

Evaluation of fungicides to control eyespot in winter wheat in Washington, 2012.

Field plots were sown at the Plant Pathology Farm in Pullman, WA in a Thatuna silt loam soil (pH 5.5) on 28 Sep 2011. 'Hill 81' was sown at the rate of 90 lb/A with a 12-in. spacing between rows in a 2-yr, wheat-summer fallow rotation. The experimental design was a randomized complete block with each treatment replicated four times. Plot size was 8 ft by 20 ft and oriented perpendicular to the planting direction. Prior to planting, seeds were treated with Cruiser Maxx Cereals and Cruiser 5FS, 5.0 and 1.0 fl oz per 100 lb seed, respectively. Based on soil test recommendations, 161 lb N, 20 lb P, 13 lb S, and 15 lb Cl/A were applied at seeding. On 20 Oct 2011, Axiom DF (10 oz/A) was applied over the plot area to control annual ryegrass (*Lolium multiflorum*) with an electric pump sprayer, mounted on a 4-wheel ATV, equipped with 11 TeeJet XRC 8002 nozzles, on a 20-in. spacing, at 12.5 gal/A. On 2 Nov 2011, plots were inoculated with a conidial suspension (1.0×10^5 /ml) containing two isolates each of *Oculimacula acuformis* and *O. yallundae* using a CO₂-pressurized (50 psi) back pack sprayer equipped with four TeeJet 8010 nozzles, on a 12-in. spacing, at 100 gal/A. On 1 May, fungicide treatments were applied with a CO₂-pressurized (40 psi) backpack sprayer equipped with five TeeJet XR 11002 nozzles, on a 19-in. spacing, at 20 gal/A. Environmental conditions at time of application were overcast, wind 11.5 mph, relative humidity 54%, air temperature 49°F, and soil temperature at 6-in. depth was 51°F. On the day of fungicide treatment application, plants were jointing, Zadoks growth stage 31 (1st node detectable), and the initial symptoms of eyespot were detected in 1 out of 23 plants assessed. Due to the incomplete control of annual ryegrass and presence of broadleaf weeds, an application of Goldsky 0.84EC (16 fl oz/A), PowerFlex 0.075DF (3.5 oz/A), Dagger 5.2 lb. MCPA Ester (12 fl oz/A), McGregor M-90 NIS (0.25% v/v) and ammonium sulfate (1.5 lb/A) occurred on 7 May, by means of the 4-wheel ATV equipment previously described. The spray solution provided by the farm manager contained Tilt (4.0 fl oz/A). This application provided acceptable control of stripe rust (*Puccinia striiformis*) throughout the remainder of the growing season. On 23 May, plants, from the untreated control plots, were reassessed for eyespot. Plants were jointing, Zadoks growth stage 32 to 34 (2nd to 4th nodes detected), and symptoms of eyespot were detected in 46 out of 188 (32%) plants assessed. Approximately 50 plants were sampled from individual replicates on 20 Jun and stored in a walk-in cooler at 39°F. Disease incidence and severity were evaluated from 22 Jun, when plants were fully headed but not flowering, Zadoks growth stage 60. Disease severity was determined by rating stem bases, 1 to 2 internodes above the crown, for symptom severity using a 0 to 4 scale where 0 = no visual symptoms, 1, 2 and 3 = up to 25, 50 and 75% of the stem circumference colonized by a lesion(s), respectively, and a 4 = a stem with a lesion girdling the base. Yield and test weight were determined by harvesting a portion (4.8 ft by 20 ft) of each plot with a small-plot combine on 21 Aug. A subsample of the grain was cleaned before test weight was determined.

Conditions were favorable for disease development during the winter of 2011 to 2012, due to intermittent snow cover. Overall disease pressure was moderate based on disease incidence and severity in the non-treated plots. Disease incidence, severity and index ranged from 21.4 to 83.0%, 1.9 to 2.9, and 9.8 to 58.5, respectively. Yield and test weight ranged from 99.6 to 120.0 bu/A and 59.3 to 60.1 lb/bu, respectively. Priaxor (both rates evaluated)-, Tilt + Topsin-, Topsin-, and Vanguard-treated plots exhibited significantly lower disease index than the non-treated plots. There were no significant differences among treatments for test weight. There was a trend for increased yield with increased disease control, but neither yield nor test weight were significantly correlated with disease index ($r = -0.06133$, $P = 0.6788$) and ($r = 0.02776$, $P = 0.8514$), respectively.

| Treatment ^z , application rate/A | Disease incidence ^{y, x} % | Disease severity ^{x, w} 0 to 4 | Disease index ^{x, v} 0 to 100 | Yield ^x bu/A | Test weight lb/bu |
|---|--|--|---|----------------------------|----------------------|
| Non-treated | 77.4 | 2.9 | 56.7 | 105.4 | 59.4 |
| Vanguard 75WG 0.893 lb | 21.4 | 1.9 | 9.8 | 114.6 | 60.1 |
| Priaxor 4.16SC 6.0 fl oz | 54.4 | 1.9 | 27.0 | 118.6 | 59.9 |
| Tilt 3.6EC 4.0 fl oz + Topsin 4.5FL 10.0 fl oz | 54.2 | 2.2 | 30.2 | 120.0 | 59.3 |
| Priaxor 4.16SC 4.0 fl oz | 65.4 | 2.0 | 33.0 | 113.2 | 59.5 |
| Topsin 4.5FL 10.0 fl oz | 71.0 | 2.5 | 46.0 | 115.3 | 59.7 |
| Alto 0.83SC 5.5 fl oz + Topsin 4.5FL 10.0 fl oz | 71.4 | 2.5 | 46.1 | 118.3 | 59.6 |
| Headline 2.08SC 6.0 fl oz | 67.6 | 2.7 | 47.7 | 105.5 | 59.7 |
| Headline 2.08SC 9.0 fl oz | 83.0 | 2.4 | 51.3 | 114.0 | 59.8 |
| Regalia 4.0 fl oz + Headline 2.08SC 6.0 fl oz | 76.1 | 2.7 | 51.5 | 111.0 | 59.7 |
| Regalia 8.0 fl oz + MSO 1.0% v/v | 73.3 | 2.9 | 54.5 | 101.0 | 59.7 |
| Regalia 4.0 fl oz + MSO 1.0% v/v | 76.8 | 2.9 | 58.5 | 99.6 | 59.8 |
| LSD _{0.05} | 22.0 | 0.5 | 20.1 | 8.7 | NS |
| Pr>F | 0.0002 | <0.0001 | 0.0005 | <0.0001 | 0.5733 |

^z All products were applied with 0.125% (v/v) NIS as Induce, except Alto + Topsin, Tilt + Topsin mix and Topsin. Regalia + MSO treatments were not applied with Induce.

^y Samples consisting of approximately 50 stems were removed from each plot on 11 Jul and transported to the farm building where the percentage of infected stems and disease severity, as reflected by extent of colonization, was determined by visual inspection of each stem.

^x Fisher's protected ($P = 0.05$) least significant difference (LSD) was used to compare treatment means. Means are based on four replicates.

^w Disease severity was determined by rating stem bases, 1-2 internodes above the crown, for symptom severity using a 0 to 4

scale where 0 = no visual symptoms, 1, 2 and 3 = up to 25, 50 and 75% of the stem circumference colonized by a lesion(s), respectively, and a 4 = a stem with a lesion girdling the base.

^v Disease index, which ranges from 0 to 100, was calculated by multiplying percent infected stems (disease incidence) by disease severity of infected stems and dividing by four.