WHEAT (*Triticum aestivum*) 'Hill 81'
Eyespot; *Oculimacula acuformis* & *O. yallundae*

H.C. Wetzel III and T.D. Murray
Dept. of Plant Pathology, Washington State University, Pullman, WA 99164-6430

Evaluation of fungicides to control eyespot in winter wheat in Washington, 2011.

Field plots were sown in a Thatuna silt loam soil (pH 5.5) at the Plant Pathology Farm in Pullman, WA on 24 Sep 10. '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, seed 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, 34 lb N, 20 lb P, 20 lb S, and 12 lb Cl/A were applied at seeding. On 5 Oct 10, 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 9 Nov 10, plots were inoculated with a conidial suspension (1.0×10^6/ml) containing two isolates each of *Oculimacula acuformis* and *O. yallundae* using a CO_2-pressurized (50 psi) back pack sprayer equipped with four TeeJet 8010 nozzles, on a 12-in. spacing, at 100 gal/A. On 22 Apr, 6 gal NH_4Cl/A was applied with an electric pump sprayer, mounted on a 4-wheel ATV, equipped with 11 TeeJet StreamJet SJ3-015-VP nozzles, on a 20-in. spacing, at 11.1 gal/A to supply additional Cl to the plants. On 4 May, fungicide treatments were applied with a CO_2-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 2 to 4 mph, relative humidity 33%, air temperature 56°F, and soil temperature at 6-in. depth was 52°F. On the day of fungicide treatment application, 45 plants were randomly sampled. Plants were jointing, Zadoks growth stage 31 (1st node detectable), and 64% of the plants exhibited the initial symptoms of eyespot. Due to below-average temperatures and above-average precipitation in the spring of 2011, conditions were highly conducive for stripe rust (*Puccinia striiformis*) development and warranted a fungicide application. On 8 Jun, a fungicide application to control stripe rust was applied over the plot area, consisting of Tilt (4.0 fl oz/A) and McGregor M90 NIS (0.15% v/v), with a CO_2-pressurized (40 psi) backpack sprayer equipped with 5 TeeJet XR 11002 nozzles, on a 19-in. spacing, at 20 gal/A. Approximately 50 plants were sampled from individual replicates on 11 Jul and stored in a walk-in cooler at 39°F. Disease incidence and severity were evaluated from 12 to 13 Jul, when plants were in the late stages of flowering to early milk development, Zadoks growth stage 68 to 73. 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 weights were determined by harvesting a portion (4.8 ft by 20 ft) of each plot with a small-plot combine on 26 Aug. A subsample of the grain was cleaned before test weight was determined.

Conditions were favorable for disease development during the winter of 2010 to 2011, due to intermittent snow cover. Overall disease pressure was severe based on disease incidence and severity in the non-treated plots. Disease incidence, severity and index ranged from 66.8 to 92.5%, 2.6 to 3.4, and 46.4 to 76.3, respectively. Yield and test weight ranged from 108.2 to 123.1 bu/A and 59.9 to 60.6 lb/bu, respectively. Priaxor- and Propulse-treated plots exhibited significantly lower disease index values than the non-treated plots. There were no significant differences among treatments for yield or test weight. Yield and test weight were not significantly correlated with disease index (r = 0.07647, P = 0.6391) and (r = -0.07508, P = 0.6452), respectively, which is likely due to the 4.0 in. above-average precipitation received in Mar to May 2011 that delayed water stress until grain fill was nearly complete.

Treatment[z], application rate/A	Disease incidence (%)[y]	Disease severity (0 to 4)[x,w]	Disease index (0 to 100)[x,v]	Yield (bu/A)	Test weight (lb/bu)
Non-treated	92.5	3.3	76.3	108.9	59.9
Priaxor (BAS 70302F) 4.16SC 8.0 fl oz	66.8	2.7	46.4	114.2	60.4
Propulse 3.33SC 8.6 fl oz	70.6	2.7	48.6	114.4	60.2
BAS 70004F 2.5SC 4.5 fl oz	81.0	2.6	54.9	118.1	60.5
Endura 70WG 7.145 fl oz	77.7	2.7	55.0	109.4	60.1
Headline 2.08SC 8.0 fl oz	75.7	3.0	58.7	113.1	60.4
Vertisan (DPX LEM17-086) 1.67EC 24.0 fl oz	88.5	3.2	71.7	117.9	60.2
Luna Privilege 4.16SC 6.8 fl oz	87.5	3.3	72.8	108.2	60.3
Alto 0.83SC 5.5 fl oz	90.0	3.2	73.5	111.2	60.0
Tilt 3.6EC 4.0 fl oz + Topsin 4.5FL 10.0 fl oz	89.6	3.4	76.0	123.1	60.6
$LSD_{0.05}$	NS	0.5	22.2	NS	NS
Pr>F	0.0594	0.0220	0.0386	0.7809	0.9300

[z] All products were applied with 0.125% (v/v) NIS as Induce, except Alto, Endura, and the Tilt + Topsin mix. Veritsan was applied with 0.250% (v/v) NIS as 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.