

Michigan Wheat Program Final Report

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Title: *Management of a new grass weed problem, roughstalk bluegrass, in winter wheat (FY17-FY18)*
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PROBLEM STATEMENT

Grass weed problems have become more prevalent in several Michigan wheat fields over the past several years. These grass species can be difficult to manage, especially since most winter wheat herbicide programs focus on managing broadleaf weeds and many of the herbicides used do not have grass activity. While there are a few different herbicide options that can be used to manage grasses in wheat, many growers do not use these herbicides until they have a problem. One grass weed that has become more apparent in many Michigan wheat fields is roughstalk bluegrass (*Poa trivialis*).

Roughstalk bluegrass (RSBG) is a cool-season perennial grass weed that is primarily a problem in turfgrass. This grass is common in many Midwestern states and is becoming more of a problem in hay and more recently in winter grains. This perennial grass can survive in turf year-to-year by creeping, above-ground stems, known as stolons. However, we believe that in hay and in wheat most of the spread is by seed. As roughstalk bluegrass grows it becomes 1 to 3 feet tall and often exceeds the wheat canopy once it flowers in May. However, roughstalk bluegrass really becomes apparent in winter wheat once the plants start to mature and turn a golden-brown color in June just prior to seed shed, while wheat is still green. While we have some general knowledge about the biology and growth of roughstalk bluegrass in turf, there is very little information available about how it grows in wheat. In FY17-18 we asked the Michigan Wheat Program for funding to investigate the following questions.

Research questions:

1. When does roughstalk bluegrass emerge in winter wheat in Michigan?
2. What herbicides and when is the best time to apply these herbicides to manage roughstalk bluegrass in winter wheat?

Procedures: ‘Sunburst’ soft red winter wheat was drilled in 7.5-inch rows at a rate of 1.8 million seeds/A on September 28, 2017 in East Lansing, MI in a field with a known population of roughstalk bluegrass. Each plot measured 10 feet by 30 feet and treatments were replicated four times. Twenty different herbicide treatments were examined for roughstalk bluegrass control. The field was set up in split plot design with herbicide application timing as the main plot and herbicide treatments as the subplots. The soil-applied herbicide Zidua (pyroxasulfone) was applied immediately after planting at 1 and 2 oz/A. Once winter wheat was at the 2-leaf stage (Feekes

stage 1.2) on October 20 four different grass herbicides listed in Table 1 were applied in the fall to wheat. There will also be an untreated plot that will be used as a control for weed control and wheat yield.

Table 1. Grass herbicides that were applied in the fall and spring postemergence to control roughstalk bluegrass in winter wheat.

	Herbicide treatment	Rate	Additives
1	Osprey	4.75 oz/A	Non-ionic surfactant + AMS
2	PowerFlex HL	2 oz/A	Non-ionic surfactant + AMS
3	Axial XL	16.4 fl oz/A	
4	Olympus ¹	0.9 oz/A	Non-ionic surfactant + AMS
5	Untreated		

¹Olympus is not registered in Michigan and was only applied in the spring.

In the early spring, when wheat was at Feekes stage 4 and RSBG was 1-2 inches tall (April 26) and in the late spring (May 8) when wheat was at Feekes stage 5 and RSBG was starting to head out Osprey, PowerFlex, and Axial XL were applied using the rates and adjuvants listed in Table 1. Additionally, each of these herbicides were tank-mixed with either Huskie or Talinor for the later spring application. Treatments containing Talinor were also mixed with CoAct+. These herbicides were tank-mixed with the grass herbicides, to observe if there were any negative effects of these tank-mixtures on wheat injury, roughstalk bluegrass control and wheat yield.

Measurements: At wheat planting, three 0.25 m² quadrats will be permanently marked in the untreated plots. Weekly or biweekly counts of emerged roughstalk bluegrass will be taken in each quadrat during times of active emergence starting in the fall. Roughstalk bluegrass seedlings will be removed once they are counted, so they are not counted twice. Roughstalk bluegrass control will be assessed several times throughout the growing season. Additionally wheat will be evaluated for injury, including stand reduction, discoloration, and differences in height. At the end of the season, wheat will be evaluated for delays in maturity due to the herbicide applications and if possible will be harvested and yields and test weight will be determined. Roughstalk bluegrass control will also be assessed after wheat harvest. All data will be analyzed to map roughstalk bluegrass emergence patterns and to determine if there are differences in herbicide application timing, and herbicide treatment.

Results and observations:

- A majority of roughstalk bluegrass emerged in the fall, less than 15% emerged in early spring.
- Roughstalk bluegrass started to head out on May 8 in East Lansing, MI. Seed heads were fully visible by May 18.
- Roughstalk bluegrass matured and turn a golden-brown color on June 1.
- The time of herbicide application influenced roughstalk bluegrass control.
- Preemergence applications of Zidua at 1 or 2 oz/A did not result in control over 75% in late summer and there was a significant effect of application rate.
- Fall applications reduced RSBG populations, but were not 100% effective. These applications generally resulted in 75-85% control. However, there were no reductions in yield.

- Across all treatments roughstalk bluegrass control was greatest from early spring applications when wheat was at Feekes stage 4 and average roughstalk bluegrass height was 2-inches.
- At this timing, applications of Osprey or Axial XL provided the greatest roughstalk bluegrass control (>90%).
- Roughstalk bluegrass control was reduced dramatically when herbicide applications were made as roughstalk bluegrass starts heading out. This was especially true with PowerFlex.
- POST applications of PowerFlex provided poor RSBG control that resulted in significant RSBG competition and yield reductions similar to the untreated control.
- RSBG was very competitive and resulted in over 50% yield loss if not effectively controlled.
- This research was highlighted at the Michigan Wheat Program's summer research field day on June 13, 2018.

Recommendations after year 1:

- Roughstalk bluegrass needs to be controlled or significant yield loss can occur.
- Early spring applications of Osprey (4.75 oz/A), or Axial XL (16.4 fl oz/A) applied to 1-2" roughstalk bluegrass provides the greatest control.
- However, if growers use fall applications they will be able to reduce RSBG populations to limit wheat yield loss.
- Later spring applications should be avoided due to poorer control and yield reductions from RSBG competition.

Since roughstalk bluegrass is a relatively new weed in Michigan wheat we are proposing to conduct another year of this research to further understand the biology and management of this weed. This is especially important since different years can provide varying results.

Take Home Message:

Growers should be on the lookout for roughstalk bluegrass in winter wheat. If roughstalk bluegrass is anticipated in wheat, Osprey or Axial XL should be included as a component of the overall weed management program.

Wheat Industry Benefits:

This research has been used and will continue to be used to refine and develop weed control recommendations that are important to Michigan winter wheat growers. Results from this research will be used to develop fact sheets, added to the MSU Weed Control Guide for Field Crops (E-434), presented at extension meetings, and posted on www.MSUweeds.com.