

Reaction of winter wheat cultivars and breeding lines to eyespot in Washington, 2015.

Field plots were sown at the Plant Pathology Farm in Pullman, WA in a Thatuna silt loam soil (pH 5.7) on 23 Sep 2014. Seed were sown at the rate of 90 lb/A in four-row plots, 4.0 ft wide by 17.8 ft long, with a 12-in. spacing between rows in a field managed in a 2-yr, wheat-summer fallow rotation. The experimental design was a randomized complete block with each genotype replicated four times. Prior to planting, seeds were treated with CruiserMaxx Cereals and Cruiser 5FS, 5.0 and 1.0 fl oz/100 lb seed, respectively. Based on soil test recommendations, 125 lb N, 20 lb P, 13 lb S, and 15 lb Cl/A were applied at seeding. On 8 Oct 2014, Zidua (1 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 10 Dec 2014, plots were inoculated with a conidial suspension (2.0×10^5 /ml) containing two isolates of *Oculimacula aciformis* and two isolates of *O. yallundae* using a CO₂-pressurized (50 psi) backpack sprayer equipped with four TeeJet 8010 nozzles on a 12-in. spacing, at 180 gal/A. Tilt (4.0 fl oz/A) and Induce surfactant (0.125% v/v) was applied on 4 June over the plot area with a CO₂-pressurized (30 psi) backpack sprayer equipped with six TeeJet XR 11002 nozzles on a 17-in. spacing, at 26 gal/A to control stripe rust. Approximately 70 stems were sampled from each plot in replicate 1 on 22 Jun, replicate 2 on 23 Jun, replicate 3 on 24 Jun and replicate 4 on 24 Jun. Samples ranged from 20 to 50% kernel extension near mid-spike, corresponding with Zadoks 70.2 to 70.5. Eyespot 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 each plot with a small-plot combine on 30 Jul 2015. A subsample of the grain was cleaned before test weight was determined.

Conditions were favorable for eyespot development during the winter 2014 to 2015 due to mild temperatures and sparse snow cover. Overall eyespot pressure was moderately severe based on the reaction of susceptible cultivar Eltan. Eyespot incidence, severity and index ranged from 85.4 to 100%, 2.1 to 3.2 and 46.4 to 80.0, respectively. Twenty-four of the entries had a statistically similar disease index (46.4 to 65.0) to Madsen, the resistant control. Twenty-one of the entries had a statistically similar disease index to Eltan the susceptible control. Yield and test weight ranged from 85.1 to 163.5 (bu/A) and 55.4 to 61.2 (lb/bu), respectively. There was a significant, negative correlation between disease index and yield ($r = -0.204$, $P = 0.0098$). There was a slight, non-significant negative correlation between disease index and test weight ($r = -0.016$, $P = 0.8401$).

Genotype	Eyespot incidence ^z %	Eyespot severity ^y 0 to 4	Eyespot index ^w 0 to 100	Yield bu/A	Test weight lb/bu
WA 8177	90.9	2.1	46.4	140.0	58.4
OR2080637.....	85.4	2.2	47.2	127.6	57.6
WA8212	92.8	2.2	49.3	126.0	58.1
DAS003	87.8	2.3	50.7	127.2	58.9
ARS06135-9C	92.5	2.2	51.0	107.9	61.1
WA8234	91.6	2.3	52.0	135.1	60.0
OR2100081H.....	87.6	2.4	52.6	118.0	59.4
SY62-21.....	87.9	2.4	52.7	147.4	60.8
Madsen	93.8	2.3	54.5	126.5	58.9
WA 8187	95.4	2.3	56.0	134.0	59.0
SY96-2.....	93.1	2.5	57.6	129.1	60.0
OR2080641.....	93.1	2.5	57.9	163.5	59.2
SY13#38.....	97.9	2.4	58.0	110.7	60.5
OR2101043.....	92.0	2.6	59.3	119.3	58.0
DAS004	97.4	2.4	59.4	135.7	57.6
4J071366-1	93.6	2.6	60.4	121.7	55.4
OR2090473.....	92.6	2.7	60.8	143.1	57.9
OR2100940.....	96.2	2.5	60.8	154.4	58.4
IDO1101	86.1	2.8	60.8	122.3	59.5
IDO1108DH.....	95.2	2.7	63.3	133.9	56.7
ARS20060123-31C.....	98.3	2.6	64.0	118.9	59.7
MT1257	91.0	2.8	64.1	113.4	59.0
ARS010669-2C	94.7	2.8	64.8	104.3	58.0
IDO1209DH.....	88.1	2.9	65.0	118.6	60.3
WA8232	96.9	2.7	65.4	136.0	59.5
IDO1005	93.9	2.9	68.4	126.0	58.4
UI Silver	93.0	3.0	68.9	115.6	59.0
ARS20060126-35C.....	97.3	2.9	70.3	99.8	59.5
WA8206	97.7	2.9	70.5	120.2	61.2
MTCS1204	97.0	2.9	71.3	100.9	60.3
WA8169	97.2	2.9	71.4	128.2	56.7
WA8233	98.3	2.9	72.4	124.0	57.6
SY71-4.....	99.6	2.9	72.6	149.6	57.9
MT1265	96.1	3.1	73.6	110.2	59.1
Eltan.....	95.8	3.1	74.2	94.7	56.6
UI SRG.....	99.4	3.0	74.8	85.1	56.4

ARS010263-10-3C	98.0	3.1	74.8	135.9	57.9
MT1078	98.5	3.1	76.3	134.3	59.3
MT1286	100.0	3.1	78.0	111.0	60.4
MTS1224	99.2	3.2	80.0	113.1	59.6
LSD ^w _{0.05}	9.9	0.4	13.2	20.5	1.4
Pr>F	0.0005	<0.0001	<0.0001	<0.0001	<0.0001

- ^z Samples consisting of approximately 70 stems were sampled from each plot in replicate 1 on 22 Jun, replicate 2 on 23 Jun, replicate 3 on 24 Jun, and replicate 4 on 24 Jun and transported to the farm building where the percentage of eyespot infected stems and eyespot severity, as reflected by extent of colonization, was determined by visual inspection of each stem.
- ^y Eyespot 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.
- ^x Eyespot index, which ranges from 0 to 100, was calculated by multiplying percent infected stems (eyespot incidence) by eyespot severity of infected stems and dividing by four.
- ^w Fisher's protected ($P = 0.05$) least significant difference (LSD) was used to compare treatment means within columns. Means are based on four replicates.