

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

PERSONNEL:

Principal Investigator: Gregg R. Carlson, Agronomist - Havre

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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. 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.

SUMMARY:

Fourteen 1991 off-station variety performance trials were conducted on fallow at six 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)

Dryland Spring Wheat Trials (Continued):

- 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. R. Quinn Farm, Chouteau County (Big Sandy)

All trials were seeded in replicated, 3-row, 20-foot plots on a 12-inch row spacing utilizing a 'Rem' 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. After 1987, all spring trials were planted with 'Acra-Plant' hoe 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.

RESULTS:

Data details for individual trials conducted in 1982-1990 were included in respective previous reports, but summary yield and test weight data from past years are presented in abridged summary form for purposes of this report.

1991 cropping environments ranged from fair to excellent throughout most of north-central Montana. However, more trials were affected at least to some degree by hail in 1991 than any other single crop year during the testing period. At Havre, total annual growing season precipitation (9/1/90 -8/31/91) was 14.76 inches or 125 percent of the average for years since 1916. April 1 through July 31 precipitation was 10.98 inches or 168 percent of the 75-year average. However, during mid-development, periods of heat stress accompanied by drying winds at some locations resulted in crop yields and quality substantially lower than the potential exhibited earlier in the growing season.

Off-station cropping environments were very diverse with some locations recording normal to well above normal yields and quality while others were below average. A major breakdown with the Hege plot combine during mid-harvest resulted in yield loss at some locations where harvest was subsequently delayed and over-ripe plots had to be cut with a Suzue binder.

Early planting of spring grains was generally more important than normal in 1991 with earlier plantings escaping the most severe effects of heat and drought at critical growth stages.

Plant height, yield, test weight, and protein data for the Myers and Peterson dryland winter wheat trials conducted in 1991 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 1991 Cederberg, Myers, Peterson, Graff, and Solberg dryland spring wheat trials are summarized in Tables 5, 7, 9, 11 and 13, respectively. 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.

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. 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.

The 1991 dryland spring oat trial at the Peterson location was totally lost to hail; and a special 'organic' dryland spring oat trial at the Quinn location was totally lost to livestock depredation.

FUTURE PLANS:

It was planned, budget allowing, to continue off-station variety investigations in the five-county area. However, pending budget reductions for the Montana Agricultural Experiment Station may now severely reduce or perhaps totally curtail the off-station program in place through Northern Agricultural Research Center since 1982.

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.

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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.

TABLE 1. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
CI 17441	VONA	30.52	58.83	62.90	10.76
PI477287	RAM	34.55	57.50	60.33	11.34
PI491532	CREE	39.95	56.10	62.00	11.94
CI 17860	NEELEY	33.50	55.43	61.27	11.02
ID 279	BLIZZARD	38.14	53.20	61.43	12.82
CJ 17879	ROCKY	36.21	50.50	62.60	10.54
ND 8002	SEWARD	36.21	50.23	61.07	11.30
CI 17902	WINRIDGE	34.37	49.47	60.70	11.02
CI 17952	HAWK	29.72	47.90	61.93	11.61
CI 15075	CENTURK	37.76	47.87	62.47	11.47
CI 13190	WARRIOR	38.16	47.37	61.53	12.46
CI 8885	CHEYENNE	39.06	47.27	61.53	12.42
NA 0001	THUNDERBIRD	32.94	46.80	62.90	11.77
CI 13670	WINALTA	39.12	46.13	62.60	12.02
PI478771	AGASSIZ	39.83	46.03	61.90	12.05
CI 17735	NORSTAR	42.19	45.80	61.50	11.62
MT 8039	JUDITH	32.64	45.37	61.00	11.36
PI517194	TIBER	34.66	44.73	61.50	11.57
PI491533	NORWIN	23.82	43.83	61.93	10.81
CI 17439	ROUGH RIDER	40.71	43.23	61.70	12.80
CI 17844	REDWIN	37.56	42.17	61.30	13.45
MT 7811	FRD/WNK//MT 6928/TR (hard white)	31.82	40.77	60.67	12.31

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	35.61	48.48	61.67	11.75
C.V. 2: (S OF MEAN/MEAN)*100	2.72	5.93	.21	-
LSD (0.05)	2.76	8.21	.37	-

Note: Crop suffered minor hail damage on two occasions (5/20 & 7/13)

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	09/24/90	Soil Temp @ Sdg:	80F @ 2in., 73F @ 4in.
Harvest Date:	08/13/91	Root Penetration Depth:	N/A in.
Seeding Depth:	1.75 in.	Depth to Moisture at Sdg:	1.50 in.
Soil Series:	Assiniboine variant	Probed Moist.Depth @ Sdg:	55.0 in.+
Previous Crop:	Fallow	Herbicide:	None Applied (hand weeded)
Initial Stored Soil Water at Seeding:	7.71 in.	(sampling depth = 48 in.)	
Fall/Winter Season Precipitation (Seeding to January 31 = Unavailable)	(February 1 to March 31):		
Total - all measurable events:	0.85 in.		

TABLE 1. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA (Continued).

Growing Season Precipitation (Apr 1 to May 2):

Total - all measurable events: 1.10 in.

Total - all events >.1 inches: 1.10 in.

Measured Soil Water on May 2: 4.11 in. (sampling depth = 48 in.)

Measured Soil Water at Harvest: 3.38 in. (sampling depth = 48 in.)

Growing Season Precipitation (May 2 to 14 days prior to harvest maturity 'HM'):

Total - all measurable events: 8.45 in.

Total - all events >.1 inches: 8.40 in.

Post Growing Season Precipitation (within 14 days of harvest maturity):

Total - all measurable events: 0.20 in.

Total - all events >.1 inches: 0.20 in.

Adj'd Residual Soil Water @ (HM-14d): 3.18 in. (sampling depth = 48 in.)

Soil Analysis on 9/24/90: (NO₃,P,K at 0-6 in.; NO₃ at 6-24, 24-36 & 36-48 in.):

NO₃(lbs/ac)= 146 , P(ppm olsen)= 19 , K(ppm)= 413 , pH= 6.8, O.M.(%) = 1.5

Fertilizer: 50#N,21#P2O₅ via NH₃ inject.+ gran. band pre-plant fall 1990

TABLE 2. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MT. 1982-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHEL PER ACRE)							TEST WEIGHT (POUNDS PER BUSHEL)								
		1987	1988	1989 4/	1990	1991 5/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 6/	PERCENT OF CHEYENNE 7/	1987	1988	1989 4/	1990	1991 5/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. TEST WT 6/	PERCENT OF CHEYENNE 7/
NA 000X RAM (P+)	3	-	14.6	-	73.2	57.5	53.3	58.7	142.6	-	57.6	-	57.8	60.3	58.6	57.5	93.5
CI 17860 NEELY	5	48.9	10.3	-	63.4	55.4	42.1	46.7	113.3	62.2	59.8	-	60.6	61.3	60.8	61.5	99.9
CI 17441 VONA	3	40.4	9.5	-	-	58.8	36.3	44.6	108.4	62.8	60.6	-	-	62.9	62.1	61.6	100.1
MT 8003 TIBER	8	45.7	12.2	-	56.7	44.7	42.8	44.2	107.4	61.8	60.2	-	60.9	61.5	61.5	61.5	99.9
NA 1316 ROCKY (P+)	9	44.8	10.5	-	53.9	50.5	44.0	44.0	106.9	62.0	59.8	-	61.3	62.6	61.9	61.9	100.5
CI 17902 WINRIDGE	8	45.1	11.1	-	62.5	49.5	42.6	44.0	106.8	61.6	59.8	-	60.4	60.7	60.3	60.3	98.0
CI 17735 NORSTAR	9	48.7	12.8	-	53.7	45.8	43.4	43.4	105.4	61.5	59.1	-	61.3	61.5	61.0	60.9	99.0
NA 200 HAWK (P+)	5	42.9	14.3	-	59.8	47.9	42.3	43.0	104.5	61.8	59.6	-	60.6	61.9	60.9	61.6	100.1
MT 77063 CREE	9	43.7	13.2	-	49.6	56.1	42.8	42.8	103.9	61.5	60.1	-	61.2	62.0	61.9	61.8	100.5
MT 8039 JUDITH	5	51.6	11.5	-	58.4	45.4	41.7	42.4	103.0	60.7	59.3	-	58.2	61.0	59.6	60.2	97.9
NA 001 THUNDERBIRD (P+)	5	40.4	16.5	-	61.6	46.8	40.9	41.7	101.2	62.2	59.9	-	61.9	62.9	61.8	62.5	101.5
CI 13190 WARRIOR	4	39.5	10.9	-	-	47.4	38.2	41.4	100.5	60.9	59.0	-	-	61.5	60.2	60.8	98.9
CI 8885 CHEYENNE	9	42.0	14.4	-	50.4	47.3	41.2	41.2	100.0	61.0	60.4	-	61.2	61.5	61.6	61.5	100.0
MT 7811 FRD//MT6928	3	-	-	-	53.3	40.8	48.2	41.2	99.9	-	-	-	60.3	60.7	62.0	60.9	98.9
CI 15075 CENTURK (+)	9	46.5	5.5	-	55.0	47.9	40.8	40.8	99.1	62.0	59.6	-	60.8	62.5	61.9	61.8	100.5
CI 13670 WINALTA	9	38.7	14.4	-	55.3	46.1	40.7	40.7	98.8	62.1	60.0	-	61.5	62.6	62.1	62.0	100.7
CI 17844 REDWIN	9	42.4	9.8	-	51.0	42.2	39.9	39.9	96.9	62.3	61.0	-	60.4	61.3	61.8	61.8	100.4
ND 7687 AGASSIZ	3	-	-	-	-	46.0	38.7	39.4	95.6	-	-	-	-	61.9	60.5	61.3	99.6
MT 7877 NORMIN	8	39.8	9.4	-	48.2	43.8	36.3	37.5	91.1	63.1	60.7	-	60.8	61.9	61.9	62.0	100.7
RH78W296 BIGHORN (P+)	3	35.7	-	-	41.5	-	40.9	37.4	90.9	61.4	-	-	59.9	-	60.9	61.5	99.9
CI 17439 ROUGHRIDER	3	-	-	-	-	43.2	36.7	36.9	89.6	-	-	-	-	61.7	50.8	61.1	99.3
NA WINGS (P+)	3	40.5	9.0	-	-	-	31.0	36.6	88.8	61.6	59.9	-	-	-	60.8	61.7	100.2
SR 4685 CITATION (P+)	3	-	-	-	-	-	33.3	33.6	81.5	-	-	-	-	-	61.2	61.2	99.5
SR 4714 BRAHMY (P+)	3	-	-	-	-	-	36.6	31.8	77.1	-	-	-	-	-	62.8	61.1	99.4

MEAN (ENTRIES LISTED)	43.2	11.7	-	55.7	48.2	-	41.4	-	61.8	59.8	-	60.5	61.7	-	61.2	-
8/ Growing Season Precip. (in.)	4.70	3.50	0.00	6.90	8.45	5.66										
9/ Soil PAW (in.) to 4 ft. @Sdg.	9.49	6.25	6.18	9.29	7.71	6.59										
Total Plant Avail. Water (in.)	14.19	9.75	0.00	16.19	16.16	12.25										
Fertilizer Applied (# N)	56.0	56.0	51.0	48.0	50.0											
(# P2O5)	28.0	28.0	28.0	21.0	21.0											
(# K2O)	10.0	10.0	9.0	0.0	0.0											
(# S)	0.0	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, 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/ 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 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 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. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
CI 17860	NEELEY	33.86	59.63	57.20	15.12
CI 17441	VONA	27.66	59.43	56.03	15.05
CI 17952	HAWK	29.92	59.30	56.07	14.21
CI 13670	WINALTA	36.71	58.27	59.23	15.98
ND 8002	SEWARD	34.97	56.37	57.30	14.11
PI491533	NORWIN	24.29	55.93	57.60	14.55
MT 7811	FRD/WNK//MT 6928/TR (hard white)	35.14	54.63	56.90	16.71
CI 13190	WARRIOR	34.27	54.50	57.23	15.93
PI477287	RAM	30.51	52.27	53.70	13.78
CI 17879	ROCKY	34.24	51.10	59.23	14.64
CI 15075	CENTURK	32.06	50.27	58.33	14.86
MT 8039	JUDITH	32.97	50.00	54.67	15.45
NA 0001	THUNDERBIRD	30.00	49.53	59.53	15.33
CI 17439	ROUGH RIDER	34.93	48.20	58.83	15.67
PI491532	CREE	33.91	48.07	58.50	16.53
CI 17844	REDWIN	34.57	47.30	58.60	16.95
PI478771	AGASSIZ	35.31	46.80	57.20	16.78
PI517194	TIBER	35.41	46.23	57.67	17.44
CI 17735	NORSTAR	34.65	45.73	58.20	15.91
ID 279	BLIZZARD	30.85	44.73	58.07	15.84
CI 17902	WINRIDGE	35.25	42.27	55.03	15.71
CI 8885	CHEYENNE	34.61	37.77	58.33	15.86

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	33.00	50.83	57.43	15.56
C.V. 2: (S OF MEAN/MEAN)*100	3.29	7.78	.61	-
LSD (0.05)	3.10	11.29	1.00	-

Note: Crop suffered substantial hail damage

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 09/10/90	Soil Temp @ Sdg: __F @ 2in., __F @ 4in.
Harvest Date: 08/24/90	Root Penetration Depth: __ in.
Seeding Depth: __ in.	Depth to Moisture at Sdg: __ in.
Soil Series: Telstad Loam	Probed Moist.Depth @ Sdg: 55.0 in.+
Previous Crop: Fallow	Herbicide: `Salvo' @ 12oz/ac
Initial Stored Soil Water at Seeding: 5.41 in.	(sampling depth = 48 in.)
Fall/Winter Season Precipitation (seeding to March 31):	
Total - all measurable events: 1.86 in.	
Total - all events >.1 inches: 1.58 in.	

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TABLE 3. DRYLAND FALLOW WINTER WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991. (Continued).

CLIMATIC and NURSERY MANAGEMENT DATA (Continued).

Growing Season Precipitation (Apr 1 to Apr 30)

Total - all measurable events:	0.84 in.	
Total - all events >.1 inches:	0.77 in.	
Measured Soil Water on Apr 30:	4.69 in.	(sampling depth = 48 in.)
Measured Soil Water at Harvest:	4.36 in.	(sampling depth = 48 in.)

Growing Season Precipitation (May 1 to 14 days prior to harvest maturity 'HM'):

Total - all measurable events:	8.84 in.
Total - all events >.1 inches:	8.36 in.

Post Growing Season Precipitation (within 14 days of harvest maturity):

Total - all measurable events:	3.24 in.
Total - all events >.1 inches:	3.24 in.

Adj'd Residual Soil Water @ (HM-14d): 1.12 in. (sampling depth = 48 in.)

Soil Analysis on 9/10/90: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):

NO3(lbs/ac)= 182 , P(ppm olsen)= 23 , K(ppm)= 302 , pH= 7.3, O.M.(%) = 1.0
Fertilizer: 65#N,25#P2O5,10#K2O via NH3 + 5-25-10 granular injected 7/19/90

TABLE 4. NINE-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. 1983-1991.

2/VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED 4/	9-YR COMPAR. AVERAGE YIELD 5/	PERCENT OF CHEYENNE YIELD 6/			
		1983	1984	1988	1990	1991 4/	1983	1984	1988	1990	1991 4/				9-YR COMPAR. AVERAGE TEST WT 5/	PERCENT OF CHEYENNE TEST WT 6/	
CI 17860 NEELY	3	-	-	14.9	41.3	59.6	38.6	45.4	122.9	-	-	61.9	56.8	57.2	58.6	59.5	97.8
MT 8039 JUDITH	3	-	-	16.1	48.7	50.0	38.3	45.0	121.7	-	-	60.6	55.8	54.7	57.0	57.9	95.1
CI 17735 NORSTAR	5	63.7	30.7	19.2	44.6	45.7	40.8	40.8	110.4	64.0	57.6	61.0	60.0	58.2	60.2	60.2	98.9
CI 15075 CENTURK (+)	4	-	29.3	15.7	42.3	50.3	34.4	40.0	108.3	-	58.8	61.2	58.6	58.3	59.2	60.3	99.1
CI 13670 WINALTA	5	54.7	30.6	15.8	40.4	58.3	39.9	39.9	108.1	64.9	59.3	61.2	60.0	59.2	60.9	60.9	100.2
PI491532 CREE	4	-	30.4	19.4	38.6	48.1	34.1	39.7	107.4	-	59.8	61.3	59.6	58.5	59.8	60.9	100.1
PI517194 TIBER	5	58.9	33.2	20.0	39.6	46.2	39.6	39.6	107.2	64.4	58.0	61.9	58.5	57.7	60.1	60.1	98.8
CI 17879 ROCKY (P+)	5	58.9	28.5	15.8	43.0	51.1	39.4	39.4	106.8	61.3	59.1	61.3	58.7	59.2	60.0	60.0	98.5
PI491533 NORWIN	5	52.7	32.4	15.2	40.3	55.9	39.3	39.3	106.4	64.8	60.0	62.3	59.0	57.6	60.7	60.7	99.8
CI 8885 CHEYENNE	5	57.7	32.7	16.7	39.8	37.8	36.9	36.9	100.0	65.2	59.2	61.5	60.0	58.3	60.8	60.8	100.0
CI 16844 REDWIN	5	47.6	31.5	17.4	36.8	47.3	36.1	36.1	97.8	62.3	58.8	62.2	58.9	58.6	60.2	60.2	98.9
CI 17092 WINRIDGE	4	-	30.0	12.7	39.1	42.3	31.0	36.1	97.7	-	55.2	60.9	55.7	55.0	56.7	57.7	94.9
MEAN (ENTRIES LISTED)		56.3	30.9	16.6	41.2	49.4		39.9		63.8	58.6	61.4	58.5	57.7		59.9	
6/ Growing Season Precip. (in.)		7.43	1.96	3.23	5.45	8.84	5.38										
7/ Soil PAW (in.) to 4 ft. @Sdg		8.00	8.00	9.30	9.92	5.41	8.13										
Total Plant Avail. Water (in.)		15.43	9.96	12.53	15.37	14.25	13.51										
Fertilizer Applied (#N)		71.0	56.0	13.5	50.0	65.0											
(#P2O5)		33.0	42.0	34.5	25.0	25.0											
(#K2O)		-	-	0.0	10.0	10.0											
(# S)		-	-	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/ 9-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 = 9-yr. average yield and test weight for the check variety Cheyenne.

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

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

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

Hr
GRC
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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. 1991.

ID	VARIETY OR SELECTION	PLNT HT YIELD TEST WT PROTEIN			
		Inches	Bu/Ac	Lbs/Bu	%
PI483235	GLENMAN	33.36	47.50	56.80	14.64
WPB 926	WESTBRED 926	29.68	47.47	56.30	15.51
CI 17430	NEWANA	32.57	47.43	57.63	15.01
CI 17828	PONDERA	31.97	45.83	57.83	15.04
ND 606	AMIDON	36.81	45.73	57.67	15.61
CI 15930	OLAF	32.82	44.37	56.17	15.53
WA 6920	PENAWAWA (soft white)	30.62	44.17	56.60	14.64
CI 17790	LEN	30.77	44.13	56.63	15.72
CI 13596	FORTUNA	38.25	42.67	59.50	15.36
CI 17429	LEW	38.90	42.47	59.27	15.66
CI 17904	OWENS (soft white)	31.65	41.23	54.20	14.26
MT 8402	HI-LINE	29.95	40.70	55.33	16.26
ND 626	GRANDIN	32.99	40.13	57.70	15.95
ND 618	GUS	35.04	39.73	57.60	17.34
ND 582	STOA	37.65	39.33	56.30	16.37
C982-324	RAMBO	30.87	39.27	56.87	15.76
NDCUT	CUTLESS	35.37	37.70	57.37	16.15
CANLANC	LANCER	40.72	37.33	58.37	16.15

STATISTICAL SUMMARY	PLNT HT YIELD TEST WT PROTEIN			
	Inches	Bu/Ac	Lbs/Bu	%

EXPERIMENTAL MEANS	33.89	42.62	57.12	15.61
C.V. 2: (S OF MEAN/MEAN)*100	1.72	4.04	.62	-
LSD (0.05)	1.68	4.95	1.01	-

Note: Shatter loss was substantial as crop was over-ripe for harvest by binder (necessary due to major plot combine breakdown).

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/08/91	Soil Temp @ Sdg: 64F @ 2in., 59F @ 4in.
Harvest Date: 08/28/91	Root Penetration Depth: 30.0 in.
Seeding Depth: 1.00 in.	Depth to Moisture at Sdg: 0.00 in.
Soil Series: Telstad	Probed Moist.Depth @ Sdg: 55.0 in.+
Previous Crop: Fallow	Herbicide: 2,4-D+Dicamba(8ozai+.75ozai)
Initial Stored Soil Water at Seeding: 6.56 in.	(sampling depth = 48 in.)
Measured Soil Water at Harvest: 1.89 in.	(sampling depth = 30 in.)
Growing Season Precipitation (Sdg. to 14 days prior to harvest maturity 'HM'):	
Total - all measurable events: 10.32 in.	
Total - all events >.1 inches: 10.04 in.	
Post Growing Season Precipitation (within 14 days of harvest maturity):	
Total - all measurable events: 0.26 in.	
Total - all events >.1 inches: 0.21 in.	
Adj'd Residual Soil Water @ (HM-14d): 1.63 in.	(sampling depth = 30 in.)
Soil Analysis on 5/8/91: (NO ₃ ,P,K at 0-6 in.; NO ₃ at 6-24, 24-36 & 36-48 in.):	
NO ₃ (lbs/ac)= 100 , P(ppm olsen)= 11 , K(ppm)= 227 , pH= 6.3, O.M.(%) = 1.2	
Fertilizer: 70#N,40#P205 via 46-0-0+11-52-0 bd'cst & till-incorp pre-plant	

TABLE 6. FIVE-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. 1987-1991.

2/ VARIETY OR SELECTION TESTED	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1987	1988	1989	1990	1991	AVERAGE FOR YEARS TESTED	5-YR. COMPAR. AVERAGE YIELD 3/	PERCENT OF FORTUNA YIELD 4/	1987	1988	1989	1990	1991	AVERAGE FOR YEARS TESTED	5-YR. COMPAR. TEST WT 3/	PERCENT OF FORTUNA TEST WT 4/
PI483235 GLENMAN	5	32.2	21.7	29.7	33.3	47.5	32.9	32.9	129.2	58.9	60.9	58.6	59.3	56.8	58.9	58.9	98.5
CI 17904 OWENS(sft wht)	5	26.0	18.3	29.8	31.3	41.2	29.3	29.3	115.3	59.5	62.7	59.6	59.2	54.2	59.0	59.0	98.8
CI 17790 LEN	5	27.1	19.7	24.7	30.5	44.1	29.2	29.2	114.9	59.1	61.2	59.1	57.9	56.6	58.8	58.8	98.3
CI 17429 LEW	5	30.4	19.0	28.5	25.7	42.5	29.2	29.2	114.8	60.3	62.3	60.3	60.2	59.3	60.5	60.5	101.2
CI 17430 NEWANA	5	25.0	20.4	24.1	27.3	47.4	28.8	28.8	113.4	60.3	59.3	61.0	59.8	57.6	59.6	59.6	99.7
CI 17910 ALEX	4	22.4	20.0	25.8	24.7	-	23.2	27.9	109.9	60.2	62.7	60.6	58.9	-	60.6	60.5	101.2
ND 606 AMIDON	3	-	-	28.6	25.4	45.7	33.2	27.7	108.9	-	-	59.7	57.6	57.7	58.3	58.5	97.9
ND 582 STOA	5	24.9	19.9	24.6	26.8	39.3	27.1	27.1	106.6	59.3	62.0	59.8	58.8	56.3	59.2	59.2	99.1
WA 6920 PENAWAWA (sfiwh)	3	-	-	25.6	27.3	44.2	32.4	27.0	105.1	-	-	59.1	58.2	56.6	58.0	58.2	97.3
CI 17828 PONDERA	5	19.8	17.7	23.6	26.6	45.8	26.7	26.7	105.0	59.9	59.5	60.0	60.0	57.8	59.4	59.4	99.4
CANLANC LANCER	4	-	17.3	27.9	27.7	37.3	27.6	26.4	103.7	-	62.0	59.6	58.7	58.4	59.7	59.3	99.3
MT 8402 HI-LINE	4	-	14.4	25.2	28.2	40.7	27.1	26.0	102.1	-	61.9	59.3	58.9	55.3	58.9	58.5	97.9
C982-324 RAMBO (P+)	5	25.4	19.7	24.8	19.7	39.3	25.8	25.8	101.3	60.7	63.3	60.4	59.3	56.9	60.1	60.1	100.6
CI 17920 MARSHALL	3	17.0	19.8	24.5	-	-	20.4	25.6	100.7	59.2	62.4	58.1	-	-	59.9	59.3	99.2
CI 15930 OLAF	5	19.7	18.2	23.0	22.4	44.4	25.5	25.5	100.4	59.0	61.5	59.5	57.9	56.2	58.8	58.8	98.4
CI 13596 FORTUNA	5	20.9	14.7	25.3	23.6	42.7	25.4	25.4	100.0	58.5	61.7	60.9	58.3	59.5	59.8	59.8	100.0
NDJUT CUTLESS	5	20.0	15.2	22.6	18.8	37.7	22.9	22.9	89.8	58.5	62.0	59.5	58.2	57.4	59.1	59.1	98.9
WPB 906R WSTBRD906R (P+)	3	-	11.8	24.7	20.1	-	18.9	22.6	88.9	-	61.7	59.6	59.2	-	60.2	59.6	99.8
MEAN (ENTRIES LISTED)		23.9	18.0	25.7	25.8	42.7		27.0		59.5	61.7	59.7	58.8	57.1		59.3	
5/ Growing Season Precip. (in.)		6.05	6.00	6.84	8.07	10.32		7.46									
6/ Soil PAW (in.) to SD @Plntng.		5.97	8.58	4.86	7.97	6.56		6.79									
Total Plant Avail. Water (in.)		12.02	14.58	11.70	16.04	16.88		14.24									
Soil NO3 (lbs.) to SD @Plntng.		68.0	84.0	52.0	120.0	100.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		53.0	50.0	70.0	62.0	70.0											
(# P2O5)		35.0	0.0	0.0	45.0	40.0											

Check variety is Fortuna.

1/ See MCEB 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/ 5-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 = 5-yr. average yield or test weight for the check variety Fortuna.

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

5/ Seeding to 14 days prior to harvest maturity.

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

TABLE 7. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
ND 606	AMIDON	40.05	36.53	54.83	15.76
ND 618	GUS	35.16	36.40	55.07	16.08
ND 582	STOA	38.71	36.17	54.53	15.76
CI 17828	PONDERA	31.60	33.73	56.67	15.12
WA 6920	PENAWAWA (soft white)	32.40	32.77	52.20	12.75
CI 17904	OWENS (soft white)	33.99	32.47	53.90	13.35
WPB 926	WESTBRED 926	33.53	31.70	55.80	15.36
CI 17790	LEN	32.94	31.30	54.70	14.75
MT 8402	HI-LINE	32.61	30.73	54.20	15.18
CI 13596	FORTUNA	39.58	30.37	56.17	15.85
CI 15930	OLAF	33.53	29.60	52.90	15.16
ND 626	GRANDIN	35.98	29.10	54.03	15.67
C982-324	RAMBO	32.03	28.40	53.10	15.73
NDCUT	CUTLESS	35.13	28.23	55.67	17.00
CI 17429	LEW	40.24	27.33	55.93	16.74
CI 17430	NEWANA	31.18	26.07	53.03	14.52
PI483235	GLENMAN	31.80	25.83	53.10	15.76
CANLANC	LANCER	40.64	25.40	55.67	17.00

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	35.06	30.67	54.53	15.42
C.V. 2: (S OF MEAN/MEAN)*100	2.05	4.87	.96	-
LSD (0.05)	2.07	4.30	1.50	-

Note: Crop suffered minor hail damage

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/02/91 Soil Temp @ Sdg: 50F @ 2in., 47F @ 4in.
Harvest Date: 08/27/91 Root Penetration Depth: N/A in.
Seeding Depth: 1.00 in. Depth to Moisture at Sdg: 0.00 in.
Soil Series: Assiniboine variant Probed Moist.Depth @ Sdg: 55.0 in.+
Previous Crop: Fallow Herbicide: None Applied (hand weeded)
Initial Stored Soil Water at Seeding: 8.47 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 2.74 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity 'HM'):
Total - all measurable events: 8.45 in.
Total - all events >.1 inches: 8.40 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
Total - all measurable events: 0.90 in.
Total - all events >.1 inches: 0.90 in.
Adj'd Residual Soil Water @ (HM-14d): 1.84 in. (sampling depth = 48 in.)
Soil Analysis on 5/2/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
NO3(lbs/ac)= 128 , P(ppm olsen)= 14 , K(ppm)= 363 , pH= 7.4, O.M.(%) = 1.3
Fertilizer: 50#N,21#P2O5 via NH3 inject.+gran band pre-plant fall 1990

TABLE 8. FOUR-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER, HAVRE, MONTANA. 1988-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	4-YR COMPAR. AVERAGE YIELD	PERCENT OF FORTUNA YIELD	
		1988	1989	1990	1991	1992	1988	1989	1990	1991	1992				
CI 17904 OWENS (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 PENAWAWA	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
WPB 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	
6/Growing Season Precip. (in.)		3.50	8.77	6.90	8.45			6.91							
7/ Soil PAW (in.) to SD at @plant		6.25	6.38	10.23	8.47			7.83							
Total Plant Avail. Water (in.)		9.75	15.15	17.13	16.92			14.74							
Soil NO3 (lbs.) to SD @Plant.		116.0	192.0	160.0	128.0										
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0										
Fertilizer Applied (NN)		56.0	51.0	48.0	50.0										
(#P205)		28.0	28.0	21.0	21.0										
(#K20)		10.0	9.0	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/ 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.

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

6/ Seeding to 14 days prior to harvest maturity.

7/ Soil PAW values are actual gravimetric measurements.

TABLE 9. DRYLAND FALLOW SPRING WHEAT VARIETY NURERSY GROWN OFF-STATION AT THE MARK & NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
WPB 926	WESTBRED 926	32.03	36.40	52.67	17.90
CI 17828	PONDERA	33.94	36.10	55.57	17.47
PI483235	GLENMAN	32.41	35.30	52.50	16.29
CI 17790	LEN	31.02	33.90	52.83	16.89
CI 17904	OWENS (soft white)	31.52	33.60	51.60	15.08
WA 6920	PENAWAWA (soft white)	30.05	33.53	50.93	15.30
C982-324	RAMBO	30.92	31.43	52.93	17.59
CI 13596	FORTUNA	37.87	31.30	55.47	16.05
NDCUT	CUTLESS	32.66	31.13	54.67	17.80
ND 606	AMIDON	36.68	30.13	53.87	17.04
MT 8402	HI-LINE	30.24	30.00	51.10	18.02
CI 17430	NEWANA	29.62	29.70	51.07	16.86
CANLANC	LANCER	39.36	28.83	55.20	16.88
CI 15930	OLAF	32.97	28.77	50.33	17.80
CI 17429	LEW	36.65	27.60	54.17	18.41
ND 626	GRANDIN	33.81	27.23	51.17	17.55
ND 582	STOA	36.55	27.10	52.83	18.02
ND 618	GUS	31.33	26.23	53.97	18.75

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %
EXPERIMENTAL MEANS	33.31	31.02	52.94	17.21
C.V. 2: (S OF MEAN/MEAN)*100	2.92	3.04	.73	-
LSD (0.05)	2.80	2.71	1.12	-

Note: Crop suffered substantial hail damage

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 04/30/91 Soil Temp @ Sdg: 54F @ 2in., 50F @ 4in.
 Harvest Date: 08/24/91 Root Penetration Depth: N/A in.
 Seeding Depth: 1.50 in. Depth to Moisture at Sdg: 0.00 in.
 Soil Series: Telstad Loam Probed Moist.Depth @ Sdg: 55.0 in.+
 Previous Crop: Fallow Herbicide: `Salvo' @ 12oz/ac

Initial Stored Soil Water at Seeding: 6.69 in. (sampling depth = 48 in.)
 Measured Soil Water at Harvest: 4.13 in. (sampling depth = 48 in.)
 Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
 Total - all measurable events: 8.96 in.
 Total - all events >.1 inches: 8.48 in.

Post Growing Season Precipitation (within 14 days of harvest maturity):
 Total - all measurable events: 3.12 in.
 Total - all events >.1 inches: 3.12 in.

Adj'd Residual Soil Water @ (HM-14d): 1.01 in. (sampling depth = 48 in.)
 Soil Analysis on 4/30/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
 NO3(lbs/ac)= 140 , P(ppm olsen)= 20 , K(ppm)= 322 , pH= 6.3, O.M.(%) = 1.0
 Fertilizer: 65#N,25#P2O5,10#K2O via NH3 + 5-25-10 granular injected 7/19/90

TABLE 10. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1982-1991.

2/ VARIETY OR SELECTION TESTED	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1987	1988	1989	1990	1991	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. OF AVERAGE YIELD	PERCENT OF FORTUNA YIELD	1987	1988	1989	1990	1991	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT	PERCENT OF FORTUNA TEST WT.
PI483235 GLENMAN	10	52.8	10.6	29.3	31.0	35.3	34.8	34.8	121.8	55.2	55.7	57.9	58.1	52.5	56.6	56.6	96.9
CI 17904 OWENS(sft white)	9	54.3	10.3	26.3	32.3	33.6	32.2	34.7	121.3	56.4	57.5	58.0	60.0	51.6	56.6	57.2	97.9
CI 17790 LEN	7	43.5	13.9	24.2	28.6	33.9	34.3	33.2	116.0	55.1	55.9	57.3	56.9	52.8	56.6	56.0	95.9
CI 17430 NEWANA	10	45.4	10.2	26.4	31.3	29.7	32.1	32.1	112.5	59.1	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	35.6	9.2	20.6	28.4	28.8	28.1	30.0	105.2	57.6	57.1	57.9	58.3	50.3	58.0	57.4	98.3
CI 17828 PONDERA	10	35.4	9.7	21.8	28.1	36.1	29.8	29.8	104.3	58.1	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	45.5	7.8	23.6	25.8	31.4	26.8	29.3	102.5	59.2	58.0	61.1	61.0	52.9	58.4	58.9	100.8
CI 17429 LEW	10	40.0	11.6	22.8	29.2	27.6	29.2	29.2	102.3	57.8	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	35.3	9.3	24.9	30.0	31.3	28.6	28.6	100.0	58.4	56.6	58.2	61.2	55.5	58.4	58.4	100.0
NDCUT CUTLESS	5	39.6	11.6	20.8	26.6	31.1	25.9	28.3	99.1	56.8	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	30.3	12.7	22.7	28.7	-	29.5	27.9	97.6	57.1	57.6	60.1	60.6	-	59.4	59.6	102.1
WPB 906R WSTBRD906R (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	33.1	12.2	22.1	27.6	27.1	23.6	25.3	88.4	57.4	56.3	57.9	57.7	52.8	56.1	55.5	95.0
CI 17920 MARSHALL	6	39.4	12.6	22.1	-	-	18.6	20.9	73.3	57.3	56.6	55.8	-	-	57.9	57.0	97.7
MEAN (ENTRIES LISTED)		40.8	10.9	24.2	28.9	31.2	-	29.1	-	57.4	57.0	58.4	59.3	53.0	-	57.6	-
7/ Growing Season Precip. (in.)		3.42	3.29	5.49	4.87	8.96	4.56										
8/ Soil PAW (in.) to SD @Pltng		9.66	11.96	7.14	8.67	6.69	7.33										
Total Plant Avail. Water (in.)		13.08	15.25	12.63	13.54	15.65	11.89										
Soil N03 (lbs.) to SD @Pltng		92.0	102.0	120.0	196.0	140.0											
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	65.0											
(# 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 Fortuna.

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

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/ 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. 1991.

ID	VARIETY OR SELECTION	1/			2/		3/
		PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %	RESIDUE Lbs/Ac	RESIDUE Lbs/Bu
WA 6920	PENAWAWA (soft white)	34.33	66.77	56.93	12.18	4801.70	82.97
CI 17904	OWENS (soft white)	36.23	63.47	55.93	11.94	5763.07	101.57
CI 17430	NEWANA	31.51	62.60	58.60	13.00	4712.07	85.20
ND 606	AMIDON	40.38	60.13	58.23	13.64	5691.60	127.13
C982-324	RAMBO	33.20	59.80	59.27	13.51	4698.20	84.63
CI 17790	LEN	33.99	59.70	58.37	13.44	5597.70	101.13
PI483235	GLENMAN	34.75	58.23	58.33	13.33	5126.07	98.47
WPB 926	WESTBRED 926	32.61	58.23	55.97	14.00	4641.63	84.73
MT 8402	HI-LINE	33.57	57.77	57.27	13.90	4937.20	94.67
CI 17828	PONDERA	33.57	57.50	58.30	13.88	5451.50	93.47
ND 618	GUS	37.24	55.27	58.67	14.73	5069.53	90.93
CI 15930	OLAF	33.75	55.07	56.50	14.23	5181.60	97.53
ND 626	GRANDIN	35.39	54.40	57.80	13.80	4623.50	90.27
ND 582	STOA	40.45	53.13	57.33	14.36	5015.13	112.70
NDCUT	CUTLESS	35.07	51.83	59.43	14.23	5109.00	108.37
CI 13596	FORTUNA	40.51	50.23	60.00	14.59	5351.23	122.03
CI 17429	LEW	40.85	49.40	59.47	14.96	5803.67	115.37
CANLANC	LANCER	44.86	42.30	58.67	15.18	5593.47	126.47

STATISTICAL SUMMARY	1/			2/		3/
	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PROTEIN %	RESIDUE Lbs/Ac	RESIDUE Lbs/Bu

EXPERIMENTAL MEANS	36.24	56.44	58.06	13.83	5175.99	100.98
C.V. 2: (S OF MEAN/MEAN)*100	2.22	4.49	1.01	-	4.86	8.72
LSD (0.05)	2.31	7.28	1.69	-	722.40	25.32

1/ Based on 19 sqft hvst with binder (precision was > than 3 sqft hand hvst)

2/ Based on 3 sqft hvst via hand clip (all above-grnd plnt material less grain)

3/ Based on hand harvest for both residue and grain

Seeding Date: 05/06/91 Soil Temp @ Sdg: 58F @ 2in., 54F @ 4in.

Harvest Date: 08/29/91 Root Penetration Depth: 48.0 in.

Seeding Depth: 1.00 in. Depth to Moisture at Sdg: 0.25 in.

Soil Series: N/A (clay loam) Probed Moist.Depth @ Sdg: 55.0 in.+

Previous Crop: Fallow Herbicide: N/A

Initial Stored Soil Water at Seeding: 10.15 in. (sampling depth = 48 in.)

Measured Soil Water at Harvest: 4.63 in. (sampling depth = 48 in.)

Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity 'HM'):

Total - all measurable events: 10.30 in.

Total - all events >.1 inches: 9.92 in.

Post Growing Season Precipitation (within 14 days of harvest maturity):

Total - all measurable events: 1.44 in.

Total - all events >.1 inches: 1.37 in.

Adj'd Residual Soil Water @ (HM-14d): 3.19 in. (sampling depth = 48 in.)

Soil Analysis on 5/6/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):

NO3(lbs/ac)= 76 , P(ppm olsen)= 12 , K(ppm)= 216 , pH= 8.0, O.M.(%) = 1.6

Fertilizer: 70#N,40#P205 via granular blend bd'cst & till-incorp pre-plant

TABLE 12. THREE-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. 1989-1991.

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	3-YR COMPAR. AVERAGE YIELD 3/	PERCENT OF FORTUNA YIELD 4/	1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	3-YR COMPAR. AVERAGE TEST WT. 3/	PERCENT OF FORTUNA TEST WT. 4/
WA 6920 PENAWAMA(SFT WHT)	3	45.8	41.2	66.8	-	-	51.3	51.3	127.1	59.7	59.2	56.9	-	-	58.6	58.6	96.2
ND 606 AMIDON	3	44.2	39.0	60.1	-	-	47.8	47.8	118.5	60.6	60.9	58.2	-	-	59.9	59.9	98.3
CI 17430 NEWANA	3	44.7	35.7	62.6	-	-	47.7	47.7	118.2	61.9	61.0	58.6	-	-	60.5	60.6	99.4
PI483235 GLENMAN	3	47.0	37.1	58.2	-	-	47.4	47.4	117.6	60.8	60.0	58.3	-	-	59.7	59.7	98.0
CI 17904 OWENS (SFT WHT)	3	42.2	35.5	63.5	-	-	47.1	47.1	116.7	60.0	59.3	55.9	-	-	58.4	58.5	96.0
CI 17790 LEN	3	43.1	38.1	59.7	-	-	47.0	47.0	116.5	59.3	59.4	58.4	-	-	59.0	59.0	96.9
CI 17828 PONDERA	3	44.3	39.1	57.5	-	-	47.0	47.0	116.5	60.9	61.2	58.3	-	-	60.1	60.1	98.7
C982-324 RAMBO (P+)	3	43.3	32.6	59.8	-	-	45.2	45.2	112.2	61.7	62.3	59.3	-	-	61.1	61.1	100.3
CI 15930 OLAF	3	44.3	35.7	55.1	-	-	45.0	45.0	111.7	59.3	60.3	56.5	-	-	58.7	58.8	96.5
MT 8402 HI-LINE	3	38.4	36.7	57.8	-	-	44.3	44.3	109.9	57.9	58.8	57.3	-	-	58.0	58.0	95.2
ND 582 STOA	3	43.8	35.7	53.1	-	-	44.2	44.2	109.6	60.3	60.6	57.3	-	-	59.4	59.5	97.6
CI 17429 LEN	3	41.6	34.2	49.4	-	-	41.7	41.7	103.4	61.8	60.4	59.5	-	-	60.5	60.5	99.4
ND CUT CUTLESS	3	39.3	31.0	51.8	-	-	40.7	40.7	100.9	60.5	61.1	59.4	-	-	60.4	60.4	99.1
CI 13596 FORTUNA	3	38.6	32.1	50.2	-	-	40.3	40.3	100.0	61.1	61.7	60.0	-	-	60.9	60.9	100.0
CANLANC LANCER	3	39.6	36.9	42.3	-	-	39.6	39.6	98.2	60.5	61.1	58.7	-	-	60.1	60.1	98.6
MEANS (ENTRIES LISTED)		42.7	36.0	56.5				45.1		60.4	60.5	58.2			59.7		
5/Growing Season Precip. (in.)		6.99	5.32	10.30				7.54									
6/ Soil PAW (in.) to SD at @plant		7.59	10.96	10.15				9.57									
Total Plant Avail. Water (in.)		14.58	16.28	20.45				17.10									
Soil NO3 (lbs.) to SD @Plant.		144.0	266.0	76.0													
SD (Sampling Depth in inches)		48.0	48.0	48.0													
Fertilizer Applied (#N)		78.0	0.0	70.0													
(#P2O5)		36.0	0.0	40.0													
(#K2O)		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/ 3-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 = 3-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.

TABLE 13. DRYLAND FALLOW SPRING WHEAT VARIETY NURSERY GROWN OFF-STATION AT THE HAROLD SOLBERG FARM, DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT YIELD TEST WT PROTEIN			
		Inches	Bu/Ac	Lbs/Bu	%
WA 6920	PENAWAWA (soft white)	25.76	27.80	56.17	12.94
WPB 926	WESTBRED 926	25.73	27.57	56.27	14.84
PI483235	GLENMAN	26.97	24.20	56.33	14.52
ND 606	AMIDON	29.88	23.97	56.73	15.74
CI 17430	NEWANA	26.25	23.13	57.97	14.33
C982-324	RAMBO	25.41	22.97	57.83	15.49
MT 8402	HI-LINE	25.18	22.03	55.97	16.38
NDCUT	CUTLESS	27.64	21.77	57.67	15.17
CI 17828	PONDERA	25.38	21.50	56.83	16.48
CI 17429	LEW	30.71	21.50	57.37	16.51
CI 13596	FORTUNA	28.94	20.73	57.47	16.32
CI 15930	OLAF	26.13	20.43	55.93	15.39
CI 17904	OWENS (soft white)	25.03	20.33	53.73	14.23
CANLANC	LANCER	31.25	19.40	57.93	15.42
ND 618	GUS	25.63	19.40	56.93	15.38
CI 17790	LEN	26.15	19.03	55.17	14.42
ND 626	GRANDIN	27.68	18.07	56.00	14.58
ND 582	STOA	27.11	17.43	54.30	16.50

STATISTICAL SUMMARY	PLNT HT YIELD TEST WT PROTEIN			
	Inches	Bu/Ac	Lbs/Bu	%
EXPERIMENTAL MEANS	27.05	21.74	56.48	15.26
C.V. 2: (S OF MEAN/MEAN)*100	3.07	10.57	.94	-
LSD (0.05)	2.39	6.60	1.53	-

Note: Crop suffered very substantial hail injury

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/19/91 Soil Temp @ Sdg: 77F @ 2in., 73F @ 4in.
 Harvest Date: 08/30/91 Root Penetration Depth: 45.0 in.
 Seeding Depth: 1.25 in. Depth to Moisture at Sdg: 0.25 in.
 Soil Series: Phillips-Elloam Probed Moist.Depth @ Sdg: 55.0 in.+
 Previous Crop: Fallow Herbicide: LV4 @ 8oz + Dicamba @ 1.5oz
 Initial Stored Soil Water at Seeding: 7.60 in. (sampling depth = 48 in.)
 Measured Soil Water at Harvest: 4.24 in. (sampling depth = 48 in.)
 Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
 Total - all measurable events: 12.50 in.
 Total - all events >.1 inches: 12.50 in.
 Post Growing Season Precipitation (within 14 days of harvest maturity):
 Total - all measurable events: 0.50 in.
 Total - all events >.1 inches: 0.50 in.
 Adj'd Residual Soil Water @ (HM-14d): 3.74 in. (sampling depth = 48 in.)
 Soil Analysis on 5/19/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
 NO3(lbs/ac)= 128 , P(ppm olsen)= 33 , K(ppm)= 391 , pH= 6.5, O.M.(%) = 1.3
 Fertilizer: 70#N,40#P2O5 via 46-0-0+11-52-0 bd'cst & till-incorp pre-plant

TABLE 14. EIGHT-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. 1984-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED 4/	8-YR. COMPAR. OF AVERAGE FORTUNA 5/	PERCENT OF FORTUNA 6/			
		1987	1988	1989	1990	1991	1987	1988	1989	1990	1991						
MT 7819 GLENMAN	8	42.1	23.8	40.7	22.3	24.2	26.7	26.7	124.7	57.0	59.3	57.5	58.3	56.3	56.8	56.8	96.5
C982-324 RAMBO(P+)	5	39.3	22.0	35.8	20.2	23.0	28.1	25.6	119.7	60.3	61.6	59.2	59.6	57.8	59.7	59.3	100.9
CI 17904 OWENS (soft white)	8	50.2	14.0	34.3	18.1	20.3	24.8	24.8	115.9	58.3	60.6	56.1	57.7	53.7	56.9	56.9	96.7
WPB 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 NEWANA	8	40.5	24.0	32.4	22.7	23.1	24.5	24.5	114.2	60.4	62.2	58.1	59.3	58.0	59.0	59.0	100.3
ND 582 STOA	8	41.2	21.7	38.2	23.4	17.4	24.1	24.1	112.6	59.1	60.3	57.1	57.5	54.3	57.7	57.7	98.0
CI 17790 LEN	6	38.6	22.4	33.5	16.6	19.0	27.2	24.1	112.3	58.1	59.9	56.7	56.9	55.2	57.5	56.9	96.7
WA 6920 PENAWAMA (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	40.7	20.5	37.2	15.4	21.5	23.8	23.8	111.3	59.7	61.5	58.1	59.1	56.8	58.6	58.6	99.6
ND 606 AMTDON	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 CJT CJTLESS	5	40.5	19.2	36.2	11.1	21.8	25.7	23.5	109.8	58.9	60.6	59.0	58.0	57.7	58.8	58.5	99.4
CI 17429 LEW	8	37.9	21.2	32.8	14.8	21.5	22.3	22.3	104.1	59.6	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	33.4	17.6	32.2	13.3	20.7	21.4	21.4	100.0	59.1	60.5	60.3	58.6	57.5	58.8	58.8	100.0
CI 17920 MARSHALL (+)	5	38.4	23.1	33.6	-	-	25.3	21.3	99.5	58.5	60.0	56.3	-	-	57.8	56.4	95.9
CI 17910 ALEX	6	36.6	20.3	32.7	17.3	-	22.3	21.2	99.1	59.9	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	34.5	19.7	32.0	17.3	20.4	23.6	20.9	97.4	60.1	60.9	58.3	57.5	55.9	58.4	58.0	98.5
MEAN (ENTRIES LISTED)		39.5	19.9	34.4	17.3	21.7	-	23.3	-	59.2	60.8	57.9	58.2	56.5	-	57.9	-
7/ Growing Season Precip. (in.)		5.30	5.05	4.35	5.50	12.50		5.94									
8/ Soil PAW (in.) to SD @PIntng.		10.74	12.66	8.02	10.71	7.60		8.67									
Total Plant Avail. Water (in.)		16.04	17.71	12.37	16.21	20.10		14.60									
Soil NO3 (lbs.) to SD @PIntng.		80.0	182.0	72.0	184.0	128.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		0.0	45.0	70.0	47.0	70.0											
(# P2O5)		0.0	0.0	0.0	21.0	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 most recent five years are shown, but summary calculations include all years noted.

4/ Crop suffered very substantial hail injury.

5/ 8-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 = 8-yr. average yield or test weight for the check variety Fortuna.

6/ Percent of Fortuna yield and 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/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.

TABLE 15. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE LEON CEDERBERG FARM, TURNER. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CJ 15229	STEPTOE	30.97	57.83	40.07	38.60	31.00	.
PI483237	BOWMAN	31.13	50.33	51.40	84.10	6.50	
ND 9866	STARK	34.40	44.93	49.50	66.10	14.70	
CI 15856	LEWIS	30.97	43.73	48.17	49.90	23.00	
MT140523	HECTOR/KLAGES	31.71	37.87	44.57	20.30	51.10	P
PI531228	BEARPAW	30.75	36.63	45.27	46.60	28.00	E
CI 15857	CLARK	31.12	35.97	45.23	31.30	38.00	N
SK 76333	HARRINGTON	32.68	34.23	44.33	35.90	35.30	D
PI491534	GALLATIN	32.06	32.50	48.13	44.70	22.30	I
CI 9558	PIROLINE	33.86	32.40	46.93	14.40	50.10	N
CI 15514	HECTOR	32.57	31.83	47.30	35.10	33.10	G
NS 78054	BARONESSE	30.76	30.50	46.23	44.80	28.90	
MTSU 247	SHONKIN	32.03	18.73	49.50	5.90	74.20	
MN 52	EXCEL	30.63	15.20	41.67	16.40	58.10	

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	31.83	35.91	46.31	38.15	35.31	.
C.V. 2: (S OF MEAN/MEAN)*100	2.46	7.50	1.20	-	-	
LSD (0.05)	2.28	7.83	1.62	-	-	

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

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	05/08/91	Soil Temp @ Sdg:	64F @ 2in., 59F @ 4in.
Harvest Date:	08/28/91	Root Penetration Depth:	45.0 in.
Seeding Depth:	1.00 in.	Depth to Moisture at Sdg:	0.00 in.
Soil Series:	Telstad	Probed Moist.Depth @ Sdg:	55.0 in.
Previous Crop:	Fallow	Herbicide:	2,4-D+Dicamba(8ozai+.75ozai)
Initial Stored Soil Water at Seeding:	6.56 in.	(sampling depth = 48 in.)	
Measured Soil Water at Harvest:	3.16 in.	(sampling depth = 48 in.)	
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):			
Total - all measurable events:	9.86 in.		
Total - all events >.1 inches:	9.58 in.		
Post Growing Season Precipitation (within 14 days of harvest maturity):			
Total - all measurable events:	0.72 in.		
Total - all events >.1 inches	0.67 in.		
Adj'd Residual Soil Water @ (HM-14d):	2.44 in.	(sampling depth = 48 in.)	
Soil Analysis on 5/8/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):			
NO3(lbs/ac)= 100 , P(ppm olsen)= 11 , K(ppm)= 227 , pH= 6.3, O.M.(%) = 1.2			
Fertilizer:	70#N,40#P205 via 46-0-0+11-52-0 bd'cst & till-incorp pre-plant		

TABLE 16. FIVE-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. 1987-1991.

2/ VARIETY OR SELECTION TESTED	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED	5-YR. COMPAR. AVERAGE YIELD	PERCENT OF PIROLINE YIELD			
		1987	1988	1989	1990	1991	1987	1988	1989	1990	1991						
CI 15856 LEWIS	5	46.7	38.4	52.5	38.3	43.7	43.9	43.9	118.7	50.2	53.6	49.7	48.5	48.2	50.0	50.0	101.4
MT140523 MT140523	4	-	41.3	51.7	45.2	37.9	44.0	43.5	117.7	-	52.8	48.6	48.5	44.6	48.6	48.7	98.8
PI483237 BOWMAN	5	42.3	33.7	46.7	41.1	50.3	42.8	42.8	115.7	49.7	53.2	49.1	48.3	51.4	50.3	50.3	102.0
PI491534 GALLATIN	5	53.3	36.4	53.5	37.9	32.5	42.7	42.7	115.5	50.3	53.1	49.7	48.5	48.1	49.9	49.9	101.2
PI531228 BEARPAW	5	47.1	41.5	56.4	29.6	36.6	42.2	42.2	114.2	48.8	51.6	47.6	47.3	45.3	48.1	48.1	97.5
CI 15229 STEPTOE	5	35.9	26.7	52.2	37.9	57.8	42.1	42.1	113.7	42.8	48.3	43.9	43.2	40.1	43.7	43.7	88.5
CI 15857 CLARK	5	46.5	37.1	51.9	36.8	36.0	41.7	41.7	112.6	48.5	52.5	47.8	46.9	45.2	48.2	48.2	97.7
CI 15514 HECTOR	5	52.2	36.1	48.5	38.5	31.8	41.4	41.4	112.0	49.6	53.3	49.5	47.6	47.3	49.5	49.5	100.2
MT 81161 MT 81161	3	46.4	34.8	53.1	-	-	44.8	40.2	108.6	48.4	51.5	50.0	-	-	50.0	49.0	99.2
CI 9558 PIROLINE	5	35.4	36.1	52.2	28.9	32.4	37.0	37.0	100.0	49.8	52.8	48.5	48.7	46.9	49.3	49.3	100.0
SK 76333 HARRINGTON	5	43.7	32.9	44.6	19.3	34.2	34.9	34.9	94.4	47.9	52.5	47.9	47.2	44.3	48.0	48.0	97.2
MEANS (ENTRIES LISTED)		44.9	35.9	51.2	35.4	39.3	-	41.1	-	48.6	52.3	48.4	47.5	46.1	-	48.6	-
6/ Growing Season Precip. (in.)		6.05	6.00	6.84	8.07	9.86	7.36										
7/ Soil PAW (in.) to SD at @Pint		5.97	8.58	4.86	7.97	6.56	6.79										
Total Plant Avail. Water (in.)		12.02	14.58	11.70	16.04	16.42	13.59										
Soil NO3 (lbs.) to SD @Pintng.		68.0	84.0	52.00	120.0	100.0											
SD (Sampling Depth in inches)		48.0	48.0	48.00	48.0	48.0											
Fertilizer Applied (# N)		53.0	50.0	70.00	62.0	70.0											
(# P2O5)		35.0	0.0	0.00	45.0	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).

3/ 5-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 = 5-yr. average yield or test weight for the check variety Piroline.

3/ 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.

TABLE 17. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT MYERS FARMS, INC., BIG SANDY. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	STEPTOE	35.20	56.87	47.07	86.20	5.10	.
CI 9558	PIROLINE	39.24	43.20	52.90	74.10	13.90	.
MT140523	HECTOR/KLAGES	37.15	42.67	53.83	83.80	6.30	.
CI 15856	LEWIS	38.43	40.20	54.20	83.70	15.10	.
PI483237	BOWMAN	36.76	39.53	54.60	90.40	4.10	P
SK 76333	HARRINGTON	37.39	32.97	53.83	73.10	12.50	E
PI491534	GALLATIN	37.36	32.33	53.33	70.90	15.30	N
ND 9866	STARK	38.31	31.83	53.57	81.10	9.00	D
PI531228	BEARPAW	36.26	31.73	53.10	66.20	15.80	I
CI 15857	CLARK	35.67	30.80	52.63	86.50	12.00	N
MN 52	EXCEL	38.48	28.63	48.37	58.60	18.80	G
CI 15514	HECTOR	37.76	28.43	52.47	81.40	7.80	.
NS 78054	BARONESSE	33.95	22.47	50.63	67.70	15.90	.
MTSU 247	SHONKIN	37.18	21.13	56.80	24.10	47.70	.

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	37.08	34.49	52.67	73.41	14.24	.
C.V. 2: (S OF MEAN/MEAN)*100	2.24	9.15	1.25	-	-	-
LSD (0.05)	2.42	9.18	1.91	-	-	-

Note: 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).

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	05/02/91	Soil Temp @ Sdg:	50F @ 2in., 47F @ 4in.
Harvest Date:	08/27/91	Root Penetration Depth:	N/A in.
Seeding Depth:	1.00 in.	Depth to Moisture at Sdg:	0.00 in.
Soil Series:	Assiniboine variant	Probed Moist.Depth @ Sdg:	55.0 in.+
Previous Crop:	Fallow	Herbicide:	None Applied (hand weeded)
Initial Stored Soil Water at Seeding:	8.47 in.	(sampling depth = 48 in.)	
Measured Soil Water at Harvest:	3.36 in.	(sampling depth = 48 in.)	
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):			
Total - all measurable events:	8.45 in.		
Total - all events >.1 inches:	8.40 in.		
Post Growing Season Precipitation (withing 14 days of harvest maturity):			
Total - all measurable events:	0.90 in.		
Total - all events >.1 inches:	0.90 in.		
Adj'd Residual Soil Water @ (HM-14d):	2.46 in.	(sampling depth = 48 in.)	
Soil Analysis on 5/02/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):			
NO3(lbs/ac)= 128 , P(ppm olsen)= 14 , K(ppm)= 363 , pH= 7.4 , O.M.(%) = 1.3			
Fertilizer:	50#N,21#P2O5 via NH3 inject.+ gran band pre-plant fall 1990		

TABLE 18. FOUR-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. 1988-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)								
		1988	1989	1990	1991 3/	1992	AVERAGE FOR YEARS TESTED	4-YR. COMPAR. AVERAGE YIELD 4/	PERCENT OF PIROLINE YIELD 5/	1988	1989	1990	1991 3/	1992	AVERAGE FOR YEARS TESTED
CI 15229 STEPTOE	4	18.8	67.6	55.4	56.9	49.7	49.7	104.2	44.7	41.3	43.0	47.1	44.0	44.0	90.1
MT140523 MT 140523	4	21.7	72.4	57.6	42.7	48.6	48.6	102.0	51.1	46.2	48.2	53.8	49.8	49.8	102.0
PI531228 BEARPAW	4	23.8	72.9	63.9	31.7	48.1	48.1	100.9	49.4	40.6	47.2	53.1	47.6	47.6	97.4
CI 9558 PIROLINE	4	19.9	67.2	60.3	43.2	47.7	47.7	100.0	49.5	44.3	48.7	52.9	48.8	48.8	100.0
PI491534 GALLATIN	4	22.6	72.9	60.7	32.3	47.1	47.1	98.9	50.8	45.9	60.7	53.3	52.7	52.7	107.9
CI 15856 LEWIS	4	21.7	67.6	58.3	40.2	46.9	46.9	98.5	51.1	45.6	48.4	54.2	49.8	49.8	102.0
PI483237 BOWMAN	4	20.0	63.5	54.8	39.5	44.5	44.5	93.3	51.2	45.8	48.0	54.6	49.9	49.9	102.2
CI 15514 HECTOR	4	20.3	64.5	59.5	28.4	43.2	43.2	90.6	50.7	47.2	49.0	52.5	49.8	49.8	102.0
CI 15857 CLARK	4	20.0	64.7	57.0	30.8	43.1	43.1	90.5	50.1	45.0	46.6	52.6	48.6	48.6	99.5
SK 76333 HARRINGTON	4	17.8	56.0	61.4	33.0	42.0	42.0	88.2	49.2	44.0	47.6	53.8	48.7	48.7	99.6
MEANS (ENTRIES LISTED)		20.7	66.9	58.9	37.9			46.1	49.8	44.6	48.8	52.8			49.0
6/ Growing Season Precip. (in.)		3.50	8.77	6.90	8.45			6.91							
7/ Soil P _{AW} (in.) to SD at Plt.		6.25	6.38	10.23	8.47			7.83							
Total Plant Avail. Water (in.)		9.75	15.15	17.13	16.92			14.74							
Soil NO ₃ (lbs.) to SD at Plt.		116.0	192.0	160.0	128.0										
SD (sampling depth in inches)		48.0	48.0	48.0	48.0										
Fertilizer Applied (#N)		50.0	51.0	48.0	50.0										
(#P2O ₅)		28.0	28.0	21.0	21.0										
(#K ₂ O)		10.0	9.0	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/ 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/ 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_{AW} 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. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
CI 15229	STEPTOE	35.04	34.73	39.97	62.90	13.80	.
MT140523	HECTOR/KLAGES	32.05	26.23	48.23	44.60	20.40	
PI483237	BOWMAN	34.02	25.93	51.57	93.60	2.80	
CI 15514	HECTOR	38.49	19.90	46.63	46.90	21.90	
CI 15857	CLARK	36.40	19.80	45.03	40.10	24.80	P
CI 15856	LEWIS	36.73	19.43	47.23	42.00	21.70	E
PI491534	GALLATIN	35.50	19.43	47.37	51.20	17.40	N
CI 9558	PIROLINE	36.19	19.27	45.73	25.80	31.70	D
ND 9866	STARK	37.86	18.93	48.57	83.50	6.40	I
SK 76333	HARRINGTON	36.48	18.07	42.83	45.00	29.00	N
PI531228	BEARPAW	35.21	16.77	42.33	33.80	29.40	G
NS 78054	BARONESSE	29.50	16.67	43.90	43.40	21.40	
MTSU 247	SHONKIN	34.96	10.50	41.37	4.00	77.70	
MN 52	EXCEL	31.13	4.67	36.50	13.40	61.20	

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	34.97	19.31	44.80	45.01	27.11	.
C.V. 2: (S OF MEAN/MEAN)*100	4.07	10.47	.96	-	-	-
LSD (0.05)	4.14	5.88	1.25	-	-	-

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

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date:	04/30/91	Soil Temp @ Sdg:	54F @ 2in., 50F @ 4in.
Harvest Date:	08/24/91	Root Penetration Depth:	N/A in.
Seeding Depth:	1.50 in.	Depth to Moisture at Sdg:	0.00 in.
Soil Series:	Telstad Loam	Probed Moist.Depth @ Sdg:	55.0 in.+
Previous Crop:	Fallow	Herbicide:	'Salvo' @ 12oz/ac
Initial Stored Soil Water at Seeding:	6.69 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:	8.84 in.		
Total - all events >.1 inches:	8.36 in.		
Post Growing Season Precipitation (within 14 days of harvest maturity):			
Total - all measurable events:	3.24 in.		
Total - all events >.1 inches:	3.24 in.		
Adj'd Residual Soil Water @ (HM-14d):	0.55 in.	(sampling depth = 48 in.)	
Soil Analysis on 4/30/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):			
NO3(lbs/ac)= 140 , P(ppm olsen)= 20 , K(ppm)= 322 , pH= 6.3, O.M.(%) = 1.0			
Fertilizer:	65#N,25#P2O5,10#K2O via NH3 + 5-25-10 granular injected 7/19/90		

TABLE 20. TEN-YEAR YIELD AND TEST WEIGHT SUMMARY ON SELECTED ENTRIES FROM A FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE MARK AND NANCY PETERSON FARM, NORTH HAVRE. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1982-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHELS PER ACRE)								TEST WEIGHT (POUNDS PER BUSHEL)							
		1987	1988	1989	1990	1991 4/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE YIELD 5/	PERCENT OF PIROLINE YIELD 6/	1987	1988	1989	1990	1991 4/	AVERAGE FOR YEARS TESTED	10-YR. COMPAR. AVERAGE TEST WT 5/	PERCENT OF PIROLINE TEST WT. 6/
MT140523 MT140523	4	-	44.8	51.1	38.4	26.2	40.1	60.3	117.9	-	48.7	47.5	49.1	48.2	48.4	49.6	101.8
CI 15229 STEPTOE	7	74.3	32.4	45.0	43.2	34.7	45.9	58.2	113.7	43.1	43.0	38.7	42.9	40.0	41.0	41.3	84.7
CI 15856 LEWIS	9	64.7	38.7	44.7	34.5	19.4	47.8	55.0	107.4	51.0	49.2	47.7	50.3	47.2	49.4	50.0	102.6
PI531228 BEARPAW	6	71.2	49.8	43.6	33.0	16.8	47.8	54.6	106.7	47.8	48.0	45.6	48.9	42.3	47.2	47.5	97.4
PI483237 BOWMAN	7	68.6	43.8	48.9	38.1	25.9	42.9	54.3	106.2	49.8	48.7	47.3	48.7	51.6	48.7	49.0	100.6
PI491534 GALLATIN	8	67.6	39.4	50.8	37.7	19.4	42.4	54.2	106.0	49.4	48.5	47.2	50.5	47.4	49.5	51.1	104.8
CI 15857 CLARK	10	66.6	38.3	43.4	33.2	19.8	49.4	52.7	103.0	49.3	47.1	44.8	47.8	45.0	47.8	47.8	98.1
CI 9558 PIROLINE	10	62.8	37.1	41.5	38.2	19.3	48.0	51.2	100.0	49.7	49.3	43.8	49.9	45.7	48.8	48.8	100.0
CI 15514 HECTOR	10	51.6	40.0	54.9	38.5	19.9	47.6	50.7	99.2	51.5	48.8	47.3	49.8	46.6	50.4	50.4	103.3
SK 76333 HARRINGTON	10	66.8	39.2	39.5	27.0	18.1	46.4	49.5	96.7	48.1	47.1	45.7	48.9	42.8	47.8	47.8	98.0
MT 81161 MT 81161	3	50.5	35.7	49.0	-	-	45.1	48.9	95.6	48.1	46.4	43.3	-	-	46.0	47.1	96.5
CI 15687 KIMBERLY	3	43.6	42.7	-	-	-	51.7	46.7	91.3	49.9	47.9	-	-	-	49.8	48.1	98.7
ND 5569 HAZEN	4	32.4	-	-	-	-	34.6	39.5	77.2	44.1	-	-	-	-	45.4	46.0	94.4
MEANS (ENTRIES LISTED)		60.1	40.1	46.6	36.2	22.0	-	52.0	-	48.5	47.7	45.4	48.7	45.7	-	48.0	-
7/ Growing Season Precip. (in.)		3.42	3.24	5.49	4.87	8.84	5.42										
8/ Soil PAW (in.) to SD @Pltng.		9.66	9.76	7.14	8.67	6.69	7.78										
Total Plant Avail. Water (in.)		13.08	13.00	12.63	13.54	15.53	13.20										
Soil NO3 (lbs.) to SD @Pltng.		92.0	90.0	120.0	196.0	140.0											
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	65.0											
(# 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 Piroline.

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

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

TABLE 22. THREE-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. 1989-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)										
		1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	3-YR. COMPAR. AVERAGE YIELD 3/	PERCENT OF PIROLINE YIELD 4/	1989	1990	1991	1992	1993	AVERAGE FOR YEARS TESTED	3-YR. COMPAR. AVERAGE TEST WT. 3/	PERCENT OF PIROLINE TEST WT. 4/
CI 15229 STEPTOE	3	50.7	56.5	67.7	-	-	58.3	58.3	112.6	43.0	43.6	44.4	-	-	43.7	43.7	89.2
MT140523 MT 140523	3	55.9	55.9	55.4	-	-	55.8	55.8	107.7	48.3	50.4	46.7	-	-	48.5	48.5	98.9
PI491534 GALLATIN	3	58.8	55.0	52.4	-	-	55.4	55.4	107.0	49.6	50.3	49.4	-	-	49.7	49.7	101.6
PI483237 BOWMAN	3	51.4	57.0	50.5	-	-	53.0	53.0	102.3	49.6	50.3	50.6	-	-	50.2	50.2	102.4
CI 15514 HECTOR	3	54.0	56.8	47.9	-	-	52.9	52.9	102.2	49.6	49.5	47.3	-	-	48.8	48.8	99.7
MT 81616 BEARPAW	3	55.2	52.1	50.5	-	-	52.6	52.6	101.6	46.4	49.8	42.8	-	-	46.3	46.3	94.6
CI 15856 LEWIS	3	54.9	51.7	50.8	-	-	52.5	52.5	101.4	49.4	50.9	48.0	-	-	49.4	49.4	100.9
CI 9558 PIROLINE	3	51.5	53.0	50.8	-	-	51.8	51.8	100.0	48.7	50.3	48.0	-	-	49.0	49.0	100.0
CI 15857 CLARK	3	45.5	51.3	45.2	-	-	47.3	47.3	91.4	47.5	48.6	47.0	-	-	47.7	47.7	97.4
SK 76333 HARRINGTON	3	45.9	50.9	34.1	-	-	43.6	43.6	84.3	48.8	49.8	41.2	-	-	46.6	46.6	95.2
MEANS (ENTRIES LISTED)		52.4	54.0	50.5				52.3		48.1	49.4	46.5			48.0		
5/ Growing Season Precip. (in.)		6.99	5.32	10.02			7.44										
6/ Soil PAW (in.) to SD at Plt.		7.59	10.96	10.15			9.57										
Total Plant Avail. Water (in.)		14.58	16.28	20.17			17.01										
Soil NO3 (lbs.) to SD at Plt.		144.00	266.0	76.0													
SD (sampling depth in inches)		48.00	48.0	48.0													
Fertilizer Applied (#N)		78.00	0.0	70.0													
(#P2O5)		36.00	0.0	40.0													
(#K2O)		0.00	0.0	0.0													

Check variety is Piroline.

1/ See MCES Bulltin 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/ 3-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 = 3-yr. average of yield or test weight for the check variety Piroline.

4/ Percent of Piroline 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.

54

TABLE 23. DRYLAND FALLOW SPRING BARLEY VARIETY NURSERY GROWN OFF-STATION AT THE HAROLD SOLBERG FARM, NORTH DODSON. NORTHERN AGRICULTURAL RESEARCH CENTER. HAVRE, MONTANA. 1991.

ID	VARIETY OR SELECTION	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
PI491534	GALLATIN	23.60	23.73	45.90	13.70	58.00	.
PI483237	BOWMAN	18.28	23.23	47.77	45.00	25.50	
MT140523	HECTOR/KLAGES	21.09	22.87	46.53	21.50	49.60	
NS 78054	BARONESSE	19.04	22.07	46.90	26.30	35.70	
CI 15856	LEWIS	19.61	20.30	47.37	27.00	47.90	P
CI 15857	CLARK	21.97	19.60	44.23	15.40	57.10	E
CI 9558	PIROLINE	22.47	19.50	47.17	24.80	43.20	N
SK 76333	HARRINGTON	21.67	19.37	44.83	24.90	39.40	D
CI 15514	HECTOR	21.10	18.43	44.97	15.20	58.90	J
PI531228	BEARPAW	16.97	18.37	44.00	20.20	49.40	N
ND 9866	STARK	22.85	17.10	46.63	36.20	36.20	G
MN 52	EXCEL	19.07	16.00	40.50	16.20	62.40	
MTSU 247	SHONKIN	21.42	14.53	47.77	1.80	90.20	
CI 15229	STEPTOE	14.92	13.37	39.37	32.80	38.10	

STATISTICAL SUMMARY	PLNT HT Inches	YIELD Bu/Ac	TEST WT Lbs/Bu	PLUMP %	THIN %	PROTEIN %
EXPERIMENTAL MEANS	20.29	19.18	45.28	22.93	49.40	.
C.V. 2: (S OF MEAN/MEAN)*100	6.90	7.06	.89	-	-	-
LSD (0.05)	4.07	3.93	1.17	-	-	-

Note: Crop suffered very substantial hail damage

CLIMATIC and NURSERY MANAGEMENT DATA

Seeding Date: 05/19/91 Soil Temp @ Sdg: 77F @ 2in., 73F @ 4in.
Harvest Date: 08/30/91 Root Penetration Depth: 45.0 in.
Seeding Depth: 1.25 in. Depth to Moisture at Sdg: 0.25 in.
Soil Series: Phillips-Elloam Probed Moist.Depth @ Sdg: 55.0 in.+
Previous Crop: Fallow Herbicide: LV4 @ 8oz + Dicamba @ 1.5oz
Initial Stored Soil Water at Seeding: 7.60 in. (sampling depth = 48 in.)
Measured Soil Water at Harvest: 3.71 in. (sampling depth = 48 in.)
Growing Season Precipitation (Sdg.to 14 days prior to harvest maturity `HM'):
 Total - all measurable events: 13.00 in.
 Total - all events >.1 inches: 13.00 in.
Post Growing Season Precipitation (within 14 days of harvest maturity):
 Total - all measurable events: 0.50
 Total - all events >.1 inches: 0.50
Adj'd Residual Soil Water @ (HM-14d): 3.21 in. (sampling depth = 48 in.)
Soil Analysis on 5/19/91: (NO3,P,K at 0-6 in.; NO3 at 6-24, 24-36 & 36-48 in.):
 NO3(lbs/ac)= 128 , P(ppm olsen)= 33 , K(ppm)= 391 , pH= 6.5, O.M.(%) = 1.3
Fertilizer: 70#N,40#P2O5 via 46-0-0+11-52-0 bd'cst & till-incorp pre-plant

TABLE 24. EIGHT-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. 1984-1991.

2/ VARIETY OR SELECTION	NO. OF YEARS TESTED 3/	1/ YIELD (BUSHEL PER ACRE)					TEST WEIGHT (POUNDS PER BUSHEL)					AVERAGE FOR YEARS TESTED 4/	8-YR. COMPAR. OF AVERAGE PIROLINE YIELD 5/	PERCENT OF PIROLINE YIELD 6/	AVERAGE FOR YEARS TESTED 4/	8-YR. COMPAR. OF AVERAGE TEST WT 5/	PERCENT OF PIROLINE TEST WT 6/
		1987	1988	1989	1990	1991	1987	1988	1989	1990	1991						
PI491534 GALLATIN	6	47.5	-	54.8	47.0	23.7	35.8	35.8	111.7	48.4	-	47.9	49.1	45.9	46.8	46.8	98.5
CI 15229 STEPTOE	5	44.2	-	62.2	42.8	13.4	36.9	35.6	111.0	38.7	-	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	46.3	-	56.6	39.7	20.3	35.1	33.8	105.5	49.3	-	47.7	49.1	47.4	47.1	47.5	100.0
PI483237 BOWMAN	5	32.0	-	55.9	45.7	23.2	34.4	33.2	103.5	48.6	-	48.9	47.9	47.8	46.8	47.1	99.2
CI 9558 PIROLINE	6	31.7	-	68.5	33.6	19.5	32.0	32.0	100.0	48.6	-	50.3	48.4	47.2	47.5	47.5	100.0
CI 15857 CLARK	6	50.5	-	48.3	37.3	19.6	32.0	32.0	99.9	47.1	-	44.6	46.1	44.2	44.8	44.8	94.2
PI531228 BEARPAW	4	43.5	-	51.9	38.9	18.4	38.2	31.9	99.6	47.6	-	44.3	46.9	44.0	45.7	44.7	94.0
CI 15514 HECTOR	6	25.2	-	71.6	39.8	18.4	31.9	31.9	99.5	47.2	-	47.9	48.1	45.0	46.3	46.3	97.4
PI483238 HAZEN	3	36.7	-	-	-	-	23.2	31.5	98.3	42.6	-	-	-	-	41.7	42.7	89.9
SK 76333 HARRINGTON	6	42.5	-	51.7	27.5	19.4	27.3	27.3	85.2	48.5	-	45.7	47.2	44.8	46.2	46.2	97.2
MEAN (ENTRIES LISTED)		40.0	-	58.2	40.1	19.9	-	32.7	-	46.6	-	46.6	47.2	45.2	-	45.4	-
7/ Growing Season Precip. (in.)		5.30	5.05	8.02	5.50	13.00	6.00										
8/ Soil PAW (in.) to SD @Plntng.		10.74	12.66	8.02	10.71	7.60	8.67										
Total Plant Avail. Water (in.)		16.04	17.71	16.04	16.21	20.60	14.67										
Soil NO3 (lbs.) to SD @Plntng.		80.0	182.0	72.0	184.0	128.0											
SD (Sampling Depth in inches)		48.0	48.0	48.0	48.0	48.0											
Fertilizer Applied (# N)		0.0	44.0	70.0	47.0	70.0											
(# P205)		0.0	0.0	0.0	21.0	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/ 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/ 8-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 = 8-yr. average yield or test weight for the check variety Piroline.

6/ Percent of Piroline yield and 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/ Depth of moist soil (ft.) * 2.00 in. PAW/ft except starting in 1986 where soil PAW values are actual gravimetric measurements.