflufen - 38.4 g/L FS	trifloxystrobin - 154 g/L FS	trifloxystrobin - 154 g/L FS		Trilex EverGol Shield	Bayer CropScience
penflufen - 154 g/L FS	trifloxystrobin - 154 g/L FS	clothianidin - 600 g/L FS		Emesto Silver	Bayer CropScience
prothioconazole - 76.8 g/L FS	trifloxystrobin - 154 g/L FS	metalaxyl - 61.4 g/L FS		Titan Emesto	Bayer CropScience
prothioconazole - 76.8 g/L FS	trifloxystrobin - 154 g/L FS	metalaxyl - 61.4 g/L FS		EverGol Energy	Bayer CropScience
prothioconazole - 76.8 g/L FS	trifloxystrobin - 154 g/L FS	metalaxyl - 61.4 g/L FS		Triflex Component A	Bayer CropScience
prothioconazole - 15.4 g/L FS	metalaxyl - 6.2 g/L FS	penflufen - 38.4 g/L FS		EverGol Energy	Bayer CropScience
prothioconazole - 15.4 g/L FS	metalaxyl - 6.2 g/L FS	tebuconazole - 3.0 g/L FS		Raxil PRO	Bayer CropScience
prothioconazole - 15.4 g/L FS	metalaxyl - 6.2 g/L FS	tebuconazole - 3.0 g/L FS	imidacloprid - 600 g/L FS	Raxil PRO Shield	Bayer CropScience

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
prothioconazole - 18 g/L FS	penflufen - 100 g/L FS	clothianidin - 600 g/L FS		Emesto Silver	Bayer CropScience
prothioconazole - 18 g/L FS	penflufen - 100 g/L FS	triticinazole - 17 g/L FS		Titan Emesto	Bayer CropScience
pyraclostrobin - 17 g/L FS	metalaxyl - 10 g/L FS	fluxapyroxad - 17 g/L FS		Insure Cereal	BASF Canada
pyraclostrobin - 17 g/L FS	metalaxyl - 10 g/L FS			Insure Pulse	BASF Canada
saponins of <i>Chenopodium quinoa</i> - 63.02% WS				Heads Up Plant Protectant	Heads Up Plant Protectants
sedaxane - 500 g/L FS				Vibrance 500FS	Syngenta Canada
sedaxane - 15.4 g/L FS	metalaxyl-m+s - 9.2 g/L FS	difenoconazole - 36.8 g/L FS	fludioxonil - 7.6 g/L FS	Vibrance Quattro	Syngenta Canada
sedaxane - 3.4 g/L FS	metalaxyl-m+s - 5 g/L FS	difenoconazole - 16 g/L FS	1.7:2.69 g/L FS	Helix Vibrance	Syngenta Canada
sedaxane - 50 g/ L FS	metalaxyl-m+s - 9.2 g/L FS	difenoconazole - 36.9 g/L FS	fludioxonil: thiamethoxam-	Cruiser Vibrance Quattro	Syngenta Canada
sedaxane - 500 g/L FS	metalaxyl-m+s - 1.1% FS	difenoconazole: fludioxonil- 16:1.7 g/L FS	7.7:61.5 g/L FS	Visivio	Syngenta Canada
sedaxane - 500 g/L FS	metalaxyl-m+s - 1.7% FS	fludioxonil - 25 g/L FS	thiamethoxam: sulfoxafo-		
sedaxane - 500 g/L FS	metalaxyl-m+s - 1.10% FS	fludioxonil - 0.73% FS	269:50 g/L FS	Vibrance Maxx RFC	Syngenta Canada
sedaxane - 50 g/L FS	metalaxyl-m+s - 37.5 g/L FS	fludioxonil - 25 g/L FS		Vibrance Maxx RTA	Syngenta Canada
sedaxane - 500 g/L FS	metalaxyl-m+s - 37.5 g/L FS	fludioxonil - 0.73% FS	ethaboxam - 383 g/L FS	Vibrance Maxx RFC with INTEGO Seed Treatment	Syngenta Canada
sedaxane - 500 g/L FS	metalaxyl-m+s - 1.1% FS	fludioxonil - 0.73% FS	thiamethoxam - 47.6% FS	Pulses	Valent Canada
sedaxane - 500 g/L FS	metalaxyl-m+s - 1.7% FS	fludioxonil - 1.12% FS	thiamethoxam - 22.6% FS	Cruiser Maxx Vibrance	Syngenta Canada
sulfoxaflor - 500 g/L FS	difenoconazole - 16 g/L FS	fludioxonil:metalaxyl- m+s-1.7:5 g/L FS	sedaxane: thiamethoxam - 3.4:2.69 g/L FS	Beans	Syngenta Canada
sulfoxaflor - 500 g/L FS	difenoconazole - 16 g/L FS	imidacloprid - 600 g/L FS	prothioconazole - 15.4 g/L FS	Rascendo	Syngenta Canada
tebuconazole - 5 g/L FS	metalaxyl - 6.6 g/L FS	imidacloprid - 600 g/L FS		Visivio	Syngenta Canada
tebuconazole - 5 g/L FS	metalaxyl - 6.6 g/L FS	imidacloprid - 600 g/L FS		Raxil MD	Bayer CropScience
tebuconazole - 3.0 g/L FS	metalaxyl - 6.2 g/L FS	prothioconazole - 15.4 g/L FS		Raxil WW	Bayer CropScience
tebuconazole - 3.0 g/L FS	metalaxyl - 6.2 g/L FS			Raxil PRO Shield	Bayer CropScience
thiabendazole - 500 g/L FS	metalaxyl - 6.2 g/L FS			Raxil PRO	Bayer CropScience
thiabendazole - 150 g/L FS	metalaxyl-m+s - 20 g/L FS	fludioxonil - 25 g/L FS		Mertect SC	Syngenta Canada
thiabendazole - 150 g/L FS	metalaxyl-m+s - 2.65% FS	fludioxonil - 3.32% FS	azoxystrobin - 1.33% FS	Apron Advance	Syngenta Canada
thiabendazole - 26.5% FS	metalaxyl-m+s - 2.65% FS	fludioxonil - 3.32% FS	azoxystrobin: thiamethoxam - 1.33:47.6% FS	Maxim Quattro	Syngenta Canada
thiabendazole - 26.5% FS	metalaxyl-m+s - 2.65% FS			Cruiser Maxx Corn	Syngenta Canada
thiamethoxam - 240 g/L FS				Actara 240SC	Syngenta Canada
thiamethoxam - 47.6% FS				Cruiser 5FS	Syngenta Canada
thiamethoxam - 250 g/L FS	fludioxonil - 62.5 g/L FS	difenoconazole - 123 g/L FS		Cruiser Maxx Potato	Syngenta Canada
thiamethoxam - 22.6% FS	fludioxonil - 1.12% FS	metalaxyl-m+s - 1.7% FS	azoxystrobin: thiabendazole - 1.33:26.5% FS	Extreme	Syngenta Canada
thiamethoxam - 47.6% FS	fludioxonil - 3.32% FS	metalaxyl-m+s - 2.65% FS	sedaxane - 500 g/L FS	Cruiser Maxx Beans	Syngenta Canada
thiamethoxam - 22.6% FS	fludioxonil - 1.12% FS	metalaxyl-m+s - 1.7% FS		Cruiser Maxx Corn	Syngenta Canada
thiamethoxam - 47.6% FS	fludioxonil - 0.73% FS	metalaxyl-m+s - 1.1% FS		Cruiser Maxx Vibrance	Syngenta Canada
thiamethoxam - 61.5 g/L FS	fludioxonil - 7.7 g/L FS	metalaxyl-m+s - 9.2 g/L FS	sedaxane - 500 g/L FS	Beans	Syngenta Canada
thiamethoxam - 269 g/L FS	fludioxonil - 1.7 g/L FS	metalaxyl-m+s - 5 g/L FS	sedaxane: difenoconazole - 15.4:36.9 g/L FS	Pulses	Syngenta Canada
			sedaxane: difenoconazole - 3.4:16 g/L FS	Cruiser Vibrance Quattro	Syngenta Canada
				Helix Vibrance	Syngenta Canada

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
thiamethoxam - 269 g/L FS	fludioxonil - 1.7 g/L FS	metalaxyl-m+; sedaxane-5:3.5 g/L FS	difenoconazole: sulfoxaflor- 16:500 g/L FS	Visivio	Syngenta Canada
thiophanate-methyl - 10% DS				Senator PSPT	Nippon Soda Company
thiram - 75% WP				Thiram 75WP	Arysta LifeScience Canada
thiram - 13.25% FS	carbathiin - 15.59% FS			Vitaflo 280	Arysta LifeScience Canada
thiram - 13.25% FS	carbathiin - 15.59% FS			Vitaflo SP Fungicide	IPCO
thiram - 13.25% FS	carbathiin - 15.59% FS			Vitaflo Fungicide	IPCO
thiram - 95.3 g/L FS	carbathiin - 47.6 g/L FS	imidacloprid - 285.7 g/L FS		GaUCHO CS FL	Bayer CropScience
trifloxystrobin - 13.5 g/L FS	metalaxyl - 10.8 g/L FS			Triflex AL	Bayer CropScience
trifloxystrobin - 7.14 g/L FS	metalaxyl - 5.36 g/L FS	clothianidin - 285.7 g/L FS	carbathiin - 50 g/L FS	Prosper FX	Bayer CropScience
trifloxystrobin - 7.15 g/L FS	metalaxyl - 7.15 g/L FS	clothianidin - 290 g/L FS	penflufen - 10.7 g/L FS	Prosper EverGol	Bayer CropScience
trifloxystrobin - 154 g/L FS	metalaxyl - 317 g/L FS	penflufen - 154 g/L FS		Triflex EverGol	Bayer CropScience
trifloxystrobin - 154 g/L FS	penflufen - 154 g/L FS			Triflex Component A	Bayer CropScience
trifloxystrobin - 154 g/L FS	pyraclostrobin - 17 g/L FS	metalaxyl - 10 g/L FS		Insure Cereal	BASF Canada



## Insecticides

Product	Active Ingredient	Formulation	Company
<i>Actara 240 SC/Actara 25 WG</i>	thiamethoxam	240 g/L SC, 25% WG	Syngenta Canada
<i>Admire 240 / SPT</i>	imidacloprid	240 g/L SC	Bayer CropScience
<i>Alias 240 SC</i>	imidacloprid	240 g/L SC	Loveland Products Canada
<i>Ambush</i>	permethrin	500 g/L EC	Amvac Chemical Corp.
<i>Assail</i>	acetamiprid	70% WP	Engage Agro / Nippon Soda Co. Ltd.
<i>Beleaf</i>	flonicamid	50% WP	FMC Corporation
<i>Capture</i>	bifenthrin	240 g/L	FMC Corporation
<i>Citadel 480EC</i>	chlorpyrifos	480 g/L EC	IPCO
<i>Closer</i>	sulfoxaflor	240 g/L	Dow AgroSciences
<i>Clutch</i>	clothianidin	50% WG	Valent Canada Inc.
<i>Concept</i>	imidacloprid : deltamethrin	75 g/L SC : 10 g/L SC	Bayer CropScience
<i>Coragen</i>	chlorantraniliprole	200 g/L SC	FMC Corporation
<i>Cygon 480EC/Cygon 480-Ag</i>	dimethoate	480 g/L EC	IPCO, FMC Corporation
<i>Decis</i>	deltamethrin	50 g/L EC	Bayer CropScience
<i>Delegate</i>	spinetoram	25% SG	Dow AgroSciences
<i>Dibrom</i>	naled	864 g/L EC	Loveland Products Canada
<i>Dipel 2X DF</i>	<i>Bacillus thuringiensis</i>	32 billion CLU/kg WG	Valent BioSciences
<i>Eco Bran</i>	carbaryl	2% spreadable bran bait	Peacock Industries
<i>Entrust</i>	spinosad	80% WP	Dow AgroSciences
<i>Fulfill</i>	pymetrozine	50% WG	Syngenta Canada
<i>Imidan</i>	phosmet	70% WP	Gowan Canada
<i>Insecto</i>	diatomaceous earth	90%	Natural Insecto Products Inc.
<i>Lagon 480E</i>	dimethoate	480 g/L EC	Loveland Products Canada
<i>Lannate</i>	methomyl	90% SP	E. I. duPont Canada
<i>Lorsban 4E</i>	chlorpyrifos	480 g/L EC	Dow AgroSciences
<i>Mako</i>	cypermethrin	407 g/L EC	Engage Agro Corp.
<i>Malathion 85E / 500</i>	malathion	85%, 500 g/L EC	Loveland Products Canada, IPCO
<i>Matador</i>	lambda-cyhalothrin	120 g/L EC	Syngenta Canada
<i>Minecto Duo</i>	thiamethoxam : cyantraniliprole	20% : 20% WG	Syngenta Canada
<i>Movento 240 SC</i>	spirotetramat	240 g/L SC	Bayer CropScience
<i>MPOWER Krypton</i>	chlorpyrifos	480 g/L	NewAgco Inc.
<i>Nolo Bait</i>	spores of <i>Nosema (Paranosema) locustae</i> Canning	Minimum of 2.2x10 <sup>6</sup> on coated wheat bran	M&R Durango, Inc.
<i>Nufos 4E</i>	chlorpyrifos	480 g/L EC	FMC Corporation
<i>Oberon</i>	spiromesifen	240 g/L SC	Bayer CropScience
<i>Orthene</i>	acephate	75% SP	Loveland Products Canada
<i>Perm-UP</i>	permethrin	384 g/L EC	United Phosphorous Inc
<i>Phostoxin</i>	aluminum phosphide	55% tablets	Degesch America Inc
<i>Poleci</i>	Delthamethrin	25 g/L EC	Bayer CropScience
<i>Pounce</i>	permethrin	384 g/L EC	FMC Corporation
<i>Protect-It</i>	diatomaceous earth	90%	Hedley Technologies Ltd
<i>Pyrifos 15G</i>	chlorpyrifos	15% G	Gowan Canada
<i>Pyrinex 480EC</i>	chlorpyrifos	480 g/L EC	ADAMA Canada
<i>Rimon 10 EC</i>	novaluron	10% EC	Platform Specialty Products
<i>Sevin XLR</i>	carbaryl	466 g/L	Univar Canada Ltd.
<i>Sharda chlorpyrifos 480 EC</i>	chlorpyrifos	480 g/L EC	Sharda CropChem Canada
<i>Ship 250 EC</i>	cypermethrin	250 g/L	Sharda CropChem Canada
<i>Silencer 120 EC</i>	lambda-cyhalothrin	120 g/L EC	ADAMA Canada
<i>Sluggo Professional</i>	ferric phosphate	0.76 % granules	Engage Agro Corp.
<i>Success 480 SC</i>	spinosad	480 g/L SC	Dow AgroSciences
<i>Superior 70 oil</i>	mineral oil	99%	Loveland Products Canada,
<i>Tempo</i>	cyfluthrin	20% WP	N.M. Bartlett Inc.
<i>Thimet 20G</i>	phorate	20% G	Bayer CropScience
<i>UP-Cyde</i>	cypermethrin	250 g/L EC	Amvac Chemical
<i>Voliam Xpress</i>	lambda-cyhalothrin: chlorantraniliprole	50 g/L: 100 g/L	United Phosphorous Inc Syngenta Canada
<i>Warhawk</i>	chlorpyrifos	480 g/L EC	Loveland Products Canada

## Key to Product Pages

### Pesticide Product Name

This field lists the pesticide product name. Where there is only one product the commercial “trade” name is given. Where more than one company sells pesticides with the same combination of active ingredients the “generic” (active ingredient) name is given.

If the active ingredients are all in a common formulation (liquid, granule, etc.) the generic name will appear as ‘Ingredient A/ Ingredient B’ and if the active ingredients are in separate containers to be mixed in the sprayer the names are given as ‘Ingredient A + Ingredient B’.

### Pesticide Resistance Group #

*This area will the pesticide active ingredient(s) to the mode of action that ingredient uses and refer to a page number where more information can be found.*

### Company:

This section identifies the company (or companies) that manufacture or market this crop protection product (or generic equivalents) in Canada as well as the PCP# for that (those) product(s). See page 7 for more information on PCP numbers. PCP#s are given as ‘(PCP#XXXXX)’ where XXXXX is a four or five digit number unique to that product. In some cases, where there are multiple components with separate PCP numbers, the PCP number will be provided below under ‘Formulation:’

### Formulation:

This section gives information on the active ingredient and its concentration in the product as well as information on formulation type and packaging types and configurations. Formulation strength (or concentrations) are given in % by weight for dry formulations and g/L for liquid formulations. PCP numbers may also be give for some products (see above).

### Crops and Staging:\*

This section indicates on which crops the product may be used and what stage of crop development it should be applied at. Rates may also be included in this section if they vary between crop types or crop stage.

*\*\*This section will also indicate which crops are registered under the User Requested Minor Use Label Expansion (URMULE) program. Some companies, as a condition of placing these minor crops on their labels request, that users of their product on these crops do so at their own risk because the registration was approved with information the company did not produce.*

*These crops will be flagged separately from the main crops.*

### Pest (Diseases, Insects, Weeds) and Staging:

This section indicates the pests (Diseases, Insects, or Weeds) that are indicated on the product label as controlled or suppressed, as well as any specifics on the timing of application relative to the pest stage if required. Rates may also be included in this section if they differ for different pests or stage of pest.

### Rates:

The rates provided in this section are given in the amount of product required per acre and the number of acres treated per package unit where possible. This section will also indicate any adjuvants that are to be used in conjunction with the product and the rate of that adjuvant.

This section will not be present if rates have been integrated into either of the previous **Crops** or **Pest** sections.

## Application Information:

- **Water Volume:** This section indicates the minimum carrier water volume to be used to apply the product. Using less than the recommended minimum carrier application volume can negatively affect pesticide performance, particularly with contact pesticides and when using low drift nozzles.
- **Nozzles and Pressure:** This section indicates if there are any particular nozzles that should or should not be used to apply the product. Pressures indicated reflect those for conventional nozzles. Low drift nozzles may require higher pressures for proper performance. A general statement of “Use nozzles and pressures designed to deliver proper coverage with **ASABE** \_\_\_ droplets” indicating the ideal droplet sizes to allow for the combination of lowest drift potential and best performance from the pesticide. ASABE refers to the American Society of Agricultural Engineers who have set standards a series of droplet measurements (in microns or micrometres) that classify droplet sizes from ‘fine’ to ‘very coarse’.

## How it Works:

This section typically refers to the page where a general description of the various modes of action of either herbicide, fungicides or insecticides.

## Effects of Growing Conditions:

This section summarizes any adverse conditions that will affect the biological function of the crop or the target pest and therefore possibly impact the product’s performance. In most cases both crop and target pest must be growing or functioning normally for pesticides to provide expected performance and/or crop tolerance. Adverse weather conditions such as extreme heat, cold, drought or flooding can slow or stop the biological processes in the crop or pest. These biological processes in the crop allow the pesticide to be degraded quickly. If biological processes that are attacked by the pesticide, and under normal conditions would kill the pest, are not functioning normally the pest may be able to rid itself of the pesticide before dying and recover from the application.

## Tank Mixes:

This section indicates which other pesticides the pesticide label indicates are registered for use as tank mix combinations with this pesticide.

Common mixes may include:

### Herbicides:

- (Subtitles may indicate specific crops or condition restrictions:)

### Insecticides:

### Fungicides:

### Fertilizers:

There may be additional pesticides that are registered but not listed on this product’s label. Other pesticides may have this product listed as a mix option on their labels. The note below (**in bold**) directs users to a chart inside the back cover that show all available mixes for this pesticide. The product listed on the left column of the chart is the product that supports the mix. Mixes supported by both products are marked with an ‘X’. Mixes supported by only one of the products is indicated by an arrow pointing to the left column.

*Included in the tank mix section in non-bolded italics may be any precautions against the mixing of pesticides which will have adverse reactions such as crop injury, reduced pest control or unusual increased danger in the use of the product.*

**Note: The above mixes are those listed on the pesticide label only. To check for other possible mixes see the blue fold out chart inside the back cover.**

## Restrictions:

Since most pesticides have a capacity to injure neighboring plants, wildlife or people, they will come with restrictions on their use in order to prevent this unintentional damage. Misuse of pesticides may result in as little as temporary or superficial damage to plants or a slight irritation to the eyes or nose, or could also result in poor performance of the pesticide, severe injury and/or yield loss to very sensitive plants and/or unacceptable residues in agricultural commodities, and/or serious illness or death of non-target organism or people. It is important to comply with product restrictions in order to minimize the impact of the pesticide used on non-target organisms and people. A selection of common restrictions and precautions found on product labels are provided in this section, **but it is important to read the label carefully in order to understand how to use the product properly.**

- **Rainfall:** This section indicates the required delay between application and rainfall to avoid reductions in the performance of the product or the unintentional movement of the product.
- **Re-entry:** This section indicates when it is safe for a person to re-enter treated field following an application of a particular pesticide without the same personal protection used to apply the product.
- **Resistance Management:** This section highlights products where an increased risk of the target pests developing resistance to the group of products (typically fungicides) has been identified. If no specific risk has been identified the reader is referred to a general resistance section. All pesticides have some risk of the target pest developing resistance. Rotating pesticide groups using as many different resistance groups as possible in the rotation is one way to avoid or delay resistance development.
- **Grazing:** This section indicates whether and how soon treated crops may be grazed by livestock or otherwise fed to livestock. This restriction is in place to avoid residues of the pesticide from being detected in milk or meat from animals consuming forage, greenfeed or straw from treated crops or forage.
- **Pre-harvest interval:** Is the time that must be left between application of a pesticide and the harvest of a crop in order to prevent greater than allowable residues of the pesticide in the harvested material. Harvest is the cutting of the crop (i.e. combining or hay cut) or removal of the harvestable material from the plant (i.e. picking fruit or stripper header). Maximum Residue Limits (MRLs) are set for commodities based on registered rates and staging of pesticides used in the production of those commodities. Disregarding these intervals can result in residues over the MRLs, which can lead to market disruptions.
- **Re-cropping:** This section indicates how soon specific crops may be seeded into treated fields. Failure to adhere to these delays could result in injury to the following crop.
- **Aerial Application:** This section indicates whether the product may be applied by aircraft and any special conditions that may be necessary.
- **Labelling:** In addition to other precautions and warnings, seed treatment products will also have statements about how seed treated with the product should be labeled.
- **Storage:** This section indicates how the product must be stored. As a general rule, unused pesticides should always be stored in their original containers in a secure, dry area, away from other pesticides, food or feed.
- **Buffer Zones:** This section will indicate any setback distances that are required from sensitive aquatic or upland habitats. Newer labels may indicate that these distances are from the downwind edge of the boom but older labels may not. Examples of aquatic habitats are lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands. Examples of terrestrial habitats are grasslands, forested areas, shelter belts, woodlots, hedgerows, riparian areas and shrublands.

In addition to the set back or 'buffer' distances indicated on product labels, provincial environment departments may also have additional restrictions or requirements for permits to apply pesticides to or near water. Check with the provincial environment department/ministry for more information.

## Tank Cleaning:

This section describes the measures that are required to properly clean out spray tanks. A general overview of sprayer cleaning is given on page 9, but products where there is a high risk of crop damage as a result of very low level contamination of the spray solution, will have specific measures indicated.

## Hazard Rating:

This section indicates the relative toxicity of the pesticide, formulations or components. For an explanation of the symbols used here see pages 7-8. An additional symbol that is used that is not a standard symbol is the (!) exclamation mark which indicates an otherwise undefined risk factor (i.e. irritation).

Example:



Caution – Eye Irritant

Some older products have not had hazard ratings developed, while other products have very low toxicity and do not have hazard warnings. Even in the absence of a hazard rating users should wear a minimum of nitrile gloves and an apron as well as long sleeved apparel during mixing and avoid unnecessary exposure.