

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:

In 2003-04 season, 10 herbicide resistant (Clearfield) winter wheat lines and 2 susceptible cultivars were evaluated for their agronomic performance after herbicide (Beyond) was applied at 2 rates (label rate: 1X and double label rate: 2X). The herbicide was sprayed on April 16, 2004 using a tractor sprayer when seedlings were 5" tall.

Despite lower temperature than normal during the winter months (Nov.-Jan.), winterkill was minimal and was not recorded. The adequate moisture in spring and early summer resulted in high yield this season. In overall, herbicide application did not affect grain yield, test weight, heading and protein content. Yield averaged 111 Bu/A. Several entries yielded more than check cultivar (Above, a commercially available herbicide resistant cultivar). Test weight was excellent for all entries with a mean of 63 Lb/Bu. Heading date ranged from Julian 148 to 151. Although plant height (42 in) was taller than normal, the lodging was minimal. Protein content ranged from 12.3% to 15.2%.

Herbicide application slightly reduced plant height. When herbicide was applied at label rate (1X), no crop injury was observed in Clearfield lines. However, herbicide application at higher rate (2X) resulted in some crop injury in some entries. The symptoms of disease infestation were moderate in some entries. MTCL0303, MTCL0306, MTCL0316 and 'Above' had stripe rust ranged from 10% to 62%. Several lines also had TCK infestation.

Summary:

Despite some crop injury at higher herbicide rate, Clearfield entries performed very well in yield and test weight. The 2003-04 was an ideal season for evaluating disease pressures. More than half of the Clearfield entries showed excellent resistance to stripe rust and TCK.

Future Plans:

Continue to evaluate herbicide resistant winter wheat materials for herbicide tolerance and agronomic attributes.

Table 1. Agronomic data from the Clearfield winter wheat lines grown at the Northwestern Agricultural Research Center, Kalispell, MT in 2003-2004 season.

Planted: September 18, 2003

Harvested: July 29, 2004

Entry ID	Yield (Bu/A)			Grain moisture (%)			Test weight (Lb/Bu)			Heading date (Julian)			Plant height (in)			Protein (%)		
	0X	1X	2X	0X	1X	2X	0X	1X	2X	0X	1X	2X	0X	1X	2X	0X	1X	2X
1 MTCL0303	114.1	115.4	95.4	12.9	12.0	11.2	63.0	62.5	61.4	150.7	150.7	151.0	45.7	44.2	42.7	12.6	13.0	13.0
2 MTCL0306	119.2	113.8	122.5	12.6	11.9	12.7	62.9	62.9	63.0	151.0	149.3	150.0	44.5	45.4	43.2	13.1	13.7	13.1
3 MTCL0313	119.7	122.3	122.8	11.7	11.8	10.8	63.7	63.6	62.5	152.0	150.7	151.7	47.6	45.4	45.8	12.3	13.0	12.6
4 MTCL0316	123.6	120.5	116.9	12.5	11.9	11.2	63.5	63.6	63.4	150.7	150.3	150.0	44.2	44.9	44.1	12.5	12.7	12.7
5 MTCL0318	109.4	114.8	115.9	12.4	10.5	11.8	63.5	63.3	63.6	150.7	150.0	150.3	42.5	42.0	40.9	14.0	14.1	14.1
6 MTCL0319	107.6	100.4	106.4	11.3	11.0	11.4	62.9	63.2	63.1	149.3	148.7	148.3	41.5	41.1	38.2	14.4	14.8	15.2
7 MTCL0322	105.4	102.4	104.6	11.6	11.6	11.8	63.5	63.4	63.7	150.0	148.3	149.0	40.4	40.0	38.8	13.9	14.5	14.0
8 MTCL0325	111.2	110.6	113.5	14.0	13.0	14.6	62.7	62.9	62.7	151.0	150.3	150.3	45.4	43.4	42.7	13.7	14.2	14.0
9 MTI01159	101.1	100.2	104.8	11.8	11.3	10.8	61.3	61.0	60.3	151.7	151.7	151.7	39.1	38.6	37.0	12.6	13.1	13.0
10 Above	109.1	100.3	105.8	11.4	11.0	11.4	62.8	63.1	63.1	148.0	148.0	148.0	39.8	39.8	37.3	12.7	12.9	13.0
Mean	112.0	110.1	110.9	12.2	11.6	11.8	63.0	63.0	62.7	150.5	149.8	150.0	43.1	42.5	41.1	13.2	13.6	13.5
11 Rampart	115.2	0.0	0.0	12.0	0.0	0.0	63.0	0.0	0.0	152.7	0.0	0.0	43.8	0.0	0.0	14.1	0.0	0.0
12 Neeley	122.2	0.0	0.0	11.9	0.0	0.0	62.2	0.0	0.0	155.7	0.0	0.0	43.8	0.0	0.0	12.5	0.0	0.0
LSD (0.05)																		
Entry Rate	10.37									0.75			1.51					
	NS									0.34			0.70					

NS: Not significant at level of 0.05.

Table 2. Crop injury, lodging and disease infection in Clearfield winter wheat lines grown at the Northwestern Agricultural Research Center, Kalispell, MT in 2003-2004 season.

Planted: September 18, 2003

Harvested: July 29, 2004

Entry	ID	Crop injury (%) (5/3/04)			Crop injury (%) (5/10/04)			Lodging index (%)			Stripe rust (%)			TCK (0-1)		
		0X	1X	2X	0X	1X	2X	0X	1X	2X	0X	1X	2X	0X	1X	2X
1	MTCL0303	0.0	0.0	11.7	0.0	0.0	6.7	0.0	1.7	1.7	33.3	40.0	61.7	0.3	0.0	0.3
2	MTCL0306	0.0	0.0	8.3	3.3	0.0	6.7	0.0	0.0	0.0	13.3	36.7	11.7	0.0	0.0	0.3
3	MTCL0313	0.0	0.0	5.0	1.7	0.0	8.3	0.0	1.7	3.3	1.7	0.0	13.3	0.0	0.7	0.7
4	MTCL0316	0.0	0.0	1.7	0.0	0.0	5.0	0.0	0.0	0.0	10.0	10.0	20.0	0.0	0.3	0.0
5	MTCL0318	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.3	0.3
6	MTCL0319	0.0	0.0	3.3	1.7	0.0	1.7	0.0	0.0	0.0	0.0	8.3	11.7	0.0	0.0	0.0
7	MTCL0322	0.0	0.0	13.3	3.3	0.0	8.3	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0
8	MTCL0325	0.0	0.0	13.3	0.0	3.3	10.0	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	0.0
9	MTI01159	0.0	0.0	6.7	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0
10	Above	0.0	0.0	11.7	3.3	0.0	1.7	0.0	0.0	0.0	18.3	28.3	16.7	0.0	0.0	0.0
	Mean	0.0	0.0	8.0	1.3	0.3	6.0	0.0	0.3	0.5	7.8	13.2	13.7	0.0	0.1	0.1
11	Rampart	0.0	81.7	85.0	1.7	98.0	98.0	1.7			0.0			0.0		
12	Neeley	0.0	81.7	85.0	3.3	98.0	98.0	0.0			10.0			0.0		
	LSD (0.05)															
	Entry		2.41			2.45			1.24			13.67			0.31	
	Rate		1.20			1.23			NS			NS			NS	

NS: Not significant at level of 0.05.