PROJECT TITLE: Early generation winter wheat screening for TCK.

PROJECT LEADERS: Bob Stougaard, Weed Scientist, NWARC
Doug Holen, Research Associate, NWARC

PROJECT PERSONNEL: Phil Bruckner, Winter Wheat Breeder, Bozeman, MT
Jim Berg, Research Associate, Bozeman, MT

OBJECTIVES:

To evaluate winter wheat germplasm responses to introduced and natural TCK (Dwarf Bunt) infection. Agronomic characteristics and additional disease reactions will be documented as well.

RESULTS:

Emergence problems and light winterkill resulted in plant populations averaging 80 percent stand survival. However, cool and dry spring conditions resulted in extensive tillering and little to no disease pressure. Documentation of genetic TCK responses were not possible as winter conditions prevented spore germination and plant infection. Conditions throughout grain fill were hot and dry with timely rainfall events and adequate soil moisture. Yields were high ranging from 113 to 160 bu/A with a 98 entry mean of 137 bu/A. Test weights were average (59.8 lbs/bu) with no significant lodging.

SUMMARY:

Growing season precipitation and temperatures resulted in high yields and average test weights in the absence of lodging and disease pressure. The winter of 1998-99 was not favorable for TCK infection in that continuous days of snow-cover never approached the approximated 60 needed to begin the fungus' life-cycle.

FUTURE PLANS:

NWARC will continue to conduct this nursery in an attempt to identify those early generation cultivars with tolerance or resistance to TCK while also evaluating all agronomic attributes.

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

Planted: September 24, 1998 Harvested: August, 18,1999

Variety		Yield Bu/A	Stand %	Test Wt Lbs/Bu	Lodge 0-9	Ht Inch	Hd Date Julian
1 Judith		148.4	90.0	58.9	1.0	37.4	154.0
2 Promontory		139.4	75.0	61.3	0.0	35.0	156.0
3 Blizzard		152.2	85.0	62.9	0.0	39.8	162.0
4 Yuma		143.7	88.0	60.0	1.0	33.1	154.0
5 399	HBC197F/Meridian	151.8	95.0	60.4	1.0	32.3	162.0
6 400	HBC197F/Meridian	128.2	88.0	59.2	1.0	32.3	156.0
7 403	HBC197F/Meridian	155.4	72.0	60.0	1.0	33.5	157.0
8 404	Blizzard/Arapahoe	132.5	85.0	60.5	0.0	37.4	157.0
9 405	Blizzard/Arapahoe	151.5	80.0	59.9	1.0	36.2	155.0
10 406	Blizzard/Arapahoe	159.7	82.0	60.6	1.0	40.6	160.0
11 407	Blizzard/Arapahoe	141.1	75.0	59.6	1.0	39.4	156.0
12 408	Blizzard/Arapahoe	149.9	80.0	60.3	1.0	39.8	161.0
13 409	Jud/Bliz//Jud/Pion	139.8	70.0	59.2	0.0	38.6	155.0
14 410	Jud/Bliz//Jud/Pion	136.5	65.0	59.5	0.0	36.6	155.0
15 411	Jud/Bliz//Jud/Pion	155.9	80.0	57.6	2.0	36.2	160.0
16 412	Jud/Bliz//Jud/Pion	128.9	70.0	57.8	0.0	40.2	160.0
17 413	Jud/Bliz//Jud/Pion	139.7	75.0	57.8	0.0	40.6	162.0
18 414	Jud/Bliz//Jud/Pion	126.5	65.0	56.8	1.0	42.5	162.0
19 415	Jud/Bliz//Jud/Pion	146.2	50.0	58.3	1.0	38.6	157.0
20 416	Jud/Bliz//Jud/Pion	159.6	75.0	58.8	0.0	37.0	157.0
21 417	Jud/Bliz//Jud/Pion	156.1	75.0	58.3	0.0	42.5	162.0
22 418	Jud/Bliz//Jud/Pion	139.5	75.0	58.7	1.0	41.3	158.0
23 419	Jud/Bliz//Jud/Pion	131.2	82.0	58.5	1.0	36.2	157.0
24 420	Jud/Bliz//Jud/Pion	145.8	88.0	57.6	2.0	38.6	160.0
25 421	Jud/Bliz//Jud/Pion	157.3	83.0	57.7	2.0	37.8	158.0
26 422	Jud/Bliz//Jud/Pion	134.2	80.0	59.5	1.0	40.6	158.0
27 423	Jud/Bliz//Jud/Pion	150.3	83.0	58.5	1.0	42.5	162.0
28 424	Jud/Flm85//UT182016	142.9	75.0	60.4	1.0	37.8	165.0
29 425	8713/Arp//Bliz/Arp	152.6	93.0	60.2	1.0	35.4	154.0
30 426	8713/Arp//Bliz/Arp	138.3	98.0	60.0	0.0	31.9	154.0
31 427	8713/Arp//Bliz/Arp	150.2	90.0	59.4	1.0	32.3	154.0
32 428	8713/Arp//Bliz/Arp	145.1	89.0	60.2	0.0	29.5	155.0
33 429	8713/Arp//Bliz/Arp	142.0	95.0	60.1	0.0	34.6	153.0
34 430	8713/Arp//Bliz/Arp	146.4	90.0	60.0	1.0	29.1	156.0
35 431	8713/Arp//Bliz/Arp	137.4	88.0	59.4	2.0	31.5	154.0
36 432	8713/Arp//Bliz/Arp	135.7	85.0	60.8	0.0	33.1	153.0
37 433	Jud/Arp//A851020W	151.7	90.0	57.8	2.0	34.6	157.0
38 434	Jud/Arp//A851020W	138.0	85.0	59.2	0.0	35.0	162.0
39 435	Jud/Arp//A851020W	132.3	88.0	59.8	0.0	30.7	153.0
40 436	Jud/Arp//A851020W	130.5	88.0	59.6	0.0	37.0	160.0
41 437	Jud/Arp//A851020W	144.3	85.0	60.8	0.0	37.4	155.0
42 438	Jud/Arp//A851020W	120.1	85.0	59.3	0.0	39.8	164.0
43 439	Jud/Arp//A851020W	148.6	60.0	60.5	0.0	37.4	162.0
44 440	Jud/Arp//A851020W	119.1	60.0	60.8	0.0	37.4	164.0
45 441	Jud/Apr//A851020W	122.0	55.0	59.9	0.0	33.5	158.0
46 442	Arp/Kes//Jud/Bliz	136.4	60.0	60.7	1.0	39.0	158.0
47 443	Arp/Kes//Jud/Bliz	140.3	75.0	60.0	1.0	36.6	161.0
48 Judith		141.4	78.0	59.4	1.0	35.8	155.0
49 Promontory		136.4	70.0	61.1	0.0	33.9	157.0

CONTINUED...

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

Planted: September 24, 1998 Harvested: August, 18,1999

Variety		Yield Bu/A	Stand %	Test Wt Lbs/Bu	Lodge 0-9	Ht Inch	Hd Date Julian
50 Blizzard		138.5	85.0	62.0	0.0	39.4	162.0
51 Yuma		131.0	75.0	59.3	1.0	31.9	153.0
52 444	Arp/Kes//Jud/Bliz	142.7	75.0	60.5	2.0	35.8	157.0
53 445	Arp/Kes//Jud/Bliz	131.3	70.0	59.9	1.0	36.6	157.0
54 446	Arp/Kes//Jud/Bliz	132.1	75.0	59.3	0.0	36.2	159.0
55 447	Arp/Kes//Jud/Bliz	145.9	80.0	59.6	2.0	37.4	157.0
56 448	Arp/Kes//Jud/Bliz	141.4	70.0	59.9	2.0	37.8	156.0
57 449	Arp/Kes//Jud/Bliz	147.4	75.0	60.3	1.0	35.8	156.0
58 450	Arp/Kes//Jud/Bliz	144.5	80.0	59.6	1.0	37.0	158.0
59 453	Arp/Kes//Jud/Bliz	136.5	85.0	59.9	2.0	38.6	155.0
60 454	Arp/Kes//Jud/Bliz	144.6	85.0	59.4	2.0	37.0	158.0
61 455	Arp/Kes//Jud/Bliz	128.2	90.0	60.4	0.0	36.2	155.0
62 456	Arp/Kes//Jud/Bliz	139.0	85.0	59.7	1.0	35.8	162.0
63 457	Arp/Kes//Jud/Bliz	136.4	88.0	59.2	1.0	34.6	157.0
64 458	Arp/Kes//Jud/Bliz	129.6	85.0	59.8	1.0	35.0	155.0
65 459	Arp/Kes//Jud/Bliz	134.5	85.0	59.2	3.0	35.8	156.0
66 460	SD88191//Jud/Bliz	134.4	85.0	58.9	2.0	33.9	160.0
67 461	SD88191//Jud/Bliz	126.2	88.0	61.2	0.0	33.5	157.0
68 462	SD88191//Jud/Bliz	136.5	88.0	59.1	2.0	35.4	161.0
69 463	SD88191//Jud/Bliz	129.2	85.0	61.2	0.0	35.8	158.0
70 464	SD88191//Jud/Bliz	138.4	85.0	61.0	1.0	36.6	158.0
71 465	SD88191//Jud/Bliz	126.6	85.0	59.6	2.0	31.5	152.0
72 466	SD88191//Jud/Bliz	128.9	85.0	61.2	0.0	29.1	155.0
73 467	SD88191//Jud/Bliz	127.1	77.0	59.4	0.0	35.0	154.0
74 468	SD88191//Jud/Bliz	130.0	83.0	58.9	3.0	32.7	153.0
75 469	Sd88191//Jud/Bliz	132.0	85.0	59.2	1.0	32.3	153.0
76 470	SD88191//Jud/Bliz	113.2	90.0	60.8	1.0	34.6	157.0
77 471	Bliz/Arp//SD88191	126.7	93.0	60.1	1.0	28.7	152.0
78 472	Bliz/Arp//SD88191	135.2	98.0	61.4	3.0	29.9	152.0
79 473	Bliz/Arp//SD88191	136.2	93.0	61.7	0.0	37.0	154.0
80 474	Bliz/Arp//SD88191	138.4	90.0	58.3	0.0	29.9	154.0
81 475	Bliz/Arp//SD88191	125.3	95.0	59.8	0.0	37.8	157.0
82 476	Bliz/Arp//SD88191	137.2	95.0	57.4	1.0	31.5	160.0
83 477	Bliz/Arp//SD88191	136.9	98.0	58.1	1.0	31.9	157.0
84 478	Bliz/Arp//SD88191	131.6	92.0	61.1	0.0	37.4	156.0
85 479	Bliz/Arp//SD88191	129.9	80.0	59.8	1.0	40.9	157.0
86 480	Bliz/Arp//SD88191	128.9	85.0	59.9	3.0	40.9	154.0
87 481	Bliz/Arp//SD88191	130.2	75.0	60.2	0.0	35.4	156.0
88 482	Bliz/Rdwn//SD88191	126.4	80.0	61.2	0.0	36.6	156.0
89 483	Bliz/Rdwn//SD88191	131.4	82.0	60.9	0.0	38.2	155.0
90 484	Bliz/Rdwn//SD88191	124.7	84.0	61.7	0.0	34.3	157.0
91 485	Bliz/Rdwn//SD88191	136.5	85.0	61.3	0.0	36.6	157.0
92 486	Bliz/Rdwn//SD88191	128.7	83.0	61.1	0.0	38.2	157.0
93 487	Bliz/Rdwn//SD88191	133.7	75.0	58.5	1.0	32.3	161.0
94 488	McGuire/Tomahawk	116.0	70.0	61.2	0.0	31.5	152.0
95 489	Promontory/Judith	122.0	60.0	62.3	0.0	34.6	157.0
96 490	Promontory/Judith	119.7	45.0	59.4	1.0	34.3	156.0
97 491	Promontory/Judith	138.6	45.0	60.8	1.0	32.3	157.0
98 492	HBC197F/S86-740//	112.9	50.0	61.9	0.0	33.9	158.0
Mean		137.0	80.0	59.8	0.8	35.8	157.0