

Reaction of winter wheat cultivars and breeding lines to Cephalosporium stripe in Washington, 2011.

Field plots were sown in a Thatuna silt loam soil (pH 5.9) at the Palouse Conservation Field Station in Pullman, WA on 16 Sep 10. Seed were sown at the rate of 90 lb/A in four-row plots, 3.0 ft wide by 16.9 ft long, with a 12-in. spacing between rows in a field managed in a 4-yr, field pea (*Pisum sativum*), spring wheat, fallow, winter wheat rotation. The experimental design was a randomized complete block with each genotype replicated four times. Prior to planting, seed were treated with CruiserMaxx Cereals and Cruiser 5FS, 5.0 and 1.0 fl oz/100 lb seed, respectively. Based on soil test recommendations, 89 lb N, 20 lb P, 20 lb S, and 8 lb Cl/A were applied on 13 Sep 10. On 6 Oct 10, dry oat kernels colonized by a seven-isolate mixture of *Cephalosporium gramineum* were broadcast on the soil surface at the rate of 171 lb/A. On 19 Oct 10, Axiom DF (10 oz/A) and Buctril (32 fl oz/A) were applied over the plot area 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 for the control of grassy and broadleaf weeds. On 22 Apr, 6 gal NH₄Cl/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 GPA to supply additional Cl to the plants. On 3 May, plots were treated with Ally Extra (0.4 oz/A), Brox 2EC (24 fl oz/A), Sencor 75DF (0.5 lb/A), McGregor M-90 (0.25% v/v), Tilt (4.0 fl oz/A) and Topsin 4.5FL (10 fl oz/A) for the control of grassy and broadleaf weeds, eyespot (*Oculimacula acuformis* and *O. yallundae*), and stripe rust (*Puccinia striiformis*). On 3 Jun, Tilt (4.0 fl oz/A) was applied to control stripe rust. Disease incidence and severity were evaluated on 5 to 8 Jul by sampling when the majority of the plants were 50% kernel extended, Zadoks growth stage 70.5. Symptoms of Cephalosporium stripe reached their greatest expression after our individual plant disease ratings were taken. On 25 Jul a whole plot disease rating was taken to visually assess percent plot area with stunted plants and/or white heads, which is descriptive of Cephalosporium stripe severity. Yield and test weights were determined by harvesting each plot with a small-plot combine on 22 Aug. A subsample of the grain was cleaned before test weight was determined.

Conditions were favorable for Cephalosporium stripe development during the winter 2010 to 2011, due to intermittent snow cover. Symptoms of Cephalosporium stripe developed in the spring of 2011, and based on the reaction of Stephens, a highly susceptible cultivar, disease pressure was severe. Due to below-average temperatures and above-average precipitation from Apr to May 2011, conditions were highly conducive for stripe rust development and warranted fungicide applications. Timely fungicide applications provided good control of stripe rust, which prevented confounding of Cephalosporium stripe ratings. Disease incidence, severity and index ranged from 56.0 to 95.8%, 2.9 to 3.8 and 40.1 to 88.3, respectively. Breeding lines ARS97230-6C, WA008135 and ARS98X402-1C, and cultivars Eltan, ORCF-103 and Finch exhibited the lowest whole plot disease rating (1.2 to 2.5%) whereas breeding lines OR2040726, MT50721 and MT50713 and cultivars Decade, AP700 CL, Yellowstone, Genou and SY Ovation exhibited the greatest susceptibility (77.5 to 92.5%), which were statistically similar to Stephens. Yield and test weight were not impacted by Cephalosporium stripe, which is likely due to the trial area receiving 4.0 in. above-average precipitation from Mar to May 2011 that delayed water stress until grain fill was nearly complete.

Genotype	Disease incidence ^{z,y} (%)	Disease severity ^{z,x} (0 to 4)	Disease index ^{z,w} (0 to 100)	Disease rating ^{y,x} (0 to 100)	Yield ^x (bu/A)	Test weight ^x (lb/bu)
Eltan	64.5	2.9	44.1	1.2	149.5	57.0
ARS97230-6C	76.8	3.0	58.1	1.2	112.9	59.2
WA008135	85.7	3.0	62.8	1.2	130.2	62.0
ORCF-103	77.0	3.1	58.6	1.5	111.8	57.5
ARS98X402-1C.....	86.2	3.1	67.0	2.3	111.9	57.3
Finch.....	66.4	3.0	51.2	2.5	117.3	58.2
OR2070870.....	56.0	2.9	40.1	4.8	64.5	58.2
OR2070608.....	63.3	3.1	49.5	5.0	71.2	57.8
Bitterroot	72.9	3.3	60.9	5.5	96.7	58.6
Skiles	78.6	3.1	59.9	6.8	119.6	57.7
WA008092.....	79.6	3.0	58.9	8.0	125.4	56.9
WA008116.....	82.5	3.1	63.1	8.0	128.0	57.1
WA008134.....	77.1	3.3	62.8	10.8	120.4	58.6
Bruehl	74.8	3.4	63.1	12.5	140.4	55.8
Bruneau	77.6	3.4	66.9	12.5	106.8	56.6
Madsen.....	72.3	3.5	63.7	13.0	83.4	57.3
OR2071628.....	76.8	3.4	65.3	15.0	111.7	56.9
99-06202A.....	80.9	3.4	68.8	15.0	90.5	55.3
ORCF-101R.....	79.8	3.2	63.9	16.8	88.3	57.6
ARS 970042-1C.....	85.9	3.3	71.3	20.0	91.1	55.8
ARS 990077-1C.....	80.5	3.5	70.4	24.2	106.5	57.7
Badger.....	64.1	3.4	54.3	36.3	73.2	56.4
Brundage 96.....	81.7	3.6	72.5	43.3	91.9	54.9
Xerpha.....	72.4	2.9	51.8	46.8	126.1	58.2
96-16702A.....	62.3	3.7	57.5	56.8	103.5	58.6
Legacy.....	82.6	3.5	71.7	57.5	96.4	55.5
Tubbs 06.....	88.4	3.4	75.6	57.5	72.0	55.4
03PN107-3.....	67.6	3.4	56.3	60.0	122.8	57.1

ARS 970161-3L.....	85.4	3.5	74.3	60.0	93.8	55.4
X970161-2L.....	80.6	3.5	69.8	62.5	108.6	55.9
03PN108#20	82.6	3.1	64.5	70.0	117.4	58.4
OR2040726.....	66.8	3.3	55.7	77.5	90.9	55.8
Decade (MT0552).....	71.2	3.7	66.1	78.8	85.3	58.4
AP700 CL.....	76.7	3.3	64.2	81.8	43.5	53.9
MT50721.....	80.8	3.6	72.4	83.8	105.7	59.9
MT50713.....	85.7	3.8	80.2	58.0	82.5	58.6
Yellowstone	86.3	3.8	82.1	88.8	111.8	56.4
Genou.....	75.9	3.7	70.5	90.0	94.0	60.5
Stephens	95.8	3.7	88.3	90.0	57.6	54.2
SY Ovation (03PN108#21)	72.6	3.3	60.1	92.5	109.7	58.6
LSD _{0.05}	17.5	0.3	15.6	21.5	20.4	1.9
Pr>F.....	0.0085	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

^z Samples, consisting of one ft of row, were removed from each plot either 5 (replications 1&2) or 7 (replications 3&4) Jul 11 and transported to the farm equipment storage 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 Visual ratings for percent of plot area with stunted plants and/or white heads per plot was descriptive of *Cephalosporium* stripe severity. Values range from 0 to 100 % and represent the mean of four replicate plots.

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