

Reaction of winter wheat cultivars and breeding lines to soilborne wheat mosaic, 2011.

Field plots were sown in a center-pivot-irrigated field in Quincy loamy fine sand (pH 8.0) near Umatilla, OR on 30 Sep 10. Seed for three separate nurseries, Oregon soft winter elite (OSW), Oregon hard winter elite (OHW), and Washington advanced winter (WAW), were sown in the same location at the rate of 90 lb/A in seven-row plots, 5.0 ft wide by 15 ft long, with 8-in. spacing between rows. Plots were arranged in a randomized complete block with each entry replicated four times. Prior to planting, seed for QSW and OHW were treated with Dividend XL RTA at 5.0 fl oz/100 lb seed; seed for WAW was treated with Dividend Extreme and Gaucho at 2.0 and 1.3 fl oz/100 lb seed, respectively. Fertilizer applications were done on 20 Oct 10 (30 lb/A Solution 32), 16 Feb (110 lb/A urea + 40 lb/A ammonium sulfate), and approximately every 10 days from 1 Apr to 30 May (30 lb/A Solution 32 totaling 150 lb/A). Weed control was done 15 Apr using BroxM at 1.5 pts/A and Affinity Broadspec at 0.5 oz/A. Fungicide applications to control stripe rust included Bumper (4 fl oz/A) and Quilt (10 fl oz/A) on 15 Apr and 25 May, respectively. Soilborne wheat mosaic (SBWM) severity was evaluated on 25 Apr, when the majority of plants were in early stem elongation, Zadoks growth stage 30-32. Visual rating on a 0 to 10 scale was based on the percentage of plants expressing SBWM symptoms and the severity of discoloration and stunting of affected plants where 0= all healthy plants with no visual symptoms and 10 = all diseased plants with severe symptoms and severe stunting. Visual rating for lodging was done on 4 Aug and represents the percent area of the plot with fallen stems. Yield and test weight were determined by harvesting each plot with a small-plot combine on 4 Aug. ANOVA was conducted to determine significance of treatments and Fisher's protected least significant difference was used to compare means. Simple linear correlations between treatment means were calculated to identify significance between response variables.

Symptoms of SBWM became apparent early in the spring and were uniform across the plot area. Disease was severe in susceptible entries and mean SBWM ratings ranged from 0.5 to 9.0, 0 to 6.5, and 0.3 to 5.8 in the OSW, OHW, and WAW nurseries, respectively. Lodging ranged from 0 to 57.5%, 0 to 80%, and 0 to 72.5% in the OSW, OHW, and WAW nurseries, respectively. Test weight ranged from 58.1 to 62.0 and 58.0 to 62.9 lb/bu in the OSW and OHW nurseries, respectively; test weight data are not available for the WAW nursery. Yield ranged from 49.8 to 162.1, 85.8 to 170.3, and 83.4 to 152.4 bu/A in the OSW, OHW, and WAW nurseries, respectively. There were significant to highly significant negative correlations between yield and SBWM rating for the OAW ($r = -0.82$, $P < 0.01$), OHW ($r = -0.67$, $P < 0.01$), and WAW ($r = -0.60$, $P < 0.05$) nurseries. There was a significant negative correlation between yield and lodging for OAW ($r = -0.33$, $P < 0.05$), but not OHW or WAW. Yield was not significantly correlated with test weight in the OSW or OHW nurseries. Test weight was not significantly correlated with SBWM rating. There were 5 entries in OSW, 10 entries in OHW, and 3 entries in WAW with mean SBWM ratings of 4.0 or less that appeared unaffected by SBWM and should be useful for growers and breeding programs in the Pacific Northwest where SBWM is of concern.

Nursery	Entry name	Class ^z	Yield, bu/ac	Test wt., lb/bu	% Lodging ^y	SBWM rating ^x
OR soft winter	SY Ovation (03PN-108#21)	SWW	162.1	59.9	7.5	0.5
	WB 1066CL	SWW	145.5	61.9	5.0	0.5
	OR2070870	SWW	162.1	61.3	0	0.8
	ORCF-103	SWW	145.0	60.9	0	1.3
	ARS 97230-6C.....	Club	157.7	62.0	0	1.5
	WB Junction (BZ6W02-616)	SWW	134.8	61.7	2.5	4.3
	OR2080641	SWW	130.8	60.1	0	4.5
	IDO 663.....	SWW	123.1	61.2	7.5	4.5
	Bruneau	SWW	121.3	61.7	5.0	4.5
	OR08047P94	SWW	150.2	61.1	0	4.8
	UICF-Brundage.....	SWW	133.8	60.7	0	4.8
	ID 96-16702A	SWW	132.2	62.0	0	4.8
	Brundage 96	SWW	125.9	60.4	0	4.8
	Stephens.....	SWW	117.6	60.6	0	4.8
	Westbred 528	SWW	131.7	60.8	20.0	5.0
	OR2040726 (MARY)	SWW	131.5	61.2	0	5.0
	ORCF-101R	SWW	120.2	62.0	0	5.0
	WA 8092	SWW	107.9	59.2	20.0	5.0
	AP 700CL.....	SWW	115.2	60.3	2.5	5.3
	ARS 970042-1C.....	Club	102.1	59.3	17.5	5.3
	Skiles	SWW	120.0	61.0	0	5.5
	AP Legacy	SWW	119.9	60.7	0	5.5
	ORCF-102.....	SWW	115.6	60.8	5.0	5.5
	OR2071029	SWW	134.1	60.5	2.5	5.8
	AP Badger	SWW	131.2	60.0	0	5.8
	OR2060395	SWW	117.6	60.2	2.5	5.8
	Goetze/Skiles blend	SWW	116.5	60.3	0	5.8
	OR2071628	SWW	115.6	59.2	32.5	5.8
	ORCF-101	SWW	115.0	61.8	0	5.8
	OR2070608	SWW	113.4	60.7	57.5	5.8
	Tubbs 06.....	SWW	112.5	59.2	25.0	5.8
	ORSS-1757	SWW	107.9	59.6	27.5	5.8

	Xerpha	SWW	125.2	59.9	40.0	6.0
	ORI2101839	SWW	119.2	59.6	2.5	6.0
	Legion	SWW	113.9	59.7	22.5	6.0
	Madsen	SWW	111.2	60.2	17.5	6.0
	OR2071073	SWW	130.5	58.1	32.5	6.3
	NSA 06-2153A	SWW	127.6	59.8	10.0	6.3
	OR2071071	SWW	123.1	58.8	25.0	6.3
	GOETZE	SWW	110.0	59.9	0	6.3
	ORI2101835	SWW	96.2	60.7	0	6.5
	CARA	Club	91.1	59.8	17.5	6.8
	OR2060323	SWW	97.3	58.4	20.0	7.0
	ARS 98X402-1C	Club	63.9	61.5	50.0	8.0
	CODA	Club	49.8	59.9	0	9.0
	LSD ^w		14.8	2.0	22.8	0.7
<u>OR hard winter</u>	Esperia	HRW	146.3	62.9	47.5	0
	Genesi	HRW	153.8	63.1	7.5	0.8
	OR2070174H	HWW	137.4	62.1	2.5	1.0
	OR2090046H	HWW	147.8	62.8	60.0	1.3
	AP 503CL2	HRW	147.5	62.4	35.0	1.3
	OR2090026H	HWW	135.4	62.6	32.5	1.3
	Agripro Paladin	HRW	143.5	62.7	0	1.5
	Whetstone	HRW	134.8	61.2	70.0	1.5
	Altigo	HRW	170.3	59.3	0	2.0
	ML9W05-2501	HRW	130.3	62.5	0	4.0
	Farnum	HRW	85.8	56.8	32.5	4.8
	OR2080111H	HWW	130.5	62.4	0	5.0
	UICF GRACE	HWW	100.5	62.0	25.0	5.0
	Tubbs 06	SWW	124.9	58.8	15.0	5.3
	Stephens	SWW	115.2	60.9	2.5	5.3
	UI Silver	HWW	99.0	61.8	36.7	5.3
	WB-Rimrock	HRW	124.2	62.1	62.5	5.5
	UI Stan	HRW	102.2	60.8	37.5	5.5
	UI Leland	HRW	95.0	60.8	67.5	5.5
	OR2090107H	HWW	132.8	61.9	0	5.8
	WB-Tucson	HRW	122.4	64.1	10.0	5.8
	OR2080236H	HWW	115.8	57.1	17.5	5.8
	Bauermeister	HRW	91.4	58.2	80.0	5.8
	Azimut	HRW	146.1	60.1	17.5	6.0
	Norwest 553	HRW	134.7	63.6	2.5	6.0
	Sinope	HRW	127.0	58.0	2.5	6.0
	OR2080229H	HWW	105.4	62.9	60.0	6.0
	Illias	HRW	116.9	58.4	3.3	6.5
	OR2080227H	HWW	109.4	60.4	77.5	6.5
	OR2080156H	HWW	97.3	62.2	0	6.5
	LSD ^w		12.8	1.4	26.3	0.6
<u>WA advanced winter</u>	WA008135	SWW	138.9	^v	0	0.3
	WA008134	SWW	152.4		15.0	3.3
	5J050509-2	SWW	119.7		0	3.8
	WA008119	HRW	105.6		50.0	5.0
	WA008120	HRW	116.0		45.0	5.0
	WA008153	SWW	110.8		45.0	5.0
	Eltan	SWW	102.0		62.5	5.0
	WA008114	SWW	136.3		62.5	5.3
	WA008137	SWW	95.3		42.5	5.5
	WA008138	SWW	91.0		60.0	5.5
	5J050348-2	SWW	113.4		72.5	5.5
	5J050304-1	SWW	114.4		5.0	5.5
	WA008115	SWW	122.8		42.5	5.8
	WA008070	HRW	83.4		10.0	5.8
	5J040150-1	SWW	114.3		40.0	5.8
	LSD ^w		14.6		24.6	0.7

^z Market class: SWW = soft white winter; Club = club winter; HRW = hard red winter; HWW = hard white winter.

^y Lodging was estimated visually on 4 Aug as the area of each plot with fallen stems.

^x SBWM = visual rating of disease severity is based on symptom severity and degree of stunting where 0= all healthy plants with no visual symptoms and progressing to 10 = all diseased plants with severe symptoms and severe stunting.

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

^v Test weight data are not available for the Washington advanced winter nursery.