

Fungicide seed treatments for reducing yield losses caused by stripe rust on spring wheat, 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 11.3 kg/ha at the time of cultivation. Seed of susceptible 'Fielder' spring wheat was treated with Raxil, Dividend Extreme, Apron XL, and various rates of BAS 595XEF combined with Apron XL at 5.56 ml/100 kg with or without Charter at 400 ml/100 kg. Non-treated seed served as check. The treated seed was planted at 11.3 kg/ha in rows 0.3 m apart with an experimental drill planter on 28 Apr. Harmony Extra 4.16 g plus Buctril 0.17 L/ha with Agridex at 1% of spray volume was applied on 30 May at tillering stage. A randomized block design was used with four replications for each treatment. Stripe rust severity (percent of diseased foliage) was assessed for each plot on 29 Jun at late boot stage; 10 Jul at flowering stage; and 24 Jul at soft dough stage. Plots were individually measured at the time of harvest and plot area ranged from 6.2 to 7.3 m². Plots were harvested on 15 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 three sets of rust severity data. Relative AUDPC was calculated as percent of the non-treated check. Rust severity, relative AUDPC, test weight, and yield data were subjected to analysis of variance and means were separated by Fishers protected LSD test.

Mean severity of stripe rust in non-treated check plots was 42.5, 100.0, and 100.0% on 29 Jun, 10 Jul, and 24 Jul, respectively. All treatments, except for the treatments of Raxil MD and Apron XL, significantly reduced stripe rust severity compared to the non-treated check at the first note on 29 Jun at late boot stage. At the second note on 10 Jul at flowering stage, all treatments were significantly lower than the non-treated check. At the third note on 24 Jul at soft dough stage, all treatments and the check had 100% of rust severity. AUDPC values of all fungicide treatments were significantly different from the non-treated check. BAS 595XEF combined with Apron XL had the best stripe rust control measured by AUDPC. All treatments did not significantly increase grain test weight compared to the non-treated check. All treatments increased grain yield by 4.9 to 26.8% compared to the non-treated check. However, the increases by Dividend, Raxil MD, and Apron XL were not significant, while those of the other treatments were significant. The results show that BAS 595XEF can be used to reduce early infection of and grain yield losses caused by stripe rust on spring wheat.

Seed treatment, rate ^z	Stripe rust severity (%) ^y				Test weight (kg/L)	Yield ^w	
	29 Jun Late boot	10 Jul Flowering	24 Jul Soft dough	Relative AUDPC ^x		Mean (kg/h)	Increase (%)
BAS 595XEF, 150.0 ml/100 kg + Apron XL, 5.56 ml/100 kg	5.0 d ^v	62.5 c	100.0 a	69.1 c	0.74 a	2806 a	26.8
BAS 595XEF, 50.0 ml/100 kg + Apron XL, 5.56 ml/100 kg	10.0 d	60.0 c	100.0 a	68.9 c	0.72 c	2681 ab	21.1
BAS 595XEF, 100.0 ml/100 kg + Apron XL, 5.56 ml/100 kg	5.0 d	57.5 c	100.0 a	66.2 c	0.73 bc	2684 ab	21.2
Charter, 400.0 ml/100 kg + BAS 595XEF, 50.0 ml/100 kg + Apron XL, 5.56 ml/100 kg	25.0 bc	77.5 b	100.0 a	82.7 b	0.73 abc	2550 abc	15.2
Charter, 400.0 ml/100 kg + BAS 595XEF, 200.0 ml/100 kg + Apron XL, 5.56 ml/100 kg	22.5 c	77.5 b	100.0 a	82.1 b	0.74 ab	2530 bc	14.3
Raxil MD, 423.8 ml/100 kg	35.0 ab	77.5 b	100.0 a	85.2 b	0.73 abc	2464 bcd	11.3
Apron XL, 5.56 ml/100 kg	42.5 a	80.0 b	100.0 a	88.6 b	0.73 abc	2429 cd	9.7
Dividend Extreme, 260.0 ml/100kg	30.0 bc	77.5 b	100.0 a	84.0 b	0.73 abc	2322 cd	4.9
Non-treated check	42.5 a	100.0 a	100.0 a	100.0 a	0.73 abc	2214 d	0.0
LSD ($P \leq 0.05$)	11.9	10.3	0.0	6.5	0.01	260	

^z Seed was treated with the fungicides before planting .

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

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

^w Yield was calculated based on 3-5% moisture for each plot.

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