NRPN: location of replicated yield trials and regional production zones.

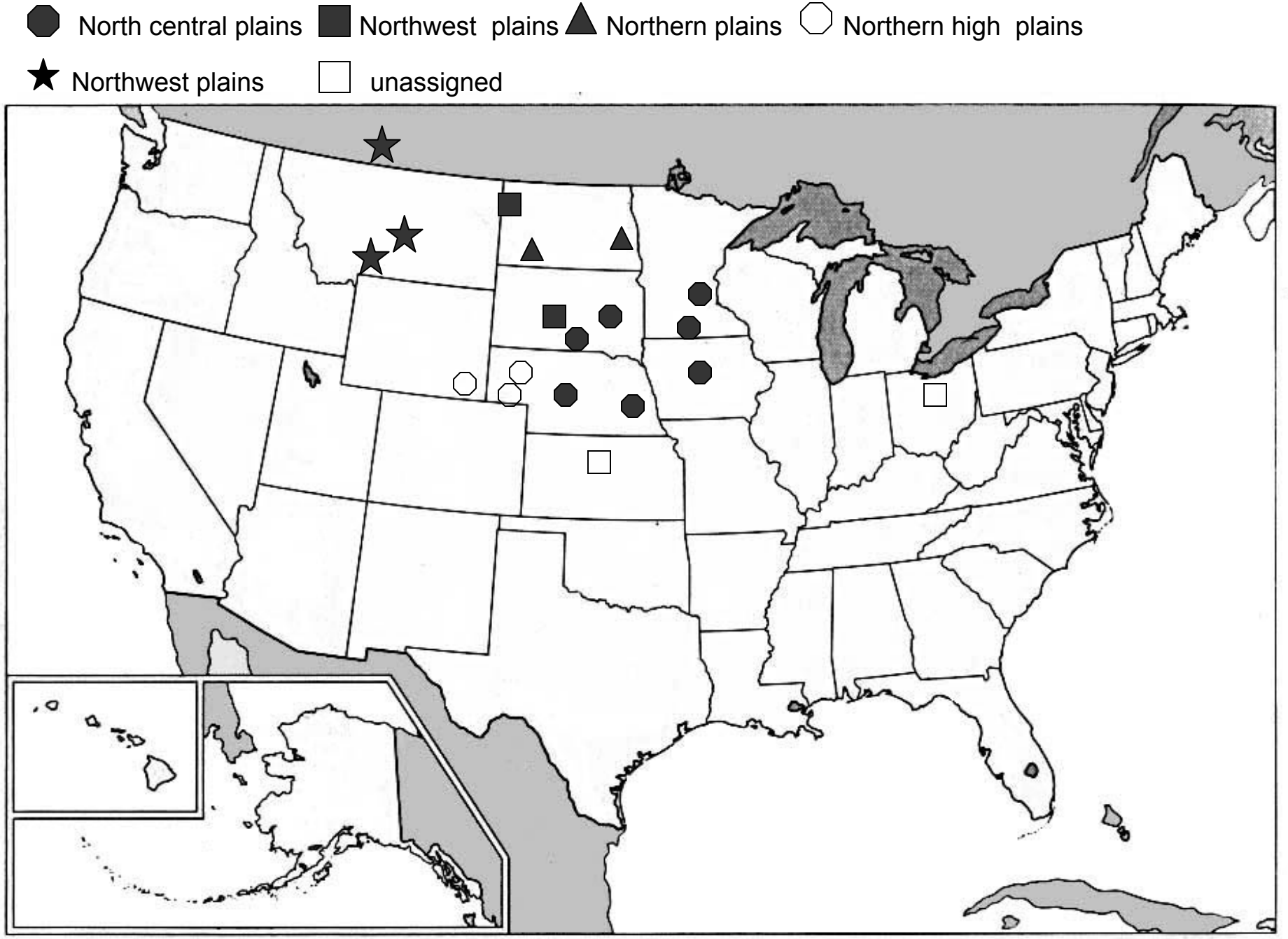

Table 1. 2004 NRPN location notes

Location	Notes
Salina, KS	
Lincoln, NE	
North Platte, NE	
Sidney, NE	
Alliance, NE	
Brookings, SD	
Dakota Lakes, SD	
Winner, SD	
Ames, IA	
Casselton, ND	
Williston, ND	Planted: Sept. 11, 2003 on Fallow. Applied Fertilizer in lbs/a: 80N:35P2O5:0K: Soil Test to two feet in lbs/a: 76N:16P:310K: 1.7 OM pH-6.4.. Total precipitation January-August = 22.2 cm.
Hettinger, ND	Fertilizer: 100 lbs/A 11-52-0 w/seed. Planted Sept. 19, 2003, harvested August 2, 2004.
Bozeman, MT	
Moccasin, MT	
Archer, WY	Lost, drought, hail, etc.
Rosemount, MN	
St. Paul, MN (field rusts)	Site lost, winterkill.
Wooster, OH	Lost, excessive moisture at harvest.
Lethbridge, Alberta	Seeded Sept. 24, 2003; harvested August 24, 2004. Abundant moisture, no supplemental irrigation needed.

Table 2. 2004 Northern Regional Performance Nursery

Entry	Line/selection	Putative market class	Cultivar or pedigree	source
1	Kharkof	HRW	Kharkof	check
2	Harding	HRW	Harding	check
3	Nuplains	HWW	Nuplains	check
4	Nekota	HRW	Nekota	check
5	Moreland (IDO517)	HRW	Sn65/II-60-155/Hgl/3/Wrr//KO/PI178383/6/Fcr//Frn/Y/3/Wsr/4/MC/5/Hlg/7/A81665W-45	Univ. Idaho
6	DW (IDO513)	HRW	'WAID/2*Borah//Neeley/3/Blizzard	Univ. Idaho
7	NW97S412-1	HWW	KS87809-10/ARAPAHOE	ARS-LNK
8	NW97S139-1	HWW	KSSB-192-3/NE89529	ARS-LNK
9	NW98S097	HWW	WA691213-27/N86L177//AP-WI89-163	ARS-LNK
10	NW97S218-lt	HWW	NW97S218 (KS85W663-1-1/KARL92) selection	ARS-LNK
11	NW98S104	HWW	KS91H184/3*RBL//N87V106	ARS-LNK
12	N02Y5065	HRW	YUMA//T-57/3/LAMAR/4/4*YUMA/5/(KS91H184/ARLIN S/KS91HW29//NE89526)	ARS-LNK
13	N02Y5072	HRW	YUMA//T-57/3/LAMAR/4/4*YUMA/5/(KS91H184/ARLIN S/KS91HW29//NE89526)	ARS-LNK
14	N02Y5075	HRW	YUMA//T-57/3/LAMAR/4/4*YUMA/5/(KS91H184/ARLIN S/KS91HW29//NE89526)	ARS-LNK
15	N02Y5078	HRW	YUMA//T-57/3/LAMAR/4/4*YUMA/5/(KS91H184/ARLIN S/KS91HW29//NE89526)	ARS-LNK
16	N02Y5106	HRW	YUMA//T-57/3/CO850034/4/4*YUMA/5/KS91H184/ARLIN S/KS91HW29//NE89526)	ARS-LNK
17	N02Y5117	HRW	YUMA//T-57/3/CO850034/4/4*YUMA/5/KS91H184/ARLIN S/KS91HW29//NE89526)	ARS-LNK
18	SD97059-2	HRW	ND8889/NE90574	SDSU
19	SD97380-2	HRW	Rawhide/Siouxland	SDSU
20	SD97394-1	HRW	Rose/SD88201	SDSU
21	SD99073	HRW	SD92124/Arapahoe	SDSU
22	SD00032	HRW	CEP17/ND9257//SD94160	SDSU
23	SD00111	HRW	KS93U134/Arapahoe	SDSU
24	SD00258	HRW	Millennium/NE93613	SDSU
25	SD97W609	HWW	Abilene/Karl	SDSU
26	SD97W671-1	HWW	RioBlanco/Rose	SDSU
27	SD98102	HRW	2076-W12-11/KARL 92//NE89526	SDSU
28	NE00633	HRW	NE92614 (=CENTURA/RL8200003)/IKE	UNL
29	NE01422	HRW	HBC059E/HBK0935W-24//137	UNL
30	NE01564	HRW	HBC197F-1/K92//HBK0935-35-1-1	UNL
31	NE01643	HRW	NE94482 (=ARA/ABILENE//NE86488)/ND8974	UNL
32	NE99533-3	HRW	TX90V7912/ABILENE	UNL
33	NE99533-5	HRW	TX90V7912/ABILENE	UNL
34	NE99656-1	HRW	TX89V4138/NE89657//KARL 92	UNL
35	NE00658	HRW	NE93462 (=ARAPAHOE/NA HW-81-170)/NE92608 (=NE82413/COLT)	UNL
36	NE99464	HRW	NE86606 (=WRR/SUT//MOW6811/3/AGATE SIB/4/CODY)/RAWHIDE//ABILENE	UNL
37	NE99489	HRW	WINDSTAR/NE91525 (=AIV/NBR/BOLAL//HIPLAINS/3/LOV 6/4/REDLAND)//KARL 92	UNL
38	MTR9997	HRW	PI262605/MT7863//Redwin	Montana St.
39	MT0097	HRW	Erhardt//Judith/CDC Kestrel	Montana St.
40	MT00159	HRW	Promontory/Judith	Montana St.

Table 3. Agronomic summary of 40 hard winter wheats entered in the 2004 NRPN.

Entry	Line/selection	Grain yield, kg/ha		Volume weight, kg/hl	Days from 1/1 to heading	Plant height, cm	Winter Survival, 0-100[a]
		mean	rank	mean	mean	mean	mean
1	Kharkof	3577	40	77.1	159	94	70
2	Harding	4553	20	75.7	158	82	74
3	Nuplains	4308	32	77.9	158	71	69
4	Nekota	4021	35	75.7	153	74	71
5	Moreland (IDO517)	4323	31	69.4	153	66	68
6	DW (IDO513)	4190	33	72.7	157	71	60
7	NW97S412-1	4499	22	74.3	157	72	60
8	NW97S139-1	4737	12	74.3	154	73	71
9	NW98S097	4374	28	76.5	157	71	67
10	NW97S218-lt	4353	30	75.1	157	74	75
11	NW98S104	4458	24	76.4	156	76	72
12	N02Y5065	3583	39	76.9	154	74	65
13	N02Y5072	3686	38	76.1	154	73	63
14	N02Y5075	3822	37	76.7	154	75	65
15	N02Y5078	3925	36	77.0	154	74	63
16	N02Y5106	4371	29	75.5	154	70	71
17	N02Y5117	4517	21	75.2	154	72	70
18	SD97059-2	4750	10	75.1	157	80	76
19	SD97380-2	4600	17	75.6	154	79	71
20	SD97394-1	4860	6	77.0	154	81	75
21	SD99073	4688	13	76.1	154	79	76
22	SD00032	4494	23	76.4	155	84	76
23	SD00111	4785	7	76.8	155	77	76
24	SD00258	5047	2	76.7	157	81	76
25	SD97W609	4404	26	76.3	153	70	70
26	SD97W671-1	4646	16	75.9	155	75	72
27	SD98102	4894	4	76.5	156	81	72
28	NE00633	4397	27	75.5	153	77	70
29	NE01422	4753	9	76.1	154	77	70
30	NE01564	4762	8	76.2	153	73	74
31	NE01643	5054	1	77.2	154	79	78
32	NE99533-3	4434	25	78.4	153	71	75
33	NE99533-5	4749	11	78.3	153	72	82
34	NE99656-1	4908	3	77.3	155	80	80
35	NE00658	4589	18	74.9	154	77	73
36	NE99464	4674	15	77.7	155	76	76
37	NE99489	4863	5	75.4	155	80	78
38	MTR9997	4153	34	74.8	160	80	69
39	MT0097	4589	19	74.6	161	80	78
40	MT00159	4683	14	73.3	160	79	73
	mean	4477		76	155	76	72

[a]Reported from 8 locations, values normalized to 0-100 scale with 0= no survival and 100 = 100% survival.

Table 4. Mean grain yields (kg/ha) and ranks for 40 wheats grown in the 2004 NRPN.

		region		Nebraska state		Lincoln, NE		North Platte, NE		Sidney, NE		Alliance, NE	
Entry	Line or selection	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank
1	Kharkof	3577	40	3153	40	4552	39	2678	40	2957	40	2427	36
2	Harding	4553	20	4029	30	6614	10	2979	39	3969	34	2554	31
3	Nuplains	4308	32	4309	14	6673	8	3782	18	4163	28	2619	30
4	Nekota	4021	35	4025	31	5647	30	3244	31	4402	14	2809	21
5	Moreland (IDO517)	4323	31	4245	19	5736	29	3555	25	4391	16	3295	3
6	DW (IDO513)	4190	33	4162	25	5845	26	3627	24	4461	10	2715	25
7	NW97S412-1	4499	22	4431	10	7135	1	3328	29	4344	19	2916	16
8	NW97S139-1	4737	12	4456	9	6204	18	3893	12	4305	22	3424	1
9	NW98S097	4374	28	4159	26	6286	17	3183	34	4205	26	2963	13
10	NW97S218-lt	4353	30	3795	35	6118	22	3141	35	3634	39	2287	39
11	NW98S104	4458	24	4268	16	6046	23	3841	13	4376	17	2811	19
12	N02Y5065	3583	39	3571	39	4724	37	2984	38	4063	31	2512	33
13	N02Y5072	3686	38	3588	38	4478	40	3396	28	3801	37	2677	29
14	N02Y5075	3822	37	3755	36	4564	38	3700	22	4343	20	2412	37
15	N02Y5078	3925	36	3702	37	4786	36	3458	27	4101	30	2465	35
16	N02Y5106	4371	29	4047	28	5084	34	4071	5	4329	21	2706	27
17	N02Y5117	4517	21	4263	18	5803	27	3788	17	4682	5	2779	22
18	SD97059-2	4750	10	4217	23	6360	16	3517	26	4454	11	2538	32
19	SD97380-2	4600	17	4472	6	6769	6	3994	7	4413	13	2714	26
20	SD97394-1	4860	6	4500	5	7019	3	4005	6	3966	35	3012	11
21	SD99073	4688	13	4350	11	6513	12	3775	19	4270	23	2840	18
22	SD00032	4494	23	4172	24	6134	21	3904	11	4256	24	2395	38
23	SD00111	4785	7	4266	17	6542	11	3828	14	4469	9	2225	40
24	SD00258	5047	2	4664	2	6645	9	4442	1	4394	15	3174	5
25	SD97W609	4404	26	4005	32	5591	31	3305	30	4247	25	2878	17
26	SD97W671-1	4646	16	4303	15	6468	13	3961	8	3762	38	3021	9
27	SD98102	4894	4	4682	1	6412	15	4229	3	5038	1	3050	8
28	NE00633	4397	27	4470	7	6171	19	4427	2	4470	8	2811	19
29	NE01422	4753	9	4460	8	6829	5	3804	16	4054	32	3152	6
30	NE01564	4762	8	4220	22	6160	20	3185	33	4779	3	2755	23
31	NE01643	5054	1	4648	3	6703	7	4093	4	4556	6	3238	4
32	NE99533-3	4434	25	4105	27	5494	32	3916	10	4050	33	2960	14
33	NE99533-5	4749	11	4320	13	5962	25	3657	23	4712	4	2949	15
34	NE99656-1	4908	3	4342	12	6954	4	3221	32	4439	12	2753	24
35	NE00658	4589	18	4227	21	6426	14	2994	37	4173	27	3317	2
36	NE99464	4674	15	4232	20	5761	28	3922	9	4120	29	3125	7
37	NE99489	4863	5	4593	4	7024	2	3807	15	4552	7	2987	12
38	MTR9997	4153	34	4035	29	4841	35	3766	20	4838	2	2696	28
39	MT0097	4589	19	3973	33	5991	24	3032	36	4367	18	2504	34
40	MT00159	4683	14	3970	34	5185	33	3712	21	3964	36	3020	10
	mean	4477		4180		6006		3629		4272		2812	
	cv (%)	13		11.1		5.3		14.8		14.8		15.2	
	l.s.d. (0.05)	130		592		521		863		ns		ns	
	n	46		12		3		3		3		3	

Table 4. Mean grain yields (kg/ha) and ranks for 40 wheats grown in the 2004 NRPN.

		region		South Dakota state		Brookings, SD		Dakota Lakes, SD		Winner, SD	
Entry	Line or selection	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank
1	Kharkof	3577	40	3711	38	5310	36	3084	32	2738	34
2	Harding	4553	20	4257	19	5782	32	3589	10	3399	8
3	Nuplains	4308	32	4134	24	5862	30	3301	25	3238	9
4	Nekota	4021	35	4020	31	5630	33	3558	13	2873	28
5	Moreland (IDO517)	4323	31	4023	29	5935	28	3646	6	2489	38
6	DW (IDO513)	4190	33	4236	21	5429	35	4065	1	3215	10
7	NW97S412-1	4499	22	4522	6	6731	10	3627	9	3208	11
8	NW97S139-1	4737	12	4414	11	6641	14	3754	4	2848	30
9	NW98S097	4374	28	3943	33	5237	37	3499	16	3092	17
10	NW97S218-lt	4353	30	4022	30	6156	25	3093	31	2819	32
11	NW98S104	4458	24	4192	22	5810	31	3658	5	3108	15
12	N02Y5065	3583	39	3506	40	4796	39	2597	39	3124	13
13	N02Y5072	3686	38	3509	39	4736	40	2763	37	3027	21
14	N02Y5075	3822	37	3730	37	5039	38	2620	38	3530	5
15	N02Y5078	3925	36	3995	32	5491	34	2772	36	3723	1
16	N02Y5106	4371	29	3833	35	5934	29	3293	26	2271	39
17	N02Y5117	4517	21	4296	17	6487	19	3324	24	3076	19
18	SD97059-2	4750	10	4415	10	6980	8	3178	27	3087	18
19	SD97380-2	4600	17	4323	15	6427	20	3580	12	2963	23
20	SD97394-1	4860	6	4448	8	7012	6	3175	28	3157	12
21	SD99073	4688	13	4113	26	6296	23	2936	34	3106	16
22	SD00032	4494	23	4296	16	6398	21	3370	22	3122	14
23	SD00111	4785	7	4431	9	6981	7	3383	20	2927	25
24	SD00258	5047	2	4716	3	7057	3	3532	14	3558	4
25	SD97W609	4404	26	3814	36	6027	26	2577	40	2837	31
26	SD97W671-1	4646	16	4247	20	6685	12	3385	19	2671	35
27	SD98102	4894	4	4352	14	6518	17	3514	15	3023	22
28	NE00633	4397	27	4109	27	6337	22	3109	30	2882	26
29	NE01422	4753	9	4673	4	7579	1	2955	33	3484	7
30	NE01564	4762	8	4600	5	6771	9	3421	18	3609	3
31	NE01643	5054	1	4790	2	7045	4	3813	3	3512	6
32	NE99533-3	4434	25	4114	25	6555	15	3155	29	2633	36
33	NE99533-5	4749	11	4482	7	7022	5	3374	21	3051	20
34	NE99656-1	4908	3	4961	1	7274	2	3908	2	3701	2
35	NE00658	4589	18	4283	18	6664	13	3332	23	2854	29
36	NE99464	4674	15	4190	23	6284	24	3474	17	2812	33
37	NE99489	4863	5	4406	12	6694	11	3644	8	2879	27
38	MTR9997	4153	34	4034	28	5947	27	3589	10	2567	37
39	MT0097	4589	19	3837	34	6489	18	2888	35	2135	40
40	MT00159	4683	14	4375	13	6537	16	3645	7	2944	24
	mean	4477		4209		6265		3330		3032	
	cv (%)	13		10.6		7.7		12.3		14.5	
	l.s.d. (0.05)	130		730		778		663		710	
	n	46		9		3		3		3	

Table 4. Mean grain yields (kg/ha) and ranks for 40 wheats grown in the 2004 NRPN.

		region		North Dakota State		Williston, ND		Casselton, ND		Hettinger, ND	
Entry	Line or selection	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank
1	Kharkof	3577	40	3497	39	3285	40	4119	35	2952	25
2	Harding	4553	20	5197	11	4464	31	7316	3	3351	10
3	Nuplains	4308	32	3939	32	3882	37	4979	29	2628	34
4	Nekota	4021	35	3983	31	4067	33	5205	27	2242	40
5	Moreland (IDO517)	4323	31	4106	30	4479	29	4467	30	3126	19
6	DW (IDO513)	4190	33	3798	34	4535	27	3878	37	2708	32
7	NW97S412-1	4499	22	3724	35	4406	32	3545	39	3052	22
8	NW97S139-1	4737	12	4680	25	5808	6	4191	32	3829	1
9	NW98S097	4374	28	4624	27	4821	22	5472	26	3231	16
10	NW97S218-lt	4353	30	4679	26	5398	13	5563	25	2541	37
11	NW98S104	4458	24	4336	28	5331	14	4462	31	2840	28
12	N02Y5065	3583	39	3445	40	3971	34	3785	38	2292	38
13	N02Y5072	3686	38	3508	38	3931	36	4014	36	2267	39
14	N02Y5075	3822	37	3604	36	3821	38	4184	33	2541	36
15	N02Y5078	3925	36	3580	37	3776	39	4134	34	2578	35
16	N02Y5106	4371	29	4856	21	5125	16	5636	23	3455	6
17	N02Y5117	4517	21	4781	22	5026	20	5617	24	3338	12
18	SD97059-2	4750	10	5340	7	5058	19	7611	2	2690	33
19	SD97380-2	4600	17	4881	19	4756	25	6453	13	2952	26
20	SD97394-1	4860	6	5485	4	5060	18	7683	1	3121	20
21	SD99073	4688	13	5449	5	5537	9	6767	9	3575	2
22	SD00032	4494	23	5164	12	4789	23	6805	8	3475	5
23	SD00111	4785	7	5390	6	5683	8	6702	10	3251	14
24	SD00258	5047	2	5040	16	5105	17	6626	11	2840	28
25	SD97W609	4404	26	4864	20	4511	28	6299	16	3420	7
26	SD97W671-1	4646	16	4715	24	4541	26	5917	19	3346	11
27	SD98102	4894	4	5080	14	5316	15	6375	15	3039	23
28	NE00633	4397	27	4153	29	3948	35	5176	28	3064	21
29	NE01422	4753	9	4722	23	4479	30	6424	14	2778	30
30	NE01564	4762	8	5294	9	5452	10	6947	7	2877	27
31	NE01643	5054	1	5655	2	5974	2	7046	6	3375	8
32	NE99533-3	4434	25	5077	15	4756	24	7164	4	2723	31
33	NE99533-5	4749	11	5498	3	6232	1	6534	12	3139	18
34	NE99656-1	4908	3	5703	1	5912	3	7118	5	3537	3
35	NE00658	4589	18	4966	18	5424	12	5805	21	3238	15
36	NE99464	4674	15	5013	17	5448	11	5714	22	3500	4
37	NE99489	4863	5	5298	8	5873	4	6243	17	3271	13
38	MTR9997	4153	34	3934	33	4982	21	3439	40	3196	17
39	MT0097	4589	19	5241	10	5786	7	6104	18	3363	9
40	MT00159	4683	14	5088	13	5867	5	5856	20	3027	24
	mean	4477		4685		4915		5684		3044	
	cv (%)	13		10.6		17.3		14.9		9.4	
	l.s.d. (0.05)	130		661		1195		1189		464	
	n	46		11		4		4		3	

Table 4. Mean grain yields (kg/ha) and ranks for 40 wheats grown in the 2004 NRPN.

		region		Montana State		Moccasin, MT		Bozeman, MT		Ames, IA	
Entry	Line or selection	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank
1	Kharkof	3577	40	4659	35	3681	36	5638	34	2737	26
2	Harding	4553	20	5427	28	4122	28	6732	25	3258	14
3	Nuplains	4308	32	5778	17	4510	16	7046	17	2508	31
4	Nekota	4021	35	4119	37	3757	34	4481	39	3003	22
5	Moreland (IDO517)	4323	31	6311	4	4802	6	7821	6	2196	37
6	DW (IDO513)	4190	33	6187	5	4430	20	7944	3	1486	40
7	NW97S412-1	4499	22	6010	9	4683	10	7337	12	2670	27
8	NW97S139-1	4737	12	7086	1	5214	1	8958	1	2428	34
9	NW98S097	4374	28	5814	16	4604	12	7023	18	2357	35
10	NW97S218-lt	4353	30	5894	12	4992	3	6797	23	3033	20
11	NW98S104	4458	24	5718	18	4660	11	6777	24	3157	17
12	N02Y5065	3583	39	3538	40	2916	39	4161	40	2192	38
13	N02Y5072	3686	38	3890	39	2872	40	4909	38	2448	32
14	N02Y5075	3822	37	3978	38	2966	38	4990	37	2330	36
15	N02Y5078	3925	36	4247	36	3304	37	5189	36	2522	30
16	N02Y5106	4371	29	4948	33	4064	29	5833	33	2650	28
17	N02Y5117	4517	21	5228	31	4400	23	6055	32	2788	25
18	SD97059-2	4750	10	5625	22	4403	22	6848	21	4082	1
19	SD97380-2	4600	17	5525	26	4239	27	6810	22	3453	10
20	SD97394-1	4860	6	6067	7	4452	19	7682	8	4082	1
21	SD99073	4688	13	5621	23	3833	32	7409	11	3500	8
22	SD00032	4494	23	5036	32	3824	33	6248	30	3178	15
23	SD00111	4785	7	5816	15	4551	14	7081	16	4045	3
24	SD00258	5047	2	6323	3	4761	7	7884	4	3820	4
25	SD97W609	4404	26	5554	25	4737	8	6371	28	3578	7
26	SD97W671-1	4646	16	5977	11	4943	4	7012	19	3679	6
27	SD98102	4894	4	5825	14	4479	18	7171	13	3178	15
28	NE00633	4397	27	5713	19	4421	21	7005	20	3070	19
29	NE01422	4753	9	5872	13	4264	26	7480	10	3763	5
30	NE01564	4762	8	5295	30	4499	17	6091	31	2898	23
31	NE01643	5054	1	6153	6	5138	2	7169	14	3272	13
32	NE99533-3	4434	25	4731	34	3883	31	5580	35	2623	29
33	NE99533-5	4749	11	5413	29	4546	15	6279	29	3030	21
34	NE99656-1	4908	3	6037	8	4266	25	7808	7	3147	18
35	NE00658	4589	18	5518	27	4555	13	6481	27	3376	11
36	NE99464	4674	15	5619	24	4714	9	6523	26	3369	12
37	NE99489	4863	5	5712	20	4335	24	7088	15	3463	9
38	MTR9997	4153	34	5652	21	3739	35	7566	9	2162	39
39	MT0097	4589	19	6003	10	3923	30	8083	2	2835	24
40	MT00159	4683	14	6364	2	4853	5	7875	5	2445	33
	mean	4477		5507		4283		6731		2995	
	cv (%)	13		11.2		12.1		10.5		6.9	
	l.s.d. (0.05)	130		1078		838		1137		410	
	n	46		6		3		3		2	

Table 4. Mean grain yields (kg/ha) and ranks for 40 wheats grown in the 2004 NRPN.

		region		Lethbridge, Alberta		Salina, KS	
Entry	Line or selection	mean	rank	mean	rank	mean	rank
1	Kharkof	3577	40	4137	38	2993	40
2	Harding	4553	20	5393	17	3451	37
3	Nuplains	4308	32	5090	23	3654	32
4	Nekota	4021	35	4989	27	3661	31
5	Moreland (IDO517)	4323	31			3772	22
6	DW (IDO513)	4190	33			3407	38
7	NW97S412-1	4499	22	6246	5	3989	9
8	NW97S139-1	4737	12	5002	26	3618	35
9	NW98S097	4374	28	4678	33	3766	23
10	NW97S218-lt	4353	30	4837	31	3702	30
11	NW98S104	4458	24	5647	14	3615	36
12	N02Y5065	3583	39	5223	20	3748	28
13	N02Y5072	3686	38	5520	16	3854	16
14	N02Y5075	3822	37	5827	11	3844	17
15	N02Y5078	3925	36	6137	6	3958	11
16	N02Y5106	4371	29	5788	12	4072	5
17	N02Y5117	4517	21	5836	10	3646	33
18	SD97059-2	4750	10	5340	19	3831	18
19	SD97380-2	4600	17	4193	37	4227	1
20	SD97394-1	4860	6	4343	34	3859	15
21	SD99073	4688	13	4866	30	3724	29
22	SD00032	4494	23	4972	29	3239	39
23	SD00111	4785	7	5162	22	3753	25
24	SD00258	5047	2	6826	1	4090	4
25	SD97W609	4404	26	4985	28	3753	25
26	SD97W671-1	4646	16	5651	13	3937	12
27	SD98102	4894	4	6763	2	4096	3
28	NE00633	4397	27	4701	32	3808	20
29	NE01422	4753	9	5386	18	4069	6
30	NE01564	4762	8	6612	3	3795	21
31	NE01643	5054	1	5215	21	4101	2
32	NE99533-3	4434	25	5573	15	3829	19
33	NE99533-5	4749	11	5038	25	4050	8
34	NE99656-1	4908	3	4288	36	3635	34
35	NE00658	4589	18	5063	24	4051	7
36	NE99464	4674	15	6379	4	3923	14
37	NE99489	4863	5	5847	9	3979	10
38	MTR9997	4153	34	4334	35	3933	13
39	MT0097	4589	19	6086	7	3753	25
40	MT00159	4683	14	6017	8	3765	24
	mean	4477		5368		3799	
	cv (%)	13		16.8		8.0	
	l.s.d. (0.05)	130		1456		492	
	n	46		3		3	

Table 5. Summary of mean yields of 40 wheats grown in the 2004 NRPN for regional production zones (Peterson, 1992, Crop Science 32: 907).

		region		North Central Plains		Northern High Plains		Northern Plains		Northwest Plains		Northwest	
Entry	Line or selection	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank
1	Kharkof	3577	40	3665	39	2692	40	3619	33	3199	40	4485	37
2	Harding	4553	20	4489	23	3262	37	5616	2	4089	27	5416	24
3	Nuplains	4308	32	4549	18	3391	30	3972	29	3633	34	5549	17
4	Nekota	4021	35	4156	30	3605	15	3935	30	3849	31	4409	39
5	Moreland (IDO517)	4323	31	4110	32	3843	4	3893	31	4122	26	6311	3
6	DW (IDO513)	4190	33	4094	35	3588	19	3377	36	4333	19	6187	5
7	NW97S412-1	4499	22	4753	12	3630	13	3334	38	4072	28	6089	7
8	NW97S139-1	4737	12	4544	19	3865	3	4036	28	4928	4	6391	2
9	NW98S097	4374	28	4151	31	3584	20	4512	25	4254	21	5435	22
10	NW97S218-lt	4353	30	4340	26	2960	39	4268	27	4410	16	5542	18
11	NW98S104	4458	24	4481	24	3593	18	3767	32	4614	8	5695	15
12	N02Y5065	3583	39	3662	40	3287	35	3145	40	3383	37	4100	40
13	N02Y5072	3686	38	3700	38	3239	38	3265	39	3431	36	4434	38
14	N02Y5075	3822	37	3940	37	3378	32	3480	34	3306	39	4594	36
15	N02Y5078	3925	36	4101	33	3283	36	3467	35	3346	38	4877	35
16	N02Y5106	4371	29	4099	34	3517	24	4702	22	4340	18	5228	30
17	N02Y5117	4517	21	4503	22	3730	11	4641	24	4297	20	5430	23
18	SD97059-2	4750	10	4857	8	3496	26	5502	4	4252	22	5530	19
19	SD97380-2	4600	17	4812	9	3563	21	4952	15	4252	24	5081	32
20	SD97394-1	4860	6	5125	3	3489	28	5728	1	4252	23	5492	20
21	SD99073	4688	13	4719	13	3555	23	5399	6	4422	15	5369	26
22	SD00032	4494	23	4645	16	3326	34	5378	7	4181	25	5014	33
23	SD00111	4785	7	4923	6	3347	33	5223	9	4697	7	5598	16
24	SD00258	5047	2	5196	1	3784	6	5003	13	4431	14	6490	1
25	SD97W609	4404	26	4317	27	3563	22	5065	12	3682	33	5364	28
26	SD97W671-1	4646	16	4765	11	3391	31	4815	19	4046	30	5869	10
27	SD98102	4894	4	4779	10	4044	1	4946	16	4544	12	6138	6
28	NE00633	4397	27	4685	14	3640	12	4271	26	3588	35	5376	25
29	NE01422	4753	9	5187	2	3603	16	4861	18	3826	32	5710	14
30	NE01564	4762	8	4641	17	3767	8	5203	10	4582	10	5734	13
31	NE01643	5054	1	5043	4	3897	2	5473	5	5048	2	5841	11
32	NE99533-3	4434	25	4360	25	3505	25	5261	8	4070	29	5012	34
33	NE99533-5	4749	11	4652	15	3830	5	5079	11	5007	3	5288	29
34	NE99656-1	4908	3	4982	5	3596	17	5583	3	5053	1	5454	21
35	NE00658	4589	18	4540	20	3745	10	4705	21	4527	13	5366	27
36	NE99464	4674	15	4505	21	3623	14	4765	20	4602	9	5872	9
37	NE99489	4863	5	4867	7	3769	7	4969	14	4918	5	5757	12
38	MTR9997	4153	34	3978	36	3767	9	3335	37	4385	17	5213	31
39	MT0097	4589	19	4186	29	3435	29	4929	17	4544	11	6031	8
40	MT00159	4683	14	4287	28	3492	27	4643	23	4915	6	6248	4
	mean	4477		4485		3542		4553		4236		5475	
	cv (%)	13		9.6		13.8		15		17		13	
	mse			595441		238458.2		2278648		737703		1481875	
	n	46		14		6		7		7		9	

Table 6. Summary of mean volume weights (kg/hl) of 40 wheats grown in the 2004 NRPN.

Entry	Line or selection	region	Dakota Lakes, SD	Winner, SD	Brookings, SD	Casselton, ND	Williston, ND	Hettinger, ND	Moccasin, MT	Bozeman, MT	Ames, IA
1	Kharkof	77.2	77.2	73.7	78.5	74.7	79.7	79.6	76.9	80.0	74.7
2	Harding	75.6	75.7	70.6	77.4	74.8	78.7	78.0	72.0	79.1	74.5
3	Nuplains	77.9	76.8	74.7	78.9	75.6	80.4	80.5	78.6	82.7	72.6
4	Nekota	75.9	73.9	70.6	77.4	73.4	80.3	78.8	77.9	79.8	71.0
5	Moreland (IDO517)	70.0	69.7	63.9	71.6	59.2	77.0	72.8	72.4	79.3	63.7
6	DW (IDO513)	72.9	73.1	68.8	74.0	63.9	79.3	78.9	74.8	80.8	62.9
7	NW97S412-1	74.4	72.0	68.2	77.8	73.2	78.6	77.3	75.4	78.6	68.0
8	NW97S139-1	74.4	73.5	71.1	76.7	68.9	78.2	77.9	74.9	80.7	67.5
9	NW98S097	76.4	75.3	72.9	75.7	75.0	81.2	80.4	77.7	82.0	67.8
10	NW97S218-lt	75.2	73.4	70.8	76.0	74.2	78.5	77.5	76.2	78.8	71.4
11	NW98S104	76.5	74.5	73.8	76.5	73.4	80.6	79.9	77.2	81.1	71.6
12	N02Y5065	77.1	74.6	77.5	77.9	73.2	81.0	80.5	77.1	79.2	72.8
13	N02Y5072	76.2	74.5	75.5	76.8	73.0	80.0	78.3	76.5	78.6	72.8
14	N02Y5075	76.7	74.8	76.8	78.5	74.8	79.8	78.7	75.7	79.2	71.6
15	N02Y5078	77.0	74.8	77.1	77.7	74.7	79.9	80.2	77.1	80.1	71.1
16	N02Y5106	75.6	74.2	73.2	77.5	71.4	79.6	79.1	76.1	79.3	70.0
17	N02Y5117	75.3	73.7	74.2	76.4	70.5	78.6	78.1	77.1	79.5	70.2
18	SD97059-2	75.1	73.9	69.9	76.7	74.2	78.2	78.3	75.2	77.8	72.2
19	SD97380-2	75.6	74.3	71.7	77.2	75.1	78.3	78.7	75.7	78.5	70.6
20	SD97394-1	76.9	75.9	75.0	78.6	76.1	79.3	79.0	74.9	79.3	73.8
21	SD99073	76.2	75.4	72.6	76.7	73.9	79.9	78.8	76.4	80.2	71.5
22	SD00032	76.5	74.6	74.2	78.2	75.1	79.6	77.9	77.1	79.1	72.4
23	SD00111	76.8	74.7	73.4	79.0	76.3	79.6	79.2	76.2	78.7	73.8
24	SD00258	76.7	74.6	71.8	78.7	76.3	80.3	78.7	76.8	80.0	73.3
25	SD97W609	76.4	74.3	73.7	76.9	74.8	80.1	79.3	78.3	79.1	71.3
26	SD97W671-1	76.1	75.3	72.1	79.8	70.6	79.5	79.3	78.4	79.7	69.9
27	SD98102	76.6	76.1	72.8	78.0	73.5	80.6	79.8	77.3	79.9	71.5
28	NE00633	75.5	73.8	73.4	77.8	73.4	79.3	78.0	76.1	78.6	68.8
29	NE01422	76.0	74.9	75.1	78.5	74.5	78.5	78.9	73.9	78.6	70.9
30	NE01564	76.3	74.6	74.2	78.3	74.0	79.8	79.4	76.8	78.3	71.3
31	NE01643	77.1	75.6	74.3	78.6	76.8	80.1	78.8	77.7	79.9	72.4
32	NE99533-3	78.4	78.1	72.7	81.5	76.8	82.3	80.9	79.5	81.7	72.5
33	NE99533-5	78.2	76.6	75.3	82.2	76.8	80.8	79.9	78.5	81.5	72.7
34	NE99656-1	77.3	75.0	75.2	79.5	76.4	80.7	79.5	75.9	80.0	73.1
35	NE00658	75.0	74.1	70.7	76.3	71.6	78.6	78.6	76.5	79.3	69.4
36	NE99464	77.8	76.5	74.4	80.0	74.8	80.6	80.1	79.2	81.4	73.5
37	NE99489	75.4	73.9	72.2	76.7	73.5	79.5	78.9	75.5	79.8	68.6
38	MTR9997	75.1	75.9	66.4	77.0	68.2	80.3	80.0	75.1	80.8	72.6
39	MT0097	74.8	71.9	66.0	75.2	73.9	79.0	78.9	75.1	80.2	72.9
40	MT00159	73.5	72.8	70.4	73.2	67.9	79.2	78.8	75.7	79.4	64.0
	mean	75.9	74.6	72.5	77.5	73.2	79.6	78.9	76.4	79.8	70.9

Table 7. Summary of mean plant heights (cm) of 40 wheats grown in the 2004 NRPN.

Entry	Line or selection	Region	Lincoln, NE	North Platte, NE	Sidney, NE	Alliance, NE	Brookings, SD	Williston, ND	Hettinger, ND	Moccasin, MT	Bozeman, MT	Ames, IA	Lethbridge, Alberta
1	Kharkof	95	107	72	69	65	118	101	62	103	129	94	125
2	Harding	83	100	63	68	55	105	83	58	91	97	81	109
3	Nuplains	71	87	59	58	51	94	72	46	78	84	63	94
4	Nekota	74	90	60	69	54	94	72	49	80	87	67	96
5	Moreland (IDO517)	66	83	58	61	54	83	66	50	74	79	55	
6	DW (IDO513)	71	87	60	64	52	93	76	50	78	88	61	
7	NW97S412-1	73	86	62	64	55	89	71	54	82	84	63	89
8	NW97S139-1	73	87	59	63	54	96	75	51	79	90	63	90
9	NW98S097	71	84	58	63	54	91	71	49	76	83	64	93
10	NW97S218-lt	74	91	58	61	56	89	73	50	80	91	71	97
11	NW98S104	76	91	64	66	58	96	73	59	75	86	74	97
12	N02Y5065	74	86	62	64	57	91	73	50	76	90	64	100
13	N02Y5072	73	87	61	64	58	87	72	53	76	86	60	101
14	N02Y5075	75	89	66	69	59	86	76	55	77	85	61	99
15	N02Y5078	74	86	64	65	59	90	74	54	78	86	63	99
16	N02Y5106	71	80	63	62	53	88	69	53	79	78	63	89
17	N02Y5117	73	80	64	63	56	94	73	56	76	82	62	92
18	SD97059-2	81	98	66	69	58	106	82	60	78	95	78	105
19	SD97380-2	80	100	69	70	59	102	79	56	78	92	74	99
20	SD97394-1	82	100	69	67	63	108	79	60	85	96	77	101
21	SD99073	80	101	64	69	55	104	78	53	78	94	80	107
22	SD00032	85	102	71	75	58	111	82	61	85	106	73	111
23	SD00111	78	94	67	66	53	102	76	52	79	93	77	100
24	SD00258	81	94	64	72	63	107	81	56	84	91	73	109
25	SD97W609	70	80	60	64	55	88	66	52	72	82	67	89
26	SD97W671-1	76	91	65	64	59	93	73	57	77	87	73	94
27	SD98102	81	96	69	72	64	101	79	58	83	92	82	101
28	NE00633	78	91	68	71	61	98	74	57	82	90	76	91
29	NE01422	78	91	67	66	60	98	79	54	82	89	75	96
30	NE01564	74	86	62	68	60	92	69	55	79	84	68	90
31	NE01643	79	95	68	72	60	97	80	55	84	94	67	97
32	NE99533-3	72	91	59	63	56	88	70	49	78	82	61	92
33	NE99533-5	72	86	58	64	54	91	70	49	74	89	66	92
34	NE99656-1	80	94	59	68	58	103	76	62	89	97	77	100
35	NE00658	78	94	56	69	63	101	75	58	84	93	74	95
36	NE99464	76	86	64	66	57	94	76	57	75	92	69	97
37	NE99489	81	102	69	69	58	101	80	52	82	93	79	103
38	MTR9997	81	94	66	72	59	102	87	56	73	97	76	104
39	MT0097	80	95	69	69	59	97	83	55	84	97	67	104
40	MT00159	80	91	65	66	63	103	84	53	89	93	72	102
	mean	77	91	64	67	58	97	76	54	80	91	70	99

Table 8. Summary of days (from 1/1) to heading for 40 wheats grown in the 2004 NRPN.

Entry	Line or selection	region	Lincoln, NE	Brookings, SD	Dakota Lakes, SD	Winner, SD	Williston, ND	Hettinger, ND	Bozeman, MT	Moccasin, MT	Ames, IA	Lethbridge, Alberta
1	Kharkof	158	140	154	147	153	168	163	167	164	151	176
2	Harding	157	139	150	146	153	165	162	164	164	151	175
3	Nuplains	157	139	150	146	153	167	162	165	165	152	175
4	Nekota	152	137	146	142	148	160	160	158	156	146	168
5	Moreland (IDO517)		134	149	145	148	162	161	160	160	148	
6	DW (IDO513)		137	154	145	152	167	163	167	166	151	
7	NW97S412-1	156	137	151	148	153	161	163	163	159	149	176
8	NW97S139-1	153	137	147	144	151	159	159	159	158	146	173
9	NW98S097	156	137	150	145	150	163	162	164	161	146	179
10	NW97S218-lt	157	138	152	148		162	161	164	159	152	174
11	NW98S104	155	136	150	146	151	162	161	163	158	148	173
12	N02Y5065	153	134	147	143	148	160	161	159	159	144	176
13	N02Y5072	153	133	148	143	149	160	161	163	158	144	175
14	N02Y5075	153	134	148	143	148	160	161	162	159	144	176
15	N02Y5078	153	135	148	143	148	159	161	161	158	145	175
16	N02Y5106	153	134	147	142	148	160	160	162	158	146	174
17	N02Y5117	154	135	148	142	148	161	161	162	158	147	173
18	SD97059-2	156	138	149	146	154	162	161	165	158	149	175
19	SD97380-2	153	137	145	142	149	161	161	161	158	149	170
20	SD97394-1	153	136	147	141	149	162	161	159	158	144	170
21	SD99073	154	137	146	143	150	159	161	162	159	148	172
22	SD00032	154	138	147	145	151	161	161	161	159	148	171
23	SD00111	154	138	145	143	149	159	161	166	158	145	172
24	SD00258	156	139	151	147	151	162	162	164	160	152	174
25	SD97W609	152	131	144	142	148	160	162	160	157	142	172
26	SD97W671-1	154	137	148	144	150	162	161	163	157	147	175
27	SD98102	155	137	150	145	151	163	161	163	159	150	173
28	NE00633	152	134	145	142	150	161	161	160	157	145	170
29	NE01422	153	133	146	142	147	162	161	164	159	143	173
30	NE01564	153	135	145	144	148	158	160	163	157	143	172
31	NE01643	154	137	147	144	152	160	160	161	158	150	171
32	NE99533-3	152	136	145	141	149	158	161	160	157	146	169
33	NE99533-5	153	137	146	142	148	158	161	158	158	150	171
34	NE99656-1	155	138	149	145	152	161	161	161	159	151	173
35	NE00658	153	136	148	144	148	160	160	161	158	146	171
36	NE99464	154	137	149	146	149	160	161	162	159	147	173
37	NE99489	154	138	146	144	150	161	160	161	158	148	172
38	MTR9997	159	139	151	148		166	164	167	162	153	180
39	MT0097	160	142	154	149		166	164	167	166	153	179
40	MT00159	159	141	153	149		165	163	169	164	151	180
	mean	155	137	148	144	150	162	161	162	159	148	174

Table 9. Stability analyses, grain yield and volume weights, of 40 wheats grown in the 2004 NRPN.

		grain yield			volume weight		
Entry	Line or selection	regional average (kg/ha)	regression coef. (b)	r^2	regional average (kg/hl)	regression coef. (b)	r^2
1	Kharkof	3577	0.70	0.88	77.2	0.71	0.91
2	Harding	4553	1.06	0.86	75.6	0.67	0.55
3	Nuplains	4308	1.03	0.90	77.9	0.96	0.96
4	Nekota	4021	0.72	0.80	75.9	1.11	0.95
5	Moreland (IDO517)	4323	1.01	0.84	70.0	1.81	0.82
6	DW (IDO513)	4190	1.00	0.75	72.9	1.90	0.92
7	NW97S412-1	4499	1.07	0.78	74.4	1.23	0.91
8	NW97S139-1	4737	1.11	0.76	74.4	1.33	0.95
9	NW98S097	4374	0.95	0.91	76.4	1.29	0.88
10	NW97S218-lt	4353	1.09	0.94	75.2	0.86	0.92
11	NW98S104	4458	0.91	0.90	76.5	1.03	0.96
12	N02Y5065	3583	0.61	0.70	77.1	0.80	0.76
13	N02Y5072	3686	0.64	0.75	76.2	0.72	0.86
14	N02Y5075	3822	0.67	0.70	76.7	0.73	0.79
15	N02Y5078	3925	0.71	0.71	77.0	0.83	0.81
16	N02Y5106	4371	0.88	0.88	75.6	1.07	0.97
17	N02Y5117	4517	0.95	0.95	75.3	0.97	0.87
18	SD97059-2	4750	1.17	0.89	75.1	0.82	0.86
19	SD97380-2	4600	1.02	0.89	75.6	0.87	0.92
20	SD97394-1	4860	1.19	0.85	76.9	0.60	0.82
21	SD99073	4688	1.10	0.92	76.2	0.94	0.98
22	SD00032	4494	1.00	0.90	76.5	0.73	0.95
23	SD00111	4785	1.14	0.93	76.8	0.69	0.85
24	SD00258	5047	1.18	0.95	76.7	0.85	0.86
25	SD97W609	4404	0.92	0.90	76.4	0.89	0.90
26	SD97W671-1	4646	1.04	0.94	76.1	1.21	0.90
27	SD98102	4894	1.12	0.96	76.6	1.00	0.98
28	NE00633	4397	0.96	0.90	75.5	1.01	0.93
29	NE01422	4753	1.18	0.92	76.0	0.76	0.79
30	NE01564	4762	1.10	0.89	76.3	0.86	0.94
31	NE01643	5054	1.09	0.95	77.1	0.77	0.91
32	NE99533-3	4434	1.02	0.85	78.4	1.09	0.90
33	NE99533-5	4749	1.04	0.90	78.2	0.90	0.87
34	NE99656-1	4908	1.21	0.87	77.3	0.77	0.87
35	NE00658	4589	1.00	0.94	75.0	1.13	0.98
36	NE99464	4674	0.94	0.93	77.8	0.91	0.97
37	NE99489	4863	1.13	0.97	75.4	1.12	0.97
38	MTR9997	4153	0.88	0.70	75.1	1.38	0.75
39	MT0097	4589	1.31	0.95	74.8	1.11	0.68
40	MT00159	4683	1.13	0.90	73.5	1.57	0.91

Table 10. Reaction of 40 wheats grown in the 2004 NRPN to WSBMV and Hessian fly.

		Wheat soilborne mosaic virus (WSBMV)			Hessian fly[3]
Entry	Line or selection	[1]Stillwater, OK, 3/04/04	[1]Stillwater, OK, 3/10/04	[2]Urbana, IL	rating
1	Kharkof	4	4	7.0	S
2	Harding	4	4	7.0	S
3	Nuplains	4	4	7.0	S
4	Nekota	2	seg-R	6.0	S
5	Moreland (IDO517)	3	2	7.5	S
6	DW (IDO513)	4	4	8.0	S
7	NW97S412-1	seg	seg	9.0	S
8	NW97S139-1	4	4	7.5	S
9	NW98S097	1	2	8.5	S
10	NW97S218-lt	1	1	3.0	S
11	NW98S104	3	3	5.5	S
12	N02Y5065	2	3	5.5	S
13	N02Y5072	2	3	3.5	S
14	N02Y5075	2	3	3.5	S
15	N02Y5078	3	3	4.5	S
16	N02Y5106	3	3	3.0	S
17	N02Y5117	3	3	2.0	S
18	SD97059-2	1	1	1.5	H-
19	SD97380-2	2	3	5.5	S
20	SD97394-1	3	3	5.0	R-
21	SD99073	2	3	7.0	H+
22	SD00032	1	2	6.5	S
23	SD00111	1	1	3.0	H
24	SD00258	3	3	7.5	H-
25	SD97W609	1	1	2.5	S
26	SD97W671-1	2	1	5.5	S
27	SD98102	1	seg-R	7.0	H-
28	NE00633	1	2	6.0	H-
29	NE01422	1	1	3.0	S
30	NE01564	1	1	4.5	S
31	NE01643	4	4	8.0	H-
32	NE99533-3	4	4	8.0	S
33	NE99533-5	4	4	7.0	S
34	NE99656-1	3	4	7.5	S
35	NE00658	2	2	4.5	S
36	NE99464	2	2	3.0	S
37	NE99489	2	2	2.5	S
38	MTR9997	4	4	9.0	S
39	MT0097	4	4	8.0	S
40	MT00159	3	4	8.0	S

[1]Visual assessment: 1=no mosaic and/or no stunting, 2=slight mosaic and/or slight stunting, 3=moderate mosaic and/or moderate stunting, 4=severe mosaic and/or severe stunting. From Bob Hunger Oklahoma State

[2]Rated on a scale of 0-9, with 0=resistant, 9=susceptible; from Fred Kolb, University of Illinois.

[3]From Elburn Parker, USDA-ARS, Manhattan, KS: S=susceptible, R=resistant, H=heterogeneous.

Table 11. Seedling reactions of entries in the 2004 NRPN to selected isolates of stem rust (from Yue Jin, USDA-ARS, St. Paul, MN), and presence of 1RS wheat-rye chromosomal translocations.

		stem rust isolates					
		TPMK	QTHJ	TTTT	RCRS	QFCS	
Entry	Line/selection	74-MN-1409	69-MN-399	02 MN 84 A-1	97 ND 82A	03 ND 76C	1RS
1	Kharkof	3+	3,1	3+,2+	;/;1/4	4/;/2	Non.1RS
2	Harding	0;	1	;,2C	0;	;	Non.1RS
3	Nuplains	3	1	1	0;	0;	Non.1RS
4	Nekota	0;	2+	3,;	0;	0;	1AL.1RS
5	Moreland (IDO517)	;/3,1	3-	4	3-/;	3-	Non.1RS
6	DW (IDO513)	4	1+	3	;1	2	Non.1RS
7	NW97S412-1	;/2	0;	0;	0	0;	1BL.1RS
8	NW97S139-1	0	3	;, 3	0;	0;	Non.1RS
9	NW98S097	2	1	2	1	2-	Non.1RS
10	NW97S218-lt	0;/23	0	;1, 3-C	0;	0;	Non.1RS
11	NW98S104	3	2	3-,2	1	2+/0;	Non.1RS
12	N02Y5065	2	1+	2/2,3	1+	1/3	Non.1RS
13	N02Y5072	2-	1	2+	1.3--	;1-	Non.1RS
14	N02Y5075	2+	1	1+	1	0;	Non.1RS
15	N02Y5078	2	1/2	1+	1	1-	Non.1RS
16	N02Y5106	2	1	2-	1	0;	Non.1RS
17	N02Y5117	2	1	;, 2	1	0;	Non.1RS
18	SD97059-2	0/2	1	;/2	1-	0;	Non.1RS
19	SD97380-2	0;	1/3	0;	0	0;	Non.1RS
20	SD97394-1	0	1-	;1, 3-C low if	0;	0	Non.1RS
21	SD99073	0/3	2+	;/1/1, 4	0	0;	Non.1RS
22	SD00032	0/3	1	3C	0;	0	1BL.1RS
23	SD00111	2/3	2	3/;1	0;/1	2-	1AL.1RS
24	SD00258	2	;1-	0;	1	1-	Non.1RS
25	SD97W609	0/3	0	3-, ;	0;1-	0;	Non.1RS
26	SD97W671-1	3/0;	0	;1, 4	1	;123	Non.1RS
27	SD98102	0;	0;/3-	;1	0;	;	1AL.1RS
28	NE00633	0;	0;	3	0;	;	Non.1RS
29	NE01422	0;	0	;, 3- low if	23-	2-	Non.1RS
30	NE01564	0;	0	0	0	0;	Non.1RS
31	NE01643	4 low if	0	;, 3	0	2N	Non.1RS
32	NE99533-3	2+	1-	;1	;1	0;	Non.1RS
33	NE99533-5	2	2-	1	1	1-	Non.1RS
34	NE99656-1	3+	2,3	4	0;	3-	Non.1RS
35	NE00658	0	3	23-	0;	0;	Non.1RS
36	NE99464	3	1	3, 2	1	1-	Non.1RS
37	NE99489	0;	1	;1-	0;	0;	Non.1RS
38	MTR9997	4	3, 1	3	3+	4	Non.1RS
39	MT0097	3- low if	0	3, 1	3	0	Non.1RS
40	MT00159	3-2	4	3	3,2	4	Non.1RS

Table 12. Seedling reactions of entries in the 2004 NRPN to selected isolates of leaf rust (from Jim Kolmer, USDA-ARS, St. Paul, MN).

		Leaf rust isolates							
Entry	Line/selection	CBMT	MCDS	MBDS	MHDS	MCRK	THBJ	TNRJ	Postulated Genes***
1	Kharkof	3	3	3	3	3	3	3	0
2	Harding	;	;	;	;	;1c	;1c	;1c	+
3	Nuplains	;	;	;	;	;	;	3	24
4	Nekota	3	3	3	3	3	3	3	0
5	Moreland (IDO517)	3	3	3	;-3	3	3	3	0
6	DW (IDO513)	3	3	3	3	3	3	3	0
7	NW97S412-1	;	;1c	;	;1c	3	3	;1c	+
8	NW97S139-1	3	3	3	3	3	3	3	0
9	NW98S097	3;	;	;	;	;	;	3;-3	+
10	NW97S218-lt	;	3	3	3	;1c	3;	;1c	+
11	NW98S104	3	3	3	3	3	3	3	0
12	N02Y5065	3	3	3	3	3	3	3	0
13	N02Y5072	3	3	3	3	3-;	3	3	0
14	N02Y5075	3	3	3	;3	3	3	3	0
15	N02Y5078	3-;	3	3	3	3	3	3	0
16	N02Y5106	3	3	3	;1c	3	3	;	+
17	N02Y5117	3	3	3	3	3	3	3	0
18	SD97059-2	;	;	;	;	;	;	;1c	+
19	SD97380-2	;	;	;	;	;	;1c	;1c	+
20	SD97394-1	;	;2c	;	;	;1c	;1c	;1c	+
21	SD99073	;	;	;1c	;	;	;1c	;1c	+
22	SD00032	;	;	;2c	;	;	;	;	+
23	SD00111	;	;	;	;	;	;	;-3	+
24	SD00258	;	;	;	;	;	;	;1c	+
25	SD97W609	3;	3	3-;	3	3	;	;	+
26	SD97W671-1	;	3	-	3	3	3	;	26
27	SD98102	;-3	3	;	3	3	3	3;	+
28	NE00633	3	3	;	3	3	3	3	+
29	NE01422	3;	3	;	3	3-;	;	;	+
30	NE01564	;	;	;	;	;	;	;	+
31	NE01643	;	;	;	;1c	;1c	;1c	3	+
32	NE99533-3	;	;	;	;1c	;	;	3	24,+
33	NE99533-5	;	;1c	;	;1c	;1c	;1c	3	24,+
34	NE99656-1	;2c	3-2c	;	3-1c	;1c-3	;-3	;1c	+
35	NE00658	;2c	2c;	;	3	;1c	3	;1c	+
36	NE99464	3	3	3	3	3	3	3	0
37	NE99489	;	;1c	;1c	;1c	;	;	3	24
38	MTR9997	3	3	3	3	3	3	3	0
39	MT0097	3	3	3	3	3	3	3	0
40	MT00159	3	3	3	3	3	3	3	0

Table 13. Field and greenhouse reactions to leaf rust, 2004 NPRN.

Entry No.	Line/selection	Stillwater, OK: seedling	Manhattan, KS, greenhouse, seedling (0-9)[1]	Brookings, SD, infection type	Brookings, SD severity (%)
1	Kharkof	S	9	S	45
2	Harding	S	7	R	0
3	Nuplains	R (seg)	6	MS	25
4	Nekota	S	9	S	60
5	Moreland (IDO517)	S	9	S	50
6	DW (IDO513)	S	9	S	65
7	NW97S412-1	S	6	R	0
8	NW97S139-1	S	9	MS	40
9	NW98S097	MR	8	R	0
10	NW97S218-lt	S	9	MS	20
11	NW98S104	S		S	35
12	N02Y5065	S	9	S	50
13	N02Y5072	S	7	S	40
14	N02Y5075	S	9	MS	30
15	N02Y5078	S	9	MS	23
16	N02Y5106	S	9	S	60
17	N02Y5117	S	9	MS	20
18	SD97059-2	MR	3H	R	0
19	SD97380-2	MR	3	R	0
20	SD97394-1	MR	7	MR	3
21	SD99073	MR	5H	R	0
22	SD00032	S	8	MS	18
23	SD00111	S	2	MR	5
24	SD00258	MS	6	R	5
25	SD97W609	S	9H	S	50
26	SD97W671-1	S	8	S	35
27	SD98102	S	9	S	55
28	NE00633	S	8	S	65
29	NE01422	S	9	R	10
30	NE01564	MR	5	R	0
31	NE01643	S	9	R	5
32	NE99533-3	MR	7	S	40
33	NE99533-5	MS	7	S	40
34	NE99656-1	S	9	MS	13
35	NE00658	S	9	S	65
36	NE99464	S	9	S	50
37	NE99489	MR	7H	MS	20
38	MTR9997	S	9	S	60
39	MT0097	S	9	MS	60
40	MT00159	S	9	S	55

[1]Leaf rust was inoculated on 10-29-2003 using a composite culture collected at Hutchison, Ks in 2003

Table 14. Field reactions to stripe rust and stem rust, 2004 NPRN.

Entry No.	Line/selection	Stripe rust, Fayetteville, AR[1]	Stripe rust, Washington State[2]						Stem rust, Brookings, SD	
			Pullman, WA		Mt. Vernon, WA					
			6/30/04		4/25/04		6/4/04			
			ST 10.5-11		ST 7-9		ST 10.5			Severity
			%	T	%	T	%	T	IT	(%)
1	Kharkof	0	30	5	2	2	10	2	S	85
2	Harding	15	100	8	10	5	50	8	R	46
3	Nuplains	85	100	8	5	3	100	8	S	11
4	Nekota	85	100	8	40	8	100	8	R	1
5	Moreland (IDO517)	2	60	5	5	2	100	8	S	80
6	DW (IDO513)	0	2	2	5	2	100	8	S	50
7	NW97S412-1	0	10	8	2	2	5	2	R	1
8	NW97S139-1	0	10	8	5	2	10	2	R	1
9	NW98S097	7	70	8	20	5	100	8	MS	25
10	NW97S218-lt	0	60	0,8	5	2	5	2	R	1
11	NW98S104	0	20	5	2	2	5	2	MS	20
12	N02Y5065	7	10	8	5	2	20	2	R	7
13	N02Y5072	0	10	5	5	2	10	2	R	1
14	N02Y5075	0	2	8	5	2	5	2	R	1
15	N02Y5078	2	10	8	5	2	5	2	R	9
16	N02Y5106	2	50	8	20	5	100	8	R	1
17	N02Y5117	0	15	8	5	2	100	8	R	1
18	SD97059-2	0	80	8	15	5	20	5	R	1
19	SD97380-2	15	80	8	15	5	100	8	R	1
20	SD97394-1	0	90	8	5	2	70	8	R	1
21	SD99073	2	60	8	20	5	30	5	R	1
22	SD00032	0	80	8	5	2	10	2	MS	11
23	SD00111	15	50	5	60	8	90	8	S	31
24	SD00258	2	70	8	20	3,8	50	5	R	1
25	SD97W609	7	60	8	5	2	80	5	R	1
26	SD97W671-1	7	100	8	5	2	20	5	S	65
27	SD98102	15	100	8	60	8	100	8	R	1
28	NE00633	0	NA	NA	5	2	40	5	R	1
29	NE01422	7	60	8	80	8	100	8	MR	45
30	NE01564	7	100	8	60	8	100	8	R	1
31	NE01643	7	100	8	20	8	80	8	S	75
32	NE99533-3	30	100	8	40	8	90	8	R	1
33	NE99533-5	15	100	8	5	2	5	2		
34	NE99656-1	7	100	8	40	8	100	8	S	80
35	NE00658	2	100	8	80	8	100	8	R	1
36	NE99464	0	60	8	5	2	5	2	MS	11
37	NE99489	0	100	8	5	2	70	8		
38	MTR9997	7	100	8	80	8	100	8	S	100
39	MT0097	0	2	2	5	2	10	2	S	16
40	MT00159	0	40	5	5	2	5	2	R	46

[1]Data is percentage of foliage with sporulating pustules at soft dough based on one rep in an inoculated, irrigated nursery. Inoculated with a field collection from Stuttgart, AR, in 2000. Has virulence on Lemhi, Lee, Fielder, Express, Yr8, & Yr9; data from Gene Milus, Univ, AR.

[2]Stripe rust percent (%) and infection type (T) under natural infestation. IT: 0=no visible symptoms; 1=necrotic &/or chlorotic flecks; no sporulation; 3=necrotic &/or chlorotic blotches or stripes; no sporulation; 4=necrotic &/or chlorotic blotches or stripes, trace sporulation; 5=necrotic &/or chlorotic blotches or stripes, intermediate sporulation; 6=necrotic &/or chlorotic blotches or stripes; moderate sporulation; necrotic &/or chlorotic blotches or stripes; abundant sporulation; 8=chlorosis behind sporulating area; abundant sporulation; 9=no necrosis of chlorosis; abundant sporulation. From Xianming Chen, USDA-ARS.

Table 15. Field reactions to leaf pathogens and Fusarium head blight.

Entry	Line/selection	Leaf Disease, Williston, ND[1]	Green leaf duration, Lethbridge, Alberta (0-9)	Powdery mildew, Lethbridge, Alberta (0-9)	Fusarium head blight, Brookings, SD[2]				
					Incidence		Severity		Disease Index
					Mean	SE	Mean	SE	Mean
1	Kharkof	20	2	6	81	9	11	6	9
2	Harding	15	1	4	89	8	31	6	27
3	Nuplains	10	2	6	95	9	39	6	37
4	Nekota	20	3	6	72	9	34	7	25
5	Moreland (IDO517)	60	2	6	97	8	44	6	43
6	DW (IDO513)	5	4	5	95	9	30	6	28
7	NW97S412-1	10	1	2	95	9	33	7	32
8	NW97S139-1	50	2	5	100	11	37	7	37
9	NW98S097	40	2	7	96	9	46	6	45
10	NW97S218-lt	30	5	4	91	9	21	6	19
11	NW98S104	50	1	3	90	8	33	6	30
12	N02Y5065	10	3	6	92	8	31	6	29
13	N02Y5072	15	3	4	82	8	30	6	25
14	N02Y5075	20	3	3	85	8	31	6	26
15	N02Y5078	15	2	5	84	8	31	6	26
16	N02Y5106	20	6	7	92	8	35	6	32
17	N02Y5117	25	6	3	92	9	35	6	32
18	SD97059-2	15	1	6	77	9	13	6	10
19	SD97380-2	15	3	5	67	10	20	7	14
20	SD97394-1	15	3	6	57	8	20	6	12
21	SD99073	40	2	5	79	8	26	6	20
22	SD00032	30	1	5	73	8	31	6	22
23	SD00111	25	2	5	57	8	21	6	12
24	SD00258	20	3	5	90	8	27	6	25
25	SD97W609	10	5	5	49	9	22	6	11
26	SD97W671-1	10	2	5	89	8	31	6	28
27	SD98102	25	3	4	62	9	25	6	16
28	NE00633	30	3	6	96	8	41	6	39
29	NE01422	15	2	3	92	9	37	7	34
30	NE01564	35	2	6	72	9	28	6	20
31	NE01643	15	2	6	64	8	20	6	13
32	NE99533-3	30	3	9	92	9	31	6	29
33	NE99533-5	60	3	8	84	8	34	6	28
34	NE99656-1	20	1	4	74	8	21	6	16
35	NE00658	50	3	6	92	8	39	6	36
36	NE99464	20	3	5	84	8	25	6	21
37	NE99489	15	2	4	91	9	34	6	31
38	MTR9997	1	2	7	94	9	16	6	15
39	MT0097	20	1	4	94	9	42	6	40
40	MT00159	10	1	5	94	9	50	6	48
	mean	24	3	5	84		30		26
	l.s.d. (0.05)				4		2.8		

[1]A visual rating of flag leaf senesence at soft dough stage of kernel development.

[2]From Amir Ibrahim, South Dakota State, FHB ratings are based on a 0-9 scale. Incidence (Inc%) is the number of infected ears. Severity (Sev%) is the average of the scab ratings * 10. Disease Index (Dis%) is incidence * severity/100.

Table 16. Miscellaneous agronomic traits of entries in the 2004 NRPN.

		Acid soil tolerance, Stillwater, OK*		Winter survival (normalized to a scale of 0-100, with 100 = no winter damage)							
Entry	Line or Selection	Mar. 2, 2004	May 28, 2004	Casselton, ND	Williston, ND	Hettinger, ND	Lethbridge, Alberta	Lincoln, NE	Bozeman, MT	Dakota Lakes, SD	Winner, SD
1	Kharkof	4	4	48	36	98	85	90	85	90	70
2	Harding	4	4	60	48	98	90	50	85	90	70
3	Nuplains	4	3	38	40	98	93	40	88	90	70
4	Nekota	4	4	50	40	98	95	40	93	80	70
5	Moreland (IDO517)	4	3	35	55	98		50	92	85	70
6	DW (IDO513)	5	5	28	47	98		50	75	70	70
7	NW97S412-1	3	3	23	40	95	73	20	80	80	70
8	NW97S139-1	3	4	30	69	99	83	20	93	85	70
9	NW98S097	3	5	33	49	98	88	40	82	80	70
10	NW97S218-lt	4	2	45	75	98	92	50	78	85	70
11	NW98S104	4	4	38	66	97	87	50	80	90	70
12	N02Y5065	4	5	18	40	97	87	70	90	90	70
13	N02Y5072	3	5	23	45	96	88	30	77	85	70
14	N02Y5075	4	4	28	55	97	82	30	73	90	70
15	N02Y5078	4	3	23	45	96	85	30	75	90	70
16	N02Y5106	3	4	55	64	94	73	30	80	90	70
17	N02Y5117	3	3	45	55	98	90	40	80	90	60
18	SD97059-2	5	3	55	64	97	92	50	85	90	70
19	SD97380-2	2	3	48	41	98	95	50	83	90	70
20	SD97394-1	4	4	53	53	99	95	50	93	90	70
21	SD99073	4	4	53	73	99	87	50	80	90	70
22	SD00032	4	3	58	54	99	97	50	87	90	70
23	SD00111	4	2	50	75	99	95	50	72	90	70
24	SD00258	4	4	58	59	97	93	50	85	90	70
25	SD97W609	4	3	55	39	98	90	20	87	90	70
26	SD97W671-1	3	3	55	50	98	90	30	87	90	70
27	SD98102	4	4	55	51	98	92	50	88	85	50
28	NE00633	3	5	55	30	98	93	50	83	90	70
29	NE01422	4	1	38	55	98	95	20	83	90	70
30	NE01564	3	4	40	74	98	95	40	82	85	70
31	NE01643	2	3	55	74	99	95	30	90	90	70
32	NE99533-3	4	4	65	58	96	93	40	82	85	70
33	NE99533-5	4	4	60	84	99	98	40	93	90	70
34	NE99656-1	3	2	73	78	98	83	30	90	90	70
35	NE00658	4	3	48	70	97	90	30	78	90	70
36	NE99464	4	4	48	71	98	100	40	82	90	70
37	NE99489	4	2	53	79	98	92	30	90	90	70
38	MTR9997	2	4	30	55	98	85	40	88	90	70
39	MT0097	5	5	50	84	99	88	40	87	90	70
40	MT00159	3	4	55	58	97	93	40	78	90	70

*The standard cultivar used to determine acid-soil tolerance was 2163, with an assigned rating of 2 on a scale of 1 (tolerant) to 5 (highly susceptible). Readings taken at Enid, OK (new location in 2004, pH = 4.6, 70 ppm Al, and Al saturation = 11%) on the dates indicated. The first set of readings may be confounded with winterhardiness expression.