

Control of stripe rust of spring wheat with foliar fungicides, 2006.

The study was conducted in a field with Palous silt loam under natural infection of stripe rust near Pullman, WA. Urea (46-0-0) was applied at 60 lb/A at the time of cultivation. Susceptible 'Fielder' spring wheat was seeded at 60 lb/A in rows 12 in apart with an experimental drill planter on 3 May 06. Harmony Extra 0.33 oz/A plus Buctril 0.75 pt/A with Agridex crop oil concentrate (COC) at 1% of spray volume was applied on 5 Jun while the crop was in the late tillering stage. Fungicide applications of Quilt at 7 fl oz/A and the Tilt, Headline, and Quilt treatments applied at herbicide timing were also applied on 5 Jun. On that date there was no stripe rust in the plots when wind was 1.7 mph and temperature was 69.7 °F. The one-time applications of Topguard, Stratego, Quadris, Tilt, and Quilt and the second component for treatments of Tilt, Headline, and Quilt treatments were sprayed on 26 Jun when plants were at early boot stage and stripe rust was just appearing in the plots. The wind was light at 1.2 mph and temperature was 81.8 °F. Sprays were applied in 16 gal water/A using a 601C backpack sprayer from R & D Sprayers Inc. with a C3470 regulator and a 2.5 lb CO₂ cylinder. The spray boom had four nozzles 19 in apart, but only three were used to accommodate the width of the plots. The spray pressure was 18 psi. A randomized block design was used with four replications for each treatment. Stripe rust severity (percent of diseased foliage) was assessed on 26 Jun just before fungicide application at late jointing stage; 29 Jun or 3 days after fungicide application at heading stage; 11 Jul or 15 days after application at flowering stage; 17 Jul or 21 days after fungicide application at early milk stage; and 24 Jul or 28 days after fungicide application at soft dough stage. Plots, ranging from 73.2 to 80.3 sq ft, were individually measured at the time of harvest and individual plot areas were used to calculate yields. Plots were harvested on 23 Aug when kernels were naturally dry, and test weight of kernels was measured for each plot. Area under disease progress curve (AUDPC) was calculated for each plot using the four severity assessment dates. Relative AUDPC was calculated as percent of the non-treated control. Rust severity, relative AUDPC, test weight, and yield data were subjected to analysis of variance and means were separated by Fisher's protected LSD test.

Stripe rust severity in non-treated control plots was 1.3, 6.3, 25.0, 65.0, and 92.5% on 26 Jun, 29 Jun, 11 Jul, 17, Jul, and 24 Jul, respectively. All treatments significantly reduced stripe rust severity at 3, 15, 21, and 28 days after application. Disease control remained effective 28 days after application, while significant stripe rust (11.8% of severity) developed in the plots treated with the half rate of Quilt (7 fl oz/A) applied at the herbicide application time. AUDPC values of the treatments varied significantly, but all were significantly different from the non-treated control. All treatments increased grain test weight, but only the treatments with two applications of Tilt and one application of Topguard, Stratego, and Quilt produced a significantly higher yield than the non-treated control. Also, all treatments were not significantly different from each other in test weight. Similar to the rust results, all fungicide treatments significantly increased grain yield compared to the non-treated control. Fungicide treatments increase yield by 25.0 to 40.2%, which could be valued at \$43 to \$69/A depending upon the treatment.

Treatment, rate/A, and timing of application ^z	Stripe rust severity (%) ^y						Test weight (lb/bu)	Yield ^w	
	26 June	29 June	11 July	17 July	24 July	Relative AUDPC ^x		Mean (bu/A)	Increase (%)
Tilt 2 fl oz (late tillering-5 June) + Tilt 2.0 fl oz (early boot-26 June)	0.0 a ^v	1.8 c	0.0 b	0.0 c	0.0 c	1.3 c	58.2 a	63.4 a	40.2
Topguard 14 fl oz (early boot-26 June)	0.0 a	1.3 dc	0.0 b	0.0 c	0.0 c	0.9 c	58.6 a	60.3 ab	33.5
Stratego 10 fl oz (early boot-26 June)	0.0 a	1.5 c	0.0 b	0.0 c	0.0 c	1.1 c	58.6 a	59.5 bc	31.6
Headline 4 fl oz (late tillering-5 June) + Headline 4 fl oz (early boot-26 June)	0.0 a	1.0 dc	0.0 b	0.3 c	0.5 c	1.1 c	57.6 ab	59.2 bc	31.0
Quadris 6 fl oz (early boot-26 June)	1.3 a	1.5 c	0.0 b	0.0 c	0.0 c	1.3 c	58.0 ab	59.1 bc	30.8
Tilt 4 fl oz (early boot-26 June)	0.0 a	3.8 b	0.5 b	0.0 c	0.0 c	3.2 bc	58.0 ab	59.1 bc	30.7
Quilt 7 fl oz (late tillering-5 June) + Quilt 13.5 fl oz (early boot-26 June)	0.0 a	0.0 d	0.0 b	0.0 c	0.0 c	0.0 c	57.7 ab	57.7 bc	27.6
Quilt 7 fl oz (late tillering-5 June)	0.0 a	0.8 dc	1.3 b	5.3 b	11.8 b	9.0 b	57.9 ab	56.5 c	25.0
Quilt 14 fl oz (early boot-26 June)	0.0 a	1.0 dc	0.0 b	0.0 c	0.0 c	0.7 c	58.2 a	56.5 c	25.0
Non-treated control	1.3 a	6.3 a	25.0 a	65 a	92.5 a	100.0 a	56.8 b	45.2 d	0.0
LSD ($P \leq 0.05$)	1.6	1.5	2.9	3.7	5.0	6.7	1.3	3.5	

^z Crop Oil Concentrate (COC) at 1% v/v was applied in all treatments.

^y Stripe rust severity was recorded as percentage of leaf area with disease.

^x AUDPC is area under disease progress curve, = $\sum[\text{rust severity (i)} + \text{rust severity (i+1)}]/2 \times \text{days}$. Relative AUDPC was calculated for each treatment as the percent of the AUDPC (as 100%) of the non-treated control.

^w Yield (lb/A) based on 3-5% moisture and test weight (lb/bu) measured for each plot.

^v Column numbers followed by the same letter are not significantly different at $P = 0.05$ as determined by LSD test.