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PROJECT TITLE: Small grain variety performance evaluation under fallow conditions off-station in Northern Montana.

PROJECT LEADER: Gregg R. Carlson, Agronomist - Havre

PROJECT PERSONNEL:
P. L. Bruckner, Breeder/Geneticist (WW) - Bozeman
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T. L. Allen, Research Spec - Havre
Extension Agents in Counties Involved
Individual Cooperating Landowners

OBJECTIVES:

Diverse cropping environments exist within that five-county area most closely served by this Research Center. Small grain production in the five counties represents an average of 36% of the statewide total. Producers are keenly interested in variety performance data generated under local conditions. It was our objective, within budget limitations, to evaluate small grain variety performance, over time, under specific Northern Montana conditions varying from those of the Research Center at Havre.

RESULTS:

Data details for individual trials conducted from 1982-1993 were included in respective previous reports, but long-term yield and test weight data from past years are presented in abridged form for summary purposes here.

1993 cropping environments ranged from good to excellent across Northcentral Montana. At Havre, total annual growing season precipitation (9/1/92 - 8/31/93) was 19.71 inches or 165 percent of the average for all years since 1916. April 1 through July 31 precipitation was 12.09 inches or 181 percent of the 77-year average. However, heat units expressed as "Growing Degree Days" (GDD, base 50) were only 89 percent of the average for the last 43 years (1951-1993). June-August GDD values were 80 percent of normal, and the GDD total in the month of July alone was only 68 percent of normal. Less than 8 percent of the days from May through October saw maximum temperatures above 86 degrees F while 70 percent of days recorded temperature minimums below 50 degrees F. The last spring and first fall frosts were 19 days late and 6 days early, respectively, resulting in only 102 frost free days - 20 percent less than the 77-year average. September 1992 through March 1993 precipitation was 5.72 inches or 142 percent of the long-term average. The early season was warmer

with March-May average temperature at 47.2 degrees F or 4.4 degrees warmer than normal while the mid-season was cooler with June-August average temperature at 62.4 degrees F or 4.3 degrees cooler than normal. Maximum summer temperature was recorded on June 10 at 98 degrees F. Crop outlook was initially good as were most final yields, although performance in some areas was not representative of the available moisture due to lack of sunlight and presence of numerous plant diseases - particularly wheat streak mosaic virus (WSMV). Wet conditions prevailing throughout the summer resulted in considerable harvest difficulty and a general reduction in threshed grain quality.

Off-station cropping environments were diverse with some locations recording normal to well above normal yields and quality while others were adversely affected by hail and/or delayed maturity and wet conditions following maturity.

Plant height, yield, test weight, and protein data for the Myers and Peterson dryland winter wheat trials conducted in 1993 are summarized in Tables 1 and 3, respectively. Multi-year yield and test weight summaries for selected 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 1993 Cederberg, Myers, Peterson, Graff and Solberg dryland spring wheat trials are summarized in Tables 5, 7, 9, 11 and 13, respectively. The Graff location further features crop residue production data. Multi-year yield and test weight summaries for selected entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 6, 8, 10, 12 and 14, respectively. A five-year summary of spring wheat grain/residue relationships at the Graff location is included in a separate report under "Other Agronomic Investigations."

Stand percent, plant height, yield, test weight, plump/thin and protein data for the current year Cederberg, Myers, Peterson, Graff and Solberg spring barley trials are summarized in Tables 15, 17, 19, 21 and 23, respectively. The Graff location further features crop residue production data. Multi-year yield and test weight summaries for selected entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 16, 18, 20, 22, and 24, respectively. A five-year summary of spring barley grain/residue relationships at the Graff location is included in a separate report under "Other Agronomic Investigations."

Stand percent, plant height, yield, test weight and protein data for the 1993 dryland spring oat trial at the Peterson location are summarized in Table 25. A multi-year yield and test weight summary for selected entries at the Peterson location is presented in Table 26. Data from a special dryland dwarf oat trial grown in 1993 at the Cederberg location are presented in Table 27.

SUMMARY:

Fourteen 1993 off-station variety performance trials were conducted on fallow

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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

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.	M & N Peterson Farm, Hill County (30NW Havre)	32-36N-13E
2.	L. Cederberg Farm, Blaine County (3NE Turner)	13-36N-25E

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 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:

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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.

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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. 1993.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
QT 542	QUANTUM 542	39.12	72.77	62.53	11.85
CI 17879	ROCKY	39.46	71.10	62.80	11.21
CI 17860	NEELEY	37.01	70.97	62.80	12.40
PI517194	TIBER	40.52	69.00	63.43	12.74
CI 17846	MANNING	34.80	66.40	61.67	12.08
RH78W296	BIGHORN	31.47	65.83	62.83	12.87
CI 17902	WINRIDGE	38.92	65.60	62.03	12.05
ID 279	BLIZZARD	39.46	65.00	63.53	12.75
ND 8002	SEWARD	39.83	64.80	62.23	11.09
CI 17952	HAWK	35.66	64.30	62.40	11.52
PI518591	ARAPAHO	34.67	63.97	61.60	12.95
MT 8039	JUDITH	38.64	63.67	61.27	12.30
RDW(sel)	AC READYMADE	38.96	63.27	62.77	13.67
CI 17735	NORSTAR	46.02	63.17	63.90	12.93
CI 17940	ARCHER	33.07	61.70	61.67	12.18
S86-15	KESTREL	35.77	61.07	62.30	11.43
PI491532	CREE	42.94	60.47	63.20	13.34
CI 15075	CENTURK	37.70	60.37	62.80	11.69
CI 17727	WESTON	38.95	59.53	62.70	13.02
CI 13670	WINALTA	42.27	59.20	63.63	13.13
PI478771	AGASSIZ	44.23	57.00	62.70	13.73
CI 13190	WARRIOR	39.87	55.83	62.30	13.31
CI 17844	REDWIN	39.65	54.97	62.33	14.03
EXPERIMENTAL MEANS		38.65	63.48	62.58	12.53
C.V. 2: (S OF MEAN/MEAN)*100		2.70	3.48	.20	-
LSD (0.05)		2.98	6.30	.36	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 09/18/92
Harvest Date: 08/09/93
Seeding Depth: 1.50 in.
Soil Series: Assinniboine variant
Previous Crop: Fallow after WW
Measured Soil Water on 09/10/92: 5.06 in. (sampling depth = 48 in.)
Precipitation 09/10/92 to Seeding: .26 in.
Initial Stored Soil Water at Seeding: 5.26 in. (sampling depth = 48 in.)
Fall/Winter Season Precipitation (seeding to 03/31/93):
Total - measurable events: 3.04 in.+ (not all snow H2O measured)
Precipitation 04/01/93 to 04/29/93:
Total - all measurable events: 1.65 in. (5 precipitation days)
Total - all events >.1 inches: 1.65 in. (5 precipitation days)

Soil Temp @ Sdg: 64F @ 2in., 60F @ 4in.
Root Penetration Depth: 32.0 in.
Depth to Moisture at Sdg: 0.25 in.
Probed Moist.Depth @ Sdg: 36.0 in.
Herbicide: None Applied (hand weeded)

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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. 1993. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA (Continued).

Measured Soil Water on 04/29/93: 4.05 in. (sampling depth = 48 in.)
Growing Season Precipitation (04/29 to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 10.65 in. (29 precipitation days)
Total - all events >.1 inches: 10.55 in. (28 precipitation days)
Growing Season Precipitation (04/01 to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 12.30 in. (34 precipitation days)
Total - all events >.1 inches: 12.20 in. (33 precipitation days)
Measured Soil Water at Harvest: 3.87 in. (sampling depth = 48 in.)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .90 in. (2 precipitation days)
Total - all events >.1 inches: .90 in. (2 precipitation days)
Adj'd Residual Soil Water @ (HM-14d): 2.97 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)= 130 , P(ppm olsen)= 9 , K(ppm)= 363 , pH= 7.1, O.M.(%) = 0.9
Fertilizer: 55#N,22#P2O5 via NH3 + 11-52-0 injected in separate op'ns fall 1992
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)= 14 , K(ppm)= 392 , pH= 7.1, O.M.(%) = 0.9

TABLE 2. TWELVE-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, MT. 1982-1993.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1989 4/	1990	1991 5/	1992	1993	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF NORSTAR YIELD 7/	1989 4/	1990	1991 5/	1992	1993	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF NORSTAR TEST WT 7/
NA 000X RAM (P+)	4	-	73.2	57.5	22.1	-	41.8	55.0	128.1	-	57.8	60.3	59.8	-	58.9	59.5	97.1
QT 542 QUANTUM 542 (P)	3	-	67.8	-	32.3	72.8	57.6	54.9	127.9	-	60.5	-	59.8	62.5	61.0	60.2	98.4
ID 279 BLIZZARD	3	-	-	53.2	27.7	65.0	48.6	49.2	114.6	-	-	61.4	61.1	63.5	62.0	61.2	100.0
CI 17860 NEELEY	7	-	63.4	55.4	29.2	71.0	44.4	48.8	113.7	-	60.6	61.3	59.5	62.8	60.9	61.3	100.2
ND 8002 SEWARD	3	-	-	50.2	24.1	64.8	46.4	46.9	109.3	-	-	61.1	59.5	62.2	60.9	60.1	98.2
PI517194 TIBER	10	-	56.7	44.7	25.2	69.0	43.7	46.8	109.0	-	60.9	61.5	60.6	63.4	61.6	61.7	100.8
NA 200 HAWK (P+)	7	-	59.8	47.9	24.0	64.3	42.8	45.1	104.9	-	60.6	61.9	60.5	62.4	61.1	61.1	99.8
NA 1316 ROCKY (P+)	11	-	53.9	50.5	24.3	71.1	44.7	44.7	104.1	-	61.3	62.6	59.8	62.8	61.9	61.9	101.1
MT 8039 JUDITH	7	-	58.4	45.4	23.7	63.7	42.3	44.5	103.6	-	58.2	61.0	59.2	61.3	59.8	59.8	97.7
CI 17441 VONA	3	-	-	58.8	-	-	36.3	43.5	101.4	-	-	62.9	-	-	62.1	62.6	102.3
CI 17439 ROUGHRIDER	4	-	-	43.2	22.9	-	33.2	43.3	100.8	-	-	61.7	60.0	-	60.6	61.8	101.0
NA 001 THUNDERBIRD (P+)	6	-	61.6	46.8	18.8	-	37.3	43.1	100.5	-	61.9	62.9	60.8	-	61.6	62.1	101.5
CI 17902 WINRIDGE	10	-	62.5	49.5	20.7	65.6	42.7	43.1	100.4	-	60.4	60.7	60.4	62.0	60.5	60.8	99.4
CI 13190 WARRIOR	6	-	-	47.4	24.3	55.8	38.8	43.1	100.4	-	-	61.5	60.1	62.3	60.6	60.6	99.0
MT 77063 CREE	11	-	49.6	56.1	27.6	60.5	43.0	43.0	100.2	-	61.2	62.0	60.7	63.2	61.9	61.9	101.1
CI 17735 NORSTAR	11	-	53.7	45.8	18.3	63.2	42.9	42.9	100.0	-	61.3	61.5	60.7	63.9	61.2	61.2	100.0
CI 8885 CHEYENNE	10	-	50.4	47.3	23.1	-	39.4	42.9	100.0	-	61.2	61.5	60.5	-	61.5	61.8	100.9
ND 7687 AGASSIZ	5	-	-	46.0	22.5	57.0	39.1	41.8	97.4	-	-	61.9	59.8	62.7	60.8	61.2	100.0
CI 15075 CENTURK (+)	11	-	55.0	47.9	23.0	60.4	41.0	41.0	95.4	-	60.8	62.5	60.0	62.8	61.8	61.8	101.0
CI 13670 WINALTA	11	-	55.3	46.1	22.4	59.2	40.7	40.7	94.8	-	61.5	62.6	60.4	63.6	62.0	62.0	101.3
RH78W296 BIGHORN (P+)	5	-	41.5	-	23.0	65.8	42.3	40.0	93.2	-	59.9	-	60.2	62.8	61.1	60.9	99.4
CI 17844 REDWIN	11	-	51.0	42.2	25.2	55.0	39.9	39.9	93.0	-	60.4	61.3	60.9	62.3	61.8	61.8	100.9
MT 7877 NORWIN	9	-	48.2	43.8	23.1	-	34.8	39.9	92.9	-	60.8	61.9	60.4	-	61.8	62.2	101.6
MEAN (ENTRIES LISTED)		-	56.6	48.8	24.0	63.8	-	44.5	-	-	60.6	61.7	60.2	62.7	-	61.3	-
8/ Growing Season Precip. (in.)		0.00	6.90	8.45	7.60	12.3	6.44										
9/ Soil PAW (in.) to 4 ft. @Sdg.		6.18	9.29	7.71	5.30	5.26	7.04										
Total Plant Avail. Water (in.)		0.00	16.19	16.16	12.90	17.56	13.48										
Fertilizer Applied (# N)		51.0	48.0	50.0	50.0	55.0											
(# P2O5)		28.0	21.0	21.0	24.0	22.0											
(# K2O)		9.0	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.

4/ The 1989 nursery was lost due to winter injury.

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

6/ 12-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 = 12-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 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. 1993.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac 1/	TEST WT Lbs/Bu	PROTEIN %
CI 17860	NEELEY	31.68	64.17	62.23	10.46
PI517194	TIBER	35.30	61.63	62.70	10.69
MT 8039	JUDITH	34.03	60.93	61.43	11.08
CI 17735	NORSTAR	41.65	60.10	63.30	10.69
ND 8002	SEWARD	35.70	60.03	61.97	10.25
QT 542	QUANTUM 542	35.30	59.00	62.37	11.00
ID 279	BLIZZARD	33.36	58.23	62.40	11.43
CI 17902	WINRIDGE	33.62	58.17	61.00	11.01
RH78W296	BIGHORN	30.37	57.67	62.43	11.65
CI 17879	ROCKY	36.90	56.37	61.90	10.24
S86-15	KESTREL	33.27	56.20	61.97	11.13
PI491532	CREE	34.75	55.33	62.50	11.75
CI 15075	CENTURK	33.43	55.33	61.77	10.98
CI 17846	MANNING	30.09	53.90	61.27	11.01
CI 17844	REDWIN	36.98	52.53	62.23	12.02
PI478771	AGASSIZ	37.99	52.53	62.37	11.84
CI 13670	WINALTA	35.84	51.97	63.37	11.34
CI 17952	HAWK	30.33	51.80	61.80	10.61
RDW(sel)	AC READYMADE	35.17	51.27	62.37	11.23
CI 17940	ARCHER	30.20	51.03	60.83	10.70
CI 17727	WESTON	36.56	49.33	62.90	12.15
PI518591	ARAPAHO	31.54	47.67	60.83	11.25
CI 13190	WARRIOR	35.12	47.60	62.20	11.82
EXPERIMENTAL MEANS		34.31	55.34	62.09	11.14
C.V. 2: (S OF MEAN/MEAN)*100		3.47	3.43	.27	-
LSD (0.05)		3.40	5.41	.47	-

1/ Nursery suffered moderate hail damage in late June.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 09/16/92
Harvest Date: 08/12/93
Seeding Depth: 1.50 in.
Soil Series: Telstad
Previous Crop: Fallow after WW
Measured Soil Water on 08/28/92: 4.65 in. (sampling depth = 48 in.)
Precipitation 08/28/92 to Seeding:
Total - all measurable events: .13 in. (3 precipitation days)
Total - all events >.1 inches: .00 in.
Initial Stored Soil Water at Seeding: 4.78 in. (sampling depth = 48 in.)

Soil Temp @ Sdg: 60F @ 2in., 58F @ 4in.
Root Penetration Depth: 34.0 in.
Depth to Moisture at Sdg: 1.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide:`Bronate'@1 pt/ac @10gpa 5/03

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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. 1993. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA (Continued).

Fall/Winter Season Precipitation (seeding to 03/31/93):
Total - all measurable events: 4.42 in.
Precipitation 04/01/93 to 05/05/93: 1.41 in.
Measured Soil Water on 05/05/93: 5.67 in.
Growing Season Precipitation (05/05 to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 10.64 in. (26 precipitation days)
Total - all events >.1 inches: 10.35 in. (21 precipitation days)
Growing Season Precipitation (04/01 to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 12.05 in.
Measured Soil Water at Harvest: 5.38 in. (sampling depth = 48 in.)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .06 in. (2 precipitation days)
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 5.32 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)= 82 , P(ppm olsen)= 14 , K(ppm)= 250 , pH= 6.6, O.M.(%) = 0.7
Fertilizer: 70.5#N,25#P2O5,10#K2O/ac via NH3+granular blend injected 09/08/92
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 26 , P(ppm olsen)= 15 , K(ppm)= 319 , pH= 7.6, O.M.(%) = 1.3

TABLE 4. ELEVEN-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. 1983-1993.

2/VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1988	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	11-YR COMPAR. AVERAGE YIELD 6/	PERCENT OF NORSTAR YIELD 7/	TEST WEIGHT (POUNDS PER BUSHEL) 1988	1990	1991 4/	1992	1993	AVERAGE FOR YEARS TESTED	11-YR COMPAR. AVERAGE TEST WT 6/	PERCENT OF NORSTAR TEST WT 7/
PI477287 RAM	3	-	49.9	52.3	23.4	-	41.9	46.3	114.1	-	56.0	53.7	58.3	-	56.0	57.1	94.1
ND 8002 SEWARD	3	-	-	56.4	23.9	60.0	46.8	45.3	111.7	-	-	57.3	59.1	62.0	59.5	59.5	98.1
CI 17860 NEELEY	5	14.9	41.3	59.6	26.0	64.2	41.2	44.1	108.8	61.9	56.8	57.2	60.3	62.2	59.7	59.8	98.5
CI 17592 HAWK	4	-	48.8	59.3	22.3	51.8	45.5	43.4	107.0	-	58.6	56.1	60.1	61.8	59.1	59.3	97.8
QT 542 QUANTUM 542 (P)	3	-	45.3	-	24.9	59.0	43.1	42.1	103.8	-	57.1	-	59.5	62.4	59.7	58.1	95.9
MT 8039 JUDITH	5	16.1	48.7	50.0	18.3	60.9	38.8	41.5	102.4	60.6	55.8	54.7	59.2	61.4	58.3	58.4	96.3
ID 279 BLIZZARD	3	-	-	44.7	24.9	58.2	42.6	41.3	101.8	-	-	58.1	61.2	62.4	60.6	60.6	99.9
CI 17735 NORSTAR	7	19.2	44.6	45.7	19.8	60.1	40.5	40.5	100.0	61.0	60.0	58.2	60.3	63.3	60.6	60.6	100.0
PI517194 TIBER	7	20.0	39.6	46.2	23.4	61.6	40.4	40.4	99.7	61.9	58.5	57.7	60.7	62.7	60.5	60.5	99.9
CI 13190 WARRIOR	4	18.4	-	54.5	23.0	47.6	35.9	40.2	99.1	60.6	-	57.2	60.4	62.2	60.1	60.0	99.0
PI491532 CREE	6	19.4	38.6	48.1	22.2	55.3	35.7	39.4	97.2	61.3	59.6	58.5	61.0	62.5	60.4	61.0	100.6
CI 15075 CENTURK (+)	6	15.7	42.3	50.3	20.4	55.3	35.5	39.3	96.8	61.2	58.6	58.3	60.6	61.8	59.9	60.4	99.7
PI491533 NORWIN	6	15.2	40.3	55.9	19.4	-	36.0	39.1	96.5	62.3	59.0	57.6	60.8	-	60.8	61.2	100.9
CI 17879 ROCKY (P+)	7	15.8	43.0	51.1	19.6	56.4	39.0	39.0	96.2	61.3	58.7	59.2	59.6	61.9	60.2	60.2	99.2
CI 13670 WINALTA	7	15.8	40.4	58.3	17.8	52.0	38.5	38.5	94.9	61.2	60.0	59.2	60.3	63.4	61.2	61.2	100.9
CI 8885 CHEYENNE	6	16.7	39.8	37.8	24.9	-	34.9	38.0	93.7	61.5	60.0	58.3	60.7	-	60.8	61.3	101.0
CI 17092 WINRIDGE	6	12.7	39.1	42.3	23.7	58.2	34.3	37.9	93.5	60.9	55.7	55.0	60.4	61.0	58.0	58.6	96.6
CI 16844 REDWIN	7	17.4	36.8	47.3	23.5	52.5	36.7	36.7	90.4	62.2	58.9	58.6	60.6	62.3	60.5	60.5	99.8
MEAN (ENTRIES LISTED)		16.7	45.6	50.6	22.3	56.9		40.7		61.4	62.4	57.4	60.2	62.2		59.9	
8/ Growing Season Precip. (in.)		3.23	5.45	8.84	4.16	12.05	6.16										
9/ Soil PAW (in.) to 4 ft. @Sdg		9.30	9.92	5.41	6.63	4.78	7.43										
Total Plant Avail. Water (in.)		12.53	15.37	14.25	10.79	16.83	13.59										
Fertilizer Applied (#N)		13.5	50.0	65.0	42.0	70.5											
(#P2O5)		34.5	25.0	25.0	25.0	25.0											
(#K2O)		0.0	10.0	10.0	10.0	10.0											
(# 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/ 11-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 = 11-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. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WA 6920	PENAWAWA (soft white)	28.39	67.63	58.37	9.65
CI 17904	OWENS (soft white)	28.58	62.57	58.17	11.35
ND 606	AMIDON	30.41	54.83	58.43	13.71
MT 8849	RS6880/MT7819	29.92	54.23	59.40	13.52
PI483235	GLENMAN	29.13	52.63	57.70	12.66
CI 17430	NEWANA	28.23	52.27	58.83	13.21
C982-324	RAMBO	30.54	49.73	59.80	12.82
WPB 926	WESTBRED 926	27.94	48.93	58.83	14.58
ND 626	GRANDIN	29.95	48.47	58.57	14.41
ND 582	STOA	30.67	48.23	57.87	15.09
MT 8402	HI-LINE	27.61	47.87	58.60	14.80
CI 17828	PONDERA	27.65	46.23	59.53	14.32
CI 17790	LEN	30.34	46.00	59.30	15.37
CI 17429	LEW	30.28	45.93	59.50	14.17
ND 618	GUS	28.36	44.70	58.10	16.81
CI 15930	OLAF	31.02	41.83	57.90	15.75
CANLANC	LANCER	31.82	41.07	58.97	14.53
NDCUT	CUTLESS	25.31	40.07	58.20	15.82
PI486139	KLASIC (hard white)	21.61	39.80	56.17	14.11
CI 13596	FORTUNA	28.67	37.07	58.07	14.32
EXPERIMENTAL MEANS		28.82	48.51	58.52	14.05
C.V. 2: (S OF MEAN/MEAN)*100		5.51	3.45	.48	-
LSD (0.05)		4.55	4.80	.80	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/27/93
Harvest Date: 09/28/93
Seeding Depth: 2.00 in.
Soil Texture: Sandy Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 46F @ 2in., 48F @ 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-DAm+BanSGF @.5+.06#ai/ac
Initial Stored Soil Water at Seeding: 7.24 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 4.57 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 9.60 in. (49 precipitation days)
Total - all events >.1 inches: 8.45 in. (20 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: 1.07 in. (5 precipitation days)
Total - all events >.1 inches: .99 in. (3 precipitation days)
Adj'd Residual Soil Water @ (HM-14d): 3.50 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)= 12 , K(ppm)= 234 , pH= 6.5, O.M.(%) = 0.9
Fertilizer: 62#N,35#P2O5/ac via gran.blend banded 1.5 in. below seed @ planting
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 30 , P(ppm olsen)= 11 , K(ppm)= 310 , pH= 6.4, O.M.(%) = 1.0

TABLE 6. SEVEN-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. 1987-1993.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
PI483235 GLENMAN	7	29.7	33.3	47.5	57.3	52.6	39.2	39.2	132.8	58.6	59.3	56.8	57.6	57.7	58.5	58.5	98.2
WA 6920 PENAWAWA (sfwh	5	25.6	27.3	44.2	58.7	67.6	44.7	38.6	130.7	59.1	58.2	56.6	58.5	58.4	58.2	58.3	97.8
CI 17904 OWENS(sft wht)	7	29.8	31.3	41.2	53.9	62.6	37.6	37.6	127.4	59.6	59.2	54.2	56.3	58.2	58.5	58.5	98.2
ND 606 AMIDON	5	28.6	25.4	45.7	54.1	54.8	41.7	36.0	122.1	59.7	57.6	57.7	59.1	58.4	58.5	58.7	98.4
CI 17430 NEWANA	7	24.1	27.3	47.4	55.2	52.3	36.0	36.0	121.9	61.0	59.8	57.6	59.3	58.8	59.5	59.5	99.7
ND 626 GRANDIN	4	-	28.6	40.1	55.7	48.5	43.2	35.0	118.7	-	59.8	57.7	59.7	58.6	58.9	59.5	99.8
CI 17790 LEN	7	24.7	30.5	44.1	46.4	46.0	34.1	34.1	115.5	59.1	57.9	56.6	59.3	59.3	58.9	58.9	98.8
CI 17429 LEW	7	28.5	25.7	42.5	46.0	45.9	34.0	34.0	115.2	60.3	60.2	59.3	60.9	59.5	60.4	60.4	101.3
WPB 926R WSTBRD926R (P+	4	-	19.3	47.5	51.0	48.9	41.7	33.8	114.5	-	59.6	56.3	58.6	58.8	58.3	58.9	98.7
ND 582 STOA	7	24.6	26.8	39.3	50.3	48.2	33.4	33.4	113.3	59.8	58.8	56.3	58.1	57.9	58.9	58.9	98.8
ND 618 GUS	4	-	27.0	39.7	50.6	44.7	40.5	32.8	111.3	-	59.6	57.6	58.8	58.1	58.5	59.1	99.1
MT 8402 HI-LINE	6	25.2	28.2	40.7	49.8	47.9	34.4	32.8	111.1	59.3	58.9	55.3	58.8	58.6	58.8	58.6	98.3
CI 17828 PONDERA	7	23.6	26.6	45.8	47.6	46.2	32.5	32.5	110.1	60.0	60.0	57.8	60.6	59.5	59.6	59.6	100.0
CI 17910 ALEX	4	25.8	24.7	-	-	-	23.2	32.4	109.9	60.6	58.9	-	-	-	60.6	60.4	101.2
C982-324 RAMBO (P+)	7	24.8	19.7	39.3	48.0	49.7	32.4	32.4	109.7	60.4	59.3	56.9	58.7	59.8	59.9	59.9	100.4
CI 15930 OLAF	7	23.0	22.4	44.4	48.0	41.8	31.1	31.1	105.3	59.5	57.9	56.2	58.2	57.9	58.6	58.6	98.3
CANLANC LANCER	6	27.9	27.7	37.3	43.8	41.1	32.5	31.0	105.1	59.6	58.7	58.4	59.4	59.0	59.5	59.3	99.5
CI 13596 FORTUNA	7	25.3	23.6	42.7	42.3	37.1	29.5	29.5	100.0	60.9	58.3	59.5	60.4	58.1	59.6	59.6	100.0
NDCUT CUTLESS	7	22.6	18.8	37.7	44.5	40.1	28.4	28.4	96.3	59.5	58.2	57.4	58.1	58.2	58.8	58.8	98.7
WPB 906R WSTBRD906R (P+	3	24.7	20.1	-	-	-	18.9	26.2	88.9	59.6	59.2	-	-	-	60.2	59.5	99.8
MEAN (ENTRIES LISTED)		25.8	25.7	42.6	50.2	48.7		33.3		59.8	59.0	57.1	58.9	58.6		59.2	
6/ Growing Season Precip. (in.)		6.84	8.07	10.32	7.77	9.60	7.81										
7/ Soil PAW (in.) to SD @Plntng.		4.86	7.97	6.56	5.52	7.24	6.67										
Total Plant Avail. Water (in.)		11.70	16.04	16.88	13.29	16.84	14.48										
Soil NO3 (lbs.) to SD @Plntng.		52.0	120.0	100.0	112.0	52.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	62.0	70.0	70.0	62.0											
(# P2O5)		0.0	45.0	40.0	40.0	35.0											

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/ 7-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 = 7-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. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WA 6920	PENAWAWA (soft white)	31.59	66.47	55.73	11.80
CI 17904	OWENS (soft white)	31.47	60.70	55.83	12.13
MT 8849	RS6880/MT7819	33.46	59.23	57.13	15.93
ND 626	GRANDIN	34.15	58.50	56.57	16.88
ND 582	STOA	38.20	57.63	56.43	15.95
ND 606	AMIDON	37.34	56.13	54.97	15.64
MT 8402	HI-LINE	31.35	55.37	56.40	15.61
ND 618	GUS	33.99	54.87	56.47	17.42
CI 17430	NEWANA	31.73	53.60	56.07	14.39
WPB 926	WESTBRED 926	29.08	52.60	56.33	15.29
PI483235	GLENMAN	33.79	52.37	56.17	13.97
CI 17828	PONDERA	31.81	50.80	56.80	15.12
CI 17429	LEW	38.87	47.83	58.27	15.75
PI486139	KLASIC (hard white)	21.78	47.73	54.63	14.01
C982-324	RAMBO	34.23	46.47	57.37	14.57
CI 13596	FORTUNA	36.27	45.70	57.47	15.54
CI 15930	OLAF	35.09	45.20	56.60	15.78
CI 17790	LEN	33.07	44.53	55.30	16.19
NDCUT	CUTLESS	32.49	43.70	54.20	16.06
CANLANC	LANCER	38.96	41.63	56.43	17.39
EXPERIMENTAL MEANS		33.44	52.05	56.26	15.27
C.V. 2: (S OF MEAN/MEAN)*100		2.63	2.95	.56	-
LSD (0.05)		2.52	4.39	.91	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/29/93
Harvest Date: 09/14/93
Seeding Depth: 2.00 in.
Soil Series: Assinniboine variant
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 60F @ 2in., 58F @ 4in.
Root Penetration Depth: 43.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 48.0 in.
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 6.29 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.55 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 13.95 in. (36 precipitation days)
Total - all events >.1 inches: 13.85 in. (35 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .10 in. (1 precipitation day)
Total - all events >.1 inches: .00 in. (0 precipitation days)
Adj'd Residual Soil Water @ (HM-14d): 5.45 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)= 158 , P(ppm olsen)= 30 , K(ppm)= 306 , pH= 6.8, O.M.(%) = 0.8
Fertilizer: 55#N,22#P2O5/ac via NH3+11-52-0 injected in separate op'ns fall`92'
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 70 , P(ppm olsen)= 14 , K(ppm)= 478 , pH= 7.1, O.M.(%) = 1.2

TABLE 8. SIX-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FR A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT MYERS FARMS,INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1988-1993.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1989	1990	1991 3/	1992 4/	1993	AVERAGE FOR YEARS TESTED	6-YR COMPAR. AVERAGE YIELD 5/	PERCENT OF FORTUNA YIELD 6/	TEST WEIGHT (POUNDS PER BUSHEL) 1989	1990	1991 3/	1992 4/	1993	AVERAGE FOR YEARS TESTED	6-YR COMPAR. AVERAGE TEST WT 5/	PERCENT OF FORTUNA TEST WT 6/
CI 17904 OWENS (SFT WHT)	5	56.0	33.2	32.5	-	60.7	38.0	38.0	135.5	55.6	56.2	53.9	-	55.8	56.6	56.6	98.9
WA 6920 PENAWAWA (SFT WHT)	4	47.3	33.0	32.8	-	66.5	44.9	37.4	133.5	52.0	56.0	52.2	-	55.7	54.0	54.7	95.6
ND 618 GUS	3	-	31.8	36.4	-	54.9	41.0	36.8	131.6	-	56.3	55.1	-	56.5	55.9	56.8	99.2
CI 17910 ALEX	3	49.6	26.1	-	-	-	27.9	36.7	131.0	56.9	57.4	-	-	-	58.5	58.3	101.8
ND 606 AMIDON	4	50.4	27.4	36.5	-	56.1	42.6	35.5	126.8	57.0	55.2	54.8	-	55.0	55.5	56.3	98.3
ND 582 STOA	5	47.3	23.4	36.2	-	57.6	35.1	35.1	125.2	54.5	55.7	54.5	-	56.4	56.6	56.6	98.8
WPB 926R WESTBRED 926R(P+)	3	-	31.2	31.7	-	52.6	38.5	34.6	123.5	-	56.2	55.8	-	56.3	56.1	56.9	99.5
ND 626 GRANDIN	3	-	27.6	29.1	-	58.5	38.4	34.5	123.2	-	57.2	54.0	-	56.6	55.9	56.8	99.2
MT 8402 HI-LINE	5	48.2	30.3	30.7	-	55.4	33.9	33.9	121.2	58.2	57.0	54.2	-	56.4	57.4	57.4	100.2
WPB 906R WESTBRED 906R(P+)	3	45.2	27.7	-	-	-	25.7	33.7	120.4	55.1	56.4	-	-	-	57.6	57.3	100.1
CI 17828 PONDERA	5	43.9	22.1	33.7	-	50.8	31.6	31.6	112.8	58.1	57.0	56.7	-	56.8	57.9	57.9	101.2
C982-324 RAMBO(P+)	5	47.3	23.7	28.4	-	46.5	30.6	30.6	109.3	55.0	55.8	53.1	-	57.4	56.7	56.7	99.2
CI 15930 OLAF	5	49.7	22.4	29.6	-	45.2	30.6	30.6	109.1	54.3	55.8	52.9	-	56.6	56.0	56.0	97.9
PI483235 GLENMAN	5	43.4	21.7	25.8	-	52.4	30.2	30.2	107.8	55.5	55.6	53.1	-	56.2	56.1	56.1	98.1
CI 17430 NEWANA	5	44.6	15.2	26.1	-	53.6	29.5	29.5	105.4	58.0	55.5	53.0	-	56.1	56.9	56.9	99.5
CI 17429 LEW	5	42.8	22.8	27.3	-	47.8	29.5	29.5	105.4	55.5	57.3	55.9	-	58.3	57.7	57.7	100.8
ND CUT CUTLESS	5	42.0	25.0	28.2	-	43.7	28.8	28.8	103.0	56.4	55.8	55.7	-	54.2	56.6	56.6	98.9
CI 17790 LEN	5	41.4	18.1	31.3	-	44.5	28.7	28.7	102.6	56.4	55.6	54.7	-	55.3	56.5	56.5	98.7
CI 13596 FORTUNA	5	41.0	17.4	30.4	-	45.7	28.0	28.0	100.0	56.6	55.6	56.2	-	57.5	57.2	57.2	100.0
CANLANC LANCER	5	40.7	22.5	25.4	-	41.6	27.0	27.0	96.4	56.8	56.0	55.7	-	56.4	57.1	57.1	99.7
MEANS (ENTRIES LISTED)		45.9	25.1	30.7	-	51.9		39.0		56.0	56.2	54.5	-	56.3		56.8	
7/Growing Season Precip. (in.)		8.77	6.90	8.45	8.25	13.95	8.30										
8/ Soil PAW (in.) to SD at @plant		6.38	10.23	8.47	6.14	6.29	7.29										
Total Plant Avail. Water (in.)		15.15	17.13	16.92	14.39	20.24	15.60										
Soil NO3 (lbs.) to SD @Plant.		192.0	160.0	128.0	200.0	158.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		51.0	48.0	50.0	50.0	55.0											
(#P2O5)		28.0	21.0	21.0	24.0	22.0											
(#K2O)		9.0	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/ Crpp suffered minor hail damage.

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

5/ 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.

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. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WA 6920	PENAWAWA (soft white)	30.30	55.97	54.47	12.42
CI 17904	OWENS (soft white)	33.71	53.63	53.00	12.67
MT 8849	RS6880/MT7819	34.30	51.93	55.67	15.59
ND 606	AMIDON	35.80	47.73	55.40	15.72
CI 17828	PONDERA	31.89	47.17	57.37	15.44
C982-324	RAMBO	33.82	46.50	56.93	14.32
CI 17430	NEWANA	31.82	46.23	54.67	13.87
ND 626	GRANDIN	35.29	43.00	56.37	16.24
WPB 926	WESTBRED 926	29.65	42.80	54.17	16.00
MT 8402	HI-LINE	31.84	42.43	55.07	16.03
PI483235	GLENMAN	32.03	41.30	54.37	14.47
PI486139	KLASIC (hard white)	23.04	40.83	54.13	15.33
CI 17429	LEW	36.35	40.57	56.83	15.53
CANLANC	LANCER	40.01	37.07	55.23	16.90
CI 13596	FORTUNA	35.51	35.53	54.83	15.17
ND 618	GUS	33.03	35.43	55.40	17.59
CI 17790	LEN	31.29	34.63	52.83	16.04
NDCUT	CUTLESS	32.76	34.47	53.63	16.05
CI 15930	OLAF	33.62	34.37	55.10	15.73
ND 582	STOA	34.93	33.40	54.37	16.39
EXPERIMENTAL MEANS		33.05	42.25	54.99	15.38
C.V. 2: (S OF MEAN/MEAN)*100		2.75	5.31	.76	-
LSD (0.05)		2.60	6.42	1.19	-

Note: Nursery suffered moderate hail damage in late June.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/05/93
Harvest Date: 09/18/93
Seeding Depth: 1.75 in.
Soil Series: Telstad
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 67F @ 2in., 65F @ 4in.
Root Penetration Depth: 37.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: None Applied (hand weeded)

Initial Stored Soil Water at Seeding: 6.75 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.46 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 13.03 in. (33 precipitation days)
Total - all events >.1 inches: 12.62 in. (25 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .50 in. (2 precipitation days)
Total - all events >.1 inches: .45 in. (1 precipitation day)
Adj'd Residual Soil Water @ (HM-14d): 4.96 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)= 162 , P(ppm olsen)= 20 , K(ppm)= 303 , pH= 7.3, O.M.(%) = 0.8
Fertilizer: 70.5#N,25#P2O5,10#K2O/ac via NH3+granular blend injected 09/08/92
Harvest 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)= 15 , K(ppm)= 326 , pH= 6.5, O.M.(%) = 0.8

TABLE 10. TWELVE-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. 1982-1993.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1989	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF PORTUNA YIELD 7/	1989	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF PORTUNA TEST WT 7/
CI 17904 OWENS(sft whte	10	26.3	32.3	33.6	-	53.6	34.3	36.5	125.1	58.0	60.0	51.6	-	53.0	56.3	56.8	97.7
PI483235 GLENMAN	11	29.3	31.0	35.3	-	41.3	35.4	35.4	121.2	57.9	58.1	52.5	-	54.4	56.4	56.4	97.1
WA 6920 PENAWAWA (sftw	4	27.5	27.6	33.5	-	56.0	36.1	34.7	118.8	59.8	56.9	50.9	-	54.5	55.5	56.1	96.6
ND 606 AMIDON	4	30.0	33.8	30.1	-	47.7	35.4	34.0	116.3	59.4	59.9	53.9	-	55.4	57.1	57.8	99.5
CI 17430 NEWANA	11	26.4	31.3	29.7	-	46.2	33.4	33.4	114.4	60.3	60.2	51.1	-	54.7	58.3	58.3	100.4
WPB 926R WSTBRD926R (P+	3	-	31.0	36.4	-	42.8	36.7	33.2	113.8	-	58.6	52.7	-	54.2	55.2	56.0	96.5
CI 17790 LEN	8	24.2	28.6	33.9	-	34.6	34.3	33.1	113.3	57.3	56.9	52.8	-	52.8	56.1	55.8	96.0
C982-324 RAMBO (P+)	6	23.6	25.8	31.4	-	46.5	30.1	31.7	108.5	61.1	61.0	52.9	-	56.9	58.2	58.8	101.3
CI 17828 PONDERA	11	21.8	28.1	36.1	-	47.2	31.4	31.4	107.4	58.2	60.0	55.6	-	57.4	58.7	58.7	101.0
ND 626 GRANDIN	3	-	31.7	27.2	-	43.0	34.0	30.7	105.3	-	58.9	51.2	-	56.4	55.5	56.4	97.1
CI 15930 OLAF	9	20.6	28.4	28.8	-	34.4	28.8	30.4	104.0	57.9	58.3	50.3	-	55.1	57.7	57.2	98.5
CI 17429 LEW	11	22.8	29.2	27.6	-	40.6	30.3	30.3	103.6	58.2	61.0	54.2	-	56.8	58.3	58.3	100.4
MT 8402 HI-LINE	5	24.8	26.7	30.0	-	42.4	27.1	30.2	103.6	56.9	57.4	51.1	-	55.1	55.6	56.4	97.1
CANLANC LANCER	5	25.2	27.8	28.8	-	37.1	26.3	29.3	100.2	58.7	60.1	55.2	-	55.2	57.3	58.1	100.0
CI 13596 FORTUNA	11	24.9	30.0	31.3	-	35.5	29.2	29.2	100.0	58.2	61.2	55.5	-	54.8	58.1	58.1	100.0
NDCUT CUTLESS	6	20.8	26.6	31.1	-	34.5	27.4	28.8	98.7	58.4	61.0	54.7	-	53.6	56.7	57.4	98.8
CI 17910 ALEX	8	22.7	28.7	-	-	-	29.5	28.5	97.6	60.1	60.6	-	-	-	59.4	59.3	102.1
WPB 906R WSTBRD906R (P+	4	21.2	27.2	-	-	-	23.7	28.3	96.9	56.8	57.8	-	-	-	57.8	57.2	98.5
ND 618 GUS	3	-	30.6	26.2	-	35.4	30.7	27.8	95.2	-	59.3	54.0	-	55.4	56.2	57.1	98.4
ND 582 STOA	9	22.1	27.6	27.1	-	33.4	24.7	26.0	89.2	57.9	57.7	52.8	-	54.4	55.9	55.4	95.5
CI 17920 MARSHALL	6	22.1	-	-	-	-	18.6	21.4	73.3	55.8	-	-	-	-	57.9	56.7	97.7
MEAN (ENTRIES LISTED)		24.2	29.2	31.0	-	41.8	-	30.7	-	58.4	59.2	52.9	-	55.0	-	57.3	-
8/ Growing Season Precip. (in.)		5.49	4.87	8.96	5.09	13.03	6.61										
9/ Soil PAW (in.) to SD @Pltng		7.14	8.67	6.69	5.67	6.75	8.40										
Total Plant Avail. Water (in.)		12.63	13.54	15.65	10.76	19.78	15.01										
Soil NO3 (lbs.) to SD @Pltng		120.0	196.0	140.0	198.0	162.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	50.0	65.0	42.0	70.5											
(# P2O5)		0.0	25.0	25.0	25.0	25.0											
(# K2O)		0.0	10.0	10.0	10.0	10.0											
(# 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/ 12-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 = 12-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. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

			1/			2/	3/
ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %	RESIDUE Lbs/Ac	RESIDUE Lbs/Bu
CI 17904	OWENS (soft white)	37.64	79.57	61.07	10.59	6050.10	78.30
WA 6920	PENAWAWA (soft white)	37.56	76.43	60.80	10.41	5880.47	74.10
PI483235	GLENMAN	36.55	74.87	60.97	12.58	5726.83	71.27
MT 8849	RS6880/MT7819	38.92	67.57	61.30	13.45	6166.43	92.27
CI 17828	PONDERA	37.73	67.40	61.90	13.94	5341.60	77.87
ND 606	AMIDON	43.74	66.83	60.43	14.45	6362.77	107.93
MT 8402	HI-LINE	35.39	66.17	62.03	13.98	4550.93	68.90
PI486139	KLASIC (hard white)	26.51	66.07	59.60	13.02	3906.43	59.20
C982-324	RAMBO	37.22	65.77	61.07	13.25	6026.67	84.60
CI 17429	LEW	44.96	64.73	62.43	13.84	6767.17	92.97
CI 17430	NEWANA	35.91	63.77	61.17	12.32	4988.43	81.60
ND 626	GRANDIN	39.76	63.53	62.27	14.97	5943.47	90.10
ND 618	GUS	41.61	61.20	61.67	15.54	5222.13	100.90
WPB 926	WESTBRED 926	34.65	59.33	59.90	14.48	4975.60	77.67
CI 13596	FORTUNA	42.19	58.63	60.97	14.37	4916.93	90.20
NDCUT	CUTLESS	41.25	55.83	60.17	15.71	5671.33	99.80
CI 17790	LEN	37.36	55.50	61.20	12.74	5112.20	95.00
CANLANC	LANCER	43.54	54.77	61.13	16.10	6279.57	109.20
ND 582	STOA	44.75	51.90	60.67	14.31	5820.73	138.47
CI 15930	OLAF	38.18	50.57	60.40	15.04	5126.10	115.70
EXPERIMENTAL MEANS		38.77	63.52	61.06	13.75	5541.79	90.30
C.V. 2: (S OF MEAN/MEAN)*100		1.65	3.68	.33	-	5.20	5.83
LSD (0.05)		1.83	6.69	.57	-	825.07	15.06

1/ Via 45 sqft harvest w/plot combine (as precision was >than w/3'hand harvest)
2/ Via 3 sqft harvest w/hand clipper (incl all above-surf dry mat. less grain)
3/ Via 3 sqft hand harvest for residue and grain.

Seeding Date: 05/11/93
Harvest Date: 10/04/93
Seeding Depth: 1.25 in.
Soil Series: Joplin-Hillon CL
Previous Crop: Fallow
Soil Temp @ Sdg: 70F @ 2in., 62F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 5.76 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.17 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 12.45 in. (51 precipitation days)
Total - all events >.1 inches: 11.68 in. (33 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .08 in. (1 precipitation day)
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 5.09 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)= 112 , P(ppm olsen)= 26 , K(ppm)= 296 , pH= 7.2, O.M.(%) = 1.4
Fertilizer: 55#N via 46-0-0 commercial topdress 05/01/93 prior to initial anal.
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 38 , P(ppm olsen)= 19 , K(ppm)= 272 , pH= 7.7, O.M.(%) = 1.2

TABLE 12. FIVE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1989-1993.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	5-YR COMPAR. AVERAGE YIELD 3/	PERCENT OF FORTUNA YIELD 4/	TEST WEIGHT (POUNDS PER BUSHEL) 1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	5-YR COMPAR. AVERAGE TEST WT 3/	PERCENT OF FORTUNA TEST WT 4/
WA 6920 PENAWAWA (SFT WHT)	5	45.8	41.2	66.8	48.4	76.4	55.7	55.7	135.7	59.7	59.2	56.9	59.4	60.8	59.2	59.2	98.2
CI 17904 OWENS (SFT WHT)	5	42.2	35.5	63.5	52.6	79.6	54.7	54.7	133.1	60.0	59.3	55.9	59.4	61.1	59.1	59.1	98.1
PI483235 GLENMAN	5	47.0	37.1	58.2	36.2	74.9	50.7	50.7	123.4	60.8	60.0	58.3	58.6	61.0	59.7	59.7	99.1
ND 606 AMIDON	5	44.2	39.0	60.1	38.9	66.8	49.8	49.8	121.3	60.6	60.9	58.2	58.3	60.4	59.7	59.7	99.1
CI 17828 PONDERA	5	44.3	39.1	57.5	36.5	67.4	49.0	49.0	119.2	60.9	61.2	58.3	60.1	61.9	60.5	60.5	100.4
CI 17430 NEWANA	5	44.7	35.7	62.6	37.3	63.8	48.8	48.8	118.9	61.9	61.0	58.6	59.1	61.2	60.4	60.4	100.2
ND 626 GRANDIN	4	-	34.9	54.4	43.3	63.5	49.0	48.3	117.6	-	59.5	57.8	60.7	62.3	60.1	60.3	100.1
C982-324 RAMBO (P+)	5	43.3	32.6	59.8	32.7	65.8	46.8	46.8	114.0	61.7	62.3	59.3	59.9	61.1	60.9	60.9	101.0
MT 8402 HI-LINE	5	38.4	36.7	57.8	27.8	66.2	45.4	45.4	110.5	57.9	58.8	57.3	60.6	62.0	59.3	59.3	98.4
CI 17790 LEN	5	43.1	38.1	59.7	29.5	55.5	45.2	45.2	110.0	59.3	59.4	58.4	59.6	61.2	59.6	59.6	98.9
ND 582 STOA	5	43.8	35.7	53.1	40.6	51.9	45.0	45.0	109.6	60.3	60.6	57.3	59.2	60.7	59.6	59.6	98.9
ND 618 GUS	4	-	33.9	55.3	31.8	61.2	45.5	44.9	109.2	-	60.8	58.7	59.1	61.7	60.1	60.3	100.0
CI 17429 LEW	5	41.6	34.2	49.4	34.0	64.7	44.8	44.8	109.0	61.8	60.4	59.5	59.8	62.4	60.8	60.8	100.9
WPB 926R WESTBRED 926R	4	-	37.1	58.2	25.4	59.3	45.0	44.3	108.0	-	59.0	56.0	59.6	59.9	58.6	58.8	97.6
ND CUT CUTLESS	5	39.3	31.0	51.8	34.7	55.8	42.5	42.5	103.6	60.5	61.1	59.4	59.0	60.2	60.0	60.0	99.6
CI 15930 OLAF	5	44.3	35.7	55.1	22.6	50.6	41.7	41.7	101.4	59.3	60.3	56.5	59.0	60.4	59.1	59.1	98.1
CI 13596 FORTUNA	5	38.6	32.1	50.2	25.7	58.6	41.1	41.1	100.0	61.1	61.7	60.0	57.5	61.0	60.3	60.3	100.0
CANLANC LANCER	5	39.6	36.9	42.3	29.9	54.8	40.7	40.7	99.1	60.5	61.1	58.7	59.0	61.1	60.1	60.1	99.7
MEANS (ENTRIES LISTED)		42.7	35.9	56.4	34.9	63.2		46.6		60.4	60.4	58.1	59.3	61.1		59.9	
5/Growing Season Precip. (in.)		6.99	5.32	10.30	9.23	12.45	8.86										
6/ Soil PAW (in.) to SD at @plant		7.59	10.96	10.15	6.64	5.76	8.22										
Total Plant Avail. Water (in.)		14.58	16.28	20.45	15.87	18.21	17.08										
Soil NO3 (lbs.) to SD @Plant.		144.0	266.0	76.0	96.0	112.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		78.0	0.0	70.0	70.0	55.0											
(#P2O5)		36.0	0.0	40.0	40.0	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/ 5-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 = 5-yr. average of yield or test weight for the check variety Fortuna.

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

5/ Seeding to 14 days prior to harvest maturity.

6/ Soil PAW values are actual gravimetric measurements.

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TABLE 13. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE HAROLD SOLBERG FARM, DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WA 6920	PENAWAWA (soft white)	32.41	72.20	59.40	9.80
CI 17904	OWENS (soft white)	32.59	65.90	58.30	9.10
MT 8849	RS6880/MT7819	35.13	65.53	60.60	11.39
ND 606	AMIDON	38.07	63.10	60.77	12.32
CI 17790	LEN	33.77	62.17	59.47	12.10
ND 626	GRANDIN	35.51	62.10	61.47	11.58
CI 17430	NEWANA	30.88	61.07	60.00	9.89
C982-324	RAMBO	32.83	61.03	59.63	10.95
CI 17828	PONDERA	32.32	60.93	61.87	11.49
PI483235	GLENMAN	33.49	57.87	58.57	11.89
ND 582	STOA	38.95	57.73	60.40	11.13
MT 8402	HI-LINE	30.84	56.67	60.73	12.09
ND 618	GUS	35.28	56.37	60.30	12.50
WPB 926	WESTBRED 926	30.42	55.90	60.17	12.31
CI 15930	OLAF	34.07	55.40	60.30	11.68
CI 17429	LEW	38.53	53.73	60.90	12.86
NDCUT	CUTLESS	34.42	50.60	60.53	11.95
PI486139	KLASIC (hard white)	23.75	48.10	59.17	11.63
CI 13596	FORTUNA	39.53	45.77	61.10	12.10
CANLANC	LANCER	41.23	45.37	61.00	12.54
EXPERIMENTAL MEANS		34.20	57.88	60.23	11.57
C.V. 2: (S OF MEAN/MEAN)*100		2.40	3.25	.55	-
LSD (0.05)		2.35	5.38	.95	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/12/93
Harvest Date: 09/17/93
Seeding Depth: 1.50 in.
Soil Series: Phillips-Elloam
Previous Crop: Fallow
Soil Temp @ Sdg: 82F @ 2in., 66F @ 4in.
Root Penetration Depth: 42.0 in.
Depth to Moisture at Sdg: 0.25 in.
Probed Moist.Depth @ Sdg: 48.0 in.
Herbicide:
Initial Stored Soil Water at Seeding: 8.05 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.48 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 10.53 in. (39 precipitation days)
Total - all events >.1 inches: 9.37 in. (19 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .42 in. (4 precipitation days)
Total - all events >.1 inches: .34 in. (1 precipitation day)
Adj'd Residual Soil Water @ (HM-14d): 5.06 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)= 116 , P(ppm olsen)= 20 , K(ppm)= 323 , pH= 7.7, O.M.(%) = 1.2
Fertilizer: 62#N,35#P2O5/ac via gran.blend banded 1.5 in. below seed @ planting
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 20 , P(ppm olsen)= 15 , K(ppm)= 344 , pH= 7.9, O.M.(%) = 1.4

TABLE 14. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE HAROLD SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1984-1993.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE) 1989	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF FORTUNA YIELD 7/	TEST WEIGHT (POUNDS PER BUSHEL) 1989	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF FORTUNA TEST WT 7/
ND 626 GRANDIN	3	-	26.3	18.1	-	62.1	35.5	32.2	133.5	-	58.1	56.0	-	61.5	58.5	58.5	99.1
WA 6920 PENAWAWA (sft wht)	4	34.7	11.5	27.8	-	72.2	36.6	31.5	130.6	57.1	58.0	56.2	-	59.4	57.7	57.4	97.1
ND 618 GUS	3	-	27.7	19.4	-	56.4	34.5	31.3	129.7	-	59.0	56.9	-	60.3	58.7	58.8	99.5
WPB 926R WESTBRED 926R(P+)	3	-	17.0	27.6	-	55.9	33.5	30.4	125.9	-	58.9	56.3	-	60.2	58.5	58.5	99.0
MT 7819 GLENMAN	9	40.7	22.3	24.2	-	57.9	30.2	30.2	125.0	57.5	58.3	56.3	-	58.6	57.0	57.0	96.4
C982-324 RAMBO(P+)	6	35.8	20.2	23.0	-	61.0	33.5	29.8	123.5	59.2	59.6	57.8	-	59.6	59.7	59.3	100.3
ND 606 AMIDON	4	31.5	18.2	24.0	-	63.1	34.2	29.5	122.1	58.7	57.2	56.7	-	60.8	58.3	58.1	98.3
CI 17904 OWENS (soft white)	9	34.3	18.1	20.3	-	65.9	29.4	29.4	121.9	56.1	57.7	53.7	-	58.3	57.1	57.1	96.6
CI 17430 NEWANA	9	32.4	22.7	23.1	-	61.1	28.5	28.5	118.2	58.1	59.3	58.0	-	60.0	59.1	59.1	100.1
CI 17790 LEN	7	33.5	16.6	19.0	-	62.2	32.2	28.5	118.0	56.7	56.9	55.2	-	59.5	57.8	57.2	96.8
CI 17828 PONDERA	9	37.2	15.4	21.5	-	60.9	28.0	28.0	115.9	58.1	59.1	56.8	-	61.9	59.0	59.0	99.8
ND 582 STOA	9	38.2	23.4	17.4	-	57.7	27.9	27.9	115.4	57.1	57.5	54.3	-	60.4	58.0	58.0	98.1
MT 8402 HI-LINE	5	34.8	15.3	22.0	-	56.7	29.8	26.6	110.4	56.4	57.9	56.0	-	60.7	58.4	57.8	97.8
ND CUT CUTLESS	6	36.2	11.1	21.8	-	50.6	29.9	26.5	110.0	59.0	58.0	57.7	-	60.5	59.1	58.7	99.4
CI 17429 LEW	9	32.8	14.8	21.5	-	53.7	25.8	25.8	106.9	59.5	58.6	57.4	-	60.9	58.6	58.6	99.2
WPB 906R WESTBRED 906R(P+)	4	35.2	19.9	-	-	-	25.5	25.5	105.8	56.1	58.9	-	-	-	58.9	57.8	97.9
CI 15930 OLAF	7	32.0	17.3	20.4	-	55.4	28.1	24.9	103.1	58.3	57.5	55.9	-	60.3	58.7	58.0	98.2
CI 13596 FORTUNA	9	32.2	13.3	20.7	-	45.8	24.1	24.1	100.0	60.3	58.6	57.5	-	61.1	59.1	59.1	100.0
CI 17920 MARSHALL (+)	5	33.6	-	-	-	-	25.3	24.0	99.5	56.3	-	-	-	-	57.8	56.7	95.9
CI 17910 ALEX	6	32.7	17.3	-	-	-	22.3	23.9	99.1	59.6	58.3	-	-	-	59.5	59.6	100.8
CANLANC LANCER	5	31.4	17.5	19.4	-	45.4	26.5	23.7	98.2	58.9	57.8	57.9	-	61.0	59.2	58.6	99.2
MEAN (ENTRIES LISTED)		34.4	18.3	21.7	-	58.0	-	27.7	-	57.9	58.3	56.5	-	60.3	-	51.6	-
8/ Growing Season Precip. (in.)		4.35	5.50	12.50	0.0	10.53	6.45										
9/ Soil PAW (in.) to SD @Plntng.		8.02	10.71	7.60	0.0	8.05	8.60										
Total Plant Avail. Water (in.)		12.37	16.21	20.10	0.0	18.58	15.04										
Soil NO3 (lbs.) to SD @Plntng.		72.0	184.0	128.0	0.0	116.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	0.0	48.0											
Fertilizer Applied (# N)		70.0	47.0	70.0	0.0	62.0											
(# P2O5)		0.0	21.0	40.0	0.0	35.0											

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 Portuna 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. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
NS 78054	BARONESSE	99.30	23.07	93.27	48.37	94.20	2.40	10.30
CI 15229	STEPTOE	100.00	21.42	88.67	41.57	92.30	3.00	10.72
MT890008	MT890008	97.20	24.16	84.83	48.07	93.90	2.50	9.96
SK 76333	HARRINGTON	97.23	24.80	83.83	48.47	90.70	3.70	10.22
MT860756	MT860756	99.30	22.19	83.60	49.87	93.30	3.10	10.46
MT851195	MT851195	98.60	23.91	81.53	48.13	91.20	4.20	10.95
ND 9866	STARK	97.90	25.50	80.87	49.17	94.60	2.20	11.31
MT851032	MT851032	98.60	23.65	80.00	49.73	94.90	2.00	10.75
MT 81161	MT 81161	97.23	23.75	78.03	47.37	92.30	4.10	11.20
PI531228	BEARPAW	98.60	23.81	77.83	49.47	93.20	3.00	10.49
PI483237	BOWMAN	97.90	24.53	75.90	48.77	95.70	1.70	11.77
PI537967	COLTER	97.20	23.70	73.23	41.60	78.70	7.90	10.10
CI 15514	HECTOR	99.30	24.42	72.43	48.87	94.10	2.50	10.85
CI 9558	PIROLINE	98.60	24.49	69.73	49.27	89.90	3.40	10.97
PI491534	GALLATIN	100.00	23.36	69.20	49.03	93.90	2.40	10.20
CI 15857	CLARK	95.13	24.49	69.03	48.83	94.10	2.70	10.50
MT140523	MT140523	99.30	23.19	68.97	48.43	88.10	5.30	11.14
CI 15856	LEWIS	94.47	22.45	53.90	50.20	95.40	1.90	10.49
EXPERIMENTAL MEANS		98.10	23.72	76.94	48.07	92.25	3.22	10.69
C.V. 2: (S OF MEAN/MEAN)*100		1.13	4.26	6.42	.44	-	-	-
LSD (0.05)		3.20	2.90	14.19	.61	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/28/93
Harvest Date: 09/28/93
Seeding Depth: 2.00 in.
Soil Texture: Sandy Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 47F @ 2in., 42F @ 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-DAm+BanSGF @.5+.06#ai/ac
Initial Stored Soil Water at Seeding: 7.24 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.09 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 9.60 in. (49 precipitation days)
Total - all events >.1 inches: 8.45 in. (20 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: 1.07 in. (5 precipitation days)
Total - all events >.1 inches: 0.99 in. (3 precipitation days)
Adj'd Residual Soil Water @ (HM-14d): 4.02 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)= 12 , K(ppm)= 234 , pH= 6.5, O.M.(%) = 0.9
Fertilizer: 62#N,35#P2O5/ac via gran.blend banded 1.5 in. below seed @ planting
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 26 , P(ppm olsen)= 8 , K(ppm)= 231 , pH= 6.8, O.M.(%) = 0.9

TABLE 16. SEVEN-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. 1987-1993.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1989	1990	1991 3/	1992	1993	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	TEST WEIGHT (POUNDS PER BUSHEL) 1989	1990	1991 3/	1992	1993	AVERAGE FOR YEARS TESTED	7-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF PIROLINE TEST WT 5/
NS 78054 BARONESSE	3	-	-	30.5	82.1	93.3	68.6	57.5	128.8	-	-	46.2	48.8	48.4	47.8	48.3	97.5
ND 9866 STARK	4	-	42.4	44.9	63.2	80.9	57.8	54.7	122.6	-	49.4	49.5	50.7	49.2	49.7	50.3	101.5
CI 15229 STEPTOE	7	52.2	37.9	57.8	71.2	88.7	52.9	52.9	118.5	43.9	43.2	40.1	43.7	41.6	43.4	43.4	87.5
PI483237 BOWMAN	7	46.7	41.1	50.3	64.3	75.9	50.6	50.6	113.4	49.1	48.3	51.4	50.6	48.8	50.1	50.1	101.2
PI491534 GALLATIN	7	53.5	37.9	32.5	69.7	69.2	50.4	50.4	112.8	49.7	48.5	48.1	49.6	49.0	49.8	49.8	100.4
PI531228 BEARPAW	7	56.4	29.6	36.6	59.5	77.8	49.8	49.8	111.6	47.6	47.3	45.3	47.0	49.5	48.1	48.1	97.1
MT140523 MT140523	6	51.7	45.2	37.9	66.9	69.0	51.5	49.8	111.5	48.6	48.5	44.6	48.7	48.4	48.6	48.6	98.1
CI 15514 HECTOR	7	48.5	38.5	31.8	66.6	72.4	49.5	49.5	110.8	49.5	47.6	47.3	48.8	48.9	49.3	49.3	99.5
MT 81161 MT 81161	5	53.1	-	-	60.3	78.0	54.5	48.5	108.6	50.0	-	-	46.3	47.4	48.7	48.0	96.9
CI 15856 LEWIS	7	52.5	38.3	43.7	64.6	53.9	48.3	48.3	108.2	49.7	48.5	48.2	49.2	50.2	49.9	49.9	100.8
CI 15857 CLARK	7	51.9	36.8	36.0	58.3	69.0	47.9	47.9	107.4	47.8	46.9	45.2	47.5	48.8	48.2	48.2	97.2
SK 76333 HARRINGTON	7	44.6	19.3	34.2	66.3	83.8	46.4	46.4	104.0	47.9	47.2	44.3	47.7	48.5	48.0	48.0	96.8
CI 9558 PIROLINE	7	52.2	28.9	32.4	57.7	69.7	44.6	44.6	100.0	48.5	48.7	46.9	50.9	49.3	49.6	49.6	100.0
MEANS (ENTRIES LISTED)		51.2	36.0	39.1	65.4	75.5	-	50.1	-	48.4	47.6	46.4	48.4	48.3	-	48.6	-
6/ Growing Season Precip. (in.)		6.84	8.07	9.86	7.53	9.60	7.71										
7/ Soil PAW (in.) to SD at @Plnt		4.86	7.97	6.56	5.52	7.24	6.67										
Total Plant Avail. Water (in.)		11.70	16.04	16.42	13.05	16.84	14.38										
Soil NO3 (lbs.) to SD @Plntng.		52.00	120.0	100.0	112.0	52.0											
SD (Sampling Depth in inches)		48.00	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.00	62.0	70.0	70.0	62.0											
(# P2O5)		0.00	45.0	40.0	40.0	35.0											

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/ 7-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 = 7-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. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
NS 78054	BARONESSE	96.53	27.51	117.90	51.53	98.20	.70	11.34
PI537967	COLTER	93.77	31.01	113.77	43.60	85.20	6.00	10.13
CI 15229	STEPTOE	97.57	30.24	113.30	43.83	95.10	1.70	10.75
MT140523	MT140523	98.60	30.12	111.57	51.33	96.00	1.30	11.76
CI 15856	LEWIS	99.30	31.44	109.70	53.17	97.80	.80	11.62
CI 9558	PIROLINE	100.00	33.48	109.13	51.50	96.00	1.60	11.79
MT 81161	MT 81161	96.17	30.91	105.97	50.33	96.30	1.10	11.76
PI483237	BOWMAN	97.57	32.36	104.80	49.10	96.30	2.40	11.69
MT890008	MT890008	96.53	30.26	104.03	48.40	96.20	2.40	11.32
ND 9866	STARK	93.07	31.75	103.97	49.57	95.70	2.60	11.42
PI531228	BEARPAW	95.50	33.83	103.30	50.53	95.60	1.60	11.04
CI 15514	HECTOR	96.20	34.28	102.53	51.03	96.50	1.30	11.72
SK 76333	HARRINGTON	97.90	31.15	102.03	50.77	97.10	1.00	11.05
PI491534	GALLATIN	98.60	31.39	101.53	51.60	95.90	1.90	11.18
MT860756	MT860756	96.20	30.83	101.07	51.40	97.80	1.00	11.51
MT851195	MT851195	97.93	28.19	99.37	48.93	95.90	2.10	11.85
MT851032	MT851032	97.90	31.72	97.90	50.53	97.50	1.00	11.22
CI 15857	CLARK	96.17	32.10	92.67	50.93	96.00	1.60	11.47
EXPERIMENTAL MEANS		96.97	31.25	105.25	49.89	95.83	1.78	11.37
C.V. 2: (S OF MEAN/MEAN)*100		1.95	3.32	3.28	.86	-	-	-
LSD (0.05)		5.44	2.99	9.93	1.23	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/29/93
Harvest Date: 08/21/93
Seeding Depth: 2.00 in.
Soil Series: Assinniboine variant
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 65F @ 2in., 60F @ 4in.
Root Penetration Depth: 39.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 48.0 in.
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 6.29 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.79 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 10.65 in. (30 precipitation days)
Total - all events >.1 inches: 10.55 in. (29 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .90 in. (2 precipitation days)
Total - all events >.1 inches: .90 in. (2 precipitation days)
Adj'd Residual Soil Water @ (HM-14d): 2.89 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)= 158 , P(ppm olsen)= 30 , K(ppm)= 306 , pH= 6.8, O.M.(%) = 0.8
Fertilizer: 55#N,22#P2O5 via NH3 + 11-52-0 injected in separate op'ns fall 1992
Harvest 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)= 312 , pH= 6.6, O.M.(%) = 0.9

TABLE 18. SIX-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. 1988-1993.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE) 1989	1990	1991 3/	1992 4/	1993	AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE YIELD 5/	PERCENT OF PIROLINE YIELD 6/	TEST WEIGHT (POUNDS PER BUSHEL) 1989	1990	1991 3/	1992 4/	1993	AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE TEST WT 5/	PERCENT OF PIROLINE TEST WT 6/
CI 15229 STEPTOE	6	67.6	55.4	56.9	30.2	113.3	57.0	57.0	105.2	41.3	43.0	47.1	39.8	43.8	43.3	43.3	89.2
MT140523 MT 140523	6	72.4	57.6	42.7	21.3	111.6	54.5	54.5	100.6	46.2	48.2	53.8	40.9	51.3	48.6	48.6	100.1
CI 9558 PIROLINE	6	67.2	60.3	43.2	25.6	109.1	54.2	54.2	100.0	44.3	48.7	52.9	44.4	51.5	48.5	48.5	100.0
CI 15856 LEWIS	6	67.6	58.3	40.2	23.6	109.7	53.5	53.5	98.7	45.6	48.4	54.2	41.8	53.2	49.1	49.1	101.1
MT 81161 MT 81161	4	67.9	-	-	25.1	106.0	54.7	53.5	98.6	43.1	-	-	39.9	50.3	45.7	46.8	96.4
PI531228 BEARPAW	6	72.9	63.9	31.7	24.5	103.3	53.4	53.4	98.4	40.6	47.2	53.1	40.6	50.5	46.9	46.9	96.6
PI491534 GALLATIN	6	72.9	60.7	32.3	23.3	101.5	52.2	52.2	96.3	45.9	48.0	53.3	42.8	51.6	48.7	48.7	100.4
NS 78054 BARONESSE	3	-	-	22.5	27.3	117.9	55.9	51.1	94.2	-	-	50.6	41.7	51.5	47.9	47.1	97.0
PI483237 BOWMAN	6	63.5	54.8	39.5	22.0	104.8	50.8	50.8	93.6	45.8	48.0	54.6	42.5	49.1	48.5	48.5	100.0
CI 15514 HECTOR	6	64.5	59.5	28.4	21.5	102.5	49.5	49.5	91.2	47.2	49.0	52.5	41.3	51.0	48.6	49.2	101.4
SK 76333 HARRINGTON	6	56.0	61.4	33.0	25.4	102.0	49.3	49.3	90.8	44.0	47.6	53.8	40.7	50.8	47.7	48.3	99.5
ND 9866 STARK	4	-	50.5	31.8	26.5	104.0	53.2	48.5	89.3	-	48.8	53.6	42.4	49.6	48.6	47.8	98.4
CI 15857 CLARK	6	64.7	57.0	30.8	23.3	92.7	48.1	48.1	88.7	45.0	46.6	52.6	39.3	50.9	47.4	48.0	98.9
MEANS (ENTRIES LISTED)		67.0	58.1	36.1	24.6	106.0		52.0		44.5	47.6	52.7	41.4	50.4		47.8	
7/ Growing Season Precip. (in.)		8.77	6.90	8.45	8.25	10.65	7.75										
8/ Soil PAW (in.) to SD at Plt.		6.38	10.23	8.47	6.14	6.29	7.29										
Total Plant Avail. Water (in.)		15.15	17.13	16.92	14.39	16.94	15.05										
Soil NO3 (lbs.) to SD at Plt.		192.0	160.0	128.0	200.0	158.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		51.0	48.0	50.0	50.0	55.0											
(#P2O5)		28.0	21.0	21.0	24.0	22.0											
(#K2O)		9.0	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/ 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.

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.

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TABLE 19. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
MT890008	MT890008	56.93	32.64	129.27	39.07	86.70	6.50	11.32
PI483237	BOWMAN	44.43	31.55	115.83	42.77	90.20	4.00	11.85
NS 78054	BARONESSE	82.63	28.96	112.10	43.83	88.50	6.40	11.03
ND 9866	STARK	54.87	31.94	108.40	42.13	86.70	6.20	11.75
MT 81161	MT 81161	59.03	29.40	107.17	45.17	90.30	4.50	11.48
MT140523	MT140523	61.83	31.85	106.80	42.70	77.60	12.00	11.54
PI537967	COLTER	66.70	28.75	106.53	37.77	72.20	13.00	10.36
CI 9558	PIROLINE	78.50	32.66	104.70	45.13	87.60	6.00	11.43
MT851032	MT851032	56.93	32.48	103.97	43.53	88.00	5.50	11.66
MT851195	MT851195	69.47	29.99	102.13	42.80	85.30	7.30	11.38
PI531228	BEARPAW	54.17	32.22	100.87	43.63	81.90	8.90	11.57
CI 15857	CLARK	51.37	32.41	100.33	43.27	87.50	6.00	11.56
SK 76333	HARRINGTON	70.13	32.02	100.13	43.63	85.10	7.80	11.27
MT860756	MT860756	64.60	29.86	99.97	42.80	88.40	5.70	11.24
PI491534	GALLATIN	75.67	29.25	98.03	44.13	86.30	6.10	10.98
CI 15856	LEWIS	67.33	31.69	97.90	44.60	84.40	6.80	11.61
CI 15514	HECTOR	59.03	32.09	95.30	43.30	85.00	7.50	11.63
CI 15229	STEPTOE	82.60	27.80	94.57	36.80	83.30	7.50	10.91
EXPERIMENTAL MEANS		64.24	30.98	104.67	42.61	85.28	7.09	11.37
C.V. 2: (S OF MEAN/MEAN)*100		7.70	3.93	7.70	.97	-	-	-
LSD (0.05)		14.22	3.50	23.16	1.19	-	-	-

Note: Stand was poor, and the site suffered moderate hail damage late June.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/06/93
Harvest Date: 09/18/93
Seeding Depth: 1.75 in.
Soil Series: Telstad
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 72F @ 2in., 64F @ 4in.
Root Penetration Depth: 42.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 6.75 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 4.20 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 13.03 in. (33 precipitation days)
Total - all events >.1 inches: 12.62 in. (25 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .50 in. (2 precipitation days)
Total - all events >.1 inches: .45 in. (1 precipitation day)
Adj'd Residual Soil Water @ (HM-14d): 3.70 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)= 162 , P(ppm olsen)= 20 , K(ppm)= 303 , pH= 7.3, O.M.(%) = 0.8
Fertilizer: 70.5#N,25#P2O5,10#K2O/ac via NH3+granular blend injected 09/08/92
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 32 , P(ppm olsen)= 14 , K(ppm)= 321 , pH= 6.7, O.M.(%) = 0.7

TABLE 20. TWELVE-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. 1982-1993.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1989	1990	1991 4/	1992 5/	1993 6/	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE YIELD 7/	PERCENT OF PIROLINE YIELD 8/	1989	1990	1991 4/	1992 5/	1993 6/	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE TEST WT 7/	PERCENT OF PIROLINE TEST WT 8/
MT140523 MT140523	5	51.1	38.4	26.2	-	106.8	53.5	59.0	111.0	47.5	49.1	48.2	-	42.7	47.3	48.6	100.4
CI 15229 STEPTOE	8	45.0	43.2	34.7	-	94.6	52.0	57.1	107.4	38.7	42.9	40.0	-	36.8	40.5	40.8	84.3
PI483237 BOWMAN	8	48.9	38.1	25.9	-	115.8	52.1	57.1	107.4	47.3	48.7	51.6	-	42.8	48.0	48.4	99.9
CI 15856 LEWIS	10	44.7	34.5	19.4	-	97.9	52.8	55.5	104.5	47.7	50.3	47.2	-	44.6	48.9	49.5	102.2
PI531228 BEARPAW	7	43.6	33.0	16.8	-	100.9	55.4	55.1	103.8	45.6	48.9	42.3	-	43.6	46.7	47.1	97.3
PI491534 GALLATIN	9	50.8	37.7	19.4	-	98.0	48.6	54.7	102.9	47.2	50.5	47.4	-	44.1	48.9	50.4	104.0
CI 15857 CLARK	11	43.4	33.2	19.8	-	100.3	54.0	54.0	101.7	44.8	47.8	45.0	-	43.3	47.4	47.4	97.9
ND 9866 STARK	3	-	35.4	18.9	-	108.4	54.3	53.3	100.4	-	50.8	48.6	-	42.1	47.2	48.8	100.9
CI 9558 PIROLINE	11	41.5	38.2	19.3	-	104.7	53.1	53.1	100.0	43.8	49.9	45.7	-	45.1	48.4	48.4	100.0
CI 15514 HECTOR	11	54.9	38.5	19.9	-	95.3	51.9	51.9	97.7	47.3	49.8	46.6	-	43.3	49.7	49.7	102.7
SK 76333 HARRINGTON	11	39.5	27.0	18.1	-	100.1	51.3	51.3	96.5	45.7	48.9	42.8	-	43.6	47.4	47.4	97.9
MT 81161 MT 81161	4	49.0	-	-	-	107.2	59.1	51.0	96.0	43.3	-	-	-	45.2	45.8	47.2	97.4
CI 15687 KIMBERLY	3	-	-	-	-	-	51.7	48.5	91.3	-	-	-	-	-	49.8	47.8	98.7
ND 5569 HAZEN	4	-	-	-	-	-	34.6	41.0	77.2	-	-	-	-	-	45.4	45.7	94.4
MEANS (ENTRIES LISTED)		46.6	36.1	21.7	-	102.5	-	53.1	-	45.4	48.9	46.0	-	43.1	-	47.7	-
9/ Growing Season Precip. (in.)		5.49	4.87	8.84	4.55	13.03	6.53										
10/ Soil PAW (in.) to SD @Pltng.		7.14	8.67	6.69	5.67	6.75	8.20										
Total Plant Avail. Water (in.)		12.63	13.54	15.53	10.22	19.78	14.73										
Soil NO3 (lbs.) to SD @Pltng.		120.0	196.0	140.0	198.0	162.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		70.0	50.0	65.0	42.0	70.5											
(# P2O5)		0.0	25.0	25.0	25.0	25.0											
(# K2O)		0.0	10.0	10.0	10.0	10.0											
(# 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/ 12-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 = 12-yr. average yield or test weight for the check variety Piroline.

8/ Percent of Piroline yield or 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/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

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TABLE 21. EVALUATION OF DRYLAND FALLOW GRAIN AND RESIDUE PERFORMANCE OF EIGHTEEN SPRING BARLEY CULTIVARS GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

				1/				2/	3/	
ID	VARIETY or SEL'N	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %	RESIDUE Lbs/Ac	RESIDUE Lbs/Bu
NS 78054	BARONESSE	100.00	34.53	90.53	49.40	95.00	1.90	11.55	4878.53	49.40
CI 15229	STEPTOE	100.00	34.66	90.40	59.83	92.60	3.70	11.22	3546.87	37.17
PI483237	BOWMAN	100.00	34.65	89.37	49.37	94.90	2.40	12.24	3604.47	54.33
MT890008	MT890008	100.00	38.43	87.03	48.57	95.70	2.00	11.07	4744.07	53.60
MT140523	MT140523	98.53	36.76	86.37	51.30	95.30	1.70	11.69	4486.93	51.50
CI 15856	LEWIS	100.00	38.65	84.63	52.03	95.10	2.30	11.54	4240.40	57.77
SK 76333	HARRINGTON	99.27	37.60	84.17	49.43	91.60	3.50	11.78	4450.63	51.93
PI537967	COLTER	100.00	33.32	83.80	43.77	83.00	6.30	10.91	3871.23	45.93
CI 9558	PIROLINE	100.00	37.95	83.37	51.27	92.80	2.50	11.86	4881.73	55.73
MT860756	MT860756	98.53	36.29	83.27	51.57	97.00	1.00	10.81	4687.53	56.70
MT851195	MT851195	100.00	36.59	82.10	50.37	95.40	1.90	12.06	4882.77	51.00
MT 81161	MT 81161	99.27	36.30	79.57	50.17	96.10	2.10	11.78	3968.33	46.50
MT851032	MT851032	100.00	34.44	77.70	50.67	95.30	1.40	11.19	3976.87	56.07
PI491534	GALLATIN	100.00	37.03	75.97	50.80	92.80	4.10	11.35	5053.53	66.53
CI 15514	HECTOR	100.00	36.71	75.37	50.27	93.90	2.70	12.02	3869.10	59.67
CI 15857	CLARK	98.53	35.13	73.90	50.10	93.00	2.80	11.67	4094.27	54.73
PI531228	BEARPAW	99.27	39.57	73.00	50.10	90.50	3.70	10.90	5415.27	59.00
ND 9866	STARK	99.27	39.50	71.80	50.47	96.30	1.80	11.69	4348.20	65.00
EXPERIMENTAL MEANS		99.59	36.56	81.80	50.53	93.68	2.66	11.52	4388.93	54.03
C.V.2:(S OF MEAN/MEAN)*100		.45	3.91	5.52	7.76	-	-	-	9.10	4.67
LSD (0.05)		1.28	4.10	12.97	11.27	-	-	-	1147.43	7.25

1/ Via 45 sqft harvest w/plot combine (as precision was > than w/3' hand harvest)
2/ Via 3 sqft harvest w/hand clipper (incl all above-surf dry matter less grain)
3/ Via 3 sqft hand harvest for residue and grain.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/11/93
Harvest Date: 10/04/93
Seeding Depth: 1.25 in.
Soil Series: Joplin-Hillon CL
Previous Crop: Fallow
Soil Temp @ Sdg: 75F @ 2in., 64F @ 4in.
Root Penetration Depth: 48.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 5.76 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 6.62 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 12.45 in. (51 precipitation days)
Total - all events >.1 inches: 11.68 in. (33 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .08 in. (1 precipitation day)
Total - all events >.1 inches: .00 in.
Adj'd Residual Soil Water @ (HM-14d): 6.54 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)= 26 , K(ppm)= 296 , pH= 7.2, O.M.(%) = 1.4
Fertilizer: 55#N via 46-0-0 commercial topdress 05/01/93 prior to initial anal.
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 36 , P(ppm olsen)= 19 , K(ppm)= 387 , pH= 7.4, O.M.(%) = 1.5

TABLE 22. FIVE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1989-1993.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1989	1990	1991	1992 3/	1993	AVERAGE FOR YEARS TESTED	5-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	1989	1990	1991	1992 3/	1993	AVERAGE FOR YEARS TESTED	5-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF PIROLINE TEST WT 5/
CI 15229 STEPTOE	5	50.7	56.5	67.7	60.2	90.4	65.1	65.1	109.8	43.0	43.6	44.4	42.8	59.8	46.7	46.7	94.3
MT 81161 MT 81161	3	58.9	-	-	71.5	79.6	70.0	64.7	109.2	46.2	-	-	48.6	50.2	48.3	48.1	97.0
MT140523 MT 140523	5	55.9	55.9	55.4	68.9	86.4	64.5	64.5	108.8	48.3	50.4	46.7	48.7	51.3	49.1	49.1	99.1
PI491534 GALLATIN	5	58.8	55.0	52.4	74.7	76.0	63.4	63.4	106.9	49.6	50.3	49.4	49.8	50.8	50.0	50.0	100.9
NS 78054 BARONESSE	3	-	-	41.9	71.2	90.5	67.9	62.8	105.9	-	-	44.7	48.2	49.4	47.4	47.4	95.7
PI483237 BOWMAN	5	51.4	57.0	50.5	63.6	89.4	62.4	62.4	105.2	49.6	50.3	50.6	47.6	49.4	49.5	49.5	99.9
CI 15856 LEWIS	5	54.9	51.7	50.8	64.5	84.6	61.3	61.3	103.4	49.4	50.9	48.0	49.2	52.0	49.9	49.9	100.7
MT 81616 BEARPAW	5	55.2	52.1	50.5	67.6	73.0	59.7	59.7	100.7	46.4	49.8	42.8	48.6	50.1	47.5	47.5	95.9
ND 9866 STARK	4	-	53.9	56.3	63.3	71.8	61.3	59.4	100.2	-	51.0	50.3	48.8	50.5	50.1	49.9	100.8
CI 9558 PIROLINE	5	51.5	53.0	50.8	57.7	83.4	59.3	59.3	100.0	48.7	50.3	48.0	49.5	51.3	49.5	49.5	100.0
CI 15514 HECTOR	5	54.0	56.8	47.9	61.5	75.4	59.1	59.1	99.7	49.6	49.5	47.3	49.4	50.3	49.2	49.2	99.3
SK 76333 HARRINGTON	5	45.9	50.9	34.1	64.5	84.2	55.9	55.9	94.3	48.8	49.8	41.2	48.1	49.4	47.5	47.5	95.8
CI 15857 CLARK	5	45.5	51.3	45.2	61.3	73.9	55.4	55.4	93.5	47.5	48.6	47.0	48.4	50.1	48.3	48.3	97.5
MEANS (ENTRIES LISTED)		53.0	54.0	50.3	65.4	81.4		61.0		47.9	49.5	46.7	48.3	51.1		48.7	
6/ Growing Season Precip. (in.)		6.99	5.32	10.02	9.23	12.45	8.80										
7/ Soil PAW (in.) to SD at Plt.		7.59	10.96	10.15	6.64	5.76	8.22										
Total Plant Avail. Water (in.)		14.58	16.28	20.17	15.87	18.21	17.02										
Soil NO3 (lbs.) to SD at Plt.		144.00	266.0	76.0	96.0	112.0											
SD (sampling depth in inches)		48.00	48.0	48.0	48.0	48.0											
Fertilizer Applied (#N)		78.00	0.0	70.0	70.0	55.0											
(#P2O5)		36.00	0.0	40.0	40.0	0.0											
(#K2O)		0.00	0.0	0.0	0.0	0.0											

Check variety is Piroline.

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

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

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

4/ 5-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 = 5-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 23. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE HAROLD SOLBERG FARM, DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
ND 9866	STARK	100.00	33.60	88.97	46.27	69.00	17.70	12.53
MT890008	MT890008	100.00	31.00	84.57	45.50	53.90	25.20	12.08
NS 78054	BARONESSE	100.00	30.14	83.77	42.87	52.00	24.60	12.43
PI537967	COLTER	100.00	30.21	82.07	42.00	63.40	18.70	10.61
CI 15229	STEPTOE	100.00	26.43	80.17	38.63	65.60	19.10	11.16
PI531228	BEARPAW	100.00	31.93	80.13	45.40	64.10	17.60	11.59
MT140523	MT140523	100.00	31.00	78.70	47.33	69.10	15.60	11.79
SK 76333	HARRINGTON	100.00	33.64	78.27	41.70	48.10	26.20	12.07
PI491534	GALLATIN	100.00	32.09	76.73	49.87	84.00	6.80	10.16
CI 9558	PIROLINE	100.00	31.18	76.30	48.27	69.00	14.20	11.43
CI 15856	LEWIS	100.00	31.65	76.23	49.97	74.00	12.00	11.30
MT851032	MT851032	100.00	32.85	75.37	44.77	62.40	18.70	11.94
MT860756	MT860756	100.00	31.01	74.43	47.97	75.80	12.70	10.90
CI 15514	HECTOR	100.00	33.71	73.20	48.00	71.30	14.50	11.70
MT851195	MT851195	100.00	31.67	71.67	44.60	51.40	26.10	13.12
PI483237	BOWMAN	100.00	30.85	71.17	47.50	90.10	4.60	11.47
MT 81161	MT 81161	98.97	31.76	69.73	46.70	63.00	21.00	12.03
CI 15857	CLARK	100.00	30.58	67.23	46.53	63.10	19.90	11.38
EXPERIMENTAL MEANS		99.94	31.40	77.15	45.77	66.07	17.51	11.65
C.V. 2: (S OF MEAN/MEAN)*100		.24	2.42	4.93	3.04	-	-	-
LSD (0.05)		.70	2.18	10.92	4.00	-	-	-

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/12/93
Harvest Date: 09/17/93
Seeding Depth: 1.50 in.
Soil Series: Phillips-Elloam
Previous Crop: Fallow
Soil Temp @ Sdg: 83F @ 2in., 74F @ 4in.
Root Penetration Depth: 36.0 in.
Depth to Moisture at Sdg: 0.25 in.
Probed Moist.Depth @ Sdg: 36.0 in.
Herbicide:
Initial Stored Soil Water at Seeding: 8.05 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 5.47 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
Total - all measurable events: 10.53 in. (39 precipitation days)
Total - all events >.1 inches: 9.37 in. (19 precipitation days)
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: .42 in. (4 precipitation days)
Total - all events >.1 inches: .34 in. (1 precipitation day)
Adj'd Residual Soil Water @ (HM-14d): 5.05 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)= 120 , P(ppm olsen)= 34 , K(ppm)= 314 , pH= 6.6, O.M.(%) = 1.0
Fertilizer: 62#N,35#P2O5/ac via gran.blend banded 1.5 in. below seed @ planting
Harvest Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 34 , P(ppm olsen)= 32 , K(ppm)= 394 , pH= 6.0, O.M.(%) = 1.3

TABLE 24. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE HAROLD SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1984-1993.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1989	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF PIROLINE YIELD 7/	1989	1990	1991 4/	1992 5/	1993	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF PIROLINE TEST WT 7/
ND 9866 STARK	3	-	51.5	17.1	-	89.0	52.5	46.7	121.8	-	49.7	46.6	-	46.3	47.5	47.2	99.2
CI 15229 STEPTOE	6	62.2	42.8	13.4	-	80.2	44.1	41.9	109.1	41.9	41.1	39.4	-	38.6	39.1	39.3	82.6
PI491534 GALLATIN	7	54.8	47.0	23.7	-	76.7	41.6	41.6	108.5	47.9	49.1	45.9	-	49.9	47.3	47.3	99.2
MT140523 MT140523	4	60.2	49.2	22.9	-	78.7	52.7	40.9	106.6	46.5	47.8	46.5	-	47.3	47.0	46.2	97.0
CI 15856 LEWIS	6	56.6	39.7	20.3	-	76.2	41.9	39.8	103.7	47.7	49.1	47.4	-	50.0	47.6	47.9	100.6
PI531228 BEARPAW	5	51.9	38.9	18.4	-	80.1	46.6	38.9	101.4	44.3	46.9	44.0	-	45.4	45.6	44.8	94.0
PI483237 BOWMAN	6	55.9	45.7	23.2	-	71.2	40.5	38.5	100.3	48.9	47.9	47.8	-	47.5	46.9	47.2	99.1
CI 9558 PIROLINE	7	68.5	33.6	19.5	-	76.3	38.4	38.4	100.0	50.3	48.4	47.2	-	48.3	47.6	47.6	100.0
CI 15514 HECTOR	7	71.6	39.8	18.4	-	73.2	37.8	37.8	98.5	47.9	48.1	45.0	-	48.0	46.5	46.5	97.7
MT 81161 MT 81161	3	59.3	-	-	-	69.7	57.9	37.7	98.4	44.3	-	-	-	46.7	30.8	29.9	62.8
PI483238 HAZEN	3	-	-	-	-	-	23.2	37.7	98.3	-	-	-	-	-	41.7	42.8	89.9
CI 15857 CLARK	7	48.3	37.3	19.6	-	67.2	37.0	37.0	96.5	44.6	46.1	44.2	-	46.5	45.0	45.0	94.6
SK 76333 HARRINGTON	7	51.7	27.5	19.4	-	78.3	34.6	34.6	90.2	45.7	47.2	44.8	-	41.7	45.6	45.6	95.7
MEAN (ENTRIES LISTED)		58.3	41.2	19.6	-	76.4	-	39.4	-	46.4	47.4	45.3	-	46.3	-	44.4	-
8/ Growing Season Precip. (in.)		8.02	5.50	13.00	0.0	10.53	6.50										
9/ Soil PAW (in.) to SD @Plntng.		8.02	10.71	7.60	0.0	8.05	8.60										
Total Plant Avail. Water (in.)		16.04	16.21	20.60	0.0	18.58	15.10										
Soil NO3 (lbs.) to SD @Plntng.		72.0	184.0	128.0	0.0	120.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	0.0	48.0											
Fertilizer Applied (# N)		70.0	47.0	70.0	0.0	62.0											
(# P2O5)		0.0	21.0	40.0	0.0	35.0											

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/ 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.

7/ Percent of Piroline 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 25. DRYLAND FALLOW MONTANA SPRING OAT VARIETY EVALUATION NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
NEWDAK	NEWDAK	100.00	43.41	150.67	30.20	15.05
CI 9297	APPALOOSA	100.00	45.07	142.23	28.00	14.59
DERBY	DERBY	100.00	49.38	140.00	32.13	14.91
CI 8263	CAYUSE	100.00	44.09	137.80	28.20	15.06
CI 9252	OTANA	100.00	48.50	135.33	31.93	15.46
CI467882	BORDER	100.00	43.06	131.80	26.60	15.27
PI548769	TROY	100.00	47.01	128.03	32.37	16.61
CI483126	MONIDA	100.00	47.53	125.70	28.23	14.62
CI 6611	PARK	100.00	51.40	124.73	29.37	15.89
OT 308	CALIBRE	100.00	48.20	121.63	31.53	15.06
ND820603	VALLEY	100.00	43.01	120.20	32.17	16.04
W 80474	RIEL	100.00	46.04	118.77	30.20	15.76
81AB5792	RIO GRANDE	100.00	36.81	117.47	29.83	15.24
82AB1142	AJAY	100.00	31.48	115.70	28.70	16.24
SD820045	SETTLER	100.00	42.74	115.00	32.90	16.89
CI 9401	OGLE	100.00	37.76	114.23	28.67	16.03
W 82056	ROBERT	100.00	43.50	110.47	28.30	14.77
HYTEST	HYTEST	100.00	43.78	96.00	32.90	18.39
EXPERIMENTAL MEANS		100.00	44.04	124.76	30.12	15.66
C.V. 2: (S OF MEAN/MEAN)*100		-	2.96	5.93	2.12	-
LSD (0.05)		-	3.75	21.27	1.83	-

Note: Site suffered moderate hail damage late June.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/06/93
Harvest Date: 08/12/93
Seeding Depth: 1.75 in.
Soil Series: Telstad
Previous Crop: Fallow after WW
Soil Temp @ Sdg: 72F @ 2in., 64F @ 4in.
Root Penetration Depth: 42.0 in.
Depth to Moisture at Sdg: 0.00 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 6.75 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 4.12 in. (sampling depth = 48 in.)
Growing Season Precipitation (Seeding to average binder harvest maturity):
Total - all measurable events: 10.70 in. (28 precipitation days)
Total - all events >.1 inches: 10.35 in. (21 precipitation days)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 162 , P(ppm olsen)= 20 , K(ppm)= 303 , pH= 7.3, O.M.(%) = 0.8
Fertilizer: 70.5#N,25#P2O5,10#K2O/ac via NH3+granular blend injected 09/08/92
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)= 14 , K(ppm)= 310 , pH= 6.6, O.M.(%) = 1.0

TABLE 26. TWELVE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW OAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1982-1993.

		1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1987	1988	1989	1990	1993	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF OTANA YIELD 5/	1987	1988	1989	1990	1993	AVERAGE FOR YEARS TESTED	12-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF OTANA TEST WT 5/
ID805807 74AB2608/CAYUS	3	99.8	65.2	66.0	-	-	77.0	96.4	136.0	37.3	38.7	29.9	-	-	35.3	34.6	98.6
ID75861 CAYUSE/OTANA	6	90.1	77.0	68.0	-	-	70.4	93.2	131.6	35.9	38.6	28.4	-	-	31.8	32.8	93.5
ID815792 74AB2608/CAYUS	3	102.5	58.5	65.8	-	-	75.6	84.2	118.8	36.8	38.0	28.3	-	-	34.4	33.7	96.0
CI 8263 CAYUSE	10	90.2	49.8	60.9	47.8	137.8	79.1	79.1	111.7	35.9	37.2	27.3	31.6	28.2	32.3	32.3	91.9
CI467882 BORDER	10	99.2	64.2	59.0	40.6	131.8	78.3	78.3	110.6	34.9	37.7	29.2	29.5	26.6	32.0	32.0	91.2
ID766843 K71299/3/OTANA	4	71.4	72.4	-	-	-	70.4	76.9	108.5	35.5	38.4	-	-	-	33.9	34.4	97.8
CI483126 MONIDA	10	83.0	67.6	53.9	43.5	125.7	75.7	75.7	106.9	35.3	39.1	32.7	31.7	28.2	33.3	33.3	94.9
ID768244 LODI/PARK	4	-	-	-	-	-	85.8	74.9	105.6	-	-	-	-	-	35.5	34.5	98.3
SD810109 TRUCKER	3	-	52.0	53.0	39.0	-	48.0	72.9	102.8	-	41.6	37.1	35.3	-	38.0	37.5	106.7
CI 9297 APPALOOSA	9	88.8	56.7	47.1	45.4	142.2	76.6	71.7	101.2	34.6	36.2	26.0	30.1	28.0	31.4	31.9	90.8
CI 9252 OTANA	10	72.7	54.6	42.6	42.9	135.3	70.9	70.9	100.0	35.5	39.7	32.2	35.0	31.9	35.1	35.1	100.0
OT 726 CASCADE	6	72.0	45.2	-	-	-	66.2	70.5	99.5	30.2	36.3	-	-	-	32.1	31.7	90.4
CI 6611 PARK	9	69.6	55.7	40.5	37.6	124.7	64.6	66.4	93.7	32.6	37.9	31.9	30.8	29.4	32.0	32.4	92.3
W 82056 ROBERT	4	-	51.9	49.3	36.6	110.5	62.1	63.9	90.1	-	37.3	33.4	33.0	28.3	33.0	33.4	95.1
ND 1001 STEELE	3	53.3	-	-	-	-	58.5	60.8	85.8	29.4	-	-	-	-	31.5	33.4	95.0
MEAN (ENTRIES LISTED)		82.7	59.3	55.1	41.7	129.7	-	75.7	-	34.5	38.2	30.6	32.1	11.8	-	33.5	-
6/ Growing Season Precip. (in.)		2.49	3.24	5.49	4.87	10.70	5.42										
7/ Soil PAW (in.) to SD @Pltng.		9.66	9.76	5.53	8.67	6.75	7.77										
Total Plant Avail. Water (in.)		12.15	13.00	11.02	13.54	17.45	13.19										
Soil NO3 (lbs.) to SD @Pltng.		92.0	90.0	160.0	196.0	162.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		50.0	13.5	70.0	50.0	70.5											
(# P2O5)		40.0	34.5	0.0	25.0	25.0											
(# K2O)		20.0	0.0	0.0	10.0	10.0											
(# SO4)		10.0	0.0	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.
The 1991 nursery was damaged by hail.
The 1992 nursery was damaged by drought and hail.

4/ 12-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 = 12-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.

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TABLE 27. EVALUATION OF SELECTED DWARF OAT LINES AND STANDARD OAT CULTIVARS UNDER CONDITIONS OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. BLAINE COUNTY EXTENSION SERVICE, CHINOOK; and NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1993.

ID	VARIETY or SELECTION	STAND %	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
87AB5641	MONIDA/75Ab861	100.00	37.87	160.70	33.30	14.19
87AB4983	OGLE/BORDER	100.00	33.71	148.27	32.33	14.52
CI483126	MONIDA	100.00	35.77	146.87	33.63	14.11
86AB 664	OGLE/75Ab861	100.00	35.30	146.10	32.67	14.25
87AB6153	81Ab5772/OGLE	100.00	31.93	135.33	33.33	15.39
89AB4026	75Ab861/IL75-3402	100.00	30.28	131.13	33.57	15.03
82AB1178	74Ab1952/75Ab1576	100.00	36.13	130.07	31.83	14.30
CI 9252	OTANA	100.00	38.98	122.60	34.87	14.17
74AB2608	CAYUSE/OTANA	100.00	32.49	120.37	32.60	16.15
83AB3250	CAYUSE/MONIDA	100.00	30.29	119.53	30.13	15.19
86AB1867	81Ab5772/OGLE	100.00	31.46	99.30	31.70	16.05
82AB1142	AJAY	100.00	30.17	96.53	30.30	15.54
EXPERIMENTAL MEANS		100.00	33.70	129.73	32.52	14.91
C.V. 2: (S OF MEAN/MEAN)*100		-	6.98	9.18	2.74	-
LSD (0.05)		-	6.89	34.93	2.61	-

1/ Principal investigation by S.R. Williams, Blaine County Extension Service in cooperation with ARS-USDA, Aberdeen and NARC-MAES, Havre.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/28/93
Harvest Date: 08/23/93
Seeding Depth: 2.00 in.
Soil Texture: Sandy Clay Loam
Previous Crop: Fallow
Soil Temp @ Sdg: 53F @ 2in., 45F @ 4in.
Root Penetration Depth: N/A in.
Depth to Moisture at Sdg: 0.50 in.
Probed Moist.Depth @ Sdg: 55.0 in.+
Herbicide: 2,4-DAm+BanSGF @.5+.06#ai/ac
Initial Stored Soil Water at Seeding: 7.16 in. (sampling depth = 48 in.)
Growing Season Precipitation (Seeding to average binder harvest maturity):
Total - all measurable events: 8.81 in. (44 Precipitation Days)
Total - all events >.1 inches: 7.79 in. (18 Precipitation Days)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 130 , P(ppm olsen)= 14 , K(ppm)= 234 , pH= 6.3, O.M.(%) = 0.9
Fertilizer: 62#N,35#P2O5/ac via gran.blend banded 1.5 in. below seed @ planting