

PROJECT TITLE: Long-Term Small Grain Variety Performance Evaluation Under Fallow Conditions Off-Station in Five Northern Montana Counties.

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OBJECTIVES:

Diverse cropping environments exist within that five-county area most closely served by this Research Center (Blaine, Chouteau, Hill, Liberty, and Phillips counties). Winter and spring wheat, barley, and oat production together in the five counties represents 28% of the 1994 statewide total (43% and 24% for winter and spring wheat alone, respectively). Producers are keenly interested in variety performance data generated under local conditions. It is our objective, within budget limitations, to evaluate small grain variety performance, over time, under conditions representative of specific areas of Northern Montana yet differing from those of the Research Center at Havre.

It is also our objective to develop and maintain databases which are not only specific to differing major crop environments, but which are further augmented by as much associated climatic and production management information as is practical and feasible to collect. Since 1982 we have recorded and reported supportive information of this nature along with the crop performance data for each investigation. However, a new standardized system was initiated in 1995 for better management and dissemination of such 'base data' in more detail than that provided previously.

RESULTS:

Data details for individual trials conducted from 1982-1994 were included in respective previous annual reports, but long-term yield and test weight data from the past ten years are presented in abridged form for summary purposes here. For winter and spring wheat, selected variety performance comparisons on the basis of gross dollar return for these off-station locations as well as the principal statewide trials conducted on-station at Havre are normally included in a separate report. However, a 1995 change in the MWBC report deadline from mid-January to mid-December has presented a problem in that year-end wheat market data is not available until approximately two weeks after reports are due.

1995 cropping environments ranged from good to excellent across North Central Montana. At Havre, total annual growing season precipitation (9/1/94 through 8/31/95) was 18.32 inches or 152 percent of the average for all years since 1916. April 1 through July 31 precipitation was 12.88 inches or 191 percent of the

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80-year average. However, heat units expressed as "Growing Degree Days" (GDD, base 50) were 93 percent of the average for the last 45 years (1951-1995). July-September, 1995 GDD values were 97 percent of normal, but 6.32 inches precipitation for the period provided for a somewhat difficult harvest. However, such cooler and wetter conditions beginning in June greatly increased grain yields and test weight. Only 29 percent of the days from July 1 through August 31 saw maximum temperatures above 86 degrees F. The last spring frost was 7 days late with the first fall frost right on target resulting in 121 frost free days - 7 days less than the 80-year average. September 1994 through March 1995 precipitation was 3.87 inches or 96 percent of the long-term average, but January and February precipitation was only 20 percent of normal. The April through July growing season was slightly cooler with average daily temperature at 56 degrees F or 2 degrees less than normal. Maximum summer temperature was recorded on August 6 at 94 degrees F. Minimum winter temperature was -19 degrees F on January 4. Crop outlook was initially weak with May drier than normal, but June and July brought rainfall at 265 percent of average affording many record yields and test weights throughout the area.

Off-station cropping environments were generally similar in 1995, but were slightly less favorable than that in the immediate Havre area. Most locations recorded excellent yields and test weights were enhanced for wheat and barley at all off-station locations except North Havre. Grain protein for even well-fertilized spring grains was generally lower than normal.

Plant height, yield, test weight, and protein data for the Myers and Peterson dryland winter wheat trials conducted in 1995 are summarized in Tables 1 and 3, respectively. Multi-year yield and test weight summaries for selected winter wheat entries at the Myers and Peterson locations are presented in Tables 2 and 4, respectively.

Stand percent, plant height, yield, test weight and protein data for the 1995 Cederberg, Myers, Peterson, and Graff dryland spring wheat trials are summarized in Tables 5, 7, 9, and 11, respectively. The Solberg location was lost to water ponding and 'Fargo' herbicide injury. The Cederberg location further features an identical trial under conditions of low fertility, but those comparisons are covered in a separate report under "Crop Fertility Investigations." Multi-year yield and test weight summaries for selected spring wheat entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 6, 8, 10, 12 and 13, respectively.

Stand percent, plant height, yield, test weight, plump/thin and protein data for the 1995 Cederberg, Myers, Peterson, Graff and Solberg spring barley trials are summarized in Tables 14, 16, 18, 20 and 22, respectively. 1995 barley stands at the Solberg location were adversely affected by pre-emergence crusting. The Cederberg location further features an identical trial under conditions of low fertility, but those comparisons are covered in a separate report under "Crop Fertility Investigations." Multi-year yield and test weight summaries for selected barley entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 15, 17, 19, 21, and 23, respectively.

SUMMARY:

Fourteen 1995 off-station variety performance trials were conducted on fallow at five locations in five Northern Montana counties.

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Dryland Winter Wheat Trials:

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|---------------------------------------|-----------------|------------|
| 1. Myers Farms, Inc., Chouteau County | (13W Big Sandy) | 13-28N-10E |
| 2. M & N Peterson Farm, Hill County | (30NW Havre) | 32-36N-13E |

Dryland Spring Wheat Trials:

- | | | |
|---------------------------------------|-----------------|------------|
| 1. *L. Cederberg Farm, Blaine County | (3NE Turner) | 13-36N-25E |
| 2. Myers Farms, Inc., Chouteau County | (13W Big Sandy) | 13-28N-10E |
| 3. M & N Peterson Farm, Hill County | (30NW Havre) | 32-36N-13E |
| 4. Graff Farms, Inc., Liberty County | (14NW Joplin) | 8-34N- 7E |
| 5. S. Solberg Farm, Phillips County | (11NE Dodson) | 36-32N-27E |

Dryland Spring Barley Trials:

- | | | |
|---------------------------------------|-----------------|------------|
| 1. *L. Cederberg Farm, Blaine County | (3NE Turner) | 13-36N-25E |
| 2. Myers Farms, Inc., Chouteau County | (13W Big Sandy) | 13-28N-10E |
| 3. M & N Peterson Farm, Hill County | (30NW Havre) | 32-36N-13E |
| 4. Graff Farms, Inc., Liberty County | (14NW Joplin) | 8-34N- 7E |
| 5. S. Solberg Farm, Phillips County | (11NE Dodson) | 36-32N-27E |

* Denotes location of paired trials (one fertilized and reported here, plus another under low fertility with comparisons discussed in a separate report under "Crop Fertility Investigations."

All trials were seeded in replicated, 3-row, 20-foot plots on a 12-inch row spacing utilizing a self-propelled cone seeder. Winter wheat trials (1981-1991) were planted with hoe openers fitted with 'Acra-Plant' or JD 3" shovels; and double-disk openers were used until 1987 for spring grains. From 1987-1991, all spring trials were planted with 'Acra-Plant' hoe openers. Beginning with spring planting of 1992 trials, all off-station trials were planted with modified 'Haybuster' openers. A randomized complete block design was standard for all trials with three replications. A 'Hege 125C' plot combine, funded in part by MWBC in 1984, was used to harvest each 3-row plot after end-trimming to 16'. Prior to 1984, sixteen feet of the center row for each plot was harvested with a 'Suzue' single-row binder and threshed with a 'Vogel' thresher. Some 1991 plots were harvested via the former binder/thresher method due to breakdown of the Hege plot combine. Other variables specific to each individual trial are listed in the data tables.

FUTURE PLANS:

It is planned, budget allowing, to continue off-station cereal variety investigations in the five-county area. This work has been strongly supported by producers in the area and by the Northern Ag Research Center Advisory Committee. Budgets aside, current workload has dictated that the number of replicated off-station trial locations be held to five; and data processed by the Center will be limited to trials where the Center performs all functions from planting to harvest. Packaged seed can likely again be provided to County Extension Agents as per their needs for non-replicated demonstrations at any additional locations. Such demonstrations will be for display and discussion use by the County Extension Agent; and performance data will not be collected or

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processed by the Research Center for any such demonstration plantings.

Efforts are continuing in the use of computer mapping to augment identification and selection of appropriate sites for off-station work. The Graff location in Liberty County was selected in this manner.

It is our current opinion that effort made to generate quality multi-year data at a few sites, carefully chosen to represent principal differences in average growing season conditions, is superior to an approach involving less concentrated work at greater numbers of locations. The concept of concentrating efforts at a single site representative of a vast area that yet differs from the Research Center has been on-going at the Peterson location in Northern Hill County. Additional winter hardiness studies and screening of F4 winter wheat populations (not reported here) has been on-going at the Peterson location under leadership of P.L. Bruckner, Bozeman in cooperation with Carlson at NARC.

TABLE 1. DRYLAND FALLOW WINTER WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI512302	BLIZZARD	34.58	70.83	61.07	13.50
S86-15	KESTREL	34.08	70.80	61.10	11.30
CI 17846	MANNING	32.26	63.90	59.87	12.60
PI564761	MT 8719	31.99	62.63	61.47	15.00
PI517194	TIBER	32.35	60.77	60.90	12.90
MT 7811	NUWEST (hard white)	34.42	58.80	60.93	13.00
MT 8039	JUDITH	30.67	58.33	59.43	12.30
RH78W296	BIGHORN	27.56	56.87	60.23	13.20
RDW(SEL)	AC READYMADE	32.99	56.70	60.83	13.70
C1 17727	WESTON	34.80	56.53	61.50	13.10
MTS92042	LEW/TBR//RDW (sawfly resistant)	32.78	56.17	59.90	14.40
PI478771	AGASSIZ	39.06	55.47	61.17	13.60
CI 17860	NEELEY	30.88	55.13	60.30	12.20
CI 17735	NORSTAR	38.27	53.23	61.23	11.20
CI 17902	WINRIDGE	34.37	52.93	59.40	12.10
QT 542	HYBRITECH 542	33.18	52.67	60.10	14.10
MTSF2238	VANGUARD (sawfly resistant)	32.30	51.10	59.90	14.00
CI 15075	CENTURK	31.69	47.43	60.03	12.60
CI 17940	ARCHER	26.64	47.03	59.03	12.90
CI 17844	REDWIN	34.44	46.20	60.87	13.90
MT 88046	PMNSMMT77003//HP344	29.06	45.77	59.80	14.60
CI 17879	ROCKY	31.94	45.33	59.90	12.30
PI518591	ARAPAHOE	29.82	43.97	58.87	14.60
CI 17952	HAWK	24.48	40.17	61.53	13.90
EXPERIMENTAL MEANS		32.27	54.53	60.39	13.21
C.V. 2: (S OF MEAN/MEAN)*100		3.29	6.21	.38	-
LSD (0.05)		3.02	9.64	.65	-

Note: Significant Ergot in Arapahoe.

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3851-WW Field: OffSta Design: RCB # Ents: 24 # Repts: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SW Section: 13 Twnshp: 28 N Range: 10 E Latitude: 48.18 N Longitude: 110.43 W Elevation: 2800 ft.

Seeding Date: 09/29/94 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.75 in. Moist Soil Depth @ Sd'g: in. Soil Temp @ Sd'g: F @ 1 in. 74.0F @ 2 in. 68.0F @ 4 in. Soil Texture: FSL Soil Series:
 Cropping System: X Fallow Recrop X Full-Till Reduced-Till No-Till # Tillages: 3 # Chem Apps: 0
 Cropping System Details: 1994 Fallow Season = 2x Tillage w/Sweeps & Harrows; 1x Tillage w/Sweeps, Harrows & Rods
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 55#N, 22#P2O5, 0#K2O/ac via NH3+11-52-0 inj'd in sep PP ops Fall94 Herbicide: None App'd, Hand Weeded
 Harvest Date: 08/31/95 Root Penetration Depth: in. Comments: Pre-Plant Soil Analysis was Pre-Fertilization

Depth	PRE-PLANT SOIL ANAL 09/08/94										POST-HVST SOIL ANAL 09/01/95 (Max Depth=48"										
	PAW	pH	OM	Lb/a	ppm	ppm	ppm	ppm	Soil	CEC	in.	PAW	pH	OM	Lb/a	ppm	ppm	ppm	ppm	Soil	CEC
0-6"	.63	6.1	0.9	32	17	292	10	VFSL+	14.5	.57	.39	6.1	1.4	4	20	350	15	VFSL	14.5		
6-24"	1.93			18			10	VFSL+		1.80	1.42			6				17	SCL		
24-36"	1.61			36				CL		1.42	1.22			4					CL		
36-48"	1.58			60				CL		1.14	1.10			12					CL		
TOTAL:	5.75			146						4.93	4.13			26							

Precipitation 09/08/94 to Sd'g: N/A in. (N/A in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: N/A in. & Stored Soil Sd'g to 04/26/95: N/A in. (N/A in events =>.1 in.) Measured Soil Water on 04/26/95: 4.93 in. Water Summary: 04/26/95 to Hvst: 14.00 in. (13.98 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 4.13 in. Stnd Grwg Seas (04/01/95 to 14 days prior to Harvest Maturity: 14.63 in.) (14.61 in events =>.1 in.) Post-Grwg Seas (14 days prior to Harvest Maturity to 08/31/95: 0.87 in.) (0.87 in events =>.1 in.) Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 14.56 in.)

TABLE 2. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1986-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	10-YR. COMPAR. OF AVERAGE NORSTAR YIELD	PERCENT OF NORSTAR YIELD			
		1991	1992	1993	1994	1995	1991	1992	1993	1994	1995						
		3/ 4/					4/								5/	6/	
NA 000X RAM (P+)	4	57.5	22.1	-	-	-	41.8	53.5	128.1	60.3	59.8	-	-	-	58.9	59.2	97.1
QT 542 QUANTUM 542 (P)	5	-	32.3	72.8	44.6	52.7	54.0	51.9	124.2	-	59.8	62.5	61.0	60.1	60.8	60.5	99.2
ID 279 BLIZZARD	4	53.2	27.7	65.0	-	70.8	54.2	50.1	120.1	61.4	61.1	63.5	-	61.1	61.8	60.9	99.9
CI 17846 MANNING	4	-	21.4	66.4	43.2	63.9	48.7	47.4	113.6	-	61.0	61.7	61.1	59.9	60.9	60.6	99.4
CI 17860 NEBLEY	8	55.4	29.2	71.0	42.5	55.1	47.0	47.2	113.0	61.3	59.5	62.8	60.5	60.3	60.9	60.8	99.7
PI517194 TIBER	9	44.7	25.2	69.0	39.1	60.8	44.6	44.6	106.9	61.5	60.6	63.4	61.3	60.9	61.3	61.3	100.5
MT 8039 JUDITH	9	45.4	23.7	63.7	41.0	58.3	43.9	43.9	105.2	61.0	59.2	61.3	57.6	59.4	59.5	59.5	97.6
ND 7687 AGASSIZ	6	46.0	22.5	57.0	39.2	55.5	43.8	43.6	104.5	61.9	59.8	62.7	60.2	61.2	61.0	61.2	100.5
CI 17902 WINRIDGE	9	49.5	20.7	65.6	39.9	52.9	43.2	43.2	103.5	60.7	60.4	62.0	59.9	59.4	60.2	60.2	98.7
NA 1316 ROCKY (P+)	9	50.5	24.3	71.1	43.8	45.3	43.2	43.2	103.3	62.6	59.8	62.8	61.8	59.9	61.1	61.1	100.2
MT 77063 CREE	7	56.1	27.6	60.5	-	-	41.8	42.8	102.5	62.0	60.7	63.2	-	-	61.4	61.2	100.4
NA 200 HAWK (P+)	9	47.9	24.0	64.3	44.0	40.2	42.7	42.7	102.1	61.9	60.5	62.4	63.1	61.5	61.3	61.3	100.6
NA 001 THUNDERBIRD (P+)	6	46.8	18.8	-	-	-	37.2	41.9	100.5	62.9	60.8	-	-	-	61.6	61.9	101.5
CI 17735 NORSTAR	9	45.8	18.3	63.2	37.0	53.2	41.8	41.8	100.0	61.5	60.7	63.9	59.3	61.2	61.0	61.0	100.0
CI 15075 CENTURK (+)	9	47.9	23.0	60.4	46.3	47.4	41.6	41.6	99.7	62.5	60.0	62.8	61.5	60.0	61.1	61.1	100.2
CI 8885 CHEYENNE	6	47.3	23.1	-	-	-	36.6	41.3	98.8	61.5	60.5	-	-	-	60.9	61.2	100.3
RH78W296 BIGHORN (P+)	7	-	23.0	65.8	41.2	56.9	44.2	40.8	97.6	-	60.2	62.8	60.2	60.2	60.9	60.7	99.5
CI 13670 WINALTA	7	46.1	22.4	59.2	-	-	39.6	40.5	97.1	62.6	60.4	63.6	-	-	61.5	61.3	100.6
CI 17940 ARCHER (P+)	6	-	22.5	61.7	43.7	47.0	37.5	40.3	96.5	-	58.8	61.7	60.5	59.0	59.8	59.8	98.0
CI 13190 WARRIOR	6	47.4	24.3	55.8	-	-	36.6	39.5	94.6	61.5	60.1	62.3	-	-	60.5	60.4	99.0
CI 17844 REDWIN	9	42.2	25.2	55.0	32.1	46.2	37.9	37.9	90.8	61.3	60.9	62.3	61.3	60.9	61.2	61.2	100.4
MT 7877 NORWIN	6	43.8	23.1	-	-	-	33.3	37.5	89.9	61.9	60.4	-	-	-	60.9	61.2	100.4
MEAN (ENTRIES LISTED)		48.5	23.8	63.7	41.3	53.8	-	43.5	-	61.7	60.2	62.7	60.7	60.3	-	60.8	-
7/ Growing Season Precip. (in.)		8.45	7.60	12.3	6.47	14.63	7.14										
8/ Soil PAW (in.) to 4 ft. @Sdg.		7.71	5.30	5.26	8.79	5.75	6.77										
Total Plant Avail. Water (in.)		16.16	12.90	17.56	15.26	20.38	13.91										
Fertilizer Applied (# N)		50.0	50.0	55.0	56.0	55.0											
(# P2O5)		21.0	24.0	22.0	22.0	22.0											
(# K2O)		0.0	0.0	0.0	0.0	0.0											
(# S)		0.0	0.0	0.0	0.0	0.0											

Check variety is Norstar.

1/ See MCES Bulletin 1098 for the evaluation of other important variety performance characteristics to include protein, quality, winter hardiness, disease resistance, etc. before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Only the most recent five years are shown, but summary calculations include all years noted. The 1989 nursery was lost due to winter injury.

4/ The 1991 crop suffered minor hail damage on two occasions (5/20 & 7/13).

5/ 10-yr. CA = (x/y) * z where x = average yield and test weight of the entry for years tested, y = average yield and test weight of Norstar for the same years, and z = 10-yr. average yield and test weight for the check variety Norstar.

6/ Percent of Norstar yield and test weight for the same data years as those in which the entry was tested.

7/ April 1 to 14 days prior to harvest maturity.

8/ Depth of moist soil (ft.) * 2.00 in.PAW/ft except starting in 1987 where soil PAW values are actual gravimetric measurements.

TABLE 3. DRYLAND FALLOW WINTER WHEAT VARIETY PERFORMANCE NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
S86-15	KESTREL	29.33	51.00	55.80	10.70
PI564761	MT 8719	23.48	46.20	56.93	13.70
CI 17860	NEELEY	26.94	46.03	56.17	13.20
MT 7811	NUWEST (hard white)	26.97	44.60	57.40	12.60
RDW(SEL)	AC READYMADE	26.51	44.40	57.67	13.20
PI512302	BLIZZARD	26.80	44.07	55.90	13.50
PI517194	TIBER	28.24	41.17	56.77	13.70
CI 17902	WINRIDGE	25.98	40.73	54.60	12.50
MT 88046	PMNSMMT77003//HP344	23.91	40.73	57.00	13.70
MTS92042	LEW/TBR//RDW (sawfly resistant)	26.56	40.20	55.87	13.60
QT 542	HYBRITECH 542	25.62	39.13	56.03	13.80
CI 17844	REDWIN	27.77	38.87	58.07	13.50
CI 17879	ROCKY	24.68	38.70	56.10	12.30
RH78W296	BIGHORN	21.92	38.67	55.40	12.10
MTSF2238	VANGUARD (sawfly resistant)	24.45	37.30	55.07	13.60
PI518591	ARAPAHOE	27.62	36.90	55.37	12.70
CI 17940	ARCHER	20.29	36.00	53.33	12.60
CI 17735	NORSTAR	32.85	35.83	56.60	13.10
MT 8039	JUDITH	24.44	35.23	53.93	13.10
CI 17846	MANNING	22.78	33.80	53.53	13.20
CI 15075	CENTURK	25.70	32.37	54.87	12.60
CI 17952	HAWK	19.40	32.03	56.70	13.10
CI 17727	WESTON	26.86	31.13	56.70	13.10
PI478771	AGASSIZ	32.44	30.57	58.23	12.90
EXPERIMENTAL MEANS		25.90	38.99	56.00	13.00
C.V. 2: (S OF MEAN/MEAN)*100		4.51	8.71	.75	-
LSD (0.05)		3.33	9.67	1.20	-

Note: Seedbed was quite hard at planting, moderate stand reduction seen due to winter injury, slight herbicide injury noted, and plots were moderately weedy due to abnormally wet growing season. Plots were harvested well beyond maturity with 'Agassiz' showing substantial shatter as a result. 'Kestrel' and 'Norstar' kernels were notably yellow although Norstar protein wasn't actually low.

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3852-WW Field: OffSta Design: RCB # Ents: 24 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft.
Qtr: NENE Section: 32 Twshp: 36 N Range: 13 E Latitude: 48.83 N Longitude: 110.03 W Elevation: 2800 ft.

Seeding Date: 09/30/94 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 4.00 in. Moist Soil Depth @ Sd'g: in.
Soil Temp @ Sd'g: F @ 1 in. 67.0F @ 2 in. 62.0F @ 4 in. Soil Texture: LCL Soil Series: Telstad Loam
Cropping System: X Fallow Recrop Full-Till X Reduced-Till No-Till # Tillages: 1 # Chem Apps: 2
Cropping System Details: 2 Chemical Fallow Apps Spring 94 + 1 Tillage/Liquid Fert Injection Summer 94
Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow
Fertilizer: 30#N,15#P2O5, 7#K2O/ac via liquid injection 07/05/94 Herbicide: 'Express'+LV6 @ .25oz+.75pt/ac
Harvest Date: 09/12/95 Root Penetration Depth: 40 in. Comments: Pre-Plant Soil Analysis was Post-Fertilization

Depth in.	PRE-PLANT SOIL ANAL 09/06/94							Max Depth=48" Soil CEC	04/26/95							POST-HVST SOIL ANAL 09/12/95 (Max Depth=48" Soil CEC			
	PAW	pH	OM	NO3	P	K	S		Text	Txt	PAW	PAW	pH	OM	NO3		P	K	S
0 -6"	.53	7.2	0.9	24	17	272	14	VFSL+	14.5	.55	.63	6.1	1.2	6	23	316	15	SCL	11.7
6-24"	2.74			42			35	CL-		1.72	1.46			18			18	CL	
24-36"	1.71			60				CL		.85	.73			8				CL	
36-48"	1.60			20				SCL		1.04	1.10			12				CL	
TOTAL:	6.58			146						4.16	3.92			44					

Precipitation & Stored Soil Sd'g to 04/26/95: 0.15 in. (0.00 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 6.73 in.
Water Summary: Sd'g to 04/26/95: 2.93 in. (2.59 in events =>.1 in.) Measured Soil Water on 04/26/95: 4.16 in.
04/26/95 to Hvst: 12.52 in. (12.13 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 3.92 in.
Std Grwg Seas (04/01/95 to 14 days prior to Harvest Maturity: 10.86 in.) (10.33 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/12/95: 2.53 in.) (2.53 in events =>.1 in.)
Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 11.11 in.)

TABLE 4. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW WINTER WHEAT NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1986-1995.

2/VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
							AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD	PERCENT OF NORSTAR YIELD						AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD	PERCENT OF NORSTAR YIELD
		1991	1992	1993	1994	1995	6/	7/	1991	1992	1993	1994	1995	6/	7/		
3/	4/	5/						4/									
MT 7811 NUWEST (hrd white)	4	54.6	-	-	51.9	44.6	48.8	45.4	116.3	56.9	-	-	59.7	57.4	57.9	59.2	98.8
CI 17860 NEELEY	7	59.6	26.0	64.2	50.4	46.0	43.2	44.2	113.3	57.2	60.3	62.2	60.1	56.2	59.2	59.2	99.0
QT 542 QUANTUM 542 (P)	5	-	24.9	59.0	56.6	39.1	45.0	43.5	111.3	-	59.5	62.4	60.5	56.0	59.1	59.0	98.5
S86-15 KESTREL	3	-	-	56.2	48.6	51.0	51.9	43.2	110.8	-	-	62.0	57.3	55.8	58.3	58.4	97.5
ID 279 BLIZZARD	4	44.7	24.9	58.2	-	44.1	43.0	41.6	106.5	58.1	61.2	62.4	-	55.9	59.4	59.7	99.7
CI 17592 HAWK (P+)	6	59.3	22.3	51.8	46.8	32.0	43.5	41.1	105.3	56.1	60.1	61.8	63.2	56.7	59.4	59.6	99.6
PI517194 TIBER	7	46.2	23.4	61.6	46.4	41.2	39.6	40.6	103.9	57.7	60.7	62.7	60.9	56.8	59.9	59.9	100.0
MT 8039 JUDITH	7	50.0	18.3	60.9	47.1	35.2	39.5	40.4	103.5	54.7	59.2	61.4	57.3	53.9	57.6	57.6	96.2
CI 17879 ROCKY (P+)	7	51.1	19.6	56.4	48.6	38.7	39.0	39.9	102.3	59.2	59.6	61.9	61.2	56.1	59.7	59.7	99.7
CI 17940 ARCHER (P+)	4	-	23.5	51.0	51.2	36.0	40.4	39.3	100.8	-	59.0	60.8	61.2	53.3	58.6	58.5	97.7
CI 17735 NORSTAR	7	45.7	19.8	60.1	44.8	35.8	38.1	39.0	100.0	58.2	60.3	63.3	59.6	56.6	59.9	59.9	100.0
RH78W296 BIGHORN (P+)	5	-	20.3	57.7	47.6	38.7	40.3	38.9	99.6	-	58.7	62.4	60.7	55.4	59.0	58.9	98.3
CI 15075 CENTURK (+)	7	50.3	20.4	55.3	49.6	32.4	38.0	38.9	99.6	58.3	60.6	61.8	61.7	54.9	59.6	59.6	99.5
CI 13190 WARRIOR	4	54.5	23.0	47.6	-	-	35.9	38.7	99.1	57.2	60.4	62.2	-	60.1	59.3	59.0	99.0
CI 16844 REDWIN	7	47.3	23.5	52.5	47.9	38.9	37.8	38.7	99.0	58.6	60.6	62.3	60.4	58.1	60.2	60.2	100.5
CI 13670 WINALTA	5	58.3	17.8	52.0	-	-	36.8	38.6	98.8	59.2	60.3	63.4	-	60.8	60.1	100.4	100.4
PI491532 CREB	5	48.1	22.2	55.3	-	-	36.7	38.4	98.5	58.5	61.0	62.5	-	60.6	59.9	100.0	100.0
CI 17092 WINRIDGE	7	42.3	23.7	58.2	45.3	40.7	37.4	38.3	98.1	55.0	60.4	61.0	58.5	54.6	58.0	58.0	96.9
CI 17846 MANNING	4	-	20.9	53.9	44.9	33.8	38.4	37.3	95.6	-	60.6	61.3	60.5	53.5	59.0	58.9	98.3
PI478771 AGASSIZ	5	46.8	20.9	52.5	44.5	30.6	39.1	37.0	94.9	57.2	60.5	62.4	60.6	58.2	59.8	60.0	100.3
CI 17727 WESTON	4	-	20.5	49.3	44.4	31.1	36.3	35.4	90.6	-	61.7	62.9	61.6	56.7	60.7	60.6	101.3
MEAN (ENTRIES LISTED)		50.6	21.9	55.7	48.0	38.3		39.9		57.5	60.2	62.2	60.3	55.9		59.3	
8/ Growing Season Precip. (in.)		8.84	4.16	12.05	6.09	10.86	7.24										
9/ Soil PAW (in.) to 4 ft. @Sdg		5.41	6.63	4.78	7.84	6.73	7.23										
Total Plant Avail. Water (in.)		14.25	10.79	16.83	13.93	17.59	14.47										
Fertilizer Applied (#N)		65.0	42.0	70.5	40.0	30.0											
(#P205)		25.0	25.0	25.0	30.0	15.0											
(#K20)		10.0	10.0	10.0	0.0	7.0											
(# S)		0.0	0.0	0.0	0.0	0.0											

Check variety is Norstar.

- 1/ See MCES Bulletin 1098 for the evaluation of other important variety performance characteristics to include protein, winter hardness, disease resistance, etc., before making variety selection decisions
- 2/ P = Private variety, + = Protected variety
- 3/ 1986 + 1987 Nurseries were not planted because it was too wet to get into the field. The 1989 nursery was lost due to winter injury.
- 4/ The 1991 crop suffered substantial hail damage.
- 5/ The 1992 nursery suffered hail damage on 7/14. Values listed above are actual harvest yields and do not contain any adjustments for hail damage.
- 6/ 10-yr. CA = (x/y)*z where x = average yield and test weight of the entry for the years tested, y = average yield and test weight of Norstar for the same years, and z = 10-yr. average yield and test weight for the check variety Norstar.
- 7/ Percent of Norstar yield and test weight for the same data years as those in which the entry was tested.
- 8/ April 1 to 14 days prior to harvest maturity.
- 9/ Depth of moist soil (ft.) * 2.00 PAW/ft except starting in 1987 where soil PAW values are actual gravimetric measurements.

Hr
GRC
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TABLE 5. PERFORMANCE OF FERTILIZED SPRING WHEAT VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT Inches	HT Bu/Ac	YIELD Lbs/Bu	TEST WT Lbs/Bu	PROTEIN %
BZ684-23	VANNA (soft white)	93.40	30.41	61.70	57.80	10.17	
WB 936	WESTBRED 936	83.33	28.32	57.93	58.33	12.30	
PI574642	MCNEAL	90.63	33.40	57.57	59.87	12.53	
PI549275	HI-LINE	92.70	29.29	57.20	59.83	12.03	
PI483235	GLENMAN	96.53	31.27	56.77	58.57	11.33	
WBEXPRES	WESTBRED EXPRESS	91.33	26.10	56.43	59.60	12.43	
CI 17828	PONDERA	85.40	31.42	55.97	60.03	12.33	
CI 17430	NEWANA	93.43	29.82	55.80	59.53	11.23	
WB 926	WESTBRED 926	92.03	29.07	54.30	57.77	12.23	
PNR 2375	PIONEER 2375	95.50	35.49	54.03	59.97	11.63	
ND 677	ERNEST	95.50	37.49	52.37	59.73	11.87	
ND 606	AMIDON	94.10	39.79	52.10	59.57	11.60	
TR983239	FERGUS	92.70	30.49	50.83	58.97	12.70	
CI 17790	LEN	95.83	29.95	50.27	58.20	12.63	
MT 9360	LEW/PND	94.77	33.33	49.67	60.23	11.87	
BZ984326	BORDER	94.10	30.91	49.67	58.33	12.63	
ND 626	GRANDIN	82.30	32.89	49.50	57.77	13.63	
C982-324	RAMBO	93.73	29.42	49.27	59.80	12.03	
ND 582	STOA	95.47	38.61	47.57	58.03	12.53	
MTHW9406	MT8182/KLASIC (hard white)	98.27	32.36	47.30	57.47	12.17	
MT 9354	MT7810/(SU73/LEW)	96.87	33.96	44.77	59.33	12.50	
CI 13596	FORTUNA	96.90	39.89	42.73	60.47	12.33	
CI 17429	LEW	96.53	40.68	40.03	60.87	11.63	
EXPERIMENTAL MEANS		93.10	32.80	51.90	59.13	12.10	
C.V. 2: (S OF MEAN/MEAN)*100		2.28	1.95	3.70	.53	2.72	
LSD (0.05)		6.05	1.82	5.48	.89	.94	

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-9951-SW Field: OffSta Design: RCB # Ents: 23 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SE Section: 13 Twnshp: 36 N Range: 25 E Latitude: 48.88 N Longitude: 108.38 W Elevation: 2900 ft.

Seeding Date: 05/11/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 55.0+ in. Soil Temp @ Sd'g: F @ 1 in. 66.0F @ 2 in. 59.0F @ 4 in. Soil Texture: SCL Soil Series:
 Cropping System: X Fallow Recrop X Pull-Till Reduced-Till No-Till # Tillages: 4 # Chem Apps: 0
 Cropping System Details: 1994 Fallow Season = 3x Tillage w/Sweeps & Harrows, 1x Tillage w/Sweeps, Rods & Harrows
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Spring Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 66#N,33#P2O5, 0#K2O/ac via gran.blend bnd'd 1.5" below seed Herbicide: 'BanvelSGP'+LV6 @4.26+6.4oz/ac
 Harvest Date: 09/13/95 Root Penetration Depth: 43 in. Comments: Pre-Plant Soil Analysis was Pre-Fertilization

Depth	PRE-PLANT SOIL ANAL 04/27/95										Max Depth=48"	POST-HVST SOIL ANAL 09/13/95									
	in.	PAW	pH	OM	Nb/a	ppm	ppm	ppm	ppm	ppm		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0-6"	.75	6.5	1.0	10	10	192	7	SCL	21.7												
6-24"	1.51			24			13	SCL			1.13										15
24-36"	1.18			8				SCL			.68										CL+
36-48"	1.23			12				CL			.97										CL+
TOTAL:	4.67			54							3.26										24

Precipitation 04/27/95 to Sd'g: 0.42 in. (0.30 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.09 in. & Stored Soil 05/11/95 to Hvst: 9.55 in. (8.95 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 3.26 in.
 Water Summary: Growing Season (05/11/95 to 14 days prior to Harvest Maturity: 8.71 in.) (8.17 in events =>.1 in.)
 Post-Grwg Seas (14 days prior to Harvest Maturity to 09/13/95: 0.84 in.) (0.78 in events =>.1 in.)
 Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 10.54 in.)

TABLE 6. NINE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION ON A 'TELSTAD' SOIL AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1987-1995.

2/ VARIETY OR SELECTION TESTED	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	9-YR. COMPAR. YIELD	PERCENT OF FORTUNA YIELD	1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	9-YR. COMPAR. TEST WT	PERCENT OF FORTUNA TEST WT
PI483235 GLENMAN	9	47.5	57.3	52.6	37.5	56.8	40.9	40.9	130.7	56.8	57.6	57.7	57.7	58.6	58.5	58.5	97.8
WA 6920 PENAWANA (sfwh)	6	44.2	58.7	67.6	34.4	-	43.0	39.7	126.6	56.6	58.5	58.4	57.2	-	58.0	58.2	97.4
PI574642 McNEAL	4	-	53.8	54.2	30.3	57.6	49.0	39.7	126.6	-	58.7	59.4	57.1	59.9	58.8	58.8	98.3
CI 17904 OWENS(sft wht)	8	41.2	53.9	62.6	36.5	-	37.5	39.2	125.2	54.2	56.3	58.2	57.2	-	58.4	58.4	97.8
CI 17430 NEWANA	9	47.4	55.2	52.3	36.3	55.8	38.2	38.2	121.9	57.6	59.3	58.8	58.6	59.5	59.4	59.4	99.3
ND 606 AMIDON	7	45.7	54.1	54.8	32.3	52.1	41.9	37.3	118.9	57.7	59.1	58.4	58.5	59.6	58.7	58.7	98.3
ND 626 GRANDIN	6	40.1	55.7	48.5	34.6	49.5	42.8	36.4	116.2	57.7	59.7	58.6	58.8	57.8	58.7	59.0	98.7
WPB 926R WSTBRD926 (P+)	6	47.5	51.0	48.9	35.6	54.3	42.8	36.4	116.1	56.3	58.6	58.8	57.8	57.8	58.1	58.4	97.7
CI 17790 LEN	9	44.1	46.4	46.0	31.7	50.3	35.6	35.6	113.6	56.6	59.3	59.3	57.5	58.2	58.7	58.7	98.2
CI 17828 PONDERA	9	45.8	47.6	46.2	36.4	56.0	35.5	35.5	113.4	57.8	60.6	59.5	58.9	60.0	59.6	59.6	99.7
PI549275 HI-LINE	8	40.7	49.8	47.9	30.6	57.2	36.8	35.3	112.6	55.3	58.8	58.6	57.3	59.8	58.7	58.6	98.0
ND 582 STOA	9	39.3	50.3	48.2	33.9	47.6	35.1	35.1	111.9	56.3	58.1	57.9	57.7	58.0	58.7	58.7	98.1
ND 618 GUS	4	39.7	50.6	44.7	-	-	40.5	34.9	111.3	57.6	58.8	58.1	-	-	58.5	59.2	99.1
PI486139 KLASIC (P+) hw	3	-	45.9	39.8	37.7	-	41.1	34.5	110.1	-	58.8	56.2	57.5	-	57.5	57.7	96.6
C982-324 RAMBO (P+)	9	39.3	48.0	49.7	34.2	49.3	34.4	34.4	109.9	56.9	58.7	59.8	59.7	59.8	59.8	59.8	100.1
CI 17910 ALEX	4	-	-	-	-	-	23.2	34.4	109.9	-	-	-	-	-	60.6	60.5	101.2
CI 17429 LEW	9	42.5	46.0	45.9	31.5	40.0	34.4	34.4	109.7	59.3	60.9	59.5	59.6	60.9	60.4	60.4	101.0
CI 15930 OLAF	7	44.4	48.0	41.8	-	-	31.1	33.0	105.3	56.2	58.2	57.9	-	-	58.6	58.7	98.3
CANLANC LANCER	7	37.3	43.8	41.1	28.3	-	31.9	32.1	102.3	58.4	59.4	59.0	59.2	-	59.5	59.4	99.3
CI 17920 MARSHALL	3	-	-	-	-	-	20.4	31.6	100.7	-	-	-	-	-	59.9	59.3	99.2
CI 13596 FORTUNA	9	42.7	42.3	37.1	32.8	42.7	31.3	31.3	100.0	59.5	60.4	58.1	60.1	60.5	59.8	59.8	100.0
NDCUT CUTLESS	8	37.7	44.5	40.1	29.5	-	28.5	29.9	95.4	57.4	58.1	58.2	60.1	-	59.0	59.1	98.8
WPB 906R WSTBRD906 (P+)	3	-	-	-	-	-	18.9	27.9	88.9	-	-	-	-	-	60.2	59.6	99.8
MEAN (ENTRIES LISTED)		42.6	50.2	48.5	33.6	51.5		35.1		57.1	58.9	58.5	58.4	59.3		59.1	
6/ Growing Season Precip. (in.)		10.32	7.77	9.60	3.93	8.71	7.48										
7/ Soil PAW (in.) to SD @Plntng.		6.56	5.52	7.24	6.84	5.09	6.51										
Total Plant Avail. Water (in.)		16.88	13.29	16.84	10.77	13.80	13.99										
Soil NO3 (lbs.) to SD @Plntng.		100.0	112.0	52.0	28.0	54.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	70.0	62.0	66.0	66.0											
(# P2O5)		40.0	40.0	35.0	33.0	33.0											

Check variety is Fortuna.

1/ See MCES Bulletin 1093 for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Only the five most recent years shown, but all years used in summary calculations.

4/ 9-yr. CA = (x/y) * z where x = average yield or test weight of the entry for years tested, y = average yield or test weight for Fortuna for the same years, and z = 9-yr. average yield or test weight for the check variety Fortuna.

5/ Percent of Fortuna yield or test weight for the same data years as those in which the entry was tested.

6/ Seeding to 14 days prior to harvest maturity.

7/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

TABLE 7. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT Inches	HT Inches	YIELD Bu/Ac	TEST Lbs/Bu	WT	PROTEIN %
BZ684-23	VANNA (soft white)	100.00	31.43	59.97	58.97	11.60		
PI549275	HI-LINE	100.00	31.22	57.83	61.00	13.30		
WBEXPRES	WESTBRED EXPRESS	99.30	27.57	57.20	60.60	13.40		
PI574642	McNEAL	100.00	34.12	56.70	60.97	14.40		
ND 606	AMIDON	100.00	39.61	56.23	60.77	13.90		
CI 17430	NEWANA	100.00	30.43	55.83	60.17	13.20		
WB 926	WESTBRED 926	99.67	31.92	54.60	60.37	13.60		
BZ984326	BORDER	99.67	32.65	54.43	61.27	14.20		
C982-324	RAMBO	99.67	30.38	54.13	60.57	12.70		
WB 936	WESTBRED 936	98.97	29.06	53.73	58.83	14.20		
TR983239	FERGUS	99.67	31.80	53.47	61.00	13.70		
PI483235	GLENMAN	100.00	32.10	52.90	59.10	13.50		
ND 626	GRANDIN	99.33	31.93	52.30	61.13	14.30		
ND 677	ERNEST	100.00	36.43	51.83	61.53	14.70		
PNR 2375	PIONEER 2375	99.67	35.67	51.47	62.07	13.60		
CI 17790	LEN	99.67	30.72	49.23	59.33	14.20		
CI 17828	PONDERA	100.00	30.93	48.87	61.57	13.50		
ND 582	STOA	100.00	37.51	48.43	59.53	14.00		
MTHW9406	MT8182/KLASIC (hard white)	100.00	31.36	46.20	59.83	12.90		
MT 9354	MT7810/(SU73/LEW)	99.67	32.44	44.07	60.80	14.00		
CI 17429	LEW	100.00	37.89	43.43	62.40	14.30		
MT 9360	LEW/PND	100.00	31.36	42.07	60.47	14.00		
CI 13596	FORTUNA	99.30	38.16	39.40	61.63	14.20		
EXPERIMENTAL MEANS		99.76	32.90	51.49	60.60	13.71		
C.V. 2: (S OF MEAN/MEAN)*100		.32	2.62	3.53	.69	-		
LSD (0.05)		.90	2.46	5.18	1.19	-		

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-9952-SW Field: OffSta Design: RCB # Ents: 23 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SW Section: 13 Twnshp: 28 N Range: 10 E Latitude: 48.18 N Longitude: 110.43 W Elevation: 2800 ft.

Seeding Date: 05/05/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 32.0 in. Soil Temp @ Sd'g: . F @ 1 in. 64.0F @ 2 in. 62.0F @ 4 in. Soil Texture: FSL Soil Series:
 Cropping System: X Fallow Recrop X Full-Till Reduced-Till No-Till # Tillages: 3 # Chem Apps: 0
 Cropping System Details: 1994 Fallow Season = 2x Tillage w/Sweeps & Harrows; 1x Tillage w/Sweeps, Harrows & Rods
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 55#N, 22#P2O5, 0#K2O/ac via NH3+11-52-0 inj'd in sep PP ops Fall94 Herbicide: 'Bronate' @ 1.5 pts/ac
 Harvest Date: 09/01/95 Root Penetration Depth: in. Comments: Pre-Plant Soil Analysis was Post-Fertilization

Depth	PRE-PLANT SOIL ANAL 04/26/95	Max Depth=48"	POST-HVST SOIL ANAL 09/01/95	(Max Depth=48"
in.	PAW pH OM % Lb/a ppm ppm ppm Soil CEC	in.	PAW pH OM % Lb/a ppm ppm ppm ppm Soil CEC	in.
0-6"	.59 6.1 1.0 36 16 378 9 VFSL 14.5		.41 6.3 1.3 8 19 341 7 VFSL 14.5	
6-24"	1.68 66 10 VFSL		1.07 6 14 SCL-	
24-36"	1.42 40 CL-		.85 12 CL	
36-48"	1.34 36 CL-		1.13 48 CL	
TOTAL:	5.03 178		3.46 74	

Precipitation 04/26/95 to Sd'g: 0.40 in. (0.40 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.43 in. & Stored Soil 05/05/95 to Hvst: 13.60 in. (13.58 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 3.46 in.
 Water Summary: Growing Season (05/05/95 to 14 days prior to Harvest Maturity: 12.73 in.) (12.73 in events =>.1 in.) Post-Grw Seas (14 days prior to Harvest Maturity to 09/01/95: 0.87 in.) (0.87 in events =>.1 in.)
 Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 14.70 in.)

TABLE 8. EIGHT-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1988-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		AVERAGE FOR YEARS TESTED					8-YR COMPAR. OF FORTUNA			AVERAGE FOR YEARS TESTED					8-YR COMPAR. OF FORTUNA		
		1991	1992	1993	1994	1995	TESTED	YIELD	PERCENT	1991	1992	1993	1994	1995	TESTED	TEST WT.	TEST WT.
3/	4/		3/			5/	6/	3/	4/		3/			5/	6/		
ND 618 GUS	3	36.4	-	54.9	-	-	41.0	39.8	131.6	55.1	-	56.5	-	-	55.9	57.7	99.2
CI 17910 ALEX	3	-	-	-	-	-	27.9	39.6	131.0	-	-	-	-	-	58.5	59.2	101.8
CI 17904 OWENS (SFT WHT)	6	32.5	-	60.7	33.1	-	37.1	39.1	129.2	53.9	-	55.8	55.1	-	56.3	56.9	97.8
WA 6920 PENAWAWA (SFT WHT)	5	32.8	-	66.5	35.3	-	43.0	39.0	128.7	52.2	-	55.7	55.3	-	54.3	55.3	95.1
PI574642 MCNEAL	3	-	-	59.2	35.2	56.7	50.4	38.9	128.6	-	-	57.1	55.6	61.0	57.9	56.6	97.3
ND 606 AMIDON	6	36.5	-	56.1	32.6	56.2	43.2	38.0	125.7	54.8	-	55.0	57.1	60.8	56.6	57.0	98.0
WPB 926R WESTBRED 926 (P+)	5	31.7	-	52.6	36.6	54.6	41.3	37.8	125.0	55.8	-	56.3	55.8	60.4	56.9	57.0	98.0
PI549275 HI-LINE	7	30.7	-	55.4	34.0	57.8	37.4	37.4	123.5	54.2	-	56.4	54.4	61.0	57.5	57.5	98.8
ND 626 GRANDIN	5	29.1	-	58.5	34.0	52.3	40.3	36.9	121.9	54.0	-	56.6	55.0	61.1	56.8	56.9	97.8
WPB 906R WESTBRED 906 (P+)	3	-	-	-	-	-	25.7	36.4	120.4	-	-	-	-	-	57.6	58.3	100.1
ND 582 STOA	7	36.2	-	57.6	30.1	48.4	36.3	36.3	119.8	54.5	-	56.4	55.6	59.5	56.8	56.8	97.7
CI 17828 PONDERA	7	33.7	-	50.8	32.2	48.9	34.1	34.1	112.8	56.7	-	56.8	57.5	61.6	58.4	58.4	100.3
CI 17430 NEWANA	7	26.1	-	53.6	34.6	55.8	34.0	34.0	112.4	53.0	-	56.1	56.2	60.2	57.3	57.3	98.5
PI483235 GLENMAN	7	25.8	-	52.4	33.7	52.9	33.9	33.9	112.1	53.1	-	56.2	55.6	59.1	56.5	56.5	97.1
C982-324 RAMBO (P+)	7	28.4	-	46.5	29.6	54.1	33.8	33.8	111.7	53.1	-	57.4	57.6	60.6	57.4	57.4	98.7
CI 15930 OLAF	5	29.6	-	45.2	-	-	30.6	33.0	109.1	52.9	-	56.6	-	-	56.0	57.0	97.9
CI 17790 LEN	7	31.3	-	44.5	29.7	49.2	31.8	31.8	105.1	54.7	-	55.3	55.1	59.3	56.7	56.7	97.5
CI 17429 LEW	7	27.3	-	47.8	30.9	43.4	31.7	31.7	104.8	55.9	-	58.3	57.2	62.4	58.3	58.3	100.2
ND CUT CUTLESS	6	28.2	-	43.7	30.7	-	29.1	30.7	101.4	55.7	-	54.2	56.4	-	56.6	57.1	98.2
CI 13596 FORTUNA	7	30.4	-	45.7	32.4	39.4	30.3	30.3	100.0	56.2	-	57.5	59.5	61.6	58.2	58.2	100.0
CANLANC LANCER	6	25.4	-	41.6	30.2	-	27.5	29.0	95.8	55.7	-	56.4	58.2	-	57.3	57.8	99.4
MEANS (ENTRIES LISTED)		30.7	-	52.3	32.6	51.5		35.3		54.5	-	56.3	56.3	60.7		57.3	
7/Growing Season Precip. (in.)		8.45	8.25	13.95	5.87	12.73	8.55										
8/ Soil PAW (in.) to SD at @plant		8.47	6.14	6.29	7.94	5.43	7.14										
Total Plant Avail. Water (in.)		16.92	14.39	20.24	13.81	18.16	15.69										
Soil NO3 (lbs.) to SD @Plant.		128.0	200.0	158.0	260.0	178.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		50.0	50.0	50.0	56.0	55.0											
(#P2O5)		21.0	24.0	22.0	22.0	22.0											
(#K2O)		0.0	0.0	0.0	0.0	0.0											

Check variety is Fortuna.

1/ See MCES Bulletin 1093 for evaluation of other important variety performance characteristics to include protien, quality,disease resistance,etc., before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Crop suffered minor hail damage.

4/ 1992 nursery was lost due to poor stand establishment because of spring drought.

5/ 8-yr. CA = (x/y)* z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Fortuna for the same years, and z = 8-yr. average of yield or test weight for the check variety Fortuna.

6/ Percent of Fortuna yield or test weight for the same data years as those in which the entry was tested.

7/ Seeding to 14 days prior to harvest maturity.

8/ Soil PAW values are actual gravimetric measurements.

TABLE 9. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI574642	MCNEAL	97.57	30.31	53.07	57.87	12.80
BZ684-23	VANNA (soft white)	98.63	29.17	51.00	53.40	11.00
CI 17430	NEWANA	99.67	29.16	49.80	57.00	12.50
WB 936	WESTBRED 936	93.77	26.04	48.43	56.13	13.20
ND 677	ERNEST	98.27	33.06	47.80	57.40	12.90
PNR 2375	PIONEER 2375	98.97	33.20	46.60	57.53	12.40
PI483235	GLENMAN	99.67	31.21	46.50	55.93	11.60
CI 17828	PONDERA	99.67	29.42	46.40	58.33	12.40
PI549275	HI-LINE	98.27	28.04	45.23	56.27	13.20
CI 17429	LEW	100.00	37.44	45.03	59.03	12.10
ND 606	AMIDON	99.33	33.75	44.83	56.87	12.30
ND 626	GRANDIN	99.33	30.37	43.63	56.27	12.00
WB 926	WESTBRED 926	95.50	27.68	43.43	55.30	13.50
MT 9360	LEW/PND	99.67	30.45	43.13	57.80	12.50
WBEXPRES	WESTBRED EXPRESS	98.97	26.50	43.10	55.37	13.50
CI 13596	FORTUNA	100.00	36.38	43.00	58.93	12.90
CI 17790	LEN	99.30	28.12	43.00	55.00	13.00
BZ984326	BORDER	98.60	29.36	42.27	55.60	14.00
TR983239	FERGUS	98.27	28.14	41.07	56.13	14.10
ND 582	STOA	98.27	33.86	40.90	55.87	13.20
MTHW9406	MT8182/KLASIC (hard white)	97.90	28.23	40.83	54.57	13.80
C982-324	RAMBO	98.97	26.67	40.80	56.70	13.40
MT 9354	MT7810/(SU73/LEW)	99.67	30.70	40.10	56.37	13.20
EXPERIMENTAL MEANS		98.62	30.31	44.78	56.51	12.85
C.V. 2: (S OF MEAN/MEAN)*100		1.05	2.72	5.51	1.02	-
LSD (0.05)		2.94	2.35	7.03	1.64	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-9953-SW Field: OffSta Design: RCB # Ents: 23 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: NENE Section: 32 Twnshp: 36 N Range: 13 E Latitude: 48.83 N Longitude: 110.03 W Elevation: 2800 ft.

Seeding Date: 05/08/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 32.0 in. Soil Temp @ Sd'g: F @ 1 in. 62.0F @ 2 in. 58.0F @ 4 in. Soil Texture: LCL Soil Series: Telstad Loam
 Cropping System: X Fallow Recrop Full-Till X Reduced-Till No-Till # Tillages: 1 # Chem Apps: 2
 Cropping System Details: 2 Chemical Fallow Apps Spring 94 + 1 Tillage/Liquid Fert Injection Summer 94
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 30#N,15#P2O5, 7#K2O/ac via liquid injection 07/05/94 Herbicide: 'Express'+LV6 @ .25oz+.75pt/ac
 Harvest Date: 09/12/95 Root Penetration Depth: 43 in. Comments: Pre-Plant Soil Analysis was Post-Fertilization

Depth in.	PRE-PLANT SOIL ANAL 04/26/95							Max Depth=48"			POST-HVST SOIL ANAL 09/12/95							(Max Depth=48"	
	PAW	pH	OM	NO3	P	K	S				Text	Txt	in.	PAW	pH	OM	NO3		P
0-6"	.64	6.0	1.0	16	17	312	6	SCL	21.7		.55	7.1	1.0	6	18	308	15	SCL	21.7
6-24"	2.08			48			24	CL			1.20			12			17	SCL	
24-36"	.91			20				CL			.61			4				SCL	
36-48"	1.06			20				SCL			.82			12				SCL	
TOTAL:	4.69			104							3.18			34					

Precipitation 04/26/95 to Sd'g: 0.27 in. (0.27 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 4.96 in. & Stored Soil 05/08/95 to Hvst: 12.25 in. (11.95 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 3.18 in.
 Water Summary: Growing Season (05/08/95 to 14 days prior to Harvest Maturity: 11.26 in.) (10.96 in events =>.1 in.) Post-Grwg Seas (14 days prior to Harvest Maturity to 09/12/95: 0.99 in.) (0.99 in events =>.1 in.)
 Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 13.04 in.)

TABLE 10. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1986-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
							AVERAGE FOR YEARS TESTED	10-YR. COMPAR. YIELD	PERCENT OF FORTUNA YIELD						AVERAGE FOR YEARS TESTED	10-YR. COMPAR. TEST WT	PERCENT OF FORTUNA TEST WT
		1991	1992	1993	1994	1995	6/	7/	1991	1992	1993	1994	1995	6/	7/		
3/	4/	5/						4/	5/								
CI 17904 OWENS (sft wht)	8	33.6	-	53.6	43.9	-	37.8	39.7	128.7	51.6	-	53.0	56.0	-	56.6	56.7	97.5
PI574642 McNEAL	3	-	-	51.9	41.3	53.1	48.8	38.3	124.0	-	-	55.7	56.0	57.9	56.5	57.2	98.3
PI483235 GLENMAN	9	35.3	-	41.3	34.8	46.5	36.3	36.3	117.5	52.5	-	54.4	55.8	55.9	56.2	56.2	96.5
CI 17430 NEWANA	9	29.7	-	46.2	41.3	49.8	36.1	36.1	116.7	51.1	-	54.7	57.9	57.0	57.7	57.7	99.2
WA 6920 PENAWAWA (sftwh)	5	33.5	-	56.0	41.8	-	37.3	35.7	115.6	50.9	-	54.5	56.1	-	55.6	56.1	96.4
ND 606 AMIDON	6	30.1	-	47.7	40.1	44.8	37.8	34.3	110.9	53.9	-	55.4	57.5	56.9	57.2	57.4	98.7
CI 17828 PONDERA	9	36.1	-	47.2	36.4	46.4	33.7	33.7	109.0	55.6	-	57.4	58.3	58.3	58.4	58.4	100.4
CI 17790 LEN	9	33.9	-	34.6	34.7	43.0	33.4	33.4	108.2	52.8	-	52.8	58.0	55.0	56.0	56.0	96.3
WPB 926R WSTBRD926 (P+)	5	36.4	-	42.8	36.6	43.4	38.1	32.8	106.1	52.7	-	54.2	57.2	55.3	55.6	55.9	96.1
CI 17429 LEW	9	27.6	-	40.6	33.9	45.0	31.9	31.9	103.3	54.2	-	56.8	57.6	59.0	58.2	58.2	100.0
PI549275 HI-LINE	7	30.0	-	42.4	36.2	45.2	31.0	31.5	101.9	51.1	-	55.1	56.4	56.3	55.8	56.2	96.7
C982-324 RAMBO (P+)	8	31.4	-	46.5	31.9	40.8	31.7	31.4	101.8	52.9	-	56.9	58.4	56.7	58.0	58.4	100.4
CI 13596 FORTUNA	9	31.3	-	35.5	39.5	43.0	30.9	30.9	100.0	55.5	-	54.8	58.8	58.9	58.2	58.2	100.0
ND 626 GRANDIN	5	27.2	-	43.0	38.2	43.6	36.8	30.4	98.5	51.2	-	56.4	56.4	56.3	55.8	56.1	96.5
ND 582 STOA	9	27.1	-	33.4	36.5	40.9	30.1	30.1	97.4	52.8	-	54.4	57.0	55.9	56.6	56.6	97.3
ND CUT CUTLESS	7	31.1	-	34.5	35.6	-	28.5	30.0	97.1	54.7	-	53.6	57.4	-	56.8	57.3	98.6
CANLANC LANCER	6	28.8	-	37.1	33.4	-	27.5	29.8	96.6	55.2	-	55.2	58.1	-	57.4	58.0	99.8
ND 618 GUS	3	26.2	-	35.4	-	-	30.7	29.4	95.2	54.0	-	55.4	-	-	56.2	57.2	98.4
CI 15930 OLAF	6	28.8	-	34.4	-	-	26.2	29.2	94.5	50.3	-	55.1	-	-	56.1	56.7	97.5
MEAN (ENTRIES LISTED)		31.0	-	42.3	37.4	45.0	-	32.9	-	52.9	-	55.0	57.2	56.9	-	57.1	-
8/ Growing Season Precip. (in.)		8.96	5.09	13.03	4.00	11.26	6.77										
9/ Soil PAW (in.) to SD @Pltng		6.69	5.67	6.75	7.93	4.96	7.88										
Total Plant Avail. Water (in.)		15.65	10.76	19.78	11.93	16.22	14.64										
Soil NO3 (lbs.) to SD @Pltng		140.0	198.0	162.0	110.0	104.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		65.0	42.0	70.5	40.0	30.0											
(# P205)		25.0	25.0	25.0	30.0	15.0											
(# K20)		10.0	10.0	10.0	0.0	7.0											
(# SO4)		0.0	0.0	0.0	0.0	0.0											

Check variety is Fortuna.

- 1/ See MCES Bulletin 1093 for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making variety selection decisions.
- 2/ P = Private variety, + = Protected variety.
- 3/ Only the most recent five years are shown, but summary calculations include all the years noted.
- 4/ Crop suffered substantial hail damage.
- 5/ 1992 nursery was not harvested due to extensive hail damage.
- 6/ 10-yr. CA = (x/y) * z where x = average yield or test weight of the entry for years tested, y = average yield or test weight for Fortuna for the same years, and z = 10-yr. average yield or test weight for the check variety Fortuna.
- 7/ Percent of Fortuna yield or test weight for the same data years as those in which the entry was tested.
- 8/ Seeding to 14 days prior to harvest maturity.
- 9/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

TABLE 11. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT Inches	HT	YIELD Bu/Ac	TEST Wt Lbs/Bu	PROTEIN %
PI574642	MCNEAL	96.87	32.86		73.73	61.43	13.00
PI549275	HI-LINE	95.47	29.51		71.90	61.97	12.90
CI 17430	NEWANA	99.30	29.76		68.77	61.83	10.60
BZ684-23	VANNA (soft white)	90.97	30.05		67.83	60.13	10.00
MTHW9406	MT8182/KLASIC (hard white)	93.40	31.18		67.33	60.83	11.80
ND 606	AMIDON	96.87	37.27		66.90	61.30	12.60
PI483235	GLENMAN	98.97	33.10		65.77	60.83	11.20
WBEXPRES	WESTBRED EXPRESS	91.00	25.05		64.17	61.07	12.20
C982-324	RAMBO	94.43	28.22		63.13	62.30	12.10
PNR 2375	PIONEER 2375	98.60	35.03		62.37	61.13	12.50
BZ984326	BORDER	98.97	29.46		62.30	60.30	11.50
CI 17790	LEN	93.73	30.45		62.13	61.53	11.70
CI 17828	PONDERA	94.43	31.52		62.03	61.60	11.30
WB 926	WESTBRED 926	97.90	29.28		61.57	60.73	11.30
TR983239	FERGUS	96.17	30.88		61.20	61.63	12.50
MT 9354	MT7810/(SU73/LEW)	98.97	30.77		60.43	61.17	11.90
ND 582	STOA	96.17	37.01		60.13	60.93	11.60
ND 677	ERNEST	98.27	36.01		57.70	60.93	12.10
ND 626	GRANDIN	85.77	33.18		56.80	61.77	12.70
MT 9360	LEW/PND	100.00	31.92		56.73	61.20	11.70
WB 936	WESTBRED 936	94.10	26.65		54.60	60.33	11.40
CI 17429	LEW	99.67	39.95		54.60	61.97	11.70
CI 13596	FORTUNA	97.57	35.05		52.63	64.37	12.20
EXPERIMENTAL MEANS		95.98	31.92		62.38	61.36	11.85
C.V. 2: (S OF MEAN/MEAN)*100		2.76	2.88		7.61	1.20	-
LSD (0.05)		7.55	2.62		13.53	2.10	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-9954-SW Field: OffSta Design: RCB # Ents: 23 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SE Section: 8 Twnshp: 34 N Range: 7 E Latitude: 48.73 N Longitude: 110.83 W Elevation: 3300 ft.

Seeding Date: 05/10/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.00 in. Moist Soil Depth @ Sd'g: 55.0+ in. Soil Temp @ Sd'g: . F @ 1 in. 71.0F @ 2 in. 60.0F @ 4 in. Soil Texture: CL Soil Series: Joplin-Hillon Cl Loam Cropping System: X Fallow Recrop Full-Till X Reduced-Till No-Till # Tillages: 3 # Chem Apps: 1 Cropping System Details: 94 Fallow Season = 1x Chem w/8oz 'Roundup', 1x Tillage w/Sweeps, 2x Tillage w/Sweeps & Rods Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow Fertilizer: 38#N,19#P2O5, 7#K2O/ac via gran.blend inj'd prior to plnt'g Herbicide: 'Amber'+4#2,4-D @ 28+10.0oz/ac Harvest Date: 09/14/95 Root Penetration Depth: 36 in. Comments: Pre-Plant Soil Analysis was Pre-Fertilization

Depth	PRE-PLANT SOIL ANAL 04/26/95										POST-HVST SOIL ANAL 09/14/95										
	in.		%		Lb/a		ppm		ppm		ppm		in.		%		Lb/a		ppm		ppm
	PAW	pH	OM	NO3	P	K	S	Text	Cec		PAW	PAW	pH	OM	NO3	P	K	S	Text	Cec	
0-6"	.71	7.4	1.4	16	16	257	12	CL	21.8		.71	7.2	1.4	6	19	285	11	CL	21.8		
6-24"	1.91			18			21	CL			1.60			6				17	CL		
24-36"	.96			8				CL			.77			8					CL		
36-48"	1.19			20				CL			1.10			20					CL		
TOTAL:	4.77			62							4.18			40							

Precipitation 04/26/95 to Sd'g: 0.84 in. (0.81 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.61 in. & Stored Soil 05/10/95 to Hvst: 14.30 in. (13.71 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 4.18 in. Water Summary: Growing Season (05/10/95 to 14 days prior to Harvest Maturity: 12.88 in.) (12.38 in events =>.1 in.) Post-Grwg Seas (14 days prior to Harvest Maturity to 09/13/95: 1.42 in.) (1.33 in events =>.1 in.) Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 14.31 in.)

TABLE 12. SEVEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1989-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	7-YR COMPAR. AVERAGE YIELD	PERCENT OF FORTUNA YIELD	1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	7-YR COMPAR. AVERAGE TEST WT	PERCENT OF FORTUNA TEST WT
WA 6920 PENAWANA (sft wht)	6	66.8	48.4	76.4	36.9	-	52.6	55.0	131.6	56.9	59.4	60.8	56.8	-	58.8	59.4	97.8
CI 17904 OWENS (sft wht)	6	63.5	52.6	79.6	32.1	-	50.9	53.2	127.5	55.9	59.4	61.1	58.4	-	59.0	59.6	98.1
PI574642 McNEAL	4	-	39.5	67.6	33.8	73.7	53.6	52.3	125.3	-	60.6	61.3	56.5	61.4	60.0	60.1	98.9
PI483235 GLENMAN	7	58.2	36.2	74.9	31.9	65.8	50.2	50.2	120.3	58.3	58.6	61.0	56.2	60.8	59.4	59.4	97.7
ND 606 AMIDON	7	60.1	38.9	66.8	31.2	66.9	49.6	49.6	118.8	58.2	58.3	60.4	58.1	61.3	59.7	59.7	98.3
CI 17430 NEWANA	7	62.6	37.3	63.8	30.7	68.8	49.1	49.1	117.5	58.6	59.1	61.2	59.3	61.8	60.4	60.4	99.4
CI 17828 PONDERA	7	57.5	36.5	67.4	34.0	62.0	48.7	48.7	116.6	58.3	60.1	61.9	59.2	61.6	60.5	60.5	99.5
PI549725 HI-LINE	7	57.8	27.8	66.2	32.1	71.9	47.3	47.3	113.2	57.3	60.6	62.0	57.1	62.0	59.4	59.4	97.7
ND 626 GRANDIN	6	54.4	43.3	63.5	31.0	56.8	47.3	46.7	111.9	57.8	60.7	62.3	58.8	61.8	60.2	60.2	99.1
C982-324 RAMBO (P+)	7	59.8	32.7	65.8	25.3	63.1	46.1	46.1	110.4	59.3	59.9	61.1	59.1	62.3	60.8	60.8	100.1
PI486139 KLASIC(P+) (hrd wht)	3	-	30.3	66.1	34.4	-	43.6	46.0	110.2	-	60.0	59.6	57.3	-	59.0	60.4	99.4
ND 618 GUS	4	55.3	31.8	61.2	-	-	45.5	45.6	109.2	58.7	59.1	61.7	-	-	60.1	60.8	100.0
CI 17790 LEN	7	59.7	29.5	55.5	30.6	62.1	45.5	45.5	109.0	58.4	59.6	61.2	58.7	61.5	59.7	59.7	98.3
ND 582 STOA	7	53.1	40.6	51.9	32.6	60.1	45.4	45.4	108.8	57.3	59.2	60.7	57.7	60.9	59.5	59.5	98.0
WPB 926R WESTBRED 926 (P+)	6	58.2	25.4	59.3	29.6	61.6	45.2	44.6	106.9	56.0	59.6	59.9	58.6	60.7	59.0	59.0	97.2
CI 17429 LEW	7	49.4	34.0	64.7	30.8	54.6	44.2	44.2	105.8	59.5	59.8	62.4	58.8	62.0	60.7	60.7	99.9
ND CUT CUTLESS	6	51.8	34.7	55.8	30.7	-	40.6	42.4	101.6	59.4	59.0	60.2	58.6	-	59.8	60.4	99.4
CI 15930 OLAF	5	55.1	22.6	50.6	-	-	41.7	42.3	101.4	56.5	59.0	60.4	-	-	59.1	59.6	98.1
CI 13596 FORTUNA	7	50.2	25.7	58.6	34.3	52.6	41.8	41.8	100.0	60.0	57.5	61.0	59.6	64.4	60.8	60.8	100.0
CANLANC LANCER	6	42.3	29.9	54.8	28.2	-	38.6	40.4	96.7	58.7	59.0	61.1	58.1	-	59.8	60.4	99.4
MEANS (ENTRIES LISTED)		56.4	34.9	63.5	31.7	63.1		46.8		58.1	59.4	61.1	58.2	61.7		60.0	
6/Growing Season Precip. (in.)		10.30	9.23	12.45	2.83	12.88		8.57									
7/ Soil PAM (in.) to SD at @plant		10.15	6.64	5.76	9.31	5.61		8.00									
Total Plant Avail. Water (in.)		20.45	15.87	18.21	12.14	18.49		16.57									
Soil NO3 (lbs.) to SD @Plant.		76.0	96.0	112.0	108.0	62.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	70.0	55.0	90.0	38.0											
(# P2O5)		40.0	40.0	0.0	0.0	19.0											
(# K2O)		0.0	0.0	0.0	0.0	7.0											

Check variety is Fortuna.

1/ See MCBS Bulletin 1093 for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc., before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Only five years shown, but summary calculations include all years noted.

4/ 7-yr. CA = (x/y)* z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Fortuna for the same years, and z = 7-yr. average of yield or test weight for the check variety Fortuna.

5/ Percent of Fortuna yield or test weight for the same data years as those in which the entry was tested.

6/ Seeding to 14 days prior to harvest maturity.

7/ Soil PAM values are actual gravimetric measurements.

TABLE 13. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE SIDNEY SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1985-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	10-YR. COMPAR. OF FORTUNA	PERCENT OF FORTUNA			
		1990	1991	1992	1993	1994	1990	1991	1992	1993	1994						
		3/	4/	5/	6/	7/	4/	5/	6/	7/							
ND 618 GUS	3	27.7	19.4	-	56.4	-	34.5	34.2	129.7	59.0	56.9	-	60.3	-	58.7	58.9	99.5
WA 6920 PENAWANA (sft wht)	5	11.5	27.8	-	72.2	44.9	38.2	34.0	129.0	58.0	56.2	-	59.4	58.3	57.8	57.4	96.9
MT 7819 GLENMAN	9	22.3	24.2	-	57.9	42.7	33.1	33.1	125.6	58.3	56.3	-	58.6	59.9	57.4	57.4	97.0
ND 626 GRANDIN	4	26.3	18.1	-	62.1	38.4	36.2	33.0	124.9	58.1	56.0	-	61.5	57.9	58.4	58.1	98.1
CI 17920 MARSHALL (+)	4	-	-	-	-	-	27.5	32.5	123.1	-	-	-	-	-	58.0	58.5	98.8
WPB 926R WESTBRED 926 (P+)	4	17.0	27.6	-	55.9	41.3	35.4	32.3	122.2	58.9	56.3	-	60.2	57.3	58.2	57.9	97.8
CI 17904 OWENS (soft white)	9	18.1	20.3	-	65.9	37.4	31.5	31.5	119.4	57.7	53.7	-	58.3	56.4	57.2	57.2	96.5
C982-324 RAMBO (P+)	7	20.2	23.0	-	61.0	33.8	33.6	31.1	118.0	59.6	57.8	-	59.6	59.5	59.7	59.2	100.0
ND 606 AMIDON	5	18.2	24.0	-	63.1	38.0	34.9	31.1	117.9	57.2	56.7	-	60.8	59.8	58.6	58.2	98.3
CI 17430 NEWANA	9	22.7	23.1	-	61.1	38.2	30.8	30.8	116.6	59.3	58.0	-	60.0	59.6	59.1	59.1	99.8
CI 17828 PONDERA	9	15.4	21.5	-	60.9	38.3	30.7	30.7	116.2	59.1	56.8	-	61.9	60.5	59.1	59.1	99.8
CI 17790 LEN	8	16.6	19.0	-	62.2	39.0	33.0	30.6	116.1	56.9	55.2	-	59.5	58.3	57.9	57.3	96.7
ND 582 STOA	9	23.4	17.4	-	57.7	39.1	30.4	30.4	115.1	57.5	54.3	-	60.4	59.2	58.0	58.0	98.0
PI549275 HI-LINE	6	15.3	22.0	-	56.7	31.5	30.1	28.7	108.8	57.9	56.0	-	60.7	59.9	58.7	58.1	98.1
WPB 906R WESTBRED 906 (P+)	4	19.9	-	-	-	-	25.5	27.9	105.8	58.9	-	-	-	-	58.9	58.0	97.9
ND CUT CUTLESS	7	11.1	21.8	-	50.6	31.0	30.0	27.9	105.6	58.0	57.7	-	60.5	59.5	59.2	58.7	99.1
CI 17429 LEW	9	14.8	21.5	-	53.7	33.0	27.5	27.5	104.2	58.6	57.4	-	60.9	60.8	58.9	58.9	99.5
CI 15930 OLAP	6	17.3	20.4	-	55.4	-	29.9	27.0	102.4	57.5	55.9	-	60.3	-	58.8	58.3	98.4
CI 13596 FORTUNA	9	13.3	20.7	-	45.8	36.2	26.4	26.4	100.0	58.6	57.5	-	61.1	60.8	59.2	59.2	100.0
CI 17910 ALEX	6	17.3	-	-	-	-	22.3	26.2	99.1	58.3	-	-	-	-	59.5	59.7	100.8
CANLANC LANCER	6	17.5	19.4	-	45.4	28.5	26.8	25.6	97.1	57.8	57.9	-	61.0	60.5	59.4	58.9	99.4
MEAN (ENTRIES LISTED)		18.3	21.7	-	58.0	37.0	-	30.1	-	58.3	56.5	-	60.3	59.3	-	58.4	-
8/ Growing Season Precip. (in.)		5.50	12.50	0.0	10.53	2.80	6.64										
9/ Soil PAW (in.) to SD @Plntng.		10.71	7.60	0.0	8.05	7.86	8.79										
Total Plant Avail. Water (in.)		16.21	20.10	0.0	18.58	10.66	15.42										
Soil NO3 (lbs.) to SD @Plntng.		184.0	128.0	0.0	116.0	52.0											
SD (Sampling Depth in inches)		48.0	48.0	0.0	48.0	48.0											
Fertilizer Applied (# N)		47.0	70.0	0.0	62.0	51.0											
(# P2O5)		21.0	40.0	0.0	35.0	25.0											

Check variety is Fortuna.

1/ See MCEB Bulletin 1093 for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Only the most recent five years are shown, but summary calculations include all years noted.

4/ Crop suffered very substantial hail injury.

5/ 1992 Nursery was lost due to drought conditions at seeding time.

6/ 10-yr. CA = (x/y) * z where x = average yield and test weight of the entry for years tested, y = average yield and test weight of Fortuna for the same years, and z = 10-yr. average yield or test weight for the check variety Fortuna.

7/ Percent of Fortuna yield and test weight for the same data years as those in which the entry was tested.

8/ Seeding to 14 days prior to harvest maturity.

9/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

TABLE 14. PERFORMANCE OF FERTILIZED SPRING BARLEY VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
NS 78054	Baronesse	88.53	28.91	71.70	49.07	88.40	4.57	10.63
H3860224	H3860224	92.03	30.31	69.27	48.70	89.80	3.70	10.00
CI 15229	Steptoe	94.47	26.67	68.30	42.53	83.27	7.83	9.93
PI537438	Targhee	95.50	30.34	63.43	48.07	81.33	8.63	10.77
MT890070	MT890070	90.27	30.76	62.50	50.70	92.57	3.47	10.83
MT890008	MT890008	96.90	29.61	59.50	46.53	81.73	7.27	9.90
H1851195	H1851195	93.40	30.87	59.10	49.40	85.93	5.00	10.83
SK 76333	Harrington	93.03	29.63	58.20	46.70	83.40	6.53	10.27
CI 9558	Pirolina	93.77	31.43	58.03	50.63	83.00	5.77	10.10
ND 9866	Stark	96.20	31.09	57.83	51.63	93.90	2.57	10.73
MT886610	MT886610	93.77	31.67	56.97	48.70	79.27	8.97	10.67
CI 15856	Lewis	90.27	30.93	55.87	49.47	79.90	9.00	10.93
PI537967	Colter	92.70	29.46	55.43	44.47	64.60	14.83	9.63
PI483237	Bowman	88.87	30.20	54.10	50.67	92.13	3.13	11.13
MT889106	MT889106	85.40	30.81	53.97	50.80	93.80	2.67	11.40
21140523	Chinook	92.73	30.71	52.50	48.67	78.73	9.53	11.00
PI491534	Gallatin	92.37	31.31	50.73	49.67	74.40	10.63	10.30
CI 15514	Hector	92.33	32.66	47.53	48.20	72.13	13.40	10.87
EXPERIMENTAL MEANS		92.36	30.41	58.61	48.59	83.24	7.08	10.55
C.V. 2: (S OF MEAN/MEAN)*100		2.42	2.72	5.35	.70	2.08	15.21	1.94
LSD (0.05)		6.42	2.38	9.01	.97	4.98	3.10	.59

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3651-SB Field: OffSta Design: RCB # Ents: 18 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SE Section: 13 Twnshp: 36 N Range: 25 E Latitude: 48.88 N Longitude: 108.38 W Elevation: 2900 ft.

Seeding Date: 05/11/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 55.0+ in. Soil Temp @ Sd'g: F @ 1 in. 66.0F @ 2 in. 59.0F @ 4 in. Soil Texture: SCL Soil Series:
 Cropping System: X Fallow Recrop X Full-Till Reduced-Till No-Till # Tillages: 4 # Chem Apps: 0
 Cropping System Details: 1994 Fallow Season = 3x Tillage w/Sweeps & Harrows, 1x Tillage w/Sweeps, Rods & Harrows
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Spring Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 66#N,33#P2O5, 0#K2O/ac via gran.blend bnd'd 1.5" below seed_Herbicide: 'BanvelSGF'+LV6 @4.26+6.4oz/ac
 Harvest Date: 09/13/95 Root Penetration Depth: 34 in. Comments: Pre-Plant Soil Analysis was Pre-Fertilization

Depth in.	PRE-PLANT SOIL ANAL 04/27/95							POST-HVST SOIL ANAL 09/13/95											
	PAW	pH	OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC	in.	PAW	pH	OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC
0-6"	.75	6.5	1.0	10	10	192	7	SCL	21.7	_____	.48	6.3	1.0	6	8	231	8	SCL	21.7
6-24"	1.51			24			13	SCL		_____	1.27			6			16	SCL	
24-36"	1.18			8				SCL		_____	.69			4				SCL	
36-48"	1.23			12				CL		_____	.80			4				SCL	
TOTAL:	4.67			54						_____	3.24			20					

Precipitation & Stored Soil 04/27/95 to Sd'g: 0.42 in. (0.30 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.09 in.
 05/11/95 to Hvst: 9.55 in. (8.95 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 3.24 in.
 Water Summary: Growing Season (05/11/95 to 14 days prior to Harvest Maturity: 8.71 in.) (8.17 in events =>.1 in.)
 Post-Grwg Seas (14 days prior to Harvest Maturity to 09/13/95: 0.84 in.) (0.78 in events =>.1 in.)
 Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 10.56 in.)

TABLE 15. NINE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION ON A 'TELSTAD' SOIL AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1987-1995.

2/ VARIETY OR SELECTION TESTED	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE YIELD	PERCENT OF PIROLINE	1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE	PERCENT OF PIROLINE
NS 78054 BARONESSE (P+)	5	30.5	82.1	93.3	55.2	71.7	66.6	57.4	120.6	46.2	48.8	48.4	47.0	49.1	47.9	48.0	96.5
CI 15229 STEPTOE	9	57.8	71.2	88.7	65.6	68.3	56.0	56.0	117.6	40.1	43.7	41.6	42.0	42.5	43.1	43.1	86.7
ND 9866 STARK	6	44.9	63.2	80.9	58.2	57.8	57.9	54.3	113.9	49.5	50.7	49.2	50.2	51.6	50.1	50.4	101.3
PI531228 BEARPAW	7	36.6	59.5	77.8	-	-	49.8	53.1	111.6	45.3	47.0	49.5	-	-	48.1	48.3	97.1
MT 81161 MT 81161	5	-	60.3	78.0	-	-	54.5	51.7	108.6	-	46.3	47.4	-	-	48.7	48.2	96.9
MT860756 GALLATIN/BELLO	3	-	66.2	83.6	51.4	-	67.1	51.6	108.5	-	48.7	49.9	47.5	-	48.7	48.3	97.1
MT890008 MT890008	3	-	-	84.8	56.6	59.5	67.0	51.5	108.1	-	-	48.1	45.8	46.5	46.8	46.5	93.5
PI483237 BOWMAN	9	50.3	64.3	75.9	53.8	54.1	51.3	51.3	107.8	51.4	50.6	48.8	48.8	50.7	50.1	50.1	100.6
CI 15857 CLARK	7	36.0	58.3	69.0	-	-	47.9	51.1	107.4	45.2	47.5	48.8	-	-	48.2	48.4	97.2
MT851195 MT851195	3	-	-	81.5	57.7	59.1	66.1	50.8	106.7	-	-	48.1	47.1	49.4	48.2	47.9	96.3
PI491534 GALLATIN	9	32.5	69.7	69.2	54.1	50.7	50.8	50.8	106.7	48.1	49.6	49.0	47.8	49.7	49.5	49.5	99.6
MT140523 CHNOOK	8	37.9	66.9	69.0	56.0	52.5	52.2	50.6	106.2	44.6	48.7	48.4	46.7	48.7	48.4	48.4	97.2
CI 15856 LEWIS	9	43.7	64.6	53.9	51.6	55.9	49.5	49.5	104.0	48.2	49.2	50.2	47.6	49.5	49.6	49.6	99.7
CI 15514 HECTOR	9	31.8	66.6	72.4	50.6	47.5	49.4	49.4	103.7	47.3	48.8	48.9	46.7	48.2	48.9	48.9	98.2
SK 76333 HARRINGTON	9	34.2	66.3	83.8	48.7	58.2	48.0	48.0	100.7	44.3	47.7	48.5	45.2	46.7	47.5	47.5	95.5
CI 9558 PIROLINE	9	32.4	57.7	69.7	58.1	58.0	47.6	47.6	100.0	46.9	50.9	49.3	50.3	50.6	49.8	49.8	100.0
PI537967 COLTER	3	-	-	73.2	56.7	55.4	61.8	47.5	99.7	-	-	41.6	42.2	44.5	44.8	44.8	90.1
MEANS (ENTRIES LISTED)		39.1	65.5	76.8	55.3	57.6	-	51.3	-	46.4	48.5	48.0	46.8	48.3	-	48.1	-
6/ Growing Season Precip. (in.)		9.86	7.53	9.60	3.93	8.71	7.40										
7/ Soil PAW (in.) to SD at @Plnt		6.56	5.52	7.24	6.84	5.09	6.51										
Total Plant Avail. Water (in.)		16.42	13.05	16.84	10.77	13.80	13.91										
Soil NO3 (lbs.) to SD @Plntng.		100.0	112.0	52.0	28.0	54.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	70.0	62.0	66.0	66.0											
(# P205)		40.0	40.0	35.0	33.0	33.0											

Check variety is Piroline.

1/ See MCES Bulletin 1094 for evaluation of other important variety performance characteristics to include malting potential, disease resistance etc., before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Head shatter and head loss was substantial as crop was over-ripe for harvest by binder (necessary due to major plot combine breakdown).

4/ 9-yr. CA = (x/y) * z where x = average yield or test weight of the entry for years tested, y = average yield or test weight for Piroline for the same years, and z = 9-yr. average yield or test weight for the check variety Piroline.

5/ Percent of Piroline yield or test weight for the same data years as those in which the entry was tested.

6/ Seeding to 14 days prior to harvest maturity.

7/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

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TABLE 16. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	Steptoe	99.67	31.86	101.60	43.43	87.10	5.90	10.20
PI483237	Bowman	99.67	32.30	93.33	49.73	93.60	3.10	12.10
H3860224	H3860224	98.97	32.35	90.37	50.03	90.30	4.60	12.20
NS 78054	Baronesse	99.67	33.01	88.60	50.23	92.30	3.40	12.30
MT890070	MT890070	99.67	31.88	84.60	49.63	92.90	3.50	11.70
PI537967	Colter	99.30	29.62	84.33	44.33	75.40	9.90	10.50
MT889106	MT889106	99.33	32.81	84.13	50.17	95.10	1.80	12.30
SK 76333	Harrington	99.67	31.78	81.33	48.67	90.80	4.20	12.10
PI537438	Targhee	99.67	33.57	81.33	49.53	91.00	3.80	12.20
CI 9558	Pirolina	100.00	34.76	79.63	51.90	92.50	2.70	12.30
MT890008	MT890008	99.67	32.94	78.40	49.63	93.30	2.70	11.90
21140523	Chinook	100.00	32.64	76.97	50.67	88.90	4.20	12.70
MT886610	MT886610	100.00	35.43	76.17	51.07	92.10	4.20	11.80
CI 15514	Hector	100.00	33.86	75.20	50.57	89.80	4.00	12.20
H1851195	H1851195	99.67	35.01	73.43	50.13	92.90	2.70	12.50
ND 9866	Stark	99.33	33.83	69.57	50.13	93.60	3.10	12.40
CI 15856	Lewis	100.00	33.67	65.00	51.47	92.70	2.90	12.50
PI491534	Gallatin	99.33	34.66	64.17	51.60	91.30	3.90	12.10
EXPERIMENTAL MEANS		99.64	33.11	80.45	49.61	90.87	3.92	12.00
C.V. 2: (S OF MEAN/MEAN)*100		.34	2.90	5.53	.91	-	-	-
LSD (0.05)		.98	2.76	12.80	1.30	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3652-SB Field: OffSta Design: RCB # Ents: 18 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SW Section: 13 Twnshp: 28 N Range: 10 E Latitude: 48.18 N Longitude: 110.43 W Elevation: 2800 ft.

Seeding Date: 05/05/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 32.0 in. Soil Temp @ Sd'g: F @ 1 in. 64.0F @ 2 in. 62.0F @ 4 in. Soil Texture: FSL Soil Series:
 Cropping System: X Fallow Recrop X Full-Till Reduced-Till No-Till # Tillages: 3 # Chem Apps: 0
 Cropping System Details: 1994 Fallow Season = 2x Tillage w/Sweeps & Harrows; 1x Tillage w/Sweeps, Harrows & Rods
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 55#N,22#P2O5, 0#K2O/ac via NH3+11-52-0 inj'd in sep PP ops Fall94 Herbicide: 'Bronate' @ 1.5 pts/ac
 Harvest Date: 09/01/95 Root Penetration Depth: in. Comments: Pre-Plant Soil Analysis was Post-Fertilization

Depth	PRE-PLANT SOIL ANAL 04/26/95								POST-HVST SOIL ANAL 09/01/95							
	in.	PAW	pH	OM	Lb/a	ppm	ppm	ppm	in.	PAW	pH	OM	Lb/a	ppm	ppm	ppm
0-6"	.59	6.1	1.0	36	16	378	9	VFSL 14.5	.32	6.0	1.2	6	16	356	8	VFSL 14.5
6-24"	1.68			66			10	VFSL	.99			6			7	VFSL
24-36"	1.42			40				CL-	.77			8				CL
36-48"	1.34			36				CL-	.90			88				CL
TOTAL:	5.03			178					2.98			108				

Precipitation 04/26/95 to Sd'g: 0.40 in. (0.40 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.43 in. & Stored Soil 05/05/95 to Hvst: 13.60 in. (13.58 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 2.98 in.
 Water Summary: Growing Season (05/05/95 to 14 days prior to Harvest Maturity: 12.73 in.) (12.73 in events =>.1 in.)
 Post-Grwg Seas (14 days prior to Harvest Maturity to 09/01/95: 0.87 in.) (0.87 in events =>.1 in.)
 Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 15.18 in.)

TABLE 17. EIGHT-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1988-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	8-YR. COMPAR. AVERAGE YIELD	PERCENT OF PIROLINE YIELD	1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	8-YR. COMPAR. AVERAGE TEST WT.	PERCENT OF PIROLINE TEST WT.
CI 15229 STEPTOE	8	56.9	30.2	113.3	68.2	101.6	64.0	64.0	110.2	47.1	39.8	43.8	37.6	43.4	42.6	42.6	88.1
PI537967 COLTER	3	-	-	113.8	60.0	84.3	86.0	60.3	103.9	-	-	43.6	38.5	44.3	42.1	41.6	86.0
PI483237 BOWMAN	8	39.5	22.0	104.8	74.4	93.3	59.1	59.1	101.7	54.6	42.5	49.1	46.7	49.7	48.5	48.5	100.2
NS 78054 BARONESSE (P+)	5	22.5	27.3	117.9	64.5	88.6	64.2	58.7	101.1	50.6	41.7	51.5	43.2	50.2	47.5	47.0	97.1
MT140523 CHINOOK	8	42.7	21.3	111.6	64.4	77.0	58.6	58.6	100.8	53.8	40.9	51.3	44.1	50.7	48.3	48.3	99.9
CI 9558 PIROLINE	8	43.2	25.6	109.1	59.7	79.6	58.1	58.1	100.0	52.9	44.4	51.5	43.6	51.9	48.3	48.3	100.0
MT 81161 MT 81161	4	-	25.1	106.0	-	-	54.7	57.3	98.6	-	39.9	50.3	-	-	45.7	46.6	96.4
PI531228 BEARPAW	6	31.7	24.5	103.3	-	-	53.4	57.2	98.4	53.1	40.6	50.5	-	-	46.9	46.7	96.6
MT890008 MT890008	3	-	-	104.3	59.3	78.4	80.7	56.6	97.4	-	-	48.4	43.3	49.6	47.1	46.5	96.1
MT860756 GALLATIN/BELLONA	3	-	26.5	101.1	61.3	-	63.0	56.4	97.2	-	42.1	51.4	44.6	-	46.1	47.9	99.0
CI 15856 LEWIS	8	40.2	23.6	109.7	60.5	65.0	55.8	55.8	96.1	54.2	41.8	53.2	43.2	51.5	48.6	48.6	100.6
MT851195 MT851195	3	-	-	99.4	61.1	73.4	78.0	54.7	94.1	-	-	48.9	43.4	50.1	47.5	46.8	96.9
PI491534 GALLATIN	8	32.3	23.3	101.5	58.1	64.2	54.5	54.5	93.8	53.3	42.8	51.6	43.7	51.6	48.5	48.5	100.2
SK 76333 HARRINGTON	8	33.0	25.4	102.0	55.5	81.3	54.0	54.0	93.0	53.8	40.7	50.8	42.2	48.7	47.1	47.1	97.5
ND 9866 STARK	6	31.8	26.5	104.0	68.7	69.6	58.5	54.0	93.0	53.6	42.4	49.6	45.7	50.1	48.4	47.9	99.0
CI 15514 HECTOR	8	28.4	21.5	102.5	58.3	75.2	53.8	53.8	92.6	52.5	41.3	51.0	42.0	50.6	48.0	48.0	99.4
CI 15857 CLARK	6	30.8	23.3	92.7	-	-	48.1	51.5	88.7	52.6	39.3	50.9	-	-	47.4	47.8	98.9
MEANS (ENTRIES LISTED)		36.1	24.7	105.7	62.4	79.4		56.7		52.7	41.4	49.9	43.0	49.4		47.0	
7/ Growing Season Precip. (in.)		8.45	8.25	10.65	5.87	12.73	8.14										
8/ Soil PAW (in.) to SD at Plt.		8.47	6.14	6.29	7.94	5.43	7.14										
Total Plant Avail. Water (in.)		16.92	14.39	16.94	13.81	18.16	15.28										
Soil NO3 (lbs.) to SD at Plt.		128.0	200.0	158.0	260.0	178.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		50.0	50.0	55.0	56.0	55.0											
(#P2O5)		21.0	24.0	22.0	22.0	22.0											
(#K2O)		0.0	0.0	0.0	0.0	0.0											

Check variety is Piroline.

1/ See MCES Bulletin 1094 for other important variety performance characteristics to include, malting potential, disease resistance, etc., before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ Head shatter and head loss was substantial as crop was over-ripe for harvest by binder (necessary due to major plot combine breakdown). Crop suffered minor hail damage on two occasions (5/20 & 7/13).

4/ 1992 nursery suffered poor initial stand development due to early drought conditions (through mid-June), and was later damaged by moderate hail.

5/ 8-yr. CA = (x/y) * z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Piroline for the same years, and z = 8-yr. average of yield or test weight for the check variety Piroline.

6/ Percent of Piroline yield or test weight for the same data years as those in which the entry was tested

7/ Seeding to 14 days prior to harvest maturity.

8/ Soil PAW values are actual gravimetric measurements.

TABLE 18. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT Inches	HT	YIELD Bu/Ac	TEST Wt Lbs/Bu	PLUMP %	THIN %	PROTEIN %
MT890008	MT890008	98.63	26.22		83.67	47.10	91.30	3.00	10.50
NS 78054	Baronesse	98.63	28.48		82.10	46.77	90.20	3.40	10.00
CI 15229	Steptoe	99.33	27.03		81.73	40.87	84.50	7.50	10.20
PI537438	Targhee	98.60	29.40		81.27	47.03	88.20	3.90	10.10
H3860224	H3860224	98.97	30.71		80.50	47.13	93.40	2.70	10.00
MT886610	MT886610	99.30	31.86		79.53	48.67	87.90	4.40	9.90
CI 9558	Pirolina	99.30	31.43		78.97	50.33	95.50	1.60	10.80
MT889106	MT889106	97.57	32.77		78.23	50.10	97.70	.80	10.50
MT890070	MT890070	98.63	29.08		76.67	48.93	94.60	1.90	10.50
PI537967	Colter	98.97	28.07		76.60	42.30	77.30	9.20	9.10
SK 76333	Harrington	98.27	29.29		76.57	45.13	89.20	4.00	9.90
H1851195	H1851195	100.00	30.37		75.83	47.53	88.30	3.20	10.70
21140523	Chinook	98.27	30.58		75.30	47.97	85.40	4.40	10.20
CI 15856	Lewis	99.67	31.94		74.33	48.90	85.80	5.70	10.10
ND 9866	Stark	98.97	30.30		72.77	49.20	91.00	3.50	10.70
PI483237	Bowman	99.67	29.23		72.57	48.43	95.20	1.60	10.30
PI491534	Gallatin	98.60	30.60		71.70	48.77	70.50	12.20	10.40
CI 15514	Hector	98.30	30.55		70.67	48.03	85.20	4.90	10.80
EXPERIMENTAL MEANS		98.87	29.88		77.17	47.40	88.40	4.33	10.26
C.V. 2: (S OF MEAN/MEAN)*100		.76	2.79		3.85	1.02	-	-	-
LSD (0.05)		2.15	2.40		8.55	1.39	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3653-SB Field: OffSta Design: RCB # Ents: 18 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: NENE Section: 32 Twnshp: 36 N Range: 13 E Latitude: 48.83 N Longitude: 110.03 W Elevation: 2800 ft.

Seeding Date: 05/08/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 32.0 in. Soil Temp @ Sd'g: F @ 1 in. 62.0F @ 2 in. 58.0F @ 4 in. Soil Texture: LCL Soil Series: Telstad Loam
 Cropping System: X Fallow Recrop Full-Till X Reduced-Till No-Till # Tillages: 1 # Chem Apps: 2
 Cropping System Details: 2 Chemical Fallow Apps Spring 94 + 1 Tillage/Liquid Fert Injection Summer 94
 Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow
 Fertilizer: 30#N,15#P2O5, 7#K2O/ac via liquid injection 07/05/94 Herbicide: 'Express'+LV6 @ .25oz+.75pt/ac
 Harvest Date: 09/11/95 Root Penetration Depth: 38 in. Comments: Pre-Plant Soil Analysis was Post-Fertilization

Depth in.	PRE-PLANT SOIL ANAL 04/26/95							Max Depth=48" in.	POST-HVST SOIL ANAL 09/12/95 (Max Depth=48" in.)								
	PAW	pH	OM	Lb/a NO3	ppm P	ppm K	ppm S			PAW	pH	OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text
0-6"	.64	6.0	1.0	16	17	312	6	SCL- 21.7	.58	6.7	1.0	6	13	270	10	SCL	21.7
6-24"	2.08			48			24	CL	1.28			12			16	SCL	
24-36"	.91			20				CL	.58			4				CL	
36-48"	1.06			20				SCL	1.13			12				CL	
TOTAL:	4.69			104					3.57			34					

Precipitation 04/26/95 to Sd'g: 0.27 in. (0.27 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 4.96 in. & Stored Soil 05/08/95 to Hvst: 12.25 in. (11.95 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 3.57 in.
 Water Summary: Growing Season (05/08/95 to 14 days prior to Harvest Maturity: 10.34 in.) (10.04 in events =>.1 in.) Post-Grwg Seas (14 days prior to Harvest Maturity to 09/12/95: 1.91 in.) (1.91 in events =>.1 in.)
 Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 11.73 in.)

TABLE 19. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1986-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		AVERAGE FOR YEARS TESTED					10-YR. PERCENT COMPAR. OF AVERAGE PIROLINE			AVERAGE FOR YEARS TESTED					10-YR. PERCENT COMPAR. OF AVERAGE PIROLINE		
		1991	1992	1993	1994	1995	TESTED	YIELD	YIELD	PERCENT	1991	1992	1993	1994	1995	TESTED	TEST WT
3/	4/	5/	6/	7/		8/	9/		4/	5/	6/	7/			8/	9/	
MT140523 CHINOOK	6	26.2	-	106.8	-	75.3	57.1	60.6	107.2	48.2	-	42.7	-	48.0	47.4	48.3	100.0
CI 15229 STEPTOE	8	34.7	-	94.6	-	81.7	59.0	59.0	104.4	40.0	-	36.8	-	40.9	41.3	41.3	85.5
NS 78054 BARONESSE (P+)	3	16.7	-	112.1	-	82.1	70.3	58.8	103.9	43.9	-	43.8	-	46.8	44.8	45.5	94.2
PI531228 BEARPAW	7	16.8	-	100.9	-	-	55.4	58.7	103.8	42.3	-	43.6	-	-	46.7	47.0	97.3
PI483237 BOWMAN	8	25.9	-	115.8	-	72.6	58.3	58.3	103.1	51.6	-	42.8	-	48.4	48.6	48.6	100.6
CI 15856 LEWIS	8	19.4	-	97.9	-	74.3	56.6	56.6	100.0	47.2	-	44.6	-	48.9	48.8	48.8	101.1
CI 9558 PIROLINE	8	19.3	-	104.7	-	79.0	56.6	56.6	100.0	45.7	-	45.1	-	50.3	48.3	48.3	100.0
PI491534 GALLATIN	8	19.4	-	98.0	-	71.7	56.4	56.4	99.7	47.4	-	44.1	-	48.8	48.4	48.4	100.2
MT 81161 MT 81161	4	-	-	107.2	-	-	60.6	55.7	98.5	-	-	45.2	-	-	45.8	47.0	97.4
CI 15857 CLARK	7	19.8	-	100.3	-	-	52.2	55.4	97.9	45.0	-	43.3	-	-	52.3	53.9	111.6
ND 9866 STARK	4	18.9	-	108.4	-	72.8	58.9	55.3	97.7	48.6	-	42.1	-	49.2	47.7	48.2	99.8
SK 76333 HARRINGTON	8	18.1	-	100.1	-	76.6	55.0	55.0	97.2	42.8	-	43.6	-	45.1	46.5	46.5	96.3
CI 15514 HECTOR	8	19.9	-	95.3	-	70.7	54.5	54.5	96.4	46.6	-	43.3	-	48.0	48.4	48.4	100.2
CI 15687 KIMBERLY	3	-	-	-	-	-	51.7	51.6	91.3	-	-	-	-	-	49.8	47.7	98.7
ND 5569 HAZEN	3	-	-	-	-	-	37.2	42.9	75.9	-	-	-	-	-	43.6	43.1	89.2
MEANS (ENTRIES LISTED)		21.3	-	103.2	-	75.7	-	55.7	-	45.8	-	43.2	-	47.4	-	47.4	-
10/ Growing Season Precip. (in.)		8.84	4.55	13.03	4.00	10.34	7.29										
11/ Soil PAW (in.) to SD @Pltng.		6.69	5.67	6.75	7.93	4.96	7.96										
Total Plant Avail. Water (in.)		15.53	10.22	19.78	11.93	15.30	15.24										
Soil NO3 (lbs.) to SD @Pltng.		140.0	198.0	162.0	110.0	104.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		65.0	42.0	70.5	40.0	30.0											
(# P2O5)		25.0	25.0	25.0	30.0	15.0											
(# K2O)		10.0	10.0	10.0	0.0	7.0											
(# SO4)		0.0	0.0	0.0	0.0	0.0											

Check variety is Piroline.

- 1/ See MCBS Bulletin 1094 for evaluation of other important variety performance characteristics to include malting potential, disease resistance, etc. before making variety selection decisions.
- 2/ P = Private variety, + = Protected variety.
- 3/ Only the five most recent years shown, but summary calculations include all years noted.
- 4/ Crop suffered substantial hail damage plus further shatter loss via harvest of over-ripe crop by binder (necessary due to major combine breakdown).
- 5/ 1992 nursery was lost to hail damage.
- 6/ Stand was poor, resulting in inflated yields. The site also suffered moderate hail damage in late June.
- 7/ Results from the 1994 nursery were not used due to poor stand establishment resulting from severe crusting.
- 8/ 10-yr. CA = $(x/y) \cdot z$ where x = average yield or test weight of the entry for years tested, y = average yield or test weight for Piroline for the same years, and z = 10-yr. average yield or test weight for the check variety Piroline.
- 9/ Percent of Piroline yield or test weight for the same data years as those in which the entry was tested.
- 10/ Seeding to 14 days prior to harvest maturity.
- 11/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

TABLE 20. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
MT890008	MT890008	93.07	27.78	98.37	50.83	94.80	2.10	10.60
NS 78054	Baronesse	86.13	25.73	97.40	50.80	89.70	4.00	11.70
CI 15229	Steptoe	89.23	24.66	96.10	43.53	90.50	3.40	10.80
PI537967	Colter	77.40	25.46	94.47	45.20	83.60	5.80	10.50
H1851195	H1851195	83.33	29.46	93.30	51.53	97.30	.60	11.90
SK 76333	Harrington	75.67	28.35	90.50	50.97	93.20	2.30	11.20
H3860224	H3860224	90.63	27.36	90.20	51.60	94.20	2.30	11.50
PI483237	Bowman	89.57	28.15	88.47	51.73	96.10	1.50	11.50
MT886610	MT886610	90.97	27.34	86.70	51.33	86.80	4.40	11.30
MT890070	MT890070	82.97	29.87	86.13	52.30	96.80	1.10	11.20
CI 15856	Lewis	77.43	28.12	85.17	51.90	90.40	3.00	12.40
PI491534	Gallatin	86.47	29.42	84.90	52.07	86.00	5.10	11.90
PI537438	Targhee	93.03	27.55	84.00	49.40	88.30	4.50	11.50
CI 9558	Piroline	88.90	29.96	82.67	52.77	93.30	1.90	11.90
MT889106	MT889106	79.17	28.43	79.37	52.47	97.80	.70	12.10
ND 9866	Stark	86.13	30.73	79.13	52.63	97.20	1.20	11.70
CI 15514	Hector	83.00	28.04	78.57	51.50	91.00	3.20	11.90
21140523	Chinook	81.27	29.70	77.10	51.50	88.80	3.50	11.80
EXPERIMENTAL MEANS		85.24	28.12	87.36	50.78	91.99	2.81	11.52
C.V. 2: (S OF MEAN/MEAN)*100		6.59	3.20	3.71	.80	-	-	-
LSD (0.05)		16.14	2.59	9.31	1.17	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3654-SB Field: OffSta Design: RCB # Ents: 18 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SE Section: 8 Twnshp: 34 N Range: 7 E Latitude: 48.73 N Longitude: 110.83 W Elevation: 3300 ft.

Seeding Date: 05/10/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.00 in. Moist Soil Depth @ Sd'g: 55.0+ in. Soil Temp @ Sd'g: F @ 1 in. 71.0F @ 2 in. 60.0F @ 4 in. Soil Texture: CL Soil Series: Joplin-Hillon Cl Loam Cropping System: X Fallow Recrop Full-Till X Reduced-Till No-Till # Tillages: 3 # Chem Apps: 1 Cropping System Details: 94 Fallow Season = 1x Chem w/80z 'Roundup', 1x Tillage w/Sweeps, 2x Tillage w/Sweeps & Rods Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Winter Wheat 3 Yrs Ago = 92 = Fallow Fertilizer: 38#N, 19#P2O5, 7#K2O/ac via gran.blend inj'd prior to plnt'g Herbicide: 'Amber' 4#2,4-D @.28*10.0oz/ac Harvest Date: 09/14/95 Root Penetration Depth: 42 in. Comments: Pre-Plant Soil Analysis was Pre-Fertilization

Depth in.	PRE-PLANT SOIL ANAL 04/26/95							POST-HVST SOIL ANAL 09/14/95										
	PAW	pH	OM	NO3	P	K	S	Text	CEC	PAW	pH	OM	NO3	P	K	S	Text	CEC
0 -6"	.71	7.4	1.4	16	16	257	12	CL	21.8	.73	6.5	1.7	10	21	304	12	CL	21.8
6-24"	1.91			18			21	CL		2.05			12			9	CL	
24-36"	.96			8				CL		.95			4				CL	
36-48"	1.19			20				CL		1.29			12				CL	
TOTAL:	4.77			62						5.02			38					

Precipitation 04/26/95 to Sd'g: 0.84 in. (0.81 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.61 in. & Stored Soil 05/10/95 to Hvst: 14.30 in. (13.71 in events =>.1 in.) Measured Resid Soil Water @ Hvst: 5.02 in. Water Summary: Growing Season (05/10/95 to 14 days prior to Harvest Maturity: 12.66 in.) (12.27 in events =>.1 in.) Post-Grwg Seas (14 days prior to Harvest Maturity to 09/13/95: 1.64 in.) (1.44 in events =>.1 in.) Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 13.25 in.)

TABLE 21. SEVEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1989-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF PIROLINE TEST WT 5/
CI 15229 STEPTOE	7	67.7	60.2	90.4	54.0	96.1	67.9	67.9	112.9	44.4	42.8	43.2	42.3	43.5	43.3	43.3	86.8
MT860756 GALLATIN/BELLONA	3	-	70.6	83.3	48.4	-	67.4	66.4	110.3	-	49.4	51.6	49.2	-	50.1	50.2	100.8
NS 78054 BARONESSE (P+)	5	41.9	71.2	90.5	46.4	97.4	69.5	66.0	109.7	44.7	48.2	49.4	47.7	50.8	48.2	48.0	96.4
MT 81161 MT 81161	3	-	71.5	79.6	-	-	70.0	65.7	109.2	-	48.6	50.2	-	-	48.3	48.3	97.0
PI537967 COLTER	3	-	-	83.8	47.8	94.5	75.4	65.3	108.5	-	-	43.8	45.0	45.2	44.7	43.8	88.0
MT890008 MT890008	3	-	-	87.0	40.5	98.4	75.3	65.3	108.4	-	-	48.6	46.2	50.8	48.5	47.7	95.7
MT851195 MT851195	3	-	-	82.1	47.0	93.3	74.1	64.3	106.7	-	-	50.4	48.5	51.5	50.1	49.2	98.8
PI483237 BOWMAN	7	50.5	63.6	89.4	49.2	88.5	64.2	64.2	106.7	50.6	47.6	49.4	49.9	51.7	49.9	49.9	100.1
PI491534 GALLATIN	7	52.4	74.7	76.0	44.9	84.9	63.8	63.8	106.0	49.4	49.8	50.8	49.4	52.1	50.2	50.2	100.8
MT140523 CHINOOK	7	55.4	68.9	86.4	45.0	77.1	63.5	63.5	105.5	46.7	48.7	51.3	49.5	51.5	49.5	49.5	99.3
CI 15856 LEWIS	7	50.8	64.5	84.6	47.7	85.2	62.8	62.8	104.3	48.0	49.2	52.0	49.6	51.9	50.2	50.2	100.7
ND 9866 STARK	6	56.3	63.3	71.8	49.9	79.1	62.4	60.9	101.2	50.3	48.8	50.5	50.5	52.6	50.6	50.4	101.2
MT 81616 BEARPAW	5	50.5	67.6	73.0	-	-	59.7	60.6	100.7	42.8	48.6	50.1	-	-	47.5	47.8	95.9
CI 9558 PIROLINE	7	50.8	57.7	83.4	42.3	82.7	60.2	60.2	100.0	48.0	49.5	51.3	48.2	52.8	49.8	49.8	100.0
CI 15514 HECTOR	7	47.9	61.5	75.4	40.7	78.6	59.3	59.3	98.4	47.3	49.4	50.3	49.3	51.5	49.6	49.6	99.5
SK 76333 HARRINGTON	7	34.1	64.5	84.2	41.7	90.5	58.8	58.8	97.7	41.2	48.1	49.4	46.8	51.0	47.9	47.9	96.1
CI 15857 CLARK	5	45.2	61.3	73.9	-	-	55.4	56.3	93.5	47.0	48.4	50.1	-	-	48.3	48.6	97.5
MEANS (ENTRIES LISTED)		50.3	65.8	116.2	46.1	88.2		63.0		46.7	48.4	49.5	48.0	50.5		48.5	
6/ Growing Season Precip. (in.)		10.02	9.23	12.45	2.83	12.66		8.50									
7/ Soil PAW (in.) to SD at Plt.		10.15	6.64	5.76	9.31	5.61		8.00									
Total Plant Avail. Water (in.)		20.17	15.87	18.21	12.14	18.27		16.50									
Soil NO3 (lbs.) to SD at Plt.		76.0	96.0	112.0	108.0	62.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		70.0	70.0	55.0	90.0	38.0											
(#P2O5)		40.0	40.0	0.0	0.0	19.0											
(#K2O)		0.0	0.0	0.0	0.0	7.0											

Check variety is Piroline.

1/ See MCES Bullutin 1094 for other important variety performance characteristics to include, malting potential, disease resistance, etc., before making variety selection decisions.

2/ P = Private variety, + = Protected variety.

3/ 4 in. wet snow on 8/23 resulted in moderate lodging & shatter loss to mature crop.

4/ 7-yr. CA = (x/y) * z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Piroline for the same years, and z = 7-yr. average of yield or test weight for the check variety Piroline.

5/ Percent of Piroline yield or test weight for the same data years as those in which the entry was tested

6/ Seeding to 14 days prior to harvest maturity.

7/ Soil PAW values are actual gravimetric measurements.

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TABLE 22. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE SIDNEY SOLBERG FARM. NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1995.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	Steptoe	73.97	23.99	66.83	44.03	82.40	7.90	10.80
MT890070	MT890070	73.27	27.43	64.53	50.33	87.60	5.80	11.80
NS 78054	Baronesse	79.53	25.04	63.03	51.30	91.40	3.60	12.60
H3860224	H3860224	76.07	27.69	61.97	50.90	91.10	3.60	12.90
PI537967	Colter	61.43	24.50	58.20	44.70	62.70	16.60	10.20
SK 76333	Harrington	76.07	28.33	58.13	48.70	84.90	6.20	12.60
H1851195	H1851195	69.43	29.84	57.50	49.63	86.00	4.70	12.90
MT889106	MT889106	59.37	27.57	55.33	51.47	91.50	4.10	12.40
MT886610	MT886610	71.17	28.23	55.20	50.67	80.30	8.50	12.50
CI 9558	Pirolina	81.97	28.65	54.70	51.70	85.40	4.50	12.50
PI483237	Bowman	77.77	26.25	51.47	51.57	92.20	3.10	12.30
CI 15856	Lewis	64.60	27.05	49.43	51.43	84.60	6.00	13.20
MT890008	MT890008	83.00	27.93	49.10	48.13	85.10	7.20	12.30
ND 9866	Stark	75.37	26.98	48.67	52.03	91.70	3.50	12.20
21140523	Chinook	70.87	27.77	46.97	50.53	83.50	7.70	13.20
PI537438	Targhee	87.83	27.52	46.93	48.17	78.30	11.50	12.30
PI491534	Gallatin	71.17	27.57	43.30	51.43	84.30	6.20	12.40
CI 15514	Hector	60.77	27.60	39.30	49.33	75.20	11.60	12.80
EXPERIMENTAL MEANS		72.98	27.22	53.92	49.78	84.34	6.79	12.34
C.V. 2: (S OF MEAN/MEAN)*100		9.32	3.67	8.57	1.00	-	-	-
LSD (0.05)		19.56	2.87	13.28	1.43	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 95-3655-SB Field: OffSta Design: RCB # Ents: 18 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft. Qtr: SESE Section: 36 Twnshp: 32 N Range: 27 E Latitude: 48.48 N Longitude: 108.18 W Elevation: 2700 ft.

Seeding Date: 05/11/95 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 55.0+ in. Soil Temp @ Sd'g: F @ 1 in. 64.0F @ 2 in. 62.0F @ 4 in. Soil Texture: CL Soil Series: Phillips-Elloam

Cropping System: X Fallow Recrop X Full-Till Reduced-Till No-Till # Tillages: 4 # Chem Apps: 1

Cropping System Details: 4x Tillage w/16" Sweeps Spr/Sum 94 & 1x Chem Fall 94 (2,4-D+'Roundup') for Bindweed Control

Cropping History: 1 Yr Ago = 94 = Fallow 2 Yrs Ago = 93 = Spring Wheat 3 Yrs Ago = 92 = Fallow

Fertilizer: 66#N,33#P2O5, 0#K2O/ac via gran.blend bnd'd 1.5" below seed Herbicide: PPI 'Fargo', 2,4-D Amine

Harvest Date: 09/15/95 Root Penetration Depth: in. Note: Soil Anal prior to bnd'd Fert, but 50#N/a app'd Fall94

Depth	PRE-PLANT SOIL ANAL 04/26/95	Max Depth=48"	POST-HVST SOIL ANAL 09/15/95 (Max Depth=48"
in.	% Lb/a ppm ppm ppm	Soil CEC	in. % Lb/a ppm ppm ppm
	PAW pH OM NO3 P K S Text Txt	PAW	PAW pH OM NO3 P K S Text Txt
0 -6"	.82 6.3 1.4 32 19 323 10	CL+ 21.8	.54 6.0 1.4 10 38 343 11
6-24"	3.03 24	CL+	1.97 18
24-36"	1.81 12	CL+	1.23 8
36-48"	1.69 28	CL+	1.41 24
TOTAL:	7.35 96		5.15 60

Precipitation 04/26/95 to Sd'g: N/A in. (N/A in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: N/A in. & Stored Soil 05/11/95 to Hvst: N/A in. (N/A in events =>.1 in.) Measured Resid Soil Water @ Hvst: 5.15 in.

Water Summary: Growing Season (05/11/95 to 14 days prior to Harvest Maturity: N/A in.) (N/A in events =>.1 in.) Post-Grwg Seas (14 days prior to Harvest Maturity to 09/15/95: N/A in.) (N/A in events =>.1 in.)

Adj'd Summary: Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: N/A in.)

TABLE 23. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE SIDNEY SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1986-1995.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	10-YR. AVERAGE YIELD	PERCENT COMPAR. OF PIROLINE	1991	1992	1993	1994	1995	AVERAGE FOR YEARS TESTED	10-YR. AVERAGE TEST WT	PERCENT COMPAR. OF PIROLINE
NS 78054 BARONESSE (P+)	4	22.1	-	83.8	68.8	63.0	59.4	55.2	111.4	46.9	-	42.9	47.2	51.3	47.1	46.2	94.3
CI 15229 STEPTOR	7	13.4	-	80.2	67.5	66.8	53.9	53.9	108.6	39.4	-	38.6	41.0	44.0	40.7	40.7	83.0
PI537967 COLTER	3	-	-	82.1	66.8	58.2	69.0	53.0	106.8	-	-	42.0	44.8	44.7	43.8	43.4	88.5
MT890008 MT890008	3	-	-	84.6	69.6	49.1	67.7	52.0	104.8	-	-	45.5	49.2	48.1	47.6	47.1	96.1
MT140523 CHINOOK	6	22.9	-	78.7	69.0	47.0	54.5	51.4	103.6	46.5	-	47.3	49.5	50.5	48.0	48.0	97.9
PI491534 GALLATIN	7	23.7	-	76.7	61.8	43.3	50.7	50.7	102.2	45.9	-	49.9	49.4	51.4	48.9	48.9	99.7
PI531228 BEARPAW	5	18.4	-	80.1	-	-	46.6	50.3	101.4	44.0	-	45.4	-	-	45.6	46.1	94.0
CI 15856 LEWIS	7	20.3	-	76.2	61.2	49.4	50.0	50.0	100.7	47.4	-	50.0	47.1	51.4	48.9	48.9	99.7
CI 9558 PIROLINE	7	19.5	-	76.3	62.9	54.7	49.6	49.6	100.0	47.2	-	48.3	48.6	51.7	49.0	49.0	100.0
MT851195 MT851195	3	-	-	71.7	64.7	57.5	64.6	49.6	100.0	-	-	44.6	47.5	49.6	47.2	46.7	95.4
MT 81161 MT 81161	3	-	-	69.7	-	-	57.9	48.8	98.4	-	-	46.7	-	-	46.1	46.0	93.9
SK 76333 HARRINGTON	7	19.4	-	78.3	61.7	58.1	48.5	48.5	97.7	44.8	-	41.7	47.2	48.7	46.3	46.3	94.4
CI 15857 CLARK	5	19.6	-	67.2	-	-	44.6	48.2	97.1	44.2	-	46.5	-	-	45.7	46.1	94.2
ND 9866 STARK	4	17.1	-	89.0	-	48.7	51.6	47.9	96.6	46.6	-	46.3	-	52.0	48.7	48.8	99.6
PI483237 BOWMAN	7	23.2	-	71.2	55.6	51.5	47.9	47.9	96.5	47.8	-	47.5	48.8	51.6	48.7	48.7	99.4
CI 15514 HECTOR	7	18.4	-	73.2	64.5	39.3	47.4	47.4	95.6	45.0	-	48.0	48.1	49.3	47.7	47.7	97.2
MEAN (ENTRIES LISTED)		19.8	-	77.4	64.5	52.8	-	50.3	-	45.5	-	45.7	47.4	49.6	-	46.8	-
9/ Growing Season Precip. (in.)		13.00	0.0	10.53	2.80	NA	6.69										
10/ Soil PAW (in.) to SD @Plntng.		7.60	0.0	8.05	7.86	NA	8.79										
Total Plant Avail. Water (in.)		20.60	0.0	18.58	10.66	NA	15.48										
Soil NO3 (lbs.) to SD @Plntng.		128.0	0.0	120.0	52.0	96.0											
SD (Sampling Depth in inches)		48.0	0.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	0.0	62.0	51.0	66.0											
(# P2O5)		40.0	0.0	35.0	25.0	33.0											

Check variety is Piroline.

- 1/ See MCES Bulletin 1094 for evaluation of other important variety performance characteristics to include malting potential, disease resistance, etc. before making variety selection decisions.
- 2/ P = Private variety, + = Protected variety.
- 3/ Only the five most recent years shown, but summary calculations include all years noted.
Severe grasshopper damage in 1986 nursery.
1988 Nursery lost to wildlife grazing.
- 4/ 1991 crop suffered very substantial hail damage.
- 5/ 1992 nursery lost to drought conditions at the time of seeding.
- 6/ The variety 'Stark' was deleted from analysis due to wildlife grazing.
- 7/ 10-yr. CA = $(x/y) * z$ where x = average yield and test weight of the entry for years tested, y = average yield and test weight of Piroline for the same years, and z = 10-yr. average yield or test weight for the check variety Piroline.
- 8/ Percent of Piroline yield and test weight for the same data years as those in which the entry was tested.
- 9/ Seeding to 14 days prior to harvest maturity.
- 10/ Depth of moist soil (ft.) * 2.00 in. PAW/t except starting in 1986 where soil PAW values are actual gravimetric measurements.