

Activity 18
Volunteer Canola Control
Annual Report – March 31, 2016

Overall Objective

The main objectives of this activity are to:

1. Determine if there are herbicide tank mix combinations that will control volunteer Roundup Ready (RR) canola in a crop of RR corn.
2. Determine if there are herbicide tank mix combinations that will control volunteer RR canola in a crop of RR soybeans.
3. Test how three weed control technologies compare under the same growing environment and over the same time (Roundup Ready, Liberty Link, Clearfield).

Audience

The audience is crop producers, specifically those who grow or who have an interest in growing canola.

Performance Measures

Gilles Leroux presented the results of Volunteer Canola Control at the ECODA Canola workshop in Montreal on April 29, 2015 to approximately 20 attendees.

Highlights

Volunteer canola is a plant that grows from the seed of a previous canola crop or that has been introduced to the field through farm equipment or other means and competes with the crop for soil nutrients, water and sunlight.

With the advent of several glyphosate tolerant crops (Roundup Ready (RR) canola, soybean and corn) being grown within consecutive seasons, the management of unwanted Roundup Ready volunteer canola is difficult. The objective of the project was to identify efficient registered herbicide/glyphosate combinations to control volunteer RR canola in a crop of RR soybean or RR corn. The results will provide growers with the right control means.

Field plots were established at the Agronomy Station of Laval University in springs of 2014 and 2015 under conventional tillage system. The experimental weed control protocol included two sets of treatments and three control treatments.

Soybean results

In both years, all herbicide treatments tested provided adequate control of volunteer canola (VC), as compared to the glyphosate only treatment and the weedy control plot. Soybean grain yield was significantly reduced by volunteer RR canola, as measured in plots treated with glyphosate.

Corn results

All herbicide treatments provided adequate control of volunteer canola as compared to glyphosate alone. In both years, corn was a better competitor than soybeans against volunteer RR canola.

Outcomes

Volunteer canola is a plant that grows from the seed of a previous canola crop or that has been introduced to the field through farm equipment or other means. Volunteer canola is a weed that competes with the crop for soil nutrients, water and sunlight. It can introduce seedling diseases to field crops and increase the pressure of flea beetle, a noxious insect of canola. Volunteer canola is a host for blackleg and clubroot diseases in non-canola years. The presence of volunteer canola reduces the effectiveness of crop rotation for managing these issues. A survey in Québec's main- canola growing areas reported that volunteer canola was present in 90% of fields and in a wide range of crops (small grains, soybean, corn). An average density of 5 plants / m² was found one year after canola production; lower densities were present 5 years after canola production, indicating the presence of a persistent canola seedbank in soil. In addition, a single canola plant can produce 5,000 seeds, thus contributing to seedbank replenishment over time.

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Field plots were established at the Agronomy Station of Laval University in springs of 2014 and 2015 under conventional tillage system. RR canola seed was broadcast in early spring prior to crop planting. The herbicide treatments were applied with a precision plot sprayer. The experimental weed control protocol included two sets of treatments:

1. Pre-emergence application (PRE) of various soil residual herbicides followed by in crop post-emergence application of glyphosate (Roundup Weathermax); and
2. Post-emergence tank mix combinations of glyphosate with soil.

All herbicide treatments tested are registered for use in Canada. There were three control treatments:

1. Untreated weedy control;
2. Hand-weeded weed-free control; and
3. Post-emergence treatment of glyphosate alone.

The herbicide treatments were replicated four times in a randomized complete block design.

Soybean results

In both years, all herbicide treatments tested provided adequate control of volunteer canola (VC), as compared to the glyphosate only treatment and the weedy control plot. The above ground dry biomass of VC was reduced significantly by all herbicide treatments (PRE: imazethapyr and metribuzin alone or

tank-mixed; metribuzin and s-metholachlor tank-mixed; POST: bentazone, fomesafen, chlorimuron, chloransulam) except that of glyphosate. Soybean grain yield was significantly reduced by volunteer RR canola, as measured in plots treated with glyphosate.

Corn results

All herbicide treatments (PRE: atrazine, isoxaflutole + atrazine, s- metolachlor/atrazine, dimethenamid P/saflufenacil; POST: atrazine, 2,4-D, bromoxynil, MCPA, bromoxynil/MCPA, mesotrione, dimethenamid P/saflufenacil) provided adequate control of volunteer canola as compared to glyphosate alone. Control of VC was lower when tank mixing dicamba with glyphosate. All herbicide treatments tested reduced the aboveground dry biomass of VC. Corn grain yield was lower in the weedy control plot; there was no significant difference in yields among all herbicide treatments. In both years, corn was a better competitor than soybean against volunteer RR canola.

Several non-glyphosate herbicide treatments that are registered in Canada for weed control in soybean and corn were found efficient to control Roundup Ready volunteer canola. Our results also indicate that Roundup Ready volunteer canola escaping post-emergence spraying of glyphosate reduces the yield of soybean but did not significantly affect corn yield. Several post-emergence tank-mixed treatments of glyphosate with either atrazine, 2,4-D, bromoxynil, MCPA, bromoxynil/MCPA, mesotrione or dimethenamid P/saflufenacil provided commercially acceptable control of volunteer RR canola in grain corn. In soybean, pre-emergence spraying of imazethapyr and metribuzin alone or tank-mixed and of metribuzin tank-mixed with s-metolachlor provided excellent control of volunteer RR canola.

Future Work

After two growing seasons, our results indicate that all herbicide treatments tested in the research project adequately controlled volunteer Roundup Ready canola in both RR corn and soybean. Corn yield is less affected by volunteer canola than that of soybean. For this reason, pre-emergence spraying of soil active herbicide (metribuzin, imazethapyr) is recommended in soybean fields infested with volunteer RR canola.