

Project Title: Agronomic Evaluation of Advanced Spring Wheat Experimental Lines

Project Leader: Bob Stougaard

Project personnel: Qingwu Xue, Luther Talbert, and Susan Lanning

Objectives: To evaluate spring wheat varieties and experimental lines for agronomic performance in environments and cropping systems representative of northwestern Montana.

Results:

Cool temperatures persisted throughout much of the growing season. These conditions delayed plant development such that the average Julian heading date for the nursery was 188 (July 7) as compared to 171 (June 20) in 2007 (Table 1). Heading dates varied by seven days with Thatcher heading last. Anthesis (flowering) began about six days after heading and averaged 194 Julian days. The difference between heading and anthesis is the exposure duration (ED) and represents the susceptible period for midge damage to occur. The ED averaged about 6 days, and ranged from a high of 8 days for Choteau and MT 0674 to a low of 4.3 days for Outlook, Thatcher, and Volt. Leaf area duration (LAD_{50}) was recorded as the date when 50% of the leaf tissue had senesced. The average LAD_{50} for the nursery was 223 (August 11), with MT 0669 and Vida having the earliest (213) and latest (232) senescence dates, respectively.

As with the previous two years, yields this season were ultimately determined by damage from the orange wheat blossom midge (OWBM). The number of midge per spike ranged from a low of 8 for MT 0414 to a high of 190 for Thatcher (Table 2). Similar trends were observed during 2007. Yields averaged 41 bu/A, ranging from a low of 17 bu/A for MTHW0471 to a high of 73 bu/A for MT 0415. It's worth noting that MT 0415 ranked as the third highest yielding entry in the 2007 nursery. Test weights were similar to last year and averaged 58.3 lb/bu. Likewise, protein levels were as high as last years and averaged 17% for the nursery. Plant height averaged 33 inches, ranging from 26.2 inches for Jedd to 44 inches for Thatcher. Lodging was not observed.

Summary:

Yields were strongly affected by midge damage. Trends are emerging with respect to which entries are susceptible (Thatcher, MTHW0471) and which show resistance (MT 0414, Reeder).

Future Plans:

Continue spring wheat evaluations for the purpose of identifying cultivars best suited for District 1.

Table 1. Agronomic data from the spring wheat advanced yield nursery grown at Kalispell, MT.

Planted: May 8, 2008		Field Y7			Harvested: September 15, 2008					
Entry	Cultivar	Yield	Test weight	Grain moist.	Heading	Anthesis	ED ^a	LAD ₅₀ ^b	Plant height	Protein
		bu/ac	lb/bu	%	----- Julian day -----				in	%
19	MT 0415	72.8	60.7	11.8	188.0	193.3	5.3	229.3	37.1	17.0
43	MT 0746	65.4	59.0	11.3	186.0	193.0	7.0	223.7	36.5	16.9
4	REEDER	64.0	60.6	12.1	187.7	193.0	5.3	229.7	36.4	16.3
18	MT 0414	61.6	61.1	11.7	188.3	193.0	4.7	221.7	34.0	16.6
49	MT 0755	61.1	60.6	11.3	186.0	193.3	7.3	224.0	32.0	17.1
58	AP604 CL	57.6	62.1	11.6	186.0	193.0	7.0	221.7	33.7	16.9
39	MT 0735	57.4	58.7	11.9	186.0	190.9	4.9	226.9	36.7	15.8
26	MT 0657	57.0	58.6	11.1	187.7	194.0	6.3	226.7	31.8	16.3
41	MT 0744	56.2	59.5	11.6	187.3	194.0	6.7	225.0	36.2	16.6
47	MT 0750	54.5	58.7	11.5	188.7	196.0	7.3	225.0	36.5	17.2
44	MT 0747	53.1	59.9	11.3	186.7	192.7	6.0	221.0	30.7	16.9
28	MT 0664	52.9	58.8	11.3	187.7	195.3	7.7	219.3	33.2	17.1
13	JEDD	52.7	61.1	11.6	187.0	193.3	6.3	230.0	26.2	16.0
56	PF906408	52.1	58.3	11.0	188.0	195.3	7.3	223.0	28.6	15.5
54	MT 0770	52.0	60.7	11.5	186.0	190.9	4.9	219.9	34.1	16.7
35	MT 0716	51.9	59.2	11.9	188.7	194.3	5.7	224.0	31.6	16.4
21	MT 0605	50.9	56.8	10.6	189.0	193.7	4.7	217.7	31.0	16.6
55	PF906407	50.9	58.4	11.1	187.0	193.3	6.3	223.7	29.1	16.4
42	MT 0745	50.5	58.4	11.0	186.7	191.7	5.0	229.0	33.3	17.1
45	MT 0748	49.3	59.1	11.4	186.0	191.0	5.0	219.0	32.0	17.4
11	VOLT	48.4	58.8	11.2	192.7	197.0	4.3	223.7	32.3	15.6
20	MT 0515	48.0	60.0	11.5	188.7	194.3	5.7	226.7	33.3	16.1
51	MT 0761	47.9	60.1	11.3	186.7	193.0	6.3	219.0	32.4	17.8
16	KELBY	46.9	58.4	11.2	186.7	192.7	6.0	219.3	28.9	16.6
8	HANK	46.1	58.4	10.9	187.3	193.7	6.3	224.3	28.9	16.6
57	PF906409	45.9	58.2	11.3	187.7	194.0	6.3	226.0	30.3	16.6
50	MT 0759	45.8	58.9	11.2	186.3	192.0	5.7	221.3	32.0	16.8
34	MT 0715	44.6	59.7	11.5	187.3	193.3	6.0	219.7	32.0	16.7
62	MTHW0771	44.0	60.8	11.7	186.0	191.3	5.3	220.3	29.3	16.5
12	ONEAL	43.9	59.4	12.1	187.7	194.3	6.7	226.0	32.8	17.3
27	MT 0658	42.6	59.0	11.4	187.0	192.0	5.0	218.7	30.6	16.8
10	CORBIN	41.2	60.0	12.0	187.0	194.7	7.7	229.0	33.9	16.9
53	MT 0766	39.3	57.6	10.9	187.7	193.3	5.7	223.7	34.6	17.3
38	MT 0724	38.6	58.3	10.8	186.3	192.3	6.0	222.7	31.5	17.3
40	MT 0737	38.5	57.3	10.9	186.7	192.7	6.0	220.0	35.6	17.9

Table 1. Continued

Planted: May 8, 2008		Field Y7				Harvested: September 19, 2008				
Entry	Cultivar	Yield	Test	Grain	Heading	Anthesis	ED ^a	LAD ₅₀ ^b	Plant	Protein
		bu/ac	lb/bu	moisture	----- Julian day -----			height		
				%					in	%
37	MT 0722	37.7	58.0	11.7	189.3	195.7	6.3	224.7	39.1	18.1
59	BZ9M1024	37.5	59.5	11.4	188.3	195.3	7.0	225.0	30.7	16.5
29	MT 0669	37.2	58.4	11.3	189.3	195.3	6.0	212.7	32.3	17.3
24	MT 0631	36.8	55.2	11.2	188.0	194.3	6.3	225.7	35.2	16.4
3	MCNEAL	35.2	54.4	10.2	188.3	195.3	7.0	219.7	32.4	18.1
15	FREYR	35.2	57.8	11.4	188.0	194.7	6.7	228.3	34.1	16.7
23	MT 0614	35.2	57.5	10.9	188.0	195.4	7.4	224.9	34.1	17.9
14	NORPRO	34.9	57.3	11.1	188.3	194.0	5.7	228.7	31.6	17.6
22	MT 0613	34.5	58.7	11.9	188.7	195.0	6.3	227.0	34.4	17.3
36	MT 0718	34.4	58.4	11.4	188.0	193.0	5.0	223.0	29.7	16.9
52	MT 0765	34.2	55.9	10.8	187.3	193.0	5.7	228.3	36.6	17.9
48	MT 0751	33.6	56.3	10.4	187.3	193.3	6.0	222.7	31.9	18.1
17	KUNTZ	32.1	59.0	11.6	189.0	195.9	6.9	222.4	29.4	16.8
30	MT 0674	32.1	57.6	11.1	187.0	195.0	8.0	215.7	32.4	18.3
61	MTHW0767	32.0	58.0	11.0	186.7	193.3	6.7	221.0	33.5	17.2
46	MT 0749	29.1	57.5	11.0	187.3	192.7	5.3	220.7	33.2	17.8
64	LILLIAN	28.8	55.8	10.7	190.7	196.0	5.3	215.0	37.7	18.8
33	MT 0713	28.1	57.9	11.2	188.0	195.0	7.0	225.7	35.4	18.0
25	MT 0640	27.8	57.2	10.9	186.0	191.3	5.3	228.0	34.0	17.3
32	MT 0708	27.4	56.8	11.1	188.3	195.0	6.7	230.0	36.5	19.1
31	MT 0707	24.9	57.7	10.9	188.0	195.9	7.9	225.4	32.8	18.5
7	VIDA	24.8	57.3	11.3	189.3	196.0	6.7	231.7	32.5	18.1
2	FORTUNA	24.4	56.7	11.3	187.0	194.0	7.0	220.0	42.0	17.8
6	CHOTEAU	23.7	55.9	10.8	186.7	194.7	8.0	223.7	32.3	17.9
1	THATCHER	23.6	57.8	11.4	192.0	196.3	4.3	223.0	44.1	16.7
9	CONAN	23.1	58.1	11.3	188.3	194.3	6.0	220.3	29.9	17.3
5	OUTLOOK	23.0	53.7	10.1	190.3	194.7	4.3	223.3	33.7	18.2
63	BZ902413	22.3	56.3	11.5	187.3	194.7	7.3	225.3	32.4	17.0
60	MTHW0471	17.0	57.7	11.0	191.3	196.7	5.3	225.0	37.7	17.9
	Mean	41.5	58.3	11.3	187.8	193.9	6.1	223.6	33.3	17.1
	C.V. (%)	16.1	1.1	2.3	0.4	0.6	17.0	1.8	5.7	
	LSD (0.05)	11.0	1.0	0.4	1.4	1.8	1.7	6.5	3.1	

^a Exposure duration: time difference between heading and anthesis. ^b When 50% of the leaf tissue has senesced.

Table 2. Assessment of spring wheat for resistance to the OWBM at Kalispell, MT.

Planted: May 8, 2008		Field Y7			Harvested: September 15, 2008		
ENTRY	Cultivar	Yield	Midge larvae		Total kernels	Damaged kernels	
		bu/ac	No./dock ^a	No./spike	No./spike	No./spike	%
19	MT 0415	72.8	1.7	14.0	30.3	7.0	22.5
43	MT 0746	65.4	1.3	23.7	36.7	11.0	29.7
4	REEDER	64.0	6.0	30.7	38.7	13.0	32.9
18	MT 0414	61.6	1.7	7.7	32.7	6.7	20.1
49	MT 0755	61.1	0.3	8.0	32.3	4.7	13.2
58	AP604 CL	57.6	3.0	37.0	32.3	13.3	39.0
39	MT 0735	57.4	10.4	25.7	37.0	11.7	31.2
26	MT 0657	57.0	2.3	67.0	40.3	23.7	59.5
41	MT 0744	56.2	5.0	18.0	29.0	8.0	27.8
47	MT 0750	54.5	6.0	36.7	23.7	9.7	41.6
44	MT 0747	53.1	3.7	36.0	36.3	15.7	42.3
28	MT 0664	52.9	2.7	84.7	31.7	21.7	69.4
13	JEDD	52.7	8.3	31.0	33.0	8.7	26.9
56	PF906408	52.1	3.3	46.0	45.0	18.3	40.8
54	MT 0770	52.0	3.9	52.7	31.3	21.0	67.1
35	MT 0716	51.9	8.0	31.3	34.7	11.7	34.5
21	MT 0605	50.9	1.7	41.0	32.3	13.0	42.5
55	PF906407	50.9	1.7	87.0	46.0	25.3	55.2
42	MT 0745	50.5	4.0	40.3	29.7	17.0	56.9
45	MT 0748	49.3	1.3	11.7	36.3	5.0	14.7
11	VOLT	48.4	2.7	95.3	46.7	29.3	61.3
20	MT 0515	48.0	16.3	80.3	46.3	27.0	59.2
51	MT 0761	47.9	3.0	41.0	33.0	16.0	48.5
16	KELBY	46.9	3.7	31.0	31.0	11.0	35.0
8	HANK	46.1	6.7	79.3	43.7	20.3	47.3
57	PF906409	45.9	3.0	77.7	44.3	25.7	57.9
50	MT 0759	45.8	2.0	23.0	28.7	8.0	28.0
34	MT 0715	44.6	8.0	19.0	31.3	8.0	27.0
62	MTHW0771	44.0	5.3	87.3	35.3	26.7	74.4
12	ONEAL	43.9	5.3	89.7	49.0	33.7	67.9
27	MT 0658	42.6	3.7	14.0	24.3	4.0	15.9
10	CORBIN	41.2	8.3	36.7	32.3	14.7	47.7
53	MT 0766	39.3	0.7	63.0	31.7	15.0	42.8
38	MT 0724	38.6	15.7	69.3	46.7	21.7	46.1
40	MT 0737	38.5	8.0	21.7	23.0	6.3	28.1

Table 2. Continued

Planted: May 8, 2008		Field Y7			Harvested: September 19, 2008		
ENTRY	Cultivar	Yield	Midge larvae		Total kernels	Damaged kernels	
		bu/ac	No./dock ^a	No./spike	No./spike	No./spike	%
37	MT 0722	37.7	11.0	109.0	49.3	31.7	63.9
59	BZ9M1024	37.5	5.3	116.7	39.0	31.3	80.3
29	MT 0669	37.2	4.0	31.3	25.0	12.0	48.6
24	MT 0631	36.8	7.0	74.3	36.3	21.3	59.3
3	MCNEAL	35.2	4.7	112.0	41.0	28.0	68.3
15	FREYR	35.2	5.0	101.7	46.3	30.3	64.9
23	MT 0614	35.2	2.9	86.3	36.7	23.3	64.3
14	NORPRO	34.9	15.0	95.3	39.7	27.0	68.3
22	MT 0613	34.5	4.3	60.7	36.3	22.0	60.8
36	MT 0718	34.4	13.7	32.3	31.3	13.3	45.3
52	MT 0765	34.2	2.3	49.0	30.7	15.3	47.7
48	MT 0751	33.6	4.0	29.0	25.7	13.0	50.6
17	KUNTZ	32.1	9.9	23.0	31.0	8.0	24.0
30	MT 0674	32.1	10.0	116.3	39.3	30.7	76.9
61	MTHW0767	32.0	10.0	115.0	38.0	26.7	69.6
46	MT 0749	29.1	1.7	61.3	27.7	18.7	71.5
64	LILLIAN	28.8	2.7	128.3	38.7	28.7	72.9
33	MT 0713	28.1	19.3	63.0	33.7	16.7	49.4
25	MT 0640	27.8	3.3	67.3	35.0	22.7	64.6
32	MT 0708	27.4	15.0	86.0	38.7	21.0	53.9
31	MT 0707	24.9	10.4	104.3	29.3	24.0	80.4
7	VIDA	24.8	9.0	107.0	47.7	34.3	72.4
2	FORTUNA	24.4	7.7	122.0	32.3	25.0	77.2
6	CHOTEAU	23.7	38.3	159.0	42.3	36.7	86.0
1	THATCHER	23.6	9.3	189.7	46.3	40.3	87.1
9	CONAN	23.1	7.0	93.7	39.3	22.7	59.2
5	OUTLOOK	23.0	3.3	52.0	29.0	12.0	46.1
63	BZ902413	22.3	13.7	123.3	28.3	20.3	71.2
60	MTHW0471	17.0	14.7	172.3	50.7	37.0	73.0
	Mean	41.5	6.8	66.2	36.0	19.2	51.8
	C.V. (%)	16.1					
	LSD (0.05)	11.0					

^a The number of midge larvae collected as dockage.