

Project Title: Evaluation of Clearfield Winter Wheat Lines for Herbicide Tolerance.

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Objectives: Evaluate crop tolerance, yield potential and agronomic attributes of experimental herbicide resistant winter wheat lines.

Results:

Twelve herbicide resistant (Clearfield) winter wheat lines were evaluated for their agronomic performance when treated with Beyond (imazamox) applied at 1 and 2 times the labeled rate (6 and 12 oz/a respectively). The herbicide application was made on April 25, 2006 when plants were at the jointing stage. Non-treated controls were included for comparison.

Adequate soil moisture at planting resulted in good stands. However, cold winter temperatures and lack of snow cover resulted in low tiller numbers. The lack of tillering contributed to lower than average yields, which ranged from 43 to 84 bu/ac. Stripe rust resurfaced during 2006, which further contributed to the poor yields. In spite of the disease pressure, test weights were above normal and ranged from 61 to 66 lb/bu. The combination of stress factors caused heading to occur one week earlier than the previous season. In addition, plant height was less than last year and ranged from 26 inches to 35 inches. Herbicide injury was minimal among the entries evaluated. Consequently, yields were similar to the non-treated plots.

Summary:

Entries MTCL0509, MTCL0538 and MTCL0550 showed excellent resistance to stripe rust, and all entries demonstrated excellent herbicide resistance.

Future Plans:

To evaluate herbicide resistant winter wheat materials for herbicide tolerance and agronomic attributes once two-gene materials become available.

Table 1. Agronomic data from the Clearfield winter wheat lines grown at the Northwestern Agricultural Research Center, Kalispell, MT during the 2005-06 season.

Planted: September 22, 2005

Harvested: August 2, 2006

Entry	ID	Yield (bu/ac)			Test weight (lb/bu)			Grain moisture (%)			Protein (%)		
		0X	1X	2x	0X	1X	2x	0X	1X	2x	0X	1X	2x
11	MTCL0549	80.9	83.9	84.4	64.4	64.7	64.6	10.0	10.0	9.8	10.4	11.0	10.6
5	MTCL0489	73.1	65.1	68.8	64.4	64.2	64.5	9.9	9.9	9.9	10.7	11.4	11.1
12	MTCL0550	72.3	71.1	70.7	64.5	64.7	64.7	9.9	9.7	10.0	11.7	11.7	11.7
9	MTCL0537	71.7	71.5	76.4	65.6	65.7	66.2	9.9	10.0	9.9	12.1	12.1	12.0
7	MTCL0508	67.5	63.0	61.9	65.8	65.6	65.9	9.4	9.5	9.2	12.9	13.8	13.8
8	MTCL0509	67.5	75.1	72.0	65.4	66.1	65.7	9.8	9.4	9.5	12.7	13.4	12.7
3	MTCL0477	61.2	78.3	75.9	65.4	65.6	65.7	10.0	9.7	9.9	11.4	11.3	11.2
4	MTCL0486	58.8	55.4	59.8	64.3	64.5	64.1	9.6	9.7	10.0	12.3	12.4	11.9
10	MTCL0538	57.4	61.2	58.8	65.4	65.8	65.6	10.3	9.8	10.1	14.1	13.9	13.6
2	MTCL0316	55.3	59.2	55.8	65.8	65.6	65.4	9.9	10.0	9.7	12.4	12.6	12.5
1	Above	46.5	51.1	49.3	60.9	61.7	61.0	9.9	9.6	9.7	12.0	11.6	11.5
6	MTCL0501	44.1	42.9	43.8	64.2	65.1	65.3	9.7	9.7	9.8	12.9	13.3	13.1
	Mean	63.0	64.8	64.8	64.7	64.9	64.9	9.9	9.7	9.8	12.1	12.4	12.2
	LSD (0.05) Entry Rate		5.59 NS			0.56 NS			0.21 NS				

NS: Not significant at 0.05 level.

Table 2. Heading, plant height, crop injury and stripe rust infection in Clearfield winter wheat lines grown at the Northwestern Agricultural Research Center, Kalispell, MT during the 2005-06 season.

Planted: September 22, 2005

Harvested: August 2, 2006

Entry	ID	Heading date (Julian)			Plant height (in)			Crop injury (14 DAT) (%)			Crop injury (28 DAT) (%)			Stripe rust (%)		
		0X	1X	2x	0X	1X	2x	0X	1X	2x	0X	1X	2x	0X	1X	2x
11	MTCL0549	152.3	152.7	152.7	32.0	33.1	31.9	0.0	0.0	0.0	0.0	0.0	1.7	15.0	10.0	8.3
5	MTCL0489	146.3	146.0	146.3	28.2	27.6	28.2	0.0	0.0	0.0	0.0	0.0	0.0	31.7	53.3	33.3
12	MTCL0550	146.0	146.0	146.7	29.1	28.9	27.8	0.0	0.0	0.0	0.0	0.0	3.3	4.0	5.0	5.0
9	MTCL0537	153.0	152.3	153.0	34.3	35.6	35.4	0.0	0.0	0.0	0.0	0.0	0.0	21.7	10.7	10.0
7	MTCL0508	146.0	146.0	146.0	32.0	29.1	29.9	0.0	0.0	1.7	0.0	1.7	0.7	10.0	6.7	8.3
8	MTCL0509	148.0	149.3	149.0	32.5	33.1	31.9	0.0	0.0	2.3	0.0	0.0	1.7	2.5	1.7	3.0
3	MTCL0477	149.0	149.0	148.3	31.6	32.9	31.9	0.0	0.0	1.7	0.0	0.0	1.7	40.0	26.7	23.3
4	MTCL0486	148.3	149.0	149.0	30.6	29.7	31.0	0.0	0.0	1.7	0.0	0.0	1.7	80.0	73.3	66.7
10	MTCL0538	146.3	146.7	147.0	29.8	31.1	29.8	0.0	0.0	0.0	0.0	1.7	3.3	5.0	10.0	6.7
2	MTCL0316	144.7	144.7	144.7	30.6	29.9	29.1	0.0	0.7	0.0	0.0	0.0	0.0	50.0	46.7	46.7
1	Above	142.0	142.0	142.0	28.7	27.2	26.4	0.0	0.0	0.0	0.0	0.0	0.0	92.5	93.3	95.0
6	MTCL0501	149.7	149.0	150.0	31.5	28.9	26.9	0.0	0.0	0.7	0.0	0.0	1.7	83.3	76.7	56.7
	Mean	147.6	147.7	147.9	30.9	30.6	30.0	0.0	0.1	0.7	0.0	0.3	1.3	36.3	34.5	30.3
	LSD (0.05)															
	Entry Rate		0.42			1.45			NS			NS			6.6	
			NS			NS			0.47			NS			NS	

DAT: Days after herbicide application.
 NS: Not significant at 0.05 level.