

## Michigan Wheat Program Final Report

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**Title:** *Weed control and crop tolerance in early- and late-planted winter wheat from fall herbicide applications*

**MWP Project #:** 22-08-05-AS

**MSU PD#:** 59267

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**PROJECT GOALS AND VALUE FOR MICHIGAN WHEAT GROWERS:** Controlling weeds in the fall may help with overall wheat establishment and growth leading to vigorous wheat stands that may outcompete spring emerging weeds, preventing the need for a spring herbicide application. However, little is known about the benefits of fall herbicide applications on early versus later planted wheat and what effect cold temperatures may have on fall herbicide applications. This research will be used to develop recommendations on fall versus spring herbicide applications on early- versus late-planted winter wheat. These recommendations will help ensure successful weed control, while maximizing wheat yields. This project fits with the Michigan Wheat Program’s priorities to:

- develop management strategies to mitigate losses due to pests
- evaluate the efficacy of fungicides, herbicides and insecticides
- evaluate the interaction of pesticides, varieties, and agronomic practices

### RESULTS OF PROJECT – Year 1:

The planting window for winter wheat in Michigan can vary each year. Delays in harvest and rainy fall weather can push an ideal planting date of mid- to late-September into late-October or further. This range in planting dates could have an impact on how to best manage weeds. This window can affect both weed and winter wheat growth and where fall herbicide applications may best fit. As planting dates get pushed to later October there are questions regarding the benefits of fall herbicide applications. Also, with earlier planted wheat growers have asked: *Will fall herbicide applications eliminate the need for a spring herbicide application?* Fall herbicide applications may also become more important, as we have struggled over the past several years in finding the ideal time to apply wheat herbicides in the spring, due to colder weather. Therefore, the **objectives** of this research were two-fold: 1) *evaluate weed control and crop tolerance from fall-applied herbicides for early- and late-planted wheat, and 2) determine if later fall herbicide applications, under cooler conditions, have an effect on wheat tolerance to commonly used herbicides.*

‘Warf’ soft red winter wheat was planted on Sept. 23 and Oct. 24, 2022 at 1.6 million seeds/A. Several fall herbicide applications (Table 1) were made to the early planted wheat on Oct. 4 (Feekes 2) and Nov. 9 (Feekes 3). Fall herbicide applications to the later planted wheat occurred on Dec. 1 (Feekes 2). Spring herbicide applications of Huskie + Osprey and PerfectMatch were made on April 27 to both planting dates. At this time wheat was 8-10 inches tall for the early planting and 6-8 inches tall for the later planted wheat.

Table 1. Fall herbicide treatments applied to early- and late-planted wheat at application 1 and 2.

	Herbicide treatment	SOA <sup>1</sup> Group #	Rate	Additives
1	Huskie	6 + 27	15 fl oz/A	NIS + AMS
2	Talinor	6 + 27	18.2 fl oz/A	CoAct+ + COC
3	Affinity BroadSpec	2 + 2	1 oz/A	NIS + AMS
4	Quelex	2 + 4	0.75 oz/A	COC
5	Osprey	2	4.75 oz/A	NIS + AMS
6	PowerFlex HL	2	2 oz/A	NIS + AMS
7	Huskie + Osprey	6 + 27 + 2	15 fl oz + 2 oz/A	NIS + AMS
8	Huskie + PowerFlex	6 + 27 + 2	15 fl oz + 4.75 oz/A	NIS + AMS
9	Untreated			

<sup>1</sup> Herbicide site of action group number.

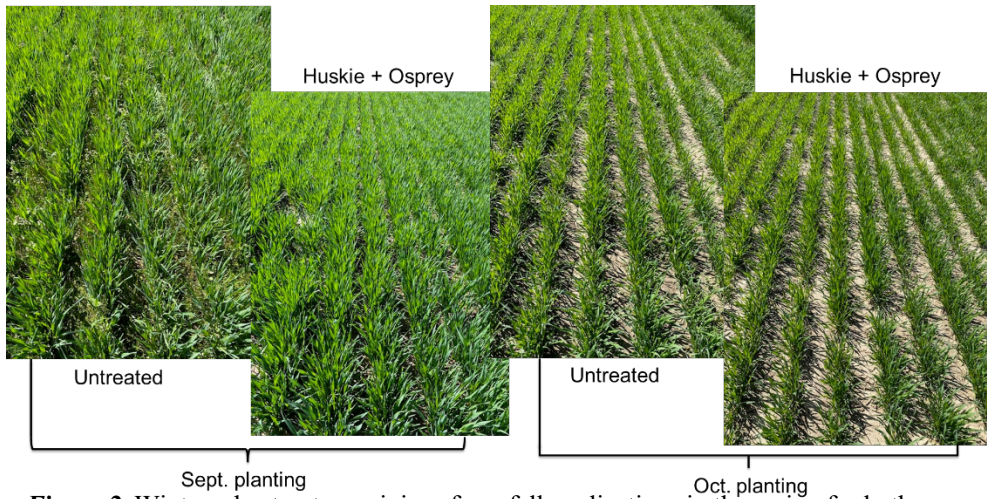
Fall herbicide treatments that contained Osprey or PowerFlex caused some injury to wheat (yellowing and stunting), 14 days after application (Figure 1). However, by spring this injury was not apparent (Figure 2). Weed biomass in the no herbicides control 4.5-times higher in the first planting date versus the later planting date in early June. Indicating that fall applications for later planted wheat may not be beneficial to control emerged weeds in a tilled system. In general, the early fall herbicide application on early planted wheat reduced weed biomass more and provided greater weed control than the later application. This could be due to larger weeds and greater wheat growth that could have affected coverage for the later application. Fall applications, regardless of timing, of the combinations of Huskie + Osprey or Huskie + PowerFlex provided excellent control of all weeds, including annual bluegrass. Another possibility could be from the lower temperatures at the later application time. Overall, fall herbicide applications provided greater weed control of



Figure 1. Wheat injury and weed control from the Oct. 4 fall application of herbicides to early planted wheat, 21 DAT.

winter annual weeds than applications made in the spring. Due to the excellent wheat growth very few summer annual weeds emerged. Overall herbicide selection did not affect wheat yield from fall herbicide applications.

However, planting date had more of an effect on yield and the early planted wheat yielded approximately 20 bu/A more than the later planted wheat, regardless of herbicide selection.



**Figure 2.** Winter wheat outgrowth injury from fall applications in the spring for both planting dates

**SUMMARY OF PROJECT:**

There has been increased interest in fall herbicide applications for weed control in winter wheat. Controlling weeds in the fall may help with overall wheat establishment and growth leading to vigorous wheat stands that may outcompete spring emerging weeds, preventing the need for a spring herbicide application. However, little is known about the benefits of fall applications on early versus later planted wheat. Since the winter wheat planting window can span 6 to 8 weeks, wheat and weed growth can vary greatly and the benefits of fall herbicide applications may not be realized with later winter wheat plantings or as fall temperatures start to decline. This year ‘Warf’ soft red winter wheat was planted on Sept. 23 and Oct. 24. Fall herbicide applications were made on Oct. 4 (Feekes 2) and Nov. 9 (Feekes 3) for the first planting date and Dec. 1 for the later planting date. Fall herbicide treatments that contained Osprey or PowerFlex caused some injury to wheat (yellowing and stunting), 14 days after application. However, by spring this injury was not apparent. Overall, all other treatments had very little herbicide injury to wheat. Fall herbicide applications provided greater weed control of winter annual weeds than applications made in the spring. Due to the excellent wheat growth very few summer annual weeds emerged. Overall herbicide selection did not affect wheat yield from fall herbicide applications. However, planting date had more of an effect on yield. We are continuing with this research to develop recommendations that will help ensure successful weed management while maximizing wheat yield. The results from this research will be included in MSU Weed Control Guide for Field Crops (E-434), presented at extension meetings, presented MWP summer field day, in newsletter articles (i.e., Wheat Wisdom), and posted on [www.MSUweeds.com](http://www.MSUweeds.com).

**FUTURE WORK:**

We are planning on conducting this research in 2023/2024 at two locations.

**PROJECT CHANGES:**

None requested.

**BUDGET NARRATIVE:**

On track.

**INTELLECTUAL PROPERTY:**

None developed.

**APPROACH TO DISSEMINATE RESEARCH:**

This research will be used to examine what effect fall applications have on weed control and crop tolerance of early and late planted winter wheat. This research will be used to develop recommendations on fall herbicide applications. This information will be shared with Michigan wheat farmers and will be included in the Michigan Weed Control Guide for Field Crops (E0434). Research data and resulting recommendations will be presented at extension meetings, MWP summer field day, in newsletter articles (i.e., Wheat Wisdom), and included in a factsheet on fall-herbicide applications in winter wheat, and on the web at [www.msuweeds.com](http://www.msuweeds.com).