PROJECT TITLE: Agronomic performance evaluation of Winter Wheat Experimental Lines in the presence of introduced and natural TCK smut fungus (*Tilletia controversa* Kuhn).

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OBJECTIIVES:

To evaluate early generation winter wheat lines for yield, test weight, harvest moisture, height, lodging, winter survival, and TCK smut fungus tolerance to both introduced and natural TCK smut fungus (Dwarf Bunt) infection in environments and cropping systems representative of northwestern Montana.

RESULTS:

Rainfall events were limited after early July through harvest. While limiting most crop disease, lack of precipitation did not seem to reduce yields. Climatic conditions were favorable during the 2000 production season for the development of TCK fungus. Several lines exhibited acceptable levels of tolerance to the presence of TCK fungus (Table1). Winter wheat yields ranged from a low of 66 bu/acre for experimental line 93X231cE13 to greatest yields exceeding 130 bu/acre for cultivars/lines Promontory, 93X542cE33, and 93X542cE46. The greatest test weight was 64.1 lbs/bu from cultivar Promontory. Lines 93X542cE67, 93X553E59, 93X553E63, 93X500cE32, 93X500cE71, 93X500cE73, and 93X510cE49 with test weights of 57.6, 56.5, 57.5, 57.1,5 1.7, 56.5, and 57.9 lbs/acre respectively, had test weights lower than desirable. Some of the low test weights appear to be related to the moderate to severe levels of the TCK fungus. All harvest moistures were of acceptable levels. Concernable lodging existed in several lines including 93X542cE75, 93X542cE79, 94X128E10, 94X128E47, and 92X24E22-1. The greatest amount of lodging occurred in lines with moderate to high infestations of TCK fungus. Plant height ranged from 32 to 45 inches. Mean height was 40 inches. All cultivars/lines had 100 percent winter survival. The nursery was planted on September 23, 1999 and harvested on August 17, 2000.

SUMMARY:

Despite limited precipitation during head filling, reserve subsoil moisture permitted excellent yields, and test weights. Environmental conditions permitted an opportunity for screening of experimental lines for TCK fungus tolerance. These observations will further the selection process toward the release of cultivars suitable for planting in TCK fungus susceptible growing regions.

FUTURE PLANS:

Continued evaluations of experimental winter wheat lines for the purpose of identifying resistance to diseases of western Montana. This research will emphasize the TCK fungus.

Table 1. Agronomic data from the TCK Winter Wheat Screening Nursery grown at the Northwestern Agricultural Research Center Kalispell, MT.

Experimental Line	[1]Yield Bu/A	Test Wt Lbs/Bu	Moist %	[2]TCK Score 1-3	Height Inches	Lodging %	Winter Survival %
Promontory	135.1	63.8	11.4	1	39.4	0	100
Promontory	134.0	64.1	11.4	1	38.6	0	100
93X542cE33	131.4	59.9	11.0	1	40.2	20	100
93X542cE46	130.4	60.9	10.9	1	40.9	20	100
93X553E454	129.4	60.4	10.8	1	41.7	0	100
93X542cE30	128.6	59.7	10.8	1	40.6	20	100
93X542cE24	125.6	60.6	10.8	1	39.8	15	100
93X234cE50	125.5	61.4	10.8	3	39.4	25	100
94X128E40	125.0	60.9	11.1	1	37.0	0	100
93X542cE71	124.2	61.4	10.9	1	43.3	0	100
Blizzard	123.5	62.4	11.0	1	44.9	15	100
93X234cE20	123.4	62.1	11.0	2	42.1	0	100
93X542cE28	122.0	60.4	10.4	2	43.7	0	100
93X234cE40	121.9	62.8	11.2	1	39.8	0	100
Promontory	120.8	62.1	10.3	1	39.4	0	100
94X128E47	120.0	61.1	10.8	2	40.6	85	100
92X24E1-2	119.2	61.7	11.0	1	40.2	0	100
93X234cE60	119.0	61.1	10.9	2	37.4	15	100
92X24E37-1	118.7	61.5	10.9	3	38.2	40	100
93X542cE15	117.9	60.2	10.8	1	40.9	5	100
92X24E80-2	116.7	60.8	9.7	1	40.6	40	100
94X128E48	116.3	61.9	10.7	2	35.8	0	100
93X234cE34	115.2	62.5	10.6	1	36.6	5	100
Yuma	114.9	61.5	11.0	2	35.8	0	100
93X553E55	114.3	59.4	9.5	1	43.7	0	100
94X128E13	114.1	60.8	9.7	1	38.2	0	100
93X231cE25	113.9	61.7	10.8	2	40.6	0	100
Yuma	113.8	59.7	10.6	2	32.7	0	100
93X234cE23	113.4	63.2	11.1	1.5	44.1	5	100
93X231cE36	113.4	62.6	11.3	3	41.3	0	100
93X542cE7	113.2	60.5	10.6	1	37.8	0	100
93X231cE18	113.1	61.6	11.1	1	44.9	0	100
93X542cE12	112.7	60.8	11.1	1	39.8	20	100
93X553E59	112.7	56.5	9.4	3	42.1	0	100
93X231cE9	112.5	62.2	11.3	1	41.3	0	100
93X542cE5	111.8	59.2	9.2	1	36.6	0	100
93X231cE21	111.7	60.3	10.8	3	41.3	10	100
93X500cE73	111.2	56.5	9.3	2	41.7	0	100
93X542cE50	111.0	60.3	10.4	1	41.3	0	100
93X542cE63	111.0	60.5	10.9	1	40.6	0	100
92X24E53-2	110.9	59.3	9.5	3	40.9	40	100
92X24E53-2	110.9	59.3	9.5	3	40.9	40	100

Continued

Table 1 continued.

Experimental Line	Yield	Test Wt	Moist	TCK Score	Height	Lodging	Winter Survival
	Bu/A	Lbs/Bu	%	1-3	Inches	%	%
93X234cE76	110.9	60.6	10.8	1	39.8	0	100
93X231cE23	110.3	60.4	10.9	1	40.2	0	100
93X361E42	110.1	62.9	10.2	2	39.8	0	100
93X502cE5	109.8	60.5	10.7	1	39.4	0	100
93X542cE58	109.3	59.7	10.8	1	40.2	0	100
94X128E28	109.2	60.5	11.0	1	39.4	0	100
93X234cE30	107.9	61.7	11.1	2	42.9	0	100
93X234cE91	107.3	62.4	11.1	3	38.6	0	100
93X619cE33	106.7	59.7	10.5	1	39.4	0	100
93X288E33-3	106.6	59.7	10.6	3	37.4	10	100
93X542cE9	106.5	62.3	11.1	2	42.1	20	100
93X542cE35	106.4	58.8	10.5	1	39.0	0	100
93X542cE79	106.3	60.9	10.6	1	39.4	90	100
93X234cE65	105.0	61.4	10.7	1	44.1	0	100
93X553E46	104.8	58.3	10.1	2	37.0	0	100
93X510cE5	104.7	60.2	10.1	1	35.4	0	100
93X231cE51	104.5	60.1	10.4	2	40.9	0	100
93X619cE11	104.4	58.4	10.3	1	41.7	0	100
93X231cE61	103.5	59.2	10.8	3	41.7	0	100
93X231cE5	103.4	60.2	10.1	1	39.4	0	100
93X231cE26	103.0	61.0	10.4	3	40.6	0	100
93X231cE38	102.7	60.9	10.9	3	40.9	0	100
93X500cE71	102.2	51.7	8.5	1	42.1	45	100
93X231cE58	102.0	61.1	11.0	3	45.3	0	100
93X361E12	101.9	63.5	11.3	1.5	40.9	0	100
94X128E16	101.8	59.3	9.6	1	36.2	0	100
93X553E63	100.6	57.5	9.8	2	44.5	0	100
93X619cE18	100.5	58.8	10.5	1	41.3	0	100
94X128E22	99.3	60.4	10.7	2	42.5	0	100
93X234cE71	99.3	61.1	11.1	3	42.1	0	100
93X619cE24	98.9	58.5	10.5	1	42.5	0	100
93X500cE32	98.7	57.1	8.9	1	39.4	0	100
93X542cE67	98.0	57.6	9.8	1	39.4	0	100
93X234cE58	97.6	61.8	11.3	3	41.3	0	100
93X510cE49	97.2	57.9	9.5	2	35.4	15	100
93X510cE39	96.7	58.3	8.8	2	37.8	0	100
93X502cE52	96.3	59.2	10.6	1	37.0	0	100
92X24E22-1	95.6	59.3	10.4	3	40.6	95	100
93X231cE55	95.3	60.0	10.7	3	39.4	5	100
93X542cE13	93.8	60.3	11.0	1	41.7	30	100
93X234cE85	93.1	59.1	10.9	3	31.9	0	100
93X542cE75	92.9	60.5	10.7	2	41.7	80	100
93X510cE4	92.8	58.5	10.5	2	37.8	0	100
94X128E10	92.7	60.1	9.0	1	40.9	95	100
93X510cE42	86.1	59.0	9.8	1	35.4	0	100
93X619cE46	82.5	61.9	10.3	2	35.8	95	100
Neeley	80.5	58.6	10.7	2	42.5	0	100
93X361E2	80.2	60.4	11.0	3	40.6	10	100
93X231cE13	66.4	60.1	10.7	3	37.0	0	100
Mean	108.4	60.3	11.6	NA	40.0	NA	100

[1]Yields adjusted to 13 % moisture.

[2]TCK damage rating. 1). Zero to slight. 2). Moderate. 3). Severe.