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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. A new, standardized system was initiated in 1995 for better management and dissemination of such `base data' in more detail than that provided previously. However, such `base data' for 1998 is not included in this report as the information is yet pending final summarization.

RESULTS:

Data details for individual trials conducted from 1982-1997 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.

1998 cropping environments ranged from poor to good across North Central Montana. At Havre, total annual growing season precipitation (9/1/97 through 8/31/98) was 12.17 inches, slightly greater than the average for all years since 1916. However, nearly half of the precipitation for the entire year came in the second half of June - too late for full development of the crop production potential that would normally be associated with above normal precipitation.

April 1 through July 31 precipitation was 8.78 inches or 130 percent of the 83-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) were 110 percent of the average for the last 48 years (1951-1997). July-September, 1998 GDD values were 119 percent of normal; and less than average precipitation for the period provided for a harvest with very few weather delays. The last spring frost was 7 days early with the first fall frost 15 days late resulting in 150 frost free days, 22 days longer than the 83-year average. September 1997 through March 1998 precipitation was 71 percent of the long-term average, but stored soil moisture was generally good to excellent. However, seedbed moisture at normal planting time was severely lacking, resulting in delayed seeding in some areas where growers feared crusting if heavy rain were to follow planting into dry clay soils. The April through July growing season saw an average daily temperature at 59.5 degrees F, or only 3 percent above normal with April, May, and July being substantially warmer than normal while June was substantially cooler than normal. August was 8 percent warmer than the long-term average. Maximum summer temperature was recorded on August 7 at 101 degrees F. Minimum winter temperature was -29 degrees F on January 11. Crop outlook was initially poor with limited surface soil moisture and seemingly sluggish early crop development in April and May. Yield and test weight comparisons with long-term averages varied according to crop and location (WW=low to normal yields and high test weights, SW=variable yields and low test weights, BLY=normal yields and low to normal test weights, and OAT=low to normal yields and low test weights). The above trends were largely associated with timeliness of planting which was of greater importance than normal in 1998. Later plantings and greater stress associated with recrop plantings resulted in lower yields and severely decreased test weights in 1998.

Off-station cropping environments were extremely variable in 1998. The Turner location was wetter than normal, but the North Joplin location was drier than normal. The Loring, 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 were generally very good to excellent.

Plant height, yield, test weight, and protein data for the Myers and Morse dryland winter wheat trials conducted in 1998 are summarized in Tables 1 and 3, respectively. Multi-year yield and test weight summaries for selected winter wheat entries at the Myers location are presented in Table 2. As the Morse location was new in 1998, replacing the former long-term Peterson location; multi-year data will not be reported until after the third year in 2000.

Stand percent, plant height, yield, test weight and protein data for the 1998 Cederberg, Graff and Flansaas/Lumsden dryland spring wheat trials are summarized in Tables 4, 6, and 8, respectively. The Flansaas/Lumsden location is relatively new (3rd 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, Graff, and Flansaas/Lumsden locations are presented in Tables 5, 7, and 9, respectively.

Stand percent, plant height, yield, test weight, plump/thin and protein data for the 1998 Cederberg, Graff and FLansaas/Lumsden spring barley trials are summarized in Tables 10, 12, and 14, respectively. The Cederberg location further features an identical trial under conditions of low fertility, but those comparisons are included in a separate report located under "Crop Fertility

Investigations." Multi-year yield and test weight summaries for selected barley entries at the Cederberg, Graff and Flansaas/Lumsden locations are presented in Tables 11, 13, and 15, respectively.

SUMMARY:

Ten, 1998 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.	Brian Morse Farm, Hill County	(30NW Havre)	36-36N-12E

Dryland Spring Wheat Trials:

1.	*L. Cederberg Farm, Blaine County	(3NE Turner)	13-36N-25E
2.	Graff Farms, Inc., Liberty County	(14NW Joplin)	8-34N- 7E
3.	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.	Graff Farms, Inc., Liberty County	(14NW Joplin)	8-34N- 7E
3.	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 NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
CI 17860	NEELEY	97.57	21.69	40.37	60.27	13.50
QT 542	QUANTUM 542	97.90	24.09	40.03	61.17	13.20
CI 17735	NORSTAR	97.23	24.59	38.83	61.67	14.70
MT 9432	NUWEST/TIBER	97.57	21.89	38.53	61.93	15.50
S86-15	KESTREL	97.57	22.10	37.00	60.30	14.20
PI517194	TIBER	96.87	22.17	36.93	60.77	15.50
PI586806	NUWEST (hard white)	98.97	21.88	35.90	61.03	15.40
MT9514	MT8030/NORSTAR	97.20	21.99	35.60	61.03	13.40
PI564761	ERHARDT	94.10	20.71	35.57	61.43	16.20
ELKHORN	ELKHORN	96.17	22.38	35.47	60.17	15.00
MT9524	NUWEST/TIBER	98.27	23.15	34.97	61.40	15.40
PI584526	JUDITH	97.23	21.94	34.20	59.87	14.80
MTW9441	NUWEST/TIBER (hard white)	94.10	22.77	33.37	61.07	16.00
PI593891	VANGUARD (sawfly resistant)	96.53	20.10	33.03	60.27	15.40
PI573096	ALLIANCE	97.57	20.84	32.33	59.80	13.50
CI 17846	MANNING	97.93	22.24	32.27	60.87	13.50
RH78W296	BIGHORN	99.30	19.65	32.17	60.53	14.50
CI 17879	ROCKY	97.20	21.14	31.70	60.57	13.90
PI593047	PRONGHORN	96.53	21.48	31.43	60.17	14.80
PI555458	PROMONTORY	96.17	22.55	30.60	61.37	14.10
PI593889	RAMPART (sawfly resistant)	93.77	21.12	29.87	60.37	15.20
CI 17844	REDWIN	97.57	21.64	27.67	60.77	16.10
PI584505	HALT	95.47	17.81	27.53	59.77	14.60
PI593890	MCGUIRE	97.23	20.55	26.40	60.57	16.40

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	96.92	21.69	33.82	60.71	14.78
C.V. 2: (S OF MEAN/MEAN)*100	1.26	4.03	5.61	.25	-
LSD (0.05)	3.47	2.49	5.41	.43	-

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

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. 1989-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1994	1995	1996 4/	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 5/	PERCENT OF NORSTAR YIELD 6/	TEST WEIGHT (POUNDS PER BUSHEL) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 5/	PERCENT OF NORSTAR TEST WT 6/
ID 279 BLIZZARD	4	-	70.8	-	-	-	54.2	55.5	120.1	-	61.1	-	-	-	61.8	61.2	99.9
CI 17902 WINRIDGE	6	39.9	52.9	-	-	-	48.5	49.6	107.3	59.9	59.4	-	-	-	60.5	60.4	98.6
PI564761 ERHARDT	5	43.9	62.6	61.3	48.6	35.6	50.4	49.6	107.3	61.8	61.5	62.5	62.1	61.4	61.8	62.4	101.9
MT 77063 CREE	4	-	-	-	-	-	48.5	49.5	107.1	-	-	-	-	-	61.8	61.1	99.9
CI 17860 NEELEY	9	42.5	55.1	42.3	41.7	40.4	49.0	49.0	106.1	60.5	60.3	59.8	60.2	60.3	60.6	60.6	99.0
S86-15 KESTREL	6	41.8	70.8	61.5	42.2	37.0	52.4	48.7	105.5	58.1	61.1	59.5	57.7	60.3	59.8	59.8	97.7
QT 542 QUANTUM 542 (P)	8	44.6	52.7	33.6	41.6	40.0	48.2	48.1	104.1	61.0	60.1	60.9	61.1	61.2	60.9	60.9	99.6
PI518591 ARAPAHO (+)	4	45.9	44.0	-	-	-	43.7	47.0	101.7	60.8	58.9	-	-	-	59.9	59.8	97.7
PI584526 JUDITH	9	41.0	58.3	55.8	38.4	34.2	46.5	46.5	100.7	57.6	59.4	59.1	58.3	59.9	59.3	59.3	96.9
PI517194 TIBER	9	39.1	60.8	48.6	36.9	36.9	46.5	46.5	100.5	61.3	60.9	61.6	61.3	60.8	61.4	61.4	100.3
PI586806 NUWEST (+)(hrd wht	7	38.9	58.8	47.8	41.6	35.9	45.3	46.3	100.2	59.7	60.9	60.9	59.3	61.0	60.4	60.5	98.8
CI 17735 NORSTAR	9	37.0	53.2	58.1	47.8	38.8	46.2	46.2	100.0	59.3	61.2	60.4	60.9	61.7	61.2	61.2	100.0
PI478771 AGASSIZ	7	39.2	55.5	56.6	43.2	-	45.7	45.7	99.0	60.2	61.2	62.0	61.8	-	61.4	61.5	100.4
RDW(sel) AC READYMADE	4	32.6	56.7	55.4	-	-	52.0	45.4	98.4	61.3	60.8	61.9	-	-	61.7	61.7	100.8
CI 17879 ROCKY (P+)	9	43.8	45.3	41.4	43.8	31.7	45.1	45.1	97.6	61.8	59.9	61.3	62.4	60.6	61.4	61.4	100.3
CI 17940 ARCHER (P+)	4	43.7	47.0	-	-	-	43.7	44.7	96.7	60.5	59.0	-	-	-	60.0	59.4	97.0
CI 17846 MANNING	7	43.2	63.9	40.9	36.6	32.3	43.5	44.6	96.5	61.1	59.9	61.1	60.6	60.9	60.9	60.9	99.5
CI 15075 CENTURK (+)	8	46.3	47.4	38.2	43.8	-	45.2	44.4	96.0	61.5	60.0	60.5	62.2	-	61.3	61.3	100.2
RH78W296 BIGHORN (P+)	8	41.2	56.9	40.2	40.8	32.2	42.7	42.6	92.3	60.2	60.2	61.5	61.2	60.5	60.8	60.9	99.4
CI 17727 WESTON	5	44.2	56.5	28.7	-	-	42.2	42.4	91.9	61.7	61.5	62.1	-	-	61.9	62.0	101.2
PI593889 RAMPART (swfly res	5	44.3	56.2	24.6	47.9	29.9	40.6	39.9	86.4	60.3	59.9	60.7	60.9	60.4	60.4	60.9	99.6
CI 17844 REDWIN	9	32.1	46.2	35.8	39.4	27.7	39.4	39.4	85.3	61.3	60.9	61.9	60.8	60.8	61.2	61.2	99.9
CI 17952 HAWK	8	44.0	40.2	3.5	30.7	-	39.3	38.5	83.4	63.1	61.5	60.0	61.4	-	61.4	61.5	100.4
PI593891 VANGUARD (swfly re	5	41.8	51.1	14.7	45.9	33.0	37.3	36.7	79.4	60.8	59.9	61.1	61.9	60.3	60.8	61.3	100.1
PI555458 PROMONTORY (+)	3	-	-	50.7	33.0	30.6	38.1	36.5	79.0	-	-	63.1	60.5	61.4	61.7	61.9	101.1
PI593890 MCGUIRE	4	-	45.8	43.1	40.4	26.4	38.9	36.3	78.7	-	59.8	60.7	61.5	60.6	60.6	60.8	99.3
MEAN (ENTRIES LISTED)		41.4	54.5	42.0	41.3	33.9	-	44.8	-	60.6	60.4	61.1	60.8	60.7	-	61.0	-
7/ Growing Season Precip. (in.)		6.47	14.63	8.16	7.16	P	7.96										
Soil PAW (in.) to 4 ft. at Plntng.		8.79	5.75	6.93	7.40	e	6.96										
Total Plant Avail. Water (in.)		15.26	20.38	15.09	14.56	n	14.92										
Soil NO3 (lbs.) to 4 ft. at Plntng.		296.0	146.0	244.0	216.0	d											
Fertilizer Applied (# N)		56.0	55.0	55.0	55.0	i											
(# P2O5)		22.0	22.0	22.0	22.0	n											
(# K2O)		0.0	0.0	0.0	0.0	g											
(# S)		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.

TABLE 3. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE BRIAN MORSE FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
MT9514	MT8030/NORSTAR	95.17	27.76	51.70	59.80	10.60
QT 542	QUANTUM 542	89.23	24.40	51.50	60.00	12.60
CI 17860	NEELEY	98.60	27.65	50.93	59.17	10.60
CI 17735	NORSTAR	95.83	32.64	48.83	60.40	11.00
PI517194	TIBER	94.10	26.60	48.33	60.53	12.60
PI586806	NUWEST (hard white)	94.10	26.60	48.30	61.03	12.30
S86-15	KESTREL	94.47	28.07	48.10	58.50	11.30
CI 17879	ROCKY	93.03	26.54	47.17	60.70	12.20
MT 9432	NUWEST/TIBER	96.53	26.93	47.07	61.70	13.20
MT9524	NUWEST/TIBER	95.13	25.73	47.03	61.77	12.70
PI584526	JUDITH	95.13	24.91	46.80	58.83	12.30
ELKHORN	ELKHORN	90.97	28.83	45.53	58.70	12.10
CI 17844	REDWIN	97.57	26.46	45.03	60.53	13.50
RH78W296	BIGHORN	97.93	21.60	44.53	59.70	13.00
MTW9441	NUWEST/TIBER (hard white)	92.73	26.36	44.07	60.83	12.70
PI555458	PROMONTORY	95.83	24.09	43.13	60.93	12.90
CI 17846	MANNING	92.70	23.35	43.07	59.83	12.70
PI593889	RAMPART (sawfly resistant)	78.47	25.04	42.70	59.10	13.90
PI573096	ALLIANCE	97.23	21.25	42.37	59.23	12.70
PI593891	VANGUARD (sawfly resistant)	90.97	23.88	42.30	59.10	13.80
PI564761	ERHARDT	96.87	24.48	41.27	61.00	14.10
PI593047	PRONGHORN	98.27	23.67	40.20	59.77	13.60
PI593890	MCGUIRE	98.60	23.56	39.60	60.17	14.80
PI584505	HALT	96.17	19.72	37.10	59.33	14.50

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	94.40	25.42	45.28	60.03	12.74
C.V. 2: (S OF MEAN/MEAN)*100	2.36	3.62	3.75	.22	-
LSD (0.05)	6.33	2.62	4.83	.38	-

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

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TABLE 4. DRYLAND FALLOW SPRING WHEAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI549275	HI-LINE	97.20	28.83	53.13	58.03	15.27
PNR 2375	PIONEER 2375	98.60	30.72	51.93	59.53	15.20
CI 17430	NEWANA	100.00	28.15	51.53	58.10	14.77
PI574642	McNEAL	99.30	30.76	51.50	58.40	16.07
MTHW9420	MT8182/MT8289 (hard white)	97.57	27.94	51.17	57.70	14.77
ND 606	AMIDON (sawfly resistant)	100.00	34.59	50.90	58.70	15.30
MT 9433	SCHOLAR (sawfly resistant)	100.00	32.74	50.77	59.53	16.40
ND 626	GRANDIN	99.67	30.47	49.47	57.83	16.43
ND 677	ERNEST (sawfly resistant)	97.23	34.15	49.47	59.37	16.47
WB 936	WESTBRED 936	97.23	25.10	49.27	57.37	15.80
WBEXPRES	WESTBRED EXPRESS	97.23	26.08	49.20	58.10	15.27
PI483235	GLENMAN (sawfly resistant)	98.60	29.44	47.60	56.53	14.70
CI 17790	LEN	99.67	30.49	47.47	58.00	15.63
MT 9609	FORTUNA/AMIDON	98.60	32.80	47.37	58.93	15.47
CI 17429	LEW (sawfly resistant)	99.30	35.14	46.83	60.50	15.43
C982-324	RAMBO (sawfly resistant)	98.97	28.96	46.17	58.90	14.83
WB 926	WESTBRED 926	99.30	26.96	45.40	57.60	15.47
ND 673	TRENTON	99.30	35.46	44.87	58.53	16.43
TR983239	FERGUS	98.97	28.52	44.37	58.07	15.60
ND 582	STOA	98.97	34.11	43.87	57.63	16.17
CI 13596	FORTUNA (sawfly resistant)	97.57	34.45	42.10	60.60	15.00

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	98.73	30.75	48.30	58.47	15.55
C.V. 2: (S OF MEAN/MEAN)*100	.90	2.22	2.74	.36	.61
LSD (0.05)	2.54	1.95	3.78	.61	.27

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

TABLE 5. 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. 1989-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1994	1995	1996	1997	1998	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	45.7	129.5	-	57.8	58.9	52.1	-	56.3	56.2	94.1
WA 6920 PENAWAWA (sfwh	6	34.4	-	-	-	-	43.0	44.6	126.6	57.2	-	-	-	-	58.0	58.2	97.4
CI 17904 OWENS(sft wht)	6	36.5	-	-	-	-	42.6	44.2	125.4	57.2	-	-	-	-	57.4	57.6	96.5
PI574642 McNEAL	7	30.3	57.6	29.1	45.5	51.5	46.0	43.5	123.3	57.1	59.9	59.2	56.4	58.4	58.4	58.4	97.7
PI483235 GLENMAN	10	37.5	56.8	30.1	41.5	47.6	43.4	43.4	123.1	57.7	58.6	59.0	55.9	56.5	57.8	57.8	96.7
CI 17430 NEWANA	10	36.3	55.8	29.9	43.8	51.5	42.4	42.4	120.1	58.6	59.5	61.5	56.9	58.1	59.1	59.1	99.0
ND 606 AMIDON	10	32.3	52.1	29.3	46.5	50.9	42.0	42.0	119.0	58.5	59.6	60.5	56.9	58.7	58.7	58.7	98.2
WB 936 WB 936 (P+)	4	-	57.9	24.2	45.0	49.3	44.1	41.8	118.4	-	58.3	60.2	56.0	57.4	58.0	57.7	96.6
MT 9433 SCHOLAR	3	-	-	28.8	45.9	50.8	41.8	41.6	118.1	-	-	60.7	58.5	59.5	59.6	59.5	99.5
WBEXPRES WB EXPRESS(P+)	4	-	56.4	27.3	42.6	49.2	43.9	41.6	117.9	-	59.6	59.7	56.4	58.1	58.4	58.2	97.4
PNR 2375 PIONEER 2375	4	-	54.0	27.7	41.6	51.9	43.8	41.5	117.7	-	60.0	61.1	57.0	59.5	59.4	59.1	99.0
PI549275 HI-LINE	10	30.6	57.2	29.7	42.3	53.1	40.5	40.5	114.8	57.3	59.8	59.8	55.5	58.0	58.1	58.1	97.3
CI 17828 PONDERA	7	36.4	56.0	-	-	-	40.3	40.4	114.6	58.9	60.0	-	-	-	59.6	59.6	99.8
ND 626 GRANDIN	9	34.6	49.5	24.7	43.0	49.5	41.6	40.3	114.3	58.8	57.8	60.9	55.7	57.8	58.5	58.7	98.2
MTHW9420 MT8182/MT8289	3	-	-	27.3	42.2	51.2	40.2	40.1	113.6	-	-	60.4	55.4	57.7	57.8	57.7	96.6
ND 677 ERNEST (+)	5	33.8	52.4	28.4	41.8	49.5	41.2	39.9	113.3	59.9	59.7	61.4	56.2	59.4	59.3	59.0	98.8
WPB 926R WB 926 (P)	9	35.6	54.3	26.2	43.1	45.4	41.0	39.8	112.8	57.8	57.8	60.3	55.6	57.6	58.0	58.2	97.4
ND 618 GUS	4	-	-	-	-	-	40.5	39.2	111.3	-	-	-	-	-	58.5	59.2	99.1
CI 17790 LEN	10	31.7	50.3	27.7	40.7	47.5	39.0	39.0	110.5	57.5	58.2	60.6	56.2	58.0	58.3	58.3	97.6
PI486139 KLASIC (P+) hw	3	37.7	-	-	-	-	41.1	38.8	110.1	57.5	-	-	-	-	57.5	57.7	96.6
ND 582 STOA	10	33.9	47.6	28.7	44.4	43.9	38.8	38.8	109.9	57.7	58.0	59.3	55.3	57.6	57.9	57.9	96.9
TR983239 WB FERGUS (P+)	4	-	50.8	24.4	44.1	44.4	40.9	38.7	109.9	-	59.0	61.3	56.4	58.1	58.7	58.4	97.8
C982-324 WB RAMBO (P+)	10	34.2	49.3	25.5	38.0	46.2	37.5	37.5	106.2	59.7	59.8	61.2	58.0	58.9	59.3	59.3	99.2
ND 673 TRENTON	3	-	-	25.8	41.9	44.9	37.5	37.4	105.9	-	-	61.0	56.2	58.5	58.6	58.5	97.9
CI 17429 LEW	10	31.5	40.0	28.6	37.6	46.8	37.3	37.3	105.8	59.6	60.9	61.3	57.4	60.5	60.0	60.0	100.4
CI 15930 OLAF	5	-	-	-	-	-	35.9	37.1	105.1	-	-	-	-	-	57.9	58.2	97.5
CANLANC LANCER	6	28.3	-	-	-	-	34.4	35.7	101.2	59.2	-	-	-	-	59.0	59.2	99.1
CI 13596 FORTUNA	10	32.8	42.7	27.3	36.8	42.1	35.3	35.3	100.0	60.1	60.5	62.0	56.9	60.6	59.7	59.7	100.0
NDCUT CUTLESS	6	29.5	-	-	-	-	32.2	33.4	94.8	60.1	-	-	-	-	58.6	58.8	98.4
MEAN (ENTRIES LISTED)		33.6	52.8	27.7	42.6	48.4	-	40.0	-	58.4	59.2	60.5	56.2	58.5	-	58.5	-
6/ Growing Season Precip. (in.)		3.93	8.71	3.62	10.48	P	7.70										
Soil PAW (in.) to SD at Plntng.		6.84	5.09	6.01	4.87	e	6.11										
Total Plant Avail. Water (in.)		10.77	13.80	9.63	15.35	n	13.81										
Soil NO3 (lbs.) to SD at Plntng.		28.0	54.0	54.0	60.0	d											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	g											
Fertilizer Applied (# N)		66.0	66.0	66.0	66.0	66.0											
(# P2O5)		33.0	33.0	33.0	33.0	33.0											

Check variety is Fortuna.

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

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

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

4/ 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 6. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	SAWFLY Rating 1/	PLNT HT Inches	YIELD Bu/Ac	TESTWT Lbs/Bu	PROTEIN %
PI574642	MCNEAL	100.00	0.17	30.01	24.33	50.33	19.20
CI 17430	NEWANA	100.00	0.50	27.17	23.67	49.73	16.60
CI 13596	FORTUNA (sawfly resistant)	100.00	0.00	34.68	23.67	52.90	16.90
WB 936	WESTBRED 936	99.30	1.33	27.20	23.67	47.37	19.70
PI549275	HI-LINE	100.00	0.00	28.58	23.17	47.23	19.20
WB 926	WESTBRED 926	100.00	0.33	28.78	23.13	48.20	19.60
PI483235	GLENMAN (sawfly resistant)	99.67	0.00	29.20	22.67	49.63	17.40
WBEXPRES	WESTBRED EXPRESS	99.33	0.33	26.10	21.87	48.70	18.00
C982-324	RAMBO (sawfly resistant)	100.00	0.00	28.25	21.47	51.30	18.00
TR983239	FERGUS	100.00	1.33	29.48	21.03	48.23	19.60
ND 677	ERNEST (sawfly resistant)	99.30	0.00	34.03	20.90	50.40	20.00
MT 9433	SCHOLAR (sawfly resistant)	100.00	1.00	33.86	20.80	51.97	18.90
CI 17429	LEW (sawfly resistant)	100.00	0.00	35.51	20.17	53.10	18.80
CI 17790	LEN	98.63	1.00	28.57	19.43	48.37	18.10
ND 582	STOA	100.00	1.50	33.64	19.20	49.17	19.10
PNR 2375	PIONEER 2375	99.67	3.00	31.73	18.87	49.43	18.50
MTHW9420	MT8182/MT8289 (hard white)	99.67	1.33	27.40	18.57	48.10	18.20
MT 9609	FORTUNA/AMIDON	100.00	0.00	33.92	18.50	49.63	19.20
ND 626	GRANDIN	99.67	1.33	31.89	17.97	45.47	18.20
ND 606	AMIDON (sawfly resistant)	100.00	1.00	35.30	17.80	50.90	18.80
ND 673	TRENTON	100.00	1.33	35.26	13.57	46.00	19.20

STATISTICAL SUMMARY	STAND %	SAWFLY Rating 1/	PLNT HT Inches	YIELD Bu/Ac	TESTWT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	99.77	.74	30.98	20.69	49.34	18.63
C.V. 2: (S OF MEAN/MEAN)*100	.34	32.44	2.35	7.85	1.46	-
LSD (0.05)	.97	.68	2.08	4.64	2.05	-

1/ Visual Sawfly Cutting rating at harvest (0 = No Cutting, 3 = Severe Cutting)

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

TABLE 7. TEN-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. 1989-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
WA 6920 PENAWAWA (sft wht)	6	36.9	-	-	-	-	52.6	52.0	131.6	56.8	-	-	-	-	58.8	58.0	97.8
CI 17904 OWENS (sft wht)	6	32.1	-	-	-	-	50.9	50.3	127.5	58.4	-	-	-	-	59.0	58.3	98.1
PI574642 McNEAL	7	33.8	73.7	47.6	37.2	24.3	46.1	46.6	118.0	56.5	61.4	56.5	51.3	50.3	56.8	57.5	96.8
CI 17828 PONDERA	7	34.0	62.0	-	-	-	48.7	46.0	116.6	59.2	61.6	-	-	-	60.5	59.1	99.5
PI483235 GLENMAN	10	31.9	65.8	46.4	34.4	22.7	45.5	45.5	115.3	56.2	60.8	56.8	52.6	49.6	57.5	57.5	96.8
BZ684-23 WB VANNA(P+)(sft w	3	-	67.8	47.0	36.6	-	50.5	45.5	115.2	-	60.1	54.2	47.1	-	53.8	53.3	89.7
CI 17430 NEWANA	10	30.7	68.8	47.0	36.4	23.7	45.1	45.1	114.1	59.3	61.8	56.8	51.5	49.7	58.1	58.1	97.8
ND 606 AMIDON	10	31.2	66.9	50.0	31.2	17.8	44.6	44.6	113.0	58.1	61.3	59.2	53.4	50.9	58.1	58.1	97.9
PI549725 HI-LINE	10	32.1	71.9	50.3	34.7	23.2	43.9	43.9	111.2	57.1	62.0	55.9	49.0	47.2	56.8	56.8	95.6
PI486139 KLASIC(P+)(hrd wht	3	34.4	-	-	-	-	43.6	43.5	110.2	57.3	-	-	-	-	59.0	59.0	99.4
ND 618 GUS	4	-	-	-	-	-	45.5	43.1	109.2	-	-	-	-	-	60.1	59.4	100.0
TR983239 WB FERGUS (P+)	4	-	61.2	50.3	36.5	21.0	42.2	43.0	108.9	-	61.6	57.3	52.1	48.2	54.8	55.9	94.1
WBEXPRES WB EXPRESS (P+)	4	-	64.2	46.6	33.7	21.9	41.6	42.3	107.3	-	61.1	57.1	51.5	48.7	54.6	55.7	93.8
ND 626 GRANDIN	9	31.0	56.8	46.6	33.4	18.0	42.4	42.3	107.2	58.8	61.8	56.4	50.3	45.5	57.0	57.2	96.3
WPB 926R WB 926 (P)	9	29.6	61.6	48.1	35.6	23.1	42.0	41.9	106.2	58.6	60.7	56.7	51.3	48.2	56.7	56.9	95.8
C982-324 WB RAMBO (P+)	10	25.3	63.1	44.3	29.2	21.5	41.7	41.7	105.8	59.1	62.3	58.0	54.7	51.3	59.0	59.0	99.3
CI 17790 LEN	10	30.6	62.1	44.8	33.2	19.4	41.6	41.6	105.4	58.7	61.5	56.7	52.1	48.4	57.5	57.5	96.9
ND 582 STOA	10	32.6	60.1	46.6	31.4	19.2	41.5	41.5	105.1	57.7	60.9	55.8	52.2	49.2	57.4	57.4	96.7
PNR 2375 PIONEER 2375	4	-	62.4	45.0	34.5	18.9	40.2	40.9	103.6	-	61.1	57.4	53.6	49.4	55.4	56.5	95.1
WB 936 WB 936 (P+)	4	-	54.6	46.6	34.8	23.7	39.9	40.6	102.9	-	60.3	55.1	50.7	47.4	53.4	54.4	91.7
CI 17429 LEW	10	30.8	54.6	41.8	33.2	20.2	40.4	40.4	102.4	58.8	62.0	58.2	53.8	53.1	59.0	59.0	99.3
NDCUT CUTLESS	6	30.7	-	-	-	-	40.6	40.1	101.6	58.6	-	-	-	-	59.8	59.0	99.4
CI 15930 OLAF	5	-	-	-	-	-	41.7	40.0	101.4	-	-	-	-	-	59.1	58.2	98.1
CI 13596 FORTUNA	10	34.3	52.6	43.9	34.9	23.7	39.5	39.5	100.0	59.6	64.4	60.3	55.3	52.9	59.4	59.4	100.0
ND 677 ERNEST (+)	5	34.4	57.7	44.6	31.7	20.9	37.9	39.5	99.9	59.6	60.9	59.3	53.3	50.4	56.7	57.6	96.9
MT 9433 SCHOLAR	3	-	-	44.6	34.9	20.8	33.4	38.6	97.9	-	-	58.5	55.2	52.0	55.2	58.4	98.4
CANLANC LANCER	6	28.2	-	-	-	-	38.6	38.2	96.7	58.1	-	-	-	-	59.8	59.0	99.4
MTHW9420 MT8182/MT8289 (HRD	3	-	-	41.8	32.7	18.6	31.0	35.9	90.8	-	-	55.2	50.3	48.1	51.2	54.1	91.1
ND 673 TRENTON	3	-	-	43.3	31.0	13.6	29.3	33.9	85.8	-	-	57.5	51.6	46.0	51.7	54.7	92.0
MEANS (ENTRIES LISTED)		31.8	62.5	46.1	33.9	20.8	-	42.3	-	58.2	61.5	57.1	52.0	49.3	-	57.4	-
6/Growing Season Precip. (in.)		2.83	12.88	4.63	4.82	P	7.72										
Soil PAW (in.) to SD at Plntng.		9.31	5.61	10.23	5.35	e	7.96										
Total Plant Avail. Water (in.)		12.14	18.49	14.86	10.17	n	15.68										
Soil NO3 (lbs.) to SD at Plntng.		108.0	62.0	194.0	74.0	d											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	i											
Fertilizer Applied (# N)		90.0	38.0	114.0	118.0	n											
(# P2O5)		0.0	19.0	29.0	33.0	g											
(# K2O)		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/ 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.

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 8. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE FLANSAAS/LUMSDEN FARM, LORING. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI574642	MCNEAL	98.97	28.50	31.67	54.17	18.20
MT 9433	SCHOLAR (sawfly resistant)	99.30	30.35	31.37	57.33	17.40
WBEXPRES	WESTBRED EXPRESS	93.43	24.68	30.47	54.33	16.10
WB 936	WESTBRED 936	97.90	25.09	30.13	52.77	18.00
PNR 2375	PIONEER 2375	98.27	28.66	29.93	54.67	17.30
ND 626	GRANDIN	98.60	29.38	29.77	51.83	17.40
MTHW9420	MT8182/MT8289 (hard white)	96.53	26.60	29.70	53.27	16.60
PI549275	HI-LINE	99.30	27.85	29.47	51.63	17.40
TR983239	FERGUS	97.57	27.34	28.80	54.57	17.30
CI 17430	NEWANA	96.20	26.98	28.23	52.67	16.40
WB 926	WESTBRED 926	95.50	24.74	28.07	53.60	17.30
C982-324	RAMBO (sawfly resistant)	96.90	26.85	27.40	55.63	17.00
ND 677	ERNEST (sawfly resistant)	97.57	30.91	27.30	54.80	18.40
CI 17790	LEN	99.30	27.89	27.20	52.83	17.20
ND 582	STOA	94.77	30.45	27.03	53.53	17.70
ND 606	AMIDON (sawfly resistant)	99.00	32.68	26.93	54.87	17.20
MT 9609	FORTUNA/AMIDON	100.00	30.28	26.13	54.40	17.20
ND 673	TRENTON	99.30	32.06	25.50	54.17	17.30
CI 17429	LEW (sawfly resistant)	98.60	32.48	24.73	56.50	17.50
CI 13596	FORTUNA (sawfly resistant)	98.97	31.35	24.53	55.33	16.20
PI483235	GLENMAN (sawfly resistant)	100.00	27.40	23.87	52.63	16.40

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	97.90	28.69	28.01	54.07	17.21
C.V. 2: (S OF MEAN/MEAN)*100	1.11	2.77	5.45	.60	-
LSD (0.05)	3.09	2.28	4.36	.93	-

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

TABLE 9. THREE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A DRYLAND FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT THE FLANSAAS/LUMSDEN FARM, LORING. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1996-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1996	1997	1998	1999	2000	AVERAGE FOR YEARS TESTED	3-YR. COMPAR. AVERAGE YIELD 3/	PERCENT OF FORTUNA YIELD 4/	TEST WEIGHT (POUNDS PER BUSHEL) 1996	1997	1998	1999	2000	AVERAGE FOR YEARS TESTED	3-YR. COMPAR. AVERAGE TEST WT 3/	PERCENT OF FORTUNA TEST WT 4/
PI574642 McNEAL	3	28.6	35.2	31.7	-	-	31.8	31.8	123.6	59.9	55.4	54.2	-	-	56.5	56.5	97.3
MT 9433 SCHOLAR	3	28.7	35.3	31.4	-	-	31.8	31.8	123.5	61.8	58.5	57.3	-	-	59.2	59.2	102.0
WB 936 WB 936 (P+)	3	26.9	37.9	30.1	-	-	31.7	31.7	123.0	60.5	56.6	52.8	-	-	56.6	56.6	97.6
CI 17430 NEWANA	3	30.2	35.9	28.2	-	-	31.5	31.5	122.2	61.6	56.8	52.7	-	-	57.0	57.0	98.3
ND 606 AMIDON	3	29.3	36.1	26.9	-	-	30.8	30.8	119.5	61.0	57.5	54.9	-	-	57.8	57.8	99.6
ND 626 GRANDIN	3	26.9	35.4	29.8	-	-	30.7	30.7	119.2	61.4	56.3	51.8	-	-	56.5	56.5	97.4
PNR 2375 PIONEER 2375	3	27.8	34.7	29.2	-	-	30.6	30.6	118.8	61.0	56.8	54.7	-	-	57.5	57.5	99.1
PI549275 HI-LINE	3	28.3	32.7	29.5	-	-	30.2	30.2	117.1	60.5	55.1	51.6	-	-	55.7	55.7	96.1
MTHW9420 MT8182/MT8289	3	27.0	33.6	29.7	-	-	30.1	30.1	116.9	61.1	55.8	53.3	-	-	56.7	56.7	97.8
WBEXPRES WB EXPRESS(P+)	3	27.8	31.2	30.5	-	-	29.8	29.8	115.9	60.3	55.9	54.3	-	-	56.8	56.8	98.0
ND 677 ERNEST (+)	3	27.1	34.8	27.3	-	-	29.8	29.8	115.6	61.5	57.1	54.8	-	-	57.8	57.8	99.6
TR983239 WB FERGUS (P+)	3	25.5	34.6	28.8	-	-	29.6	29.6	115.1	62.0	56.6	54.6	-	-	57.7	57.7	99.5
WPB 926R WB 926R (P)	3	25.7	34.1	28.1	-	-	29.3	29.3	113.8	61.0	56.2	53.6	-	-	56.9	56.9	98.1
PI483235 GLENMAN	3	28.8	33.8	23.9	-	-	28.8	28.8	112.0	58.7	56.1	52.6	-	-	55.8	55.8	96.2
ND 582 STOA	3	26.6	32.8	27.0	-	-	28.8	28.8	111.9	59.9	55.1	53.5	-	-	56.2	56.2	96.8
CI 17790 LEN	3	26.9	31.4	27.2	-	-	28.5	28.5	110.7	61.2	55.4	52.8	-	-	56.5	56.5	97.4
ND 673 TRENTON	3	25.9	33.4	25.5	-	-	28.3	28.3	109.8	60.7	56.8	54.2	-	-	57.2	57.2	98.6
CI 17429 LEW	3	27.1	30.7	24.7	-	-	27.5	27.5	106.9	61.3	57.1	56.5	-	-	58.3	58.3	100.5
C982-324 WB RAMBO (P+)	3	26.6	27.8	27.4	-	-	27.2	27.2	105.8	61.6	57.6	55.6	-	-	58.3	58.3	100.4
CI 13596 FORTUNA	3	23.0	29.7	24.5	-	-	25.7	25.7	100.0	61.2	57.6	55.3	-	-	58.0	58.0	100.0
MEAN (ENTRIES LISTED)		27.2	33.6	28.1	-	-	-	29.6	-	60.9	56.5	54.1	-	-	-	57.2	-
5/ Growing Season Precip. (in.)		3.19	7.36	P			5.28										
Soil PAW (in.) to SD at Plntng.		5.26	5.55	e			5.41										
Total Plant Avail. Water (in.)		8.45	12.91	n			10.69										
Soil NO3 (lbs.) to SD at Plntng.		40.0	40.0	d													
SD (Sampling Depth in inches)		48.0	48.0	i													
Fertilizer Applied (# N)		57.0	90.0	n													
(# P2O5)		28.0	48.0	g													
(#K)		0.0	21.0														

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/ 3-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 = 3-yr. average yield or test weight for the check variety Fortuna.

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

5/ Seeding to 14 days prior to harvest maturity.

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TABLE 10. DRYLAND FALLOW SPRING BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
MTLB 5	MTLB 5	100.00	30.62	77.27	51.97	63.80	15.17	13.69
MTLB 32	MTLB 32	100.00	28.52	76.90	50.47	60.23	19.33	13.38
ND 9866	Stark	100.00	32.40	74.97	52.43	76.97	12.33	12.74
PI568246	Baronesse	100.00	24.92	74.13	49.30	68.90	14.40	12.89
MT920073	MT920073	100.00	27.81	73.93	51.53	80.07	12.87	12.77
MT910150	MT910150	100.00	30.41	73.73	52.70	77.60	11.63	13.93
MTLB 57	MTLB 57	100.00	28.41	72.67	51.23	67.13	18.13	13.41
MTLB 6	MTLB 6	100.00	29.79	72.63	51.27	69.03	14.93	13.83
SK 76333	Harrington	100.00	29.38	72.53	48.70	67.23	16.50	12.82
PI491534	Gallatin	100.00	30.97	70.73	51.00	67.40	15.10	12.46
PI483237	Bowman	100.00	26.69	69.77	52.00	78.23	10.30	12.83
MT910189	MT910189	100.00	29.67	69.30	52.07	78.00	11.23	12.01
PI591823	Chinook	100.00	29.41	68.70	51.27	66.27	17.83	13.42
CI 15856	Lewis	100.00	31.05	66.60	52.33	77.87	10.33	13.34
N1123111	Logan	100.00	27.68	66.43	51.33	72.60	14.80	12.88
CI 15514	Hector	100.00	31.04	64.57	51.50	68.07	15.90	13.40

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	100.00	29.30	71.55	51.32	71.21	14.42	13.11
C.V. 2: (S OF MEAN/MEAN)*100	-	2.57	4.23	.74	2.81	8.53	1.77
LSD (0.05)	-	2.18	8.74	1.10	5.79	3.55	.67

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

TABLE 11. 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. 1989-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF HECTOR YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF HECTOR TEST WT 5/
CI 15229 STEPTOE	9	65.6	68.3	42.5	60.4	-	60.5	62.2	119.9	42.0	42.5	42.1	44.4	-	42.6	42.9	88.3
MT890008 MT890008	3	56.6	59.5	-	-	-	67.0	61.1	117.8	45.8	46.5	-	-	-	46.8	47.4	97.6
NS 78054 BARONESSE (P+)	8	55.2	71.7	43.4	56.7	74.1	63.4	60.9	117.4	47.0	49.1	48.9	46.6	49.3	48.0	48.0	98.9
H3860224 LEWIS/APEX	4	50.8	69.3	38.7	60.4	-	54.8	57.9	111.7	45.1	48.7	47.7	47.8	-	47.3	47.9	98.6
ND 9866 STARK	9	58.2	57.8	39.3	62.8	75.0	58.3	57.9	111.5	50.2	51.6	49.7	49.9	52.4	50.3	50.4	103.8
MT851195 MT851195	5	57.7	59.1	42.6	58.4	-	59.9	57.8	111.4	47.1	49.4	47.8	48.3	-	48.1	48.0	98.8
PI537438 TARGHEE	3	-	63.4	41.2	57.3	-	54.0	57.7	111.1	-	48.1	47.5	47.5	-	47.7	47.8	98.5
PI483237 BOWMAN	10	53.8	54.1	49.4	65.1	69.8	57.0	57.0	110.0	48.8	50.7	50.0	51.3	52.0	50.1	50.1	103.2
PI537967 COLTER	3	56.7	55.4	-	-	-	61.8	56.4	108.7	42.2	44.5	-	-	-	45.1	45.7	94.0
MT860756 GALLATIN/BELLO	3	51.4	-	-	-	-	67.1	55.0	106.1	47.5	-	-	-	-	48.7	49.1	101.2
N1123111 LOGAN	3	-	-	38.9	64.4	66.4	56.6	54.1	104.3	-	-	48.5	50.4	51.3	50.1	49.1	101.1
PI591823 CHINOOK (+)	10	56.0	52.5	39.0	54.8	68.7	53.9	53.9	103.8	46.7	48.7	47.8	47.7	51.3	48.1	48.1	99.0
PI491534 GALLATIN	10	54.1	50.7	36.5	59.4	70.7	53.4	53.4	103.0	47.8	49.7	48.4	48.5	51.0	49.0	49.0	101.0
MT 81161 MT 81161	3	-	-	-	-	-	63.8	53.0	102.1	-	-	-	-	-	47.9	46.4	95.6
MT886610 MT81143/LEWIS	4	50.2	57.0	33.9	58.1	-	49.8	52.6	101.5	46.3	48.7	48.7	47.7	-	47.8	48.4	99.6
PI531228 BEARPAW	5	-	-	-	-	-	52.0	52.3	100.8	-	-	-	-	-	47.3	47.5	97.7
CI 15856 LEWIS	10	51.6	55.9	40.9	54.9	66.6	52.3	52.3	100.8	47.6	49.5	49.1	48.4	52.3	49.3	49.3	101.4
CI 15514 HECTOR	10	50.6	47.5	43.8	54.4	64.6	51.9	51.9	100.0	46.7	48.2	47.9	49.1	51.5	48.6	48.6	100.0
SK 76333 HARRINGTON	10	48.7	58.2	32.1	57.0	72.5	51.7	51.7	99.6	45.2	46.7	47.2	47.2	48.7	47.1	47.1	96.9
CI 9558 PIROLINE	8	58.1	58.0	34.5	-	-	48.9	50.8	97.9	50.3	50.6	48.0	-	-	49.2	49.6	102.1
CI 15857 CLARK	5	-	-	-	-	-	50.4	50.7	97.7	-	-	-	-	-	47.2	47.4	97.6
MEANS (ENTRIES LISTED)		54.7	58.7	39.8	58.9	69.8	-	55.3	-	46.6	48.3	47.9	48.2	51.1	-	48.0	-
6/ Growing Season Precip. (in.)		3.93	8.71	3.62	9.88	P	8.23										
Soil PAW (in.) to SD at Plntng.		6.84	5.09	6.01	3.96	n	6.96										
Total Plant Avail. Water (in.)		10.77	13.80	9.63	13.84	d	15.19										
Soil NO3 (lbs.) to SD at Plntng.		28.0	54.0	54.0	60.0	g											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		66.0	66.0	66.0	66.0	66.0											
(# P2O5)		33.0	33.0	33.0	33.0	33.0											

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 12. DRYLAND FALLOW SPRING BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
MT920073	MT920073	99.30	29.99	45.63	43.27	5.20	69.80	17.50
PI483237	Bowman	100.00	30.73	44.87	47.67	39.20	27.50	17.21
N1123111	Logan	100.00	29.76	43.17	45.13	8.60	61.90	17.41
MT910150	MT910150	100.00	32.53	42.53	44.33	5.80	64.90	18.93
MTLB 32	MTLB 32	100.00	29.83	42.27	41.57	.60	90.40	17.22
ND 9866	Stark	99.30	31.81	40.87	45.17	11.00	61.90	16.57
PI568246	Baronesse	100.00	27.89	40.43	40.43	3.00	82.30	18.37
MTLB 6	MTLB 6	100.00	29.38	40.27	42.80	1.10	89.10	18.37
MTLB 57	MTLB 57	99.67	29.59	40.10	42.83	1.60	86.00	17.47
PI591823	Chinook	98.27	31.55	39.40	43.20	3.00	81.90	18.40
CI 15856	Lewis	99.30	32.89	39.10	43.13	2.10	82.60	18.02
MT910189	MT910189	100.00	29.29	38.53	42.60	3.90	76.70	17.35
PI491534	Gallatin	100.00	33.14	37.40	42.17	1.70	85.00	18.38
SK 76333	Harrington	98.60	29.23	36.03	38.87	2.60	82.90	18.85
MTLB 5	MTLB 5	99.67	32.38	35.37	41.37	1.00	92.70	18.51
CI 15514	Hector	100.00	31.14	31.87	42.33	1.30	86.10	17.93

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	99.63	30.70	39.86	42.93	5.73	76.36	17.91
C.V. 2: (S OF MEAN/MEAN)*100	.57	2.51	2.86	.99	-	-	-
LSD (0.05)	1.64	2.23	3.29	1.23	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

TABLE 13. TEN-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. 1989-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF HECTOR YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1994	1995	1996	1997	1998	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF HECTOR TEST WT 5/
N1123111 LOGAN	3	-	-	72.8	48.3	43.2	54.8	64.9	117.0	-	-	47.9	49.0	45.1	47.4	50.5	104.7
PI537967 COLTER	3	47.8	94.5	-	-	-	75.4	64.5	116.1	45.0	45.2	-	-	-	44.7	42.8	88.7
MT890008 MT890008	3	40.5	98.4	-	-	-	75.3	64.4	116.1	46.2	50.8	-	-	-	48.5	46.5	96.4
MT860756 GALLATIN/BELLONA	3	48.4	-	-	-	-	67.4	63.3	113.9	49.2	-	-	-	-	50.1	48.6	100.8
NS 78054 BARONESSE (P+)	8	46.4	97.4	72.7	45.8	40.4	63.3	63.3	113.9	47.7	50.8	46.2	44.8	40.4	46.5	46.8	97.1
MT851195 MT851195	5	47.0	93.3	70.5	50.4	-	68.7	62.9	113.2	48.5	51.5	47.3	47.2	-	49.0	48.3	100.2
CI 15229 STEPTOE	9	54.0	96.1	70.6	45.5	-	65.7	62.8	113.1	42.3	43.5	41.1	41.4	-	42.8	42.2	87.5
PI483237 BOWMAN	10	49.2	88.5	72.8	54.8	44.9	62.2	62.2	112.0	49.9	51.7	48.5	50.1	47.7	49.5	49.5	102.7
MT 81161 MT 81161	3	-	-	-	-	-	70.0	61.1	110.0	-	-	-	-	-	48.3	46.9	97.1
ND 9866 STARK	9	49.9	79.1	74.5	52.4	40.9	60.2	60.0	108.1	50.5	52.6	48.9	49.2	45.2	49.7	49.8	103.2
PI491534 GALLATIN	10	44.9	84.9	68.9	44.9	37.4	59.8	59.8	107.7	49.4	52.1	46.7	45.8	42.2	48.6	48.6	100.7
PI591823 CHINOOK (+)	10	45.0	77.1	65.9	46.6	39.4	59.7	59.7	107.4	49.5	51.5	45.7	46.3	43.2	48.2	48.2	99.8
MT886610 MT81143/LEWIS	4	45.8	86.7	66.9	43.7	-	60.8	59.2	106.7	49.0	51.3	46.3	45.6	-	48.0	47.8	99.0
CI 15856 LEWIS	10	47.7	85.2	68.0	45.5	39.1	59.2	59.2	106.6	49.6	51.9	47.4	46.2	43.1	48.8	48.8	101.1
H3860224 H3860224	3	-	90.2	61.9	46.7	-	66.3	59.0	106.2	-	51.6	45.2	46.0	-	47.6	47.6	98.6
PI537438 TARGHEE	3	-	84.0	69.0	43.4	-	65.5	58.3	104.9	-	49.4	44.5	45.1	-	46.4	46.3	96.0
CI 9558 PIROLINE	8	42.3	82.7	75.9	-	-	62.2	57.5	103.5	48.2	52.8	48.8	-	-	49.7	48.7	100.9
MT 81616 BEARPAW	5	-	-	-	-	-	59.7	56.1	100.9	-	-	-	-	-	47.5	46.6	96.6
CI 15514 HECTOR	10	40.7	78.6	65.4	43.2	31.9	55.5	55.5	100.0	49.3	51.5	46.9	46.5	42.3	48.3	48.3	100.0
SK 76333 HARRINGTON	10	41.7	90.5	64.0	43.4	36.0	55.5	55.5	100.0	46.8	51.0	44.4	43.8	38.9	46.2	46.2	95.8
CI 15857 CLARK	5	-	-	-	-	-	55.4	52.1	93.8	-	-	-	-	-	48.3	47.4	98.2
MEANS (ENTRIES LISTED)		46.1	87.9	69.3	46.8	39.2	-	60.1	-	48.1	50.6	46.4	46.2	43.1	-	47.5	-
6/ Growing Season Precip. (in.)		2.83	12.66	4.63	4.61	P	7.64										
Soil PAW (in.) to SD at Plntng.		9.31	5.61	10.23	5.35	e	7.96										
Total Plant Avail. Water (in.)		12.14	18.27	14.86	9.96	n	15.60										
Soil NO3 (lbs.) to SD at Plntng.		108.0	62.0	194.0	74.0	d											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	i											
Fertilizer Applied (#N)		90.0	38.0	114.0	118.0	n											
(#P2O5)		0.0	19.0	29.0	33.0	g											
(#K2O)		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/ 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 14. DRYLAND FALLOW SPRING BARLEY VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE FLANSAAS/LUMSDEN FARM, LORING. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1998.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac 1/	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
PI568246	Baronesse	95.13	27.36	46.90	44.57	31.70	31.70	17.01
MTLB 6	MTLB 6	92.70	29.17	46.87	47.00	24.80	40.30	16.60
PI491534	Gallatin	96.53	28.78	45.07	45.70	27.80	37.30	16.50
MTLB 5	MTLB 5	90.30	28.77	44.37	47.13	20.40	42.80	16.71
MTLB 32	MTLB 32	95.83	27.74	44.03	44.40	13.00	51.40	16.42
N1123111	Logan	94.10	28.66	43.67	46.33	30.10	35.70	15.14
ND 9866	Stark	93.73	30.21	43.17	46.40	37.80	31.20	15.22
MT910150	MT910150	89.93	27.17	43.10	47.13	39.30	31.00	17.25
MT920073	MT920073	93.43	27.74	42.03	45.27	37.80	29.20	16.50
MTLB 57	MTLB 57	97.93	26.08	42.00	44.53	21.70	45.60	16.53
PI591823	Chinook	93.40	31.00	41.10	46.73	24.80	44.40	17.39
PI483237	Bowman	95.47	27.18	39.10	47.20	52.30	20.80	15.57
CI 15514	Hector	96.20	28.19	38.40	45.93	18.40	47.10	16.72
SK 76333	Harrington	88.90	27.90	37.67	45.57	42.70	29.30	17.10
MT910189	MT910189	95.83	27.44	37.40	45.63	30.20	40.00	15.53
CI 15856	Lewis	95.83	29.63	34.87	47.33	34.00	34.70	16.82

STATISTICAL SUMMARY	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	94.08	28.31	41.86	46.05	30.43	37.03	16.44
C.V. 2: (S OF MEAN/MEAN)*100	2.19	3.00	3.58	1.02	-	-	-
LSD (0.05)	5.95	2.45	4.33	1.36	-	-	-

1/ Lewis, Baronesse, Stark, MTLB5, MTLB6, and MT920073 were damaged by grazing antelope in rep 1 (yields were adjusted for missing row footage).

CLIMATIC and NURSERY MANAGEMENT DATA (summarization yet pending)

TABLE 15. THREE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION ON THE FLANSAAS/LUMSDEN FARM, LORING. NORTHERN AGRICULTURAL RESEARCH CENTER. 1996-1998.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1996	1997	1998	1999	2000	AVERAGE FOR YEARS TESTED	2-YR. COMPAR. AVERAGE YIELD 3/	PERCENT OF HECTOR YIELD 4/	TEST WEIGHT (POUNDS PER BUSHEL) 1996	1997	1998	1999	2000	AVERAGE FOR YEARS TESTED	2-YR. COMPAR. AVERAGE TEST WT 3/	PERCENT OF HECTOR TEST WT 4/
NS 78054 BARONESSE (P+)	3	38.1	47.6	46.9	-	-	44.2	44.2	109.9	48.0	46.9	44.6	-	-	46.5	46.5	97.5
PI491534 GALLATIN	3	37.9	49.5	45.1	-	-	44.2	44.2	109.8	48.5	48.9	45.7	-	-	47.7	47.7	100.0
N1123111 LOGAN	3	37.7	50.3	43.7	-	-	43.9	43.9	109.1	47.3	50.5	46.3	-	-	48.0	48.0	100.7
PI591823 CHINOOK (+)	3	38.8	47.1	41.1	-	-	42.3	42.3	105.2	47.0	48.6	46.7	-	-	47.4	47.4	99.4
CI 15856 LEWIS	3	39.1	48.4	34.9	-	-	40.8	40.8	101.5	48.9	49.0	47.3	-	-	48.4	48.4	101.5
CI 15514 HECTOR	3	39.3	43.0	38.4	-	-	40.2	40.2	100.0	48.6	48.6	45.9	-	-	47.7	47.7	100.0
SK 76333 HARRINGTON	3	36.5	44.6	37.7	-	-	39.6	39.6	98.4	47.5	48.3	45.6	-	-	47.1	47.1	98.8
ND 9866 STARK	3	37.2	38.1	43.2	-	-	39.5	39.5	98.2	49.6	50.2	46.4	-	-	48.7	48.7	102.2
PI483237 BOWMAN	3	36.4	40.1	39.1	-	-	38.5	38.5	95.8	49.8	50.2	47.2	-	-	49.1	49.1	102.9
MEANS (ENTRIES LISTED)		37.9	45.4	41.1	-	-	-	41.5	-	48.3	49.0	46.2	-	-	-	47.9	-
5/ Growing Season Precip. (in.)		3.19	6.79	P			4.99										
Soil PAW (in.) to SD at Plntng.		5.26	5.55	e			5.41										
Total Plant Avail. Water (in.)		8.45	12.34	n			10.40										
Soil NO3 (lbs.) to SD at Plntng.		40.0	40.0	d													
SD (Sampling Depth in inches)		48.0	48.0	i													
Fertilizer Applied (# N)		57.0	90.0	n													
(# P2O5)		28.0	48.0	g													
(#K)		0.0	21.0														

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/ 2-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 = 3-yr. average yield or test weight for the check variety Hector.

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

5/ Seeding to 14 days prior to harvest maturity.