

## Preemergence and Postemergence Herbicides for Control of Italian ryegrass (*Lolium multiflorum*) in Winter Wheat

M.R. Beaudoin and I.C. Burke



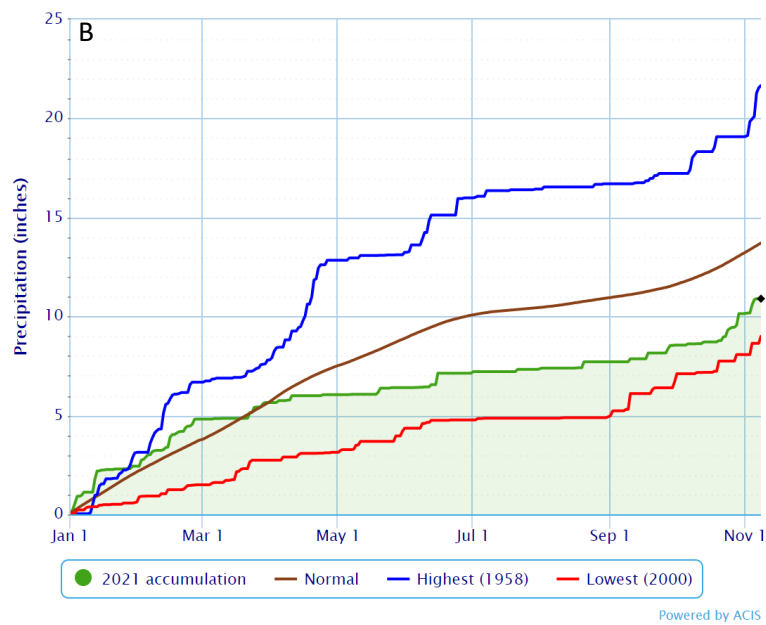
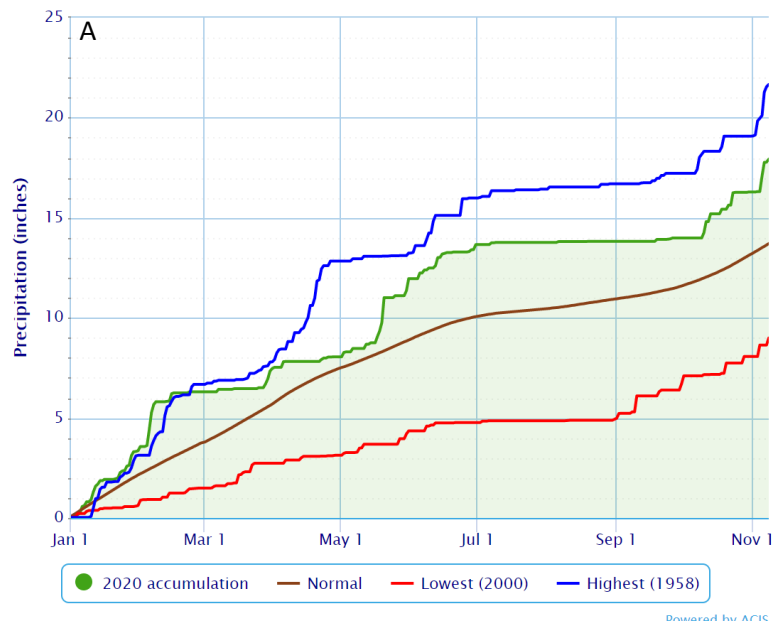
Italian ryegrass (*Lolium multiflorum*) is a problematic weed in cereal crops and grass seed crops in the Pacific Northwest (PNW). Italian ryegrass management is increasingly more difficult due to widespread Acetyl CoA Carboxylase (ACCase) and acetolactate synthase (ALS) inhibitor resistance. The objective of this study was to evaluate gibberellic acid (GA<sub>3</sub>) (RyzUp Smartgrass) in mixture with preemergence herbicides for improved control of Italian ryegrass in winter wheat. Applications of gibberellic acid could be used to stimulate weed seed germination, potentially mitigating the protracted germination period in the spring typical of Italian ryegrass. Preemergence applications of Zidua, Fierce, and Fierce MTZ were applied with and without gibberellic acid.

The study was seeded to winter wheat variety ‘LCS Hulk’ on October 8, 2020, using a Horsch direct seed drill. Treatments were applied preemergence to the winter wheat (Table 1). The study was arranged in a randomized complete block design with 10’ by 30’ long plots and 4 replications. Italian ryegrass percent control was assessed by visual estimation 172, 185, 192, 221 days after application (DAT), and density was assessed 194, 207, and 229 DAT using a 1/4-m<sup>2</sup> quadrat. Winter wheat was harvested using a Kincaid plot combine with a 5.74 ft wide header on August 2, 2021. Data was subjected to an analysis of variance using the statistical package included in Agricultural Research Manager software system (ARM 8.5.0, Gylling Data Management).

The PNW experienced abnormal weather patterns for the 2021 cropping year (Figure 1). Rainfall essentially ceased well before the typical Italian ryegrass germination period. Control with a single application of Axial XL was minimal, as the study site is apparently infested with ACCase resistant Italian ryegrass. Control of Italian ryegrass preemergence applications of pyroxasulfone, metribuzin, and flumioxazin at different rates alone and in combination with GA<sub>3</sub> was similar (Table 2), and did not change through the season. Italian ryegrass density for nontreated and postemergence treatments of Axial XL 16.4 fl oz/A were greater than preemergence treatments (Table 3). However, yield was similar among treatments.

Gibberellic acid combined with preemergence herbicides did not improve control of Italian ryegrass in 2021. Environmental conditions such as light, water availability, soil type, and soil temperature could have an impact on the efficacy of gibberellic acid applied under field conditions. Growth chamber experiments are ongoing to understand the environmental conditions required for effective use of gibberellic acid. Other means of control such as prevention, mechanical, and cultural management methods essential tools for management of Italian ryegrass.

Figure 1. Precipitation weather data for Pullman, WA, during the field trial. The 2020 precipitation (A) was slightly above normal, while 2021 (B) was significantly below normal (National Weather Service).



**Table 1.** Environmental conditions at the time of treatment application.

<b>Study Application</b>	<b>Preemergence</b>	<b>Postemergence</b>
Date	10/16/2020	5/10/2021
Application Timing	10:00 AM	12:30 PM
Application volume (GPA)	15	15
Day air temperature (°F)	52	51.4
Soil temperature (°F)	50.7	55
Wind velocity (mph, direction)	5, SE	6, SE
Next rain occurred on	10/18/2021	5/20/2021

**Table 2.** Percent Italian ryegrass (*Lolium multiflorum*) control following the fall preemergence (PRE) application and spring postemergence (POST) application. Pullman, WA, 2021.

Treatment	Timing	Product Rate	Active Ingredient Rate lb ai/A	Control				Yield
				4/13/21 172 DAT <sup>a</sup>	4/26/21 185 DAT	5/3/21 192 DAT	6/9/2021 233 DAT	8/2/2021
				%				lb/A
Nontreated	-	-	-	0	0	0	0	3375
Axial XL	POST <sup>b</sup>	16.4 fl oz/A	0.054	0	0	0	57	3275
Zidua	PRE	1.5 oz/A	0.08	80	80	80	89	2525
Axial XL	POST	16.4 fl oz/A	0.054					
Zidua	PRE	1.5 oz/A	0.08					
RyzUp		1 oz/A	0.025	95	89	85	84	2810
Axial XL	POST	16.4 fl oz/A	0.054					
Fierce	PRE	3 oz/A	0.143	91	91	82	84	3370
Axial XL	POST	16.4 fl oz/A	0.054					
Fierce MTZ	PRE	16 fl oz/A	0.33	89	81	81	84	2610
Axial XL	POST	16.4 fl oz/A	0.054					
Fierce	PRE	3 oz/A	0.143					
RyzUp		1 oz/A	0.025	91	84	79	86	3030
Axial XL	POST	16.4 fl oz/A	0.054					
Fierce MTZ	PRE	16 fl oz/A	0.33					
RyzUp		1 oz/A	0.025	91	86	79	94	3775
Axial XL	POST	16.4 fl oz/A	0.054					
LSD				19	13	14	16	1167

<sup>a</sup> DAT = days after preemergence treatment.

<sup>b</sup> POST, postemergence; PRE, preemergence.

**Table 3.** Density of Italian ryegrass (*Lolium multiflorum*) per 1 m<sup>2</sup> following fall preemergence (PRE) and spring postemergence (POST) applications in Pullman, WA, in 2021.

Treatment	Timing	Product Rate	Active Ingredient	5/5/21 201 DAAT	5/18/21 8 DABT	6/9/21 30 DABT
			Rate lb ai/A	Density Plants per m <sup>2</sup>		
Nontreated	-	-	-	122	125	54
Axial XL	POST <sup>a</sup>	16.4 fl oz/A	0.054	69	237	51
Zidua	PRE	1.5 oz/A	0.08	26	28	15
Axial XL	POST	16.4 fl oz/A	0.054			
Zidua	PRE	1.5 oz/A	0.08	24	50	17
RyzUp		1 oz/A	0.025			
Axial XL	POST	16.4 fl oz/A	0.054	36	36	6
Fierce	PRE	3 oz/A	0.143			
Axial XL	POST	16.4 fl oz/A	0.054	35	54	4
Fierce MTZ	PRE	16 fl oz/A	0.33			
Axial XL	POST	16.4 fl oz/A	0.054	34	46	9
Fierce	PRE	3 oz/A	0.143			
RyzUp		1 oz/A	0.025	80	34	4
Axial XL	POST	16.4 fl oz/A	0.054			
Fierce MTZ	PRE	16 fl oz/A	0.33	96	95	23
RyzUp		1 oz/A	0.025			
Axial XL	POST	16.4 fl oz/A	0.054	96	95	23
			LSD			

<sup>a</sup> DAT= days after preemergence application.

<sup>b</sup> POST, postemergence; PRE, preemergence.

## **Disclaimer**

**Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to \$7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.**

