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

PROJECT LEADER: Gregg R. Carlson, Agronomist - Havre

PROJECT PERSONNEL:
T.A. Allen, Research Specialist - Havre
P.L. Bruckner, Breeder/Geneticist (WW) - Bozeman
L.E. Talbert, Breeder/Geneticist (SW) - Bozeman
T.K. Blake, Breeder/Geneticist (BLY & OATS) - Bozeman
J.E. Berg, Research Associate (WW) - Bozeman
S.P. Lanning, Research Associate (SW) - Bozeman
P.F. Hensleigh, Research Associate (BLY & OATS) - Bozeman
Cooperating County Extension Agents
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). Winter and spring wheat, barley, and oat production together in the five counties represents 29% of the 1993 statewide total (38% and 26% 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.

RESULTS:

Data details for individual trials conducted from 1982-1993 were included in respective previous annual reports, but long-term yield and test weight data from past 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.

1994 cropping environments ranged from fair to excellent across North Central Montana. At Havre, total annual growing season precipitation (9/1/93 through 8/31/94) was 9.58 inches or 80 percent of the average for all years since 1916. April 1 through July 31 precipitation was 6.23 inches or 93 percent of the 79-year average. However, heat units expressed as "Growing Degree Days" (GDD, base 50) were 108 percent of the average for the last 44 years (1951-1994). July-September, 1994 GDD values at 111 percent of normal coupled with only .99 inches precipitation for the period - provided for ideal harvest conditions. However, warm and very dry conditions beginning in late June reduced spring wheat test weight. Sixty-two percent of the days from June 20 through July 31 saw maximum temperatures above 86 degrees F. The last spring and first fall frosts were 11 days early and 15 days late, respectively, resulting in 154 frost free days - 20 percent greater than the 79-year average. September 1993 through March 1994 precipitation was 3.17 inches or 79 percent of the long-term average. The April through July growing season was warmer with average daily temperature at 57.8 degrees F or 3.3 degrees warmer than normal. Maximum summer temperature was recorded on August 14 at 100 degrees F. Minimum winter temperature was -38

degrees F on February 8. Crop outlook was initially good as were most final yields, although spring grain test weight performance was sub-standard.

Off-station cropping environments were generally similar in 1994, but drier than that at Havre. Most recorded very respectable yields, particularly in view of extremely short growing season precipitation at some locations. Test weights were reduced for spring wheat at all off-station locations - and for barley as well at most locations. Grain protein for fertilized nurseries was good to excellent at all locations with the exception of North Dodson where we have had difficulty obtaining good protein for the past two years in a row. Stored soil NO3 and applied fertilizer N levels in both years should have afforded target protein at the achieved yields, but it hasn't. Further investigation will be conducted in 1995 in an attempt to determine what is limiting protein at this site.

Plant height, yield, test weight, and protein data for the Myers and Peterson dryland winter wheat trials conducted in 1994 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.

Plant height, yield, test weight and protein data for the 1994 Cederberg, Myers, Peterson, Graff and Solberg dryland spring wheat trials are summarized in Tables 5, 7, 9, 11 and 13, 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 spring wheat entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 6, 8, 10, 12 and 14, respectively.

Stand percent, plant height, yield, test weight, plump/thin and protein data for the 1994 Cederberg, Myers, Graff and Solberg spring barley trials are summarized in Tables 15, 17, 20 and 22, respectively. 1994 barley stands at the Peterson location were severely affected by pre-emergence crusting and are not presented due to high variability not associated with varieties. The Cederberg location further features an identical trial under conditions of low fertility, but those comparisons are covered in a separate report under "Crop Fertility Investigations." Multi-year yield and test weight summaries for selected barley entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 16, 18, 19, 21, and 23, respectively.

Stand percent, plant height, yield and test weight data for the 1994 dryland spring oat trial at the Cederberg location are summarized in Table 24. A multi-year yield and test weight summary for selected oat entries at the Cederberg location is presented in Table 25.

SUMMARY:

Fifteen 1994 off-station variety performance trials were conducted on fallow at five locations in five Northern Montana counties.

Dryland Winter Wheat Trials:

1. Myers Farms, Inc., Chouteau County (13W Big Sandy) 14-28N-10E
2. M & N Peterson Farm, Hill County (30NW Havre) 32-36N-13E

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Dryland Spring Wheat Trials:

*1.	L. Cederberg Farm, Blaine County (3NE Turner)	13-36N-25E
2.	Myers Farms, Inc., Chouteau County (13W Big Sandy)	14-28N-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.	H. Solberg Farm, Phillips County (11NE Dodson)	36-32N-27E

Dryland Spring Barley Trials:

*1.	L. Cederberg Farm, Blaine County (3NE Turner)	13-36N-25E
2.	Myers Farms, Inc., Chouteau County (13W Big Sandy)	14-28N-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.	H. Solberg Farm, Phillips County (11NE Dodson)	36-32N-27E

Dryland Spring Oat Trials:

1.	L. Cederberg Farm, Blaine County (3NE Turner)	13-36N-25E

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

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

FUTURE PLANS:

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

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

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

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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. 1994.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
CI 15075	CENTURK	31.71	46.27	61.47	13.40
PI518591	ARAPAHOE	30.92	45.90	60.80	14.10
QT 542	QUANTUM 542	32.65	44.57	61.03	13.50
MTS92042	LEW/TBR//RDW (sawfly resistant)	30.59	44.33	60.33	14.70
CI 17727	WESTON	33.64	44.20	61.73	14.20
CI 17952	HAWK	25.35	44.00	63.10	14.30
PI564761	MT 8719	30.46	43.90	61.77	15.00
CI 17879	ROCKY	31.56	43.83	61.80	13.40
CI 17940	ARCHER	26.38	43.70	60.53	13.20
CI 17846	MANNING	29.80	43.23	61.10	13.40
CI 17860	NEELEY	31.90	42.50	60.53	14.30
S86-736	S86-736	34.11	42.20	57.43	13.90
MTSF2238	MTSF2238 (sawfly resistant)	30.56	41.83	60.77	14.60
S86-15	KESTREL	32.62	41.80	58.13	13.60
RH78W296	BIGHORN	27.94	41.17	60.23	14.50
MT 8039	JUDITH	32.01	41.00	57.63	14.20
CI 17902	WINRIDGE	32.02	39.93	59.90	13.80
PI564762	MT 8713	27.20	39.87	60.50	14.70
PI478771	AGASSIZ	37.13	39.17	60.20	15.00
PI517194	TIBER	32.56	39.13	61.30	14.50
MT 7811	MT 7811 (hard white)	32.15	38.93	59.73	14.40
CI 17735	NORSTAR	36.90	36.97	59.33	15.10
RDW(sel)	AC READYMADE	32.56	32.57	61.30	15.00
CI 17844	REDWIN	32.56	32.10	61.27	15.20
EXPERIMENTAL MEANS		31.47	41.38	60.50	14.25
C.V. 2: (S OF MEAN/MEAN)*100		2.03	4.58	.61	-
LSD (0.05)		1.82	5.39	1.04	-

Note: Moderate sawfly injury was evident with more severe damage evident in `AC Readymade.' The nursery also suffered minor hail damage on June 26.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 10/12/93
Harvest Date: 08/04/94
Seeding Depth: 1.50 in.
Soil Series: Assinniboine variant
Previous Crop: Fallow after WW
Measured Soil Water on 09/14/93: 8.39 in. (sampling depth = 48 in.)
Precipitation 09/14/93 to Seeding: .40 in. (0.40 in events > .1 in.)
Initial Stored Soil Water at Seeding: 8.79 in. (sampling depth = 48 in.)

Soil Temp @ Sdg: 63F @ 2in., 58F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: None (minimal hand weeding)

TABLE 1. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA (Continued).

Fall/Winter Season Precipitation 1/ (seeding to April 21):
Total - all measurable events: .60 in.
Total - all events >.1 inches: .60 in.
Measured Soil Water on 04/21/94: 7.47 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.42 in. (sampling depth = 48 in.)
Growing Season Precipitation (Apr 21 to 14 days prior to harvest maturity`HM'):
Total - all measurable events: 5.87 in.
Total - all events >.1 inches: 5.75 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 3.42 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 296 , P(ppm olsen)= 13 , K(ppm)= 364 , pH= 7.6, O.M.(%) = 1.3
Fertilizer: 56#N,22#P2O5/ac via NH3+11-52-0 inj'd in sep pre-plnt opn's Fall 93
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 248 , P(ppm olsen)= 19 , K(ppm)= 432 , pH= 7.7, O.M.(%) = 1.8

1/ Does not include moisture in approximately 40 inches of snow received during winter months - most of which ran off frozen soils in late winter to early spring filling area reservoirs to capacity.

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. 1985-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1990	1991 4/	1992	1993	1994	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 5/	PERCENT OF NORSTAR YIELD 6/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991 4/	1992	1993	1994	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 5/	PERCENT OF NORSTAR TEST WT 6/
QT 542 QUANTUM 542 (P)	4	67.8	-	32.3	72.8	44.6	54.4	54.0	137.7	60.5	-	59.8	62.5	61.0	61.0	60.3	99.5
CI 17860 NEELEY	8	63.4	55.4	29.2	71.0	42.5	44.1	44.7	113.9	60.6	61.3	59.5	62.8	60.5	60.9	60.8	100.4
CI 17846 MANNING	3	-	-	21.4	66.4	43.2	43.7	43.4	110.7	-	-	61.0	61.7	61.1	61.2	60.5	99.9
PI518591 ARAPAHO (+)	3	-	-	20.8	64.0	45.9	43.6	43.3	110.4	-	-	58.3	61.6	60.8	60.2	59.5	98.2
PI517194 TIBER	9	56.7	44.7	25.2	69.0	39.1	41.8	41.8	106.6	60.9	61.5	60.6	63.4	61.3	61.2	61.2	101.1
NA 200 HAWK (P+)	8	59.8	47.9	24.0	64.3	44.0	43.0	41.8	106.5	60.6	61.9	60.5	62.4	63.1	61.4	61.0	100.7
CI 17727 WESTON	3	-	-	22.1	59.5	44.2	41.9	41.7	106.2	-	-	61.3	62.7	61.7	61.9	61.2	101.0
NA 1316 ROCKY (P+)	9	53.9	50.5	24.3	71.1	43.8	41.4	41.4	105.4	61.3	62.6	59.8	62.8	61.8	61.2	61.2	101.0
MT 8039 JUDITH	8	58.4	45.4	23.7	63.7	41.0	42.1	41.0	104.4	58.2	61.0	59.2	61.3	57.6	59.5	59.2	97.7
CI 17902 WINRIDGE	9	62.5	49.5	20.7	65.6	39.9	40.8	40.8	103.9	60.4	60.7	60.4	62.0	59.9	60.3	60.3	99.5
MT 77063 CREE	8	49.6	56.1	27.6	60.5	-	40.4	40.1	102.1	61.2	62.0	60.7	63.2	-	61.4	61.3	101.1
CI 15075 CENTURK (+)	9	55.0	47.9	23.0	60.4	46.3	39.5	39.5	100.6	60.8	62.5	60.0	62.8	61.5	61.2	61.2	101.0
CI 17735 NORSTAR	9	53.7	45.8	18.3	63.2	37.0	39.2	39.2	100.0	61.3	61.5	60.7	63.9	59.3	60.6	60.6	100.0
CI 8885 CHEYENNE	7	50.4	47.3	23.1	-	-	35.9	39.0	99.4	61.2	61.5	60.5	-	-	60.8	61.1	100.9
CI 17940 ARCHER (P+)	5	-	-	22.5	61.7	43.7	35.6	38.8	98.9	-	-	58.8	61.7	60.5	59.9	59.6	98.4
ND 7687 AGASSIZ	6	-	46.0	22.5	57.0	39.2	39.2	38.8	98.8	-	61.9	59.8	62.7	60.2	60.7	60.7	100.2
MT 7811 FRD//MT6928	3	53.3	40.8	-	-	38.9	44.3	38.2	97.4	60.3	60.7	-	-	59.7	60.2	59.3	97.9
CI 13670 WINALTA	8	55.3	46.1	22.4	59.2	-	38.4	38.2	97.3	61.5	62.6	60.4	63.6	-	61.4	61.2	101.1
RH78W296 BIGHORN (P+)	6	41.5	-	23.0	65.8	41.2	42.1	37.6	95.7	59.9	-	60.2	62.8	60.2	61.0	60.4	99.7
CI 13190 WARRIOR	7	-	47.4	24.3	55.8	-	35.0	36.6	93.3	-	61.5	60.1	62.3	-	60.5	60.5	99.8
CI 17844 REDWIN	9	51.0	42.2	25.2	55.0	32.1	36.4	36.4	92.7	60.4	61.3	60.9	62.3	61.3	61.1	61.1	100.9
MT 7877 NORWIN	7	48.2	43.8	23.1	-	-	32.7	35.4	90.3	60.8	61.9	60.4	-	-	61.0	61.3	101.2
MEAN (ENTRIES LISTED)		55.0	47.3	23.7	63.5	41.6	-	40.5	-	60.6	61.7	60.1	62.6	60.7	-	60.6	-
7/ Growing Season Precip. (in.)		6.90	8.45	7.60	12.3	6.47	5.90										
8/ Soil PAW (in.) to 4 ft. @Sdg.		9.29	7.71	5.30	5.26	8.79	7.00										
Total Plant Avail. Water (in.)		16.19	16.16	12.90	17.56	15.26	12.90										
Fertilizer Applied (# N)		48.0	50.0	50.0	55.0	56.0											
(# P2O5)		21.0	21.0	24.0	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 summarry calculations include all years noted. The 1989 nursery was lost due to winter injury.

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

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

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

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

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

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TABLE 3. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
QT 542	QUANTUM 542	31.29	56.63	60.50	13.80
MT 7811	MT 7811 (hard white)	30.96	51.87	59.73	13.30
S86-736	S86-736	31.60	51.50	58.43	12.50
CI 17940	ARCHER	25.41	51.20	61.20	13.00
CI 17860	NEELEY	31.48	50.40	60.10	13.80
CI 15075	CENTURK	30.31	49.60	61.67	13.00
S86-15	KESTREL	34.57	48.63	57.27	12.40
CI 17879	ROCKY	30.49	48.57	61.17	13.30
MTS92042	LEW/TBR//RDW (sawfly resistant)	26.84	48.20	59.40	14.60
CI 17844	REDWIN	31.99	47.93	60.40	14.00
PI518591	ARAPAHOE	29.67	47.93	61.17	14.30
RH78W296	BIGHORN	25.39	47.60	60.67	13.60
MT 8039	JUDITH	30.33	47.13	57.30	13.60
CI 17952	HAWK	24.08	46.77	63.20	14.40
PI517194	TIBER	32.78	46.37	60.87	13.80
RDW(sel)	AC READYMADE	31.76	45.80	60.90	14.10
PI564761	MT 8719	28.67	45.43	61.60	14.30
CI 17902	WINRIDGE	30.63	45.27	58.53	13.30
CI 17846	MANNING	27.81	44.87	60.50	13.10
CI 17735	NORSTAR	37.94	44.77	59.63	13.30
PI478771	AGASSIZ	36.18	44.47	60.63	14.10
CI 17727	WESTON	31.81	44.43	61.57	13.70
MTSF2238	MTSF2238 (sawfly resistant)	28.67	44.37	60.80	14.00
PI564762	MT 8713	25.33	43.70	60.83	14.20
EXPERIMENTAL MEANS		30.25	47.64	60.34	13.65
C.V. 2: (S OF MEAN/MEAN)*100		2.91	5.11	.59	-
LSD (0.05)		2.51	6.92	1.02	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	10/13/94	Soil Temp @ Sdg:	62F @ 2in., 53F @ 4in.
Harvest Date:	08/12/94	Root Penetration Depth:	43.0 in.
Seeding Depth:	1.50 in.	Depth to Moisture at Sdg:	0.50 in.
Soil Series:	Telstad Clay Loam	Probed Moist.Depth @ Sdg:	55.0 in.+
Previous Crop:	Fallow	Herbicide: `Bronate' @ 1.0 pt/ac	
Measured Soil Water on 08/31/93:	6.90 in.	(sampling depth = 48 in.)	
Precipitation 08/31/93 to Seeding:	.94 in.	(0.83 in events > .1 in.)	
Initial Stored Soil Water at Seeding:	7.84 in.	(sampling depth = 48 in.)	
Fall/Winter Season Precipitation (seeding to April 14):			
Total - all measurable events:	1.19 in.		
Total - all events >.1 inches:	.97 in.		
Measured Soil Water on 04/14/94:	6.03 in.	(sampling depth = 48 in.)	

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TABLE 3. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA (Continued).

Measured Soil Water at Harvest: 3.24 in. (sampling depth = 48 in.)
Growing Season Precipitation (Apr 14 to 14 days prior to harvest maturity`HM'):
Total - all measurable events: 4.90 in.
Total - all events >.1 inches: 4.51 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .02 in.
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 3.22 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 112 , P(ppm olsen)= 19 , K(ppm)= 268 , pH= 6.8, O.M.(%) = 0.7
Fertilizer: 40#N,30#P2O5/ac via 20-15-0 liquid injected @ 20 gpa Fall 93
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 60 , P(ppm olsen)= 31 , K(ppm)= 383 , pH= 6.4, O.M.(%) = 1.5

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. 1985-1994.

2/VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1990	1991 4/	1992 5/	1993	1994	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD 6/	PERCENT OF NORSTAR YIELD 7/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991 4/	1992	1993	1994	AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE TEST WT 6/	PERCENT OF NORSTAR TEST WT 7/
ND 8002 SEWARD	3	-	56.4	23.9	60.0	-	46.8	43.6	111.7	-	57.3	59.1	62.0	-	59.5	59.3	98.1
MT 7811 FRD/WNK//MT6928/TD	3	44.2	54.6	-	-	51.9	50.2	43.5	111.6	57.7	56.9	-	-	59.7	58.1	59.2	98.0
QT 542 QUANTUM 542 (P)	4	45.3	-	24.9	59.0	56.6	46.5	42.9	109.8	57.1	-	59.5	62.4	60.5	59.9	59.5	98.4
CI 17860 NEELEY	6	41.3	59.6	26.0	64.2	50.4	42.7	42.7	109.5	56.8	57.2	60.3	62.2	60.1	59.8	59.8	98.9
CI 17592 HAWK (P+)	5	48.8	59.3	22.3	51.8	46.8	45.8	41.6	106.5	58.6	56.1	60.1	61.8	63.2	60.0	60.1	99.4
MT 8039 JUDITH	6	48.7	50.0	18.3	60.9	47.1	40.2	40.2	103.0	55.8	54.7	59.2	61.4	57.3	58.2	58.2	96.3
PI517194 TIBER	6	39.6	46.2	23.4	61.6	46.4	39.5	39.5	101.3	58.5	57.7	60.7	62.7	60.9	60.4	60.4	100.0
CI 17940 ARCHER (P+)	3	-	-	23.5	51.0	51.2	41.9	39.4	100.9	-	-	59.0	60.8	61.2	60.3	59.7	98.8
CI 17879 ROCKY (P+)	6	43.0	51.1	19.6	56.4	48.6	39.1	39.1	100.1	58.7	59.2	59.6	61.9	61.2	60.3	60.3	99.8
CI 17735 NORSTAR	6	44.6	45.7	19.8	60.1	44.8	39.0	39.0	100.0	60.0	58.2	60.3	63.3	59.6	60.4	60.4	100.0
CI 15075 CENTURK (+)	6	42.3	50.3	20.4	55.3	49.6	38.9	38.9	99.7	58.6	58.3	60.6	61.8	61.7	60.4	60.4	99.9
CI 13190 WARRIOR	4	-	54.5	23.0	47.6	-	35.9	38.7	99.1	-	57.2	60.4	62.2	-	60.1	59.8	99.0
PI491532 CREE	5	38.6	48.1	22.2	55.3	-	36.7	37.8	96.9	59.6	58.5	61.0	62.5	-	60.6	60.4	100.0
PI478771 AGASSIZ	4	-	46.8	20.9	52.5	44.5	41.3	37.8	96.9	-	57.2	60.5	62.4	60.6	60.2	60.2	99.7
CI 16844 REDWIN	6	36.8	47.3	23.5	52.5	47.9	37.6	37.6	96.3	58.9	58.6	60.6	62.3	60.4	60.5	60.5	100.1
RH78W296 BIGHORN (P+)	4	37.1	-	20.3	57.7	47.6	40.7	37.5	96.1	57.7	-	58.7	62.4	60.7	59.9	59.6	98.6
CI 17846 MANNING	3	-	-	20.9	53.9	44.9	39.9	37.5	96.0	-	-	60.6	61.3	60.5	60.8	60.1	99.5
CI 17092 WINRIDGE	6	39.1	42.3	23.7	58.2	45.3	36.9	36.9	94.4	55.7	55.0	60.4	61.0	58.5	58.6	58.6	97.0
PI518591 ARAPAHO (+)	3	-	-	19.7	47.7	47.9	38.4	36.1	92.5	-	-	58.9	60.8	61.2	60.3	59.6	98.7
CI 17727 WESTON	3	-	-	20.5	49.3	44.4	38.1	35.8	91.6	-	-	61.7	62.9	61.6	62.0	61.4	101.6
MEAN (ENTRIES LISTED)		42.3	50.9	21.9	55.5	48.0		39.3		58.0	57.3	60.1	62.0	60.5		59.9	
8/ Growing Season Precip. (in.)		5.45	8.84	4.16	12.05	6.09	6.64										
9/ Soil PAW (in.) to 4 ft. @Sdg		9.92	5.41	6.63	4.78	7.84	7.31										
Total Plant Avail. Water (in.)		15.37	14.25	10.79	16.83	13.93	13.95										
Fertilizer Applied (#N)		50.0	65.0	42.0	70.5	40.0											
(#P2O5)		25.0	25.0	25.0	25.0	30.0											
(#K2O)		10.0	10.0	10.0	10.0	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, winter hardiness, disease resistance,etc.,before making variety selection decisions

2/ P = Private variety, + = Protected variety

3/ 1985 Nursery lost to winter injury and severe drought.
1986 + 1987 Nurseries were not planted because it was too wet to get into the field.
The 1989 nursery was lost due to winter injury.

4/ The 1991 crop suffered substantial hail damage.

5/ The 1992 nursery suffered hail damage on 7/14. Values listed above are actual harvest yields and do not contain any adjustments for hail damage.

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

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

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

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

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TABLE 5. PERFORMANCE OF SPRING WHEAT VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI486139	KLASIC (hard white)	90.60	19.06	37.67	57.50	13.63
PI483235	GLENMAN	98.27	26.96	37.53	57.73	13.27
CI 17904	OWENS (soft white)	97.23	25.85	36.53	57.20	11.73
CI 17828	PONDERA	96.87	26.68	36.43	58.90	14.13
CI 17430	NEWANA	95.47	24.62	36.33	58.57	12.90
WPB 926	WESTBRED 926	91.33	24.45	35.60	57.77	14.53
ND 626	GRANDIN	94.80	27.57	34.60	58.77	14.20
WA 6920	PENAWAWA (soft white)	98.97	23.25	34.43	57.23	12.60
C982-324	RAMBO	98.27	24.65	34.20	59.70	14.23
ND 582	STOA	94.43	30.88	33.93	57.73	14.37
ND 677	ND622*2/CUTLESS	93.77	28.90	33.83	59.90	14.57
CI 13596	FORTUNA	96.87	29.46	32.77	60.10	14.33
ND 606	AMIDON	94.43	29.62	32.33	58.53	13.97
CI 17790	LEN	94.47	26.47	31.67	57.47	14.93
CI 17429	LEW	98.27	31.08	31.53	59.60	14.47
PI549275	HI-LINE	97.57	24.55	30.60	57.33	14.03
PI574642	McNEAL	96.53	26.39	30.33	57.13	14.67
NDCUT	CUTLESS	97.93	27.17	29.47	60.13	14.37
BZ984326	BORDER	87.17	25.46	28.87	57.47	14.67
CANLANC	LANCER	96.53	33.48	28.33	59.20	14.83
EXPERIMENTAL MEANS		95.49	26.83	33.35	58.40	14.02
C.V. 2: (S OF MEAN/MEAN)*100		2.13	2.17	5.08	.53	2.58
LSD (0.05)		5.82	1.66	4.85	.89	1.04

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/02/94
Harvest Date: 08/16/94
Seeding Depth: 1.50 in.
Soil Texture: Sandy Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 64F @ 2in., 58F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.50 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: 2,4-D+`BanvelSGF'@.5#+2oz/ac
Initial Stored Soil Water at Seeding: 6.84 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.08 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 3.93 in. (electronic accum. guage)
Total - all events >.1 inches: N/A
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 3.08 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 28 , P(ppm olsen)= 16 , K(ppm)= 278 , pH= 6.4, O.M.(%) = 0.7
Fertilizer: 66#N,33#P2O5/ac via 46-0-0+11-52-0 banded 1.5" below seed at plntg
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 16 , P(ppm olsen)= 21 , K(ppm)= 354 , pH= 6.3, O.M.(%) = 1.4

TABLE 6. EIGHT-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION ON A 'TELSTAD' SOIL AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1987-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1990	1991	1992	1993	1994	AVERAGE FOR YEARS TESTED	8-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991	1992	1993	1994	AVERAGE FOR YEARS TESTED	8-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
PI483235 GLENMAN	8	33.3	47.5	57.3	52.6	37.5	39.0	39.0	130.3	59.3	56.8	57.6	57.7	57.7	58.4	58.4	97.9
WA 6920 PENAWAWA (sfwh	6	27.3	44.2	58.7	67.6	34.4	43.0	37.9	126.6	58.2	56.6	58.5	58.4	57.2	58.0	58.1	97.4
CI 17904 OWENS(sft wht)	8	31.3	41.2	53.9	62.6	36.5	37.5	37.5	125.2	59.2	54.2	56.3	58.2	57.2	58.4	58.4	97.8
PI574642 McNEAL	3	-	-	53.8	54.2	30.3	46.1	36.9	123.4	-	-	58.7	59.4	57.1	58.4	58.6	98.1
CI 17430 NEWANA	8	27.3	47.4	55.2	52.3	36.3	36.0	36.0	120.4	59.8	57.6	59.3	58.8	58.6	59.3	59.3	99.4
ND 606 AMIDON	6	25.4	45.7	54.1	54.8	32.3	40.2	35.4	118.3	57.6	57.7	59.1	58.4	58.5	58.5	58.6	98.2
ND 626 GRANDIN	5	28.6	40.1	55.7	48.5	34.6	41.5	34.8	116.3	59.8	57.7	59.7	58.6	58.8	58.9	59.3	99.4
WPB 926R WSTBRD926 (P+)	5	19.3	47.5	51.0	48.9	35.6	40.5	33.9	113.4	59.6	56.3	58.6	58.8	57.8	58.2	58.6	98.2
CI 17790 LEN	8	30.5	44.1	46.4	46.0	31.7	33.8	33.8	112.9	57.9	56.6	59.3	59.3	57.5	58.8	58.8	98.4
CI 17429 LEW	8	25.7	42.5	46.0	45.9	31.5	33.7	33.7	112.6	60.2	59.3	60.9	59.5	59.6	60.3	60.3	101.0
ND 582 STOA	8	26.8	39.3	50.3	48.2	33.9	33.5	33.5	112.0	58.8	56.3	58.1	57.9	57.7	58.7	58.7	98.4
ND 618 GUS	4	27.0	39.7	50.6	44.7	-	40.5	33.3	111.3	59.6	57.6	58.8	58.1	-	58.5	59.1	99.1
CI 17828 PONDERA	8	26.6	45.8	47.6	46.2	36.4	33.0	33.0	110.3	60.0	57.8	60.6	59.5	58.9	59.5	59.5	99.7
PI486139 KLASIC (P+) hw	3	-	-	45.9	39.8	37.7	41.1	32.9	110.1	-	-	58.8	56.2	57.5	57.5	57.6	96.6
CI 17910 ALEX	4	24.7	-	-	-	-	23.2	32.9	109.9	58.9	-	-	-	-	60.6	60.4	101.2
C982-324 RAMBO (P+)	8	19.7	39.3	48.0	49.7	34.2	32.6	32.6	109.0	59.3	56.9	58.7	59.8	59.7	59.9	59.9	100.3
PI549275 HI-LINE	7	28.2	40.7	49.8	47.9	30.6	33.8	32.4	108.4	58.9	55.3	58.8	58.6	57.3	58.6	58.4	97.9
CI 15930 OLAF	7	22.4	44.4	48.0	41.8	-	31.1	31.5	105.3	57.9	56.2	58.2	57.9	-	58.6	58.7	98.3
CANLANC LANCER	7	27.7	37.3	43.8	41.1	28.3	31.9	30.6	102.3	58.7	58.4	59.4	59.0	59.2	59.5	59.3	99.3
CI 17920 MARSHALL	3	-	-	-	-	-	20.4	30.1	100.7	-	-	-	-	-	59.9	59.2	99.2
CI 13596 FORTUNA	8	23.6	42.7	42.3	37.1	32.8	29.9	29.9	100.0	58.3	59.5	60.4	58.1	60.1	59.7	59.7	100.0
NDCUT CUTLESS	8	18.8	37.7	44.5	40.1	29.5	28.5	28.5	95.4	58.2	57.4	58.1	58.2	60.1	59.0	59.0	98.8
WPB 906R WSTBRD906 (P+)	3	20.1	-	-	-	-	18.9	26.6	88.9	59.2	-	-	-	-	60.2	59.6	99.8
MEAN (ENTRIES LISTED)		25.7	42.6	50.2	48.5	33.6		33.3		59.0	57.1	58.9	58.5	58.4		59.0	
6/ Growing Season Precip. (in.)		8.07	10.32	7.77	9.60	3.93	7.32										
7/ Soil PAW (in.) to SD @Plntng.		7.97	6.56	5.52	7.24	6.84	6.69										
Total Plant Avail. Water (in.)		16.04	16.88	13.29	16.84	10.77	14.02										
Soil NO3 (lbs.) to SD @Plntng.		120.0	100.0	112.0	52.0	28.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		62.0	70.0	70.0	62.0	66.0											
(# P2O5)		45.0	40.0	40.0	35.0	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/ 8-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 = 8-yr. average yield or test weight for the check variety Fortuna.

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

6/ Seeding to 14 days prior to harvest maturity.

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

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TABLE 7. PERFORMANCE OF SPRING WHEAT VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI486139	KLASIC (hard white)	100.00	21.51	38.93	57.70	14.80
WPB 926	WESTBRED 926	100.00	24.46	36.57	55.83	16.80
WA 6920	PENAWAWA (soft white)	99.30	23.74	35.27	55.33	15.60
PI574642	McNEAL	100.00	26.64	35.23	55.63	16.10
BZ984326	BORDER	99.30	24.68	35.00	56.23	16.30
CI 17430	NEWANA	100.00	23.83	34.63	56.23	15.50
PI549275	HI-LINE	100.00	25.55	34.00	54.43	16.90
ND 626	GRANDIN	100.00	27.09	33.97	55.03	16.50
PI483235	GLENMAN	100.00	26.05	33.73	55.57	15.30
CI 17904	OWENS (soft white)	100.00	25.17	33.07	55.13	15.00
ND 606	AMIDON	100.00	28.75	32.60	57.07	16.00
CI 13596	FORTUNA	100.00	28.58	32.43	59.47	15.70
CI 17828	PONDERA	100.00	26.94	32.23	57.47	16.80
ND 677	ND622*2/CUTLESS	100.00	28.27	31.23	57.97	16.70
CI 17429	LEW	100.00	28.01	30.90	57.17	16.70
NDCUT	CUTLESS	100.00	26.23	30.67	56.43	16.50
CANLANC	LANCER	100.00	29.37	30.17	58.23	16.40
ND 582	STOA	100.00	27.97	30.13	55.60	16.60
CI 17790	LEN	100.00	25.26	29.67	55.13	16.50
C982-324	RAMBO	100.00	22.52	29.57	57.60	16.30
EXPERIMENTAL MEANS		99.93	26.03	33.00	56.46	16.15
C.V. 2: (S OF MEAN/MEAN)*100		.22	1.96	3.20	.53	-
LSD (0.05)		.64	1.46	3.02	.86	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/21/94
Harvest Date: 08/04/94
Seeding Depth: 1.50 in.
Soil Series: Assinniboine variant
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 69F @ 2in., 63F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.50 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: `Bronate' @ 1.5 pts/ac
Initial Stored Soil Water at Seeding: 7.94 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.62 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 5.87 in.
Total - all events >.1 inches: 5.45 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 3.62 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 260 , P(ppm olsen)= 19 , K(ppm)= 354 , pH= 6.8, O.M.(%) = 0.8
Fertilizer: 56#N,22#P2O5/ac via NH3+11-52-0 inj'd in sep pre-plnt opn's Fall 93
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 224 , P(ppm olsen)= 17 , K(ppm)= 418 , pH= 7.5, O.M.(%) = 1.8
Note: The nursery suffered minor hail damage on June 26.

TABLE 8. SEVEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES OM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT MYERS FARMS,INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1988-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1990	1991 3/	1992 4/	1993	1994 3/	AVERAGE FOR YEARS TESTED	7-YR COMPAR. AVERAGE YIELD 5/	PERCENT OF FORTUNA YIELD 6/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991 3/	1992 4/	1993	1994 3/	AVERAGE FOR YEARS TESTED	7-YR COMPAR. AVERAGE TEST WT. 5/	PERCENT OF FORTUNA TEST WT. 6/
ND 618 GUS	3	31.8	36.4	-	54.9	-	41.0	37.8	131.6	56.3	55.1	-	56.5	-	55.9	57.1	99.2
CI 17910 ALEX	3	26.1	-	-	-	-	27.9	37.6	131.0	57.4	-	-	-	-	58.5	58.6	101.8
CI 17904 OWENS (SFT WHT)	6	33.2	32.5	-	60.7	33.1	37.1	37.1	129.2	56.2	53.9	-	55.8	55.1	56.3	56.3	97.8
WA 6920 PENAWAWA (SFT WHT)	5	33.0	32.8	-	66.5	35.3	43.0	37.0	128.7	56.0	52.2	-	55.7	55.3	54.3	54.8	95.1
ND 606 AMIDON	5	27.4	36.5	-	56.1	32.6	40.6	35.0	121.7	55.2	54.8	-	55.0	57.1	55.8	56.3	97.8
WPB 926R WESTBRED 926 (P+)	4	31.2	31.7	-	52.6	36.6	38.0	34.7	120.8	56.2	55.8	-	56.3	55.8	56.0	56.4	98.0
WPB 906R WESTBRED 906 (P+)	3	27.7	-	-	-	-	25.7	34.6	120.4	56.4	-	-	-	-	57.6	57.7	100.1
ND 582 STOA	6	23.4	36.2	-	57.6	30.1	34.2	34.2	119.1	55.7	54.5	-	56.4	55.6	56.4	56.9	98.8
ND 626 GRANDIN	4	27.6	29.1	-	58.5	34.0	37.3	34.1	118.5	57.2	54.0	-	56.6	55.0	55.7	56.1	97.4
MT 8402 HI-LINE	6	30.3	30.7	-	55.4	34.0	33.9	33.9	118.1	57.0	54.2	-	56.4	54.4	56.9	56.9	98.7
CI 17828 PONDERA	6	22.1	33.7	-	50.8	32.2	31.7	31.7	110.2	57.0	56.7	-	56.8	57.5	57.8	57.8	100.4
CI 15930 OLAF	5	22.4	29.6	-	45.2	-	30.6	31.4	109.1	55.8	52.9	-	56.6	-	56.0	56.4	97.9
PI483235 GLENMAN	6	21.7	25.8	-	52.4	33.7	30.8	30.8	107.1	55.6	53.1	-	56.2	55.6	56.1	56.1	97.3
C982-324 RAMBO (P+)	6	23.7	28.4	-	46.5	29.6	30.4	30.4	105.9	55.8	53.1	-	57.4	57.6	56.9	56.9	98.8
CI 17430 NEWANA	6	15.2	26.1	-	53.6	34.6	30.4	30.4	105.7	55.5	53.0	-	56.1	56.2	56.8	56.8	98.6
CI 17429 LEW	6	22.8	27.3	-	47.8	30.9	29.8	29.8	103.5	57.3	55.9	-	58.3	57.2	57.6	57.6	100.0
ND CUT CUTLESS	6	25.0	28.2	-	43.7	30.7	29.1	29.1	101.4	55.8	55.7	-	54.2	56.4	56.6	56.6	98.2
CI 17790 LEN	6	18.1	31.3	-	44.5	29.7	28.9	28.9	100.5	55.6	54.7	-	55.3	55.1	56.3	56.3	97.7
CI 13596 FORTUNA	6	17.4	30.4	-	45.7	32.4	28.7	28.7	100.0	55.6	56.2	-	57.5	59.5	57.6	57.6	100.0
CANLANC LANCER	6	22.5	25.4	-	41.6	30.2	27.5	27.5	95.8	56.0	55.7	-	56.4	58.2	57.3	57.3	99.4
MEANS (ENTRIES LISTED)		25.1	30.7	-	51.9	32.5		32.7		56.2	54.5	-	56.3	56.4		56.8	
7/Growing Season Precip. (in.)		6.90	8.45	8.25	13.95	5.87	7.96										
8/ Soil PAW (in.) to SD at @plant		10.23	8.47	6.14	6.29	7.94	7.39										
Total Plant Avail. Water (in.)		17.13	16.92	14.39	20.24	13.81	15.34										
Soil NO3 (lbs.) to SD @Plant.		160.0	128.0	200.0	158.0	260.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		48.0	50.0	50.0	55.0	56.0											
(#P2O5)		21.0	21.0	24.0	22.0	22.0											
(#K2O)		0.0	0.0	0.0	0.0	0.0											

Check variety is Fortuna.

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

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

3/ Crop suffered minor hail damage.

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

5/ 7-yr. CA = (x/y)* z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Fortuna for the same years, and z = 7-yr. average of yield or test weight for the check variety Fortuna.

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

7/ Seeding to 14 days prior to harvest maturity.

8/ Soil PAW values are actual gravimetric measurements.

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TABLE 9. PERFORMANCE OF SPRING WHEAT VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
CI 17904	OWENS (soft white)	78.47	25.93	43.93	56.00	13.50
WA 6920	PENAWAWA (soft white)	80.90	21.51	41.80	56.13	13.60
CI 17430	NEWANA	89.60	29.37	41.33	57.90	14.20
PI574642	McNEAL	89.23	25.88	41.30	56.03	15.20
PI486139	KLASIC (hard white)	81.60	22.61	40.80	57.30	14.60
ND 606	AMIDON	80.57	29.37	40.07	57.50	14.80
CI 13596	FORTUNA	79.53	27.38	39.47	58.80	15.20
ND 626	GRANDIN	84.37	27.90	38.20	56.37	15.30
BZ984326	BORDER	82.63	27.43	37.47	57.37	15.10
WPB 926	WESTBRED 926	82.27	27.76	36.63	57.23	15.20
ND 582	STOA	79.17	30.58	36.47	57.03	15.00
CI 17828	PONDERA	87.17	28.14	36.40	58.33	14.70
PI549275	HI-LINE	88.90	25.24	36.23	56.40	14.60
NDCUT	CUTLESS	80.53	27.20	35.63	57.37	15.10
ND 677	ND622*2/CUTLESS	80.20	27.26	34.83	58.37	15.70
PI483235	GLENMAN	88.90	28.56	34.77	55.80	14.00
CI 17790	LEN	80.20	27.39	34.67	57.97	14.70
CI 17429	LEW	84.37	28.43	33.87	57.63	15.00
CANLANC	LANCER	88.20	29.44	33.43	58.10	15.50
C982-324	RAMBO	88.90	25.38	31.93	58.43	15.00
EXPERIMENTAL MEANS		83.79	27.14	37.46	57.30	14.80
C.V. 2: (S OF MEAN/MEAN)*100		6.25	7.14	10.18	.82	-
LSD (0.05)		15.00	5.55	10.92	1.34	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/30/94
Harvest Date: 08/15/94
Seeding Depth: 1.50 in.
Soil Series: Telstad Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 66F @ 2in., 58F @ 4in.
Root Penetration Depth: 46.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: `Bronate' @ 1.0 pts/ac
Initial Stored Soil Water at Seeding: 7.93 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.42 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 4.00 in.
Total - all events >.1 inches: 3.59 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 3.42 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 110 , P(ppm olsen)= 26 , K(ppm)= 280 , pH= 6.4, O.M.(%) = 0.6
Fertilizer: 40#N,30#P2O5/ac via 20-15-0 liquid injected @ 20 gpa Fall 93
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 78 , P(ppm olsen)= 23 , K(ppm)= 291 , pH= 6.6, O.M.(%) = 1.3

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. 1985-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1990	1991 4/	1992 5/	1993	1994	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF FORTUNA YIELD 7/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991 4/	1992 5/	1993	1994	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF FORTUNA TEST WT 7/
CI 17904 OWENS (sftwht)	9	32.3	33.6	-	53.6	43.9	35.0	35.0	127.0	60.0	51.6	-	53.0	56.0	55.8	55.8	97.3
PI483235 GLENMAN	9	31.0	35.3	-	41.3	34.8	32.6	32.6	118.3	58.1	52.5	-	54.4	55.8	55.3	55.3	96.5
CI 17920 MARSHALL	4	-	-	-	-	-	29.1	32.4	117.8	-	-	-	-	-	57.3	56.0	97.8
CI 17430 NEWANA	9	31.3	29.7	-	46.2	41.3	31.8	32.1	116.6	60.2	51.1	-	54.7	57.9	57.2	57.2	99.7
WA 6920 PENAWAWA (sfw)	5	27.6	33.5	-	56.0	41.8	37.3	31.8	115.6	56.9	50.9	-	54.5	56.1	55.6	55.2	96.4
ND 606 AMIDON	5	33.8	30.1	-	47.7	40.1	36.3	31.0	112.7	59.9	53.9	-	55.4	57.5	57.2	56.8	99.1
CI 17790 LEN	8	28.6	33.9	-	34.6	34.7	32.2	30.2	109.7	56.9	52.8	-	52.8	58.0	56.1	55.4	96.6
CI 17828 PONDERA	9	28.1	36.1	-	47.2	36.4	30.0	30.0	108.9	60.0	55.6	-	57.4	58.3	57.7	57.7	100.7
WPB 926R WSTBRD926 (P+)	4	31.0	36.4	-	42.8	36.6	36.7	29.7	107.7	58.6	52.7	-	54.2	57.2	55.7	55.4	96.7
C982-324 RAMBO (P+)	7	25.8	31.4	-	46.5	31.9	30.4	28.4	103.2	61.0	52.9	-	56.9	58.4	58.2	57.9	101.0
ND 626 GRANDIN	4	31.7	27.2	-	43.0	38.2	35.0	28.3	102.8	58.9	51.2	-	56.4	56.4	55.7	55.4	96.8
CI 17910 ALEX	6	28.7	-	-	-	-	24.2	28.2	102.5	60.6	-	-	-	-	58.2	57.7	100.7
CI 17429 LEW	9	29.2	27.6	-	40.6	33.9	28.2	28.2	102.4	61.0	54.2	-	56.8	57.6	57.3	57.3	100.1
PI549275 HI-LINE	6	26.7	30.0	-	42.4	36.2	28.7	27.8	100.9	57.4	51.1	-	55.1	56.4	55.8	55.5	96.9
CI 13596 FORTUNA	9	30.0	31.3	-	35.5	39.5	27.5	27.5	100.0	61.2	55.5	-	54.8	58.8	57.3	57.3	100.0
ND 582 STOA	9	27.6	27.1	-	33.4	36.5	27.0	27.0	98.0	57.7	52.8	-	54.4	57.0	56.3	56.3	98.2
NDCUT CUTLESS	7	26.6	31.1	-	34.5	35.6	28.5	26.7	97.1	61.0	54.7	-	53.6	57.4	56.8	56.5	98.6
CANLANC LANCER	6	27.8	28.8	-	37.1	33.4	27.5	26.6	96.6	60.1	55.2	-	55.2	58.1	57.4	57.2	99.8
ND 618 GUS	3	30.6	26.2	-	35.4	-	30.7	26.2	95.2	59.3	54.0	-	55.4	-	56.2	56.4	98.4
CI 15930 OLAF	6	28.4	28.8	-	34.4	-	26.2	26.0	94.5	58.3	50.3	-	55.1	-	56.1	55.8	97.5
MEAN (ENTRIES LISTED)		29.3	31.0	-	41.8	37.2		29.3		59.3	52.9	-	55.0	57.3		56.4	
8/ Growing Season Precip. (in.)		4.87	8.96	5.09	13.03	4.00	5.80										
9/ Soil PAW (in.) to SD @Pltng		8.67	6.69	5.67	6.75	7.93	7.83										
Total Plant Avail. Water (in.)		13.54	15.65	10.76	19.78	11.93	13.64										
Soil NO3 (lbs.) to SD @Pltng		196.0	140.0	198.0	162.0	110.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		50.0	65.0	42.0	70.5	40.0											
(# P2O5)		25.0	25.0	25.0	25.0	30.0											
(# K2O)		10.0	10.0	10.0	10.0	0.0											
(# SO4)		0.0	0.0	0.0	0.0	0.0											

Check variety is Fortuna.

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

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

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

4/ Crop suffered substantial hail damage.

5/ 1992 nursery was not harvested due to extensive hail damage.

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

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

8/ Seeding to 14 days prior to harvest maturity.

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

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TABLE 11. PERFORMANCE OF SPRING WHEAT VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WA 6920	PENAWAWA (soft white)	97.20	22.57	36.87	56.83	12.60
PI486139	KLASIC (hard white)	97.57	20.29	34.37	57.33	14.10
ND 677	ND622*2/CUTLESS	91.00	18.53	34.37	59.57	15.10
CI 13596	FORTUNA	96.87	26.51	34.30	59.60	14.80
CI 17828	PONDERA	97.23	25.47	34.03	59.23	15.10
PI574642	McNEAL	98.60	24.84	33.80	56.53	15.50
ND 582	STOA	95.47	28.50	32.60	57.73	15.40
CI 17904	OWENS (soft white)	99.30	23.75	32.10	58.43	13.00
PI549275	HI-LINE	96.53	21.93	32.07	57.13	15.50
PI483235	GLENMAN	99.67	23.15	31.90	56.20	14.20
ND 606	AMIDON	97.23	27.82	31.17	58.10	14.80
ND 626	GRANDIN	96.90	25.38	30.97	58.83	15.50
CI 17429	LEW	98.63	27.85	30.77	58.77	15.00
NDCUT	CUTLESS	98.60	26.25	30.73	58.57	15.80
CI 17430	NEWANA	97.23	23.03	30.70	59.27	15.00
CI 17790	LEN	93.40	25.81	30.63	58.73	15.20
WPB 926	WESTBRED 926	94.10	23.91	29.60	58.63	16.00
CANLANC	LANCER	98.63	28.92	28.23	58.13	15.90
BZ984326	BORDER	91.67	23.71	28.00	57.67	15.10
C982-324	RAMBO	92.70	22.70	25.30	59.10	15.10
EXPERIMENTAL MEANS		96.43	24.55	31.63	58.22	14.94
C.V. 2: (S OF MEAN/MEAN)*100		2.39	7.63	5.95	.75	-
LSD (0.05)		6.60	5.36	5.39	1.25	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/04/94
Harvest Date: 08/19/94
Seeding Depth: 1.25 in.
Soil Series: Joplin-Hillon CL
Previous Crop: Fallow
Soil Temp @ Sdg: 58F @ 2in., 50F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.25 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: 2,4-D+`BnvlSGF'@.375#+4oz/ac
Measured Soil Water on 04/15/94: 8.26 in. (sampling depth = 48 in.)
Precipitation 04/15/94 to Seeding: 1.05 in. (1.01 in events > .1 in.)
Initial Stored Soil Water at Seeding: 9.31 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 4.18 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 2.83 in.
Total - all events >.1 inches: 1.96 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .26 in. (0.26 in events > .1 in.)
Adj'd Residual Soil Water @ (HM-14d): 3.92 in. (sampling depth = 48 in.)
Soil Analysis on 04/15/94 (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 108 , P(ppm olsen)= 14 , K(ppm)= 230 , pH= 7.9, O.M.(%) = 1.5
Fertilizer: 90#N/ac via NH3 injected Fall 1993
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 80 , P(ppm olsen)= 22 , K(ppm)= 307 , pH= 7.0, O.M.(%) = 1.5

TABLE 12. SIX-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. 1989-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1990	1991	1992	1993	1994	AVERAGE FOR YEARS TESTED	6-YR COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991	1992	1993	1994	AVERAGE FOR YEARS TESTED	6-YR COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
WA 6920 PENAWAWA (sft wht)	6	41.2	66.8	48.4	76.4	36.9	52.6	52.6	131.6	59.2	56.9	59.4	60.8	56.8	58.8	58.8	97.8
CI 17904 OWENS (sft wht)	6	35.5	63.5	52.6	79.6	32.1	50.9	50.9	127.5	59.3	55.9	59.4	61.1	58.4	59.0	59.0	98.1
PI483235 GLENMAN	6	37.1	58.2	36.2	74.9	31.9	47.7	47.7	119.3	60.0	58.3	58.6	61.0	56.2	59.1	59.1	98.3
PI574642 McNEAL	3	-	-	39.5	67.6	33.8	46.9	47.4	118.7	-	-	60.6	61.3	56.5	59.5	60.3	100.2
ND 606 AMIDON	6	39.0	60.1	38.9	66.8	31.2	46.7	46.7	117.0	60.9	58.2	58.3	60.4	58.1	59.4	59.4	98.8
CI 17828 PONDERA	6	39.1	57.5	36.5	67.4	34.0	46.5	46.5	116.4	61.2	58.3	60.1	61.9	59.2	60.3	60.3	100.2
CI 17430 NEWANA	6	35.7	62.6	37.3	63.8	30.7	45.8	45.8	114.7	61.0	58.6	59.1	61.2	59.3	60.2	60.2	100.0
ND 626 GRANDIN	5	34.9	54.4	43.3	63.5	31.0	45.4	45.1	113.0	59.5	57.8	60.7	62.3	58.8	59.8	60.0	99.8
PI486139 KLASIC (P+) hrdwht	3	-	-	30.3	66.1	34.4	43.6	44.0	110.2	-	-	60.0	59.6	57.3	59.0	59.8	99.4
ND 618 GUS	4	33.9	55.3	31.8	61.2	-	45.5	43.6	109.2	60.8	58.7	59.1	61.7	-	60.1	60.2	100.0
C982-324 RAMBO (P+)	6	32.6	59.8	32.7	65.8	25.3	43.2	43.2	108.3	62.3	59.3	59.9	61.1	59.1	60.6	60.6	100.7
PI549725 HI-LINE	6	36.7	57.8	27.8	66.2	32.1	43.2	43.2	108.0	58.8	57.3	60.6	62.0	57.1	59.0	59.0	98.0
ND 582 STOA	6	35.7	53.1	40.6	51.9	32.6	43.0	43.0	107.5	60.6	57.3	59.2	60.7	57.7	59.3	59.3	98.6
CI 17790 LEN	6	38.1	59.7	29.5	55.5	30.6	42.8	42.8	107.1	59.4	58.4	59.6	61.2	58.7	59.4	59.4	98.8
CI 17429 LEW	6	34.2	49.4	34.0	64.7	30.8	42.4	42.4	106.3	60.4	59.5	59.8	62.4	58.8	60.4	60.4	100.5
WPB 926R WESTBRED 926 (P+)	5	37.1	58.2	25.4	59.3	29.6	41.9	41.7	104.3	59.0	56.0	59.6	59.9	58.6	58.6	58.8	97.8
ND CUT CUTLESS	6	31.0	51.8	34.7	55.8	30.7	40.6	40.6	101.6	61.1	59.4	59.0	60.2	58.6	59.8	59.8	99.4
CI 15930 OLAF	5	35.7	55.1	22.6	50.6	-	41.7	40.5	101.4	60.3	56.5	59.0	60.4	-	59.1	59.0	98.1
CI 13596 FORTUNA	6	32.1	50.2	25.7	58.6	34.3	39.9	39.9	100.0	61.7	60.0	57.5	61.0	59.6	60.2	60.2	100.0
CANLANC LANCER	6	36.9	42.3	29.9	54.8	28.2	38.6	38.6	96.7	61.1	58.7	59.0	61.1	58.1	59.8	59.8	99.4
MEANS (ENTRIES LISTED)		35.9	56.4	34.9	63.5	31.7		44.3		60.4	58.1	59.4	61.1	58.2		59.7	
6/Growing Season Precip. (in.)		5.32	10.30	9.23	12.45	2.83	7.85										
7/ Soil PAW (in.) to SD at @plant		10.96	10.15	6.64	5.76	9.31	8.40										
Total Plant Avail. Water (in.)		16.28	20.45	15.87	18.21	12.14	16.26										
Soil NO3 (lbs.) to SD @Plant.		266.0	76.0	96.0	112.0	108.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		0.0	70.0	70.0	55.0	90.0											
(# P2O5)		0.0	40.0	40.0	0.0	0.0											
(# 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 five years shown, but summary calculations include all years noted.

4/ 6-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 = 6-yr. average of yield or test weight for the check variety Fortuna.

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

6/ Seeding to 14 days prior to harvest maturity.

7/ Soil PAW values are actual gravimetric measurements.

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TABLE 13. PERFORMANCE OF SPRING WHEAT VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE SIDNEY SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

1/

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
PI486139	KLASIC (hard white)	100.00	25.14	49.57	60.77	9.70
WA 6920	PENAWAWA (soft white)	99.30	28.04	44.87	58.30	8.85
PI574642	McNEAL	100.00	32.43	44.40	58.50	10.70
PI483235	GLENMAN	100.00	32.02	42.70	59.93	9.75
WPB 926	WESTBRED 926	99.30	28.61	41.33	57.30	11.25
BZ984326	BORDER	100.00	31.13	39.27	57.80	11.90
ND 582	STOA	100.00	35.41	39.07	59.20	10.90
CI 17790	LEN	100.00	30.43	38.97	58.27	11.30
ND 626	GRANDIN	100.00	31.25	38.37	57.87	11.60
CI 17828	PONDERA	100.00	31.52	38.30	60.50	9.70
CI 17430	NEWANA	99.30	27.52	38.20	59.63	9.75
ND 606	AMIDON	100.00	35.60	38.00	59.80	10.60
CI 17904	OWENS (soft white)	100.00	29.41	37.43	56.37	10.40
CI 13596	FORTUNA	100.00	36.31	36.20	60.77	9.70
C982-324	RAMBO	100.00	25.46	33.83	59.47	11.60
CI 17429	LEW	100.00	37.17	33.00	60.80	9.85
PI549275	HI-LINE	100.00	29.34	31.47	59.90	9.80
NDCUT	CUTLESS	100.00	33.69	31.03	59.50	11.55
ND 677	ND622*2/CUTLESS	100.00	35.75	30.60	60.23	10.45
CANLANC	LANCER	100.00	38.52	28.53	60.50	10.65
EXPERIMENTAL MEANS		99.89	31.74	37.76	59.27	10.50
C.V. 2: (S OF MEAN/MEAN)*100		.27	2.19	6.59	1.21	-
LSD (0.05)		.78	1.99	7.13	2.06	-

1/ Mean of 2 smpl sets (1st seemed low for condit's, but 2nd was very similar)

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/20/94
Harvest Date: 08/18/94
Seeding Depth: 1.50 in.
Soil Series: Phillips-Elloam
Previous Crop: Fallow
Soil Temp @ Sdg: 76F @ 2in., 66F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 1.00 in.
Probed Moist.Depth @ Sdg: 42.0 in.
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 7.86 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.99 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 2.80 in.
Total - all events >.1 inches: N/A
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 3.99 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 52 , P(ppm olsen)= 23 , K(ppm)= 278 , pH= 7.2, O.M.(%) = 1.2
Fertilizer: 51#N,25#P2O5/ac via 46-0-0+11-52-0 banded 1.5" below seed at plntg
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 16 , P(ppm olsen)= 8 , K(ppm)= 248 , pH= 7.7, O.M.(%) = 1.2

TABLE 14. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE SIDNEY SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1985-1994.

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

Check variety is Fortuna.

1/ See 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 years noted.

4/ Crop suffered very substantial hail injury.

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

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

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

8/ Seeding to 14 days prior to harvest maturity.

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

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TABLE 15. PERFORMANCE OF SPRING BARLEY VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	Steptoe	90.97	23.61	65.60	41.97	72.37	10.17	11.23
ND 9866	Stark	96.87	25.25	58.17	50.23	90.83	3.50	12.23
CI 9558	Piroline	96.53	24.46	58.10	50.27	71.00	8.37	11.87
MT851195	MT851195	94.10	23.98	57.73	47.10	78.67	7.30	13.00
MT889106	Apex/Lewis	92.33	24.40	57.13	48.90	91.43	3.57	12.33
PI537967	Colter	93.37	23.44	56.70	42.17	50.20	21.80	10.37
MT890008	MT890008	97.23	22.10	56.60	45.77	68.20	11.10	11.80
MT140523	MT140523	88.53	23.16	56.03	46.73	65.30	13.50	13.03
MT861596	Lewis/MT 41549	86.10	24.65	55.77	48.33	67.83	12.80	13.00
NS 78054	Baronesse	96.53	21.05	55.17	46.97	65.67	12.97	13.00
PI491534	Gallatin	92.00	24.78	54.07	47.80	67.30	11.70	12.20
PI483237	Bowman	90.97	23.08	53.77	48.80	88.97	4.43	12.53
CI 15856	Lewis	91.00	25.22	51.60	47.57	75.97	8.67	12.93
MT860756	MT860756	95.50	24.53	51.40	47.53	78.00	8.30	11.67
H3860224	Lewis/Apex (MT860224 HR #	85.07	23.71	50.80	45.07	78.57	10.80	13.50
CI 15514	Hector	91.00	26.04	50.57	46.73	70.50	11.83	13.03
MT886610	MT 81143/Lewis	91.67	24.93	50.20	46.27	67.67	14.47	13.03
SK 76333	Harrington	91.67	22.77	48.70	45.17	64.03	14.00	13.20
H5860219	Lewis/Apex (MT860219 HR #	80.53	23.27	48.43	45.53	73.63	11.40	13.43
WPB92 1	Medallion	93.77	18.40	42.23	42.13	33.53	33.10	12.83
EXPERIMENTAL MEANS		91.79	23.64	53.94	46.55	70.98	11.69	12.51
C.V. 2: (S OF MEAN/MEAN)*100		3.20	2.56	5.58	.99	3.74	12.19	1.90
LSD (0.05)		8.41	1.74	8.62	1.32	7.61	4.08	.68

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/02/94
Harvest Date: 08/10/94
Seeding Depth: 1.50 in.
Soil Texture: Sandy Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 64F @ 2in., 58F @ 4in.
Root Penetration Depth: 45.0 in.
Depth to Moisture at Sdg: 0.50 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: 2,4-D+`BanvelSGF'@.5#+2oz/ac
Initial Stored Soil Water at Seeding: 6.84 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.09 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 3.93 in. (electronic accum. guage)
Total - all events >.1 inches: N/A
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: N/A (believed little or none)
Adj'd Residual Soil Water @ (HM-14d): 3.09 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 28 , P(ppm olsen)= 16 , K(ppm)= 278 , pH= 6.4, O.M.(%) = 0.7
Fertilizer: 66#N,33#P2O5/ac via 46-0-0+11-52-0 banded 1.5" below seed at plntg
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 16 , P(ppm olsen)= 20 , K(ppm)= 337 , pH= 6.3, O.M.(%) = 1.3

TABLE 16. EIGHT-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION ON A 'TELSTAD' SOIL AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1987-1994.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1990	1991 3/	1992	1993	1994	AVERAGE FOR YEARS TESTED	8-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1990	1991 3/	1992	1993	1994	AVERAGE FOR YEARS TESTED	8-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF PIROLINE TEST WT 5/
NS 78054 BARONESSE (P+)	4	-	30.5	82.1	93.3	55.2	65.3	55.5	119.8	-	46.2	48.8	48.4	47.0	47.6	47.9	96.5
CI 15229 STEPTOE	8	37.9	57.8	71.2	88.7	65.6	54.5	54.5	117.6	43.2	40.1	43.7	41.6	42.0	43.2	43.2	87.0
ND 9866 STARK	5	42.4	44.9	63.2	80.9	58.2	57.9	54.3	117.3	49.4	49.5	50.7	49.2	50.2	49.8	50.2	101.2
PI531228 BEARPAW	7	29.6	36.6	59.5	77.8	-	49.8	51.7	111.6	47.3	45.3	47.0	49.5	-	48.1	48.2	97.1
PI483237 BOWMAN	8	41.1	50.3	64.3	75.9	53.8	51.0	51.0	110.1	48.3	51.4	50.6	48.8	48.8	50.0	50.0	100.7
PI491534 GALLATIN	8	37.9	32.5	69.7	69.2	54.1	50.8	50.8	109.7	48.5	48.1	49.6	49.0	47.8	49.5	49.5	99.8
MT140523 CHINOOK	7	45.2	37.9	66.9	69.0	56.0	52.1	50.4	108.9	48.5	44.6	48.7	48.4	46.7	48.3	48.3	97.4
MT 81161 MT 81161	5	-	-	60.3	78.0	-	54.5	50.3	108.6	-	-	46.3	47.4	-	48.7	48.1	96.9
MT860756 GALLATIN/BELLO	3	-	-	66.2	83.6	51.4	67.1	50.2	108.5	-	-	48.7	49.9	47.5	48.7	48.2	97.1
CI 15857 CLARK	7	36.8	36.0	58.3	69.0	-	47.9	49.8	107.4	46.9	45.2	47.5	48.8	-	48.2	48.3	97.2
CI 15514 HECTOR	8	38.5	31.8	66.6	72.4	50.6	49.6	49.6	107.1	47.6	47.3	48.8	48.9	46.7	49.0	49.0	98.6
CI 15856 LEWIS	8	38.3	43.7	64.6	53.9	51.6	48.7	48.7	105.2	48.5	48.2	49.2	50.2	47.6	49.6	49.6	100.0
SK 76333 HARRINGTON	8	19.3	34.2	66.3	83.8	48.7	46.7	46.7	100.8	47.2	44.3	47.7	48.5	45.2	47.6	47.6	96.0
CI 9558 PIROLINE	8	28.9	32.4	57.7	69.7	58.1	46.3	46.3	100.0	48.7	46.9	50.9	49.3	50.3	49.6	49.6	100.0
MEANS (ENTRIES LISTED)		36.0	39.1	65.5	76.1	54.8	-	50.7	-	47.6	46.4	48.5	48.4	47.3	-	48.4	-
6/ Growing Season Precip. (in.)		8.07	9.86	7.53	9.60	3.93	7.24										
7/ Soil PAW (in.) to SD at @Plnt		7.97	6.56	5.52	7.24	6.84	6.69										
Total Plant Avail. Water (in.)		16.04	16.42	13.05	16.84	10.77	13.93										
Soil NO3 (lbs.) to SD @Plntng.		120.0	100.0	112.0	52.0	28.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		62.0	70.0	70.0	62.0	66.0											
(# P2O5)		45.0	40.0	40.0	35.0	33.0											

Check variety is Piroline.

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

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

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

4/ 8-yr. CA = (x/y) * z where x = average yield or test weight of the entry for years tested, y = average yield or test weight for Piroline for the same years, and z = 8-yr. average yield or test weight for the check variety Piroline.

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

6/ Seeding to 14 days prior to harvest maturity.

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

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TABLE 17. PERFORMANCE OF SPRING BARLEY VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
PI483237	Bowman	97.93	28.46	74.40	46.73	77.30	8.50	13.80
MT889106	Apex/Lewis	98.30	25.92	68.93	47.10	79.50	7.00	13.60
ND 9866	Stark	97.23	28.35	68.67	45.67	43.80	24.60	14.00
CI 15229	Steptoe	96.53	27.66	68.17	37.57	27.10	34.70	12.10
NS 78054	Baronesse	99.33	25.68	64.53	43.23	12.70	50.70	15.40
MT140523	MT140523	96.53	23.54	64.40	44.10	12.80	55.00	14.90
MT861596	Lewis/MT 41549	97.60	27.14	61.53	45.07	10.40	56.90	15.60
MT860756	MT860756	94.13	25.05	61.27	44.63	26.80	39.60	15.40
MT851195	MT851195	98.63	26.14	61.07	43.40	21.00	31.30	14.90
CI 15856	Lewis	98.27	27.22	60.53	43.20	9.50	60.90	15.10
MT886610	MT 81143/Lewis	96.17	27.49	60.17	43.13	13.80	51.90	15.40
PI537967	Colter	98.97	26.13	60.00	38.47	10.00	59.70	11.90
CI 9558	Piroline	99.33	28.69	59.67	43.63	8.00	60,80	15.60
MT890008	MT890008	97.93	24.48	59.30	43.33	13.30	45.90	15.00
CI 15514	Hector	97.23	29.76	58.30	42.00	10.20	60.10	15.10
PI491534	Gallatin	97.90	28.10	58.13	43.67	12.10	53.80	15.50
SK 76333	Harrington	96.87	23.88	55.50	42.17	18.60	46.00	15.80
WPB92 1	Medallion	99.67	22.17	45.40	36.80	2.00	90.40	14.60
EXPERIMENTAL MEANS		97.70	26.44	61.66	42.99	27.72	46.54	14.65
C.V. 2: (S OF MEAN/MEAN)*100		.82	5.22	3.64	.88	-	-	-
LSD (0.05)		2.30	3.96	6.46	1.08	-	-	-

Note: The nursery suffered minor hail damage on June 26.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/21/94
Harvest Date: 08/05/94
Seeding Depth: 1.50 in.
Soil Series: Assinniboine variant
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 69F @ 2in., 63F @ 4in.
Root Penetration Depth: 34.0 in.
Depth to Moisture at Sdg: 0.50 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: `Bronate' @ 1.5 pts/ac
Initial Stored Soil Water at Seeding: 7.94 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 4.51 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 5.87 in.
Total - all events >.1 inches: 5.45 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 4.51 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 260 , P(ppm olsen)= 19 , K(ppm)= 354 , pH= 6.8, O.M.(%) = 0.8
Fertilizer: 56#N,22#P2O5/ac via NH3+11-52-0 inj'd in sep pre-plnt opn's Fall 93
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 128 , P(ppm olsen)= 23 , K(ppm)= 389 , pH= 7.1, O.M.(%) = 1.2

TABLE 18. SEVEN-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. 1988-1994.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1990	1991 3/	1992 4/	1993	1994	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE YIELD 5/	PERCENT OF PIROLINE YIELD 6/	1990	1991 3/	1992 4/	1993	1994	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE TEST WT. 5/	PERCENT OF PIROLINE TEST WT. 6/
CI 15229 STEPTOE	7	55.4	56.9	30.2	113.3	68.2	58.6	58.6	106.6	43.0	47.1	39.8	43.8	37.6	42.5	42.5	88.8
MT140523 CHINOOK	7	57.6	42.7	21.3	111.6	64.4	55.9	55.9	101.7	48.2	53.8	40.9	51.3	44.1	48.0	48.0	100.3
CI 9558 PIROLINE	7	60.3	43.2	25.6	109.1	59.7	55.0	55.0	100.0	48.7	52.9	44.4	51.5	43.6	47.8	47.8	100.0
CI 15856 LEWIS	7	58.3	40.2	23.6	109.7	60.5	54.5	54.5	99.1	48.4	54.2	41.8	53.2	43.2	48.2	48.2	100.8
MT 81161 MT 81161	4	-	-	25.1	106.0	-	54.7	54.2	98.6	-	-	39.9	50.3	-	45.7	46.1	96.4
PI483237 BOWMAN	7	54.8	39.5	22.0	104.8	74.4	54.2	54.2	98.5	48.0	54.6	42.5	49.1	46.7	48.3	48.3	100.9
PI531228 BEARPAW	6	63.9	31.7	24.5	103.3	-	53.4	54.1	98.4	47.2	53.1	40.6	50.5	-	46.9	46.2	96.6
NS 78054 BARONESSE (P+)	4	-	22.5	27.3	117.9	64.5	58.1	53.8	97.7	-	50.6	41.7	51.5	43.2	46.8	46.5	97.2
MT860756 GALLATIN/BELLONA	3	-	-	26.5	101.1	61.3	63.0	53.4	97.2	-	-	42.1	51.4	44.6	46.1	47.4	99.0
PI491534 GALLATIN	7	60.7	32.3	23.3	101.5	58.1	53.1	53.1	96.5	48.0	53.3	42.8	51.6	43.7	48.0	48.0	100.4
ND 9866 STARK	5	50.5	31.8	26.5	104.0	68.7	56.3	52.0	94.5	48.8	53.6	42.4	49.6	45.7	48.0	47.6	99.6
CI 15514 HECTOR	7	59.5	28.4	21.5	102.5	58.3	50.7	50.7	92.2	49.0	52.5	41.3	51.0	42.0	47.7	47.7	99.6
SK 76333 HARRINGTON	7	61.4	33.0	25.4	102.0	55.5	50.1	50.1	91.2	47.6	53.8	40.7	50.8	42.2	46.9	46.9	98.0
CI 15857 CLARK	6	57.0	30.8	23.3	92.7	-	48.1	48.8	88.7	46.6	52.6	39.3	50.9	-	47.4	47.3	98.9
MEANS (ENTRIES LISTED)		58.1	36.1	24.7	105.7	63.1		53.5		47.6	52.7	41.4	50.5	43.3		47.0	
7/ Growing Season Precip. (in.)		6.90	8.45	8.25	10.65	5.87	7.48										
8/ Soil PAW (in.) to SD at Plt.		10.23	8.47	6.14	6.29	7.94	7.39										
Total Plant Avail. Water (in.)		17.13	16.92	14.39	16.94	13.81	14.87										
Soil NO3 (lbs.) to SD at Plt.		160.0	128.0	200.0	158.0	260.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		48.0	50.0	50.0	55.0	56.0											
(#P2O5)		21.0	21.0	24.0	22.0	22.0											
(#K2O)		0.0	0.0	0.0	0.0	0.0											

Check variety is Piroline.

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

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

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

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

5/ 7-yr. CA = (x/y)* z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Piroline for the same years, and z = 7-yr. average of yield or test weight for the check variety Piroline.

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

7/ Seeding to 14 days prior to harvest maturity.

8/ Soil PAW values are actual gravimetric measurements.

TABLE 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. 1985-1994.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1990	1991 4/	1992 5/	1993 6/	1994 7/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 8/	PERCENT OF PIROLINE YIELD 9/	1990	1991 4/	1992 5/	1993 6/	1994 7/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 8/	PERCENT OF PIROLINE TEST WT 9/
MT140523 CHINOOK	5	38.4	26.2	-	106.8	-	53.5	59.0	111.0	49.1	48.2	-	42.7	-	47.3	47.0	100.4
PI483237 BOWMAN	8	38.1	25.9	-	115.8	-	52.1	57.1	107.4	48.7	51.6	-	42.8	-	48.0	48.0	102.5
CI 15229 STEPTOE	8	43.2	34.7	-	94.6	-	52.0	57.0	107.3	42.9	40.0	-	36.8	-	40.5	40.5	86.5
PI531228 BEARPAW	7	33.0	16.8	-	100.9	-	55.4	55.1	103.8	48.9	42.3	-	43.6	-	46.7	45.6	97.3
PI491534 GALLATIN	8	37.7	19.4	-	98.0	-	50.3	55.1	103.7	50.5	47.4	-	44.1	-	47.3	47.3	101.1
CI 15856 LEWIS	8	34.5	19.4	-	97.9	-	49.8	54.6	102.8	50.3	47.2	-	44.6	-	47.9	47.9	102.4
ND 9866 STARK	3	35.4	18.9	-	108.4	-	54.3	53.3	100.4	50.8	48.6	-	42.1	-	47.2	47.2	100.9
CI 9558 PIROLINE	8	38.2	19.3	-	104.7	-	48.5	53.1	100.0	49.9	45.7	-	45.1	-	46.8	46.8	100.0
CI 15514 HECTOR	8	38.5	19.9	-	95.3	-	48.1	52.8	99.3	49.8	46.6	-	43.3	-	47.5	47.5	101.4
CI 15857 CLARK	8	33.2	19.8	-	100.3	-	47.9	52.5	98.8	47.8	45.0	-	43.3	-	45.7	45.7	97.7
MT 81161 MT 81161	4	-	-	-	107.2	-	60.6	52.3	98.5	-	-	-	45.2	-	45.8	45.6	97.4
SK 76333 HARRINGTON	8	27.0	18.1	-	100.1	-	46.8	51.3	96.5	48.9	42.8	-	43.6	-	45.7	45.7	97.6
CI 15687 KIMBERLY	3	-	-	-	-	-	51.7	48.5	91.3	-	-	-	-	-	49.8	46.2	98.7
ND 5569 HAZEN	3	-	-	-	-	-	37.2	40.3	75.9	-	-	-	-	-	43.6	41.8	89.2
MEANS (ENTRIES LISTED)		36.1	21.7	-	102.5	-	-	53.0	-	48.9	46.0	-	43.1	-	-	45.9	-
10/ Growing Season Precip. (in.)		4.87	8.84	4.55	13.03	4.00	6.42										
11/ Soil PAW (in.) to SD @Pltng.		8.67	6.69	5.67	6.75	7.93	7.91										
Total Plant Avail. Water (in.)		13.54	15.53	10.22	19.78	11.93	14.33										
Soil NO3 (lbs.) to SD @Pltng.		196.0	140.0	198.0	162.0	110.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		50.0	65.0	42.0	70.5	40.0											
(# P2O5)		25.0	25.0	25.0	25.0	30.0											
(# K2O)		10.0	10.0	10.0	10.0	0.0											
(# SO4)		0.0	0.0	0.0	0.0	0.0											

Check variety is Piroline.

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

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

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

4/ Crop suffered substantial hail damage plus further shatter loss via harvest of over-ripe crop by binder (necessary due to major combine breakdown).

5/ 1992 nursery was lost to hail damage.

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

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

8/ 10-yr. CA = (x/y) * z where x = average yield or test weight of the entry for years tested, y = average yield or test weight for Piroline for the same years, and z = 10-yr. average yield or test weight for the check variety Piroline.

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

10/ Seeding to 14 days prior to harvest maturity.

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

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TABLE 20. PERFORMANCE OF SPRING BARLEY VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	Steptoe	98.27	20.18	53.97	42.27	66.80	11.00	11.60
MT861596	Lewis/MT 41549	94.83	24.53	52.77	50.23	64.80	10.70	13.80
ND 9866	Stark	92.00	23.82	49.87	50.53	89.50	3.90	12.70
PI483237	Bowman	90.97	23.39	49.23	49.93	88.90	4.90	12.90
MT860756	MT860756	92.70	22.73	48.40	49.20	83.70	5.50	13.00
PI537967	Colter	96.20	20.43	47.80	45.00	61.10	13.60	10.60
CI 15856	Lewis	95.47	22.82	47.73	49.57	69.20	10.30	13.70
MT851195	MT851195	90.27	24.66	47.00	48.53	82.50	4.20	13.60
NS 78054	Baronesse	96.53	20.09	46.43	47.67	73.30	8.00	13.50
MT886610	MT 81143/Lewis	95.13	23.62	45.77	49.00	69.40	11.10	13.00
MT140523	MT140523	94.47	23.02	45.00	49.53	74.00	8.20	13.20
PI491534	Gallatin	93.77	23.11	44.93	49.40	66.00	12.90	13.10
MT889106	Apex/Lewis	89.57	22.81	43.13	50.00	87.70	6.70	12.70
CI 9558	Piroline	95.50	22.22	42.30	48.20	47.70	19.30	13.40
SK 76333	Harrington	93.07	22.66	41.67	46.83	62.60	12.10	13.70
CI 15514	Hector	96.20	23.83	40.70	49.33	75.00	9.10	13.70
MT890008	MT890008	94.10	22.03	40.53	46.23	60.50	16.80	12.60
WPB92 1	Medallion	89.90	17.30	37.20	44.77	41.30	26.20	12.40
EXPERIMENTAL MEANS		93.83	22.40	45.80	48.12	70.22	10.81	12.96
C.V. 2: (S OF MEAN/MEAN)*100		2.07	3.32	4.97	.63	-	-	-
LSD (0.05)		5.59	2.14	6.54	.87	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/04/94
Harvest Date: 08/19/94
Seeding Depth: 1.25 in.
Soil Series: Joplin-Hillon CL
Previous Crop: Fallow
Soil Temp @ Sdg: 58F @ 2in., 50F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.25 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: 2,4-D+`BnvlSGF'@.375#+4oz/ac
Measured Soil Water on 04/15/94: 8.26 in. (sampling depth = 48 in.)
Precipitation 04/15/94 to Seeding: 1.05 in. (1.05 in events > .1 in.)
Initial Stored Soil Water at Seeding: 9.31 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 4.63 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 2.83 in.
Total - all events >.1 inches: 1.96 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .26 in. (0.26 in events > .1 in.)
Adj'd Residual Soil Water @ (HM-14d): 4.37 in. (sampling depth = 48 in.)
Soil Analysis on 04/15/94 (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 108 , P(ppm olsen)= 14 , K(ppm)= 230 , pH= 7.9, O.M.(%) = 1.5
Fertilizer: 90#N/ac via NH3 injected Fall 1993
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 102 , P(ppm olsen)= 20 , K(ppm)= 280 , pH= 6.6, O.M.(%) = 1.4

TABLE 21. SIX-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. 1989-1994.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1990	1991	1992 3/	1993	1994	AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	1990	1991	1992 3/	1993	1994	AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF PIROLINE TEST WT 5/
CI 15229 STEPTOE	6	56.5	67.7	60.2	90.4	54.0	63.2	63.2	112.0	43.6	44.4	42.8	43.2	42.3	43.2	43.2	87.6
MT860756 GALLATIN/BELLONA	3	-	-	70.6	83.3	48.4	67.4	62.3	110.3	-	-	49.4	51.6	49.2	50.1	49.7	100.8
MT 81161 MT 81161	3	-	-	71.5	79.6	-	70.0	61.6	109.2	-	-	48.6	50.2	-	48.3	47.8	97.0
MT140523 CHINOOK	6	55.9	55.4	68.9	86.4	45.0	61.3	61.3	108.5	50.4	46.7	48.7	51.3	49.5	49.2	49.2	99.7
PI491534 GALLATIN	6	55.0	52.4	74.7	76.0	44.9	60.3	60.3	106.8	50.3	49.4	49.8	50.8	49.4	49.9	49.9	101.1
NS 78054 BARONESSE (P+)	4	-	41.9	71.2	90.5	46.4	62.5	60.3	106.8	-	44.7	48.2	49.4	47.7	47.5	47.6	96.5
PI483237 BOWMAN	6	57.0	50.5	63.6	89.4	49.2	60.2	60.2	106.6	50.3	50.6	47.6	49.4	49.9	49.6	49.6	100.5
CI 15856 LEWIS	6	51.7	50.8	64.5	84.6	47.7	59.1	59.1	104.6	50.9	48.0	49.2	52.0	49.6	49.9	49.9	101.1
ND 9866 STARK	5	53.9	56.3	63.3	71.8	49.9	59.0	58.0	102.8	51.0	50.3	48.8	50.5	50.5	50.2	50.1	101.5
MT 81616 BEARPAW	5	52.1	50.5	67.6	73.0	-	59.7	56.8	100.7	49.8	42.8	48.6	50.1	-	47.5	47.3	95.9
CI 9558 PIROLINE	6	53.0	50.8	57.7	83.4	42.3	56.4	56.4	100.0	50.3	48.0	49.5	51.3	48.2	49.3	49.3	100.0
CI 15514 HECTOR	6	56.8	47.9	61.5	75.4	40.7	56.0	56.0	99.3	49.5	47.3	49.4	50.3	49.3	49.2	49.2	99.8
SK 76333 HARRINGTON	6	50.9	34.1	64.5	84.2	41.7	53.5	53.5	94.8	49.8	41.2	48.1	49.4	46.8	47.4	47.4	96.0
CI 15857 CLARK	5	51.3	45.2	61.3	73.9	-	55.4	52.8	93.5	48.6	47.0	48.4	50.1	-	48.3	48.1	97.5
MEANS (ENTRIES LISTED)		54.0	50.3	65.8	81.6	46.4		58.7		49.5	46.7	48.4	50.0	48.4		48.4	
6/ Growing Season Precip. (in.)		5.32	10.02	9.23	12.45	2.83	7.81										
7/ Soil PAW (in.) to SD at Plt.		10.96	10.15	6.64	5.76	9.31	8.40										
Total Plant Avail. Water (in.)		16.28	20.17	15.87	18.21	12.14	16.21										
Soil NO3 (lbs.) to SD at Plt.		266.0	76.0	96.0	112.0	108.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		0.0	70.0	70.0	55.0	90.0											
(#P2O5)		0.0	40.0	40.0	0.0	0.0											
(#K2O)		0.0	0.0	0.0	0.0	0.0											

Check variety is Piroline.

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

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

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

4/ 6-yr. CA = (x/y)* z where x = average yield or test weight of the entry for the years tested, y = average yield or test weight of Piroline for the same years, and z = 6-yr. average of yield or test weight for the check variety Piroline.

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

6/ Seeding to 14 days prior to harvest maturity.

7/ Soil PAW values are actual gravimetric measurements.

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TABLE 22. PERFORMANCE OF SPRING BARLEY VARIETIES UNDER DRYLAND FALLOW CROPPING CONDITIONS OFF-STATION AT THE SIDNEY SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	1/ VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
MT890008	MT890008	99.30	27.05	69.57	49.17	79.60	5.10	8.60
MT860756	MT860756	99.30	30.17	69.37	50.40	79.40	7.00	10.40
MT140523	MT140523	98.60	31.21	68.97	49.47	72.20	8.20	9.90
NS 78054	Baronesse	99.30	26.78	68.77	47.23	53.00	18.70	10.70
CI 15229	Steptoe	99.30	31.59	67.47	41.00	64.30	14.60	9.90
MT861596	Lewis/MT 41549	99.30	30.59	67.00	50.10	50.00	19.40	11.10
PI537967	Colter	100.00	31.34	66.80	44.83	56.00	16.90	8.60
MT886610	MT 81143/Lewis	100.00	31.64	65.83	48.53	58.10	17.00	10.60
MT851195	MT851195	99.30	29.97	64.67	47.50	71.80	9.60	10.70
CI 15514	Hector	100.00	29.08	64.50	48.07	61.30	16.30	10.90
WPB92 1	Medallion	99.30	24.97	63.87	42.20	26.10	40.50	10.20
CI 9558	Piroline	100.00	32.55	62.90	48.63	35.70	23.20	11.40
PI491534	Gallatin	99.30	29.78	61.83	49.40	55.70	17.70	11.50
SK 76333	Harrington	100.00	29.48	61.70	47.17	72.30	9.00	10.30
CI 15856	Lewis	100.00	30.17	61.20	47.10	40.60	26.10	12.20
PI483237	Bowman	98.60	29.44	55.63	48.80	78.90	7.70	12.00
MT889106	Apex/Lewis	99.30	29.71	54.83	51.33	94.30	1.60	10.30
EXPERIMENTAL MEANS		99.46	29.74	64.41	47.70	61.72	15.21	10.55
C.V. 2: (S OF MEAN/MEAN)*100		.56	2.56	4.82	1.77	-	-	-
LSD (0.05)		1.61	2.19	8.95	2.44	-	-	-

1/ The Variety `Stark' was deleted from analysis due to wildlife grazing damage.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/20/94
Harvest Date: 08/18/94
Seeding Depth: 1.50 in.
Soil Series: Phillips-Elloam
Previous Crop: Fallow
Soil Temp @ Sdg: 76F @ 2in., 66F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 1.00 in.
Probed Moist.Depth @ Sdg: 42.0 in.
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 7.86 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.07 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 2.80 in.
Total - all events >.1 inches: N/A
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .00 in.
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 5.07 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 52 , P(ppm olsen)= 23 , K(ppm)= 278 , pH= 7.2, O.M.(%) = 1.2
Fertilizer: 51#N,25#P2O5/ac via 46-0-0+11-52-0 banded 1.5" below seed at plntg
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 18 , P(ppm olsen)= 30 , K(ppm)= 249 , pH= 6.3, O.M.(%) = 1.2

TABLE 23. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE SIDNEY SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1985-1994.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1990	1991 4/	1992 5/	1993	1994 6/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 7/	PERCENT OF PIROLINE YIELD 8/	1990	1991 4/	1992 5/	1993	1994 6/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 7/	PERCENT OF PIROLINE TEST WT 8/
ND 9866 STARK	3	51.5	17.1	-	89.0	-	52.5	53.2	121.8	49.7	46.6	-	46.3	-	47.5	47.1	99.2
NS 78054 BARONESSE (P+)	3	-	22.1	-	83.8	68.8	58.2	48.0	110.0	-	46.9	-	42.9	47.2	45.7	45.2	95.1
CI 15229 STEPTOE	7	42.8	13.4	-	80.2	67.5	47.5	47.5	108.7	41.1	39.4	-	38.6	41.0	39.4	39.4	82.8
MT140523 CHINOOK	5	49.2	22.9	-	78.7	69.0	56.0	46.8	107.3	47.8	46.5	-	47.3	49.5	47.5	46.5	97.9
PI537967 COLTER	2	-	-	-	82.1	66.8	74.4	46.7	106.9	-	-	-	42.0	44.8	43.4	42.6	89.6
PI491534 GALLATIN	7	47.0	23.7	-	76.7	61.8	46.6	46.6	106.9	49.1	45.9	-	49.9	49.4	47.3	47.3	99.5
CI 15856 LEWIS	7	39.7	20.3	-	76.2	61.2	44.7	44.7	102.4	49.1	47.4	-	50.0	47.1	47.5	47.5	100.0
PI531228 BEARPAW	5	38.9	18.4	-	80.1	-	46.6	44.2	101.4	46.9	44.0	-	45.4	-	45.6	44.7	94.0
CI 15514 HECTOR	7	39.8	18.4	-	73.2	64.5	43.8	43.8	100.4	48.1	45.0	-	48.0	48.1	46.4	46.4	97.6
CI 9558 PIROLINE	7	33.6	19.5	-	76.3	62.9	43.6	43.6	100.0	48.4	47.2	-	48.3	48.6	47.5	47.5	100.0
MT 81161 MT 81161	3	-	-	-	69.7	-	57.9	42.9	98.4	-	-	-	46.7	-	30.8	29.8	62.8
PI483237 BOWMAN	7	45.7	23.2	-	71.2	55.6	42.7	42.7	97.8	47.9	47.8	-	47.5	48.8	47.2	47.2	99.3
CI 15857 CLARK	6	37.3	19.6	-	67.2	-	39.1	42.2	96.6	46.1	44.2	-	46.5	-	44.7	44.9	94.5
SK 76333 HARRINGTON	7	27.5	19.4	-	78.3	61.7	40.7	40.7	93.3	47.2	44.8	-	41.7	47.2	45.2	45.2	95.1
MEAN (ENTRIES LISTED)		41.2	19.8	-	77.3	64.0	-	45.3	-	47.4	45.5	-	45.8	47.2	-	44.4	-
9/ Growing Season Precip. (in.)		5.50	13.00	0.0	10.53	2.80	6.69										
10/ Soil PAW (in.) to SD @Plntng.		10.71	7.60	0.0	8.05	7.86	8.79										
Total Plant Avail. Water (in.)		16.21	20.60	0.0	18.58	10.66	15.48										
Soil NO3 (lbs.) to SD @Plntng.		184.0	128.0	0.0	120.0	52.0											
SD (Sampling Depth in inches)		48.0	48.0	0.0	48.0	48.0											
Fertilizer Applied (# N)		47.0	70.0	0.0	62.0	51.0											
(# P2O5)		21.0	40.0	0.0	35.0	25.0											

Check variety is Piroline.

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

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

3/ Only the five most recent years shown, but summary calculations include all years noted.
Severe grasshopper damage in 1986 nursery.
1988 Nursery lost to wildlife grazing.

4/ 1991 crop suffered very substanstial hail damage.

5/ 1992 nursery lost to drought conditions at the time of seeding.

6/ The variety 'Stark' was deleted from analysis due to wildlife grazing.

7/ 10-yr. CA = (x/y) * z where x = average yield and test weight of the entry for years tested, y = average yield and test weight of Piroline for the same years, and z = 10-yr. average yield or test weight for the check variety Piroline.

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

9/ Seeding to 14 days prior to harvest maturity.

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

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TABLE 24. DRYLAND FALLOW OAT VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1994.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
83AB3250	CAYUSE/MONIDA	25.07	76.80	30.40	.
87AB5641	MONIDA/75AB861	27.93	75.13	31.50	P
CI483126	MONIDA	30.62	75.13	31.47	
90AB1322	80AB988/MONIDA	23.12	73.13	32.60	E
CI 9252	OTANA	33.28	72.83	32.33	
86AB664	OGLE/75AB861	27.70	72.17	30.83	N
82AB1142	AJAY	21.77	71.17	31.47	
82AB1178	74AB1952/75AB1576	22.74	66.17	34.87	D
89AB1545	81AB5792//OGLE/BORDE	28.11	61.97	33.87	
87AB4983	OGLE/BORDER	25.00	53.10	32.10	I
86AB1867	81AB5772/OGLE	25.38	49.57	31.60	
86AB1616	79AB3811/S7884	27.44	47.43	34.80	N
89AB2861	PI447276/81AB5792	24.49	46.03	38.23	
87AB6153	81AB5772/OGLE	25.81	43.93	31.37	G
EXPERIMENTAL MEANS		26.32	63.18	32.67	.
C.V. 2: (S OF MEAN/MEAN)*100		2.45	3.08	1.59	-
LSD (0.05)		1.87	5.66	1.51	-

1/ Trial conducted by Blaine County Extension Service in cooperation with USDA-ARS, Aberdeen and AES-NARC, Havre.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/02/94
Harvest Date: 08/10/94 (combine)
Seeding Depth: 1.50 in.
Soil Texture: Sandy Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 64F @ 2in., 58F @ 4in.
Root Penetration Depth: 40.0 in.
Depth to Moisture at Sdg: 0.50 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: 2,4-D+`BanvelSGF'@.5#+2oz/ac
Initial Stored Soil Water at Seeding: 6.84 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.23 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 3.93 in. (electronic accum. guage)
Total - all events >.1 inches: N/A
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: N/A
Adj'd Residual Soil Water @ (HM-14d): 3.23 in. (sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 28 , P(ppm olsen)= 16 , K(ppm)= 278 , pH= 6.4, O.M.(%) = 0.7
Fertilizer: 66#N,33#P2O5/ac via 46-0-0+11-52-0 banded 1.5" below seed at plntg
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 22 , P(ppm olsen)= 22 , K(ppm)= 353 , pH= 6.1, O.M.(%) = 1.3

TABLE 25. THREE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW OAT VARIT VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992-1994.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1992	1993	1994	1995	1996	AVERAGE FOR YEARS TESTED	3-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF OTANA YIELD 5/	1992	1993	1994	1995	1996	AVERAGE FOR YEARS TESTED	3-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF OTANA TEST WT 5/
87AB5641 MONIDA/75AB861	3	132.9	160.7	75.1	-	-	122.9	122.9	116.2	34.5	33.3	31.5	-	-	33.1	33.1	97.2
CI483126 MONIDA	3	126.6	146.9	75.1	-	-	116.2	116.2	109.9	32.1	33.6	31.5	-	-	32.4	32.4	95.1
86AB664 OGLE/75AB861	3	121.3	146.1	72.2	-	-	113.2	113.2	107.0	31.7	32.7	30.8	-	-	31.7	31.7	93.1
82AB1178 74AB1952/75AB1	3	111.2	130.1	66.2	-	-	106.0	106.0	100.3	32.3	31.8	34.9	-	-	33.0	33.0	96.8
CI 9252 OTANA	3	121.8	122.6	72.8	-	-	105.7	105.7	100.0	35.0	34.9	32.3	-	-	34.1	34.1	100.0
83AB3250 CAYUSE/MONIDA	3	109.6	119.5	76.8	-	-	102.0	102.0	96.4	30.7	30.1	30.4	-	-	30.4	30.4	89.2
82AB1142 AJAY	3	111.9	96.5	71.2	-	-	93.2	93.2	88.1	31.3	30.3	31.5	-	-	31.0	31.0	91.1
86AB1867 81AB5772/OGLE	3	109.1	99.3	49.6	-	-	86.0	86.0	81.3	35.9	31.7	31.6	-	-	33.1	33.1	97.1
MEAN (ENTRIES LISTED)		118.0	127.7	69.9	-	-	-	105.7	-	32.9	32.3	31.8	-	-	-	32.4	-
6/ Growing Season Precip. (in.)		7.38	8.81	3.93	-	-	6.71										
7/ Soil PAW (in.) to SD @Pltng.		5.52	7.16	6.84	-	-	6.51										
Total Plant Avail. Water (in.)		12.90	15.97	10.77	-	-	13.21										
Soil NO3 (lbs.) to SD @Pltng.		112.0	130.0	28.0	-	-											
SD (Sampling Depth in inches)		48.0	48.0	48.0	-	-											
Fertilizer Applied (# N)		70.0	62.0	66.0	-	-											
(# P2O5)		40.0	35.0	33.0	-	-											
(# K2O)		0.0	0.0	0.0	-	-											
(# SO4)		0.0	0.0	0.0	-	-											

Check variety is Otana.

1/ See MCES Bulletin 1095 for evaluation of other important variety performance characteristics to include disease resistance 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.

4/ 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 Otana for the same years, and z = 3-yr. average yield or test weight for the check variety Otana.

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

6/ Seeding to 14 days prior to harvest maturity.

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