

Fall Weed Control Provides Foundation For A Clean Crop

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Following harvest, a window opens for post-harvest weed control for many pulse and soybean growers in Western Canada. An open fall allows winter annuals to germinate and perennial weeds to resume growth. An open fall can also provide an opportunity for growers to layer soil-active herbicides down in the fall to set up cleaner fields next spring.

Annual and Winter Annual Weed Control

Winter annuals germinate in the fall and can survive over winter. Common winter annual weeds include stinkweed, flixweed, shepherd's purse, narrow-leaved hawk's-beard, and all members of the mustard family. Other annual broadleaf weeds that can sometimes survive over the winter include cleavers, chickweed, field violet, and stork's bill. All these weeds, if left uncontrolled in the fall, can grow fairly large before setting up rosettes to overwinter. In addition to consuming soil moisture in the fall, winter annuals may become too large to control easily in the spring with a pre-seed burndown.

Chickweed, ball mustard, wild mustard, narrow-leaved hawk's-beard, shepherd's purse, and stinkweed have also been confirmed as having Group 2 herbicide resistance. Control of these winter annuals becomes more critical in pulses since in-crop control options are limited and Clearfield® lentil herbicides would not control these Group 2 resistant biotypes.

Post-harvest weed control for winter annuals provides growers an opportunity to clean up fields with a different herbicide mode of action to help reduce the selection pressure on the Group 2 herbicides commonly used in pulse crops. Groups 4, 14, and 4+19 herbicides are registered in the fall, and are often tank-mixed with glyphosate (Group 9) to provide effective control.

Caution must be used in herbicide selection and time of herbicide application, as some herbicides will not breakdown as rapidly in the soil and cause germination damage the following spring. For example, a low rate of 2,4-D (280 grams active ingredient per hectare or four ounces active per acre) is safe for most pulse crops and soybeans, but higher rates may cause crop injury the following spring, especially if applied just prior to freeze-up. Similar precautions must be observed with other Group 4 herbicides registered for post-harvest application.

Typically, winter annuals are controlled with post-harvest herbicides from early October until freeze-up. However, late applications may affect the efficacy of glyphosate, which works better with warmer temperatures.

Make sure that current weed leaf staging and size is controlled with the herbicide labeled rates. Winter annuals quickly outgrow recommended herbicide stages, so scout fields to ensure optimum timing. Apply herbicides when the majority of winter annuals have emerged and are at the right stage for control.

Perennial Weed Control

Few options exist for in-crop perennial weed control in pulses, making a lead-up treatment of these weeds in the fall critical to maximizing yield. A fall application with glyphosate can be effective for perennial weed control, including Canada thistle, dandelion, foxtail barley, and quackgrass. In the fall, these perennials are moving nutrients downward to the root to build up new root material and energy reserves, to start growing the next spring. Glyphosate is translocated down into the root, increasing the amount of active ingredient that reaches the plant's growing point.

The best approach for control of Canada thistle and quackgrass, particularly for later maturing crops, is with a pre-harvest application. This timing has been shown to be more consistent and up to twice as effective as a post-harvest application. After harvest, adequate regrowth is required for glyphosate to be effective, usually four to six weeks. Plants should have a minimum of three to four new green leaves and quackgrass should be a minimum of eight inches tall. Apply glyphosate and other systemic herbicides during the heat of day when perennial weeds are actively growing and putting energy into their roots. Application timing from mid-September to early October usually provides the best post-harvest results, but applications can be made at any time while temperatures are warm and leaf tissues have not been damaged by frost. In some situations, treated perennials may not appear to succumb to the glyphosate treatment in the fall, but control the following year will be effective.

For dandelion, which grows under the crop canopy and may be missed with a pre-harvest herbicide, post-harvest is an ideal time for weed control. Dandelions are more actively growing in cool, fall environmental conditions. Research has shown that the ideal time for dandelion control is September 15 to 30. Choose the correct herbicide rate for the size of the dandelion rosette, and use higher rates for larger plants. Dandelions covered by straw may not be controlled as the straw can interfere with herbicides contacting the dandelion leaves.

Spraying After A Frost

Winter annuals can tolerate light frosts but perennials harden off after several nights of low temperature in the fall. In general, dandelions are the most frost tolerant, followed by winter annuals, quackgrass, foxtail barley, and Canada thistle.

Application recommendations for Roundup® brands of glyphosate include:

- Light frost (0 to -4°C): Should not negatively affect perennial or winter annual weed control. Spray if the daytime forecast is a minimum of 8°C for at least two to four hours after the application, and there is no risk of overnight frost
- Heavy frost (-5°C or colder): Wait one to two days to assess injury severity, and treat only if the majority of target weeds are more than 60 per cent green and show signs of active growth (leaves are still bright green and supple to the touch). Spray if the daytime forecast is a minimum of 8°C for at least two to four hours after the application, and there is no risk of overnight frost
- When possible, spray late in the morning or early afternoon when it is warm and plants are most actively growing. Ideally, spray on sunny days. With cool temperatures, stop spraying two hours before sunset

Getting Ahead of the Spring

Post-harvest weed control can also help provide the foundation for a clean crop next spring. Trifluralin (Treflan™, Rival®, and Bonanza®) and Edge™ can (preferably) be applied in the fall prior to seeding pulse crops. These herbicides are usually more effective when fall-applied because:

- They are broken down by sunlight and days are shorter in the fall
- They are volatile and soil temperatures are typically lower in the fall and dropping
- Stubble is easier for the granule to penetrate and make contact with the soil surface
- Wet/dry and freeze/thaw cycles through the winter break down the granules to allow the herbicide material to be more evenly distributed by spring harrowing prior to seeding

A pre-seed burndown will still be required to control early germinating annuals. For lentils, Edge™ granular is only registered with a fall application.

it allows time for the herbicide to move off the granule. Spring snowmelt also helps activate the herbicide. A pre-seed burndown may still be required to control early germinating annuals. For lentils, Edge™ granular is only registered as a fall application. Trifluralin and Edge™ granular

require incorporation. Consult labels for incorporation recommendations.

Liquid formulations of trifluralin should only be used in the spring and in fields that have been well worked to minimize the amount of residue from the previous crop (75 per cent black) before application, since the product will be trapped and deactivated by any residue that intercepts the spray.

Manage Herbicide Resistance

Another advantage of a fall application of trifluralin or Edge™ is for herbicide resistance management. Herbicide layering, the placement of a soil-active herbicide followed up with a post-emergent herbicide of a different Group, provides multiple modes of action for weed control. Edge™ and trifluralin are both Group 3 herbicides, and can help control Group 2 resistant weeds in peas, Clearfield® lentils, faba beans, and dry beans.

Encouraging Fall Volunteer Canola

Research by Rob Gulden at the University of Manitoba looked at how fall tillage could encourage volunteer canola to germinate in the fall and terminate naturally with frost. Soil disturbance used either a spring-tooth tine harrow (one centimetre depth) or tandem disc (12 centimetre depth) with two passes in opposite directions.

Gulden found that timely tillage shortly after canola harvest increases volunteer canola seedling germination in the fall and thereby decreasing volunteer canola in the seedbank. Timing of tillage was more important than tillage type, and even a low disturbance tillage pass (tine harrow) was effective at encouraging early fall and spring emergence of volunteer canola. Early fall soil disturbance, shortly after canola harvest, was the most effective timing to maximize volunteer canola fall germination. Winterkill of seedlings following germination reduced overall seedbank populations of volunteer canola.