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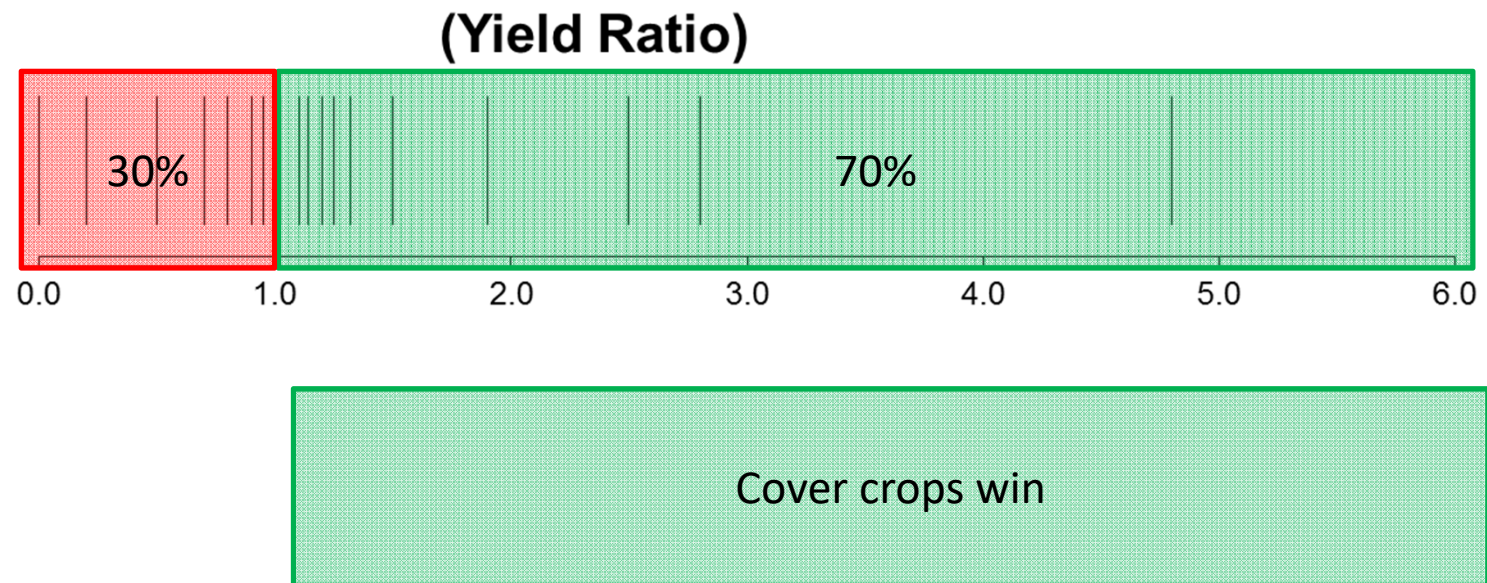
SouthWest Agriculture Conference  
Ridgetown

Summary of 2400 cover crop studies

$$\text{Yield Ratio} = \frac{\text{crop yield with cover crop}}{\text{crop yield without cover crop}}$$

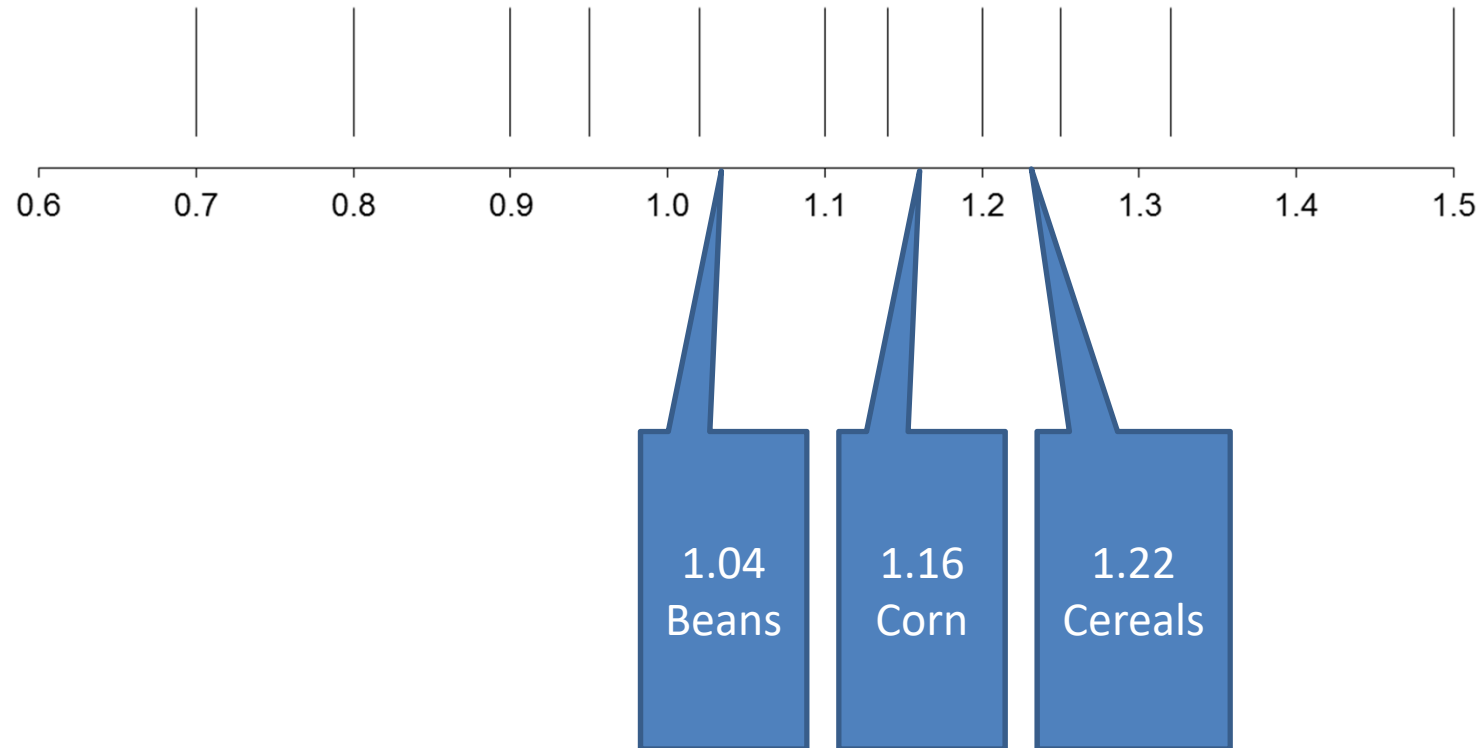
Yield Ratio	
<1	Cover crops lose yield
=1	Same yield
>1	Cover crops win

# All crops 2400 studies



# Specific crops

(Yield Ratio)



# RESULTS

legumes > grasses = brassicas

clover fall kill = clover spring kill

Mike Cowborough  
OMAFRA Weed Specialist

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

<b>LOW RISK</b> - Unlikely to observe a reduction in stand density or biomass produced		
Herbicide Name	Active Ingredient(s)	Evidence to Support Risk Level
Armezon + atrazine	topramazone + atrazine	BASF internal trials.
Banvel II or Marksman	dicamba or dicamba/atrazine	BASF internal trials.
Converge XT (20 ac/case rate)	isoxaflutole + atrazine	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson and in Quebec by Dr. Gilles Leroux.
Engarde	rimsulfuorn + mesotrione	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson.
Integrity (292 mL/ac)	saflufenacil/dimethenamid	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson and in Quebec by Dr. Gilles Leroux.
<b>MODERATE RISK</b> - it's possible to experience a reduction in stand density or biomass produced		
Callisto	mesotrione	Injury and stand reduction observed in trials conducted in Ontario by Dr. Darren Robinson.
Prowl H2O	pendimethalin	Injury and stand reduction observed in trials conducted in Ontario by Dr. Darren Robinson.
<b>HIGH RISK</b> - You will likely experience a reduction in stand density or biomass produced		
Dual II Magnum	s-metolachlor/benoaxacor	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	pyroxasulfone + carfentrazone	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.
Lumax EZ	s-metolachlor/atrazine/mesotrione	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.



Table 2. Clover sensitivity to soil applied corn herbicides.

<b>LOW RISK</b> = Unlikely to observe a reduction in stand density or biomass produced		
Herbicide Name	Active Ingredient(s)	Evidence to Support Risk Level
Integrity (292 mL/ac)	saflufenacil/dimethenamid	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson and in Quebec by Dr. Gilles Leroux.
Focus	pyroxasulfone + carfentrazone	Little to no injury observed in trials conducted in Ontario by Dr. Darren Robinson.
<b>MODERATE RISK</b> = it's possible to experience a reduction in stand density or biomass produced		
Converge XT	isoxaflutole + atrazine	Significant stand reductions 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	pendimethalin	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.
<b>HIGH RISK</b> = You will likely experience a reduction in stand density or biomass produced		
Callisto	mesotrione	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.
Dual II Magnum	s-metolachlor/benoaxacor	Over 40% reduction in stand observed in a 2015 OMAFRA trial. A Michigan study by Tharp and Kells, 2000 observed a 45% stand reduction with metolachlor, the active ingredient in Dual II Magnum.
Engarde	rimsulfuorn + mesotrione	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.
Lumax EZ	s-metolachlor/atrazine/mesotrione	Significant stand reductions observed in trials conducted in Ontario by Dr. Darren Robinson.

Observations from any Ontario and Quebec research: Crimson clover appears to be more tolerant to herbicides than red clover.

**Tolerance of annual rye grass, crimson clover and tillage radish 21 days after herbicide applications**

Crop Tolerance (0 = no injury 10 = Complete Death)				
Herbicide	Timing	Annual Rye grass	Crimson Clover	Tillage Radish
2,4-DB	Post-emergence	0	2	2
2,4-D	Post-emergence	0	8	8
Aatrex 480 (atrazine)	Pre-emergence	5	10	10
	Post-emergence	5	5	10
Accent (nicosulfuron)	Post-emergence	7	2	8
Banvel II (dicamba)	Pre-emergence	0	5	2
	Post-emergence	0	7	6
Callisto (mesotrione)	Pre-emergence	0	2	8
Converge Flexx (isoxaflutole)	Pre-emergence	4	8	8
Classic (chlorimuron)	Pre-emergence	7	8	10
	Post-emergence	1	6	8
Dual II Magnum (s-metolachlor)	Pre-emergence	10	5	0
glyphosate	Post-emergence	10	7	10
Impact (topramazone)	Post-emergence	3	3	8
Liberty 200 SN (glufosinate)	Post-emergence	10	10	10
Permit (halosulfuron)	Post-emergence	0	5	8
Prowl H2O (pendimethalin)	Pre-emergence	5	1	6
Pursuit (imazethapyr)	Pre-emergence	7	0	10
	Post-emergence	7	1	8
Reflex (fomesafen)	Pre-emergence	5	2	10
	Post-emergence	2	8	10
Sencor 75 DF (metribuzin)	Pre-emergence	8	5	10
Sencor 75 DF (metribuzin)	Post-emergence	2	10	10
Valtera (flumioxazin)	Pre-emergence	8	5	6

Source: Mike Cowbrough (Ontario Ministry of Agriculture Food and Rural Affairs - 2015)

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## Cover Crops Do's & Don't's

*Uncovering cover crop facts  
and myths about weed, insect,  
and disease management.*



### Find Out More

This publication was developed by the Crop Protection Network, a multi-state and international collaboration of university/provincial extension specialists and public/private professionals that provides unbiased, research-based information to farmers and agricultural personnel. Learn more at [cropprotectionnetwork.org](http://cropprotectionnetwork.org).

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Cover Crops Do's & Don't's

## Weed Management



### **DO** TERMINATE COVER CROPS BEFORE PLANTING

Once the field crop emerges, your options for using herbicides to terminate the cover crop are much more limited.

### **DO** CHOOSE THE RIGHT COVER CROP

Choose a cover crop that will suit your needs, and avoid covers that may be too difficult to terminate, or that are contaminated with weed seeds.



### **DON'T** REDUCE HERBICIDE USE

Always use preemergence residual herbicides that have multiple sites of action. Apply at full rates since cover crop residues can reduce the amount of herbicide that reaches the soil. And be aware that residual herbicides can interfere with cover crop establishment and may have restrictions (such as grazing).



### **DON'T** RELY ON COVER CROPS FOR UNIVERSAL WEED SUPPRESSION

A well-established cereal rye cover crop can suppress 60-80 percent of some specific weeds. But the ability of other cover crops to suppress weeds is extremely variable.



Cover Crops Do's &amp; Don'ts

## Insect Management



### **DO** COMMIT TO SCOUTING

Cover crops are more attractive to insects of all types (including pests) than bare, tilled ground or even sparse weed cover.



### **DON'T** TREAT UNNECESSARILY

Cover crops attract many beneficial insects. Don't harm those beneficials with an unnecessary insecticide application.

### **DON'T** PLANT IMMEDIATELY AFTER TERMINATING THE COVER CROP

Displaced insects will be hungry. Even insects that don't normally feed on your corn, soybean, or other crops will attempt to do so!



### **DO** WAIT 10-14 DAYS AFTER COVER CROP HAS DIED

Waiting to plant ensures that you starve the pest insects that require large amounts of food daily — especially caterpillars like armyworms and black cutworms — before the crop emerges.



Cover Crops Do's &amp; Don't's

## Disease Management



### ***DON'T*** RELY SOLELY ON COVER CROPS TO REDUCE DISEASES

Cover crops can be hosts for *both* beneficial organisms and organisms that cause disease, including nematodes. Cover crops can also affect the soil microenvironment, and we don't know how this affects specific diseases.

### ***DON'T*** PLANT IMMEDIATELY AFTER TERMINATING THE COVER CROP

Cover crops may be a green bridge that can increase seedling pathogen and virus populations. After terminating the cover crop, wait 10-14 days to decrease these populations and reduce disease risk.



### ***DO*** USE MULTIPLE MANAGEMENT PRACTICES

Disease management in cover crops requires an integrated approach using resistant varieties/hybrids, crop rotation, residue management, and fungicides where needed.

