

Evaluation of chemical seed treatments for control of stripe rust in winter wheat, 2012.

The study was conducted in a field with Palouse silt loam near Pullman, WA. Fertilizer (Osmocota 14-14-14) was applied at 60 lb/A at the time of cultivation on 20 Oct 11. A randomized block design was used with four replications for each of the seven treatments and a non-treated control. For each plot, seed of susceptible 'PS 279' winter wheat were seeded in rows spaced 14-in. apart at 60 lb/A with a drill planter on 21 Oct 11. Each plot was 4.4-ft (4 rows) in width and 15.0 - 16.8-ft in length, with spaces of 20 in. between plots. Huskie 15 fl oz plus Axial 80 ml and M-90 140 ml/A were applied on 30 May 12 when wheat plants were at early jointing stage. Plant stand was estimated as percentage for each plot at early tillering stage. Disease severity (percentage of diseased foliage on whole plot) was assessed for each plot on 8 Jun (flag leaf stage), 22 Jun (heading), 5 Jul (milk), and 17 Jul (soft dough). Plots were harvested on 15 Aug when kernels had 3-5% kernel moisture and test weight of kernels was measured. Area under disease progress curve (AUDPC) was calculated for each plot 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 Fisher's protected LSD test. The weather conditions during the crop season allowed a moderate level of stripe rust epidemic.

There were no significant differences in plant stand, indicating that the seed treatment chemicals did not have obvious phytotoxicity. On 8 Jun at flag leaf stage, stripe rust severity was scored as 3-8% severity. Such a late start of stripe rust in the plots indicated that there was no infection before the winter, or that the fungus infected plants in the fall of 2011 might have not survived the winter. At 22 Jun (heading stage), plants of non-treated control had 85-90% rust severity. At 5 Jul (milk) and 17 Jul (soft dough), stripe rust developed to 100% severity. There were no significant differences in rust severity and relative AUDPC among the chemical treated plots and non-treated control. Thus, none of the seed treatments had significant effect on stripe rust development. Similarly, no difference was observed for grain test weight among the treatments and non-treated control. However, significant differences were found for grain yield. Compared to the non-treated control, three treatments [(Nipsit Inside Insect 5.00 FS 1.000 fl oz/cwt, Metlock 3.70FS 0.090 floz/cwt + V10209 2.65FS 0.150 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Metconazole 2.5), and Dividend Extreme 0.96SS 3.000 fl oz/cwt + Rancona 3.80FS 0.051 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Difenocon 18 gai + Ipconazole 1.5)] increased yield, but none of the increases was significant. The remaining four treatments [Metlock 3.70FS 0.052 fl oz/cwt + V10209 2.65FS 0.150 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Metconazole 1.5), Dividend Extreme 0.96SS 3.000 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Difenocon- 18 gai), Stamina F3 1.74FS 1.000 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt, and Proceed Concentrate 1.03FS 1.000 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt] produced less grain than the non-treated control, of which the first treatment produced significantly lower yield, reducing yield by 14.9%. The results showed that the tested chemicals did not have any effect on control of stripe rust under the field disease conditions. Any possible control effect of the chemicals may not last long.

Product and rate/A	Stripe rust severity (%) ^z					Test weight ^y (lb/bu)	Yield ^y	
	8 Jun Flag leaf	22 Jun Heading	5 Jul Milk	17 Jul Dough	Relative AUDPC ^x		Mean (bu/A)	Inc. (%)
Non-treated control.....	4.5 a ^w	87.5 a	100.0 a	100.0 a	100.0 a	50.1 a	34.3 abc	0.0
Nipsit Inside Insect 5.00 FS 1.000 fl oz/cwt	4.8 a	88.8 a	100.0 a	100.0 a	100.5 a	50.3 a	35.6 a	3.8
Metlock 3.70FS 0.052 fl oz/cwt + V10209 2.65FS 0.150 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Metconazole 1.5).....	5.8 a	90.0 a	100.0 a	100.0 a	101.5 a	49.8 a	29.2 c	-14.9
Metlock 3.70FS 0.090 floz/cwt + V10209 2.65FS 0.150 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Metconazole 2.5).....	4.3 a	87.5 a	100.0 a	100.0 a	100.0 a	50.6 a	34.6 ab	0.9
Dividend Extreme 0.96SS 3.000 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Difenocon- 18 gai).....	5.3 a	88.8 a	100.0 a	100.0 a	100.5 a	50.1 a	30.5 bc	-11.1
Dividend Extreme 0.96SS 3.000 fl oz/cwt + Rancona 3.80FS 0.051 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt (Difenocon 18 gai + Ipconazole 1.5)	5.0 a	87.5 a	100.0 a	100.0 a	100.0 a	50.2 a	34.8 ab	1.5
Stamina F3 1.74FS 1.000 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt.	5.5 a	88.8 a	100.0 a	100.0 a	100.8 a	50.1 a	32.3 abc	-5.8
Proceed Concentrate 1.03FS 1.000 fl oz/cwt + Nipsit Inside Insect 5.00FS 1.000 fl oz/cwt	5.0 a	92.5 a	100.0 a	100.0 a	102.3 a	50.4 a	33.7 abc	-1.7
LSD ($P \leq 0.05$)	1.7	5.6	0.0	0.0	2.6	1.9	4.4	

^z Stripe rust severity was recorded as percentage of whole plot leaf area with disease.

^y Test weight (lb/bu) and yield (lb/A) based on 3-5% kernel moisture.

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