

PROJECT TITLE: Statewide Spring Wheat Variety Performance - 1997

PROJECT LEADER:

L. Talbert, Spring Wheat breeder, Bozeman

PROJECT PERSONNEL:

D.M. Wichman, CARC, Moccasin

J.L.A. Eckhoff, EARC, Sidney

G.R. Carlson, NARC, Havre

R.N. Stougaard, NWARC Kalispell

G.D. Kushnak, WTARC, Conrad

OBJECTIVE: To evaluate new and existing varieties and experimental lines of spring wheat under various growing conditions and environments in Montana.

RESULTS: The 1997 Advanced Spring Wheat yield trial was grown at two irrigated and seven rainfed sites across Montana. Irrigated sites were at Sidney and Huntley. Replicated multiple-row plots were established at all locations using standard research techniques.

Yield, test weight, heading date, plant height at maturity, and grain protein contents are summarized in Tables 1, 2, 3, 4, and 5.

Good soil moisture at planting allowed good emergence at **Sidney**, but conditions were very dry until July, when abundant rain resulted in considerable secondary tillering. The rain was too late to help the early maturing varieties, but the late maturing varieties did surprisingly well. **Havre** experienced good moisture early in the season, but dry conditions late in the season resulted in low test weights. Saturated conditions at **Kalispell** resulted in late planting into cold wet soil, which promoted *Pythium* infection. The disease stunted plants and reduced tillering. **Bozeman** experienced wet conditions throughout the season. Planting and harvest were later than normal due to wet soils. Timely and well-distributed rainfall resulted in very high yields at **Conrad**. Dry conditions prevailed at the end of the season, which was reflected in some lower test weights. No disease or sawfly pressure was observed. **Moccasin** experienced a cool, damp spring and above average precipitation with cool conditions during the growing season. These conditions were conducive to good yield, although higher than expected yields caused some lower protein contents. A dry spring at **Huntley** followed by a growing season with average precipitation resulted in average yields.

SUMMARY: Highest yielding varieties on a statewide basis were soft white wheats Vanna and Penewawa. Highest yielding hard red wheats on a statewide basis were McNeal and Montana line MT9675. Highest yielding varieties at individual sites were MT9675 at Havre, Amidon at Sidney dryland, MT9653 at Sidney irrigated, Vanna at Moccasin, Westbred 936 at Conrad, Vanna at Huntley dryland and irrigated, MT9644 at Kalispell, and Penewawa at Bozeman.

FUTURE PLANS: New and existing varieties and experimental lines will continue to be evaluated at Bozeman and the Research Centers in Montana, so that breeders can release improved varieties and producers can have information on varieties best adapted to conditions in their areas.

Table 1. 1997 GRAIN YIELD (BU/AC) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	CONRAD	HUNTLEY	HUNTLEY	KALISPELL	BOZEMAN	AVG	RANK	BYX	RSQ
		DRY	IRR		DRY	DRY	IRR	1/	DRY					
BZ684-23	VANNA	50.5	45.7	77.5	80.5	68.1	62.3	87.6	52.2	102.7	69.7	1	1.14	0.92
BZ987331	MSFRS SELECTION	47.5	35.6	80.7	68.5	64.5	47.4	70.6	59.9	86.7	62.4	5	0.89	0.74
BZ992588	RAMBO/906R	48.5	40.6	66.3	54.6	55.8	44.3	61.9	30.6	76.2	53.2	45	0.84	0.94
BZ992632	FORTUNA/906R	46.6	32.2	64.0	61.0	63.9	52.2	71.3	41.0	87.8	57.8	22	1.02	0.94
CI 10003	THATCHER	41.1	38.0	66.1	58.8	59.1	49.3	68.2	35.7	58.8	52.8	46	0.68	0.80
CI 13596	FORTUNA	43.3	31.8	56.1	59.1	59.4	55.9	79.7	26.2	73.0	53.8	43	1.01	0.85
CI 17429	LEW	42.0	41.4	68.8	60.6	61.5	48.8	67.3	33.8	74.2	55.4	37	0.87	0.96
CI 17430	NEWANA	50.4	39.3	65.7	65.6	61.6	55.0	80.6	39.3	92.4	61.1	11	1.08	0.96
CI 17790	LEN	48.5	38.3	68.2	59.8	63.9	53.3	69.5	31.7	80.7	57.1	27	0.96	0.96
MT 9410	MT8808/MARBERG	44.5	40.1	72.3	60.6	62.1	50.5	86.2	36.9	79.7	59.2	19	1.06	0.93
MT 9433	MT8808/MARBERG	50.9	45.1	73.6	58.7	66.7	47.9	82.1	41.3	88.9	61.7	7	1.04	0.95
MT 9453	GLENMAN/AMIDON	51.0	40.8	67.3	58.2	61.6	57.2	74.5	21.6	85.4	57.5	24	1.10	0.90
MT 9507	PONDERA/FORTUNA//PONDERA	48.6	32.5	58.7	60.2	56.9	42.6	68.5	36.6	70.0	52.7	47	0.80	0.92
MT 9508	FORTUNA/PONDERA//PONDERA	50.7	31.2	65.7	55.9	60.5	47.9	77.8	31.3	72.9	54.9	40	0.98	0.91
MT 9513	FORTUNA/PONDERA//PONDERA	48.7	38.7	70.4	57.6	61.0	42.3	65.7	39.4	83.0	56.3	33	0.92	0.93
MT 9539	LEW/PONDERA//PONDERA	46.0	41.4	65.0	65.5	58.2	56.0	77.2	33.2	88.2	59.0	20	1.06	0.95
MT 9541	LEW/PONDERA//PONDERA	45.7	39.7	64.4	61.2	65.6	43.6	74.8	39.5	82.6	57.5	25	0.97	0.95
MT 9542	NORANA/FORTUNA//NORANA	52.6	38.9	69.1	71.8	56.3	56.4	76.8	36.3	92.8	61.2	10	1.10	0.94
MT 9553	PONDERA/FORTUNA//PONDERA	49.1	38.7	60.9	61.5	55.9	52.4	71.7	35.6	79.4	56.1	36	0.87	0.96
MT 9558	PONDERA/LEW//PONDERA	49.4	41.4	61.5	59.7	64.9	43.9	66.9	24.9	77.8	54.5	41	0.95	0.89
MT 9565	HI-LINE/PI372129//HI-LINE	46.3	36.2	68.5	64.2	60.6	48.8	62.7	34.3	73.3	55.0	38	0.85	0.93
MT 9602	FORTUNA/AMIDON	44.4	27.9	62.1	50.1	56.6	43.4	75.9	31.4	70.5	51.4	49	0.98	0.91
MT 9603	FORTUNA/AMIDON	47.4	41.4	70.7	52.2	60.9	47.2	73.6	28.3	67.1	54.3	42	0.86	0.85
MT 9607	FORTUNA/AMIDON	48.3	33.2	69.7	59.5	66.5	44.8	80.3	49.3	62.7	57.1	28	0.73	0.65
MT 9608	FORTUNA/AMIDON	47.1	32.1	66.2	59.3	56.5	43.4	69.7	45.1	75.4	55.0	39	0.84	0.91
MT 9609	FORTUNA/AMIDON	50.0	36.0	73.0	57.4	59.6	42.0	75.3	32.2	80.3	56.2	34	1.07	0.96
MT 9619	GRANDIN/FORTUNA	43.6	34.4	71.6	55.6	55.2	53.5	76.5	36.6	82.6	56.6	31	1.05	0.96
MT 9627	GRANDIN/LEW	49.7	38.1	76.0	68.1	60.5	49.2	80.9	46.2	85.3	61.5	9	1.02	0.94
MT 9628	GRANDIN/PONDERA	48.7	38.5	72.5	60.1	62.6	56.7	74.8	34.1	92.7	60.1	16	1.13	0.97
MT 9631	LEN/LEW	44.0	47.9	76.5	64.4	55.8	49.9	73.4	24.6	80.8	57.5	26	1.06	0.88
MT 9644	LEW/AMIDON	46.5	40.4	63.7	59.8	59.6	52.0	70.7	68.8	82.7	60.5	15	0.57	0.50
MT 9653	LEW/AMIDON	46.3	47.1	90.2	59.5	57.7	52.6	74.2	39.7	87.9	61.7	8	1.05	0.84
MT 9660	NEWANA/GRANDIN	46.7	34.9	73.6	57.5	67.1	50.1	77.2	31.0	86.0	58.2	21	1.18	0.98
MT 9662	NEWANA/REDWIN	48.6	39.5	66.1	70.2	66.9	55.1	81.7	25.0	104.2	61.9	6	1.41	0.93

1/THE 1997 NURSERY GROWN AT KALISPELL WAS HIGHLY INFECTED WITH PYTHIUM WHICH PRODUCED SIGNIFICANTLY LOWER THAN NORMAL YIELDS

(continued)

Table 1. 1997 GRAIN YIELD (BU/AC) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	CONRAD	HUNTLEY	HUNTLEY	KALISPELL	BOZEMAN	AVG	RANK	BYX	RSQ
		DRY	IRR	IRR	DRY	DRY	IRR	1/	DRY					
MT 9667	REDWIN/FORTUNA	44.0	33.5	56.2	52.8	56.0	46.9	65.1	36.7	72.0	51.5	48	0.77	0.96
MT 9668	REDWIN/FORTUNA	44.9	37.9	63.2	60.9	51.7	46.6	72.7	30.2	75.1	53.7	44	0.94	0.96
MT 9675	WINRIDGE/NEWANA	53.3	39.4	70.6	69.6	62.2	57.5	82.8	41.6	93.3	63.4	4	1.09	0.96
ND 606	AMIDON	48.1	48.7	79.2	56.2	62.7	54.2	81.9	29.6	86.3	60.8	13	1.11	0.91
ND 626	GRANDIN	47.2	43.3	75.5	62.5	64.4	46.9	74.9	49.9	85.5	61.1	12	0.90	0.91
ND 673	TRENTON	46.7	42.0	75.7	50.5	63.9	57.1	85.7	32.3	83.3	59.7	17	1.10	0.88
ND 677	ERNEST	44.6	45.2	72.6	59.9	58.4	46.2	82.9	42.3	84.1	59.6	18	1.00	0.92
PI483235	GLENMAN	50.5	41.7	70.7	67.4	60.0	43.5	65.3	22.5	84.2	56.2	35	1.09	0.89
PI549275	HI-LINE	45.7	38.4	66.5	68.4	59.8	50.9	86.1	34.6	95.7	60.7	14	1.27	0.96
PI574642	McNEAL	51.8	43.2	82.2	66.2	62.0	54.8	78.1	41.5	93.0	63.6	3	1.10	0.97
TR983239	FERGUS	47.0	39.5	63.8	64.2	62.2	45.6	61.3	29.6	95.4	56.5	32	1.11	0.87
WA 6920	PENAWAWA	49.1	48.2	83.0	77.1	68.0	57.1	64.8	34.6	107.9	65.5	2	1.24	0.82
WB 926	WESTBRED 926	46.7	38.8	71.7	58.2	56.8	51.3	68.2	37.3	91.4	57.8	23	1.04	0.94
WB 936	WESTBRED 936	46.6	37.9	67.0	68.0	68.6	51.6	56.6	34.7	82.4	57.0	29	0.89	0.81
WBEXPRES	WESTBRED EXPRESS	39.9	36.6	69.8	60.5	58.6	48.5	74.7	32.5	91.7	57.0	30	1.21	0.98
*****	SITE MEAN *****	47.3	39.0	69.6	61.6	61.0	50.1	74.0	36.4	83.4	58.1		1.00	1.00
	C.V	4.8	5.5	6.6	7.4	6.9	10.1	12.5	34.9	8.2				
	LSD (.05)	4.0	3.8	8.0	8.0	7.5	8.4	15.8	20.6	11.8				

1/THE 1997 NURSERY GROWN AT KALISPELL WAS HIGHLY INFECTED WITH PYTHIUM WHICH PRODUCED SIGNIFICANTLY LOWER THAN NORMAL YIELDS

Table 2.

1997 TEST WEIGHT (LB/BU) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	CONRAD	HUNTLEY	HUNTLEY	KALISPELL	BOZEMAN	AVG	RANK	BYX	RSQ
		DRY	IRR	IRR	DRY	DRY	IRR	DRY						
BZ684-23	VANNA	57.1	57.4	58.5	62.4	59.9	59.4	58.4	57.7	61.9	59.2	47	1.34	0.75
BZ987331	MSFRS SELECTION	58.2	57.3	59.8	61.7	62.4	60.4	57.3	59.1	61.1	59.7	45	1.36	0.81
BZ992588	RAMBO/906R	61.6	60.2	59.5	62.3	61.4	61.5	60.5	60.1	58.5	60.6	29	0.36	0.14
BZ992632	FORTUNA/906R	59.2	60.1	59.2	63.0	61.9	61.0	58.4	58.6	62.6	60.4	32	1.27	0.80
CI 10003	THATCHER	57.9	58.7	60.0	62.6	61.2	59.7	59.8	58.2	61.2	59.9	41	1.12	0.81
CI 13596	FORTUNA	60.2	59.3	60.5	63.0	63.2	58.2	60.5	56.7	62.9	60.5	31	1.40	0.58
CI 17429	LEW	60.2	59.9	61.5	64.4	62.8	61.9	60.6	59.3	62.9	61.5	7	1.32	0.94
CI 17430	NEWANA	60.3	60.0	59.0	62.0	61.4	61.5	58.8	59.5	59.4	60.2	33	0.67	0.49
CI 17790	LEN	59.8	59.9	59.3	62.5	61.4	60.8	59.0	57.9	59.8	60.0	39	0.97	0.77
MT 9410	MT8808/MARBERG	60.8	60.2	62.0	63.9	63.5	61.5	61.5	60.8	63.3	62.0	2	1.00	0.84
MT 9433	MT8808/MARBERG	61.1	60.9	60.2	63.4	62.2	61.7	60.7	60.1	60.2	61.2	15	0.68	0.58
MT 9453	GLENMAN/AMIDON	61.1	60.3	60.3	62.9	62.0	61.0	59.6	59.6	60.0	60.8	25	0.75	0.69
MT 9507	PONDERA/FORTUNA/PONDERA	62.2	60.4	62.5	62.8	63.6	61.2	59.5	59.1	62.9	61.6	6	1.07	0.66
MT 9508	FORTUNA/PONDERA/PONDERA	60.7	58.8	62.0	62.4	62.9	60.8	59.6	58.8	62.5	60.9	23	1.14	0.77
MT 9513	FORTUNA/PONDERA/PONDERA	60.3	60.2	61.7	63.6	62.4	61.6	59.6	60.5	62.8	61.4	9	1.04	0.89
MT 9539	LEW/PONDERA/PONDERA	59.7	60.5	61.4	64.1	62.1	60.7	59.7	60.2	62.6	61.2	16	1.11	0.85
MT 9541	LEW/PONDERA/PONDERA	60.3	59.9	60.5	63.6	62.7	60.6	59.0	61.2	61.7	61.0	21	1.01	0.77
MT 9542	NORANA/FORTUNA/NORANA	60.3	60.5	58.8	62.3	61.7	60.3	59.3	57.2	60.2	60.1	35	0.95	0.60
MT 9553	PONDERA/FORTUNA/PONDERA	61.6	59.8	60.5	63.3	62.6	61.1	58.7	60.3	62.3	61.1	19	1.06	0.78
MT 9558	PONDERA/LEW/PONDERA	60.2	58.9	59.7	62.9	61.9	60.1	58.2	56.8	61.4	60.0	40	1.43	0.86
MT 9565	HI-LINE/PI372129//HI-LINE	60.7	60.3	62.3	64.5	63.0	62.3	61.2	61.9	62.9	62.1	1	0.93	0.80
MT 9602	FORTUNA/AMIDON	61.5	61.1	62.2	62.2	62.0	61.3	60.7	60.3	61.4	61.4	10	0.42	0.63
MT 9603	FORTUNA/AMIDON	61.8	59.9	62.0	62.2	62.7	61.7	60.1	59.9	60.1	61.2	17	0.63	0.47
MT 9607	FORTUNA/AMIDON	61.4	61.9	61.7	62.8	64.1	60.7	61.0	60.1	62.2	61.8	4	0.74	0.58
MT 9608	FORTUNA/AMIDON	60.5	61.2	61.8	62.9	61.4	60.9	60.2	59.8	61.6	61.1	20	0.64	0.72
MT 9609	FORTUNA/AMIDON	59.9	60.4	61.5	62.8	61.7	60.7	60.2	59.2	61.7	60.9	24	0.83	0.86
MT 9619	GRANDIN/FORTUNA	59.4	59.9	62.2	63.6	62.6	61.6	60.5	60.3	61.8	61.3	13	1.02	0.82
MT 9627	GRANDIN/LEW	60.5	60.9	61.7	63.8	63.2	61.3	61.1	61.9	61.5	61.8	5	0.73	0.69
MT 9628	GRANDIN/PONDERA	59.2	59.9	61.7	64.1	62.8	61.2	59.6	60.6	62.6	61.3	14	1.25	0.87
MT 9631	LEN/LEW	60.7	60.0	62.3	64.1	62.9	61.9	60.9	62.2	61.7	61.9	3	0.81	0.65
MT 9644	LEW/AMIDON	60.6	60.8	61.0	62.9	62.9	61.5	60.9	60.9	62.2	61.5	8	0.70	0.88
MT 9653	LEW/AMIDON	60.6	59.8	61.2	63.0	61.7	61.0	60.0	61.7	60.4	61.0	22	0.57	0.49
MT 9660	NEWANA/GRANDIN	56.2	60.1	60.5	62.9	61.8	60.9	60.0	59.1	60.2	60.2	34	1.08	0.51
MT 9662	NEWANA/REDWIN	59.4	59.6	59.7	63.6	62.2	60.9	57.7	59.2	58.6	60.1	36	1.23	0.68

(continued)

Table 2. 1997 TEST WEIGHT (LB/BU) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	CONRAD	HUNTLEY	HUNTLEY	KALISPELL	BOZEMAN	AVG	RANK	BYX	RSQ
		DRY	IRR	IRR	DRY	DRY	IRR	DRY						
MT 9667	REDWIN/FORTUNA	60.4	58.6	60.3	62.3	62.5	62.0	59.5	57.8	61.7	60.6	30	1.20	0.77
MT 9668	REDWIN/FORTUNA	60.1	57.5	59.3	61.5	62.1	60.0	59.3	58.8	62.1	60.1	37	1.05	0.67
MT 9675	WINRIDGE/NEWANA	58.6	57.0	58.0	61.8	60.3	58.8	57.9	57.5	58.0	58.7	49	1.09	0.79
ND 606	AMIDON	60.6	59.3	60.0	61.7	61.4	60.8	60.4	60.9	60.8	60.7	27	0.41	0.50
ND 626	GRANDIN	60.5	59.8	62.0	63.6	62.5	61.3	61.1	60.2	61.8	61.4	11	0.91	0.86
ND 673	TRENTON	60.5	59.2	61.8	63.0	62.9	61.8	59.8	59.8	61.9	61.2	18	1.08	0.89
ND 677	ERNEST	61.1	59.8	61.7	62.6	62.8	61.2	61.0	60.2	62.4	61.4	12	0.75	0.79
PI483235	GLENMAN	59.6	57.9	59.5	62.8	59.8	59.9	55.3	56.4	60.5	59.1	48	1.60	0.76
PI549275	HI-LINE	59.5	59.0	60.8	63.1	62.7	61.2	60.5	56.7	62.9	60.7	28	1.46	0.74
PI574642	McNEAL	58.5	59.2	59.7	62.7	59.9	61.0	59.7	59.5	60.6	60.1	38	0.77	0.60
TR983239	FERGUS	59.5	61.4	60.0	63.7	62.1	60.9	58.3	58.9	62.5	60.8	26	1.26	0.75
WA 6920	PENAWAWA	58.3	59.4	60.7	62.7	60.7	59.5	58.4	58.1	61.0	59.9	42	1.15	0.84
WB 926	WESTBRED 926	59.1	59.1	59.7	62.2	61.4	60.8	58.1	57.8	61.2	59.9	43	1.21	0.92
WB 936	WESTBRED 936	58.8	58.9	60.0	62.4	61.9	60.3	56.0	59.5	61.6	59.9	44	1.36	0.73
WBEXPRES	WESTBRED EXPRESS	58.6	58.3	59.7	62.0	62.3	59.6	57.7	59.1	58.0	59.5	46	1.08	0.64
*****	SITE MEAN *****	60.0	59.7	60.7	62.9	62.1	60.9	59.5	59.4	61.4	60.7		1.00	1.00

Table 3. 1997 HEADING DATE (DAYS FROM JAN.1)¹ SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY DRY	SIDNEY IRR	MOCCASIN	CONRAD DRY	KALISPELL	BOZEMAN DRY	AVG	RANK	BYX	RSQ
BZ684-23	VANNA	176.60	169.33	175.07	186.28	190.00	190.00	191.00	182.6	43	1.11	0.99
BZ987331	MSFRS SELECTION	172.02	166.30	170.58	178.02	186.00	184.00	187.00	177.7	3	1.03	0.98
BZ992588	RAMBO/906R	174.66	168.15	173.91	183.79	189.00	185.33	189.00	180.5	22	1.04	0.99
BZ992632	FORTUNA/906R	173.72	167.97	172.93	183.12	187.00	184.33	188.00	179.6	17	1.00	1.00
CI 10003	THATCHER	178.36	171.38	175.09	187.95	189.00	188.67	190.00	182.9	45	0.97	0.97
CI 13596	FORTUNA	174.30	169.48	173.30	184.28	188.00	184.67	188.00	180.3	20	0.97	0.99
CI 17429	LEW	177.94	172.42	176.56	188.10	192.00	190.00	190.00	183.9	49	1.00	0.99
CI 17430	NEWANA	177.99	172.30	176.64	187.57	192.00	188.67	190.00	183.6	48	0.98	0.99
CI 17790	LEN	176.34	171.03	174.29	186.72	190.00	186.33	189.00	182.0	37	0.98	0.98
MT 9410	MT8808/MARBERG	171.41	167.10	171.09	179.28	186.00	184.00	187.00	178.0	5	1.02	0.99
MT 9433	MT8808/MARBERG	177.34	171.25	175.29	186.40	190.00	188.67	190.00	182.7	44	0.99	0.99
MT 9453	GLENMAN/AMIDON	175.36	169.58	173.85	185.07	189.00	188.67	188.00	181.4	34	1.03	0.99
MT 9507	PONDERA/FORTUNA/PONDERA	171.97	166.45	170.46	179.80	186.00	184.33	186.00	177.9	4	1.03	1.00
MT 9508	FORTUNA/PONDERA/PONDERA	173.34	166.87	172.34	179.33	187.00	183.67	185.00	178.2	6	0.95	0.99
MT 9513	FORTUNA/PONDERA/PONDERA	173.63	167.53	173.01	179.73	188.00	184.00	186.00	178.8	11	0.96	0.98
MT 9539	LEW/PONDERA/PONDERA	174.99	168.85	173.64	184.31	189.00	186.33	189.00	180.9	28	1.04	1.00
MT 9541	LEW/PONDERA/PONDERA	173.61	167.47	172.65	180.28	187.00	186.00	188.00	179.3	16	1.02	0.98
MT 9542	NORANA/FORTUNA/NORANA	176.33	170.55	175.02	186.25	189.00	187.67	189.00	182.0	36	0.98	0.99
MT 9553	PONDERA/FORTUNA/PONDERA	173.34	167.33	172.67	180.67	187.00	185.33	187.00	179.0	13	1.00	0.99
MT 9558	PONDERA/LEW/PONDERA	176.78	169.15	174.97	185.67	190.00	189.33	190.00	182.3	41	1.08	1.00
MT 9565	HI-LINE/PI372129//HI-LINE	172.97	167.23	171.00	180.14	186.00	183.33	188.00	178.4	8	1.01	0.99
MT 9602	FORTUNA/AMIDON	172.36	167.88	171.72	180.65	188.00	184.67	187.00	178.9	12	1.03	0.99
MT 9603	FORTUNA/AMIDON	175.36	169.08	173.61	184.41	189.00	186.67	188.00	180.9	27	1.01	0.99
MT 9607	FORTUNA/AMIDON	172.68	167.50	172.25	179.69	187.00	185.00	187.00	178.7	10	1.00	0.98
MT 9608	FORTUNA/AMIDON	173.94	168.55	172.64	179.98	189.00	186.67	188.00	179.8	18	1.04	0.98
MT 9609	FORTUNA/AMIDON	173.03	168.33	172.69	180.33	187.00	184.33	188.00	179.1	15	0.98	0.99
MT 9619	GRANDIN/FORTUNA	175.66	169.92	174.53	184.69	190.00	186.33	189.00	181.4	33	1.00	0.99
MT 9627	GRANDIN/LEW	175.66	171.00	173.61	185.02	189.00	186.00	188.00	181.2	31	0.94	0.99
MT 9628	GRANDIN/PONDERA	174.28	167.35	172.40	179.61	187.00	183.67	186.00	178.6	9	0.94	0.98
MT 9631	LEN/LEW	176.64	171.38	174.81	185.28	190.00	188.33	190.00	182.3	40	0.99	0.99
MT 9644	LEW/AMIDON	175.37	168.97	173.72	184.13	190.00	187.00	188.00	181.0	30	1.04	1.00
MT 9653	LEW/AMIDON	176.69	171.32	175.28	186.72	191.00	187.33	189.00	182.5	42	0.98	0.98
MT 9660	NEWANA/GRANDIN	174.99	169.53	173.99	184.70	188.00	187.00	189.00	181.0	29	1.00	0.99
MT 9662	NEWANA/REDWIN	177.97	171.32	176.31	186.30	191.00	187.33	191.00	183.0	46	0.98	0.99

¹ JULIAN DAYS : 180 = JUNE 29

(continued)

c2c

Table 3. 1997 HEADING DATE (DAYS FROM JAN.1)¹ SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY DRY	SIDNEY IRR	MOCCASIN	CONRAD DRY	KALISPELL	BOZEMAN DRY	AVG	RANK	BYX	RSQ
MT 9667	REDWIN/FORTUNA	175.28	169.03	173.31	184.28	188.00	185.67	189.00	180.7	26	1.00	0.99
MT 9668	REDWIN/FORTUNA	174.43	168.77	173.25	184.69	188.00	187.00	188.00	180.6	24	1.03	0.99
MT 9675	WINRIDGE/NEWANA	177.67	172.52	176.39	186.99	192.00	188.67	191.00	183.6	47	1.00	1.00
ND 606	AMIDON	174.64	170.57	174.15	184.63	190.00	187.00	189.00	181.4	32	1.02	1.00
ND 626	GRANDIN	173.94	168.98	172.37	183.00	188.00	185.00	188.00	179.9	19	1.00	0.99
ND 673	TRENTON	173.76	170.30	173.12	184.06	188.00	185.33	189.00	180.5	21	0.99	0.99
ND 677	ERNEST	174.60	168.78	173.34	185.00	189.00	186.33	188.00	180.7	25	1.04	1.00
PI483235	GLENMAN	176.97	171.05	174.68	186.36	189.00	187.67	189.00	182.1	38	0.96	0.99
PI549275	HI-LINE	171.97	167.65	172.31	179.87	186.00	184.33	187.00	178.4	7	0.98	0.99
PI574642	McNEAL	176.60	170.85	174.71	186.39	188.00	187.33	189.00	181.8	35	0.94	0.98
TR983239	FERGUS	174.69	167.55	172.35	181.39	188.00	181.67	188.00	179.1	14	0.98	0.97
WA 6920	PENAWAWA	176.35	170.05	175.04	185.59	190.00	188.33	190.00	182.2	39	1.04	1.00
WB 926	WESTBRED 926	171.40	166.22	170.74	177.96	185.00	181.67	185.00	176.9	1	0.94	0.98
WB 936	WESTBRED 936	171.06	166.97	170.73	179.47	186.00	182.33	186.00	177.5	2	0.99	0.99
WBEXPRES	WESTBRED EXPRESS	175.34	169.85	173.93	180.68	187.00	186.33	191.00	180.6	23	0.97	0.95
*****	SITE MEAN *****	174.82	169.16	173.52	183.36	188.47	186.09	188.37	180.5		1.00	1.00

¹ JULIAN DAYS : 180 = JUNE 29

Table 4. 1997 PLANT HEIGHT (INCHES) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	CONRAD	HUNTLEY	KALISPELL	BOZEMAN	AVG	BYX	RSQ
		DRY	IRR	DRY	DRY							
BZ684-23	VANNA	26.5	18.7	30.1	34.0	29.0	26.4	32.0	33.9	28.8	0.89	0.93
BZ987331	MSFRS SELECTION	24.4	17.8	28.1	33.0	30.0	28.0	30.7	34.8	28.4	0.96	0.96
BZ992588	RAMBO/906R	25.1	19.8	27.5	32.4	29.0	26.3	27.7	35.7	27.9	0.83	0.90
BZ992632	FORTUNA/906R	28.5	19.6	32.1	35.4	34.0	30.0	32.2	34.8	30.8	0.93	0.98
CI 10003	THATCHER	33.2	22.6	38.9	45.7	43.0	37.7	40.4	43.6	38.1	1.35	0.98
CI 13596	FORTUNA	31.2	21.6	35.4	40.7	41.0	34.7	38.5	43.2	35.8	1.26	0.97
CI 17429	LEW	33.3	23.5	37.1	40.7	43.0	31.3	37.9	42.3	36.1	1.15	0.92
CI 17430	NEWANA	26.6	18.6	31.1	33.7	30.0	30.7	29.2	34.0	29.2	0.86	0.91
CI 17790	LEN	29.1	20.1	31.3	32.4	32.0	29.0	27.4	36.1	29.7	0.79	0.84
MT 9410	MT8808/MARBERG	29.2	22.5	31.6	41.3	38.0	30.0	36.5	39.3	33.5	1.12	0.93
MT 9433	MT8808/MARBERG	32.0	23.8	34.4	39.0	38.0	30.0	36.9	38.3	34.0	0.93	0.94
MT 9453	GLENMAN/AMIDON	29.7	22.5	34.4	39.7	36.0	34.6	33.1	38.2	33.5	0.96	0.94
MT 9507	PONDERA/FORTUNA/PONDERA	24.9	20.0	30.5	35.0	34.0	30.4	31.8	35.9	30.3	0.97	0.95
MT 9508	FORTUNA/PONDERA/PONDERA	27.3	18.1	30.6	32.7	32.0	30.3	27.7	33.7	29.1	0.86	0.89
MT 9513	FORTUNA/PONDERA/PONDERA	27.9	19.7	31.9	33.0	32.0	28.0	31.3	35.5	29.9	0.86	0.95
MT 9539	LEW/PONDERA/PONDERA	26.7	18.4	32.3	35.3	30.0	25.3	32.2	34.6	29.3	0.99	0.91
MT 9541	LEW/PONDERA/PONDERA	25.8	19.9	28.6	34.7	31.0	26.7	33.6	34.1	29.3	0.90	0.92
MT 9542	NORANA/FORTUNA/NORANA	26.7	19.2	32.3	35.3	32.0	27.6	28.2	34.2	29.4	0.92	0.93
MT 9553	PONDERA/FORTUNA/PONDERA	25.9	17.8	29.3	33.7	30.0	29.7	31.9	33.5	29.0	0.92	0.93
MT 9558	PONDERA/LEW/PONDERA	28.3	20.6	32.3	34.6	32.0	30.0	29.7	34.7	30.3	0.81	0.95
MT 9565	HI-LINE/PI372129//HI-LINE	29.6	20.3	31.5	39.0	38.0	27.7	35.7	37.9	32.5	1.15	0.93
MT 9602	FORTUNA/AMIDON	27.7	19.9	32.6	38.0	37.0	30.7	35.7	40.8	32.8	1.21	0.97
MT 9603	FORTUNA/AMIDON	32.9	23.7	34.3	42.7	39.0	35.3	38.2	43.4	36.2	1.14	0.97
MT 9607	FORTUNA/AMIDON	29.6	21.3	32.2	40.0	39.0	31.7	40.8	40.4	34.4	1.20	0.89
MT 9608	FORTUNA/AMIDON	31.0	21.1	34.3	39.7	37.0	31.4	39.8	41.7	34.5	1.19	0.94
MT 9609	FORTUNA/AMIDON	30.1	20.7	34.9	40.0	36.0	31.0	34.7	41.0	33.5	1.18	0.99
MT 9619	GRANDIN/FORTUNA	30.2	20.6	33.2	40.0	39.0	30.0	35.3	39.7	33.5	1.19	0.97
MT 9627	GRANDIN/LEW	26.3	19.4	28.9	34.0	32.0	28.7	30.5	34.1	29.2	0.88	0.99
MT 9628	GRANDIN/PONDERA	27.5	20.4	29.2	35.3	34.0	31.0	29.6	35.1	30.3	0.87	0.93
MT 9631	LEN/LEW	32.0	23.5	37.4	42.3	38.0	32.0	35.1	42.2	35.3	1.12	0.96
MT 9644	LEW/AMIDON	32.0	22.5	34.1	39.3	41.0	33.4	39.1	38.8	35.0	1.05	0.90
MT 9653	LEW/AMIDON	32.0	25.8	38.0	41.6	38.0	35.3	39.5	40.6	36.3	0.94	0.95
MT 9660	NEWANA/GRANDIN	28.9	18.3	30.2	36.7	33.0	32.0	32.3	34.7	30.8	0.99	0.93
MT 9662	NEWANA/REDWIN	24.9	18.1	30.2	35.0	30.0	26.7	25.7	33.2	28.0	0.93	0.90

(continued)

Table 4. 1997 PLANT HEIGHT (INCHES) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	CONRAD	HUNTLEY	KALISPELL	BOZEMAN	AVG	BYX	RSQ
		DRY	IRR	DRY	DRY							
MT 9667	REDWIN/FORTUNA	30.3	20.3	34.6	40.7	37.0	31.3	37.1	39.2	33.8	1.19	0.98
MT 9668	REDWIN/FORTUNA	29.6	21.6	33.4	42.0	35.0	29.0	34.1	40.2	33.1	1.16	0.94
MT 9675	WINRIDGE/NEWANA	27.0	19.6	31.1	37.0	34.0	28.0	31.7	36.9	30.7	1.05	0.99
ND 606	AMIDON	31.0	23.7	37.4	40.0	39.0	35.3	37.6	41.2	35.7	1.04	0.97
ND 626	GRANDIN	29.3	22.6	32.6	37.3	36.0	30.3	34.5	37.0	32.4	0.91	0.99
ND 673	TRENTON	31.8	21.6	35.3	43.0	40.0	36.7	35.3	43.8	35.9	1.28	0.96
ND 677	ERNEST	31.5	22.8	33.8	40.7	38.0	33.3	34.9	39.8	34.4	1.04	0.99
PI483235	GLENMAN	27.3	21.0	30.9	35.3	34.0	28.0	27.6	36.3	30.1	0.89	0.90
PI549275	HI-LINE	25.5	18.5	28.0	32.3	33.0	26.0	27.5	33.1	28.0	0.88	0.94
PI574642	McNEAL	28.4	20.7	32.4	36.7	33.0	28.7	32.4	35.5	31.0	0.92	0.98
TR983239	FERGUS	25.9	20.0	30.5	34.7	32.0	27.3	28.4	34.6	29.2	0.89	0.97
WA 6920	PENAWAWA	22.9	17.8	31.3	33.7	31.0	27.3	28.5	33.8	28.3	0.99	0.94
WB 926	WESTBRED 926	24.6	17.6	29.8	32.0	30.0	25.3	29.7	31.0	27.5	0.86	0.96
WB 936	WESTBRED 936	24.2	18.2	26.1	32.6	29.0	26.0	26.1	29.6	26.5	0.76	0.94
WBEXPRES	WESTBRED EXPRESS	24.0	16.6	26.0	29.7	30.0	23.7	24.8	30.7	25.7	0.83	0.95
*****	SITE MEAN *****	28.4	20.5	32.1	37.0	34.7	30.0	32.9	37.1	31.6	1.00	1.00

Table 5. 1997 GRAIN PROTEIN (%) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	HUNTLEY	HUNTLEY	CONRAD	KALISPELL	BOZEMAN	AVG	BYX	RSQ
		DRY	IRR	DRY	IRR	DRY	DRY						
BZ987331	MSFRS SELECTION	14.4	16.9	13.0	11.6	15.8	15.0	12.6	12.1	14.3	14.0	1.26	0.95
BZ992588	RAMBO/906R	14.8	15.8	14.4	13.8	15.5	14.0	13.1	12.7	13.9	14.2	0.63	0.72
BZ992632	FORTUNA/906R	13.9	16.3	13.4	12.7	13.8	14.4	11.6	11.5	12.9	13.4	0.93	0.75
CI 10003	THATCHER	15.1	15.4	12.5	12.2	15.9	14.4	12.1	11.2	13.2	13.6	1.14	0.86
CI 13596	FORTUNA	14.4	16.3	13.7	13.0	15.7	14.9	12.7	11.6	15.2	14.2	1.07	0.92
CI 17429	LEW	14.6	14.9	13.5	11.6	15.4	16.0	12.0	11.8	14.3	13.8	1.13	0.89
CI 17430	NEWANA	13.9	14.4	13.3	11.9	15.2	15.0	11.2	11.4	13.7	13.3	1.05	0.91
CI 17790	LEN	14.9	16.1	14.7	13.4	15.7	15.9	12.1	13.5	15.0	14.6	0.92	0.87
MT 9410	MT8808/MARBERG	14.3	15.8	12.8	12.1	15.4	14.9	12.3	12.4	14.7	13.8	1.04	0.97
MT 9433	MT8808/MARBERG	15.2	15.0	12.8	12.8	16.5	15.3	12.3	12.8	14.8	14.2	1.00	0.84
MT 9453	GLENMAN/AMIDON	14.8	15.1	13.7	12.8	15.2	15.7	13.0	13.1	15.4	14.3	0.77	0.86
MT 9507	PONDERA/FORTUNA//PONDERA	15.0	17.9	14.2	14.1	16.3	15.0	13.5	13.1	15.2	14.9	0.98	0.83
MT 9508	FORTUNA/PONDERA//PONDERA	14.6	18.0	14.2	14.1	16.0	14.8	13.2	13.6	15.2	14.9	0.91	0.75
MT 9513	FORTUNA/PONDERA//PONDERA	13.5	16.8	13.4	12.4	15.1	14.8	12.1	13.2	13.9	13.9	0.97	0.82
MT 9539	LEW/PONDERA//PONDERA	14.4	16.3	13.2	12.1	15.1	14.9	12.2	12.4	13.9	13.8	1.06	0.96
MT 9541	LEW/PONDERA//PONDERA	15.4	16.8	13.9	12.8	15.9	14.9	12.8	13.5	14.8	14.5	0.96	0.90
MT 9542	NORANA/FORTUNA//NORANA	13.0	14.6	12.4	11.8	14.2	13.8	11.7	11.2	12.9	12.8	0.84	0.96
MT 9553	PONDERA/FORTUNA//PONDERA	13.5	15.4	13.6	12.6	15.3	14.7	12.5	12.3	13.9	13.8	0.84	0.94
MT 9558	PONDERA/LEW//PONDERA	14.4	15.6	13.8	12.7	14.8	15.0	11.7	12.8	13.5	13.8	0.86	0.87
MT 9565	HI-LINE/PI372129//HI-LINE	15.0	16.5	13.7	12.2	15.5	15.1	12.4	11.9	13.7	14.0	1.14	0.93
MT 9602	FORTUNA/AMIDON	14.5	18.1	13.9	13.8	16.1	15.9	13.5	12.6	16.2	14.9	1.16	0.84
MT 9603	FORTUNA/AMIDON	14.7	15.1	13.3	13.8	15.7	15.4	12.7	12.2	15.6	14.3	0.87	0.81
MT 9607	FORTUNA/AMIDON	14.0	17.2	13.8	13.6	16.0	15.4	13.0	13.7	15.6	14.7	0.93	0.83
MT 9608	FORTUNA/AMIDON	14.6	16.7	13.5	13.5	15.6	15.8	13.3	13.2	15.8	14.7	0.93	0.90
MT 9609	FORTUNA/AMIDON	14.7	16.0	14.0	13.2	15.6	15.7	13.0	12.6	14.9	14.4	0.92	0.98
MT 9619	GRANDIN/FORTUNA	14.6	15.6	13.4	12.6	15.5	15.6	13.0	11.4	14.5	14.0	1.04	0.91
MT 9627	GRANDIN/LEW	13.8	14.5	13.0	12.4	14.4	15.1	12.0	13.9	13.8	13.7	0.60	0.64
MT 9628	GRANDIN/PONDERA	15.4	17.6	14.7	12.5	15.4	15.2	12.9	13.4	15.2	14.7	1.04	0.83
MT 9631	LEN/LEW	15.2	15.1	13.3	12.7	16.0	15.8	12.6	11.4	14.7	14.1	1.11	0.87
MT 9644	LEW/AMIDON	14.4	15.4	12.9	11.8	15.4	15.2	11.8	13.4	15.2	13.9	1.01	0.84
MT 9653	LEW/AMIDON	14.5	14.4	13.5	13.0	15.9	15.8	13.0	13.3	15.0	14.3	0.72	0.74
MT 9660	NEWANA/GRANDIN	14.9	16.2	13.9	12.6	15.6	15.9	12.3	12.4	15.2	14.3	1.13	0.97
MT 9662	NEWANA/REDWIN	14.2	14.6	12.1	10.5	15.3	14.5	10.5	10.2	14.5	12.9	1.47	0.93

(continued)

Table 5. 1997 GRAIN PROTEIN (%) SUMMARY FOR THE ADVANCED SPRING WHEAT NURSERY GROWN ACROSS MONTANA

ID	PEDIGREE	HAVRE	SIDNEY	SIDNEY	MOCCASIN	HUNTLEY	HUNTLEY	CONRAD	KALISPELL	BOZEMAN	AVG	BYX	RSQ
		DRY	IRR	IRR	DRY	IRR	DRY	DRY					
MT 9667	REDWIN/FORTUNA	14.6	15.8	13.8	13.1	16.2	16.0	12.8	13.5	14.4	14.5	0.89	0.91
MT 9668	REDWIN/FORTUNA	14.7	15.4	13.5	12.7	15.9	14.9	12.8	12.8	13.4	14.0	0.84	0.87
MT 9675	WINRIDGE/NEWANA	13.1	13.9	12.1	10.6	14.7	14.7	11.6	10.8	13.4	12.8	1.08	0.89
ND 606	AMIDON	13.6	14.4	12.9	13.1	15.6	14.8	12.5	12.8	15.3	13.9	0.72	0.72
ND 626	GRANDIN	14.3	16.0	14.2	13.3	16.2	15.7	12.5	13.1	15.2	14.5	0.95	0.93
ND 673	TRENTON	14.3	16.0	13.2	12.5	16.0	16.3	12.4	12.1	15.1	14.2	1.21	0.95
ND 677	ERNEST	15.3	16.3	13.6	13.0	16.4	15.3	12.9	13.6	15.0	14.6	0.96	0.93
PI483235	GLENMAN	13.9	14.7	12.5	11.8	14.8	15.0	12.2	11.4	13.8	13.3	0.98	0.94
PI549275	HI-LINE	14.5	17.1	14.1	12.8	16.2	14.2	12.7	13.1	14.1	14.3	0.98	0.81
PI574642	McNEAL	14.8	15.9	12.8	12.4	15.9	14.9	12.5	13.0	14.7	14.1	1.01	0.93
TR983239	FERGUS	15.2	16.4	13.8	12.9	16.0	15.2	12.6	12.0	14.5	14.3	1.12	0.97
WB 926	WESTBRED 926	14.9	16.8	14.7	12.7	16.0	16.0	12.9	12.8	14.8	14.6	1.09	0.95
WB 936	WESTBRED 936	15.0	16.9	13.9	12.1	16.6	15.8	12.3	11.3	14.9	14.3	1.46	0.98
WBEXPRES	WESTBRED EXPRESS	14.6	16.0	13.3	12.6	15.6	15.2	12.1	10.5	14.3	13.8	1.27	0.92
*****	SITE MEAN *****	14.5	15.9	13.5	12.6	15.6	15.2	12.5	12.4	14.5	14.1	1.00	1.00