



Current Report

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One- and Two-pass Herbicide Programs for Italian Ryegrass Control in Winter Wheat, 2010-2011

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Introduction

Italian ryegrass, also known as Marshall ryegrass, is a winter annual grass weed commonly found in winter wheat fields throughout Oklahoma. Italian ryegrass is very competitive with winter wheat for moisture and nutrients and can cause substantial reductions in yield and grain quality when not adequately controlled. Italian ryegrass is also a prolific seed producer, capable of producing several thousand seeds per plant. Furthermore, Italian ryegrass is an especially important problem in Oklahoma wheat production due to the widespread presence of herbicide-resistant populations. ALS-resistant Italian ryegrass, resistant to commonly used herbicides such as Finesse, Osprey, PowerFlex, and Beyond, is present in at least 17 counties in central and eastern Oklahoma. To effectively control Italian ryegrass, many producers now rely on Axial XL (Group 1) since it is from a different herbicide mode of action than the ALS inhibitor herbicides (Group 2). However, as more and more Axial XL is used each year, there is concern that resistance to this herbicide will develop. Therefore, additional herbicide options are needed to properly control Italian ryegrass and lessen the dependence on a single herbicide active ingredient.

Materials and methods

To investigate options for improving Italian ryegrass control in winter wheat, two field trials were conducted at OSU Research Stations near Stillwater and Perkins during the 2010-2011 growing season. At both locations, Italian ryegrass was the predominant weed species. The Stillwater location was planted on September 29 and the Perkins location was planted on October 7. Early-POST treatments were applied when the wheat was in the two to three leaf growth stage and Italian ryegrass was in the one leaf growth stage on November 1 at the Stillwater location and October 18 at the Perkins location. POST treatments were applied on December 3 at the Stillwater location and November 22 at the Perkins location when the wheat was in the 3-leaf, 1-tiller growth stage and Italian ryegrass was in the 1- to 3-tiller growth stage.

The following treatments were evaluated in these studies:

- Axiom (6 oz/acre) early-postemergence (early-POST)
- Axiom (8 oz/acre) early-POST

- Axial XL (16.4 fl oz/acre) postemergence (POST)
- Osprey (4.75 oz/acre) POST
- PowerFlex (3.5 oz/acre) POST
- Axiom (8 oz/acre) early-POST followed by Axial XL POST
- Axiom (8 oz/acre) early-POST followed by Osprey POST
- Axiom (8 oz/acre) early-POST followed by PowerFlex POST

Results and discussion

Italian ryegrass control

Italian ryegrass control was evaluated in mid-May. At both trial locations, the highest levels of Italian ryegrass control were achieved with Axial XL applied POST (≥ 98 percent) and Axiom followed by Axial XL (99 percent) (Figures 1 and 2). Italian ryegrass control with Axiom ranged from 64 percent to 84 percent, depending on use rate. At Perkins, Osprey and PowerFlex provided only 33 percent and 45 percent control of Italian ryegrass, most likely due to the presence of ALS-resistant Italian ryegrass at this location.

Yield

Winter wheat yields varied among locations and herbicide treatments. At both locations, the highest wheat yields were achieved when Axiom was applied as an early-POST treatment, regardless of whether or not a follow-up treatment was applied (Figures 3 and 4). Despite the excellent Italian ryegrass control, yields for a single POST application of Axial XL were still lower than an early-POST application of Axiom. Results of these trials indicate that early-season weed competition has the greatest effect on winter wheat yields.

Summary

Though Axiom does not provide season-long control of Italian ryegrass, it will eliminate early-season competition between winter wheat and Italian ryegrass. Axial XL applied as a POST treatment in the fall provided excellent control of Italian ryegrass at both locations (≥ 98 percent); however, yield losses due to weed competition did occur prior to application. To maximize both yield and Italian ryegrass control, the most effective option is a two-pass program consisting of Axiom applied early-POST followed by Axial XL applied POST.

Axiom applied as an early-POST treatment will control the early-season flush of Italian ryegrass and Axial XL applied as a follow-up POST treatment will control any remaining or late-germinating Italian ryegrass. Compared to using Axial XL alone, the yield benefits from a two-pass herbicide program should compensate for the additional cost of a second herbicide application. Furthermore, Axiom includes two active ingredients from additional herbicide modes of action and is a useful product to prevent Axial XL-resistant Italian ryegrass

from developing in Oklahoma. When using Axiom, the use rate must be tailored to the soil type to prevent potential crop injury.

Additional information

“Herbicide How-To: Understanding herbicide mode of action. Oklahoma Cooperative Extension Service Fact Sheet PSS-2778. Available at <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-6656/Pss2778web.pdf>.

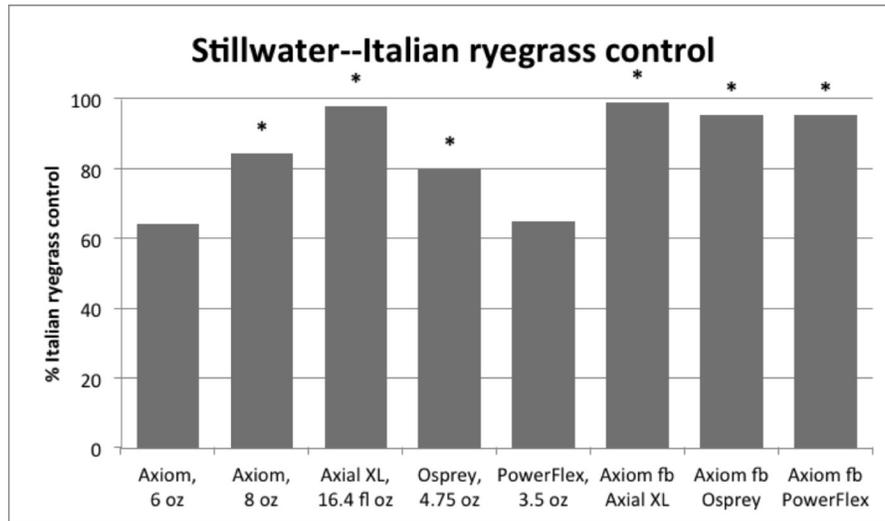


Figure 1. Italian ryegrass control at the Stillwater location in 2010-2011 for one- and two-pass herbicide programs. Treatments with an asterisk above the bar indicate provided the highest level of Italian ryegrass control. (Abbreviation: fb, followed by)

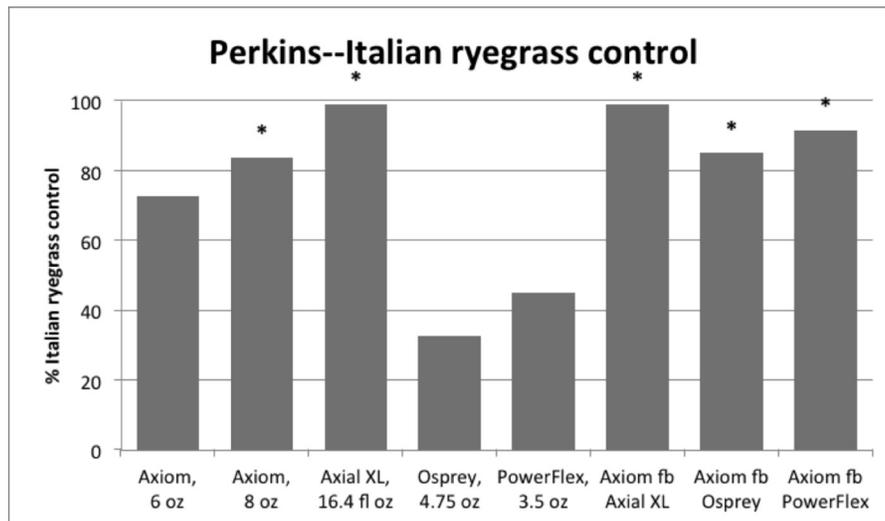


Figure 2. Italian ryegrass control at the Perkins location in 2010-2011 for one- and two-pass herbicide programs. The lack of control with Osprey and PowerFlex is likely due to the presence of ALS-resistant Italian ryegrass at this location. Treatments with an asterisk above the bar indicate provided the highest level of Italian ryegrass control. (Abbreviation: fb, followed by)

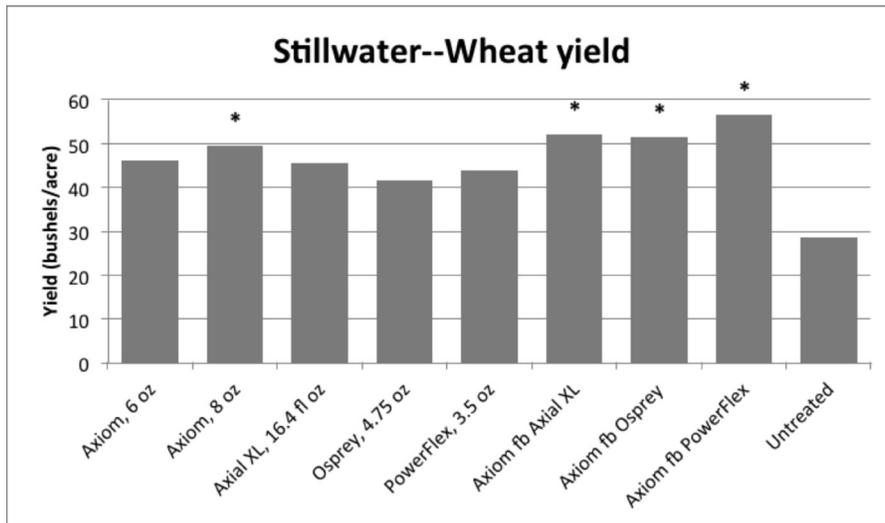


Figure 3. Wheat yields at the Stillwater location in 2010-2011 for one- and two-pass herbicide programs. Treatments with an asterisk above the bar indicate the statistically highest yielding treatments. (Abbreviation: fb, followed by)

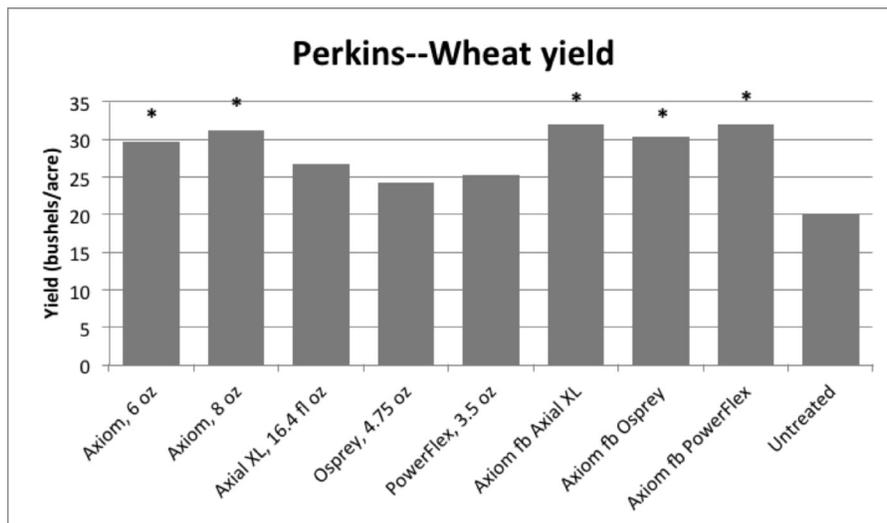


Figure 4. Wheat yields at the Perkins location in 2010-2011 for one- and two-pass herbicide programs. Treatments with an asterisk above the bar indicate the statistically highest yielding treatments. (Abbreviation: fb, followed by)

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