

**Control of stripe rust of spring wheat with foliar fungicides, 2007.**

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 'Lemhi' spring wheat was seeded at 60 lb/A in rows 12 in apart with an experimental drill planter on 30 Apr 07. 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 30 May while the crop was in the late tillering stage. Fungicides were applied in 16 gal water/A on different dates and stages depending upon the treatments. The first applications of Topguard for the two-application treatments were done on 21 Jun at boot stage when plants had no stripe rust. Sprays were applied when wind was 1.2 mph and temperature was about 68 °F. The one-time applications of Headline, Tilt, Quilt, Stratego, Topguard, and Quadris were done on 27 Jun when plants were at early heading stage and had 5-10% stripe rust severity. Sprays were applied when wind was 1.0 mph and temperature was about 80 °F. The second applications of Topguard for the two-application treatment were done on 3 Jul when plants were at late heading stage. Sprays were applied when wind was 1.0 mph and temperature was about 71 °F. A 601C backpack sprayer from R & D Sprayers Inc. was used with a C3470 regulator and a 2.5 lb CO<sub>2</sub> cylinder. The spray boom had four nozzles 19 in apart, but three were used because of 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 21 Jun (boot) just before the first fungicide application and on 27 Jun (heading), 5 Jul (flowering), 12 Jul (milk), and 19 Jul (soft dough) or 7, 15, 22, and 29 days after the first fungicide application, respectively. Plots, ranging from 79.6 to 85.0 sq ft, were individually measured at the time of harvest and individual plot areas were used to calculate yields. Plots were harvested on 22 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 sets of severity data. 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 0, 6.3, 50.0, 95.0, and 100% on 21 Jun, 27 Jun, 5 Jul, 12 Jul, and 19 Jul, respectively. All treatments significantly reduced stripe rust severity at 8 days after application. Disease control remained effective throughout the remaining growth season. AUDPC values of the treatments varied significantly, but all were significantly different from the non-treated control. All treatments did not significantly increase grain test weight due to the relatively short duration of stripe rust infection. All fungicide treatments significantly increased grain yield compared to the non-treated control, except for treatments with quilt and one application of Topguard, in which the increases were not significantly different from the non-treated control. Fungicide treatments increased yield by 26.3 (7.1 bu/A) to 52.1% (14.1 bu/A), which could be valued at \$57 to \$113/A depending upon the treatment.

Treatment, rate/A, and timing of application <sup>x</sup>	Stripe rust severity (%) <sup>z</sup>				Relative AUDPC <sup>w</sup>	Test weight <sup>y</sup> (lb/bu)	Yield <sup>v</sup>	
	27 Jun Heading	5 Jul Flowering	12 Jul Milk	29 Jul Soft dough			Mean (bu/A)	Increase (%)
Non-treated control .....	6.3 a <sup>v</sup>	50.0 a	95.0 a	100.0 a	100.0 a	64.3 a	27.0 b	0.0
Topguard 1.04SC 7 fl oz/A (early heading-6 June) + Topguard 1.04SC 7 fl oz/A (flowering-20 June) .....	6.3 a	1.0 cd	2.0 b	0.0 c	3.3 bc	62.0 a	40.5 a	49.7
Topguard 1.04SC 10 fl oz/A (early heading-6 June) + Topguard 1.04SC 10 fl oz/A (flowering-20 June) .....	5.0 a	1.0 cd	1.0 b	0.0 c	2.4 c	62.2 a	41.1 a	52.1
Topguard 1.04SC 14 fl oz/A (early heading-6 June) + Topguard 1.04 lb/gal SC 14 fl oz/A (flowering-20 June) .....	5.0 a	0.8 cd	0.0 b	0.0 c	1.8 c	62.4 a	40.9 a	51.4
Headline 2.08F 4 fl oz/A (late heading - 12 June) .....	6.3 a	4.0 b	0.8 b	0.3 b	4.3 b	60.8 a	39.7 a	46.9
Tilt 3.6EC 4 fl oz/A (late heading - 12 June) .....	5.0 a	0.5 d	0.0 b	0.0 c	1.7 c	62.3 a	38.9 a	43.8
Quilt 1.67SE 14 fl oz/A (late heading - 12 June) .....	6.3 a	0.0 d	0.0 b	0.0 c	1.8 c	62.3 a	35.1 ab	30.0
Stratego 2.08EC 10 fl oz (late heading -12 June) .....	6.3 a	0.3 d	0.0 b	0.0 c	1.9 c	63.6 a	40.5 a	49.7
Topguard 1.04SC 14 fl oz/A (late heading-12 June) ..	5.0 a	2.0 c	0.0 b	0.0 c	2.5 c	63.4 a	34.2 ab	26.3
Quadris 2.08SC 6 fl oz/A (late heading - 12 June) .....	5.0 a	0.5 d	0.0 b	0.0 c	1.7 c	62.6 c	37.3 a	38.0
LSD ( <i>P</i> ≤ 0.05) .....	2.6	1.4	2.8	0.2	1.8	3.6	9.4	

<sup>z</sup> Stripe rust severity was recorded as percentage of leaf area with disease.

<sup>y</sup> Test weight (lb/bu) and yield (lb/A) based on 3-5% moisture measured for each plot.

<sup>x</sup> Crop Oil Concentrate (COC) at 1% v/v was applied in treatments of Headline, Tilt, Quilt, Stratego, and Quadris..

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

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