cover crops in WISCONSIN

Establishment Research

Impact of Corn/Soybean Herbicide Carryover on Cover Crop Establishment

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In short…

- Cover crop establishment following herbicide can be a challenge due to the residual properties of some herbicides.
- Results from this experiment indicate that risk of herbicide carryover injury is dependent on year, herbicide application rate, and cover crop species by herbicide combination.

What's the Question?

Do herbicides that are commonly applied to silage corn or soybean adversely affect cover crop growth?

Why Does it Matter?

Commonly applied corn and soybean residual herbicides have activity in the soil for a period of time after application, and may remain active after the cash crop is harvested, potentially impacting cover crop establishment. A wide range of management choices (tillage, residue management, herbicide application rate, timing, method, and active ingredient), soil properties (soil moisture, temperature, pH, and organic matter) and environmental conditions (temperature and precipitation between herbicide application and cover crop establishment) can affect the residual properties of the herbicide. Cover crop injury will be dependent upon species sensitivity to the herbicide, application timing and rate, management choices, and environment conditions between herbicide application and cover crop establishment. Residual herbicide activity is often hard to predict prior to cover crop establishment and variable from one year to another.

Non-treated Radish Plot

Example of herbicide carryover on Radish

What are the Results?

In 2013 and 2014 several common corn and soybean residual herbicides' were evaluated for their impact on cover crops establishment following silage harvest. All herbicides were applied at full-labeled rate and at the latest application timing.

Results confirmed that herbicide carryover injury is dependent on year, herbicide application rate, and cover crop/ herbicide combination. In 2014, little to no carryover injury was seen to any of the cover crops, likely due to ore precipitation events and warmer temperatures leading to greater pesticide dissipation and degradation. The results from 2013 are shared in the table below.

Summary of cover crop injury nine weeks after establishment at the Arlington Agricultural Research Station 2013

Herbicide Treatment Active Ingredient(s)	Winter Rye	Radish	Crimson Clover	Annual Ryegrass	Oats Peas Mixture
Corn Herbicides					
flumetsulam					
S-metolachlor + mesotrione + S-metolachlor + glyphosate + mesotrione					
flumioxazin + pyroxasulfone					
Soybean Herbicides					
flumioxazin					
pyroxasulfone					
S-metolachlor					
fomesafen					
imazethapyr					
imazethapyr + glyphosate					

Injury | No Injury

Winter Rye: Research from several universities including this study have shown that winter rye is readily established following many residual herbicides used in corn and soybean cropping systems. Winter rye is also one of the few cover crops that may be successfully established in Wisconsin following corn or soybean grain harvest due to rye's ability to germinate and grow under low temps.

Using Cover Crops for Forage A crop is classified as a cover crop when no biomass is harvested, it becomes a forage crop when it is harvested for feed. A cover crop can be used for forage, however, most pesticide labels do not provide the plant back restriction time required from pesticide application to grazing or harvest for cover crops, only forage crops. If a cover crop will be planted later this cropping season, consider the rotational restrictions for any herbicides used in the field the past few seasons. Establishing a cover crop within this rotation restriction time period is allowed, however, the grower accepts a risk that the cover crop may not establish and will not be harvested for forage.

What's the Status of the Research? Are There Updates?

The research ended in 2015. For more information on herbicide and cover crop interactions, visit the following links:

University of Missouri: http://weedscience.missouri.edu/extension/pdf/cover_crop_carryover_slideshow.pdf

Purdue University: https://ag.purdue.edu/btny/weedscience/Documents/covercropcarryover.pdf

Penn State: http://extension.psu.edu/plants/crops/soil-management/cover-crops/herbicide-persistence/herbicide-carryover-table