

Reduction of stripe rust severities on spring wheat by seed treatment with fungicides, 2005.

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 'Lemhi' spring wheat was treated with Flutriafol, Vincit, and Dividend. Untreated seed served as a check. The treated and untreated seed was planted at 11.3 kg/ha in rows 0.3 m apart with an experimental drill planter on 26 Apr. Harmony Extra 4.16 g plus Buctril 0.17 L/ha with Agridex at 1% of spray volume was applied on 27 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 1 Jun, 34 days after planting at tillering stage; 15 Jun, 50 days after planting at early boot stage; 22 Jun, 57 days after planting at boot stage; and 8 Jul, 73 days after planting at late flowering stage. Plots were individually measured at the time of harvest and plot area ranged from 1.39 to 1.86 sq ft. Plots were harvested on 21 Sep 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 treatment using the five 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 Fishers protected LSD test.

Stripe rust severity in non-treated control plots was 4.25, 45.00, 45.00, and 100.0% on 1 Jun, 15 Jun, 22 Jun, and 8 Jul, respectively. All treatments significantly reduced stripe rust severity at 34 days and 50 days after planting, compared to the untreated check. The differences were not significant at 57 days after planting. At 73 days after planting, all treated and untreated plots had 100% stripe rust severity. Because of the reduction of stripe rust severities in the early growth stages, the relative AUDPC values of stripe rust were significantly lower than that of the untreated check. However, the yields in treated and untreated plots were not significantly different because these plots had similar levels of stripe rust severity since the boot stage, at which stripe rust just starts appearing in a normal year in this region. The results indicate that Flutriafol, Vincit, and Dividend can be used to reduce early stripe rust infection. However, to make these seed treatments profitable, they should be used under conditions when stripe rust occurs early like 2005 and the weather become hot quickly unlike 2005. 2005 had a long cool growth season in late spring and early summer, and therefore, a very long stripe rust epidemic season. The seed treatments may have be more useful for cultivars with high-temperature, adult-plant resistance.

Seed Treatment, rate ^z	Stripe rust severity (%) ^y					Yield ^w	
	1 June Tillering	15 June Early boot	22 June Boot	8 July Late flowering	Relative AUDPC ^x	Mean (kg/ha)	Increase (%)
Flutriafol 25 SC RTU, 0.4 ml/400gram	1.25	20.00	42.50	100.00	82.50	745.60	3.07
Flutriafol 25 SC RTU, 0.8 ml/400gram	1.00	11.25	35.00	100.00	72.75	719.13	-0.59
Vincit F SC RTU, 0.8 ml/400gram	1.00	8.75	42.50	100.00	76.00	584.55	-19.19
Dividend; 155.52 g/cwt	1.00	15.00	35.00	100.00	75.00	797.04	10.18
Untreated check	4.25	45.00	45.00	100.00	99.75	723.38	
LSD ($P \leq 0.05$)	1.07	10.57	12.61	0.00	12.20	296.64	

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

^w Yield (lb/A) calculated based on 3-5% moisture for each plot.