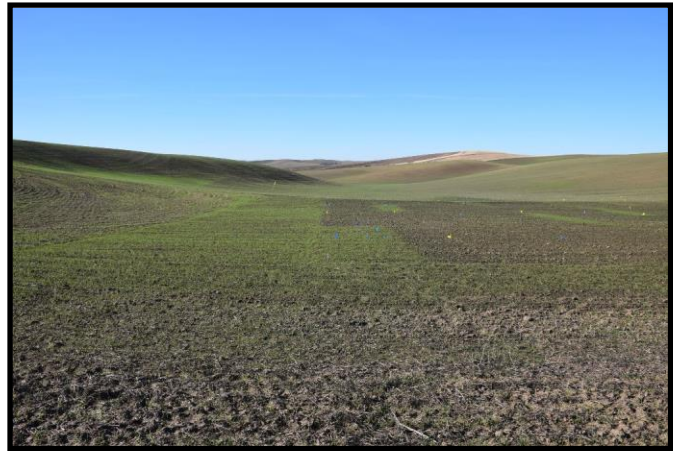


## Evaluation of application timings with Zidua® for the control of Italian ryegrass in winter wheat

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A field study was conducted at the Cook Agronomy Farm near Pullman, WA to determine the application timing of Zidua that would provide optimum control of Italian ryegrass in winter wheat. We evaluated four herbicide application timings in relation to wheat growth stage: preemergence, delayed preemergence, spike leaf emerged and early tillering.



The soil at this site is a Naff silt loam with 3.6% organic matter and a pH of 5.0. The trial area was conventionally summer fallowed. On September 29, 2016, ‘Puma’ winter wheat was seeded at 90 lb seed per acre at a depth of 1.5 inches with a John Deere 9400 hoe drill on a 7-inch row spacing. The ground was fertilized with granular urea on November 10<sup>th</sup> with 100 lb N per acre. Preemergence treatments were applied on September 30<sup>th</sup> with a CO<sub>2</sub>-powered backpack sprayer set to deliver 10 gpa at 44 psi at 2.3 mph. The applications were made under calm conditions with an air temperature of 67°F and relative humidity of 19%. Delayed preemergence treatments were applied on October 4<sup>th</sup> with a CO<sub>2</sub>-powered backpack sprayer set to deliver 10 gpa at 45 psi at 2.3 mph. The applications were made under calm conditions with an air temperature of 56°F and relative humidity of 60%. Spike leaf treatments were applied on October 11<sup>th</sup> with a CO<sub>2</sub>-powered backpack sprayer set to deliver 10 gpa at 47 psi at 2.3 mph. The applications were made under calm conditions with an air temperature of 52°F and relative humidity of 46%. Early tillering treatments were applied on April 9, 2017 with a CO<sub>2</sub>-powered backpack sprayer set to deliver 10 gpa at 44 psi at 2.3 mph. The applications were made under winds out of the east at 4 mph with an air temperature of 43°F and relative humidity of 65%. The plots were harvested on August 10<sup>th</sup> using a Kincaid 8XP plot combine.

October was an extremely wet month with 22 days receiving rainfall and totaling 4.78 inches. Initial counts of Italian ryegrass plants in the nontreated check occurred on October 12<sup>th</sup>. A significant portion of Italian ryegrass germinated in the fall and survived the winter due to prolonged snow cover. In the spring, it was difficult to get back into the field from all the fall precipitation, snow melt and continued rains in late winter/early spring. On April 9<sup>th</sup>, when the early tillering application was made, wheat was at 1 to 2 tillers and 6 to 7 inches tall and the Italian ryegrass ranged from 2-leaf to fully tillered, with the majority of the plants 1- to 3-tiller, at a height of 3 to 5 inches. The density of Italian ryegrass in the nontreated checks was so high that it seemed unlikely that additional plants were going to emerge in the spring. The trial area was also non-uniformly infested with wireworms which had some level of impact on yield. The wireworm damage was most pronounced in the spring. However, we believe that yield was most influenced by the level of Italian ryegrass control. Zidua (2.5 oz/A) or Zidua + PowerFlex® HL (2.5 + 2.0 oz/A) applied at spike leaf or Zidua (1.5 oz/A) preemergence followed by Zidua (1.0 oz/A) spike leaf; Zidua (1.5 oz/A) preemergence followed by Zidua + PowerFlex HL (1.0 + 2.0 oz/A) spike leaf provided the best control of Italian ryegrass. The addition of PowerFlex HL to

the aforementioned treatments did not improve control compared to Zidua alone. The best Italian ryegrass control was achieved when a total of 2.5 oz/A of Zidua was applied in the fall. It did not matter if it was applied as sequential treatments or all at once at the spike leaf stage. The 2.5 oz/A rate cannot be applied to wheat prior to emergence, so if a grower wants to ensure some level of control prior to wheat emergence, they will need to apply Zidua at 1.0 to 1.75 oz/A (depending on soil type) preplant surface or preemergence and then follow with a sequential treatment of 0.75 to 1.5 oz/A (not to exceed a total of 2.5 oz/A). Zidua + PowerFlex HL applied at early tillering in the spring did not provide commercially acceptable control of Italian ryegrass. When Zidua applications were split between fall and spring, the fall applications were providing most of the control and the spring applications added very little.

				6/23	8/10
				Italian ryegrass	
Treatment #	Treatment	Rate	Application Timing <sup>2</sup>	control	Yield
		oz/A		-----0-100%-----	bu/A
1	Nontreated Check	--	--	--	33 b
2	Zidua	1.5	preemergence	75 e <sup>3</sup>	103 a
3	Zidua	1.5	delayed preemergence	81 c-e	101 a
4	Zidua + Sencor	1.5 + 1.45	delayed preemergence	79 de	104 a
5	Zidua	2.5	spike leaf	90 a-c	102 a
6	Zidua + PowerFlex HL	2.5 + 2.0	spike leaf	89 a-c	83 a
7	Zidua	2.5	early tillering	30 f	40 b
8	Zidua + PowerFlex HL <sup>1</sup>	2.5 + 2.0	early tillering	27 f	44 b
9	Zidua	1.5	preemergence	95 a	96 a
9	Zidua	1.0	spike leaf		
10	Zidua	1.5	preemergence	91 ab	89 a
10	Zidua + PowerFlex HL	1.0 + 2.0	spike leaf		
11	Zidua	1.5	preemergence	79 de	94 a
11	Zidua	1.0	early tillering		
12	Zidua	1.5	preemergence	85 b-d	103 a
12	Zidua + PowerFlex HL <sup>1</sup>	1.0 + 2.0	early tillering		

<sup>1</sup> Treatment was tank mixed with 0.5% NIS and 2.0 qts UAN/a

<sup>2</sup> Dates of application, preemergence (9/30/16), delayed preemergence (10/4/16), spike leaf (10/11/16) and early tillering (4/9/17)

<sup>3</sup> Means, based on four replicates, within a column, followed by the same letter are not significantly different at P = 0.05 as determined by Fisher's protected LSD test, which means that we are not confident that the difference is the result of treatment rather than experimental error or random variation associated with the experiment.