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

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Individual Cooperating Landowners

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 1982-1996 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 included in a separate report.

1997 cropping environments ranged from fair to good across North Central Montana. At Havre, total annual growing season precipitation (9/1/96 through 8/31/97) was 12.04 inches, equivalent to the average for all years since 1916. April 1 through July 31 precipitation was 6.18 inches or 92 percent of the 82-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) were 108 percent of the average for the last 47 years (1951-1997). July-September, 1997 GDD values were 110 percent of normal; and less than average

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precipitation for the period provided for a harvest with very few weather delays. The last spring frost was 4 days late with the first fall frost one day early resulting in 123 frost free days - 5 days shorter than the 82-year average. September 1996 through March 1997 precipitation was 119 percent of the long-term average, and stored soil moisture was generally good. The April through July growing season saw an average daily temperature at 58 degrees F or nearly normal, but April was substantially cooler than normal while August was substantially warmer than the long-term average. Maximum summer temperature was recorded on August 4 at 100 degrees F. Minimum winter temperature was -36 degrees F on January 11. Crop outlook was initially mixed with good soil moisture, but very short March and April precipitation and seemingly sluggish early crop development in April and May. Generally favorable conditions throughout the remainder of the season resulted in yields and test weight comparisons with long-term averages varying according to crop (WW=normal yields and high test weights, SW=high yields and normal test weights, BLY=high yields and test weights, and OAT=high yields and normal test weights). The above trends were associated with timely planting. Later plantings and greater stress associated with recrop plantings resulted in lower yields and severely decreased test weights in 1997.

Off-station cropping environments were somewhat variable in 1997. The Turner and Loring locations were wetter than normal, but the North Joplin location was drier than normal. The Big Sandy and North Havre locations had slightly below-average precipitation. Most locations recorded yields commensurate with moisture, and test weights were generally lower at all off-station locations. Protein levels for appropriately fertilized wheat and barley was generally very good.

Plant height, yield, test weight, and protein data for the Myers and Peterson dryland winter wheat trials conducted in 1997 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 1997 Cederberg, Myers, Peterson, Graff and Flansaas/Lumsden dryland spring wheat trials are summarized in Tables 5, 7, 9, 11 and 13, respectively. The Flansaas/Lumsden location is relatively new (2nd year)at Loring in Phillips County replacing the 10-year Solberg location at Dodson (1986-1995). 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, and Graff locations are presented in Tables 6, 8, 10, and 12, respectively. Following one more year of data in 1998, multi-year yield and test weight summaries will be included for the Flansaas/Lumsden location.

Stand percent, plant height, yield, test weight, plump/thin and protein data for the 1997 Cederberg, Myers, Peterson, Graff and FLansaas/Lumsden spring barley trials are summarized in Tables 14, 16, 18, 20 and 22, respectively. 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, and Graff locations are presented in Tables 15, 17, 19, and 21, respectively.

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SUMMARY:

Fourteen 1997 off-station variety performance trials were conducted on mechanical or chemical fallow at five locations in five Northern Montana counties.

Dryland Winter Wheat Trials:

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.	Flansaas/Lumsden Farm, Phillips Co	(1SW Loring)	24-35N-29E

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.	Flansaas/Lumsden Farm, Phillips Co	(1SW Loring)	24-35N-29E

* 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. Trials (1988-1991) were planted with hoe openers fitted with `Acra-Plant' or JD 3" shovels. Beginning with spring planting in 1992, all off-station trials were planted with modified `Haybuster' openers. A randomized complete block design was standard for all trials with three replications. Beginning in 1997, a `Wintersteiger 1541-21' plot combine, funded in part by MWBC was used to harvest each 3-row plot after end-trimming to 16'. Prior to 1997, a `Hege 125C' plot combine, also funded in part by MWBC in 1984, was used. 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 the 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 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 and Flansaas/Lumsden locations in Liberty and Phillips Counties were 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.

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TABLE 1. DRYLAND FALLOW WINTER WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND % 1/	PLNT HT Inches	YIELD Bu/Ac 2/	TESTWT Lbs/Bu	PROTEIN %
PI564761	ERHARDT	94.47	23.66	48.60	62.10	13.80
PI593889	RAMPART (sawfly resistant)	95.33	27.38	47.90	60.90	14.20
CI 17735	NORSTAR	98.60	30.37	47.77	60.87	13.20
MT 9432	NUWEST/TIBER	94.10	28.48	46.13	62.03	14.00
PI593891	VANGUARD (sawfly resistant)	97.40	27.76	45.87	61.90	14.20
CI 17879	ROCKY	98.97	26.64	43.80	62.37	13.10
CI 15075	CENTURK	95.83	25.60	43.77	62.17	12.80
PI478771	AGASSIZ	98.97	30.22	43.20	61.83	13.50
MT 91192	WWP4394/NUWEST//MT7431/MT	98.60	26.85	42.47	59.27	13.10
S86-15	KESTREL	90.63	29.25	42.20	57.67	12.50
CI 17860	NEELEY	91.30	27.28	41.67	60.17	13.70
QT 542	QUANTUM 542	94.80	25.58	41.60	61.10	13.60
PI586806	NUWEST	93.07	24.91	41.57	59.30	13.40
RH78W296	BIGHORN	94.43	24.70	40.77	61.17	13.60
PI573096	ALLIANCE	96.17	23.50	40.40	62.27	12.70
PI593890	McGUIRE	97.90	24.65	40.40	61.50	14.90
CI 17844	REDWIN	91.17	27.90	39.43	60.80	14.10
MT 9222	NUWEST/MT7869//NWN/MT7840	92.73	25.93	39.03	60.50	13.80
PI584526	JUDITH	96.00	27.15	38.43	58.30	13.30
PI517194	TIBER	96.53	26.71	36.93	61.33	13.60
CI 17846	MANNING	92.37	22.68	36.60	60.63	13.00
PI559720	YUMA	93.57	22.18	35.63	61.20	12.30
PI555458	PROMONTORY	83.37	24.50	33.00	60.47	12.90
CI 17952	HAWK	93.43	23.85	30.70	61.37	12.90
EXPERIMENTAL MEANS		94.57	26.15	41.16	60.88	13.43
C.V. 2: (S OF MEAN/MEAN)*100		3.19	4.28	7.64	.61	-
LSD (0.05)		8.59	3.18	8.95	1.05	-

1/ Percent stand occupancy at harvest maturity
2/ Sawfly cutting was substantial among most hollow-stemmed, non-resistant lines. Pickup guards were utilized on the 5' plot combine, but cutting height minimum was restricted to simulate that minimum appropriate with full-width combines.

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3851-WW Field: OffSta Design: __RCB__ # Ents: 24 # 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: 110.40 W Elevation: 2800 ft.

Seeding Date: 09/24/96 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 48.00 in.
Soil Temp @ Sd'g: __.__F @ 1 in. 56.0F @ 2 in. 53.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 2x Tillage w/Sweeps & Harrows; 1x Tillage w/Sweeps, Harrows & Rods__
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Winter Wheat_ 3 Yrs Ago = 94 = ____Fallow___
Fertilizer: 55#N,22#P2O5, 0#K2O/ac via NH3+11-52-0 inj'd in sep PP ops Fall96 Herbicide: __'Bronate' @ 1.5pts/ac___
Harvest Date: 08/06/97 Root Penetration Depth: 48 in. Comments: __Pre-Plant Soil Analysis was Pre-Fertilization___

Depth	PRE-PLANT SOIL ANAL 09/13/96 (Max Depth=48")									04/03/97	POST-HVST SOIL ANAL 08/06/97 (Max Depth=48")								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.62	5.8	1.3	62	20	354	6	VFSL	14.5	.58	.22	6.1	1.2	2	15	311	6	VFSL+	14.5
6-24"	2.65			42			21	SCL-		1.88	.82			24			12	SCL	
24-36"	2.25			56				CL		2.07	.71			12				CL	
36-48"	1.88			56				CL		1.43	1.24			36				CL	
TOTAL:	7.40			216						5.96	2.99			74					

Precipitation & Stored Soil Water Summary: 09/13/96 to Sd'g: __.__ in. (__.__ in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: __.__ in.
Sd'g to 04/03/97: __.__ in. (__.__ in events =>.1 in.) Measured Soil Water on 04/03/97: 5.96 in.
04/03/07 to Hvst: 7.16 in. (__.__ in events =>.1 in.) Measured Resid Soil Water @ Hvst: 2.99 in.
Stnd Grwg Seas (04/01/97 to 14 days prior to Harvest Maturity: 7.16 in.) (_.__ in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 08/06/97: 0.00 in.) (_.__ 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: 10.13 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. 1988-1997.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993	1994	1995	1996 4/	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 5/	PERCENT OF NORSTAR YIELD 6/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 5/	PERCENT OF NORSTAR TEST WT 6/
NA 000X RAM (P+)	4	-	-	-	-	-	41.8	55.5	128.1	-	-	-	-	-	58.9	59.2	97.1
ID 279 BLIZZARD	4	65.0	-	70.8	-	-	54.2	52.0	120.1	63.5	-	61.1	-	-	61.8	60.9	99.9
PI564761 ERHARDT	4	-	43.9	62.6	61.3	48.6	54.1	48.1	111.0	-	61.8	61.5	62.5	62.1	62.0	62.4	102.5
S86-15 KESTREL	5	61.1	41.8	70.8	61.5	42.2	55.5	46.5	107.4	62.3	58.1	61.1	59.5	57.7	59.7	59.5	97.7
QT 542 QUANTUM 542 (P)	7	72.8	44.6	52.7	33.6	41.6	49.3	46.3	106.8	62.5	61.0	60.1	60.9	61.1	60.9	60.7	99.6
CI 17902 WINRIDGE	7	65.6	39.9	52.9	-	-	43.2	46.1	106.4	62.0	59.9	59.4	-	-	60.4	60.3	99.0
CI 17860 NEELEY	9	71.0	42.5	55.1	42.3	41.7	45.7	45.7	105.4	62.8	60.5	60.3	59.8	60.2	60.5	60.5	99.4
PI584526 JUDITH	9	63.7	41.0	58.3	55.8	38.4	44.0	44.0	101.6	61.3	57.6	59.4	59.1	58.3	59.3	59.3	97.3
PI517194 TIBER	9	69.0	39.1	60.8	48.6	36.9	43.8	43.8	101.1	63.4	61.3	60.9	61.6	61.3	61.3	61.2	100.5
CI 17735 NORSTAR	9	63.2	37.0	53.2	58.1	47.8	43.3	43.3	100.0	63.9	59.3	61.2	60.4	60.9	60.9	60.9	100.0
PI478771 AGASSIZ	7	57.0	39.2	55.5	56.6	43.2	45.7	42.9	99.0	62.7	60.2	61.2	62.0	61.8	61.4	61.2	100.4
CI 17879 ROCKY (P+)	9	71.1	43.8	45.3	41.4	43.8	42.7	42.7	98.7	62.8	61.8	59.9	61.3	62.4	61.3	61.3	100.6
RDW(sel) AC READYMADE	4	63.3	32.6	56.7	55.4	-	52.0	42.6	98.4	62.8	61.3	60.8	61.9	-	61.7	61.4	100.8
CI 17846 MANNING	6	66.4	43.2	63.9	40.9	36.6	45.4	42.5	98.2	61.7	61.1	59.9	61.1	60.6	60.9	60.7	99.7
CI 17940 ARCHER (P+)	5	61.7	43.7	47.0	-	-	37.0	41.2	95.2	61.7	60.5	59.0	-	-	59.7	59.3	97.3
PI586806 NUWEST (+)(hrd whi	6	-	38.9	58.8	47.8	41.6	46.9	41.2	95.1	-	59.7	60.9	60.9	59.3	60.3	60.5	99.2
CI 15075 CENTURK (+)	9	60.4	46.3	47.4	38.2	43.8	40.9	40.9	94.5	62.8	61.5	60.0	60.5	62.2	61.1	61.1	100.3
RH78W296 BIGHORN (P+)	7	65.8	41.2	56.9	40.2	40.8	44.2	40.5	93.4	62.8	60.2	60.2	61.5	61.2	60.9	60.6	99.5
CI 17727 WESTON	5	59.5	44.2	56.5	28.7	-	42.2	39.8	91.9	62.7	61.7	61.5	62.1	-	61.9	61.7	101.2
PI593889 RAMPART (swfly res	4	-	44.3	56.2	24.6	47.9	43.3	38.4	88.7	-	60.3	59.9	60.7	60.9	60.5	60.7	99.7
CI 17844 REDWIN	9	55.0	32.1	46.2	35.8	39.4	37.4	37.4	86.3	62.3	61.3	60.9	61.9	60.8	61.2	61.2	100.5
CI 17952 HAWK	9	64.3	44.0	40.2	3.5	30.7	36.5	36.5	84.3	62.4	63.1	61.5	60.0	61.4	61.2	61.2	100.5
PI593890 MCGUIRE	3	-	-	45.8	43.1	40.4	43.1	35.2	81.3	-	-	59.8	60.7	61.5	60.7	60.7	99.7
PI593891 VANGUARD (swfly re	4	-	41.8	51.1	14.7	45.9	38.4	34.1	78.7	-	60.8	59.9	61.1	61.9	60.9	61.4	100.7
MEAN (ENTRIES LISTED)		64.2	41.2	55.0	41.6	41.7	-	42.8	-	62.6	60.6	60.5	61.0	60.9	-	60.7	-
7/ Growing Season Precip. (in.)		12.3	6.47	14.63	8.16	7.16	7.99										
Soil PAW (in.) to 4 ft. at Plntng.		5.26	8.79	5.75	6.93	7.40	6.89										
Total Plant Avail. Water (in.)		17.56	15.26	20.38	15.09	14.56	14.87										
Soil NO3 (lbs.) to 4 ft. at Plntng.		130.0	296.0	146.0	244.0	216.0											
Fertilizer Applied (# N)		55.0	56.0	55.0	55.0	55.0											
(# P2O5)		22.0	22.0	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.
The 1991 crop suffered minor hail damage on two occasions (5/20 & 7/13).

4/ The 1996 nursery suffered 31% average stand loss due to winter injury (from 1 to 92% by individual variety).

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.

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TABLE 3. DRYLAND FALLOW WINTER WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND % 1/	PLNT HT Inches	YIELD Bu/Ac	TESTWT Lbs/Bu	PROTEIN %
S86-15	KESTREL	92.20	26.99	57.90	58.20	11.00
PI517194	TIBER	79.20	26.93	56.25	59.45	13.30
CI 17735	NORSTAR	96.90	31.16	50.20	59.40	11.20
CI 17879	ROCKY	94.80	24.31	49.45	60.55	11.70
PI584526	JUDITH	83.35	26.34	49.05	58.70	12.20
PI586806	NUWEST	97.90	26.00	48.95	60.20	13.40
CI 17860	NEELEY	89.05	25.41	48.85	60.15	12.00
MT 9432	NUWEST/TIBER	77.10	27.40	48.75	60.60	13.90
MT 91192	WWP4394/NUWEST//MT7431/MT	91.70	24.21	48.60	58.65	13.00
MT 9222	NUWEST/MT7869//NWN/MT7840	95.30	25.22	48.50	59.60	13.10
QT 542	QUANTUM 542	62.50	25.87	46.45	59.40	13.30
PI564761	ERHARDT	92.75	23.13	45.15	60.50	12.70
PI478771	AGASSIZ	88.55	28.25	43.45	59.60	13.20
RH78W296	BIGHORN	88.55	23.74	43.15	59.25	12.90
PI555458	PROMONTORY	88.55	23.70	41.50	59.95	12.60
CI 17844	REDWIN	91.65	25.79	41.45	59.95	13.80
CI 17952	HAWK	87.50	20.79	40.95	58.15	12.20
PI573096	ALLIANCE	95.35	23.23	40.45	58.95	12.00
PI559720	YUMA	85.45	21.83	39.80	58.50	11.90
PI593891	VANGUARD (sawfly resistant)	60.95	22.20	39.60	58.30	14.00
CI 15075	CENTURK	88.00	24.13	39.00	59.60	12.80
PI593889	RAMPART (sawfly resistant)	73.95	25.61	38.00	58.35	14.00
PI593890	McGUIRE	91.15	23.96	36.95	59.05	14.60
CI 17846	MANNING	71.90	23.68	36.75	58.70	12.50
2/						
EXPERIMENTAL MEANS		86.01	25.00	44.96	59.32	12.80
C.V. 2: (S OF MEAN/MEAN)*100		8.85	4.72	5.76	.47	-
LSD (0.05)		22.28	3.45	7.57	.82	-

1/ Percent stand occupancy at harvest maturity
2/ Only replications 2 & 3 were harvested due to severe weed pressure in rep 1

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3852-WW Field: OffSta Design: __RCB__ # Ents: 24 # 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: 09/27/96 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 0.25 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __.__F @ 1 in. 56.0F @ 2 in. 50.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop ___ Full-Till ___ Reduced-Till _X_ No-Till # Tillages: 0 # Chem Apps: 2
Cropping System Details: __1996 Fallow Season = 2x Chem Fallow Apps ('Fallow Master')_____
Cropping History: 1 Yr Ago = 96 = _Chem Fallow__ 2 Yrs Ago = 95 = _Winter Wheat__ 3 Yrs Ago = 94 = _Red'T Fallow_
Fertilizer: 40#N,20#P2O5, 6#K2O/ac via Liquid (pre-plant colter injection)____ Herbicide: __'Bronate' @ 1.5 pt/ac__
Harvest Date: 08/29/97 Root Penetration Depth: 43 in. Comments: __Pre-Plant Soil Analysis was Post-Fertilization__

Depth	PRE-PLANT SOIL ANAL 09/25/96 (Max Depth=48")									04/02/07	POST-HVST SOIL ANAL 08/29/97 (Max Depth=48")								
	in.		%	Lb/a	ppm	ppm	ppm	Soil	CEC	in.	in.		%	Lb/a	ppm	ppm	ppm	Soil	CEC
	PAW	pH	OM	NO3	P	K	S	Text	Txt	PAW	PAW	pH	OM	NO3	P	K	S	Text	Txt
0 -6"	.92	6.6	1.0	52	14	318	6	SCL-	21.7	.53	.23	6.0	1.0	4	15	325	8	VFSL+	14.5
6-24"	2.57			30			16	SCL-		2.22	1.29			6			15	SCL	
24-36"	1.63			12				SCL-		1.25	.87			4				CL	
36-48"	1.52			8				SCL		1.14	1.07			4				CL	
TOTAL:	6.64			102						5.14	3.46			18					

Precipitation & Stored Soil Water Summary:
09/25/96 to Sd'g: 0.00 in. (0.00 in events =>.1 in.)
Sd'g to 04/02/97: 1.32 in. (1.28 in events =>.1 in.)
04/02/97 to Hvst: 5.98 in. (5.68 in events =>.1 in.)
Calc'd Initial Soil Water @ Sd'g: 6.64 in.
Measured Soil Water on 04/02/97: 5.14 in.
Measured Resid Soil Water @ Hvst: 3.46 in.

Adj'd Summary:
Stnd Grwg Seas (04/01/97 to 14 days prior to Harvest Maturity: 5.34 in.) (5.19 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 08/29/97: 0.64 in.) (0.49 in events =>.1 in.)
Init GS H2O Inv + 'Init GS Inv to Hvst' Prec - Hvst Resid H2O - 'PostGS' Prec (Calc'd ET: 7.02 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. 1988-1997.

2/VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1993	1994	1995	1996 4/	1997	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD 5/	PERCENT OF NORSTAR YIELD 6/	TEST WEIGHT (POUNDS PER BUSHEL) 1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE TEST WT 5/	PERCENT OF NORSTAR TEST WT 6/
PI477287 RAM (P)+	3	-	-	-	-	-	41.9	45.9	114.1	-	-	-	-	-	56.0	56.6	94.1
S86-15 KESTREL	5	56.2	48.6	51.0	49.0	57.9	52.5	44.8	111.5	62.0	57.3	55.8	60.3	58.2	58.7	58.5	97.4
PI586806 NUWEST (+)(hrd whi	6	-	51.9	44.6	40.0	49.0	47.4	44.8	111.3	-	59.7	57.4	62.7	60.2	59.1	59.8	99.5
CI 17860 NEELEY	9	64.2	50.4	46.0	43.8	48.9	43.9	43.9	109.2	62.2	60.1	56.2	62.2	60.2	59.7	59.7	99.3
ID 279 BLIZZARD	4	58.2	-	44.1	-	-	43.0	42.8	106.5	62.4	-	55.9	-	-	59.4	59.9	99.7
PI564761 ERHARDT	4	-	45.4	46.2	45.3	45.2	45.5	41.7	103.7	-	61.6	56.9	63.3	60.5	60.6	61.2	101.8
PI584526 JUDITH	9	60.9	47.1	35.2	46.4	49.1	41.3	41.3	102.7	61.4	57.3	53.9	60.1	58.7	58.0	58.0	96.5
PI517194 TIBER	9	61.6	46.4	41.2	35.9	56.3	41.1	41.1	102.1	62.7	60.9	56.8	63.1	59.5	60.2	60.2	100.1
CI 17940 ARCHER (P+)	4	51.0	51.2	36.0	-	-	40.4	40.5	100.8	60.8	61.2	53.3	-	-	58.6	58.7	97.7
QT 542 QUANTUM 542 (P)	7	59.0	56.6	39.1	27.4	46.5	42.7	40.5	100.6	62.4	60.5	56.0	62.0	59.4	59.6	59.4	98.9
CI 17735 NORSTAR	9	60.1	44.8	35.8	44.7	50.2	40.2	40.2	100.0	63.3	59.6	56.6	62.4	59.4	60.1	60.1	100.0
RDW(sel) AC READYMADE	4	51.3	45.8	44.4	43.1	-	46.1	40.0	99.6	62.4	60.9	57.7	63.0	-	61.0	60.6	100.8
CI 17879 ROCKY (P+)	9	56.4	48.6	38.7	35.3	49.5	39.8	39.8	98.9	61.9	61.2	56.1	62.6	60.6	60.1	60.1	100.0
CI 17092 WINRIDGE	7	58.2	45.3	40.7	-	-	37.4	39.4	98.1	61.0	58.5	54.6	-	-	58.0	58.2	96.9
CI 17592 HAWK (P+)	8	51.8	46.8	32.0	30.5	41.0	41.5	39.0	97.0	61.8	63.2	56.7	63.9	58.2	59.8	59.9	99.7
CI 16844 REDWIN	9	52.5	47.9	38.9	42.7	41.5	38.7	38.7	96.3	62.3	60.4	58.1	63.3	60.0	60.5	60.5	100.6
RH78W296 BIGHORN (P+)	7	57.7	47.6	38.7	36.4	43.2	40.1	38.0	94.6	62.4	60.7	55.4	62.4	59.3	59.5	59.4	98.8
CI 15075 CENTURK (+)	9	55.3	49.6	32.4	35.8	39.0	37.9	37.9	94.1	61.8	61.7	54.9	62.1	59.6	59.9	59.9	99.6
PI478771 AGASSIZ	7	52.5	44.5	30.6	43.0	43.5	40.3	37.7	93.7	62.4	60.6	58.2	62.0	59.6	60.1	60.2	100.2
MTS92042 RAMPART (swfly res	4	-	48.2	40.2	27.3	38.0	38.4	35.2	87.6	-	59.4	55.9	61.7	58.4	58.8	59.4	98.9
MT 88046 MCGUIRE	3	-	-	40.7	35.8	37.0	37.8	34.9	86.8	-	-	57.0	61.1	59.1	59.0	59.7	99.3
CI 17727 WESTON	5	49.3	44.4	31.1	32.7	-	35.6	34.9	86.8	62.9	61.6	56.7	63.3	-	61.2	60.9	101.3
MTSF2238 VANGUARD (swfly re	4	-	44.4	37.3	27.8	39.6	37.3	34.1	84.9	-	60.8	55.1	61.7	58.3	59.0	59.6	99.1
CI 17846 MANNING	6	53.9	44.9	33.8	32.0	36.8	31.7	30.0	74.5	61.3	60.5	53.5	62.1	58.7	59.5	59.3	98.6
MEAN (ENTRIES LISTED)		56.1	47.6	39.1	37.7	45.1	-	39.5	-	62.1	60.4	56.0	62.3	59.3	-	59.6	-
7/ Growing Season Precip. (in.)		12.05	6.09	10.86	5.36	5.34	7.01										
Soil PAW (in.) to 4 ft. at Plntng.		4.78	7.84	6.73	6.25	6.64	7.11										
Total Plant Avail. Water (in.)		16.83	13.93	17.59	11.61	11.98	14.11										
Soil NO3 (lbs.) to 4 ft. at Plntng.		82.0	112.0	146.0	158.0	102.0											
Fertilizer Applied (#N)		70.5	40.0	30.0	56.0												
(#P2O5)		25.0	30.0	15.0	25.0												
(#K2O)		10.0	0.0	7.0	8.0												

Check variety is Norstar.

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

2/ P = Private variety, + = Protected variety

3/ Only the five most recent years are shown, but summary calculations include all years noted.
The 1989 nursery was lost due to winter injury.
The 1991 crop suffered substantial hail damage.
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.

4/ The 1996 nursery suffered 26% average stand loss due to winter injury (from 1 to 54% by individual variety).

5/ 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.

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.

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TABLE 5. DRYLAND FALLOW SPRING WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
ND 606	AMIDON	98.97	33.73	46.53	56.93	13.27
BZ684-23	VANNA (soft white)	100.00	27.48	46.23	52.10	13.10
MT 9433	MT8808/MARBERG	100.00	31.18	45.90	58.47	13.73
PI574642	McNEAL	100.00	29.62	45.47	56.40	14.10
WB 936	WESTBRED 936	99.33	26.48	45.03	55.97	14.77
ND 582	STOA	100.00	31.42	44.37	55.33	14.50
TR983239	FERGUS	99.30	27.52	44.07	56.40	14.20
CI 17430	NEWANA	100.00	28.12	43.83	56.90	13.17
MT 9508	FORTUNA/PONDERA//PONDERA	99.67	30.52	43.73	58.40	13.80
WB 926	WESTBRED 926	99.33	27.70	43.07	55.57	14.73
ND 626	GRANDIN	97.57	29.95	42.97	55.70	14.07
WBEXPRES	WESTBRED EXPRESS	99.30	25.62	42.63	56.37	13.77
PI549275	HI-LINE	99.30	28.07	42.27	55.53	14.47
MTHW9420	MT8182/MT8289 (hard white)	99.67	25.92	42.20	55.40	14.13
ND 673	TRENTON	100.00	34.53	41.90	56.17	14.17
ND 677	ERNEST	99.30	32.70	41.77	56.23	14.40
PNR 2375	PIONEER 2375	99.30	30.04	41.63	56.97	14.03
PI483235	GLENMAN	99.30	30.34	41.53	55.87	13.03
CI 17790	LEN	99.67	28.19	40.73	56.17	14.23
MTHW9520	CAN1/MT8182 (hard white)	99.67	27.59	39.30	54.80	14.73
C982-324	RAMBO	99.67	28.33	38.03	58.03	13.93
CI 17429	LEW	100.00	32.57	37.60	57.37	13.73
CI 13596	FORTUNA	100.00	32.99	36.80	56.90	14.37
EXPERIMENTAL MEANS		99.54	29.59	42.50	56.26	14.02
C.V. 2: (S OF MEAN/MEAN)*100		.49	2.09	2.45	.59	2.34
LSD (0.05)		1.39	1.76	2.96	.94	.93

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-9951-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: 108.39 W Elevation: 2900 ft.

Seeding Date: 05/12/97 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 1.00 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. __._F @ 2 in. __._F @ 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: __1996 Fallow Season = 3x Tillage w/Sweeps, Spring 1997 = 1x Tillage w/Sweeps & Rods_____
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Spring Wheat_ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer: 70#N,40#P2O5, 0#K2O/ac via gran.blend banded 1.5" below seed___ Herbicide: LV6+'BanvelSGF'(.3+.25pt/ac)
Harvest Date: 09/13/97 Root Penetration Depth: 42 in. Comments: (Yr#4 of 5-yr"Fertility x SW Variety Evals" On-Loc)

Depth	PRE-PLANT SOIL ANAL 04/17/97 (Max Depth=48")									__/__/__	POST-HVST SOIL ANAL 09/13/97 (Max Depth=48")								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.55	6.1	1.2	10	13	256	5	SCL	21.7	_____	.50	6.1	1.4	6	14	263	7	SCL	21.7
6-24"	1.91			30			14	SCL		_____	1.13			6			16	SCL	
24-36"	1.03			8				SCL		_____	.70			4				SCL	
36-48"	.91			12				SCL		_____	.50			4				VFSL	
TOTAL:	4.40			60						_____	2.83			20					

Precipitation & Stored Soil Water Summary: 04/17/97 to Sd'g: 0.47 in. (0.23 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 4.87 in.
Sd'g to 09/13/97: 11.15 in. (10.37 in events =>.1 in.) Meas'd Resid Soil Water 09/13/97: 2.83 in.
Growing Season (05/12/97 to 14 days prior to Harvest Maturity: 10.48 in.) (9.72 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/13/97: 0.67 in.) (0.65 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: 12.52 in.)

TABLE 6. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1988-1997.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
BZ684-23 WB VANNA(P+)sf	3	-	-	61.7	30.5	46.2	46.1	42.1	129.5	-	-	57.8	58.9	52.1	56.3	56.3	94.1
WA 6920 PENAWAWA (sfwh	6	67.6	34.4	-	-	-	43.0	41.2	126.6	58.4	57.2	-	-	-	58.0	58.3	97.4
PI483235 GLENMAN	10	52.6	37.5	56.8	30.1	41.5	40.8	40.8	125.4	57.7	57.7	58.6	59.0	55.9	58.2	58.2	97.3
CI 17904 OWENS(sft wht)	7	62.6	36.5	-	-	-	39.1	40.8	125.3	58.2	57.2	-	-	-	58.2	58.2	97.2
PI574642 McNEAL	6	54.2	30.3	57.6	29.1	45.5	45.1	40.2	123.5	59.4	57.1	59.9	59.2	56.4	58.4	58.6	98.0
CI 17430 NEWANA	10	52.3	36.3	55.8	29.9	43.8	39.3	39.3	120.7	58.8	58.6	59.5	61.5	56.9	59.5	59.6	99.5
WB 936 WB 936 (P+)	3	-	-	57.9	24.2	45.0	42.4	38.7	119.0	-	-	58.3	60.2	56.0	58.2	58.2	97.3
ND 606 AMIDON	9	54.8	32.3	52.1	29.3	46.5	41.0	38.6	118.8	58.4	58.5	59.6	60.5	56.9	58.7	58.9	98.4
WBEXPRES WB EXPRESS(P+)	3	-	-	56.4	27.3	42.6	42.1	38.5	118.2	-	-	59.6	59.7	56.4	58.5	58.6	97.9
PNR 2375 PIONEER 2375	3	-	-	54.0	27.7	41.6	41.1	37.5	115.4	-	-	60.0	61.1	57.0	59.4	59.4	99.3
CI 17828 PONDERA	8	46.2	36.4	56.0	-	-	37.5	37.4	114.9	59.5	58.9	60.0	-	-	59.9	59.9	100.0
ND 626 GRANDIN	8	48.5	34.6	49.5	24.7	43.0	40.6	37.0	113.8	58.6	58.8	57.8	60.9	55.7	58.6	59.0	98.6
WPB 926R WB 926 (P)	8	48.9	35.6	54.3	26.2	43.1	40.5	36.9	113.6	58.8	57.8	57.8	60.3	55.6	58.1	58.4	97.7
PI549275 HI-LINE	10	47.9	30.6	57.2	29.7	42.3	36.6	36.6	112.5	58.6	57.3	59.8	59.8	55.5	58.5	58.5	97.8
ND 677 ERNEST (+)	4	-	33.8	52.4	28.4	41.8	39.1	36.4	112.0	-	59.9	59.7	61.4	56.2	59.3	59.3	99.1
ND 582 STOA	10	48.2	33.9	47.6	28.7	44.4	36.4	36.4	111.8	57.9	57.7	58.0	59.3	55.3	58.3	58.3	97.5
TR983239 WB FERGUS (P+)	3	-	-	50.8	24.4	44.1	39.8	36.3	111.6	-	-	59.0	61.3	56.4	58.9	58.9	98.5
ND 618 GUS	4	44.7	-	-	-	-	40.5	36.2	111.3	58.1	-	-	-	-	58.5	59.3	99.1
CI 17790 LEN	10	46.0	31.7	50.3	27.7	40.7	36.2	36.2	111.2	59.3	57.5	58.2	60.6	56.2	58.6	58.6	97.9
CI 17910 ALEX	3	-	-	-	-	-	23.5	36.0	110.7	-	-	-	-	-	60.7	60.3	100.7
PI486139 KLASIC (P+) hw	3	39.8	37.7	-	-	-	41.1	35.8	110.1	56.2	57.5	-	-	-	57.5	57.8	96.6
C982-324 WB RAMBO (P+)	10	49.7	34.2	49.3	25.5	38.0	34.8	34.8	107.0	59.8	59.7	59.8	61.2	58.0	59.7	59.7	99.8
CI 15930 OLAF	6	41.8	-	-	-	-	33.0	34.7	106.5	57.9	-	-	-	-	58.5	58.6	97.8
CI 17429 LEW	10	45.9	31.5	40.0	28.6	37.6	34.5	34.5	106.2	59.5	59.6	60.9	61.3	57.4	60.2	60.2	100.5
CANLANC LANCER	7	41.1	28.3	-	-	-	31.9	33.3	102.3	59.0	59.2	-	-	-	59.5	59.4	99.3
CI 13596 FORTUNA	10	37.1	32.8	42.7	27.3	36.8	32.5	32.5	100.0	58.1	60.1	60.5	62.0	56.9	59.8	59.8	100.0
NDCUT CUTLESS	7	40.1	29.5	-	-	-	29.8	31.0	95.4	58.2	60.1	-	-	-	59.1	59.1	98.7
MEAN (ENTRIES LISTED)		48.5	33.6	52.8	27.7	42.5	-	37.0	-	58.5	58.4	59.2	60.5	56.2	-	58.9	-
6/ Growing Season Precip. (in.)		9.60	3.93	8.71	3.62	10.48	7.53										
Soil PAW (in.) to SD at Plntng.		7.24	6.84	5.09	6.01	4.87	6.35										
Total Plant Avail. Water (in.)		16.84	10.77	13.80	9.63	15.35	13.88										
Soil NO3 (lbs.) to SD at Plntng.		52.0	28.0	54.0	54.0	60.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		62.0	66.0	66.0	71.0	70.0											
(# P2O5)		35.0	33.0	33.0	35.0	40.0											

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/ 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.

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.

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TABLE 7. DRYLAND FALLOW SPRING WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
ND 606	AMIDON	100.00	31.06	41.60	56.87	15.30
ND 673	TRENTON	99.30	32.03	38.00	56.50	16.10
BZ684-23	VANNA (soft white)	98.60	25.87	37.70	53.00	14.80
MT 9433	MT8808/MARBERG	100.00	28.39	37.60	58.23	17.00
WB 936	WESTBRED 936	98.60	24.57	37.33	55.63	16.30
PI574642	McNEAL	100.00	26.68	36.70	55.33	16.00
WB 926	WESTBRED 926	98.60	25.73	36.60	56.47	16.20
TR983239	FERGUS	99.30	25.68	36.07	57.67	15.20
ND 677	ERNEST	100.00	28.95	34.83	56.33	16.40
ND 582	STOA	98.30	30.05	34.63	55.77	15.80
WBEXPRES	WESTBRED EXPRESS	99.67	25.75	34.43	56.63	15.50
ND 626	GRANDIN	99.67	27.61	33.53	55.50	16.20
PI549275	HI-LINE	99.67	24.75	33.43	55.33	16.30
MTHW9420	MT8182/MT8289 (hard white)	100.00	26.01	33.43	55.60	15.60
MT 9508	FORTUNA/PONDERA//PONDERA	98.63	26.73	33.13	57.87	15.30
MTHW9520	CAN1/MT8182 (hard white)	98.63	26.09	32.90	54.60	N/A
PNR 2375	PIONEER 2375	100.00	27.70	32.43	57.27	15.30
CI 17790	LEN	99.30	26.90	31.87	55.37	16.90
C982-324	RAMBO	98.60	25.10	31.37	58.83	15.40
PI483235	GLENMAN	99.67	25.80	31.17	55.67	15.10
CI 17430	NEWANA	100.00	23.75	30.53	58.20	15.30
CI 17429	LEW	99.30	29.34	29.97	58.60	16.20
CI 13596	FORTUNA	99.67	29.82	28.23	58.53	15.20
EXPERIMENTAL MEANS		99.37	27.15	34.24	56.51	15.79
C.V. 2: (S OF MEAN/MEAN)*100		.63	3.40	4.47	.86	-
LSD (0.05)		1.78	2.63	4.36	1.38	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-9952-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: 110.40 W Elevation: 2800 ft.

Seeding Date: 05/08/97 Sd'g Depth: 1.00 in. Depth to Moisture @ Sd'g: 0.75 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 64.0F @ 2 in. 64.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 2x Tillage w/Sweeps & Harrows; 1x Tillage w/Sweeps, Harrows & Rods__
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Winter Wheat_ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer: 55#N,22#P2O5, 0#K2O/ac via NH3+11-52-0 inj'd in sep PP ops Fall 96 Herbicide: __'Bronate' @ 1.5pts/ac__
Harvest Date: 09/05/97 Root Penetration Depth: 44 in. Comments: __Pre-Plant Soil Analysis was Post-Fertilization__

Depth	PRE-PLANT SOIL ANAL 04/03/97 Max Depth=48"								__/__/__	POST-HVST SOIL ANAL 09/05/97 (Max Depth=48")							
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.62	6.1	1.3	20	20	381	6	VFSL	14.5	_____	.17	6.5	1.2	6	20	355	5	VFSL	14.5
6-24"	2.47			84			85	SCL		_____	.82			12			10	VFSL+	
24-36"	1.83			76				CL		_____	.81			36				CL	
36-48"	1.73			68				CL		_____	1.29			48				CL	
TOTAL:	6.65			248						_____	3.09			102					

Precipitation & Stored Soil Water Summary: 04/03/97 to Sd'g: 0.60 in. (0.60 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 7.25 in.
Sd'g to 09/05/97: 7.30 in. (7.24 in events =>.1 in.) Meas'd Resid Soil Water 09/05/97: 3.09 in.
Growing Season (05/08/97 to 14 days prior to Harvest Maturity: 6.56 in.) (6.56 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/05/97: 0.74 in.) (0.68 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: 10.72 in.)

TABLE 8. TEN-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. 1988-1997.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1993	1994 4/	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD 6/	PERCENT OF FORTUNA YIELD 7/	TEST WEIGHT (POUNDS PER BUSHEL) 1993	1994 4/	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE TEST WT. 6/	PERCENT OF FORTUNA TEST WT. 7/
BZ684-23 WB VANNA (P+)(sft	3	-	-	60.0	47.7	37.7	47.1	41.0	132.3	-	-	59.0	58.1	53.0	56.7	54.7	93.2
WBEXPRES WB EXPRESS (P+)	3	-	-	57.2	48.7	34.4	46.8	40.8	131.3	-	-	60.6	60.1	56.6	59.1	57.0	97.2
CI 17904 OWENS (SFT WHT)	6	60.7	33.1	-	-	-	37.1	40.1	129.2	55.8	55.1	-	-	-	56.3	57.4	97.8
WB 936 WB 936 (P+)	3	-	-	53.7	46.8	37.3	46.0	40.0	129.0	-	-	58.8	58.6	55.6	57.7	55.7	94.9
WA 6920 PENAWAWA (SFT WHT)	5	66.5	35.3	-	-	-	43.0	39.9	128.7	55.7	55.3	-	-	-	54.3	55.8	95.1
TR983239 WB FERGUS (P+)	3	-	-	53.5	46.6	36.1	45.4	39.5	127.4	-	-	61.0	59.4	57.7	59.4	57.3	97.6
ND 606 AMIDON	8	56.1	32.6	56.2	46.5	41.6	43.4	39.4	126.9	55.0	57.1	60.8	60.7	56.9	57.2	57.4	97.8
PI574642 McNEAL	5	59.2	35.2	56.7	44.1	36.7	46.4	38.9	125.4	57.1	55.6	61.0	59.0	55.3	57.6	56.5	96.2
PNR 2375 PIONEER 2375	3	-	-	51.5	48.0	32.4	44.0	38.3	123.4	-	-	62.1	60.9	57.3	60.1	58.0	98.8
WPB 926R WB 926 (P+)	7	52.6	36.6	54.6	42.7	36.6	40.9	38.1	122.9	56.3	55.8	60.4	57.4	56.5	56.9	56.8	96.9
PI549275 HI-LINE	9	55.4	34.0	57.8	46.0	33.4	37.6	37.6	121.0	56.4	54.4	61.0	58.7	55.3	57.4	57.4	97.8
ND 582 STOA	9	57.6	30.1	48.4	45.5	34.6	37.1	37.1	119.6	56.4	55.6	59.5	59.4	55.8	57.0	57.0	97.2
ND 626 GRANDIN	7	58.5	34.0	52.3	42.6	33.5	39.7	37.0	119.3	56.6	55.0	61.1	60.1	55.5	57.1	57.0	97.2
ND 677 ERNEST (+)	4	-	31.2	51.8	43.3	34.8	40.3	35.9	115.7	-	58.0	61.5	61.9	56.3	59.4	57.7	98.3
CI 17828 PONDERA	7	50.8	32.2	48.9	-	-	34.1	35.0	112.8	56.8	57.5	61.6	-	-	58.4	58.9	100.3
PI483235 GLENMAN	9	52.4	33.7	52.9	46.1	31.2	35.0	35.0	112.7	56.2	55.6	59.1	59.4	55.7	56.7	56.7	96.7
C982-324 WB RAMBO (P+)	9	46.5	29.6	54.1	42.6	31.4	34.5	34.5	111.2	57.4	57.6	60.6	60.2	58.8	57.9	57.9	98.7
CI 17430 NEWANA	9	53.6	34.6	55.8	40.9	30.5	34.4	34.4	110.8	56.1	56.2	60.2	60.3	58.2	57.7	57.7	98.4
CI 15930 OLAF	5	45.2	-	-	-	-	30.6	33.9	109.1	56.6	-	-	-	-	56.0	57.5	97.9
CI 17790 LEN	9	44.5	29.7	49.2	39.8	31.9	32.7	32.7	105.4	55.3	55.1	59.3	59.4	55.4	56.9	56.9	96.9
CI 17429 LEW	9	47.8	30.9	43.4	40.1	30.0	32.4	32.4	104.6	58.3	57.2	62.4	61.6	58.6	58.7	58.7	100.1
ND CUT CUTLESS	6	43.7	30.7	-	-	-	29.1	31.5	101.4	54.2	56.4	-	-	-	56.6	57.6	98.2
CI 13596 FORTUNA	9	45.7	32.4	39.4	39.2	28.2	31.0	31.0	100.0	57.5	59.5	61.6	62.2	58.5	58.7	58.7	100.0
CANLANC LANCER	6	41.6	30.2	-	-	-	27.5	29.7	95.8	56.4	58.2	-	-	-	57.3	58.3	99.4
MEANS (ENTRIES LISTED)		52.1	32.6	52.5	44.3	34.0	-	36.4	-	56.3	56.4	60.6	59.9	56.5	-	57.3	-
8/Growing Season Precip. (in.)		13.95	5.87	12.73	8.16	6.56	8.31										
Soil PAW (in.) to SD at @Plntng.		6.29	7.94	5.43	7.03	7.25	7.14										
Total Plant Avail. Water (in.)		20.24	13.81	18.16	15.19	13.81	15.46										
Soil NO3 (lbs.) to SD at Plntng.		158.0	260.0	178.0	260.0	248.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		55.0	56.0	55.0	55.0	55.0											
(#P2O5)		22.0	22.0	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/ Only the five most recent years shown, but summary calculations include all years noted. 1992 nursery was lost due to poor stand establishment because of spring drought.

4/ Crop suffered minor hail damage.

5/ 10-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 = 10-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.

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TABLE 9. DRYLAND FALLOW SPRING WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
MT 9508	FORTUNA/PONDERA//PONDERA	99.30	28.48	39.60	57.77	15.60
WB 926	WESTBRED 926	100.00	25.17	35.20	53.47	17.40
WB 936	WESTBRED 936	100.00	23.99	34.90	54.17	17.00
MT 9433	MT8808/MARBERG	99.30	30.28	34.43	55.77	17.80
ND 606	AMIDON	98.60	31.02	32.83	54.40	17.20
PI574642	McNEAL	100.00	26.55	32.33	52.27	17.90
PNR 2375	PIONEER 2375	100.00	28.53	32.00	54.33	17.20
CI 17430	NEWANA	100.00	25.45	31.67	53.03	16.80
MTHW9420	MT8182/MT8289 (hard white)	100.00	27.26	31.67	52.40	17.00
ND 677	ERNEST	98.60	29.36	31.60	55.03	17.80
ND 626	GRANDIN	99.30	28.49	31.53	51.50	17.20
PI483235	GLENMAN	100.00	28.82	31.33	52.23	16.20
CI 13596	FORTUNA	99.30	30.24	31.23	55.60	16.30
TR983239	FERGUS	96.87	26.72	31.17	54.30	17.40
MTHW9520	CAN1/MT8182 (hard white)	99.30	25.29	31.07	53.00	17.70
PI549275	HI-LINE	100.00	24.79	30.87	50.73	18.40
ND 582	STOA	100.00	28.85	30.53	52.50	18.10
ND 673	TRENTON	100.00	30.17	30.30	51.97	17.70
BZ684-23	VANNA (soft white)	100.00	25.80	29.93	47.80	17.20
CI 17790	LEN	98.97	26.35	29.83	51.83	17.20
CI 17429	LEW	100.00	29.63	28.53	53.77	17.90
WBEXPRES	WESTBRED EXPRESS	99.30	24.16	27.33	52.60	18.40
C982-324	RAMBO	96.53	26.30	26.47	55.27	17.80
EXPERIMENTAL MEANS		99.36	27.46	31.58	53.29	17.36
C.V. 2: (S OF MEAN/MEAN)*100		.92	2.80	4.13	.84	-
LSD (0.05)		2.60	2.19	3.72	1.28	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-9953-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: 05/10/97 Sd'g Depth: 1.00 in. Depth to Moisture @ Sd'g: 1.00 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 65.0F @ 2 in. 62.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ____ Recrop ____ Full-Till ____ Reduced-Till _X_ No-Till # Tillages: 0 # Chem Apps: 2
Cropping System Details: __1996 Fallow Season = 2x Chem Fallow Apps ('Fallow Master')_____
Cropping History: 1 Yr Ago = 96 = _Chem Fallow__ 2 Yrs Ago = 95 = _Winter Wheat_ 3 Yrs Ago = 94 = _Red'T Fallow_
Fertilizer:100#N,55#P2O5,27#K2O/ac (40-20-6 PP inj'd)+(60-35-21 bnd'd 1.5"below seed) Herbicide:'Bronate'@ 1.5pts/ac
Harvest Date: 08/29/97 Root Penetration Depth: 37 in. Comments: _Pre-Plant Soil Anal was Post-Inj'd/Pre-Bnd'd Fert

Depth	PRE-PLANT SOIL ANAL 04/02/97 Max Depth=48"									__/__/__	POST-HVST SOIL ANAL 08/29/97 (Max Depth=48"								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.65	7.6	1.3	36	15	259	8	VFSL	21.7	_____	.21	5.8	1.0	32	21	334	6	VFSL+	14.5
6-24"	2.77			48			24	SCL		_____	1.05			6			22	SCL	
24-36"	1.29			4				CL		_____	.53			4				CL	
36-48"	1.46			8				CL		_____	1.06			12				CL	
TOTAL:	6.17			96						_____	2.85			54					

Precipitation & Stored Soil Water Summary: 04/02/97 to Sd'g: 0.25 in. (0.25 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 6.42 in.
Sd'g to 08/29/97: 5.74 in. (5.43 in events =>.1 in.) Meas'd Resid Soil Water 08/29/97: 2.85 in.
Growing Season (05/10/97 to 14 days prior to Harvest Maturity: 5.58 in.) (5.43 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 08/29/97: 0.16 in.) (0.00 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: 9.15 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. 1988-1997.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
PI574642 McNEAL	5	51.9	41.3	53.1	44.3	32.3	44.6	37.6	121.3	55.7	56.0	57.9	58.0	52.3	56.0	56.0	96.9
BZ684-23 WB VANNA(P+)(S	3	-	-	51.0	47.5	29.9	42.8	36.6	118.0	-	-	53.4	58.0	47.8	53.1	52.5	90.9
CI 17904 OWENS(sft wht)	6	53.6	43.9	-	-	-	33.4	36.4	117.4	53.0	56.0	-	-	-	56.0	56.3	97.4
WA 6920 PENAWAWA(sftwh	5	56.0	41.8	-	-	-	37.3	35.9	115.6	54.5	56.1	-	-	-	55.6	55.7	96.4
WB 936 WB 936 (P+)	3	-	-	48.4	41.2	34.9	41.5	35.5	114.5	-	-	56.1	59.0	54.2	56.4	55.9	96.6
PNR 2375 PIONEER 2375	3	-	-	46.6	45.0	32.0	41.2	35.3	113.6	-	-	57.5	60.4	54.3	57.4	56.8	98.3
ND 606 AMIDON	8	47.7	40.1	44.8	42.7	32.8	37.8	34.7	111.9	55.4	57.5	56.9	60.0	54.4	57.2	57.0	98.6
CI 17430 NEWANA	9	46.2	41.3	49.8	39.8	31.7	34.1	34.1	109.7	54.7	57.9	57.0	59.5	53.0	56.9	56.9	98.3
WPB 926R WB 926 (P)	7	42.8	36.6	43.4	40.8	35.2	38.0	33.7	108.6	54.2	57.2	55.3	59.7	53.5	55.9	55.8	96.5
PI483235 GLENMAN	9	41.3	34.8	46.5	41.2	31.3	33.5	33.5	107.9	54.4	55.8	55.9	58.5	52.2	55.7	55.7	96.3
CI 17828 PONDERA	7	47.2	36.4	46.4	-	-	32.2	32.8	105.7	57.4	58.3	58.3	-	-	58.1	58.1	100.6
WBEXPRES WB EXPRESS (P+	3	-	-	43.1	43.7	27.3	38.1	32.6	104.9	-	-	55.4	59.3	52.6	55.8	55.2	95.5
PI549275 HI-LINE	9	42.4	36.2	45.2	37.3	30.9	31.7	31.7	102.2	55.1	56.4	56.3	58.8	50.7	55.6	55.6	96.2
TR983239 WB FERGUS (P+)	3	-	-	41.1	38.5	31.2	36.9	31.6	101.8	-	-	56.1	60.2	54.3	56.9	56.3	97.4
ND 677 ERNEST (+)	4	-	34.8	47.8	36.1	31.6	37.6	31.5	101.4	-	58.4	57.4	60.5	55.0	57.8	57.2	98.8
ND 626 GRANDIN	7	43.0	38.2	43.6	40.6	31.5	35.1	31.1	100.3	56.4	56.4	56.3	59.3	51.5	55.7	55.6	96.2
CI 17790 LEN	9	34.6	34.7	43.0	37.4	29.8	31.1	31.1	100.3	52.8	58.0	55.0	59.0	51.8	55.5	55.5	96.0
CI 13596 FORTUNA	9	35.5	39.5	43.0	34.6	31.2	31.0	31.0	100.0	54.8	58.8	58.9	60.7	55.6	57.8	57.8	100.0
CI 17429 LEW	9	40.6	33.9	45.0	38.0	28.5	30.8	30.8	99.3	56.8	57.6	59.0	61.0	53.8	57.7	57.7	99.8
C982-324 WB RAMBO (P+)	9	46.5	31.9	40.8	39.8	26.5	30.5	30.5	98.1	56.9	58.4	56.7	59.7	55.3	57.8	57.8	99.9
CANLANC LANCER	6	37.1	33.4	-	-	-	27.5	30.0	96.6	55.2	58.1	-	-	-	57.4	57.7	99.8
ND 582 STOA	9	33.4	36.5	40.9	38.1	30.5	29.8	29.8	96.1	54.4	57.0	55.9	58.8	52.5	55.9	55.9	96.7
NDCUT CUTLESS	6	34.5	35.6	-	-	-	26.7	29.2	94.0	53.6	57.4	-	-	-	56.8	57.1	98.8
CI 15930 OLAF	5	34.4	-	-	-	-	24.3	28.7	92.6	55.1	-	-	-	-	55.7	56.3	97.3
MEAN (ENTRIES LISTED)		42.7	37.3	45.5	40.4	31.1	-	32.7	-	55.0	57.3	56.6	59.5	53.0	-	56.4	-
6/ Growing Season Precip. (in.)		13.03	4.00	11.26	4.50	5.58	6.61										
Soil PAW (in.) to SD at Plntng.		6.75	7.93	4.96	5.13	6.42	7.13										
Total Plant Avail. Water (in.)		19.78	11.93	16.22	9.63	12.00	13.74										
Soil NO3 (lbs.) to SD at Plntng.		162.0	110.0	104.0	84.0	96.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.5	40.0	30.0	56.0	100.0											
(# P2O5)		25.0	30.0	15.0	25.0	55.0											
(# K2O)		10.0	0.0	7.0	8.0	27.0											
(# 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.
The 1991 crop suffered substantial hail damage.
1992 nursery was not harvested due to extensive hail damage.

4/ 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.

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.

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TABLE 11. DRYLAND FALLOW SPRING WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI574642	McNEAL	99.30	27.98	37.17	51.27	17.70
BZ684-23	VANNA (soft white)	98.63	27.73	36.57	47.10	16.10
MT 9508	FORTUNA/PONDERA//PONDERA	99.67	28.81	36.50	54.97	16.50
TR983239	FERGUS	98.97	29.88	36.47	52.07	17.30
CI 17430	NEWANA	98.60	27.22	36.37	51.50	16.10
WB 926	WESTBRED 926	97.93	26.71	35.60	51.30	17.70
CI 13596	FORTUNA	97.93	34.25	34.90	55.33	15.60
MT 9433	MT8808/MARBERG	100.00	32.34	34.90	55.23	17.90
WB 936	WESTBRED 936	99.30	25.37	34.77	50.73	17.70
PI549275	HI-LINE	99.30	28.60	34.70	48.97	17.70
PNR 2375	PIONEER 2375	98.97	31.31	34.47	53.60	16.60
PI483235	GLENMAN	100.00	30.56	34.43	52.63	15.60
WBEXPRES	WESTBRED EXPRESS	100.00	26.22	33.70	51.53	17.10
ND 626	GRANDIN	98.97	30.67	33.40	50.33	16.80
CI 17790	LEN	98.63	29.17	33.23	52.10	16.80
CI 17429	LEW	98.97	34.71	33.17	53.83	17.30
MTHW9420	MT8182/MT8289 (hard white)	100.00	26.12	32.70	50.27	17.10
ND 677	ERNEST	99.30	33.67	31.70	53.30	17.90
ND 582	STOA	99.67	31.73	31.37	52.23	17.90
ND 606	AMIDON	100.00	33.37	31.17	53.37	16.80
ND 673	TRENTON	100.00	35.83	31.03	51.57	17.20
MTHW9520	CAN1/MT8182 (hard white)	100.00	27.91	29.83	51.40	18.00
C982-324	RAMBO	99.30	26.92	29.17	54.73	17.10
EXPERIMENTAL MEANS		99.28	29.87	33.80	52.15	17.06
C.V. 2: (S OF MEAN/MEAN)*100		.73	2.10	4.64	.72	-
LSD (0.05)		2.05	1.79	4.47	1.08	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-9954-SW Field: OffSta Design: __RCB__ # Ents: 23 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft.
Qtr: ___SWSE___ Section: 8 Twnshp: 34 N Range: 7 E Latitude: 48.73 N Longitude: 110.83 W Elevation: 3300 ft.

Seeding Date: 05/09/97 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 0.50 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 70.0F @ 2 in. 61.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 1x Tillage w/Sweeps, then Rotary Harrow, 2x Tillage w/Sweeps & Rods_
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Spring Wheat_ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer:118#N,33#P2O5,21#K2O/ac (60N pre-inj'd NH3, + gran.blend bnd'd 1.5" below seed Herbicide: _None Applied_
Harvest Date: 08/28/97 Root Penetration Depth: 48 in. Comments: __Pre-Plant Soil Anal was Post-NH3/Pre-Gran Fert__

Depth	PRE-PLANT SOIL ANAL 04/03/97 Max Depth=48"									__/__/__	POST-HVST SOIL ANAL 08/28/97 (Max Depth=48"								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.82	7.1	1.4	34	19	290	10	SCL	21.7	_____	.28	5.9	1.7	14	24	363	8	CL	21.8
6-24"	1.91			24			13	SCL		_____	1.03			36			15	CL	
24-36"	1.09			4				SCL		_____	.49			12				CL	
36-48"	1.10			12				SCL		_____	.80			20				CL	
TOTAL:	4.92			74						_____	2.60			82					

Precipitation & Stored Soil Water Summary: 04/03/97 to Sd'g: 0.43 in. (0.40 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.35 in.
Sd'g to 08/28/97: 5.66 in. (4.93 in events =>.1 in.) Meas'd Resid Soil Water 08/28/97: 2.60 in.
Growing Season (05/09/97 to 14 days prior to Harvest Maturity: 4.82 in.) (4.37 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 08/28/97: 0.84 in.) (0.56 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: 7.57 in.)

TABLE 12. NINE-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. 1989-1997.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	9-YR COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	9-YR COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
WA 6920 PENAWAWA (sft wht)	6	76.4	36.9	-	-	-	52.6	54.3	131.6	60.8	56.8	-	-	-	58.8	58.8	97.8
CI 17904 OWENS (sft wht)	6	79.6	32.1	-	-	-	50.9	52.6	127.5	61.1	58.4	-	-	-	59.0	59.0	98.1
PI574642 McNEAL	6	67.6	33.8	73.7	47.6	37.2	49.7	49.3	119.5	61.3	56.5	61.4	56.5	51.3	57.9	58.3	97.1
CI 17828 PONDERA	7	67.4	34.0	62.0	-	-	48.7	48.1	116.6	61.9	59.2	61.6	-	-	60.5	59.8	99.5
PI483235 GLENMAN	9	74.9	31.9	65.8	46.4	34.4	48.1	48.1	116.6	61.0	56.2	60.8	56.8	52.6	58.3	58.3	97.1
ND 606 AMIDON	9	66.8	31.2	66.9	50.0	31.2	47.6	47.6	115.4	60.4	58.1	61.3	59.2	53.4	58.9	58.9	98.1
BZ684-23 WB VANNA(P+)(sft w	3	-	-	67.8	47.0	36.6	50.5	47.5	115.2	-	-	60.1	54.2	47.1	53.8	53.9	89.7
CI 17430 NEWANA	9	63.8	30.7	68.8	47.0	36.4	47.4	47.4	115.0	61.2	59.3	61.8	56.8	51.5	59.0	59.0	98.2
TR983239 WB FERGUS (P+)	3	-	-	61.2	50.3	36.5	49.3	46.4	112.6	-	-	61.6	57.3	52.1	57.0	57.1	95.0
PI549725 HI-LINE	9	66.2	32.1	71.9	50.3	34.7	46.2	46.2	112.1	62.0	57.1	62.0	55.9	49.0	57.8	57.8	96.2
PI486139 KLASIC(P+)(hrd wht	3	66.1	34.4	-	-	-	43.6	45.4	110.2	59.6	57.3	-	-	-	59.0	59.7	99.4
WBEXPRES WB EXPRESS (P+)	3	-	-	64.2	46.6	33.7	48.2	45.3	109.9	-	-	61.1	57.1	51.5	56.6	56.7	94.3
ND 626 GRANDIN	8	63.5	31.0	56.8	46.6	33.4	45.5	45.1	109.5	62.3	58.8	61.8	56.4	50.3	58.5	58.6	97.5
ND 618 GUS	4	61.2	-	-	-	-	45.5	45.0	109.2	61.7	-	-	-	-	60.1	60.1	100.0
PNR 2375 PIONEER 2375	3	-	-	62.4	45.0	34.5	47.3.	44.5	107.9	-	-	61.1	57.4	53.6	57.4	57.5	95.6
CI 17790 LEN	9	55.5	30.6	62.1	44.8	33.2	44.1	44.1	106.9	61.2	58.7	61.5	56.7	52.1	58.6	58.6	97.4
WPB 926R WB 926 (P)	8	59.3	29.6	61.6	48.1	35.6	44.4	44.0	106.8	59.9	58.6	60.7	56.7	51.3	57.7	57.9	96.3
C982-324 WB RAMBO (P+)	9	65.8	25.3	63.1	44.3	29.2	44.0	44.0	106.7	61.1	59.1	62.3	58.0	54.7	59.8	59.8	99.5
ND 582 STOA	9	51.9	32.6	60.1	46.6	31.4	44.0	44.0	106.7	60.7	57.7	60.9	55.8	52.2	58.3	58.3	97.0
CI 17429 LEW	9	64.7	30.8	54.6	41.8	33.2	42.7	42.7	103.5	62.4	58.8	62.0	58.2	53.8	59.6	59.6	99.2
WB 936 WB 936 (P+)	3	-	-	54.6	46.6	34.8	45.3	42.7	103.5	-	-	60.3	55.1	50.7	55.4	55.5	92.3
ND 677 ERNEST (+)	4	-	34.4	57.7	44.6	31.7	42.1	41.9	101.6	-	59.6	60.9	59.3	53.3	58.3	58.5	97.4
NDCUT CUTLESS	6	55.8	30.7	-	-	-	40.6	41.9	101.6	60.2	58.6	-	-	-	59.8	59.7	99.4
CI 15930 OLAF	5	50.6	-	-	-	-	41.7	41.8	101.4	60.4	-	-	-	-	59.1	58.9	98.1
CI 13596 FORTUNA	9	58.6	34.3	52.6	43.9	34.9	41.2	41.2	100.0	61.0	59.6	64.4	60.3	55.3	60.1	60.1	100.0
CANLANC LANCER	6	54.8	28.2	-	-	-	38.6	39.9	96.7	61.1	58.1	-	-	-	59.8	59.7	99.4
MEANS (ENTRIES LISTED)		63.5	31.8	62.5	46.5	34.0	-	45.4	-	61.1	58.2	61.5	57.1	52.0	-	58.5	-
6/Growing Season Precip. (in.)		12.45	2.83	12.88	4.63	4.82	7.72										
Soil PAW (in.) to SD at Plntng.		5.76	9.31	5.61	10.23	5.35	7.96										
Total Plant Avail. Water (in.)		18.21	12.14	18.49	14.86	10.17	15.68										
Soil NO3 (lbs.) to SD at Plntng.		112.0	108.0	62.0	194.0	74.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		55.0	90.0	38.0	114.0	118.0											
(# P2O5)		0.0	0.0	19.0	29.0	33.0											
(# K2O)		0.0	0.0	7.0	0.0	21.0											

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

4/ 9-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 = 9-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.

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TABLE 13. DRYLAND FALLOW SPRING WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT FLANSAAS/LUMSDEN FARMS, LORING. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WB 936	WESTBRED 936	98.27	25.50	37.90	56.60	13.40
MT 9508	FORTUNA/PONDERA//PONDERA	100.00	28.39	37.17	58.30	13.60
ND 606	AMIDON	100.00	30.51	36.07	57.47	13.00
CI 17430	NEWANA	100.00	26.69	35.90	56.83	11.90
ND 626	GRANDIN	99.67	29.28	35.40	56.33	13.30
MT 9433	MT8808/MARBERG	99.67	30.00	35.30	58.47	14.40
PI574642	McNEAL	99.33	28.04	35.20	55.37	14.90
ND 677	ERNEST	98.60	30.94	34.83	57.13	14.50
PNR 2375	PIONEER 2375	98.63	27.24	34.70	56.80	14.00
TR983239	FERGUS	99.00	26.73	34.60	56.63	14.60
BZ684-23	VANNA (soft white)	99.67	25.64	34.27	51.03	14.00
WB 926	WESTBRED 926	99.67	25.79	34.10	56.17	14.80
PI483235	GLENMAN	100.00	26.97	33.83	56.13	12.70
MTHW9420	MT8182/MT8289 (hard white)	99.67	26.18	33.57	55.83	13.90
ND 673	TRENTON	99.67	30.80	33.43	56.80	14.00
ND 582	STOA	99.30	28.57	32.80	55.10	15.20
PI549275	HI-LINE	100.00	25.91	32.73	55.10	14.60
MTHW9520	CAN1/MT8182 (hard white)	99.33	26.12	32.00	55.17	14.70
CI 17790	LEN	99.30	26.86	31.40	55.43	14.90
WBEXPRES	WESTBRED EXPRESS	98.63	24.24	31.20	55.90	14.20
CI 17429	LEW	100.00	30.16	30.70	57.13	14.00
CI 13596	FORTUNA	99.30	32.09	29.70	57.57	13.90
C982-324	RAMBO	97.57	25.24	27.77	57.60	15.00
EXPERIMENTAL MEANS		99.36	27.73	33.68	56.30	14.06
C.V. 2: (S OF MEAN/MEAN)*100		.62	2.15	3.12	.40	-
LSD (0.05)		1.75	1.70	2.99	.65	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-9955-SW Field: OffSta Design: __RCB__ # Ents: 23 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft.
Qtr: _____ Section: 24 Twnshp: 35 N Range: 29 E Latitude: 48.78 N Longitude: 107.88 W Elevation: 2700 ft.

Seeding Date: 05/13/97 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 1.50 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __.__F @ 1 in. 70.0F @ 2 in. 62.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 1x Tillage w/Sweeps, 2x Tillage w/Sweeps & Rods_____
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Spring Wheat__ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer: 90#N,48#P2O5,21#K2O/ac (30-13-0 Bd'Cst Fall96+60-35-21 Bnd'd @Plntg Herbicide: LV6+'Ally'(4.0+0.1 oz/ac)
Harvest Date: 09/06/97 Root Penetration Depth: 40 in. Comments: __Pre-Plant Soil Anal was Post-Fall/Pre-Spr Fert__

Depth	PRE-PLANT SOIL ANAL 04/17/97 Max Depth=48"								__/__/__	POST-HVST SOIL ANAL 09/06/97 (Max Depth=48"							
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.64	6.3	1.0	8	11	290	31	SCL	21.7	_____	.35	6.3	1.3	8	17	305	7	SCL	21.7
6-24"	1.78			24			16	SCL		_____	1.23			6			12	SCL	
24-36"	1.21			4				CL		_____	.77			4				SCL	
36-48"	1.25			4				SCL		_____	.88			4				CL	
TOTAL:	4.88			40						_____	3.23			22					

Precipitation & Stored Soil Water Summary: 04/17/97 to Sd'g: 0.67 in. (0.45 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.55 in.
Sd'g to 09/06/97: 7.84 in. (7.74 in events =>.1 in.) Meas'd Resid Soil Water 09/06/97: 3.23 in.
Growing Season (05/13/97 to 14 days prior to Harvest Maturity: 7.36 in.) (7.26 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/06/97: 0.48 in.) (0.48 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: 9.68 in.)

TABLE 14. DRYLAND FALLOW BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
PI483237	Bowman	98.27	27.44	65.10	51.33	89.70	2.70	12.63
N1123111	Logan	97.57	25.75	64.37	50.37	72.87	7.93	12.85
ND 9866	Stark	98.27	28.45	62.83	49.87	79.60	5.90	13.12
H3860224	H3860224	99.30	24.11	60.43	47.77	75.13	8.30	13.33
CI 15229	Steptoe	100.00	22.93	60.40	44.37	74.90	8.77	10.78
PI491534	Gallatin	99.33	26.61	59.37	48.50	58.87	14.57	12.87
H1851195	H1851195	98.97	24.59	58.43	48.30	72.03	7.70	13.62
MT886610	MT886610	100.00	24.82	58.07	47.67	53.93	17.20	12.88
PI537438	Targhee	100.00	24.19	57.33	47.47	59.73	15.63	12.75
SK 76333	Harrington	99.30	25.33	57.00	47.20	70.20	9.30	13.18
PI568246	Baronesse	100.00	23.27	56.67	46.57	55.13	14.37	12.77
CI 15856	Lewis	96.53	25.87	54.87	48.40	58.33	15.87	13.09
PI591823	Chinook	98.27	24.71	54.77	47.70	42.33	23.27	13.24
CI 15514	Hector	98.97	24.96	54.40	49.13	52.90	16.63	13.26
MN 56	Stander	93.77	25.93	48.83	48.70	66.83	10.57	13.34
ND 11055	Foster	100.00	26.09	45.67	45.80	48.63	22.30	12.70
EXPERIMENTAL MEANS		98.66	25.31	57.41	48.07	64.45	12.56	12.90
C.V. 2: (S OF MEAN/MEAN)*100		1.21	2.80	3.22	.76	3.23	7.73	2.36
LSD (0.05)		3.44	2.05	5.34	1.05	6.01	2.81	.88

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3651-SW Field: OffSta Design: __RCB__ # Ents: 16 # 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: 108.39 W Elevation: 2900 ft.

Seeding Date: 05/12/97 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 1.00 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 72.0F @ 2 in. 68.0F @ 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: __1996 Fallow Season = 3x Tillage w/Sweeps, Spring 1997 = 1x Tillage w/Sweeps & Rods_____
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Spring Wheat_ 3 Yrs Ago = 94 = ___Fallow_____
Fertilizer: 70#N,40#P2O5, 0#K2O/ac via gran.blend banded 1.5" below seed___ Herbicide: LV6+'BanvelSGF'(.3+.25pt/ac)
Harvest Date: 09/13/97 Root Penetration Depth: 36 in. Comments:(Yr#4 of 5-yr"Fertility x Bly Variety Evals" On-Loc)

Depth	PRE-PLANT SOIL ANAL 04/17/97 Max Depth=48"									__/__/__	POST-HVST SOIL ANAL 09/13/97 (Max Depth=36"								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.55	6.1	1.2	10	13	256	5	SCL	21.7	_____	.56	6.2	1.3	8	14	239	9	SCL	21.7
6-24"	1.91			30			14	SCL		_____	1.16			6			12	SCL	
24-36"	1.03			8				SCL		_____	.51			4				SCL	
36-48"	.91			12				SCL		_____	_n/a_			_n/a_				_n/a_	
TOTAL:	4.40 (3'=3.49)			60						_____	2.23 (3')			18 (3')					

Precipitation & Stored Soil Water Summary: 04/17/97 to Sd'g: 0.47 in. (0.23 in events =>.1 in.) Calc'd Init Soil Wtr @Sd'g to 3': 3.96 in.
Sd'g to 09/13/97: 11.15 in. (10.37 in events =>.1 in.) Meas'd Resid Soil Water 09/13/97: 2.23 in.
Growing Season (05/12/97 to 14 days prior to Harvest Maturity: 9.88 in.) (9.16 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/13/97: 1.27 in.) (1.21 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: 11.61 in.)

TABLE 15. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1987-1996.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF HECTOR YIELD 5/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF HECTOR TEST WT 5/
NS 78054 BARONESSE (P+)	7	93.3	55.2	71.7	43.4	56.7	61.8	57.8	117.9	48.4	47.0	49.1	48.9	46.6	47.9	48.4	99.4
MT890008 MT890008	3	84.8	56.6	59.5	-	-	67.0	57.8	117.8	48.1	45.8	46.5	-	-	46.8	47.6	97.6
CI 15229 STEPTOE	10	88.7	65.6	68.3	42.5	60.4	57.1	57.1	116.5	41.6	42.0	42.5	42.1	44.4	43.2	43.2	88.6
H3860224 LEWIS/APEX	4	-	50.8	69.3	38.7	60.4	54.8	54.7	111.7	-	45.1	48.7	47.7	47.8	47.3	48.0	98.6
MT851195 MT851195	5	81.5	57.7	59.1	42.6	58.4	59.9	54.6	111.4	48.1	47.1	49.4	47.8	48.3	48.1	48.2	98.8
PI537438 TARGHEE	3	-	-	63.4	41.2	57.3	54.0	54.5	111.1	-	-	48.1	47.5	47.5	47.7	48.0	98.5
ND 9866 STARK	8	80.9	58.2	57.8	39.3	62.8	56.2	54.3	110.8	49.2	50.2	51.6	49.7	49.9	50.0	50.7	104.1
PI483237 BOWMAN	10	75.9	53.8	54.1	49.4	65.1	53.4	53.4	109.0	48.8	48.8	50.7	50.0	51.3	50.2	50.2	103.0
PI537967 COLTER	3	73.2	56.7	55.4	-	-	61.8	53.3	108.7	41.6	42.2	44.5	-	-	45.1	45.8	94.0
MT860756 GALLATIN/BELLO	3	83.6	51.4	-	-	-	67.1	52.0	106.1	49.9	47.5	-	-	-	48.7	49.3	101.2
PI591823 CHINOOK (+)	10	69.0	56.0	52.5	39.0	54.8	51.1	51.1	104.3	48.4	46.7	48.7	47.8	47.7	48.2	48.2	99.0
PI531228 BEARPAW	6	77.8	-	-	-	-	50.3	50.3	102.6	49.5	-	-	-	-	48.0	47.6	97.6
PI491534 GALLATIN	10	69.2	54.1	50.7	36.5	59.4	50.0	50.0	102.0	49.0	47.8	49.7	48.4	48.5	49.2	49.2	101.0
MT886610 MT81143/LEWIS	4	-	50.2	57.0	33.9	58.1	49.8	49.7	101.5	-	46.3	48.7	48.7	47.7	47.8	48.6	99.6
CI 15856 LEWIS	10	53.9	51.6	55.9	40.9	54.9	49.5	49.5	100.9	50.2	47.6	49.5	49.1	48.4	49.4	49.4	101.3
CI 15514 HECTOR	10	72.4	50.6	47.5	43.8	54.4	49.0	49.0	100.0	48.9	46.7	48.2	47.9	49.1	48.7	48.7	100.0
CI 15857 CLARK	6	69.0	-	-	-	-	48.2	48.2	98.3	48.8	-	-	-	-	48.1	47.6	97.7
CI 9558 PIROLINE	9	69.7	58.1	58.0	34.5	-	47.5	48.1	98.1	49.3	50.3	50.6	48.0	-	49.6	49.6	101.8
SK 76333 HARRINGTON	10	83.8	48.7	58.2	32.1	57.0	47.7	47.7	97.3	48.5	45.2	46.7	47.2	47.2	47.4	47.4	97.3
MT 81161 MT 81161	4	78.0	-	-	-	-	56.6	42.7	87.1	47.4	-	-	-	-	48.8	47.5	97.4
MEANS (ENTRIES LISTED)		76.8	54.7	58.7	39.8	58.4	-	51.8	-	48.0	46.6	48.3	47.9	48.0	-	48.2	-
6/ Growing Season Precip. (in.)		9.60	3.93	8.71	3.62	9.88	7.40										
Soil PAW (in.) to SD at Plntng.		7.24	6.84	5.09	6.01	3.96	6.26										
Total Plant Avail. Water (in.)		16.84	10.77	13.80	9.63	13.84	13.66										
Soil NO3 (lbs.) to SD at Plntng.		52.0	28.0	54.0	54.0	60.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		62.0	66.0	66.0	71.0	70.0											
(# P2O5)		35.0	33.0	33.0	35.0	40.0											

Check variety is Hector.

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 last five are shown, but summary calculations include all years noted. In 1991 crop head shatter and head loss was substantial as crop was over-ripe for harvest by binder (necessary due to major plot combine breakdown).

4/ 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 Hector for the same years, and z = 10-yr. average yield or test weight for the check variety Hector.

5/ Percent of Hector 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.

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TABLE 16. DRYLAND FALLOW BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
N1123111	Logan	99.30	27.91	58.87	51.10	67.10	12.20	13.98
CI 15229	Steptoe	100.00	25.98	57.43	44.50	59.30	13.90	11.72
PI483237	Bowman	96.20	26.76	57.37	51.80	83.90	3.70	14.18
ND 9866	Stark	96.53	29.19	56.83	51.07	66.80	9.10	14.48
PI568246	Baronesse	100.00	22.99	53.63	46.67	43.10	23.70	14.38
PI491534	Gallatin	100.00	27.32	53.23	48.20	41.60	24.60	14.86
MT886610	MT886610	98.60	27.69	49.57	47.63	51.60	20.60	14.57
H3860224	H3860224	97.90	25.03	48.60	49.00	73.00	10.90	15.08
PI537438	Targhee	98.97	26.54	47.43	48.20	48.60	24.80	14.88
PI591823	Chinook	99.30	27.48	47.17	48.97	45.70	26.40	15.02
SK 76333	Harrington	100.00	27.85	46.07	47.70	56.40	16.90	14.79
H1851195	H1851195	96.90	27.11	45.57	48.23	50.90	20.70	15.52
ND 11055	Foster	98.97	28.37	45.37	46.57	63.00	18.20	13.59
MN 56	Stander	93.40	26.61	44.90	46.77	46.20	26.90	14.28
CI 15856	Lewis	98.60	25.96	43.20	48.33	41.00	27.20	15.59
CI 15514	Hector	98.27	26.64	40.57	48.70	39.80	28.80	15.10
EXPERIMENTAL MEANS		98.31	26.84	49.74	48.34	54.88	19.29	14.50
C.V. 2: (S OF MEAN/MEAN)*100		1.33	3.03	4.68	1.47	-	-	-
LSD (0.05)		3.77	2.35	6.73	2.06	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3652-SB Field: OffSta Design: __RCB__ # Ents: 16 # 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: 110.40 W Elevation: 2800 ft.

Seeding Date: 05/08/97 Sd'g Depth: 1.00 in. Depth to Moisture @ Sd'g: 0.75 in. Moist Soil Depth @ Sd'g: 48.00 in.
Soil Temp @ Sd'g: __.__F @ 1 in. 62.0F @ 2 in. 64.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 2x Tillage w/Sweeps & Harrows; 1x Tillage w/Sweeps, Harrows & Rods__
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Winter Wheat_ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer: 55#N,22#P2O5, 0#K2O/ac via NH3+11-52-0 inj'd in sep PP ops Fall 96 Herbicide: __'Bronate' @ 1.5pts/ac__
Harvest Date: 09/05/97 Root Penetration Depth: 47 in. Comments: __Pre-Plant Soil Analysis was Post-Fertilization__

Depth	PRE-PLANT SOIL ANAL 04/03/97 Max Depth=48"									__/__/__	POST-HVST SOIL ANAL 09/15/97 (Max Depth=48"								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.62	6.1	1.3	20	20	381	6	VFSL	14.5	_____	.16	5.8	1.0	14	19	356	6	VFSL	14.5
6-24"	2.47			84			85	SCL		_____	.79			12			6	VFSL	
24-36"	1.83			76				CL		_____	.70			12				CL	
36-48"	1.73			68				CL		_____	1.01			36				CL	
TOTAL:	6.65			248						_____	2.66			74					

Precipitation & Stored Soil Water Summary: 04/03/97 to Sd'g: 0.60 in. (0.60 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 7.25 in.
Sd'g to 09/15/97: 7.30 in. (7.24 in events =>.1 in.) Meas'd Resid Soil Water 09/15/97: 2.66 in.
Growing Season (05/08/97 to 14 days prior to Harvest Maturity: 6.56 in.) (6.56 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/15/97: 0.74 in.) (0.68 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: 11.15 in.)

TABLE 17. TEN-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. 1988-1997.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF HECTOR YIELD 5/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT. 4/	PERCENT OF HECTOR TEST WT. 5/
CI 15229 STEPTOE	10	113.3	68.2	101.6	75.4	57.4	64.5	64.5	120.3	43.8	37.6	43.4	40.5	44.5	42.6	42.6	88.7
NS 78054 BARONESSE (P+)	7	117.9	64.5	88.6	73.1	53.6	63.9	61.3	114.3	51.5	43.2	50.2	46.7	46.7	47.2	47.7	99.3
H3860224 H3860224	3	-	-	90.4	66.5	48.6	68.5	60.9	113.6	-	-	50.0	45.0	49.0	48.0	47.3	98.6
PI483237 BOWMAN	10	104.8	74.4	93.3	72.5	57.4	60.2	60.2	112.4	49.1	46.7	49.7	49.1	51.8	48.9	48.9	101.8
PI537967 COLTER	3	113.8	60.0	84.3	-	-	86.0	58.7	109.4	43.6	38.5	44.3	-	-	42.1	42.2	88.0
PI591823 CHINOOK (+)	10	111.6	64.4	77.0	68.9	47.2	58.5	58.5	109.1	51.3	44.1	50.7	44.8	49.0	88.0	88.0	183.5
PI531228 BEARPAW	6	103.3	-	-	-	-	53.4	57.8	107.9	50.5	-	-	-	-	46.9	46.2	96.4
PI537438 TARGHEE	3	-	-	81.3	66.1	47.4	64.9	57.8	107.8	-	-	49.5	44.0	48.2	47.3	46.6	97.1
CI 9558 PIROLINE	9	109.1	59.7	79.6	68.2	-	59.2	57.7	107.6	51.5	43.6	51.9	47.6	-	48.3	48.3	100.8
MT886610 MT81143/LEWIS	4	-	60.2	76.2	69.6	49.6	63.9	57.3	106.9	-	43.1	51.1	45.6	47.6	46.9	47.8	99.7
ND 9866 STARK	8	104.0	68.7	69.6	73.9	56.8	60.2	57.2	106.8	49.6	45.7	50.1	48.7	51.1	48.7	49.0	102.1
MT 81161 MT 81161	4	106.0	-	-	-	-	54.7	56.1	104.7	50.3	-	-	-	-	45.7	46.1	96.1
CI 15856 LEWIS	10	109.7	60.5	65.0	68.8	43.2	55.9	55.9	104.2	53.2	43.2	51.5	47.2	48.3	48.5	48.5	101.0
MT860756 GALLATIN/BELLONA	3	101.1	61.3	-	-	-	63.0	55.5	103.6	51.4	44.6	-	-	-	46.1	49.3	102.8
PI491534 GALLATIN	10	101.5	58.1	64.2	64.8	53.2	55.4	55.4	103.3	51.6	43.7	51.6	47.3	48.2	48.3	48.3	100.7
MT851195 MT851195	5	99.4	61.1	73.4	72.9	45.6	70.5	55.3	103.1	48.9	43.4	50.1	45.6	48.2	47.3	47.4	98.8
MT890008 MT890008	3	104.3	59.3	78.4	-	-	80.7	54.9	102.5	48.4	43.3	49.6	-	-	47.1	47.2	98.4
SK 76333 HARRINGTON	10	102.0	55.5	81.3	68.6	46.1	54.7	54.7	102.1	50.8	42.2	48.7	45.1	47.7	47.0	47.0	97.9
CI 15514 HECTOR	10	102.5	58.3	75.2	65.0	40.6	53.6	53.6	100.0	51.0	42.0	50.6	46.8	48.7	48.0	48.0	100.0
CI 15857 CLARK	6	92.7	-	-	-	-	48.1	52.1	97.2	50.9	-	-	-	-	47.4	46.7	97.4
MEANS (ENTRIES LISTED)		105.7	62.3	80.0	69.6	49.7	-	57.3	-	49.9	43.0	49.6	46.0	48.4	-	49.2	-
6/ Growing Season Precip. (in.)		10.65	5.87	12.73	8.16	6.56	7.98										
Soil PAW (in.) to SD at Plntng.		6.29	7.94	5.43	7.03	7.25	7.14										
Total Plant Avail. Water (in.)		16.94	13.81	18.16	15.19	13.81	15.12										
Soil NO3 (lbs.) to SD at Plntng.		158.0	260.0	178.0	260.0	248.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		55.0	56.0	55.0	55.0	55.0											
(#P2O5)		22.0	22.0	22.0	22.0	22.0											
(#K2O)		0.0	0.0	0.0	0.0	0.0											

Check variety is Hector.

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/ Only the last five years shown, but summary calculations include all years noted.
In 1991 head shatter and head loss was substantial as crop was overripe for harvest by binder (necessary due to a major plot combine breakdown).
Crop suffered minor hail damage on two occasions (5/20 & 7/13).
1992 nursery suffered poor intial stand development due to early drought conditions (through mid-June), and was later damaged by moderate hail.

4/ 10-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 Hector for the same years, and z = 10-yr. average of yield or test weight for the check variety Hector.

5/ Percent of Hector 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.

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TABLE 18. DRYLAND FALLOW BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
N1123111	Logan	100.00	24.70	50.53	49.00	47.20	26.30	13.86
PI491534	Gallatin	98.97	24.41	47.97	46.77	36.60	33.50	14.45
MN 56	Stander	93.73	25.77	46.27	47.83	55.00	27.00	13.03
PI568246	Baronesse	98.97	22.53	45.87	47.10	43.10	26.60	14.74
PI483237	Bowman	98.60	24.59	45.30	49.67	68.70	13.80	13.67
CI 15229	Steptoe	98.27	22.59	45.30	45.90	65.60	16.50	11.51
MT886610	MT886610	99.30	23.64	44.97	46.83	43.10	31.80	14.92
ND 9866	Stark	96.20	23.58	44.93	49.90	61.90	16.30	14.19
H1851195	H1851195	97.90	24.67	44.90	47.53	41.60	28.80	15.35
PI591823	Chinook	98.60	22.69	42.27	47.73	37.00	35.80	14.86
CI 15856	Lewis	99.30	22.48	42.03	47.70	41.20	32.80	15.20
PI537438	Targhee	100.00	24.34	41.37	46.07	37.10	36.80	15.56
H3860224	H3860224	100.00	24.00	40.90	47.43	45.00	30.40	15.83
ND 11055	Foster	99.30	25.04	39.83	44.37	42.50	32.10	13.77
CI 15514	Hector	99.30	23.27	38.93	48.00	36.90	33.90	15.24
SK 76333	Harrington	99.30	23.48	37.40	45.10	41.00	33.90	14.80
EXPERIMENTAL MEANS		98.61	23.86	43.67	47.31	46.47	28.52	14.44
C.V. 2: (S OF MEAN/MEAN)*100		1.64	4.25	7.35	.80	-	-	-
LSD (0.05)		4.67	2.93	9.27	1.09	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3653-SB Field: OffSta Design: __RCB__ # Ents: 16 # 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: 05/10/97 Sd'g Depth: 1.0_ in. Depth to Moisture @ Sd'g: 1.0_ in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 65.0F @ 2 in. 62.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ____ Recrop ____ Full-Till ____ Reduced-Till _X_ No-Till # Tillages: 0 # Chem Apps: 2
Cropping System Details: __1996 Fallow Season = 2x Chem Fallow Apps ('Fallow Master') _____
Cropping History: 1 Yr Ago = 96 = __Chem Fallow__ 2 Yrs Ago = 95 = _Winter Wheat_ 3 Yrs Ago = 94 = _Red'T Fallow_
Fertilizer:100#N,55#P2O5,27#K2O/ac (40-20-6 PP inj'd)+(60-35-21 bnd'd 1.5"below seed) Herbicide:'Bronate'@ 1.5pts/ac
Harvest Date: 08/29/97 Root Penetration Depth: 38 in. Comments: _Pre-Plant Soil Anal was Post-Inj'd/Pre-Bnd'd Fert

Depth	PRE-PLANT SOIL ANAL 04/02/97 (Max Depth=48"									__/__/__	POST-HVST SOIL ANAL 08/29/97 (Max Depth=48"								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.65	7.6	1.3	36	15	259	8	VFSL	21.7	_____	.27	6.2	1.0	14	15	285	5	SCL-	21.7
6-24"	2.77			48			24	SCL		_____	1.27			36			20	CL	
24-36"	1.29			4				CL		_____	.78			12				CL	
36-48"	1.46			8				CL		_____	1.35			20				CL	
TOTAL:	6.17			96						_____	3.67			82					

Precipitation & Stored Soil Water Summary: 04/02/97 to Sd'g: 0.25 in. (0.25 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 6.42 in.
Sd'g to 08/29/97: 5.74 in. (5.43 in events =>.1 in.) Meas'd Resid Soil Water 08/29/97: 3.67 in.
Growing Season (05/10/97 to 14 days prior to Harvest Maturity: 5.09 in.) (4.94 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 08/29/97: 0.65 in.) (0.49 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: 7.84 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. 1988-1997.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993 4/	1994 5/	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF HECTOR YIELD 7/	1993 4/	1994 5/	1995	1996	1997	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF HECTOR TEST WT 7/
NS 78054 BARONESSE (P+)	5	112.1	-	82.1	76.0	45.9	66.5	60.2	111.5	43.8	-	46.8	48.5	47.1	46.0	46.6	97.8
H3860224 H3860224	3	-	-	80.5	78.6	40.9	66.7	58.9	109.1	-	-	47.1	48.8	47.4	47.8	47.0	98.7
MT851195 MT851195	4	102.1	-	75.8	77.1	44.9	75.0	58.1	107.7	42.8	-	47.5	48.8	47.5	46.4	46.9	98.5
PI591823 CHINOOK (+)	8	106.8	-	75.3	75.2	42.3	57.5	57.5	106.6	42.7	-	48.0	50.2	47.7	47.8	47.8	100.3
PI483237 BOWMAN	8	115.8	-	72.6	68.7	45.3	57.4	57.4	106.3	42.8	-	48.4	49.5	49.7	48.3	48.3	101.5
CI 15229 STEPTOE	8	94.6	-	81.7	77.2	45.3	56.8	56.8	105.2	36.8	-	40.9	43.5	45.9	41.5	41.5	87.0
ND 9866 STARK	6	108.4	-	72.8	73.5	44.9	59.0	56.7	105.1	42.1	-	49.2	50.9	49.9	48.6	48.7	102.3
MT886610 MT886610	3	-	-	79.5	66.1	45.0	63.5	56.1	104.0	-	-	48.7	48.6	46.8	48.0	47.3	99.2
PI537438 TARGHEE	3	-	-	81.3	67.8	41.4	63.5	56.1	103.9	-	-	47.0	45.9	46.1	46.3	45.6	95.7
PI491534 GALLATIN	8	98.0	-	71.7	75.3	48.0	55.0	55.0	102.0	44.1	-	48.8	49.1	46.8	47.8	47.8	100.3
MT 81161 MT 81161	3	107.2	-	-	-	-	64.0	54.5	100.9	45.2	-	-	-	-	45.0	46.1	96.8
CI 15514 HECTOR	8	95.3	-	70.7	73.7	38.9	54.0	54.0	100.0	43.3	-	48.0	49.2	48.0	47.6	47.6	100.0
CI 9558 PIROLINE	7	104.7	-	79.0	68.6	-	55.5	53.4	98.9	45.1	-	50.3	50.0	-	47.7	47.8	100.3
PI531228 BEARPAW	5	100.9	-	-	-	-	48.8	53.0	98.2	43.6	-	-	-	-	45.7	46.1	96.9
CI 15856 LEWIS	8	97.9	-	74.3	70.6	42.0	52.8	52.8	97.8	44.6	-	48.9	50.4	47.7	48.2	48.2	101.3
CI 15857 CLARK	5	100.3	-	-	-	-	47.0	51.1	94.6	43.3	-	-	-	-	45.6	46.0	96.7
SK 76333 HARRINGTON	8	100.1	-	76.6	64.1	37.4	50.3	50.3	93.1	43.6	-	45.1	47.4	45.1	45.7	45.7	96.0
MEANS (ENTRIES LISTED)		103.2	-	76.7	72.3	43.2	-	55.4	-	43.1	-	47.5	48.6	47.4	-	46.8	-
8/ Growing Season Precip. (in.)		13.03	4.00	10.34	4.50	5.09	7.71										
Soil PAW (in.) to SD at Plntng.		6.75	7.93	4.96	5.13	6.42	7.34										
Total Plant Avail. Water (in.)		19.78	11.93	15.30	9.63	11.51	15.05										
Soil NO3 (lbs.) to SD at Plntng.		162.0	110.0	104.0	84.0	96.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.5	40.0	30.0	56.0	100.0											
(# P2O5)		25.0	30.0	15.0	25.0	55.0											
(# K2O)		10.0	0.0	7.0	8.0	27.0											

Check variety is Hector.

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.
In 1991 the crop suffered substantial hail damage plus further shatter loss via harvest of over-ripe crop by binder (necessary due to major plot combine breakdown).
1992 nursery was lost to hail damage.

4/ Stand was poor, resulting in inflated yields. The site also suffered moderate hail damage in late June.

5/ Results from the 1994 nursery were not used due to poor stand establishment resulting from severe crusting.

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 Hector for the same years, and z = 10-yr. average yield or test weight for the check variety Hector.

7/ Percent of Hector 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.

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TABLE 20. DRYLAND FALLOW BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
PI483237	Bowman	100.00	28.81	54.77	50.13	51.20	20.50	15.18
ND 9866	Stark	98.97	28.28	52.43	49.17	38.20	30.00	14.49
H1851195	H1851195	98.97	26.12	50.43	47.17	27.90	36.30	16.59
N1123111	Logan	99.67	28.28	48.27	49.03	28.00	37.80	15.54
H3860224	H3860224	100.00	27.99	46.67	45.97	14.20	56.90	17.17
PI591823	Chinook	100.00	28.58	46.63	46.27	7.40	70.30	16.77
PI568246	Baronesse	100.00	23.20	45.80	44.80	12.80	58.60	17.08
CI 15229	Steptoe	100.00	27.26	45.50	41.37	17.20	43.60	13.44
CI 15856	Lewis	100.00	27.80	45.47	46.20	11.40	60.10	16.23
PI491534	Gallatin	100.00	26.18	44.90	45.83	5.80	66.70	15.95
MT886610	MT886610	100.00	27.17	43.73	45.57	6.70	70.40	16.20
PI537438	Targhee	99.67	26.29	43.40	45.13	9.70	65.60	16.85
SK 76333	Harrington	98.97	27.28	43.37	43.77	8.60	66.30	16.92
CI 15514	Hector	99.67	27.47	43.20	46.47	12.10	60.10	14.89
MN 56	Stander	99.67	29.49	33.23	43.30	15.10	60.20	15.54
ND 11055	Foster	99.67	26.56	32.00	41.37	9.40	70.40	15.81
EXPERIMENTAL MEANS		99.70	27.30	44.99	45.72	17.23	54.61	15.92
C.V. 2: (S OF MEAN/MEAN)*100		.39	3.72	4.23	.80	-	-	-
LSD (0.05)		1.13	2.93	5.49	1.05	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3654-SB Field: OffSta Design: __RCB__ # Ents: 16 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft.
Qtr: ___SWSE___ Section: 8 Twnshp: 34 N Range: 7 E Latitude: 48.73 N Longitude: 110.83 W Elevation: 3300 ft.

Seeding Date: 05/09/97 Sd'g Depth: 1.25 in. Depth to Moisture @ Sd'g: 0.50 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 70.0F @ 2 in. 61.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 1x Tillage w/Sweeps, then Rotary Harrow, 2x Tillage w/Sweeps & Rods_
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Spring Wheat_ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer:118#N,33#P2O5,21#K2O/ac (60N pre-inj'd NH3, + gran.blend bnd'd 1.5" below seed Herbicide: _None Applied_
Harvest Date: 08/28/97 Root Penetration Depth: 39 in. Comments: __Pre-Plant Soil Anal was Post-NH3/Pre-Gran Fert__

Depth	PRE-PLANT SOIL ANAL 04/03/97 (Max Depth=48")									__/__/__	POST-HVST SOIL ANAL 08/28/97 (Max Depth=47")								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.82	7.1	1.4	34	19	290	10	SCL	21.7	_____	.34	6.3	1.7	22	22	333	7	SCL	21.7
6-24"	1.91			24			13	SCL		_____	1.05			30			16	CL	
24-36"	1.09			4				SCL		_____	.72			52				CL	
36-48"	1.10			12				SCL		_____	1.19			80				CL	
TOTAL:	4.92			74						_____	3.30			184					

Precipitation & Stored Soil Water Summary: 04/03/97 to Sd'g: 0.43 in. (0.40 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.35 in.
Sd'g to 08/28/97: 5.66 in. (4.93 in events =>.1 in.) Meas'd Resid Soil Water 08/28/97: 3.30 in.
Growing Season (05/09/97 to 14 days prior to Harvest Maturity: 4.61 in.) (4.20 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 08/28/97: 1.05 in.) (0.73 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: 6.66 in.)

TABLE 21. NINE-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. 1989-1997.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF HECTOR YIELD 5/	1993	1994	1995	1996	1997	AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF HECTOR TEST WT 5/
PI537967 COLTER	3	83.8	47.8	94.5	-	-	75.4	67.5	116.1	43.8	45.0	45.2	-	-	44.7	43.4	88.7
MT890008 MT890008	3	87.0	40.5	98.4	-	-	75.3	67.5	116.1	48.6	46.2	50.8	-	-	48.5	47.1	96.4
MT860756 GALLATIN/BELLONA	3	83.3	48.4	-	-	-	67.4	66.3	113.9	51.6	49.2	-	-	-	50.1	49.3	100.8
MT851195 MT851195	5	82.1	47.0	93.3	70.5	50.4	68.7	65.8	113.2	50.4	48.5	51.5	47.3	47.2	49.0	49.0	100.2
CI 15229 STEPTOE	9	90.4	54.0	96.1	70.6	45.5	65.7	65.7	113.1	43.2	42.3	43.5	41.1	41.4	42.8	42.8	87.5
NS 78054 BARONESSE (P+)	7	90.5	46.4	97.4	72.7	45.8	66.6	65.7	112.9	49.4	47.7	50.8	46.2	44.8	47.4	47.6	97.3
PI483237 BOWMAN	9	89.4	49.2	88.5	72.8	54.8	64.1	64.1	110.3	49.4	49.9	51.7	48.5	50.1	49.8	49.8	101.7
MT 81161 MT 81161	3	79.6	-	-	-	-	70.0	64.0	110.0	50.2	-	-	-	-	48.3	47.5	97.1
PI491534 GALLATIN	9	76.0	44.9	84.9	68.9	44.9	62.3	62.3	107.1	50.8	49.4	52.1	46.7	45.8	49.3	49.3	100.8
ND 9866 STARK	8	71.8	49.9	79.1	74.5	52.4	62.7	62.1	106.8	50.5	50.5	52.6	48.9	49.2	50.2	50.3	102.9
MT886610 MT81143/LEWIS	4	-	45.8	86.7	66.9	43.7	60.8	62.0	106.7	-	49.0	51.3	46.3	45.6	48.0	48.4	99.0
PI591823 CHINOOK (+)	9	86.4	45.0	77.1	65.9	46.6	61.9	61.9	106.5	51.3	49.5	51.5	45.7	46.3	48.7	48.7	99.6
H3860224 H3860224	3	-	-	90.2	61.9	46.7	66.3	61.8	106.2	-	-	51.6	45.2	46.0	47.6	48.2	98.6
CI 15856 LEWIS	9	84.6	47.7	85.2	68.0	45.5	61.4	61.4	105.6	52.0	49.6	51.9	47.4	46.2	49.4	49.4	101.0
PI537438 TARGHEE	3	-	-	84.0	69.0	43.4	65.5	61.0	104.9	-	-	49.4	44.5	45.1	46.4	47.0	96.0
CI 9558 PIROLINE	8	83.4	42.3	82.7	75.9	-	62.2	60.2	103.5	51.3	48.2	52.8	48.8	-	49.7	49.4	100.9
MT 81616 BEARPAW	5	73.0	-	-	-	-	59.7	58.7	100.9	50.1	-	-	-	-	47.5	47.3	96.6
CI 15514 HECTOR	9	75.4	40.7	78.6	65.4	43.2	58.2	58.2	100.0	50.3	49.3	51.5	46.9	46.5	48.9	48.9	100.0
SK 76333 HARRINGTON	9	84.2	41.7	90.5	64.0	43.4	57.7	57.7	99.2	49.4	46.8	51.0	44.4	43.8	47.0	47.0	96.2
CI 15857 CLARK	5	73.9	-	-	-	-	55.4	54.5	93.8	50.1	-	-	-	-	48.3	48.0	98.2
MEANS (ENTRIES LISTED)		82.0	46.1	87.9	69.1	46.6	-	62.4	-	49.5	48.1	50.6	46.3	46.0	-	47.9	-
6/ Growing Season Precip. (in.)		12.45	2.83	12.66	4.63	4.61	7.64										
Soil PAW (in.) to SD at Plntng.		5.76	9.31	5.61	10.23	5.35	7.96										
Total Plant Avail. Water (in.)		18.21	12.14	18.27	14.86	9.96	15.60										
Soil NO3 (lbs.) to SD at Plntng.		112.0	108.0	62.0	194.0	74.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		55.0	90.0	38.0	114.0	118.0											
(#P2O5)		0.0	0.0	19.0	29.0	33.0											
(#K2O)		0.0	0.0	7.0	0.0	21.0											

Check variety is Hector.

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/ Only the five most recent years shown, but summary calculations include all years noted. 4 in. wet snow on 8/23 resulted in moderate lodging & shatter loss to mature crop in 1992.

4/ 9-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 Hector for the same years, and z = 9-yr. average of yield or test weight for the check variety Hector.

5/ Percent of Hector 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.

TABLE 22. DRYLAND FALLOW BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT FLANSAAS/LUMSDEN FARMS, LORING. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1997.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	Steptoe	99.67	22.20	54.53	42.60	60.40	17.40	11.16
N1123111	Logan	98.27	24.07	50.27	50.53	69.20	10.90	11.88
PI491534	Gallatin	99.30	25.58	49.50	48.87	49.80	21.70	12.15
CI 15856	Lewis	99.00	24.38	48.43	48.97	47.10	24.70	12.76
H1851195	H1851195	98.27	24.63	48.37	48.47	50.40	19.20	13.33
PI568246	Baronesse	99.30	23.20	47.57	46.93	44.40	25.70	12.86
PI591823	Chinook	99.67	23.77	47.07	48.57	30.80	38.20	12.77
MT886610,	MT886610	99.00	24.80	47.03	47.63	39.20	31.70	12.88
H3860224	H3860224	97.93	25.68	45.90	48.13	59.30	15.70	13.61
PI537438	Targhee	99.30	24.03	45.30	47.57	44.70	27.00	13.38
SK 76333	Harrington	97.23	24.65	44.60	48.33	59.40	14.90	13.14
CI 15514	Hector	100.00	25.71	42.97	48.57	39.90	29.40	12.80
PI483237	Bowman	97.93	26.64	40.07	50.20	78.50	7.30	12.97
ND 11055	Foster	97.57	23.90	39.83	44.90	45.80	24.90	12.36
MN 56	Stander	99.30	26.35	39.43	47.67	64.70	13.10	13.29
ND 9866	Stark	97.60	26.59	38.13	50.20	69.90	10.00	12.93
EXPERIMENTAL MEANS		98.71	24.76	45.56	48.01	53.34	20.74	12.77
C.V. 2: (S OF MEAN/MEAN)*100		1.20	3.19	4.99	.55	-	-	-
LSD (0.05)		3.41	2.28	6.57	.76	-	-	-

Note: Entries 'Bowman' and 'Stark' suffered minor wildlife grazing damage.

CLIMATIC and NURSERY MANAGEMENT DATA

Exp #: 97-3655-SB Field: OffSta Design: __RCB__ # Ents: 16 # Reps: 3 Plot-Obsrv: 54 sqft. Hvst-Obsrv: 48 sqft.
Qtr: _____ Section: 24 Twnshp: 35 N Range: 29 E Latitude: 48.78 N Longitude: 107.88 W Elevation: 2700 ft.

Seeding Date: 05/13/97 Sd'g Depth: 1.50 in. Depth to Moisture @ Sd'g: 1.50 in. Moist Soil Depth @ Sd'g: 55.0+ in.
Soil Temp @ Sd'g: __._F @ 1 in. 70.0F @ 2 in. 62.0F @ 4 in. Soil Texture: SCL Soil Series: _____
Cropping System: _X_ Fallow ___ Recrop _X_ Full-Till ___ Reduced-Till ___ No-Till # Tillages: 3 # Chem Apps: 0
Cropping System Details: __1996 Fallow Season = 1x Tillage w/Sweeps, 2x Tillage w/Sweeps & Rods_____
Cropping History: 1 Yr Ago = 96 = ____Fallow____ 2 Yrs Ago = 95 = _Spring Wheat_ 3 Yrs Ago = 94 = ____Fallow____
Fertilizer: 90#N,48#P2O5,21#K2O/ac (30-13-0 Bd'Cst Fall96+60-35-21 Bnd'd @Plntg Herbicide: LV6+'Ally'(4.0+0.1 oz/ac)
Harvest Date: 09/09/97 Root Penetration Depth: 38 in. Comments: __Pre-Plant Soil Anal was Post-Fall/Pre-Spr Fert__

Depth	PRE-PLANT SOIL ANAL 04/17/97 (Max Depth=48")									__/__/__	POST-HVST SOIL ANAL 09/09/97 (Max Depth=48")								
	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt	in. PAW	in. PAW	pH	% OM	Lb/a NO3	ppm P	ppm K	ppm S	Soil Text	CEC Txt
0 -6"	.64	6.3	1.0	8	11	290	31	SCL	21.7	_____	.37	6.1	1.4	6	14	310	10	SCL-	21.7
6-24"	1.78			24			16	SCL		_____	1.20			6			15	CL	
24-36"	1.21			4				CL		_____	1.01			4				CL+	
36-48"	1.25			4				SCL		_____	.84			4				CL+	
TOTAL:	4.88			40						_____	3.42			20					

Precipitation & Stored Soil Water Summary: 04/17/97 to Sd'g: 0.67 in. (0.45 in events =>.1 in.) Calc'd Initial Soil Water @ Sd'g: 5.55 in.
Sd'g to 09/09/97: 7.84 in. (7.74 in events =>.1 in.) Meas'd Resid Soil Water 09/09/97: 3.42 in.
Growing Season (05/13/97 to 14 days prior to Harvest Maturity: 6.79 in.) (6.69 in events =>.1 in.)
Post-Grwg Seas (14 days prior to Harvest Maturity to 09/09/97: 1.05 in.) (1.05 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: 8.92 in.)