

# Michigan Wheat Program Final Report

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**Title:** *Impact of weed management timing on frost-seeded clover survival, weed control and winter wheat yield (FY15)*

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**Investigator:** Christy Sprague, Professor and Extension Specialist,  
Plant, Soil and Microbial Sciences, Michigan State University,  
517/353-0224, [sprague1@msu.edu](mailto:sprague1@msu.edu)

### **Problem Statement:**

There has been limited research in the upper Midwest evaluating the effects of herbicide application timing on weed control and yield of winter wheat. The majority of studies published or reported have focused on evaluating various spring-applied herbicides for overall weed control of common weed species or specific weed problems in winter wheat. Results of these studies often report good weed control of target species, but very few ever find increases in yield over the non-treated control.

More recently there has been an increased interest in applying herbicides in the fall for weed control in winter wheat. Many growers and consultants speculate that these fall herbicide applications will help in managing weeds, like common chickweed and various other winter annual weed problems, ultimately helping to improve overall wheat yield. However, there has been a major concern by many on whether these fall herbicide applications will cause significant injury and reduce wheat yield.

One compounding factor that makes the use of herbicides more difficult for weed control in winter wheat is the increased use of frost-seeded red clover. While there are many potential benefits for seeding red clover in winter wheat several of the herbicides used can significantly reduce or completely wipe out a stand of red clover. However, there is the potential that some of these herbicides may be applied in the fall and possibly not cause a problem with red clover. But these fall herbicide applications may also not be as effective on some of our more common summer annual weed problems in winter wheat.

### **Objective:**

- 1) Determine the impact of fall and spring herbicide applications on frost-seeded clover survival and weed control in winter wheat.

### **Procedures:**

Research has been conducted over the past two wheat growing seasons. The experiment has been set up as a split-split plot design with herbicide application timing (Fall or Spring) as the main plot and herbicide treatment as the sub plot. All plots have been replicated 4 times. The first year of research was conducted at the Saginaw Valley Research and Extension Center near Richville, MI. 'Jupiter' soft white winter wheat was drilled in 7.5-inch rows on October 12, 2013 at a seeding rate was approximately 2.2 million seeds per acre. When winter wheat was at the 3-leaf stage (Feeke's stage 1.3), November 21, six different herbicide treatments (1-6) listed in Table 1 were applied to wheat. On April 3, the entire area was frost-seeded with medium red

clover at approximately 10 lbs/A. At Feeke’s stage 5, on May 19 wheat was treated with the same six herbicide treatments that were applied in the fall in different plots.

The second year of research was conducted at the MSU Agronomy Farm in Lansing Michigan. ‘Sunburst’ soft red winter wheat was drilled on September 26, 2014 at approximately 1.8 million seeds per acre. Fall herbicide applications were made on October 23, 2014 and spring applications were made on April 28. Medium red clover was frost-seeded on March 18 at approximately 12 lbs/A. Four additional treatments (7-9) were added the second year (Table 1).

Table 1. Herbicide treatments applied in the fall and spring into winter wheat.

	<b>Herbicide treatment</b>	<b>Rate</b>	<b>Additives</b>
<b>1</b>	Affinity BroadSpec	0.75 oz/A	Non-ionic surfactant + AMS
<b>2</b>	Huskie	13 fl oz/A	Non-ionic surfactant + AMS
<b>3</b>	Osprey	4.75 oz/A	Non-ionic surfactant + AMS
<b>4</b>	PowerFlex HL	2 oz/A	Non-ionic surfactant + AMS
<b>5</b>	Clarity	0.25 pt/A	
<b>6</b>	2,4-D ester	1 pt/A	
<b>7</b>	MCPA*	0.38 pt/A	
<b>8</b>	Affinity BroadSpec (Fall) fb. MCPA (Spring)*		
<b>9</b>	Huskie (Fall) fb. MCPA (Spring)*		
<b>10</b>	Untreated		

\*Treatments added in second year. MCPA was applied both in the Fall and Spring.

*Measurements:* Winter wheat injury, red clover establishment and survival, and weed control were assessed several times throughout the growing season. Wheat was harvested for yield in year 2. Data was analyzed for difference in wheat injury, clover survival, weed control, and yield compared with the untreated control.

**Results:**

- Common lambsquarters was the predominant weed species in this experiment both years.
- Spring applications of Affinity BroadSpec, Huskie, PowerFlex HL, Clarity, 2,4-D, and MCPA were effective in controlling common lambsquarters.
- Osprey which is more of a grass herbicide was not effective for common lambsquarters control.
- Unexpectedly, fall-applied Affinity BroadSpec provided good control of common lambsquarters both years.
- Clover was able to tolerate fall applications of all the herbicides. However, there was a slightly more injury and sometimes lower populations of clover from fall applied Osprey in the first year and PowerFlex in the second year, so this may be a concern. Some initial bleaching was also present from fall applications of Huskie in year 1.
- All spring herbicide applications, with the exception of MCPA) caused significant injury and stand reduction of clover (Figure 1).
- Fall-applied 2,4-D resulted in significant wheat injury and over a 25% reduction in yield in the second year of this research.
- Fall-applied Affinity Broadspec or Huskie followed by spring-applied MCPA resulted in good clover establishment and good weed control.

- This research was highlighted at the 2014 and 2015 Michigan Wheat Field at the Saginaw Valley Research and Extension Center.

**Wheat Industry Benefits:**

This research was essential to develop recommendations on fall and spring herbicide applications for Michigan winter wheat. This information will be useful to growers who want to frost-seed red clover into their winter wheat crop. The ultimate goal of this research is to provide proper weed management recommendation for Michigan wheat growers which should reduce weed seed production, improve wheat yields and ultimately increase economic returns and wheat quality. We are currently working on a factsheet for Michigan Wheat Growers summarizing this research.

Figure 1. Frost-seeded clover injury from fall- and spring-applied herbicides after winter wheat harvest.

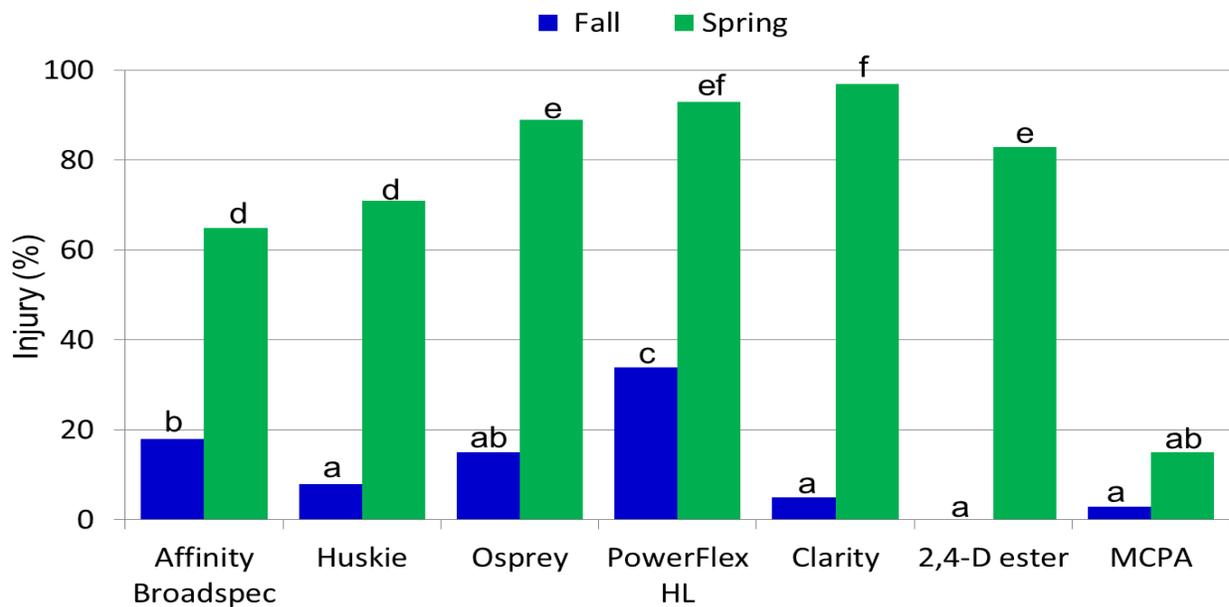


Figure 2. Differences in clover populations between fall and spring applications of Affinity BroadSpec and Huskie.

