

Project Title: Evaluation of spring wheat varieties for resistance to the Orange Wheat Blossom Midge (OWBM)

Objective: To evaluate spring wheat varieties for agronomic performance and resistance to the OWBM.

Materials and Methods:

Twenty commercially available spring wheat varieties were evaluated as a subset within the Advanced Yield Trial to assess resistance to the OWBM. The study was analyzed as a randomized complete block with three replications. The previous crop was alfalfa and the field was fertilized with 27-30-120-24 lb/A of N-P-K-S, respectively. The soil type was a Creston silt loam (25-50-25) with an organic matter content of 4%, a pH of 7.5, and a CEC of 20 meq/100g. The spring wheat varieties were planted on April 23, 2010 at a rate of 75 lb/A to a depth of 1.5 inches. Each plot was 15 foot long and consisted of 7 rows, spaced 6 inches apart. Wolverine was applied at 1.7 pt/A on May 25, 2010 for weed control.

Heading was recorded when 50 percent of the plants in a plot had half of the spike exposed. Three randomly selected spikes were collected on August 6. Each spike was dissected and the number of larvae and kernels were determined. Height measurements were recorded near maturity. Plots were harvested on September 29 to determine grain yield and quality parameters from each plot. Protein was determined from plots in the first replication.

Results:

Plant heights were taller than normal and averaged about 38 inches (Table 1). The tallest variety was Thatcher (49.6 inches) and the shortest was Jedd (30.84 inches). Heading occurred over a span of seven days. The average heading date for the nursery was approximately 182 (July 1). Kelby had the earliest heading date at 179, while Mott and Thatcher had the latest date (186.33). Unlike previous years, there was no relationship between heading date and midge infestations. Midge populations were low, averaging about 10 larvae per spike. As a result, the relationship between grain yield and larval numbers was weak (Figure 1). Nevertheless, certain trends among the varieties were evident. Reeder again had one of the lowest infestation levels with only 1.3 larvae/spike, while Thatcher had the highest density with 20 larvae/spike.

While midge densities were low, foliar disease pressures were substantial. Stripe rust was the most prevalent, and averaged an infection level of 31 percent. Stripe rust infection ranged from a high of 95 percent for AP604 CL to a low of 0 for Volt and Choteau. Not surprisingly, there was a very strong association between stripe rust infection and percent green leaf area ($R^2=0.96$). While stripe rust infection levels were high, the association between the disease and yield was not strong ($R^2=0.25$). However, the effect of the disease on test weight was more apparent (Figure 2). Septoria also was present, but was less evident, averaging only about a 12 percent infection level. Septoria infection ranged from a low of 0 in AP604 CL to a high of 26 percent in Corbin.

Table 1. Agronomic data from the spring wheat AYT off-station subset. Kalispell, MT. 2010

Variety	Test				Heading Julian	Height inches	Stripe		Green
	Yield bu/A	weight lb/bu	Protein %	owbm ¹ No/spike			rust %	Septoria %	leaf area %
Volt	108.92	60.73	13.50	2.56	182.33	36.22	0.00	6.67	91.67
Jenna	107.11	58.27	14.10	11.89	184.00	36.22	15.00	13.33	80.00
Reeder	103.81	60.37	15.20	1.33	180.33	39.37	11.67	10.00	86.67
Brennan	100.79	59.33	14.70	0.44	179.67	32.28	1.67	13.33	86.67
AP604 CL	99.51	59.37	13.70	0.33	180.00	38.98	95.67	0.00	5.00
Kelby	99.27	59.37	15.10	1.89	179.33	33.20	5.00	15.00	81.67
Vida	99.20	59.40	15.00	9.56	181.33	38.71	13.33	8.33	83.33
Corbin	96.23	59.27	14.20	13.89	180.33	37.53	33.33	26.67	53.33
Choteau	94.24	59.03	15.00	8.89	181.33	36.22	0.00	5.00	90.00
Freyr	94.13	59.70	14.70	12.67	180.67	39.24	3.33	10.00	88.33
Kuntz	93.93	59.43	14.50	12.78	181.33	34.12	5.00	8.33	85.00
Hank	90.16	56.17	15.10	25.22	180.33	35.17	90.00	5.00	6.67
Outlook	87.02	58.07	15.20	16.55	184.00	39.24	1.67	8.33	90.67
McNeal	85.09	59.43	15.20	12.11	184.00	41.08	18.33	8.33	81.67
Fortuna	85.08	59.07	14.40	1.44	181.67	45.14	1.67	25.00	66.67
Mott	83.79	58.77	14.50	7.11	186.33	42.65	63.33	18.33	25.00
Conan	74.47	59.33	14.40	18.00	181.00	36.75	48.33	11.67	50.00
Jedd	73.17	57.23	13.70	21.67	180.33	30.84	90.00	16.67	8.33
Oneal	71.51	57.83	14.80	5.00	182.67	36.75	85.00	11.67	11.67
Thatcher	61.30	58.37	14.80	20.33	186.33	49.61	50.00	16.67	40.00
MIN	61.30	56.17	13.50	0.33	179.33	30.84	0.00	0.00	5.00
MAX	108.92	60.73	15.20	25.22	186.33	49.61	95.67	26.67	91.67
MEAN	90.44	58.93	14.59	10.18	181.87	37.97	31.62	11.92	60.62
LSD (P=.05)	10.79	0.66	NA	14.96	1.42	2.21	12.2	9.96	14.02
CV	7.21	0.68	NA	88.89	0.47	3.52	23.35	50.58	13.99
TRT (Pr >F)	0.0001	0.0001	NA	0.0230	0.0001	0.0001	0.0001	0.0005	0.0001

¹ owbm: orange wheat blossom midge. Planted April 23, harvested September 29.