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Annual rye-grass and clover sensitivity to soil applied corn herbicides

Dr. Darren Robinson (University of Guelph, Ridgetown Campus) and Mike Cowbrough (OMAFRA)

“Reprinted from Field Crop News (<http://fieldcropnews.com/>)”

There is interest in inter-seeding annual rye-grass and clover into corn (Figure 1).



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Corn shown in October with a inter-seeded annual rye-grass and crimson clover that was seeded at the 7-8 leaf over stage of corn

Research studies have been done in the United States and Canada to determine the tolerance of cover crops to various soil applied corn herbicides. This article provides an overview of the results of that work, and provides some consensus across the different locations.

Two important factors influence the potential for carryover injury to rotational crops:

- 1) The sensitivity of the cover crop to herbicide residues, and
- 2) How long the herbicide persists in the soil. Herbicides with shorter half-lives (the time it takes for 50% of the active ingredient to dissipate) offer less risk of injury to rotational crops, or in this case, an inter-seeded cover crop.

Several factors will influence the rate of dissipation such as rainfall, soil texture and soil pH. In general, products with a 4 month or less rotation restriction for the cover crops of interest should pose little risk to establishment. These products typically have half-lives of less than 30 days.

Annual rye-grass and clover sensitivity to soil applied corn herbicides...con't

The following tables provide an estimation of the range of injury levels, as well as consensus on the potential for carryover of some commonly pre-emergence corn herbicides to injure inter-seeded annual ryegrass and clover (crimson and red).

Table 1. Annual rye-grass sensitivity to soil applied corn herbicides.

Herbicide Name	Injury Risk	Evidence to Support Risk Level
Armezon + atrazine	Low	BASF internal trials.
Banvel II or Marksman	Low	BASF internal trials.
Converge XT (20 ac/case rate)	Low	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson and in Quebec by Dr. Gilles Leroux.
Engarde	Low	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson.
Integrity (292 mL/ac)	Low	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson and in Quebec by Dr. Gilles Leroux.
Callisto	Moderate	Injury and stand reduction observed in trials conducted in Ontario by Dr. Darren Robinson.
Prowl H2O	Moderate	Injury and stand reduction observed in trials conducted in Ontario by Dr. Darren Robinson.
Dual II Magnum	High	Over 90% reduction in stand observed in a 2015 OMAFRA trial. A Michigan study by Tharp and Kells, 2000 observed a 96% stand reduction with metolachlor, the active ingredient in Dual II Magnum.
Focus	High	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.
Lumax EZ	High	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.

Table 2. Clover species sensitivity to soil applied corn herbicides.

Herbicide Name	Injury Risk	Evidence to Support Risk Level
Integrity (292 mL/ac)	Low	Little to no injury to red clover observed in trials conducted in Ontario by Dr. Darren Robinson and on crimson clover in Quebec by Dr. Gilles Leroux.
Focus	Low	Little to no injury to red clover observed in trials conducted in Ontario by Dr. Darren Robinson.
Converge XT (20 ac/case rate)	Moderate	Significant stand reductions of red clover observed in trials conducted in Ontario by Dr. Darren Robinson. Studies conducted in Quebec by Dr. Gilles Leroux found variable tolerance with crimson clover being more tolerant than red clover and less injury with both at the lowest rate of Converge XT.
Prowl H2O	Moderate	Slight injury and stand reduction observed in trials conducted in Ontario by Dr. Darren Robinson. A Michigan study by Tharp and Kells, 2000 observed a 15% stand reduction in crimson clover.
Callisto	High	Significant stand reductions to red clover observed in trials conducted in Ontario by Dr. Darren Robinson.
Dual II Magnum	High	Over 40% reduction in stand of crimson clover observed in a 2015 OMAFRA trial. A Michigan study by Tharp and Kells, 2000 observed a 45% stand reduction in crimson clover with metolachlor, the active ingredient in Dual II Magnum.
Engarde	High	Significant stand reductions to red clover observed in trials conducted in Ontario by Dr. Darren Robinson.
Lumax EZ	High	Significant stand reductions to red clover observed in trials conducted in Ontario by Dr. Darren Robinson.

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Notes:

- Observations from any Ontario and Quebec research: Crimson clover appears to be more tolerant to herbicides than red clover. Crimson clover is also more shade tolerant and likely a better candidate for inter-seeding into corn.
- LOW RISK = Unlikely to observe a reduction in stand density or biomass produced
- MODERATE RISK = it's possible to experience a reduction in stand density or biomass produced
- HIGH RISK = You will likely experience a reduction in stand density or biomass produced

Printable Versions of the Above Tables

1. Annual rye-grass sensitivity to soil applied corn herbicides(http://fieldcropnews.com/wp-content/uploads/2016/04/ANNUAL-RYEGRASS_SENSITIVITY_TABLE_2016.pdf)
2. Clover sensitivity to soil applied corn herbicides(http://fieldcropnews.com/wp-content/uploads/2016/04/CLOVER_SENSITIVITY_TABLE_2016.pdf)

Other useful resources:

1. [Annual ryegrass cover crop management for corn and soybean production](#)
2. [OMAFRA/UofG herbicide screening trial at Elora Research Station, 2015](#)

References Cited

Bosak, E. and Davis, V. 2013. Herbicide rotation restrictions in forage and cover cropping systems. University of Wisconsin-Extension. http://wcws.cals.wisc.edu/wp-content/uploads/sites/4/2013/03/WCWS_201_Herbicide_Rotation_Restrictions_WEB.pdf

Hayes, A. 2015. Cover crop options for 2015. OMAFRA. <http://www.omafra.gov.on.ca/english/crops/field/news/croptalk/2015/ct-0615a7.htm>

Legleiter, T., Johnson, B. and Johnson, K. 2012. Herbicide rotation restrictions for cover crops and fall forages. Purdue University. https://ag.purdue.edu/btny/weedscience/Documents/Rotation_Restrictions.pdf

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Seasonal topics – May 2, 2016



May 2, 2016 — Some topics are relevant year after year, but you might not always take the time to filter through previous posts to find them. I've highlighted some here that might be of interest this week. Click on the preview images below to jump to the articles.

Need a refresher on PPI herbicide options in field tomatoes? Dr. Darren Robinson (Ridgetown Campus – University of Guelph) lays it out here.

Weed control with PPI herbicides in tomatoes

May 29, 2015 by Janice LeBoeuf | Edit



Worried about getting the nitrogen right after a cover crop? Here's some guidance from Dr. John Lauzon (University of Guelph).

Managing nitrogen in cover crop systems

May 10, 2013 by Janice LeBoeuf | Edit

Dr. John Lauzon, University of Guelph (*adapted from a presentation given at the workshop – Making Sense with Cover Crops Feb. 28, 2013*)

Cover crops may be grown for many reasons including; reducing erosion, adding soil organic matter, soil structural improvement, nematode suppression, weed suppression, scavenging residual nitrogen, providing nitrogen to the next year's

Poly tanks get a lot of use at this time of year. What would be the consequences of a tank failure? Take some time for inspection and maintenance.

Poly tank inspection and maintenance

May 2, 2013 by Janice LeBoeuf | Edit

At this time of year, many polyethylene tanks are being used across the vegetable industry for storage and transportation of water, fertilizer, and pesticides. However, each poly tank has a limited lifespan, and the potential for failure once it is beyond that lifespan.

Looking for the most current version of a pesticide label? This article from 2011 is still one of the most popular on our site, although it's not a new search page anymore.

New PMRA Pesticide Label Search

February 10, 2011 by Janice LeBoeuf | Edit

Janice LeBoeuf, OMAFRA Vegetable Crop Specialist, Ridgetown

PMRA has a new pesticide label search at <http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>.

Click on the Registration Number to get a pdf of the label. Click on the Product Name to get information on the product registration.



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OSCIA Soil Champion



The Ontario Soil & Crop Improvement Association is taking nominations for their 2017 OSCIA Soil Champion Award (<http://www.ontariosoilcrop.org/association/association-soil-champion-award/>). To be eligible, an individual must be a resident of Ontario or have contributed to soil management in a way that directly influences improved soil health and crop production sustainability in Ontario.

Deadline for nominations is September 1, 2016. Learn more and see previous champions at the OSCIA website or call the OSCIA at 519-826-3152 .