

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

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Individual Cooperating Landowners

OBJECTIVES:

Diverse cropping environments exist within that five-county area most closely served by this Research Center. Wheat 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 in 1982-1991 were included in respective previous reports, but summary yield and test weight data from past years are presented in abridged form for summary purposes here.

1992 cropping environments ranged from devastating to excellent across north-central Montana. At Havre, total annual growing season precipitation (9/1/91 - 8/31/92) was 13.50 inches or 113 percent of the average for years since 1916. April 1 through July 31 precipitation was 10.24 inches or 154 percent of the 76-year average. However, precipitation timing and other adverse climatic factors had pronounced effects on crop performance in 1992. The last spring and first fall frosts were 11 days late and 24 days early, respectively resulting in only 91 frost free days - 29 percent shorter than the 76-year average. September 1991 through May 1992 precipitation was only 3.11 inches or 46 percent of the long-term average. Precipitation March-May 1992 was 44 percent of normal at 1.46 inches. In addition to being dry, the early season was also warmer with March-May average temperature at 50.2F or 7.4 degrees warmer than average. Maximum summer temperature was recorded on June 10 at 98

degrees F. Crop outlook was poor at best with uneven germination and emergence until rain commenced in mid June and continued for the better part of 2 weeks. After that, frequent hail associated with high levels of precipitation plagued the general area for over a month. July precipitation at Havre totalled 7.27 inches equivalent to 516 percent of normal. A difficult cropping season was rounded out with snow the third week of August.

Off-station cropping environments were very diverse with some locations recording normal to well above normal yields and quality while others were adversely affected or totally lost to drought and/or severe hail.

Plant height, yield, test weight, and protein data for the Myers and Peterson dryland winter wheat trials conducted in 1992 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 1992 Cederberg and Graff dryland spring wheat trials are summarized in Tables 5 and 9, respectively. The Peterson location was lost to hail and the Myers and Solberg trials were lost to early drought. Multi-year yield and test weight summaries for selected entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 6, 7, 8, 10, and 11, respectively.

Plant height, yield, test weight, plump/thin and protein data for the current year Cederberg, Myers, and Graff spring barley trials are summarized in Tables 12, 14, and 17, respectively. Multi-year yield and test weight summaries for selected entries at the Cederberg, Myers, Peterson, Graff, and Solberg locations are presented in Tables 13, 15, 16, 18, and 19, respectively.

The 1992 dryland spring oat trial at the Peterson location was totally lost to hail, however a multi-year yield and test weight summary for selected entries at the Peterson location is presented in Table 20. Data from a special dryland dwarf oat trial grown in 1992 at the Cederberg location are presented in Table 21.

#### SUMMARY:

Fourteen 1992 off-station variety performance trials were conducted on fallow at five locations in five Northern Montana counties.

#### Dryland Winter Wheat Trials:

1. Myers Farms, Inc., Chouteau County (Big Sandy)
2. M & N Peterson Farm, Hill County (North Havre)

Dryland Spring Wheat Trials:

1. L. Cederberg Farm, Blaine County (Turner)
2. Myers Farms, Inc., Chouteau County (Big Sandy)
3. M & N Peterson Farm, Hill County (North Havre)
4. Graff Farms, Inc., Liberty County (North Joplin)
5. H. Solberg Farm, Phillips County (North Dodson)

Dryland Spring Barley Trials:

1. L. Cederberg Farm, Blaine County (Turner)
2. Myers Farms, Inc., Chouteau County (Big Sandy)
3. M & N Peterson Farm, Hill County (North Havre)
4. Graff Farms, Inc., Liberty County (North Joplin)
5. H. Solberg Farm, Phillips County (North Dodson)

Dryland Spring Oat Trials:

1. M & N Peterson Farm, Hill County (North Havre)
2. L. Cederberg Farm, Blaine County (Turner)

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 MWRMC in 1984, was used to harvest each 3-row plot after end-trimming to 16'. Prior to 1984, sixteen feet of the center row for each plot was harvested with a 'Suzue' single-row binder and threshed with a 'Vogel' thresher. Some 1991 plots were harvested via the former binder/thresher method due to breakdown of the Hege plot combine. Other variables specific to each individual trial are listed in the data tables.

FUTURE PLANS:

It is planned, budget allowing, to continue off-station cereal variety investigations in the five-county area. This work has been strongly supported by producers in the area and by the Northern Ag Research Center Advisory Committee. Budgets aside, current workload has dictated that the number of replicated off-station trial locations be held to five; and data processed by the Center will be limited to trials where the Center performs all functions from planting to harvest. Packaged seed can likely again be provided to County Extension Agents as per their needs for non-replicated demonstrations at any

additional locations. Such demonstrations will be for display and discussion use by the County Extension Agent; and performance data will not be collected or processed by the Research Center for any such demonstration plantings.

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

It is our current opinion that effort made to generate quality multi-year data at a few sites, carefully chosen to represent principal differences in average growing season conditions, is superior to an approach involving less concentrated work at greater numbers of locations. The concept of concentrating efforts at a single site representative of a vast area that yet differs from the Research Center has been on-going at the Peterson location in Northern Hill County.

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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. 1992.

ID	VARIETY OR SELECTION	PLNT HT YIELD TEST WT PROTEIN			
		Inches	Bu/Ac	Lbs/Bu	%
QT 542	QUANTUM 542	20.56	32.33	59.83	14.50
CI 17860	NEELEY	17.14	29.23	59.53	14.90
ID 279	BLIZZARD	19.16	27.67	61.10	15.40
PI491532	CREE	20.94	27.63	60.70	15.50
PI517194	TIBER	18.58	25.23	60.57	15.80
CI 17844	REDWIN	19.61	25.17	60.87	16.60
CI 13190	WARRIOR	19.21	24.30	60.10	15.90
CI 17879	ROCKY	18.86	24.27	59.83	14.90
ND 8002	SEWARD	19.62	24.07	59.50	14.30
CI 17952	HAWK	17.74	24.03	60.53	14.80
MT 8039	JUDITH	21.76	23.67	59.20	15.30
PI491533	NORWIN	15.14	23.10	60.37	15.10
CI 8885	CHEYENNE	20.59	23.10	60.53	16.20
RH78W296	BIGHORN	17.24	22.97	60.17	15.80
CI 15075	CENTURK	18.16	22.97	60.00	15.40
CI 17439	ROUGH RIDER	21.72	22.93	60.00	15.60
CI 17940	ARCHER	17.22	22.50	58.83	15.30
PI478771	AGASSIZ	20.52	22.50	59.83	16.50
CI 13670	WINALTA	20.10	22.37	60.37	15.70
PI477287	RAM	18.46	22.10	59.77	15.20
CI 17727	WESTON	20.38	22.07	61.33	15.90
CI 17846	MANNING	20.52	21.43	60.97	15.60
PI518591	ARAPAHO	18.53	20.83	58.27	16.00
CI 17902	WINRIDGE	17.78	20.67	60.40	15.80
NA 0001	THUNDERBIRD	17.85	18.83	60.77	15.30
CI 17735	NORSTAR	19.42	18.30	60.73	16.30

STATISTICAL SUMMARY	PLNT HT YIELD TEST WT PROTEIN			
	Inches	Bu/Ac	Lbs/Bu	%
EXPERIMENTAL MEANS	19.11	23.63	60.16	15.55
C.V. 2: (S OF MEAN/MEAN)*100	3.95	6.43	.25	-
LSD (0.05)	2.15	4.32	.43	-

Note: Crop suffered moderate hail injury on 7/23

TABLE 1. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992. (Continued).

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CLIMATIC and NURSERY MANAGEMENT DATA

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Seeding Date:	09/17/91	Soil Temp @ Sdg:	74F @ 2in., 65F @ 4in.
Harvest Date:	07/27/92	Root Penetration Depth:	N/A in.
Seeding Depth:	1.25 in.	Depth to Moisture at Sdg:	0.25 in.
Soil Series:	Assinniboine var.	Probed Moist.Depth @ Sdg:	41.0 in.
Previous Crop:	Fallow	Herbicide:	None Applied
Initial Stored Soil Water at Seeding:	5.30 in.		(sampling depth = 48 in.)
Fall/Winter Season Precipitation (Seeding to March 31):			
Total - all measurable events:	___ in.		
Early Spring Season Precipitation (April 1 to Sampling):			
Total - all measurable events:	1.30 in.		
Measured Soil Water on 04/28/92:	4.65 in.		(sampling depth = 48 in.)
Measured Soil Water at Harvest:	3.36 in.		(sampling depth = 48 in.)
Growing Season Precipitation (Apr 1 to 14 days prior to harvest maturity 'HM'):			
Total - all measurable events:	7.60 in.		
Total - all events >.1 inches:	7.50 in.		
Post Growing Season Precipitation (within 14 days of harvest maturity):			
Total - all measurable events:	1.10 in.		
Total - all events >.1 inches:	1.10 in.		
Adj'd Residual Soil Water @ (HM-14d):	2.26 in.		(sampling depth = 48 in.)
Initial Soil Analysis (NO <sub>3</sub> ,P,K at 0-6 in.; NO <sub>3</sub> at 6-24, 24-36 & 36-48 in.):			
NO <sub>3</sub> (lbs/ac)= 214 , P(ppm olsen)= 17 , K(ppm)= 400 , pH= 7.6, O.M.(%) = 1.5			
Fertilizer: 50#N,24#P2O <sub>5</sub> via NH <sub>3</sub> + 11-52-0 pre-plant injected in separate opns.			

TABLE 2. ELEVEN-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. 1982-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)						TEST WEIGHT (POUNDS PER BUSHEL)									
		1988	1989	1990	1991	1992	AVERAGE FOR YEARS TESTED	11-YR. COMPAR. AVERAGE YIELD	PERCENT OF CHEYENNE	1988	1989	1990	1991	1992	AVERAGE FOR YEARS TESTED	11-YR. COMPAR. TEST WT	PERCENT OF CHEYENNE TEST WT
NA 000X RAM (P+)	4	14.6	-	73.2	57.5	22.1	45.5	53.0	134.6	57.6	-	57.8	60.3	59.8	58.9	58.3	94.8
CI 17860 NEELEY	6	10.3	-	63.4	55.4	29.2	39.9	45.2	114.8	59.8	-	60.6	61.3	59.5	60.6	61.3	99.7
CI 17441 VONA	3	9.5	-	-	58.8	-	36.3	42.7	108.4	60.6	-	-	62.9	-	62.1	61.5	100.1
PI517194 TIBER	9	12.2	-	56.7	44.7	25.2	40.9	42.3	107.5	60.2	-	60.9	61.5	60.6	61.4	61.4	99.9
NA 1316 ROCKY (P+)	10	10.5	-	53.9	50.5	24.3	42.1	42.1	106.8	59.8	-	61.3	62.6	59.8	61.8	61.8	100.5
CI 17902 WINRIDGE	9	11.1	-	62.5	49.5	20.7	40.1	41.6	105.6	59.8	-	60.4	60.7	60.4	60.3	60.4	98.2
MT 77063 CREE	10	13.2	-	49.6	56.1	27.6	41.3	41.3	104.9	60.1	-	61.2	62.0	60.7	61.8	61.8	100.5
NA 200 HAWK (P+)	6	14.3	-	59.8	47.9	24.0	39.2	41.1	104.4	59.6	-	60.6	61.9	60.5	60.8	61.4	99.9
CI 17735 NORSTAR	10	12.8	-	53.7	45.8	18.3	40.9	40.9	103.9	59.1	-	61.3	61.5	60.7	61.0	61.0	99.2
MT 8039 JUDITH	6	11.5	-	58.4	45.4	23.7	38.7	40.5	103.0	59.3	-	58.2	61.0	59.2	59.5	60.2	97.9
CI 13190 HARRIOR	5	10.9	-	-	47.4	24.3	35.4	39.8	101.1	59.0	-	-	61.5	60.1	60.2	60.9	99.0
CI 8885 CHEYENNE	10	14.4	-	50.4	47.3	23.1	39.4	39.4	100.0	60.4	-	61.2	61.5	60.5	61.5	61.5	100.0
MT 7811 FRD/MT6928	3	-	-	53.3	40.8	-	48.2	39.3	99.9	-	-	60.3	60.7	-	62.0	60.8	98.9
CI 15075 CENTURK (+)	10	6.5	-	55.0	47.9	23.0	39.0	39.0	99.1	59.6	-	60.8	62.5	60.0	61.7	61.7	100.4
NA 001 THUNDERBIRD (P+)	6	16.5	-	61.6	46.8	18.8	37.3	39.0	99.1	59.9	-	61.9	62.9	60.8	61.6	62.3	101.4
CI 13670 WINALTA	10	14.4	-	55.3	46.1	22.4	38.8	38.8	98.6	60.0	-	61.5	62.6	60.4	61.9	61.9	100.6
CI 17844 REDWIN	10	9.8	-	51.0	42.2	25.2	38.4	38.4	97.6	61.0	-	60.4	61.3	60.9	61.7	61.7	100.4
ND 7687 AGASSIZ	4	-	-	-	46.0	22.5	34.7	37.8	95.9	-	-	-	61.9	59.8	60.3	61.1	99.4
RH78W296 BIGHORN (P+)	4	-	-	41.5	-	23.0	36.4	36.3	92.1	-	-	59.9	-	60.2	60.7	61.4	99.8
MT 7877 NORWIN	9	9.4	-	48.2	43.8	23.1	34.8	35.1	91.7	60.7	-	60.8	61.9	60.4	61.8	61.9	100.6
CI 17439 ROUGHRIDER	4	-	-	-	43.2	22.9	33.2	35.9	91.1	-	-	-	61.7	60.0	60.6	61.1	99.3
NA WINGS (P+)	3	9.0	-	-	-	-	31.0	35.0	88.8	59.9	-	-	-	-	60.8	61.6	100.2
SR 4685 CITATION (P+)	3	-	-	-	-	-	33.3	32.1	81.5	-	-	-	-	-	61.2	61.2	99.5
SR 4714 BRAUNY (P+)	3	-	-	-	-	-	36.6	30.4	77.1	-	-	-	-	-	62.8	61.1	99.4
MEAN (ENTRIES LISTED)		11.7	-	55.7	48.2	23.3	-	39.5	-	59.8	-	60.5	61.7	60.2	-	61.2	-
8/ Growing Season Precip. (in.)		3.50	0.00	6.90	8.45	7.60	5.85										
9/ Soil PAW (in.) to 4 ft. @Sdg.		6.25	6.18	9.29	7.71	5.30	6.48										
Total Plant Avail. Water (in.)		9.75	0.00	16.19	16.16	12.90	12.33										
Fertilizer Applied (# N)		56.0	51.0	48.0	50.0	50.0											
(# P2O5)		28.0	28.0	21.0	21.0	24.0											
(# K2O)		10.0	9.0	0.0	0.0	0.0											
(# S)		0.0	0.0	0.0	0.0	0.0											

Check variety is Cheyenne.

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

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

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

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/ 11-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 Cheyenne for the same years, and z = 11-yr. average yield and test weight for the check variety Cheyenne.

7/ Percent of Cheyenne 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.

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. 1992.

ID	VARIETY	PLNT HT YIELD TEST WT PROTEIN			
		Inches	Bu/Ac	Lbs/Bu	%
		1/			
CI 17860	NEELEY	20.05	26.00	60.33	13.00
QT 542	QUANTUM 542	21.04	24.90	59.53	11.80
ID 279	BLIZZARD	20.89	24.90	61.20	13.30
CI 8885	CHEYENNE	22.17	24.87	60.67	13.80
ND 8002	SEWARD	22.17	23.87	59.13	12.30
CI 17902	WINRIDGE	21.21	23.70	60.43	12.10
CI 17844	REDWIN	20.84	23.53	60.57	14.80
CI 17940	ARCHER	18.44	23.53	58.97	13.20
PI477287	RAM	21.25	23.43	58.33	12.90
PI517194	TIBER	21.59	23.40	60.67	14.30
CI 13190	WARRIOR	22.73	23.00	60.40	14.70
CI 17952	HAWK	19.86	22.27	60.13	13.40
PI491532	CREE	19.48	22.17	61.00	14.10
CI 17846	MANNING	22.31	20.90	60.57	13.40
PI478771	AGASSIZ	21.63	20.87	60.47	14.50
CI 17727	WESTON	22.73	20.47	61.67	14.10
CI 15075	CENTURK	20.13	20.37	60.60	13.60
CI 17439	ROUGH RIDER	21.60	20.33	59.90	14.20
RH78W296	BIGHORN	20.41	20.27	58.73	14.30
CI 17735	NORSTAR	23.69	19.77	60.30	14.20
PI518591	ARAPAHO	21.02	19.67	58.90	15.70
CI 17879	ROCKY	20.18	19.63	59.57	12.60
PI491533	NORWIN	20.97	19.43	60.77	13.60
NA 0001	THUNDERBIRD	20.54	19.07	60.73	14.40
MT 8039	JUDITH	19.76	18.30	59.23	14.60
CI 13670	WINALTA	20.91	17.77	60.33	15.20

STATISTICAL SUMMARY	PLNT HT YIELD TEST WT PROTEIN			
	Inches	Bu/Ac	Lbs/Bu	%
	1/			
EXPERIMENTAL MEANS	21.06	21.78	60.12	13.80
C.V. 2: (S OF MEAN/MEAN)*100	4.64	7.49	.49	-
LSD (0.05)	2.78	4.63	.84	-

1/ Nursery Suffered Hail Injury on 7/14 Averaging 13 Percent over All Varieties and Observations - with Individual Entry Average Losses Ranging from 4.7 to 22.4 Percent. Yields listed above are actual 'post-damage' values; and do not reflect adjustment for hail loss.

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. 1992. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	09/20/91	Soil Temp @ Sdg:	62F @ 2in., 62F @ 4in.
Harvest Date:	07/31/92	Root Penetration Depth:	N/A in.
Seeding Depth:	1.25 in.	Depth to Moisture at Sdg:	0.25 in.
Soil Series:	Telstad	Probed Moist.Depth @ Sdg:	36.0 in.
Previous Crop:	Fallow	Herbicide:	8ozLV6+4ozBan.IISGF+Surf
Initial Stored Soil Water at Seeding:	6.63 in.		(sampling depth = 48 in.)
Fall/Winter Season Precipitation (seeding to March 31):			
Total - all measurable events:	1.28 in.		
Total - all events >.1 inches:	1.11 in.		
Early Spring Season Precipitation (April 1 to Sampling):			
Total - all measurable events:	.44 in.		
Total - all events >.1 inches:	.44 in.		
Measured Soil Water on 04/29/92:	4.41 in.		(sampling depth = 48 in.)
Adjusted Soil Water to 04/01/92:	3.97 in.		
Measured Soil Water at Harvest:	2.64 in.		(sampling depth = 48 in.)
Growing Season Precipitation (Apr 1 to 14 days prior to harvest maturity 'HM'):			
Total - all measurable events:	4.16 in.		
Total - all events >.1 inches:	3.80 in.		
Post Growing Season Precipitation (within 14 days of harvest maturity):			
Total - all measurable events:	.41 in.		
Total - all events >.1 inches:	.34 in.		
Adj'd Residual Soil Water @ (HM-14d):	2.23 in.		(sampling depth = 48 in.)
Fertilizer:	7/05/91 - 37#N via NH3 injected		
	9/08/91 - 5#N,25#P205,10#K20 via granular blend injected		
Initial Soil Anal 9/20/91 (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):			
NO3(lbs/ac)= 272 , P(ppm olsen)= 19 , K(ppm)= 327 , pH= 7.5, O.M.(%) = 1.2			
Final Soil Anal 7/31/92			
NO3(lbs/ac)= 96 , P(ppm olsen)= 22 , K(ppm)= 294 , pH= 6.9, O.M.(%) = 1.0			
Nitrogen Reduction (lbs/ac) post-harvest vs pre-plant sample (by depth increm):			
0-6 = -44, 6-24 = -0, 24-36 = -88, 36-48 = -44 (0-48 = -176)			

TABLE 4. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW WINTER WHEAT NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1983-1992.

2/VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	10-YR COMPAR. AVERAGE YIELD 6/	PERCENT OF CHEYENNE YIELD 7/			
		1984	1988	1990	1991	1992	1984	1988	1990	1991	1992						
					4/	5/				4/							
CI 17592 HAWK	3	-	-	48.8	59.3	22.3	43.4	44.4	127.2	-	-	58.6	56.1	60.1	58.3	59.4	97.6
PI477287 RAM	3	-	-	49.9	52.3	23.4	41.9	42.8	122.6	-	-	56.0	53.7	58.3	56.0	57.1	93.9
CI 13190 WARRIOR	3	-	18.4	-	54.5	23.0	32.0	42.2	120.9	-	60.6	-	57.2	60.4	59.4	60.1	98.8
CI 17860 NEELEY	4	-	14.9	41.3	59.6	26.0	35.5	41.6	119.1	-	61.9	56.8	57.2	60.3	59.1	59.8	98.3
NA 0001 THUNDERBIRD	3	-	-	48.1	49.5	19.1	38.9	39.8	113.9	-	-	60.4	59.5	60.7	60.2	61.4	100.9
MT 8039 JUDITH	4	-	16.1	48.7	50.0	18.3	33.3	39.0	111.7	-	60.6	55.8	54.7	59.2	57.6	58.3	95.9
CI 17735 NORSTAR	6	30.7	19.2	44.6	45.7	19.8	37.3	37.3	106.8	57.6	61.0	60.0	58.2	60.3	60.2	60.2	99.0
PI517194 TIBER	6	33.2	20.0	39.6	46.2	23.4	36.9	36.9	105.6	58.0	61.9	58.5	57.7	60.7	60.2	60.2	99.0
PI491532 CREE	5	30.4	19.4	38.6	48.1	22.2	31.7	36.5	104.4	59.8	61.3	59.6	58.5	61.0	60.0	60.9	100.2
CI 15075 CENTURK (+)	5	29.3	15.7	42.3	50.3	20.4	31.6	36.3	103.9	58.8	61.2	58.6	58.3	60.6	59.5	60.4	99.3
CI 13670 WINALTA	6	30.6	15.8	40.4	58.3	17.8	36.2	36.2	103.8	59.3	61.2	60.0	59.2	60.3	60.8	60.8	100.0
CI 17879 ROCKY (P+)	6	28.5	15.8	43.0	51.1	19.6	36.1	36.1	103.5	59.1	61.3	58.7	59.2	59.6	59.9	59.9	98.5
PI491533 NORWIN	6	32.4	15.2	40.3	55.9	19.4	36.0	36.0	103.1	60.0	62.3	59.0	57.6	60.8	60.8	60.8	99.9
CI 17439 ROUGHRIDER	3	28.7	-	-	48.2	20.3	32.4	35.6	102.0	56.7	-	-	58.8	59.9	58.5	59.9	98.5
CI 8885 CHEYENNE	6	32.7	16.7	39.8	37.8	24.9	34.9	34.9	100.0	59.2	61.5	60.0	58.3	60.7	60.8	60.8	100.0
CI 16844 REDWIN	6	31.5	17.4	36.8	47.3	23.5	34.0	34.0	97.4	58.8	62.2	58.9	58.6	60.6	60.2	60.2	99.0
CI 17092 WINRIDGE	5	30.0	12.7	39.1	42.3	23.7	29.5	34.0	97.3	55.2	60.9	55.7	55.0	60.4	57.4	58.3	95.8
MEAN (ENTRIES LISTED)		30.7	16.7	42.8	50.4	21.6		37.9		58.4	61.4	58.4	57.5	60.2		59.9	
8/ Growing Season Precip. (in.)		1.96	3.23	5.45	8.84	4.16	5.18										
9/ Soil PAW (in.) to 4 ft. BSdg		8.00	9.30	9.92	5.41	6.63	7.88										
Total Plant Avail. Water (in.)		9.96	12.53	15.37	14.25	10.79	13.06										
Fertilizer Applied (lb)		56.0	13.5	50.0	65.0	42.0											
(#P2O5)		42.0	34.5	25.0	25.0	25.0											
(#K2O)		-	0.0	10.0	10.0	10.0											
(# S)		-	0.0	0.0	0.0	0.0											

Check variety is Cheyenne.

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

2/ P = Private variety, + = Protected variety

3/ 1985 Nursery lost to winter injury and severe drought.

1986 + 1987 Nurseries were not planted because it was too wet to get into the field.

The 1989 nursery was lost due to winter injury.

4/ The 1991 crop suffered substantial hail damage.

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

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

7/ Percent of Cheyenne 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.

TABLE 5. DRYLAND FALLOW SPRING WHEAT VARIETIES GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992.

ID	VARIETY or SELECTION	PLNT HT YIELD TEST WT PROTEIN			
		Inches	Bu/Ac	Lbs/Bu	%
WA 6920	PENAWAWA (soft white)	30.33	58.70	58.47	12.20
PI483235	GLENMAN	31.69	57.27	57.63	13.60
ND 626	GRANDIN	33.31	55.70	59.70	15.40
CI 17430	NEWANA	29.96	55.20	59.33	13.50
ND 606	AMIDON	36.44	54.13	59.13	14.60
CI 17904	OWENS (soft white)	31.09	53.93	56.30	12.30
MT 8849	RS6880/MT7819	31.92	53.83	58.67	14.30
WPB 926	WESTBRED 926	29.30	51.03	58.57	13.50
ND 618	GUS	33.69	50.63	58.83	16.10
ND 582	STOA	35.98	50.27	58.13	16.00
MT 8402	HI-LINE	30.93	49.80	58.83	14.30
C982-324	RAMBO	29.40	48.00	58.70	14.20
CI 15930	OLAF	31.80	47.97	58.23	15.20
CI 17828	PONDERA	30.64	47.63	60.57	14.20
CI 17790	LEN	30.50	46.43	59.33	15.00
CI 17429	LEW	36.22	46.03	60.87	13.90
PI486139	KLASIC (hard white)	24.87	45.93	58.77	13.60
NDCUT	CUTLESS	33.14	44.50	58.13	15.50
CANLANC	LANCER	40.42	43.83	59.37	15.60
CI 13596	FORTUNA	37.62	42.27	60.43	14.40

STATISTICAL SUMMARY	PLNT HT YIELD TEST WT PROTEIN			
	Inches	Bu/Ac	Lbs/Bu	%
EXPERIMENTAL MEANS	32.46	50.16	58.90	14.37
C.V. 2: (S OF MEAN/MEAN)*100	3.26	3.45	.80	-
LSD (0.05)	3.03	4.95	1.35	-

Note: Early season drought was severe with poor germination and emergence until late June; yet performance was generally excellent w/timely, late season rains.

TABLE 5. DRYLAND FALLOW SPRING WHEAT VARIETIES GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992. (Continued).

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CLIMATIC and NURSERY MANAGEMENT DATA

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Seeding Date:	04/17/92	Soil Temp @ Sdg:	72F @ 2in., 64F @ 4in.
Harvest Date:	09/30/92	Root Penetration Depth:	42.0 in.
Seeding Depth:	1.50 in.	Depth to Moisture at Sdg:	0.50 in.
Soil Series:	Telstad	Probed Moist.Depth @ Sdg:	48.0 in.
Previous Crop:	Fallow	Herbicide:	None Applied
Initial Stored Soil Water at Seeding:	5.52 in.		(sampling depth = 48 in.)
Measured Soil Water at Harvest:	3.47 in.		(sampling depth = 48 in.)
Growing Season Precipitation (Sdg. to 14 days prior to harvest maturity 'HM'):			
Total - all measurable events:		7.77 in.	
Total - all events >.1 inches:		7.53 in.	
Post Growing Season Precipitation (Within 14 days of combine harvest maturity):			
Total - all measurable events:		.33 in.	
Total - all events >.1 inches:		.23 in.	
Adj'd Residual Soil Water @ (HM-14d):	3.14 in.		(sampling depth = 48 in.)
Initial Soil Analysis (NO <sub>3</sub> , P, K at 0-6 in.; NO <sub>3</sub> at 6-24, 24-36 & 36-48 in.):			
NO <sub>3</sub> (lbs/ac)= 112 , P(ppm olsen)= 17 , K(ppm)= 282 , pH= 6.6, O.M.(%) = 0.9			
Fertilizer: 70#N, 40#P2O5 via gran. blend banded 1.5 in. below seed at planting.			

TABLE 6. SIX-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. 1987-1992.

2/ VARIETY OR SELECTION 3/	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF FORTUNA YIELD 5/			
	1988	1989	1990	1991	1992	1988	1989	1990	1991	1992				AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF FORTUNA TEST WT 5/
PI483235 GLENMAN	6	21.7	29.7	33.3	47.5	57.3	36.9	36.9	130.8	60.9	58.6	59.3	56.8	57.6	58.7	98.0
CI 17904 OWENS(sft wht)	6	18.3	29.8	31.3	41.2	53.9	33.4	33.4	118.4	62.7	59.6	59.2	54.2	55.3	58.6	97.8
CI 17430 NEHANA	6	20.4	24.1	27.3	47.4	55.2	33.2	33.2	117.7	59.3	61.0	59.8	57.6	59.3	59.6	99.5
WA 6920 PENAWANA (sfwh)	4	-	25.6	27.3	44.2	58.7	39.0	32.9	116.4	-	59.1	58.2	56.6	58.5	58.1	97.2
ND 606 AMIDON	4	-	28.6	25.4	45.7	54.1	38.5	32.5	114.9	-	59.7	57.6	57.7	59.1	58.5	97.9
ND 626 GRANDIN	3	-	-	28.6	40.1	55.7	41.5	32.4	114.6	-	-	59.8	57.7	59.7	59.1	99.4
CI 17790 LEN	6	19.7	24.7	30.5	44.1	46.4	32.1	32.1	113.6	61.2	59.1	57.9	56.6	59.3	58.9	98.3
CI 17429 LEN	6	19.0	28.5	25.7	42.5	46.0	32.0	32.0	113.3	62.3	60.3	60.2	59.3	60.9	60.5	101.1
CI 17910 ALEX	4	20.0	25.8	24.7	-	-	23.2	31.0	109.9	62.7	60.6	58.9	-	-	60.6	101.2
ND 582 STOA	6	19.9	24.6	26.8	39.3	50.3	31.0	31.0	109.6	62.0	59.8	58.8	56.3	58.1	59.1	98.6
WPB 926R WSTBRD926R (P+)	3	-	-	19.3	47.5	51.0	39.3	30.7	108.6	-	-	59.6	56.3	58.6	58.1	97.9
ND 618 GUS	3	-	-	27.0	39.7	50.6	39.1	30.5	108.1	-	-	59.6	57.6	58.8	58.7	98.7
CI 17828 PONDERA	6	17.7	23.6	26.6	45.8	47.6	30.2	30.2	105.9	59.5	60.0	60.0	57.8	60.6	59.6	99.6
MT 8402 HI-LINE	5	14.4	25.2	28.2	40.7	49.8	31.7	30.1	105.6	61.9	59.3	58.9	55.3	58.8	58.8	97.8
C982-324 RAMBO (P+)	6	19.7	24.8	19.7	39.3	48.0	29.5	29.5	104.3	63.3	60.4	59.3	56.9	58.7	59.9	100.0
CANLANC LANCER	5	17.3	27.9	27.7	37.3	43.8	30.8	29.3	103.7	62.0	59.6	58.7	58.4	59.4	59.6	99.1
CI 15930 OLAF	6	18.2	23.0	22.4	44.4	48.0	29.3	29.3	103.7	61.5	59.5	57.9	56.2	58.2	58.7	98.1
CI 17920 MARSHALL	3	19.8	24.5	-	-	-	20.4	28.4	100.7	62.4	58.1	-	-	-	59.9	99.2
CI 13596 FORTUNA	6	14.7	25.3	23.6	42.7	42.3	28.2	28.2	100.0	61.7	60.9	58.3	59.5	60.4	59.9	100.0
NDCUT CUTLESS	6	15.2	22.6	18.8	37.7	44.5	26.5	26.5	93.7	62.0	59.5	58.2	57.4	58.1	58.9	98.4
WPB 906R WSTBRD906R (P+)	3	11.8	24.7	20.1	-	-	18.9	25.1	88.9	61.7	59.6	59.2	-	-	60.2	99.8
MEAN (ENTRIES LISTED)		18.0	25.7	25.7	42.6	50.2		30.7		61.7	59.7	59.0	57.1	58.9		59.2
6/ Growing Season Precip. (in.)		6.00	6.84	8.07	10.32	7.77	7.51									
7/ Soil PAW (in.) to SD @PIntng.		8.58	4.86	7.97	6.55	5.52	6.58									
Total Plant Avail. Water (in.)		14.58	11.70	16.04	16.88	13.29	14.09									
Soil NO3 (lbs.) to SD @PIntng.		84.0	52.0	120.0	100.0	112.0										
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0										
Fertilizer Applied (# N)		50.0	70.0	62.0	70.0	70.0										
(# P2O5)		0.0	0.0	45.0	40.0	40.0										

Check variety is Fortuna.

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

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

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

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

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

6/ Seeding to 14 days prior to harvest maturity.

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

TABLE 7. FIVE-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., 81G SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1988-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1988	1989	1990	1991 3/	1992 4/	AVERAGE FOR YEARS TESTED	5-YR COMPAR. AVERAGE YIELD 5/	PERCENT OF FORTUNA YIELD 6/	1988	1989	1990	1991 3/	1992 4/	AVERAGE FOR YEARS TESTED	5-YR COMPAR. AVERAGE TEST WT. 5/	PERCENT OF FORTUNA TEST WT. 6/
CI 17904 OHENS (SFT WHT)	4	7.3	56.0	33.2	32.5	-	32.3	32.3	136.8	61.4	55.6	56.2	53.9	-	56.8	57.8	99.3
CI 17910 ALEX	3	8.0	49.6	26.1	-	-	27.9	30.9	131.0	61.3	56.9	57.4	-	-	58.5	59.2	101.8
ND 606 AMIDON	3	-	50.4	27.4	36.5	-	38.1	30.4	128.8	-	57.0	55.2	54.8	-	55.7	57.7	99.2
WA 6920 PENAWANA (SFT WHT)	3	-	47.3	33.0	32.8	-	37.7	30.0	127.4	-	52.0	56.0	52.2	-	53.4	55.4	95.2
ND 582 STOA	4	10.8	47.3	23.4	36.2	-	29.4	29.4	124.8	61.6	54.5	55.7	54.5	-	56.6	57.6	99.0
MT 8402 HI-LINE	4	5.0	48.2	30.3	30.7	-	28.6	28.6	121.2	61.0	58.2	57.0	54.2	-	57.6	58.6	100.7
WPS 906R WESTBRED 906R(P+)	3	4.1	45.2	27.7	-	-	25.7	28.4	120.4	61.2	55.1	56.4	-	-	57.6	58.2	100.1
CI 15930 OLAF	4	5.9	49.7	22.4	29.6	-	26.9	26.9	114.1	60.6	54.3	55.8	52.9	-	55.9	56.9	97.8
CI 17828 PONDERA	4	7.3	43.9	22.1	33.7	-	26.8	26.8	113.5	61.0	58.1	57.0	56.7	-	58.2	59.2	101.8
C982-324 RAMBO(P+)	4	7.1	47.3	23.7	28.4	-	26.6	26.6	113.0	62.5	55.0	55.8	53.1	-	56.6	57.6	99.0
ND CUT CUTLESS	4	5.3	42.0	25.0	28.2	-	25.1	25.1	106.6	60.9	56.4	55.8	55.7	-	57.2	58.2	100.0
CI 17429 LEW	4	6.8	42.8	22.8	27.3	-	24.9	24.9	105.8	61.6	55.5	57.3	55.9	-	57.6	58.6	100.7
CI 17790 LEN	4	8.3	41.4	18.1	31.3	-	24.8	24.8	105.2	60.4	56.4	55.6	54.7	-	56.8	57.8	99.3
PI483235 GLENMAN	4	7.6	43.4	21.7	25.8	-	24.6	24.6	104.5	60.4	55.5	55.6	53.1	-	56.1	57.1	98.2
CI 13596 FORTUNA	4	5.5	41.0	17.4	30.4	-	23.6	23.6	100.0	60.3	56.6	55.6	56.2	-	57.2	58.2	100.0
CI 17430 NEMANA	4	8.1	44.6	15.2	26.1	-	23.5	23.5	99.7	62.0	58.0	55.5	53.0	-	57.1	58.1	99.9
CANLANC LANCER	4	4.8	40.7	22.5	25.4	-	23.3	23.3	99.0	60.5	56.8	56.0	55.7	-	57.2	58.2	100.1
MEANS (ENTRIES LISTED)		6.8	45.9	24.2	30.3	-		27.1		61.1	56.0	56.1	54.4	-		57.9	
7/ Growing Season Precip. (in.)		3.50	8.77	6.90	8.45	8.25	7.17										
8/ Soil PAW (in.) to SD at @plant		6.25	6.38	10.23	8.47	6.14	7.49										
Total Plant Avail. Water (in.)		9.75	15.15	17.13	16.92	14.39	14.67										
Soil NO3 (lbs.) to SD @Plant.		116.0	192.0	160.0	128.0	200.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (NN)		56.0	51.0	48.0	50.0	50.0											
(#P205)		28.0	28.0	21.0	21.0	24.0											
(#K20)		10.0	9.0	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/ Crop suffered minor hail damage.

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

5/ 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.

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

7/ Seeding to 14 days prior to harvest maturity.

8/ Soil PAW values are actual gravimetric measurements.

TABLE 8. ELEVEN-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. 1982-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1988	1989	1990	1991 4/	1992 5/	AVERAGE FOR YEARS TESTED	11-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF FORTUNA YIELD 7/	1988	1989	1990	1991 4/	1992 5/	AVERAGE FOR YEARS TESTED	11-YR. COMPAR. AVERAGE TEST WT 6/	PERCENT OF FORTUNA TEST WT. 7/
PI483235 GLENMAN	10	10.6	29.3	31.0	35.3	-	34.8	34.8	121.8	55.7	57.9	58.1	52.5	-	56.6	56.6	96.9
CI 17904 OHENS(sft white)	9	10.3	26.3	32.3	33.6	-	32.2	34.7	121.3	57.5	58.0	60.0	51.6	-	56.6	57.2	97.9
CI 17790 LEN	7	13.9	24.2	28.6	33.9	-	34.3	33.2	116.0	55.9	57.3	56.9	52.8	-	56.6	56.0	95.9
CI 17430 NEWANA	10	10.2	26.4	31.3	29.7	-	32.1	32.1	112.5	58.0	60.3	60.2	51.1	-	58.7	58.7	100.4
ND 606 AMIDON	3	-	30.0	33.8	30.1	-	31.3	31.1	108.9	-	59.4	59.9	53.9	-	57.7	57.8	99.0
CI 15930 OLAF	8	9.2	20.6	28.4	28.8	-	28.1	30.0	105.2	57.1	57.9	58.3	50.3	-	58.0	57.4	98.3
CI 17828 PONDERA	10	9.7	21.8	28.1	36.1	-	29.8	29.8	104.3	58.5	58.2	60.0	55.6	-	58.8	58.8	100.7
WA 6920 PENAWANA (sftw)	3	-	27.5	27.6	33.5	-	29.5	29.4	102.8	-	59.8	56.9	50.9	-	55.9	56.0	95.9
C982-324 RAMBO (P+)	5	7.8	23.6	25.8	31.4	-	26.8	29.3	102.5	58.0	61.1	61.0	52.9	-	58.4	58.9	100.8
CI 17429 LEW	10	11.6	22.8	29.2	27.6	-	29.2	29.2	102.3	57.7	58.2	61.0	54.2	-	58.4	58.4	100.1
PI476211 LLOYD (durum)	3	-	-	-	-	-	26.4	28.7	100.4	-	-	-	-	-	56.3	57.0	97.7
CI 13596 FORTUNA	10	9.3	24.9	30.0	31.3	-	28.6	28.6	100.0	56.6	58.2	61.2	55.5	-	58.4	58.4	100.0
NDCUT CUTLESS	5	11.6	20.8	26.6	31.1	-	25.9	28.3	99.1	55.9	58.4	61.0	54.7	-	57.4	57.8	98.9
CANLANC LANCER	4	12.4	25.2	27.8	28.8	-	23.6	28.2	98.6	57.0	58.7	60.1	55.2	-	57.8	58.3	99.8
MT 8402 HI-LINE	4	11.8	24.8	26.7	30.0	-	23.3	27.9	97.7	57.6	56.9	57.4	51.1	-	55.8	56.3	96.3
CI 17438 CANDO (durum)	4	-	-	-	-	-	30.7	27.9	97.6	-	-	-	-	-	58.5	58.6	100.4
CI 17910 ALEX	8	12.7	22.7	28.7	-	-	29.5	27.9	97.6	57.6	60.1	60.6	-	-	59.4	59.6	102.1
WFB 906R WSTBR0906R (P+)	4	8.8	21.2	27.2	-	-	23.7	27.7	96.9	56.1	56.8	57.8	-	-	57.8	57.6	98.5
CI 15892 WARD (durum)	4	-	-	-	-	-	28.9	26.2	91.8	-	-	-	-	-	58.3	58.4	100.0
ND 582 STOA	8	12.2	22.1	27.6	27.1	-	23.6	25.3	88.4	56.3	57.9	57.7	52.8	-	56.1	55.5	95.0
CI 17920 MARSHALL	6	12.6	22.1	-	-	-	18.6	20.9	73.3	56.6	55.8	-	-	-	57.9	57.0	97.7
MEAN (ENTRIES LISTED)		10.9	24.2	28.9	31.2	-	-	29.1	-	57.0	58.4	59.3	53.0	-	-	57.6	-
8/ Growing Season Precip. (in.)		3.29	5.49	4.87	8.95	5.09	5.43										
9/ Soil PAW (in.) to SD @Plng		11.96	7.14	8.67	6.69	5.67	7.78										
Total Plant Avail. Water (in.)		15.25	12.63	13.54	15.65	10.76	13.21										
Soil NO3 (lbs.) to SD @Plng		102.0	120.0	196.0	140.0	198.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		13.5	70.0	50.0	65.0	42.0											
(# P2O5)		34.5	0.0	25.0	25.0	25.0											
(# K2O)		0.0	0.0	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/ 11-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 = 11-yr. average yield or test weight for the check variety Fortuna.

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

8/ Seeding to 14 days prior to harvest maturity.

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

TABLE 9. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992.

ID	VARIETY or SELECTION	1/	2/	YIELD BU/AC	TEST WT LBS/BU	PROTEIN %	3/	4/
		HEAD DATE	PLNT INCHES				HT INCHES	RESIDUE LBS/AC
CI 17904	OWENS (soft white)	167.00	24.21	52.63	59.37	13.60	3274.77	60.97
WA 6920	PENAWAWA (soft white)	167.00	20.55	48.37	59.93	13.20	2357.10	54.43
ND 626	GRANDIN	167.00	26.67	43.27	60.73	15.70	3285.40	73.90
ND 582	STOA	167.00	29.44	40.57	59.20	16.20	3064.57	61.60
MT 8849	RS6880/MT7819	167.00	24.48	39.47	59.70	18.50	3222.47	66.60
ND 606	AMIDON	170.00	27.80	38.93	58.30	18.30	3770.93	79.60
CI 17430	NEWANA	170.00	22.78	37.27	59.13	17.10	3799.73	94.63
CI 17828	PONDERA	174.00	24.48	36.53	60.13	17.50	2602.50	62.03
PI483235	GLENMAN	170.00	24.44	36.17	58.57	16.00	2863.93	58.00
NDCUT	CUTLESS	167.00	26.68	34.70	59.00	17.80	3029.33	67.53
CI 17429	LEW	170.00	27.62	34.03	59.83	17.50	2852.20	79.90
C982-324	RAMBO	167.00	22.52	32.70	59.93	15.70	3216.07	77.77
ND 618	GUS	167.00	25.07	31.77	59.13	15.90	2836.20	58.87
PI486139	KLASIC (hard white)	163.00	18.20	30.27	60.03	15.90	1587.77	55.10
CANLANC	LANCER	163.00	28.57	29.93	59.00	19.00	2351.77	70.57
CI 17790	LEN	167.00	25.49	29.50	59.57	17.00	3121.13	87.00
MT 8402	HI-LINE	163.00	23.75	27.77	60.57	16.60	1906.83	57.53
CI 13596	FORTUNA	170.00	27.43	25.73	57.53	19.00	2732.70	103.97
WPB 926	WESTBRED 926	163.00	23.10	25.40	59.63	16.30	2289.90	67.13
CI 15930	OLAF	167.00	25.84	22.60	59.00	17.00	2833.03	87.17

STATISTICAL SUMMARY	1/	2/	YIELD BU/AC	TEST WT LBS/BU	PROTEIN %	3/	4/
	HEAD DATE	PLNT INCHES				HT INCHES	RESIDUE LBS/AC
EXPERIMENTAL MEANS	167.30	24.95	34.88	59.42	16.68	2849.92	71.22
C.V. 2: (S OF MEAN/MEAN)*100	-	4.24	11.32	.45	-	11.84	9.80
LSD (0.05)	-	3.03	11.31	.76	-	966.08	19.98

- 1/ No. of Days from January 1 (167 - June 15)  
 2/ Based on 45 sqft harvest w/plot combine (as precision was > than w/ 3' hand hvst)  
 3/ Based on 3 sqft harvest w/hand clipper (incl all above-surf dry mat. less grain)  
 4/ Based on 3 sqft hand harvest for residue and grain

Note: 4 in. wet snow on 8/24 resulted in lodging & head shatter to mature crop.

TABLE 9. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992. (Continued).

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CLIMATIC and NURSERY MANAGEMENT DATA

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Seeding Date:	04/08/92	Soil Temp @ Sdg:	55F @ 2in., 50F @ 4in.
Harvest Date:	08/31/92	Root Penetration Depth:	N/A in.
Seeding Depth:	1.50 in.	Depth to Moisture at Sdg:	0.50 in.
Soil Series:	Joplin-Hillon CL	Probed Moist.Depth @ Sdg:	55.0 in.+
Previous Crop:	Fallow	Herbicide:	None Applied
Initial Stored Soil Water at Seeding:	6.64 in.		(sampling depth = 48 in.)
Measured Soil Water at Harvest:	3.07 in.		(sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity 'HM'):			
Total - all measurable events:		9.23 in.	
Total - all events >.1 inches:		8.25 in.	
Post Growing Season Precipitation (Within 14 days of harvest maturity 'HM'):			
Total - all measurable events:		.84 in. (via 4 in. wet snow 8/24)	
Total - all events >.1 inches:		.84 in.	
Adj'd Residual Soil Water @ (HM-14d):	2.23 in.		(sampling depth = 48 in.)
Initial Soil Analysis (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):			
NO3(lbs/ac)= 96 , P(ppm olsen)= 10 , K(ppm)= 155 , pH= 7.8, O.M.(%) = 1.3			
Fertilizer: 70#N,40#P205 via gran. blend banded 1.5 in. below seed at planting.			

TABLE 10. FOUR-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., JOPLIN  
NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1989-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	4-YR. COMPAR. AVERAGE YIELD 3/	PERCENT OF FORTUNA YIELD 4/	1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	4-YR. COMPAR. TEST WT. 3/	PERCENT OF FORTUNA TEST WT. 4/
WA 6920 PENAWAWA (SFT WHT)	4	45.8	41.2	66.8	48.4	-	50.5	50.5	137.8	59.7	59.2	56.9	59.4	-	58.8	58.8	97.9
CI 17904 OWENS (SFT WHT)	4	42.2	35.5	63.5	52.6	-	48.5	48.5	132.1	60.0	59.3	55.9	59.4	-	58.7	58.7	97.6
ND 606 AMIDON	4	44.2	39.0	60.1	38.9	-	45.6	45.6	124.2	60.6	60.9	58.2	58.3	-	59.5	59.5	99.1
CI 17430 NEHANA	4	44.7	35.7	62.6	37.3	-	45.1	45.1	122.9	61.9	61.0	58.6	59.1	-	60.2	60.2	100.1
ND 626 GRANDIN	3	-	34.9	54.4	43.3	-	44.2	45.0	122.7	-	59.5	57.8	60.7	-	59.4	59.7	99.3
PI483235 GLENMAN	4	47.0	37.1	58.2	36.2	-	44.6	44.6	121.7	60.8	60.0	58.3	58.6	-	59.4	59.4	98.9
CI 17828 PONDERA	4	44.3	39.1	57.5	36.5	-	44.4	44.4	121.0	60.9	61.2	58.3	60.1	-	60.1	60.1	100.1
ND 582 STQA	4	43.8	35.7	53.1	40.6	-	43.3	43.3	118.1	60.3	60.6	57.3	59.2	-	59.4	59.4	98.8
CI 17790 LEN	4	43.1	38.1	59.7	29.5	-	42.6	42.6	116.2	59.3	59.4	58.4	59.6	-	59.2	59.2	98.5
C982-324 RAMBO (P+)	4	43.3	32.6	59.8	32.7	-	42.1	42.1	114.8	61.7	62.3	59.3	59.9	-	60.8	60.8	101.2
ND 618 GLS	3	-	33.9	55.3	31.8	-	40.3	41.0	111.9	-	60.8	58.7	59.1	-	59.5	59.9	99.6
WPB 926R WESRBRED 926R	3	-	37.1	58.2	25.4	-	40.2	41.0	111.7	-	59.0	56.0	59.6	-	58.2	58.5	97.4
MT 8402 HI-LINE	4	38.4	36.7	57.8	27.8	-	40.2	40.2	109.5	57.9	58.8	57.3	60.6	-	58.6	58.6	97.6
CI 17429 LEW	4	41.6	34.2	49.4	34.0	-	39.8	39.8	108.5	61.8	60.4	59.5	59.8	-	60.4	60.4	100.5
CI 15930 OLAF	4	44.3	35.7	55.1	22.6	-	39.4	39.4	107.5	59.3	60.3	56.5	59.0	-	58.8	58.8	97.8
ND CUT CUTLESS	4	39.3	31.0	51.8	34.7	-	39.2	39.2	105.9	60.5	61.1	59.4	59.0	-	60.0	60.0	99.9
CANLANC LANCER	4	39.6	36.9	42.3	29.9	-	37.2	37.2	101.4	60.5	61.1	58.7	59.0	-	59.8	59.8	99.6
CI 13596 FORTUNA	4	36.6	32.1	50.2	25.7	-	36.7	36.7	100.0	61.1	61.7	60.0	57.5	-	60.1	60.1	100.0
MEANS (ENTRIES LISTED)		42.7	35.9	56.4	34.9			42.6		60.4	60.4	58.1	59.3			59.5	
5/ Growing Season Precip. (in.)		6.99	5.32	10.30	9.23			7.96									
6/ Soil P <sub>AN</sub> (in.) to SD at @plant		7.59	10.96	10.15	6.64			8.84									
Total Plant Avail. Water (in.)		14.58	16.28	20.45	15.87			16.80									
Soil NO <sub>3</sub> (lbs.) to SD @plant.		144.0	266.0	76.0	96.0												
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0												
Fertilizer Applied (M)		78.0	0.0	70.0	70.0												
(#P205)		36.0	0.0	40.0	40.0												
(#K20)		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/ 4-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 = 4-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 P<sub>AN</sub> values are actual gravimetric measurements.

TABLE 11. NINE-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. 1984-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)					AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE YIELD	PERCENT OF FORTUNA YIELD	TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE TEST WT	PERCENT OF FORTUNA TEST WT
		1988	1989	1990	1991 4/	1992 5/				1988	1989	1990	1991 4/	1992 5/			
MT 7819 GLENMAN	8	23.8	40.7	22.3	24.2	-	26.7	26.7	124.7	59.3	57.5	58.3	56.3	-	56.8	56.8	96.5
CS82-324 RAMBO(P+)	5	22.0	35.8	20.2	23.0	-	28.1	25.6	119.7	61.6	59.2	59.6	57.8	-	59.7	59.3	100.9
CI 17904 OWENS (soft white)	8	14.0	34.3	18.1	20.3	-	24.8	24.8	115.9	60.6	56.1	57.7	53.7	-	56.9	56.9	96.7
WFB 906R WESTBRED 906R(P+)	4	10.6	35.2	19.9	-	-	25.5	24.5	114.6	60.5	56.1	58.9	-	-	58.9	57.6	97.9
CI 17430 NEMANA	8	24.0	32.4	22.7	23.1	-	24.5	24.5	114.2	62.2	58.1	59.3	58.0	-	59.0	59.0	100.3
ND 582 STOA	8	21.7	38.2	23.4	17.4	-	24.1	24.1	112.6	60.3	57.1	57.5	54.3	-	57.7	57.7	98.0
CI 17790 LEN	6	22.4	33.5	16.6	19.0	-	27.2	24.1	112.3	59.9	56.7	56.9	55.2	-	57.5	56.9	96.7
WA 6920 PENAWANA (sft wht)	3	-	34.7	11.5	27.8	-	24.7	23.9	111.8	-	57.1	58.0	56.2	-	57.1	57.1	97.1
CI 17828 PONDERA	8	20.5	37.2	15.4	21.5	-	23.8	23.8	111.3	61.5	58.1	59.1	56.8	-	58.6	58.6	99.6
ND 606 AMIDON	3	-	31.5	18.2	24.0	-	24.5	23.8	111.2	-	58.7	57.2	56.7	-	57.5	57.6	97.9
ND CUT CUTLESS	5	19.2	36.2	11.1	21.8	-	25.7	23.5	109.8	60.6	59.0	58.0	57.7	-	58.8	58.5	99.4
CI 17429 LEN	8	21.2	32.8	14.8	21.5	-	22.3	22.3	104.1	61.1	59.5	58.6	57.4	-	58.3	58.3	99.2
MT 8402 HI-LINE	4	20.1	34.8	15.3	22.0	-	23.1	22.2	103.5	61.0	56.4	57.9	56.0	-	57.8	57.3	97.5
CI 13596 FORTUNA	8	17.6	32.2	13.3	20.7	-	21.4	21.4	100.0	60.5	60.3	58.6	57.5	-	58.8	58.8	100.0
CI 17920 MARSHALL (+)	5	23.1	33.6	-	-	-	25.3	21.3	99.5	60.0	56.3	-	-	-	57.8	56.4	95.9
CI 17910 ALEX	6	20.3	32.7	17.3	-	-	22.3	21.2	99.1	61.6	59.6	58.3	-	-	59.5	59.3	100.8
CANLANC LANCER	4	18.8	31.4	17.5	19.4	-	21.8	20.9	97.7	60.5	58.9	57.8	57.9	-	58.8	58.3	99.0
CI 15930 OLAF	6	19.7	32.0	17.3	20.4	-	23.6	20.9	97.4	60.9	58.3	57.5	55.9	-	58.4	58.0	98.5
MEAN (ENTRIES LISTED)		19.9	34.4	17.3	21.7	-	-	23.3	-	54.0	57.9	58.2	56.5	-	-	57.9	-
8/ Growing Season Precip. (in.)		5.05	4.35	5.50	12.50	0.0	5.94										
9/ Soil PAW (in.) to SD @PIntng.		12.66	8.02	10.71	7.60	0.0	8.67										
Total Plant Avail. Water (in.)		17.71	12.37	16.21	20.10	0.0	14.60										
Soil NO3 (lbs.) to SD @PIntng.		182.0	72.0	184.0	128.0	0.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	0.0											
Fertilizer Applied (# N)		45.0	70.0	47.0	70.0	0.0											
(# P2O5)		0.0	0.0	21.0	40.0	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 years noted.

4/ Crop suffered very substantial hail injury.

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

6/ 9-yr. CA =  $(x/y) * z$  where x = average yield and test weight of the entry for years tested, y = average yield and test weight of Fortuna for the same years, and z = 9-yr. average yield or test weight for the check variety Fortuna.

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

8/ Seeding to 14 days prior to harvest maturity.

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

TABLE 12 DRYLAND FALLOW SPRING BARLEY VARIETY TRIAL GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
NS 78054	BARONESSE	25.97	82.13	48.83	90.40	4.00	11.50
CI 15229	STEPTOE	22.93	71.17	43.67	89.00	4.90	11.30
PI491534	GALLATIN	27.62	69.67	49.63	84.20	6.70	11.60
MT140523	HECTOR/KLAGES	26.26	66.87	48.70	85.20	7.70	12.20
CI 15514	HECTOR	29.92	66.60	48.83	80.90	9.50	12.20
SK 76333	HARRINGTON	26.56	66.33	47.70	85.90	5.60	11.50
MT860756	GALLATIN/BELLONA	25.97	66.20	48.70	86.20	6.30	11.30
CI 15856	LEWIS	26.09	64.60	49.23	82.80	8.60	12.50
PI483237	BOWMAN	27.23	64.27	50.57	94.60	2.00	12.10
ND 9866	STARK	28.96	63.17	50.70	91.80	3.90	11.70
MT 81161	LEWIS//KGS/SMT	26.25	60.33	46.33	79.70	9.80	11.70
PI531228	BEARPAW	25.54	59.53	47.00	78.10	8.90	11.40
MN 52	EXCEL	26.93	59.13	45.13	69.00	12.10	11.70
CI 15857	CLARK	28.44	58.27	47.50	78.40	10.10	11.90
CI 9558	PIROLINE	30.39	57.67	50.93	86.90	5.30	12.30

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	27.00	65.06	48.23	84.21	7.03	11.78
C.V. 2: (S OF MEAN/MEAN)*100	3.37	4.37	.91	-	-	-
LSD (0.05)	2.64	8.23	1.27	-	-	-

Note: Early season drought was severe with poor germination and emergence until late June; yet performance was generally excellent w/timely, late season rains.

#### CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	04/17/92	Soil Temp @ Sdg:	72F @ 2in., 64F @ 4in.
Harvest Date:	09/30/92	Root Penetration Depth:	42.0 in.
Seeding Depth:	1.50 in.	Depth to Moisture at Sdg:	0.50 in.
Soil Series:	Telstad	Probed Moist.Depth @ Sdg:	48.0 in.
Previous Crop:	Fallow	Herbicide:	None Applied
Initial Stored Soil Water at Seeding:	5.52 in.	(sampling depth = 48 in.)	
Measured Soil Water at Harvest:	3.69 in.	(sampling depth = 48 in.)	
Growing Season Precipitation (Sdg. to 14 days prior to harvest maturity 'HM'):			
Total - all measurable events:	7.77 in.		
Total - all events >.1 inches:	7.53 in.		
Post Growing Season Precipitation (Within 14 days of combine harvest maturity):			
Total - all measurable events:	.33 in.		
Total - all events >.1 inches:	.23 in.		
Adj'd Residual Soil Water @ (HM-14d):	3.36 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)= 17 , K(ppm)= 282 , pH= 6.6, O.M.(%) = 0.9			
Fertilizer:	70#N,40#P2O5 via gran. blend banded 1.5 in. below seed at planting.		

TABLE 13. SIX-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. 1987-1992.

2/ VARIETY OR SELECTION TESTED	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)							TEST WEIGHT (POUNDS PER BUSHEL)								
		1988	1989	1990	1991 3/	1992	AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	1988	1989	1990	1991 3/	1992	AVERAGE FOR YEARS TESTED	6-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF PIROLINE TEST WT 5/
ND 9866 STARK	3	-	-	42.4	44.9	63.2	50.2	51.2	126.5	-	-	49.4	49.5	50.7	49.9	50.6	102.1
CI 15856 LEWIS	6	38.4	52.5	38.3	43.7	64.6	47.4	47.4	117.1	53.6	49.7	48.5	48.2	49.2	49.9	49.9	100.6
PI491534 GALLATIN	6	36.4	53.5	37.9	32.5	69.7	47.2	47.2	116.7	53.1	49.7	48.5	48.1	49.6	49.9	49.9	100.6
CI 15229 STEPTOE	6	26.7	52.2	37.9	57.8	71.2	46.9	46.9	116.0	48.3	43.9	43.2	40.1	43.7	43.7	43.7	88.0
MT140523 MT140523	5	41.3	51.7	45.2	37.9	66.9	48.0	46.8	115.8	52.8	48.6	48.5	44.6	48.7	48.6	48.7	98.1
PI483237 BONMAN	6	33.7	46.7	41.1	50.3	64.3	46.4	46.4	114.7	53.2	49.1	48.3	51.4	50.6	50.4	50.4	101.6
CI 15514 HECTOR	6	36.1	48.5	38.5	31.8	66.6	45.6	45.6	112.8	53.3	49.5	47.6	47.3	48.8	49.4	49.4	99.5
PI531228 BEARPAW	6	41.5	56.4	29.6	36.6	59.5	45.1	45.1	111.6	51.6	47.6	47.3	45.3	47.0	47.9	47.9	95.6
CI 15857 CLARK	6	37.1	51.9	36.8	36.0	58.3	44.4	44.4	109.8	52.5	47.8	46.9	45.2	47.5	48.1	48.1	96.9
MT 81161 MT 81161	4	34.8	53.1	-	-	60.3	48.7	43.4	107.3	51.5	50.0	-	-	46.3	49.1	48.2	97.1
CI 9558 PIROLINE	6	36.1	52.2	28.9	32.4	57.7	40.4	40.4	100.0	52.8	48.5	48.7	46.9	50.9	49.6	49.6	100.0
SK 76333 HARRINGTON	6	32.9	44.6	19.3	34.2	66.3	40.2	40.2	99.3	52.5	47.9	47.2	44.3	47.7	47.9	47.9	96.6
MEANS (ENTRIES LISTED)		35.9	51.2	36.0	39.8	64.0	-	45.4	-	52.3	48.4	47.6	46.4	48.4	-	48.7	-
6/ Growing Season Precip. (in.)		6.00	6.84	8.07	9.86	7.53	7.39										
7/ Soil PAM (in.) to SD at @PInt		8.58	4.86	7.97	6.56	5.52	6.58										
Total Plant Avail. Water (in.)		14.58	11.70	16.04	16.42	13.05	13.97										
Soil NO3 (lbs.) to SD @PIntng.		84.0	52.00	120.0	100.0	112.0											
SD (Sampling Depth in inches)		48.0	48.00	48.0	48.0	48.0											
Fertilizer Applied (# N)		50.0	70.00	62.0	70.0	70.0											
(# P2O5)		0.0	0.00	45.0	40.0	40.0											

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/ 6-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 = 6-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. PAM/ft except starting in 1986 where soil PAM values are actual gravimetric measurements.

TABLE 14. DRYLAND FALLOW SPRING BARLEY VARIETY TRIAL GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992.

ID	VARIETY or SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	STEPTOE	16.92	30.17	39.80	72.10	10.00	15.10
NS 78054	BARONESSE	18.95	27.30	41.67	55.60	18.30	15.40
MT860756	GALLATIN/BELLONA	18.25	26.53	42.13	60.10	15.80	15.20
ND 9866	STARK	21.75	26.50	42.40	69.70	13.00	16.00
CI 9558	PIROLINE	19.74	25.60	44.37	51.60	15.20	15.80
SK 76333	HARRINGTON	18.91	25.37	40.73	57.60	19.10	15.90
MT 81161	LEWIS//KGS/SMT	19.54	25.13	39.87	51.00	19.30	15.10
PI531228	BEARPAW	18.67	24.53	40.60	60.00	16.10	16.10
CI 15856	LEWIS	18.94	23.63	41.83	48.90	20.50	16.60
CI 15857	CLARK	19.57	23.30	39.27	56.00	16.30	16.30
PI491534	GALLATIN	18.24	23.27	42.77	53.50	19.90	15.20
PI483237	BOWMAN	19.53	22.00	42.50	61.80	14.50	16.50
CI 15514	HECTOR	22.20	21.53	41.33	54.90	18.00	16.60
MT140523	HECTOR/KLAGES	18.81	21.30	40.93	35.80	24.00	15.30
MN 52	EXCEL	18.08	21.27	43.23	74.50	6.70	14.80

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	19.21	24.50	41.56	57.54	16.45	15.73
C.V. 2: (S OF MEAN/MEAN)*100	4.59	7.63	1.29	-	-	-
LSD (0.05)	2.56	5.41	1.56	-	-	-

Note: This trial suffered poor initial stand development due to early drought conditions (through mid-June), and was later damaged by moderate hail.

#### CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/28/92	Soil Temp @ Sdg: 73F @ 2in., 64F @ 4in.
Harvest Date: 08/19/92	Root Penetration Depth: N/A in.
Seeding Depth: 1.50 in.	Depth to Moisture at Sdg: 0.25 in.
Soil Series: Assiniboine var.	Probed Moist.Depth @ Sdg: 55.0 in.+
Previous Crop: Fallow	Herbicide: None Applied
Initial Stored Soil Water at Seeding: 6.14 in.	(sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.92 in.	(sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity 'HM'):	
Total - all measurable events: 8.25 in.	
Total - all events >.1 inches: 8.15 in.	
Post Growing Season Precipitation (within 14 days of harvest maturity):	
Total - all measurable events: .00 in.	
Adj'd Residual Soil Water @ (HM-14d): 3.92 in.	(sampling depth = 48 in.)
Soil Analysis on 4/28/92 (NO <sub>3</sub> ,P,K at 0-6 in.; NO <sub>3</sub> at 6-24, 24-36 & 36-48 in.):	
NO <sub>3</sub> (lbs/ac)= 200 , P(ppm olsen)= 21 , K(ppm)= 449 , pH= 6.8, O.M.(%) = 1.2	
Fertilizer: 50#N,24#P205 via NH <sub>3</sub> + 11-52-0 injected in sep. operations Fall 91.	

TABLE 15. FIVE-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. 1988-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT ( POUNDS PER BUSHEL)										
		1988	1989	1990	1991	1992	AVERAGE FOR YEARS TESTED	5-YR. COMPAR. AVERAGE YIELD	PERCENT OF PIROLINE YIELD	1988	1989	1990	1991	1992	AVERAGE FOR YEARS TESTED	5-YR. COMPAR. AVERAGE TEST WT.	PERCENT OF PIROLINE TEST WT.
CI 15229 STEPTOE	5	18.8	67.6	55.4	56.9	30.2	45.8	45.8	105.9	44.7	41.3	43.0	47.1	39.8	43.2	43.2	90.0
PI531228 BEARPAW	5	23.8	72.9	63.9	31.7	24.5	43.4	43.4	100.3	49.4	40.6	47.2	53.1	40.6	46.2	46.2	96.3
MT 81161 MT 81161	3	19.8	67.9	-	-	25.1	37.6	43.3	100.1	49.4	43.1	-	-	39.9	44.1	46.0	95.8
CI 9558 PIROLINE	5	19.9	67.2	60.3	43.2	25.6	43.2	43.2	100.0	49.5	44.3	48.7	52.9	44.4	47.9	47.9	100.0
MT140523 MT 140523	5	21.7	72.4	57.6	42.7	21.3	43.1	43.1	99.7	51.1	46.2	48.2	53.8	40.9	48.1	48.1	100.2
PI491534 GALLATIN	5	22.6	72.9	60.7	32.3	23.3	42.4	42.4	98.0	50.8	45.9	60.7	53.3	42.8	50.7	50.7	105.8
CI 15856 LEWIS	5	21.7	67.6	58.3	40.2	23.6	42.3	42.3	97.8	51.1	45.6	48.4	54.2	41.8	48.2	48.2	100.6
PI483237 BOWMAN	5	20.0	63.5	54.8	39.5	22.0	40.0	40.0	92.4	51.2	45.8	48.0	54.6	42.5	48.4	48.4	101.0
CI 15857 CLARK	5	20.0	64.7	57.0	30.8	23.3	39.2	39.2	90.6	50.1	45.0	46.6	52.6	39.3	46.7	46.7	97.4
CI 15514 HECTOR	5	20.3	64.5	59.5	28.4	21.5	38.9	38.9	89.9	50.7	47.2	49.0	52.5	41.3	48.1	48.1	100.4
SK 76333 HARRINGTON	5	17.8	56.0	61.4	33.0	25.4	38.7	38.7	89.5	49.2	44.0	47.6	53.8	40.7	47.1	47.1	98.2
ND 9866 STARK	3	-	-	50.5	31.8	26.5	36.3	36.5	84.3	-	-	48.8	53.6	42.4	48.3	47.6	99.2
MEANS (ENTRIES LISTED)		20.6	67.0	58.1	37.3	24.4		41.4		49.7	44.5	48.8	52.9	41.4		47.3	
7/ Growing Season Precip. (in.)		3.50	8.77	6.90	8.45	8.25	7.17										
8/ Soil PAW (in.) to SD at Plt.		6.25	6.38	10.23	8.47	6.14	7.49										
Total Plant Avail. Water (in.)		9.75	15.15	17.13	16.92	14.39	14.67										
Soil NO3 (lbs.) to SD at Plt.		116.0	192.0	160.0	128.0	200.0											
SD (sampling depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (lb)		50.0	51.0	48.0	50.0	50.0											
(#P2O5)		28.0	28.0	21.0	21.0	24.0											
(#K2O)		10.0	9.0	0.0	0.0	0.0											

Check variety is Piroline.

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

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

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

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

5/ 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.

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

7/ Seeding to 14 days prior to harvest maturity.

8/ Soil PAW values are actual gravimetric measurements.

TABLE 16. ELEVEN-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. 1982-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	11-YR. COMPAR. AVERAGE TEST WT	PERCENT OF PIROLINE TEST WT.			
		1988	1989	1990	1991	1992	1988	1989	1990	1991	1992						
					4/	5/	6/	7/	4/	5/	6/				7/		
MT140523 MT140523	4	44.8	51.1	38.4	26.2	-	40.1	60.4	118.0	48.7	47.5	49.1	48.2	-	48.4	49.6	101.8
CI 15229 STEPTOE	7	32.4	45.0	43.2	34.7	-	45.9	58.2	113.7	43.0	38.7	42.9	40.0	-	41.0	41.3	84.7
CI 15856 LEWIS	9	38.7	44.7	34.5	19.4	-	47.8	55.0	107.4	49.2	47.7	50.3	47.2	-	49.4	50.0	102.6
PI531228 BEARPAW	6	49.8	43.6	33.0	16.8	-	47.8	54.6	106.7	48.0	45.6	48.9	42.3	-	47.2	47.5	97.4
PI483237 BOWMAN	7	43.8	48.9	38.1	25.9	-	42.9	54.3	106.2	48.7	47.3	48.7	51.6	-	48.7	49.0	100.6
PI491534 GALLATIN	8	39.4	50.8	37.7	19.4	-	42.4	54.2	106.0	48.5	47.2	50.5	47.4	-	49.5	51.1	104.8
CI 15857 CLARK	10	38.3	43.4	33.2	19.8	-	49.4	52.7	103.0	47.1	44.8	47.8	45.0	-	47.8	47.8	98.1
CI 9558 PIROLINE	10	37.1	41.5	38.2	19.3	-	48.0	51.2	100.0	49.3	43.8	49.9	45.7	-	48.8	48.8	100.0
CI 15514 HECTOR	10	40.0	54.9	38.5	19.9	-	47.6	50.7	99.2	48.8	47.3	49.8	46.6	-	50.4	50.4	103.3
SK 76333 HARRINGTON	10	39.2	39.5	27.0	18.1	-	46.4	49.5	96.7	47.1	45.7	48.9	42.8	-	47.8	47.8	98.0
MT 81161 MT 81161	3	35.7	49.0	-	-	-	45.1	48.9	95.6	46.4	43.3	-	-	-	46.0	47.1	96.5
CI 15687 KIMBERLY	3	42.7	-	-	-	-	51.7	46.7	91.3	47.9	-	-	-	-	49.8	48.1	98.7
ND 5569 HAZEN	4	-	-	-	-	-	34.6	39.5	77.2	-	-	-	-	-	45.4	46.0	94.4
MEANS (ENTRIES LISTED)		40.1	46.6	36.2	22.0	-	-	52.0	-	47.7	45.4	48.7	45.7	-	-	48.0	-
8/ Growing Season Precip. (in.)		3.24	5.49	4.87	8.84	4.55	5.34										
9/ Soil PAH (in.) to SD @Plng.		9.76	7.14	8.67	6.69	5.67	7.58										
Total Plant Avail. Water (in.)		13.00	12.63	13.54	15.53	10.22	12.93										
Soil NO3 (lbs.) to SD @Plng.		90.0	120.0	196.0	140.0	198.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		13.5	70.0	50.0	65.0	42.0											
(# P2O5)		34.5	0.0	25.0	25.0	25.0											
(# K2O)		0.0	0.0	10.0	10.0	10.0											
(# SO4)		0.0	0.0	0.0	0.0	0.0											

Check variety is Pirolina.  
 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/ 11-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 Pirolina for the same years, and z = 11-yr. average yield or test weight for the check variety Pirolina.  
 7/ Percent of Pirolina 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. PAH/ft except starting in 1986 where soil PAH values are actual gravimetric measurements

TABLE 17. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT GRAFF FARMS, 1 INC., NORTH JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1992.

ID	VARIETY or SEL'N	1/		2/				3/		4/
		HEAD DATE	PLNT HT INCHES	YIELD BU/AC	TEST WT LBS/BU	PLUMP %	THIN %	PROTEIN %	RESIDUE LBS/AC	RESIDUE LBS/BU
PI491534	GALLATIN	174.00	22.49	74.67	49.83	93.70	2.70	12.80	2813.80	40.20
MT 81161	LEWIS//KGS/SMT	174.00	21.98	71.50	48.57	94.80	2.70	12.90	2034.87	31.70
NS 78054	BARONESSE	174.00	18.19	71.17	48.20	94.90	2.40	13.10	2714.57	37.50
MT860756	GALLATIN/BELLONA	170.00	20.89	70.63	49.40	95.70	1.60	12.40	2465.93	39.80
MT140523	HECTOR/KLAGES	174.00	22.39	68.90	48.73	94.50	2.30	13.80	2237.60	39.17
PI531228	BEARPAW	174.00	22.49	67.60	48.57	94.10	2.90	12.80	2827.67	43.70
CI 15856	LEWIS	178.00	22.03	64.50	49.23	91.70	3.30	13.50	2802.07	37.37
SK 76333	HARRINGTON	170.00	22.11	64.47	48.13	93.40	2.70	13.00	3156.30	39.70
PI483237	BOWMAN	170.00	18.91	63.57	47.63	95.90	1.70	13.60	2393.40	40.67
ND 9866	STARK	170.00	23.48	63.33	48.80	94.40	2.30	13.10	2591.83	39.67
CI 15514	HECTOR	174.00	24.38	61.47	49.37	92.20	3.40	13.40	2646.30	41.57
CI 15857	CLARK	178.00	21.89	61.27	48.37	93.00	3.80	13.20	2502.23	37.27
CI 15229	STEPTOE	170.00	18.07	60.23	42.77	96.90	1.40	12.20	2147.97	42.13
CI 9558	PIROLINE	174.00	22.24	57.67	49.53	93.40	2.20	13.50	2351.77	36.53
MN 52	EXCEL	174.00	21.19	42.43	46.27	96.80	1.20	12.10	2158.63	38.13

STATISTICAL SUMMARY	1/		2/				3/		4/
	HEAD DATE	PLNT HT INCHES	YIELD BU/AC	TEST WT LBS/BU	PLUMP %	THIN %	PROTEIN %	RESIDUE LBS/AC	RESIDUE LBS/BU

EXPERIMENTAL MEANS	173.00	21.52	64.23	48.23	94.36	2.44	13.02	2523.00	39.01
C.V. 2: (S OF MEAN/MEAN)*100	-	4.56	6.90	.95	-	-	-	8.86	7.70
LSD (0.05)	-	2.84	12.84	1.32	-	-	-	647.64	8.71

1/ No. of Days from January 1 (173 = June 21)  
 2/ Based on 45 sqft harvest w/plot combine (as precision was > than with 3 sqft hand harvest)  
 3/ Based on 3 sqft harvest w/hand clipper (includes all above-surface dry matter less grain)  
 4/ Based on 3 sqft hand harvest for residue and grain  
 Note: 4 in. wet snow on 8/23 resulted in moderate lodging & shatter loss to the mature crop.  
 CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/08/92	Soil Temp @ Sdg: 55F @ 2in., 50F @ 4in.
Harvest Date: 08/31/92	Root Penetration Depth: N/A in.
Seeding Depth: 1.50 in.	Depth to Moisture at Sdg: 0.50 in.
Soil Series: Joplin-Hillon CL	Probed Moist.Depth @ Sdg: 55.0 in.+
Previous Crop: Fallow	Herbicide: None Applied
Initial Stored Soil Water at Seeding: 6.64 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: 9.23 in.	
Total - all events >.1 inches: 8.25 in.	
Post Growing Season Precipitation (within 14 days of harvest maturity 'HM'):	
Total - all measurable events: .84 in.	(via 4 in. wet snow 8/24)
Total - all events >.1 inches: .84 in.	
Adj'd Residual Soil Water @ (HM-14d): 4.25 in.	(sampling depth = 48 in.)
Initial Soil Analysis (N03,P,K at 0-6 in.; N03 at 6-24, 24-36 & 36-48 in.):	
N03(lbs/ac)= 96 , P(ppm olsen)= 10 , K(ppm)= 155 , pH= 7.8, O.M.(%) = 1.3	
Fertilizer: 70#N,40#P205 via gran. blend banded 1.5 in. below seed at planting.	

TABLE 18 FOUR-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY NURSERY GROWN OFF-STATION AT GRAFF FARMS, INC., JOPLIN. NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1989-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHELS PER ACRE)									TEST WEIGHT ( POUNDS PER BUSHEL)						
		1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	4-YR. COMPAR. AVERAGE YIELD	PERCENT OF PIROLINE YIELD	1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	4-YR. COMPAR. AVERAGE TEST WT.	PERCENT OF PIROLINE TEST WT.
PI491534 GALLATIN	4	58.8	55.0	52.4	74.7	-	60.2	60.2	113.1	49.6	50.3	49.4	49.8	-	49.8	49.8	101.3
MT140523 MT 140523	4	55.9	55.9	55.4	68.9	-	59.0	59.0	110.9	48.3	50.4	46.7	48.7	-	48.5	48.5	98.8
CI 15229 STEPTOE	4	50.7	56.5	67.7	60.2	-	58.8	58.8	110.4	43.0	43.6	44.4	42.8	-	43.5	43.5	88.5
ND 9866 STARK	3	-	53.9	56.3	63.3	-	57.8	57.2	107.5	-	51.0	50.3	48.8	-	50.0	49.9	101.6
MT 81616 BEARPAW	4	55.2	52.1	50.5	67.6	-	56.3	56.3	105.8	46.4	49.8	42.8	48.6	-	46.9	46.9	95.5
PI483237 BOWMAN	4	51.4	57.0	50.5	63.6	-	55.6	55.6	104.5	49.6	50.3	50.6	47.6	-	49.5	49.5	100.8
CI 15856 LEWIS	4	54.9	51.7	50.8	64.5	-	55.5	55.5	104.2	49.4	50.9	48.0	49.2	-	49.4	49.4	100.6
CI 15514 HECTOR	4	54.0	56.8	47.9	61.5	-	55.0	55.0	103.4	49.6	49.5	47.3	49.4	-	49.0	49.0	99.7
CI 9558 PIROLINE	4	51.5	53.0	50.8	57.7	-	53.3	53.3	100.0	48.7	50.3	48.0	49.5	-	49.1	49.1	100.0
CI 15857 CLARK	4	45.5	51.3	45.2	61.3	-	50.8	50.8	95.4	47.5	48.6	47.0	48.4	-	47.9	47.9	97.4
SK 76333 HARRINGTON	4	45.9	50.9	34.1	64.5	-	48.8	48.8	91.7	48.8	49.8	41.2	48.1	-	47.0	47.0	95.7
MEANS (ENTRIES LISTED)		52.4	54.0	51.0	64.3			55.5		48.1	49.5	46.9	48.3			48.2	
6/ Growing Season Precip. (in.)		6.99	5.32	10.02	9.23		7.89										
7/ Soil P <sub>AW</sub> (in.) to SD at Plt.		7.59	10.96	10.15	6.64		8.84										
Total Plant Avail. Water (in.)		14.58	16.28	20.17	15.87		16.73										
Soil NO <sub>3</sub> (lbs.) to SD at Plt.		144.00	266.0	76.0	96.0												
SD (sampling depth in inches)		48.00	48.0	48.0	48.0												
Fertilizer Applied (N)		78.00	0.0	70.0	70.0												
(NPK205)		36.00	0.0	40.0	40.0												
(NPK20)		0.00	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/ 4-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 = 4-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 P<sub>AW</sub> values are actual gravimetric measurements.

TABLE 19. NINE-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. 1984-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)					AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE YIELD	PERCENT OF PIROLINE YIELD	TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	9-YR. COMPAR. AVERAGE TEST WT	PERCENT OF PIROLINE TEST WT
		1988 3/	1989	1990	1991 4/	1992 5/				1988 3/	1989	1990	1991 4/	1992 5/			
PI491534 GALLATIN	6	-	54.8	47.0	23.7	-	35.8	35.8	111.7	-	47.9	49.1	45.9	-	46.8	46.8	98.5
CI 15229 STEPTOE	5	-	62.2	42.8	13.4	-	36.9	35.6	111.0	-	41.9	41.1	39.4	-	39.2	39.5	83.1
MT140523 MT140523	3	-	60.2	49.2	22.9	-	44.1	34.9	108.8	-	46.5	47.8	46.5	-	47.0	45.9	96.6
CI 15856 LEWIS	5	-	56.6	39.7	20.3	-	35.1	33.8	105.5	-	47.7	49.1	47.4	-	47.1	47.5	100.0
PI483237 BONMAN	5	-	55.9	45.7	23.2	-	34.4	33.2	103.5	-	48.9	47.9	47.8	-	46.8	47.1	99.2
CI 9558 PIROLINE	6	-	68.5	33.6	19.5	-	32.0	32.0	100.0	-	50.3	48.4	47.2	-	47.5	47.5	100.0
CI 15857 CLARK	6	-	48.3	37.3	19.6	-	32.0	32.0	99.9	-	44.6	46.1	44.2	-	44.8	44.8	94.2
PI531228 BEARPAW	4	-	51.9	38.9	18.4	-	38.2	31.9	99.6	-	44.3	46.9	44.0	-	45.7	44.7	94.0
CI 15514 HECTOR	6	-	71.6	39.8	18.4	-	31.9	31.9	99.5	-	47.9	48.1	45.0	-	46.3	46.3	97.4
PI483238 HAZEN	3	-	-	-	-	-	23.2	31.5	98.3	-	-	-	-	-	41.7	42.7	89.9
SK 76333 HARRINGTON	6	-	51.7	27.5	19.4	-	27.3	27.3	85.2	-	45.7	47.2	44.8	-	46.2	46.2	97.2
MEAN (ENTRIES LISTED)		-	52.9	36.5	18.1	-	-	32.7	-	-	42.3	42.9	41.1	-	-	45.4	-
8/ Growing Season Precip. (in.)		5.05	8.02	5.50	13.00	0.0	6.00										
9/ Soil PAW (in.) to SD @PIntng.		12.66	8.02	10.71	7.60	0.0	8.67										
Total Plant Avail. Water (in.)		17.71	16.04	16.21	20.60	0.0	14.67										
Soil NO3 (lbs.) to SD @PIntng.		182.0	72.0	184.0	128.0	0.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	0.0											
Fertilizer Applied (# N)		44.0	70.0	47.0	70.0	0.0											
(# P2O5)		0.0	0.0	21.0	40.0	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.  
Severe grasshopper damage in 1986 nursery.  
1988 Nursery lost to wildlife grazing.
- 4/ 1991 crop suffered very substantial hail damage.
- 5/ 1992 nursery lost to drought conditions at the time of seeding.
- 6/ 9-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 = 9-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.

TABLE 20. ELEVEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW OAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1982-1992.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)							TEST WEIGHT (POUNDS PER BUSHEL)								
		1986	1987	1988	1989	1990	AVERAGE FOR YEARS TESTED	11-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF OTANA YIELD 5/	1986	1987	1988	1989	1990	AVERAGE FOR YEARS TESTED	11-YR. COMPAR. AVERAGE TEST WT 4/	PERCENT OF OTANA TEST WT. 5/
ID805807 74A82608/CAYUS	3	-	99.8	65.2	66.0	-	77.0	86.6	136.0	-	37.3	38.7	29.9	-	35.3	35.0	98.6
ID75861 CAYUSE/OTANA	6	128.3	90.1	77.0	68.0	-	70.4	83.8	131.6	34.8	35.9	38.6	28.4	-	31.8	33.2	93.5
ID815792 74A82608/CAYUS	3	-	102.5	58.5	65.8	-	75.6	75.7	118.8	-	36.8	38.0	28.3	-	34.4	34.1	96.0
CI 8263 CAYUSE	9	128.9	90.2	49.8	60.9	47.8	72.6	72.6	114.0	34.6	35.9	37.2	27.3	31.6	32.7	32.7	92.3
CI467882 BORDER	9	117.6	99.2	64.2	59.0	40.6	72.4	72.4	113.7	34.1	34.9	37.7	29.2	29.5	32.6	32.6	92.0
CI 9297 APPALOOSA	8	127.2	88.8	56.7	47.1	45.4	68.3	71.9	112.8	33.2	34.6	36.2	26.0	30.1	31.9	32.3	91.1
CI483126 MONIDA	9	117.9	83.0	67.6	53.9	43.5	70.2	70.2	110.2	35.3	35.3	39.1	32.7	31.7	33.9	33.9	95.6
ID766843 K71299/3/OTANA	4	108.0	71.4	72.4	-	-	70.4	69.1	108.5	36.7	35.5	38.4	-	-	33.9	34.7	97.8
ID768244 LODI/PARK	4	110.6	-	-	-	-	85.8	67.3	105.6	37.9	-	-	-	-	35.5	34.9	98.3
SD810109 TRUCKER	3	-	-	52.0	53.0	39.0	48.0	65.5	102.8	-	-	41.6	37.1	35.3	38.0	37.8	106.7
CI 9252 OTANA	9	111.2	72.7	54.6	42.6	42.9	63.7	63.7	100.0	39.0	35.5	39.7	32.2	35.0	35.5	35.5	100.0
OT 726 CASCADE	6	113.4	72.0	45.2	-	-	66.2	63.4	99.5	35.9	30.2	36.3	-	-	32.1	32.1	90.4
W 82056 ROBERT	3	-	-	51.9	49.3	36.6	45.9	62.7	98.4	-	-	37.3	33.4	33.0	34.6	34.4	97.1
CI 6611 PARK	8	104.5	69.6	55.7	40.5	37.6	57.0	60.0	94.1	36.4	32.6	37.9	31.9	30.8	32.3	32.8	92.4
ND 1001 STEELE	3	100.3	53.3	-	-	-	58.5	54.7	85.8	36.8	29.4	-	-	-	31.5	33.7	95.0
MEAN (ENTRIES LISTED)		115.3	82.7	59.3	55.1	41.7	-	69.3	-	35.9	34.5	38.2	30.6	32.1	-	34.0	-
6/ Growing Season Precip. (in.)		8.07	2.49	3.24	5.49	4.87	4.83										
7/ Soil PAW (in.) to SD @Plng.		9.34	9.66	9.76	5.53	8.67	7.88										
Total Plant Avail. Water (in.)		17.41	12.15	13.00	11.02	13.54	12.72										
Soil NO3 (lbs.) to SD @Plng.		136.0	92.0	90.0	160.0	196.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		40.0	50.0	13.5	70.0	50.0											
(# P205)		35.0	40.0	34.5	0.0	25.0											
(# K20)		20.0	20.0	0.0	0.0	10.0											
(# SO4)		0.0	10.0	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/ 11-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 = 11-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 21 . EVALUATION OF 8 DWARF OAT LINES AND 2 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. 1992.

ID	ENTRY or CULTIVAR	PLNT HT YIELD TEST WT PROTEIN			
		Inches	Bu/Ac	Lbs/Bu	%
87AB5641	EXP DWARF 7	33.75	132.87	34.53	14.30
CI483126	MONIDA (stnd)	35.79	126.57	32.10	15.20
CI 9252	OTANA (stnd)	40.08	121.80	35.03	15.60
86AB 664	EXP DWARF 5	34.88	121.30	31.67	16.10
74AB2608	EXP DWARF 1	32.59	113.07	30.07	15.60
821142-B	EXP DWARF 2	26.51	111.93	31.33	15.80
82AB1178	EXP DWARF 3	28.78	111.17	32.27	15.90
83AB3250	EXP DWARF 4	30.35	109.57	30.67	14.00
86AB1867	EXP DWARF 6	29.61	109.10	35.93	16.00
88AB3073	EXP DWARF 8	31.26	67.60	41.57	20.10

  

STATISTICAL SUMMARY	PLNT HT YIELD TEST WT PROTEIN			
	Inches	Bu/Ac	Lbs/Bu	%
EXPERIMENTAL MEANS	32.36	112.50	33.52	15.86
C.V. 2: (S OF MEAN/MEAN)*100	2.73	4.31	1.33	-
LSD (0.05)	2.63	14.39	1.33	-

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

Note: Early season drought was severe with poor germination and emergence until  
late June; yet performance was generally excellent w/timely, late season rains.

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/17/92	Soil Temp @ Sdg: 72F @ 2in., 64F @ 4in.
Harvest Date: 09/04/92 (binder ripe)	Root Penetration Depth: 44.0 in.
Seeding Depth: 1.50 in.	Depth to Moisture at Sdg: 0.50 in.
Soil Series: Telstad	Probed Moist.Depth @ Sdg: 48.0 in.
Previous Crop: Fallow	Herbicide: None Applied
Initial Stored Soil Water at Seeding:	5.52 in. (sampling depth = 48 in.)
Measured Soil Water on 09/30/92:	3.90 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg. to 14 days prior to harvest maturity 'HM'):	
Total - all measurable events:	7.38 in.
Total - all events >.1 inches:	7.19 in.
Post Growing Season Precipitation (Within 14 days of combine ripe maturity)	
Total - all measurable events:	.72 in.
Total - all events >.1 inches:	.57 in.
Adj'd Residual Soil Water @ (HM-14d):	3.18 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)= 17 , K(ppm)= 282 , pH= 6.6, O.M.(%) = 0.9	
Fertilizer: 70#N,40#P205 via gran. blend banded 1.5 in.below seed at planting.	