

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

Field plots were sown at the Palouse Conservation Field Station in Pullman, WA in a Thatuna silt loam soil (pH 5.6) on 11 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 4-yr, chickpea (*Cicer arietinum* L.), spring wheat, fallow, winter wheat 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, 91.8 lb N, 10 lb P, 20 lb S and 7.5 lb Cl/A were applied before planting. On 8 Oct 2014, dry oat kernels colonized by a seven-isolate mixture of *Cephalosporium gramineum* were broadcast on the soil surface at the rate of 215 lb/A. On 2 Apr, Tilt (4.0 fl oz/A), Topsin (10 fl oz/A) and Induce surfactant (0.125% v/v) was applied 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 eyespot caused by *Oculimacula acuformis* and *O. yallundae*. On 4 June, Tilt (4.0 fl oz/A) and Induce surfactant (0.125% v/v) was applied over the plot area with a CO₂-pressurized (30 psi) backpack sprayer equipped with four TeeJet XR 11002 nozzles-on a 15-in. spacing, at 20 gal/A to control stripe rust (*Puccinia striiformis*). Disease incidence and severity were evaluated from 18 to 23 June by destructively sampling one ft of row when the majority of the plants had kernels watery ripe to mid-milk, Zadoks growth stages 71 to 75. Yield and test weight were determined by harvesting each plot with a small-plot combine on 8 Aug. Only three out of four replicates were harvested due to an uneven stand in the first replicate. A subsample of the grain was cleaned before test weight was determined.

Conditions were favorable for Cephalosporium stripe development during the winter 2014 to 2015 due to mild temperatures and sparse snow cover. Symptoms of Cephalosporium stripe developed in the spring of 2015, and based on the reaction of Stephens, a highly susceptible cultivar, disease pressure was moderate. Conditions were conducive for stripe rust development and warranted a fungicide application, which provided adequate control of stripe rust. Disease incidence, severity and index ranged from 31.8 to 92.8%, 3.2 to 4.4 and 21.0 to 77.7, respectively. The tolerant control line Eltan had the lowest disease index of 21.0. Breeding lines 4J071366-1 and MTS1224 and cultivars MDM, UI Silver, and UI SRG had statistically similar disease indexes to Eltan (21.0 to 37.3). Seventeen of the entries were susceptible (59.1 to 77.7) based on statistically similar disease indexes to susceptible control Stephens (77.7). *Cephalosporium gramineum* had a significant impact on yield, which was negatively correlated with disease index ($r = -0.296$, $P = 0.0005$). Test weight was also negatively correlated with disease index but not significantly ($r = -0.136$, $P = 0.116$).

Genotype	Disease incidence ^z %	Disease severity ^y 0 to 4	Disease index ^x 0 to 100	Yield ^w bu/A	Test weight ^w lb/bu
Eltan.....	31.8	3.2	21.0	100.3	54.9
MDM.....	35.4	3.4	23.3	94.1	55.7
4J071366-1.....	56.6	3.3	36.2	125.4	55.8
UI Silver.....	49.6	3.7	36.5	102.5	59.8
MTS1224.....	51.0	3.6	36.6	104.8	57.6
UI SRG.....	48.2	3.7	37.3	94.0	57.0
WA8169.....	56.6	3.6	40.2	120.2	53.5
IDO1101.....	53.0	4.0	41.5	112.0	58.9
MT1078.....	64.3	3.4	42.4	109.7	57.6
Bruehl.....	59.5	3.6	42.4	105.1	55.2
SY71-4.....	62.3	3.5	42.5	123.2	55.5
Bauermeister.....	67.4	3.4	43.6	87.6	57.0
IDO1108DH.....	58.9	3.8	45.1	107.9	53.5
IDO1209DH.....	66.9	3.4	46.0	107.6	59.8
MTCS1204.....	58.8	4.0	48.1	68.1	57.0
WA8212.....	69.8	3.5	49.7	94.1	53.4
OR2101043.....	68.7	3.8	52.9	97.0	53.3
WA 8187.....	70.2	3.8	52.9	100.8	54.7
Brundage 96.....	68.5	3.9	53.0	97.4	54.3
SY13#38.....	67.8	3.9	53.2	106.7	58.0
MT1286.....	63.3	4.2	53.6	83.0	55.9
ARS010669-2C.....	68.5	4.0	53.9	92.9	56.5
ARS06135-9C.....	70.8	3.8	54.0	98.6	58.3
ARS20060126-35C.....	72.1	3.8	54.4	92.8	56.4
DAS003.....	71.2	3.9	55.3	91.2	52.7
ARS010263-10-3C.....	76.2	3.8	56.7	106.0	55.3
WA8232.....	72.5	4.0	58.0	97.8	53.7
MT1257.....	70.1	4.2	58.9	92.9	54.8
OR2090473.....	78.3	3.7	59.1	97.8	52.3
DAS004.....	76.0	4.0	60.1	82.6	50.4
OR2100081H.....	76.2	4.1	61.7	86.1	56.1
ARS20060123-31C.....	80.4	3.9	62.3	96.5	57.4
IDO1005.....	80.1	3.9	62.6	73.7	54.1
WA 8177.....	84.9	3.8	63.6	90.5	55.5

Madsen	83.9	3.8	63.9	86.1	54.2	
MT1265	77.4	4.1	64.0	88.7	55.1	
OR2100940.....	82.9	4.0	65.6	96.0	52.9	
OR2080637.....	83.4	3.9	65.6	64.3	50.6	
WA8233	92.8	3.7	67.5	105.7	52.8	
OR2080641.....	84.9	4.0	67.5	89.0	51.7	
WA8234	82.3	4.2	68.7	82.2	52.0	
SY62-21.....	79.1	4.3	69.3	85.8	56.2	
WA8206	86.5	4.0	69.6	78.3	52.9	
SY96-2.....	82.1	4.4	71.7	90.1	56.6	
Stephens.....	89.5	4.3	77.7	61.4	48.2	
	LSD ^v _{0.05}	23.4	0.3	18.7	15.5	2.9
	Pr>F	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

^z Samples, consisting of one half meter of row, were removed from each plot either 18 (replication 1), 19 (replication 2), 22 (replication 3), or 23 (replication 4) June and transported to the farm equipment building where percentage of infected stems and disease severity, as reflected by the extent of colonization, was determined by visual inspection of each stem.

^y Disease severity was determined by rating individual stems for symptom severity using a 0 to 5 scale where 5 = symptoms detected on the peduncle or a white head, 4 = symptoms detected in the flag leaf, 3, 2 or 1 = symptoms detected on the respective leaves below the flag leaf, and 0 = no visual symptoms.

^x 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.

^w Yield and test weight data was collected from replications 2, 3, and 4 due to uneven emergence of wheat plants in replication 1.

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