

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

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### **OBJECTIVES:**

Diverse cropping environments exist within that five-county area most closely served by this Research Center (Blaine, Chouteau, Hill, Liberty, and Phillips counties). Winter and spring wheat, barley, and oat production together in the five counties represents 29% of the 1998-2002 statewide total (34% and 31% for winter and spring wheat alone, respectively). Producers are keenly interested in variety performance data generated under local conditions. It is our objective, within budget and other resource limitations, to evaluate small grain variety performance, over time, under conditions representative of specific areas of Northern Montana yet differing from those of the Research Center.

It is also our objective to develop and maintain databases which are not only specific to differing major crop environments, but which are further augmented by as much associated climatic and production management information as is practical and feasible to collect. Since 1982 we have recorded and reported supportive information of this nature along with the crop performance data for each investigation. A new, standardized system was initiated in 1995 for better management and dissemination of such 'base data' in more detail than that provided previously. An abridged version of such 'base data' is included in this report for each trial at each location.

### **RESULTS:**

Data details for individual trials conducted from 1983-2002 were included in respective previous annual reports, but long-term yield and test weight data from the past ten years are presented in abridged form for summary purposes here as applicable. For winter and spring wheat, selected variety performance comparisons on the basis of gross dollar return for these off-station locations as well as the principal statewide trials conducted on-station at Havre are included in a separate report.

Cropping environments in 2003 ranged from very poor to fair across North Central Montana. At Havre, total annual growing season precipitation (9/1/02 through 8/31/03) was 11.54 inches, 3.7 percent less than the average for all years since 1916. April 1 through July 31 precipitation was 7.07 inches or 105 percent of the 88-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) were 107 percent of the average for the last 53 years (1951-2003). The last spring frost was 5 days late with the first fall frost 2 days early resulting in 117 frost-free days, 7 days shorter than the 88-year average. September 2002 through March 2003 precipitation was 98 percent of the long-term average. The April through July growing season saw an average daily temperature at 60 degrees F, over 2 degrees above normal. July and August average temperatures were 7.6 percent higher than normal with the high for 2003 recorded on July 14 at 105 degrees F. There were 40 days over 90 degrees F, 152 percent of the average at 26.4. There were 10 days over 100 degrees F. Favorable early conditions were soon followed by severe drought and heat stress commencing in late June which resulted in substantial crop yield reduction, abnormally high protein and moderate to severe reduction in grain test weight. Minimum winter temperature was -24 degrees F on January 23. Although crop outlook was initially very good with adequate fallow-stored soil moisture and generally favorable conditions, spring crop performance in most areas was a substantial disappointment whereas winter wheat performance varied from poor to excellent depending upon location. Late June hail damage in some areas (NARC-Havre included) further served to reduce crop yield and quality. Yield and test weight comparisons with long-term

averages varied according to crop and location. On-Station WW at Havre had reduced yields (60% of 10-year average) and normal test weights, SW had severely reduced yields (32% of 10-year average) and test weights (3 lbs less than 10-year average), BLY had severely reduced yields (22 percent of 10-year average) and moderately reduced test weights (2 lbs less than 10-year average), and OATS had severely reduced yields (31 percent of 10-year average) and test weights (3.5 lbs less than 10-year average). Some very early spring plantings escaped the severity of stress imposed on later plantings, but spring crops in general suffered stress associated with both drought and heat in most areas.

Off-station cropping environments were quite variable in 2003. The Loma location again had far below-average precipitation and suffered from substantial heat stress during periods critical to the production of cereal crops. Winter wheat yields were respectable with reduced test weights. Spring grain yields at Loma were relatively good with normal test weights for barley, but spring wheat saw severe test weight reduction. The Turner location had well below average precipitation which resulted in reduced yields and test weights across most spring crops throughout the Big Flat area. Sawfly damage was moderate at Turner with differential stem cutting by variety. The Loring location had appreciable precipitation early, but drought and heat stress that followed resulted in reduced yields and test weights for both spring wheat and barley. Sawfly damage at Loring ranged from moderate to severe with strong differential seen in stem cutting across varieties. Most locations recorded yields commensurate with moisture. Protein levels for appropriately fertilized wheat and barley were generally excellent, but protein values were abnormally high in those areas most seriously affected by drought and heat stress.

Stand percent, plant height, yield, moisture, test weight and protein data for the 2003 Peterson (North Havre) and McKeever (Loma) dryland winter wheat trials are summarized in Tables 1 and 2, respectively. This was the first year for a new series of winter wheat trials established at the Peterson location for winter hardiness evaluation. Multi-year yield and test weight summaries for this location will not be available until three years of data have been collected. The 2002 McKeever dryland winter wheat variety trial failed due to drought and was destroyed along with numerous other winter wheat studies in place there that year. Multi-year yield and test weight summary data for selected winter wheat entries at the McKeever location for 1999-2003 are presented in Table 3.

Stand percent, plant height, yield, moisture, test weight and protein data for the 2003 Cederberg (Turner), Flansaas/Lumsden (Loring) and McKeever (Loma) dryland spring wheat trials are summarized in Tables 4, 6 and 8, respectively. The Cederberg location, in place since 1982, further featured "fertilized vs. unfertilized" spring wheat variety performance evaluations (1994-1998). The Flansaas/Lumsden location replaced the 10-year Solberg location at Dodson (1986-1995). The McKeever location replaces the former, long-term Myers location (Big Sandy, 1988-1997). Multi-year yield and test weight summaries for selected spring wheat entries at the Cederberg, Flansaas/Lumsden and McKeever locations are presented in Tables 5, 7 and 9, respectively.

Stand percent, plant height, yield, moisture, test weight and protein data for the 2003 Cederberg (Turner) and McKeever (Loma) dryland durum trials are summarized in Tables 10 and 11, respectively. The evaluation of durum varieties was added at the Cederberg location in 2002, and at the McKeever location in 2003. After three years of data are in place at a location, multi-year year and test weight summaries will be reported.

Stand percent, plant height, yield, moisture, test weight, plump/thin and protein data for the 2003 Cederberg (Turner), Flansaas/Lumsden (Loring) and McKeever (Loma) dryland spring barley trials are summarized in Tables 12, 14 and 16, respectively. The Cederberg location, in place since 1982, further featured "fertilized vs. unfertilized" barley variety performance evaluations (1994-1998). The Flansaas/Lumsden location replaces the 10-year Solberg location at Dodson (1986-1995). The McKeever location replaces the former long-term Myers location (Big Sandy, 1988-1997), but barley variety evaluation was not initiated there until 1999. Multi-year yield and test weight summaries for selected spring barley entries at the Cederberg, Flansaas/Lumsden, and McKeever locations are presented in Tables 13, 15 and 17, respectively.

## **SUMMARY:**

Eight, standard, off-station variety performance trials were conducted in 2003 on mechanical or chemical fallow at three locations in three northern Montana counties.

## Dryland Winter Wheat Trials:

- |  |              |            |
|--|--------------|------------|
| 1. Mark Peterson Grain & Cattle, Inc., Hill County | (35NW Havre) | 20-35N-13E |
| 2. McKeever Farm & Seed, Inc., Chouteau County     | (12N Loma)   | 16-27N-10E |

## Dryland Spring Wheat Trials:

- |  |              |            |
|--|--------------|------------|
| 1. Leon Cederberg Farm, Blaine County          | (3NE Turner) | 13-36N-25E |
| 2. Flansaas/Lumsden Farm, Phillips County      | (1SW Loring) | 24-35N-29E |
| 3. McKeever Farm & Seed, Inc., Chouteau County | (12N Loma)   | 16-27N-10E |

## Dryland Spring Durum Trials:

- |  |              |            |
|--|--------------|------------|
| 1. Leon Cederberg Farm, Blaine County          | (3NE Turner) | 13-36N-25E |
| 2. McKeever Farm & Seed, Inc., Chouteau County | (12N Loma)   | 16-27N-10E |

## Dryland Spring Barley Trials:

- |  |              |            |
|--|--------------|------------|
| 1. Leon Cederberg Farm, Blaine County          | (3NE Turner) | 13-36N-25E |
| 2. Flansaas/Lumsden Farm, Phillips County      | (1SW Loring) | 24-35N-29E |
| 3. McKeever Farm & Seed, Inc., Chouteau County | (12N Loma)   | 16-27N-10E |

All trials were seeded in replicated, 3-row, 20-foot plots on a 12-inch row spacing utilizing a self-propelled cone seeder. Trials (1988-1991) were planted with hoe openers fitted with 'Acra-Plant' or JD 3" shovels. Beginning with spring planting in 1992, all off-station trials were planted with modified 'Haybuster' openers. A randomized complete block design was standard for all trials with three replications. Beginning in 1997, a 'Wintersteiger 1541-21' plot combine, funded in part by MWBC was used to harvest each 3-row plot after end-trimming to 16'. Prior to 1997, a 'Hege 125C' plot combine, also funded in part by MWBC in 1984, was used. Some 1991 plots were harvested via the former binder/thresher method due to breakdown of the Hege plot combine. Other variables specific to each individual trial are listed with the current year data tables.

**FUTURE PLANS:**

It is planned, with drought, budget and other resources allowing, to continue off-station cereal variety investigations in the five-county area. This work has been strongly supported by producers near most of the locations, and by the Northern Ag Research Center Advisory Committee. Budgets aside, expanded overall workload suggested that the number of replicated, off-station variety trial locations needed to be reduced - at least for the time being. Spring grains were dropped in 1997 (after 10 years of data) at the Myers/Big Sandy location. This was an excellent location with truly outstanding producer cooperation and support. However, current sawfly-resistant variety development efforts involve establishment and maintenance of 2,000-3,000 plots on the McKeever Farm only a few miles away where conditions (other than sawfly pressure) are quite similar. Thus, the Big Sandy location has been put on hold for the time being; and standard off-station winter wheat, spring wheat, durum and barley variety trials have been established at the Loma sawfly research site. In addition, spring grains were dropped from the North Havre location when it was relocated from the Peterson Farm to other sites for winter wheat variety evaluation only, in the fall of 1997. And, although the cooperating producer interest and support at the former Graff location north of Joplin (spring wheat and barley varieties) was excellent, a need to reduce overall workload made it necessary to discontinue this location after collecting ten years of data.

It is planned to continue off-station spring wheat and barley variety evaluations at the Cederberg (Turner), Flansaas/Lumsden (Loring) and McKeever (Loma) locations and durum evaluation at the Cederberg and McKeever location. The Loring location is entering its' ninth year, and the cooperator and area producer interest and support has been outstanding. The Turner location is only 32 miles from the Loring site, but conditions there are quite different; and it is our opinion that the Turner location should be continued at least until 2007 which will mark 20 years at the present site (plus 5 years on a different soil series at a site nearby). However, the double plantings at Turner comparing fertilized vs. unfertilized plots were terminated following the 1998 crop year as originally planned. Cooperating producer and general community interest and support at Turner is outstanding.

Data processed by the Center will normally be limited to trials where the Center performs all field functions from

planting to harvest. Special arrangements may be made with Extension Agents desiring to conduct additional replicated trials on their own. Packaged seed can likely again be provided to the County Extension Agents as per their needs for non-replicated demonstration 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 GPS, GIS and computer mapping to augment identification and selection of appropriate sites for off-station work. The former Graff, and current Flansaas/Lumsden locations in Liberty and Phillips Counties were selected in this manner.

It is our current opinion that effort put forth 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. This is particularly true when critical season workload would otherwise result in less than timely planting and maintenance of certain sites.

**TABLE 1. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at the Mark Peterson Grain & Cattle Inc., North Havre. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-3852-WW)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/		2/		SAWFLY % cut
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	PROTEIN %	
ND9257	JERRY	70.8	30.5	61.4	9.7	57.8	15.7	61.7
MT9982	Promontory/Judith	87.2	26.4	60.3	9.4	58.8	15.2	35.0
CI 17860	NEELEY	71.5	27.1	59.2	9.9	57.1	15.4	13.3
PI586806	NUWEST	78.5	28.8	58.9	9.1	59.2	15.6	78.3
MT00159	Promontory/Judith	86.8	27.1	58.8	9.2	58.3	15.2	43.3
PI599336	MORGAN	83.7	27.7	56.4	9.2	58.0	15.6	56.7
PI555458	PROMONTORY	88.2	26.8	56.2	8.9	61.8	14.4	81.7
MTR9997	PI262605/MT7863//Redwin	88.9	26.3	55.9	9.1	60.5	16.7	88.3
MTI01158	Fidel/Tiber	86.8	26.7	55.9	9.0	61.7	14.8	15.0
MTW9441	NUSKY	93.8	27.9	55.9	9.1	60.4	15.3	90.0
MTS0031	GENOU	97.6	28.8	55.0	9.3	59.6	16.3	8.3
PI593889	RAMPART	96.9	30.7	54.8	9.2	59.6	16.2	3.3
S94-4	CDC FALCON	95.5	25.0	54.1	9.2	59.0	15.5	43.3
MT9989	Blizzard/Arapahoe	96.2	29.2	53.5	8.9	57.8	15.9	61.7
CI 17879	ROCKY	93.8	28.1	51.7	9.5	61.3	15.6	23.3
PI584526	JUDITH	86.5	27.4	50.3	9.0	56.4	15.5	63.3
RH78W296	BIGHORN	94.1	25.4	49.5	9.2	60.6	15.8	43.3
BZ96-919	PRYOR	91.0	27.0	48.6	8.9	57.4	15.3	58.3
MT0097	Erhardt//Judith/Kestrel	91.0	25.7	48.5	9.7	57.8	15.7	28.3
MT9426	PAUL	89.9	26.1	48.2	9.0	54.9	16.0	68.3
PI593891	VANGUARD	92.7	27.8	46.8	9.1	59.5	16.4	8.3
CI 17735	NORSTAR	83.7	29.0	46.7	10.1	57.5	16.2	43.3
MT 9432	BIGSKY	97.9	29.5	45.9	9.0	61.1	16.2	63.3
PI517194	TIBER	85.1	26.8	45.0	9.2	59.8	16.1	31.7
EXPERIMENTAL MEANS		88.7	27.6	53.2	9.3	59.0	15.7	46.3
LSD (0.05)		18.8	3.5	11.2	0.8	2.2	.	33.5
C.V.2: (S of MEAN / MEAN)*100		7.5	4.5	7.4	3.2	1.3	.	25.4

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.

2/ Protein values are adjusted to 12 percent grain moisture.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.6	2" Soil Temp (°F) @ Plnt'g	60
Quarter	NE	Soil Texture 0-6"	CL	4" Soil Temp (°F) @ Plnt'g	59
Section	20	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	35N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	13E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	70
Latitude	N48 52.578'	Init Zn (ppm) 0-6"	0.7	Fert. Rate (lbs/ac) P2O5	40
Longitude	W108 23.580'	Init Mn (ppm) 0-6"	9.2	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	0.8	Herbicide App. Date	5/27
pH 0-6"	7	Init Fe (ppm) 0-6"	29.5	Herbicide Product	Bronate Adv.
Org.Matter (%) 0-6"	1.6	CEC 0-6"	21.8	Herbicide Rate (/ac)	20 oz
Init N (lbs/ac) 0-6"	38	Init PAW (in.) 0-6"	0.98	Precip (in.) Plnt'g-Harvest	5.65
Init N (lbs/ac) 6-24"	30	Init PAW (in.) 6-24"	3.22	Precip (>.1) Plnt'g-Harvest	4.48
Init N (lbs/ac) 24-36"	28	Init PAW (in.) 24-36"	2.11	Harvest Date	7/31
Init N (lbs/ac) 36-48"	28	Init PAW (in.) 36-48"	2.26	Rooting Depth (in.)	
Init P (ppm) Olsen 0-6"	33	Cropping System	NT-ChmFlw	Post PAW (in.) 0-6"	0.28
Init K (ppm) 0-6"	449	Planting Date	9/23	Post PAW (in.) 6-24"	0.84
Init S (ppm) 0-24"	20	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	0.91
Init Na (MEQ/100g) 0-6"	0.08	Moist Soil Depth @Plnt'g	51	Post PAW (in.) 36-48"	1.46
SaltHaz (MMHOS/cm) 0-6"	0.88	Dry Surf Soil (in.) @Plnt'g	0.25	Precip (>.1) Hvst-Post	0.86

**TABLE 2. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-3853-WW)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/		2/	
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	PROTEIN %
MT00159	Promontory/Judith	100.0	33.4	51.2	6.6	56.3	16.9
MTI01158	Fidel/Tiber	98.9	31.1	50.0	6.6	59.5	16.9
CI 17879	ROCKY	100.0	35.5	48.1	6.9	58.5	16.1
PI555458	PROMONTORY	99.5	33.0	46.7	6.8	56.2	17.1
MT0097	Erhardt//Judith/Kestrel	100.0	34.0	46.0	6.7	57.4	17.5
PI517194	TIBER	99.7	36.2	45.4	6.9	59.5	17.2
MTR9997	PI262605/MT7863//Redwin	100.0	34.8	43.5	6.8	58.4	17.3
BZ96-919	PRYOR	99.2	28.1	43.5	6.3	55.9	18.4
MT9989	Blizzard/Arapahoe	99.7	36.5	43.5	6.5	52.8	17.6
ND9257	JERRY	99.2	34.6	43.2	6.8	57.4	17.5
S94-4	CDC FALCON	99.5	28.3	42.7	6.6	55.0	17.9
RH78W296	BIGHORN	99.7	27.1	41.2	6.7	58.5	17.3
PI593891	VANGUARD	99.2	32.4	40.8	6.8	59.1	17.9
MTW9441	NUSKY	99.2	31.6	40.7	6.6	57.6	18.1
PI599336	MORGAN	99.5	33.8	40.6	6.5	56.4	16.3
MT9982	Promontory/Judith	98.9	32.4	39.8	6.7	57.4	17.2
PI586806	NUWEST	99.2	31.7	39.8	6.5	57.0	17.9
MTS0031	GENOU	99.7	33.2	39.4	6.6	56.1	18.5
CI 17860	NEELEY	98.7	28.7	38.8	6.5	55.9	18.3
MT9426	PAUL	99.7	29.6	37.8	6.3	53.0	19.0
PI593889	RAMPART	100.0	30.7	37.0	6.7	59.2	17.9
CI 17735	NORSTAR	99.2	33.3	36.1	6.8	58.7	17.5
PI584526	JUDITH	98.9	34.3	35.9	6.4	52.8	18.0
MT 9432	BIGSKY	99.7	34.2	35.8	6.5	55.6	18.5
EXPERIMENTAL MEANS		99.5	32.4	42.0	6.6	56.8	17.6
LSD (0.05)		1.3	3.6	5.7	0.3	1.7	.
C.V.2: (S of MEAN / MEAN)*100		0.5	3.9	4.7	1.4	1.0	.

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.

2/ Protein values are adjusted to 12 percent grain moisture.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.72	2" Soil Temp (°F) @ Plnt'g	64
Quarter	SE	Soil Texture 0-6"	CL	4" Soil Temp (°F) @ Plnt'g	61
Section	16	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	27N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	10E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude	N48 05.782'	Init Zn (ppm) 0-6"	0.4	Fert. Rate (lbs/ac) P2O5	40
Longitude	W110 27.174'	Init Mn (ppm) 0-6"	11.4	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	1.2	Herbicide App. Date	n/a
pH 0-6"	6.2	Init Fe (ppm) 0-6"	30	Herbicide Product	n/a
Org.Matter (%) 0-6"	1	CEC 0-6"	21.8	Herbicide Rate (/ac)	n/a
Init N (lbs/ac) 0-6"	26	Init PAW (in.) 0-6"	1.02	Precip (in.) Plnt'g-Harvest	
Init N (lbs/ac) 6-24"	36	Init PAW (in.) 6-24"	3.46	Precip (>.1) Plnt'g-Harvest	
Init N (lbs/ac) 24-36"	36	Init PAW (in.) 24-36"	1.69	Harvest Date	8/1
Init N (lbs/ac) 36-48"	20	Init PAW (in.) 36-48"	1.82	Rooting Depth (in.)	34"
Init P (ppm) Olsen 0-6"	23	Cropping System	CT-MechFlw	Post PAW (in.) 0-6"	0.82
Init K (ppm) 0-6"	284	Planting Date	9/29	Post PAW (in.) 6-24"	2.75
Init S (ppm) 0-24"	34	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	1.42
Init Na (MEQ/100g) 0-6"	0.09	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	1.59
SaltHaz (MMHOS/cm) 0-6"	0.48	Dry Surf Soil (in.) @Plnt'g	0.75	Precip (>.1) Hvst-Post	0.00

<sup>1</sup>Cooperator applied pre-plant Anhydrous - 50 lb available N



**TABLE 3. Four-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station in a Wheat Stem Sawfly Environment at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 1999-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)							TEST WEIGHT (Pounds Per Bushel)								
		1999	2000	2001	2002 6/	2003	AVE.	%	5-YR COMP. AVE. YIELD 3/	1999	2000	2001	2002 6/	2003	AVE.	%	5-YR COMP. AVE. TEST WT 3/
							TESTED 5/	CHECK YIELD 4/							TESTED 5/	CHECK TEST WT 4/	
CI 17879	ROCKY	4	33.2	47.0	13.3	48.1	35.4	120.4	<b>35.4</b>	62.8	63.6	54.6	58.5	59.9	101.5	<b>59.9</b>	
PI517194	TIBER	4	36.7	44.9	13.1	45.4	35.0	119.1	<b>35.0</b>	62.4	62.7	54.3	59.5	59.7	101.3	<b>59.7</b>	
PI593889	RAMPART (sawfly resis.)	4	35.9	42.7	16.4	37.0	33.0	112.3	<b>33.0</b>	61.8	62.2	55.0	59.2	59.5	100.9	<b>59.5</b>	
PI555458	PROMONTORY	4	35.8	39.7	9.3	46.7	32.9	111.8	<b>32.9</b>	63.5	63.5	55.2	56.2	59.6	101.0	<b>59.6</b>	
PI593891	VANGUARD (sawfly res.)	4	32.6	41.4	15.7	40.8	32.6	111.0	<b>32.6</b>	62.3	62.3	54.6	59.1	59.6	101.0	<b>59.6</b>	
PI599336	MORGAN (P+)	4	40.6	37.2	10.9	40.6	32.3	110.0	<b>32.3</b>	61.8	61.9	53.1	54.4	57.8	98.0	<b>57.8</b>	
PI584505	HALT	3	33.1	46.9	8.9		29.6	109.1	<b>32.1</b>	62.6	62.8	54.9		60.1	101.7	<b>60.0</b>	
PI584526	JUDITH	4	43.7	36.1	12.4	35.9	32.0	109.0	<b>32.0</b>	61.4	60.6	51.9	52.8	56.7	96.1	<b>56.7</b>	
CI 17860	NEELEY	4	34.9	39.5	12.3	38.8	31.4	106.7	<b>31.4</b>	61.6	61.9	51.7	55.9	57.8	97.9	<b>57.8</b>	
MT 9432	BIGSKY (++)	4	39.6	38.5	11.4	35.8	31.3	106.5	<b>31.3</b>	63.2	62.6	55.0	55.6	59.1	100.2	<b>59.1</b>	
RH78W296	BIGHORN (P+)	4	37.3	34.2	10.7	41.2	30.9	104.9	<b>30.9</b>	62.7	62.6	54.9	58.5	59.7	101.1	<b>59.7</b>	
PI593890	McGUIRE	3	34.6	37.3	11.5		27.8	102.3	<b>30.1</b>	62.4	61.9	55.6		60.0	101.5	<b>59.9</b>	
PI564761	ERHARDT	3	38.3	34.3	10.2		27.6	101.6	<b>29.9</b>	62.4	62.7	54.9		60.0	101.5	<b>59.9</b>	
CI 17735	NORSTAR	4	35.8	36.5	9.2	36.1	29.4	100.0	<b>29.4</b>	61.1	62.2	54.0	58.7	59.0	100.0	<b>59.0</b>	
MTW 9441	NUSKY	4	35.8	27.5	13.2	40.7	29.3	99.6	<b>29.3</b>	61.8	61.1	55.0	57.6	58.9	99.8	<b>58.9</b>	
PI586806	NUWEST (hard white)	4	32.8	34.0	8.8	39.8	28.8	98.1	<b>28.8</b>	60.9	61.7	55.3	57.0	58.7	99.5	<b>58.7</b>	
MT 9426	PAUL	3		33.5	8.5	37.8	26.6	97.5	<b>28.7</b>		61.2	53.0	53.0	55.8	95.7	<b>56.4</b>	
PI596352	ELKHORN (+)	3	25.1	36.7	9.4		23.7	87.4	<b>25.7</b>	59.9	62.3	53.2		58.5	99.0	<b>58.4</b>	
MEANS (For Entries Listed)			35.6	38.2	11.4	40.3			31.2	62.0	62.2	54.2	56.9			58.9	

5/ Growing Season Precipitation (in.)		Pndg	Pndg	Pndg	4.03	4.03
Soil PAW (in.) to SD @ Planting		Pndg	Pndg	Pndg	7.99	7.99
Total Plant Available Water (in.)		Pndg	Pndg	Pndg	12.02	12.02
Soil NO3 (lbs.) to SD at Planting		Pndg	Pndg	Pndg	170.0	170.00
Fertilizer Applied	(# N)	70.0	65.0	70.0	70.0	68.75
	(# P <sub>2</sub> O <sub>5</sub> )	40.0	40.0	40.0	40.0	40.00
	(# K <sub>2</sub> O)	25.0	25.0	25.0	25.0	25.00

Check Variety is Norstar

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

2/ P = Private Variety, + = Protected Variety

3/ 4-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Norstar for the same years, and z = 4-Yr average yield or test weight for the check variety Norstar.

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

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

6/ Nursery abandoned due to drought stress in this location.

7/ Seeding to 14 days prior to harvest maturity.

**TABLE 4. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-9951-SW)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/ YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	TKW grams	2/ PROTEIN %	SAWFLY % cut
PI592761	ERNEST (sawfly resistant)	84.7	25.2	25.6	8.8	58.7	23.5	18.1	6.7
MT 9874	OUTLOOK (RWA resistant)	94.8	22.8	24.7	8.7	57.9	22.0	17.4	6.7
MT 9929	CHOTEAU (sawfly resistant)	92.0	21.7	24.5	8.8	57.7	23.5	18.2	3.7
ND 695	REEDER	96.2	21.4	23.6	8.6	58.3	21.4	18.0	15.0
BZ992588	CONAN (sawfly tolerant)	79.5	21.8	23.6	9.3	60.0	26.7	18.1	2.3
PI619086	EXPLORER (hard white wheat)	93.0	22.3	23.3	8.8	58.5	19.8	17.9	11.7
PI607557	SCHOLAR (mod. sawfly resistant)	94.4	24.2	22.8	8.8	59.5	23.4	18.3	15.0
WB 936	WESTBRED 936	86.8	21.6	22.7	8.5	58.7	26.4	18.2	15.0
C982-324	RAMBO (mod. sawfly resistant)	93.0	22.8	22.7	9.1	59.6	24.5	18.4	1.0
PI527682	AMIDON (mod. sawfly resistant)	97.6	24.7	22.5	8.7	57.9	23.3	17.7	15.0
MT 9918	MT9328/MT9419	86.8	23.4	22.4	8.7	57.0	21.3	17.8	11.7
PI574642	MCNEAL	93.1	23.4	22.3	8.8	58.0	22.6	17.5	15.0
BZ992322	HANK	74.7	20.5	22.2	8.6	58.4	28.1	17.9	20.0
PI549275	HI-LINE	87.9	20.7	21.9	8.6	58.1	22.5	18.6	10.0
CI 17429	LEW (sawfly resistant)	97.2	25.8	21.1	9.1	59.3	22.7	17.6	2.3
CI 17430	NEWANA	92.4	20.6	21.0	9.1	60.4	23.1	16.7	8.3
WB 926	WESTBRED 926	85.7	21.8	20.7	8.6	58.7	26.4	18.4	15.0
CI 13596	FORTUNA (sawfly resistant)	89.9	23.7	20.4	9.1	58.8	26.7	17.5	3.7
WBEXPRES	WESTBRED EXPRESS	91.0	20.0	20.1	9.0	58.5	24.6	18.1	5.0
MTHW9420	MTHW9420 (hard white wheat)	92.4	20.6	18.6	8.5	57.9	22.3	17.6	15.0
EXPERIMENTAL MEANS		90.2	22.4	22.3	8.8	58.6	23.7	17.9	9.9
LSD (0.05)		9.1	2.1	3.6	0.2	0.8	1.6	.	5.0
C.V.2: (S of MEAN / MEAN)*100		3.5	3.2	5.6	0.7	0.5	2.4	.	17.6

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.  
2/ Protein values are adjusted to 12 percent grain moisture.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	72
Quarter		Soil Texture 0-6"	CL-	4" Soil Temp (°F) @ Plnt'g	55
Section	13	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	36N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	25E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude		Init Zn (ppm) 0-6"	0.5	Fert. Rate (lbs/ac) P2O5	40
Longitude		Init Mn (ppm) 0-6"	14.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	0.7	Herbicide App. Date	6/16
pH 0-6"	5.2	Init Fe (ppm) 0-6"	41.9	Herbicide Product	Achieve, MCPE
Org.Matter (%) 0-6"	1.4	CEC 0-6"	21.8	Herbicide Rate (/ac)	40 oz, 15.5 oz
Init N (lbs/ac) 0-6"	42	Init PAW (in.) 0-6"	0.16	Precip (in.) Plnt'g-Harvest	3.15
Init N (lbs/ac) 6-24"	78	Init PAW (in.) 6-24"	1.13	Precip (>.1) Plnt'g-Harvest	2.54
Init N (lbs/ac) 24-36"	28	Init PAW (in.) 24-36"	0.73	Harvest Date	8/21
Init N (lbs/ac) 36-48"	12	Init PAW (in.) 36-48"	0.36	Rooting Depth (in.)	44"
Init P (ppm) Olsen 0-6"	19	Cropping System	CT-MechFlw	Post PAW (in.) 0-6"	0.16
Init K (ppm) 0-6"	308	Planting Date	5/21	Post PAW (in.) 6-24"	1.13
Init S (ppm) 0-24"	40	Planting Depth (in.)	1.5	Post PAW (in.) 24-36"	0.73
Init Na (MEQ/100g) 0-6"	0.04	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	0.36
SaltHaz (MMHOS/cm) 0-6"	0.72	Dry Surf Soil (in.) @Plnt'g	0.5	Precip (>.1) Hvst-Post	0.00

<sup>1</sup>Cooperator applied pre-plant Anhydrous - 50 lb available N

**TABLE 5. Ten-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 1994-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					10-YR COMP. AVE. YIELD 6/	10-YR COMP. TEST WT 6/				
		1999 4/	2000	2001	2002	2003	AVE. for YEARS TESTED 3/	% of CHECK YIELD 5/	1999 4/	2000	2001			2002	2003	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 5/
MT9929	CHOTEAU (sawfly resis.)	3		36.4	40.9	24.5	33.9	133.4	<b>47.4</b>			61.8	57.6	57.7	59.1	99.1	<b>59.6</b>
ND695	REEDER (+)	4	49.9	40.1	38.7	23.6	38.1	127.6	<b>45.4</b>	61.9	62.4	59.1	58.3	60.4	100.9		<b>60.7</b>
MT9874	OUTLOOK	3		37.3	34.2	24.7	32.0	126.0	<b>44.8</b>		60.3	58.7	57.9	59.0	99.0		<b>59.5</b>
PI574642	McNEAL	9	52.7	42.6	44.2	22.3	41.8	124.8	<b>44.4</b>	59.9	60.6	58.4	58.0	58.7	97.9		<b>58.8</b>
PI607557	SCHOLAR(+)(mod.sf res)	7	47.3	38.8	39.3	22.8	39.1	121.4	<b>43.1</b>	61.8	62.0	58.2	59.5	60.0	100.3		<b>60.3</b>
PI549275	HI-LINE	9	49.0	42.6	37.4	21.9	40.4	120.8	<b>42.9</b>	60.5	61.2	58.3	58.1	58.7	98.0		<b>58.9</b>
CI17430	NEWANA	9	48.5	41.6	32.6	21.0	40.1	119.9	<b>42.6</b>	61.1	61.9	58.4	60.4	59.6	99.4		<b>59.8</b>
WB936	WB 936 (P+)	8	50.0	35.2	36.5	22.7	40.1	119.6	<b>42.5</b>	60.6	61.8	57.3	58.7	58.8	98.1		<b>59.0</b>
WBEXPRES	WB EXPRESS (P+)	8	48.6	37.7	36.5	20.1	39.8	118.7	<b>42.2</b>	60.3	60.9	58.2	58.5	59.0	98.4		<b>59.1</b>
PI527682	AMIDON (mod.swfly res.)	9	46.1	39.5	37.5	22.5	39.6	118.5	<b>42.1</b>	61.1	61.6	57.0	57.9	59.1	98.6		<b>59.2</b>
PI619086	EXPLORER (hard white)	4	51.4	33.9	32.6	23.3	35.3	118.4	<b>42.1</b>	60.4	60.9	57.4	58.5	59.3	99.0		<b>59.5</b>
PI592761	ERNEST (+) (sawfly res.)	9	45.2	41.0	38.2	25.6	39.5	118.2	<b>42.0</b>	61.5	62.4	57.2	58.7	59.6	99.4		<b>59.8</b>
BZ992588	CONAN (P+) (sawfly tol)	4	43.0	36.0	37.5	23.6	35.0	117.4	<b>41.7</b>	60.5	62.0	59.1	60.0	60.4	100.9		<b>60.6</b>
PI531005	GRANDIN	7	48.0	42.9			41.7	116.7	<b>41.5</b>	61.5	62.5			59.3	98.2		<b>59.0</b>
MTHW9420	MTHW9420 (hrd wht)	7	49.6	36.3	32.4	18.6	36.8	114.2	<b>40.6</b>	60.3	61.4	56.8	57.9	58.6	97.8		<b>58.8</b>
WPB926	WB 926 (P)	9	46.5	35.5	31.8	20.7	37.7	112.6	<b>40.0</b>	60.2	61.1	57.5	58.7	58.5	97.6		<b>58.7</b>
C982-324	WB RAMBO (P+)(mod sf)	9	43.4	36.8	36.9	22.7	37.0	110.6	<b>39.3</b>	61.0	62.3	58.5	59.6	59.9	99.9		<b>60.0</b>
CI17429	LEW (sawfly resistant)	9	41.0	36.9	36.3	21.1	35.5	106.2	<b>37.7</b>	60.9	62.2	58.9	59.3	60.1	100.3		<b>60.3</b>
CI13596	FORTUNA (sawfly resis.)	9	43.0	25.6	30.3	20.4	33.4	100.0	<b>35.5</b>	60.7	61.9	58.1	58.8	59.9	100.0		<b>60.1</b>
MEANS (For Entries Listed)			47.2	37.7	36.3	22.4			42.0	60.8	61.6	58.1	58.7				59.6
7/ Growing Season Precipitation (in.)			Pndg	Pndg	Pndg	3.12	5.97										
Soil PAW (in.) to SD @ Planting			Pndg	Pndg	5.65	6.96	5.90										
Total Plant Available Water (in.)			Pndg	Pndg	5.65	10.08	10.88										
Soil NO3 (lbs.) to SD at Planting			Pndg	Pndg	36	160	65.33										
SD (Sampling Depth in Inches)			48.0	48.0	48.0	48.0	48.00										
Fertilizer Applied			(# N)	70.0	70.0	70.0	70.0	67.78									
			(# P <sub>2</sub> O <sub>5</sub> )	40.0	40.0	40.0	40.0	36.11									
			(# K <sub>2</sub> O)	25.0	25.0	25.0	25.0	11.11									

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 cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

4/ Nursery not planted due to wet conditions extending throughout and beyond the normal seeding period for this location.

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

6/ 10-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Fortuna for the same years, and z = 10-Yr average yield or test weight for the check variety Fortuna.

7/ Seeding to 14 days prior to harvest maturity.

**TABLE 6. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Flansaas-Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-9955-SW)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/			2/		
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	TKW grams	PROTEIN %	SAWFLY % cut
CI 13596	FORTUNA (sawfly resistant)	99.0	30.2	30.0	9.1	55.2	25.7	17.8	13.3
PI619086	EXPLORER (hard white wheat)	100.0	24.7	28.6	8.6	54.5	18.7	19.4	28.3
ND 695	REEDER	99.0	25.6	28.5	8.8	55.0	21.1	18.3	26.7
BZ992322	HANK	98.3	24.9	28.1	8.9	53.1	24.2	19.0	25.0
MT 9874	OUTLOOK (RWA resistant)	99.7	25.1	28.0	8.6	52.5	20.4	18.3	35.0
MT 9929	CHOTEAU (sawfly resistant)	100.0	24.6	27.3	8.8	53.6	20.5	18.5	10.0
WBEXPRES	WESTBRED EXPRESS	96.5	23.5	27.3	8.6	53.0	20.7	17.6	33.3
CI 17430	NEWANA	99.3	23.6	27.0	8.7	54.1	19.5	17.6	28.3
WB 936	WESTBRED 936	99.7	25.0	27.0	8.7	52.9	22.9	19.3	23.3
BZ992588	CONAN (sawfly tolerant)	100.0	23.7	26.9	9.3	55.1	22.8	18.4	30.0
WB 926	WESTBRED 926	100.0	24.7	26.7	8.7	53.1	22.5	19.4	28.3
PI592761	ERNEST (sawfly resistant)	100.0	27.3	26.7	8.6	54.6	20.9	19.0	16.7
PI574642	MCNEAL	99.7	24.4	26.5	8.6	52.9	21.2	18.9	60.0
MTHW9420	MTHW9420 (hard white wheat)	99.3	24.0	25.9	8.6	51.4	19.6	18.2	21.7
MT 9918	MT9328/MT9419	100.0	28.6	25.6	8.6	53.1	19.4	18.5	31.7
PI607557	SCHOLAR (mod. sawfly resistant)	100.0	27.1	25.1	8.7	56.1	22.5	18.9	33.3
PI549275	HI-LINE	99.7	23.2	25.0	8.4	53.3	20.0	18.9	33.3
C982-324	RAMBO (mod. sawfly resistant)	100.0	21.6	24.0	8.9	54.7	21.1	18.7	25.0
CI 17429	LEW (sawfly resistant)	100.0	29.2	23.8	9.0	54.7	21.3	19.3	15.0
PI527682	AMIDON (mod. sawfly resistant)	100.0	27.4	22.9	8.5	54.3	20.5	18.3	28.3
EXPERIMENTAL MEANS		99.5	25.4	26.5	8.7	53.9	21.3	18.6	27.3
LSD (0.05)		1.5	2.6	2.9	0.3	0.8	1.1	.	9.5
C.V.2: (S of MEAN / MEAN)*100		0.5	3.5	3.8	1.0	0.5	1.8	.	12.1

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.  
2/ Protein values are adjusted to 12 percent grain moisture.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	62
Quarter		Soil Texture 0-6"	CL-	4" Soil Temp (°F) @ Plnt'g	53
Section	2	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	35N	Soil Texture 24-36"	SCL-	Fertilizer Placement	Bnd at Plntg
Range	29E	Soil Texture 36-48"	SCL-	Fert. Rate (lbs/ac) N	70
Latitude	N48 46.601'	Init Zn (ppm) 0-6"	0.6	Fert. Rate (lbs/ac) P2O5	40
Longitude	W107 53.036'	Init Mn (ppm) 0-6"	10.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	0.8	Herbicide App. Date	6/10
pH 0-6"	6.1	Init Fe (ppm) 0-6"	36.4	Herbicide Product	Bronate
Org.Matter (%) 0-6"	1.3	CEC 0-6"	21.8	Herbicide Rate (/ac)	16 oz
Init N (lbs/ac) 0-6"	22	Init PAW (in.) 0-6"	1.01	Precip (in.) Plnt'g-Harvest	6.63
Init N (lbs/ac) 6-24"	30	Init PAW (in.) 6-24"	3.12	Precip (>.1) Plnt'g-Harvest	6.09
Init N (lbs/ac) 24-36"	12	Init PAW (in.) 24-36"	2.06	Harvest Date	8/11
Init N (lbs/ac) 36-48"	12	Init PAW (in.) 36-48"	2.07	Rooting Depth (in.)	36"
Init P (ppm) Olsen 0-6"	9	Cropping System	CT-MechFlw	Post PAW (in.) 0-6"	0.76
Init K (ppm) 0-6"	317	Planting Date	4/29	Post PAW (in.) 6-24"	1.20
Init S (ppm) 0-24"	18	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	0.84
Init Na (MEQ/100g) 0-6"	0.04	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	
SaltHaz (MMHOS/cm) 0-6"	0.48	Dry Surf Soil (in.) @Plnt'g	0.5	Precip (>.1) Hvst-Post	0.00

**TABLE 7. Eight-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Flansaas/Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 1996-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					8-YR COMP. AVE. YIELD 5/	8-YR COMP. TEST WT 5/				
		1999	2000	2001	2002	2003	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	1999	2000	2001			2002	2003	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/
PI531005 GRANDIN	6	44.9	41.2	38.6			36.1	121.6	<b>36.5</b>	58.2	61.3	61.3			58.4	98.6	<b>57.9</b>
ND 695 REEDER (+)	5	49.4	41.2	42.0	36.3	28.5	39.5	121.4	<b>36.4</b>	60.1	62.1	61.7	58.8	55.0	59.5	100.8	<b>59.1</b>
PI574642 McNEAL	8	47.0	42.8	39.3	38.1	25.9	36.1	120.4	<b>36.1</b>	59.1	59.7	59.9	58.3	51.4	57.2	97.6	<b>57.2</b>
CI 17430 NEWANA	8	47.7	41.7	40.6	34.4	27.0	35.7	119.2	<b>35.7</b>	58.8	61.3	61.3	59.1	54.1	58.2	99.2	<b>58.2</b>
WB 936 WB 936 (P+)	8	42.6	40.4	40.6	35.0	27.0	35.1	117.0	<b>35.1</b>	58.0	60.6	60.4	56.7	52.9	57.3	97.7	<b>57.3</b>
PI549275 HI-LINE	8	45.3	40.0	43.3	35.1	25.0	34.9	116.4	<b>34.9</b>	58.2	60.9	60.9	57.5	53.3	57.2	97.6	<b>57.2</b>
PI607557 SCHOLAR (+)(mod.sf res)	8	45.4	37.7	36.5	37.0	25.1	34.6	115.6	<b>34.6</b>	59.0	61.6	61.6	59.9	56.1	59.5	101.4	<b>59.5</b>
MT9874 OUTLOOK	3			44.0	35.6	28.0	35.9	114.1	<b>34.2</b>			60.0	58.0	52.5	56.8	96.9	<b>56.8</b>
PI527682 AMIDON (mod.swfly res.)	8	45.3	38.9	40.4	33.7	22.9	34.2	114.1	<b>34.2</b>	57.6	61.2	61.1	58.2	54.3	58.2	99.3	<b>58.2</b>
WBEXPRES WB EXPRESS (P+)	8	47.8	37.4	38.0	32.9	27.3	34.1	113.8	<b>34.1</b>	58.8	59.9	60.2	58.2	53.0	57.6	98.1	<b>57.6</b>
PI592761 ERNEST (+) (sawfly res.)	8	40.4	38.1	38.2	34.7	26.7	33.4	111.5	<b>33.4</b>	57.7	61.4	61.8	58.2	54.6	58.4	99.5	<b>58.4</b>
BZ992588 CONAN (P+) (sawfly tol)	5	43.0	37.7	39.0	34.1	26.9	36.1	111.1	<b>33.3</b>	60.6	61.0	61.4	59.9	55.1	59.6	101.0	<b>59.2</b>
WPB 926 WB 926 (P)	8	38.5	40.4	36.4	35.6	26.7	33.2	110.7	<b>33.2</b>	57.7	60.1	60.1	57.5	53.1	57.4	97.9	<b>57.4</b>
MTHW9420 MTHW9420 (hrd wht)	8	40.1	39.2	35.7	33.9	25.9	33.1	110.6	<b>33.1</b>	58.0	60.4	60.9	57.4	51.4	57.3	97.6	<b>57.3</b>
C982-324 WB RAMBO (P+) (mod sf)	8	44.0	38.5	37.2	33.4	24.0	32.4	108.0	<b>32.4</b>	59.5	61.2	61.5	60.1	54.7	59.1	100.7	<b>59.1</b>
PI EXPLORER (hard white)	4		38.2	36.2	34.8	28.6	34.4	107.5	<b>32.2</b>		60.7	60.5	58.2	54.5	58.5	98.6	<b>57.9</b>
MT 9929 CHOTEAU (sawfly resis.)	3			37.6	33.4	27.3	32.8	104.3	<b>31.3</b>			60.3	57.1	53.6	57.0	97.2	<b>57.0</b>
CI 17429 LEW (sawfly resistant)	8	38.4	35.1	35.6	34.5	23.8	31.2	104.2	<b>31.2</b>	59.7	61.3	61.9	60.0	54.7	59.0	100.6	<b>59.0</b>
CI 13596 FORTUNA (sawfly resis.)	8	34.4	33.9	32.8	31.5	30.0	30.0	100.0	<b>30.0</b>	58.2	61.1	61.7	59.1	55.2	58.7	100.0	<b>58.7</b>
MEANS (For Entries Listed)		43.4	39.0	38.5	34.7	26.5			33.8	58.7	60.9	61.0	58.5	53.9			58.1
6/ Growing Season Precipitation (in.)		Pndg	Pndg	Pndg	Pndg	5.59	5.34										
Soil PAW (in.) to SD @ Planting		Pndg	Pndg	Pndg	Pndg	8.25	6.34										
Total Plant Available Water (in.)		Pndg	Pndg	Pndg	Pndg	13.84	11.68										
Soil NO3 (lbs.) to SD at Planting		Pndg	Pndg	Pndg	80.0	76.0	73.20										
SD (Sampling Depth in Inches)		48.0	48.0	48.0	48.0	48.0	48.00										
Fertilizer Applied	(# N)	70.0	70.0	70.0	70.0	70.0	70.88										
	(# P <sub>2</sub> O <sub>5</sub> )	40.0	40.0	40.0	40.0	40.0	39.50										
	(# K <sub>2</sub> O)	25.0	25.0	25.0	25.0	25.0	21.38										

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 cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

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

5/ 8-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Fortuna for the same years, and z = 8-Yr average yield or test weight for the check variety Fortuna.

6/ Seeding to 14 days prior to harvest maturity.

**TABLE 8. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-9957-SW)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/ YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	TKW grams	2/ PROTEIN %	SAWFLY % cut
PI574642	MCNEAL	94.6	26.7	28.6	6.9	50.2	17.8	19.4	0.0
BZ992322	HANK	94.3	25.3	28.5	7.3	50.0	19.1	19.9	1.7
CI 13596	FORTUNA (sawfly resistant)	93.5	30.7	28.0	7.5	54.9	21.7	18.6	0.0
WB 936	WESTBRED 936	95.1	27.9	28.0	6.9	50.2	17.6	20.2	0.0
WB 926	WESTBRED 926	92.4	26.6	27.8	6.8	50.5	17.6	20.0	0.0
PI607557	SCHOLAR (mod. sawfly resistant)	94.0	28.5	26.7	7.3	56.0	18.9	20.0	0.0
PI549275	HI-LINE	94.0	26.4	26.7	6.8	49.2	17.1	19.7	0.0
PI619086	EXPLORER (hard white wheat)	93.5	27.0	26.3	6.8	51.3	15.1	20.2	0.0
MT 9874	OUTLOOK (RWA resistant)	94.3	26.6	26.2	6.7	49.8	16.2	19.5	0.0
PI527682	AMIDON (mod. sawfly resistant)	94.0	27.9	25.9	7.1	55.0	18.8	19.0	0.0
CI 17430	NEWANA	95.1	24.3	25.7	7.0	50.4	15.3	18.9	0.0
MT 9918	MT9328/MT9419	94.3	30.2	25.3	7.2	52.4	17.1	19.1	0.0
ND 695	REEDER	93.0	27.1	25.2	7.1	52.5	16.8	19.6	5.0
BZ992588	CONAN (sawfly tolerant)	93.5	26.3	24.9	7.6	54.2	18.5	19.0	0.0
MT 9929	CHOTEAU (sawfly resistant)	94.6	26.6	24.7	7.3	52.9	17.3	19.1	0.0
WBEXPRES	WESTBRED EXPRESS	94.8	23.5	24.4	7.1	50.7	17.3	18.4	8.3
CI 17429	LEW (sawfly resistant)	93.8	30.8	23.9	7.2	51.4	17.0	19.6	0.0
PI592761	ERNEST (sawfly resistant)	94.6	26.6	23.7	7.1	54.1	17.6	19.7	0.0
MTHW9420	MTHW9420 (hard white wheat)	95.1	26.3	23.7	6.9	48.9	16.0	19.4	5.0
C982-324	RAMBO (mod. sawfly resistant)	93.2	24.8	23.2	7.5	54.6	18.2	18.8	0.0
EXPERIMENTAL MEANS		94.1	27.0	25.9	7.1	52.0	17.5	19.4	1.0
LSD (0.05)		2.4	2.4	2.7	0.2	1.4	1.4	.	2.9
C.V.2: (S of MEAN / MEAN)*100		0.9	3.1	3.7	0.8	1.0	2.7	.	100.8

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.  
2/ Protein values are adjusted to 12 percent grain moisture.



Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	70
Quarter	SE	Soil Texture 0-6"	CL	4" Soil Temp (°F) @ Plnt'g	60
Section	16	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	27N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	10E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude	N48 05.782'	Init Zn (ppm) 0-6"	0.5	Fert. Rate (lbs/ac) P2O5	40
Longitude	W110 27.174'	Init Mn (ppm) 0-6"	13.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	1.1	Herbicide App. Date	n/a
pH 0-6"	6	Init Fe (ppm) 0-6"	36.8	Herbicide Product	n/a
Org.Matter (%) 0-6"	1.2	CEC 0-6"	21.8	Herbicide Rate (/ac)	n/a
Init N (lbs/ac) 0-6"	20	Init PAW (in.) 0-6"	1.10	Precip (in.) Plnt'g-Harvest	4.08
Init N (lbs/ac) 6-24"	90	Init PAW (in.) 6-24"	3.89	Precip (>.1) Plnt'g-Harvest	n/a
Init N (lbs/ac) 24-36"	20	Init PAW (in.) 24-36"	1.53	Harvest Date	8/2
Init N (lbs/ac) 36-48"	16	Init PAW (in.) 36-48"	1.91	Rooting Depth (in.)	26"
Init P (ppm) Olsen 0-6"	27	Cropping System	NT-ChmFlw	Post PAW (in.) 0-6"	0.28
Init K (ppm) 0-6"	272	Planting Date	4/25	Post PAW (in.) 6-24"	1.23
Init S (ppm) 0-24"	30	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	0.62
Init Na (MEQ/100g) 0-6"	0.06	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	0.90
SaltHaz (MMHOS/cm) 0-6"	0.44	Dry Surf Soil (in.) @Plnt'g	0.25	Precip (>.1) Hvst-Post	0.00

<sup>1</sup>Cooperator applied pre-plant Anhydrous - 50 lb available N

**TABLE 9. Six-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station in a Wheat Stem Sawfly Environment at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 1998-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)								TEST WEIGHT (Pounds Per Bushel)								
		1999	2000	2001	2002	2003	AVE. YEARS TESTED	% of CHECK YIELD 4/	6-YR COMP. AVE. YIELD 5/	1999	2000	2001	2002	2003	AVE. YEARS TESTED	% of CHECK TEST WT 4/	6-YR COMP. AVE. TEST WT 5/	
PI619086	EXPLORER (hard white)	4		30.8	9.2	18.1	26.3	21.1	111.6	<b>25.8</b>		54.9	53.5	50.2	51.3	52.5	99.1	<b>53.3</b>
ND695	REEDER (+)	5	34.2	30.4	7.1	22.0	25.2	23.8	110.8	<b>25.6</b>	55.5	55.9	53.6	52.4	52.5	54.0	99.4	<b>53.5</b>
WPB926	WB 926 (P)	4		32.1	7.6	15.4	27.8	23.5	109.5	<b>25.3</b>		55.3	53.0	50.0	50.5	51.3	95.6	<b>51.4</b>
WB936	WB 936 (P+)	4		27.5	6.6	20.2	28.0	20.6	108.9	<b>25.2</b>		55.8	52.9	50.0	50.2	52.2	98.5	<b>53.0</b>
WBEXPRES	WB EXPRESS (P+)	4		27.3	6.5	23.8	24.4	20.5	108.4	<b>25.1</b>		52.8	54.2	52.7	50.7	52.6	99.3	<b>53.4</b>
PI607557	SCHOLAR (+)(mod.sf res)	6	34.8	28.5	8.0	19.3	26.7	25.1	108.3	<b>25.1</b>	54.7	56.3	55.6	53.8	56.0	54.6	101.4	<b>54.6</b>
PI574642	McNEAL	6	35.7	29.8	9.2	13.2	28.6	25.0	108.2	<b>25.0</b>	52.2	53.1	53.4	50.7	50.2	51.1	94.9	<b>51.1</b>
PI527682	AMIDON (mod.swfly res.)	6	37.0	28.5	9.0	15.4	25.9	24.5	105.8	<b>24.5</b>	53.7	55.7	54.3	52.3	55.0	53.7	99.8	<b>53.7</b>
BZ992588	CONAN (P+) (sawfly tol)	5	36.7	26.0	7.1	18.0	24.9	22.6	105.1	<b>24.3</b>	55.3	56.7	56.7	52.8	54.2	55.1	101.5	<b>54.6</b>
MT9874	OUTLOOK	3			9.0	16.1	26.2	17.1	103.6	<b>24.0</b>			53.4	50.4	49.8	51.2	96.9	<b>52.2</b>
CI17430	NEWANA	6	37.3	25.3	8.4	17.2	25.7	23.5	101.4	<b>23.5</b>	54.8	55.0	55.7	52.5	50.4	52.2	97.0	<b>52.2</b>
PI549275	HI-LINE	6	30.7	27.3	9.1	14.1	26.7	23.4	101.1	<b>23.4</b>	53.0	54.2	51.6	49.0	49.2	50.4	93.7	<b>50.4</b>
CI13596	FORTUNA (sawfly resis.)	6	31.7	26.1	7.7	13.8	28.0	23.1	100.0	<b>23.1</b>	54.4	55.7	54.0	52.1	54.9	53.8	100.0	<b>53.8</b>
PI592761	ERNEST (+) (sawfly res.)	6	29.9	28.3	8.6	16.0	23.7	22.8	98.5	<b>22.8</b>	53.3	56.8	54.7	52.6	54.1	53.7	99.7	<b>53.7</b>
C982-324	WB RAMBO (P+) (mod sf)	6	34.1	27.5	8.9	11.9	23.2	21.9	94.6	<b>21.9</b>	54.8	57.0	56.1	53.6	54.6	54.1	100.4	<b>54.1</b>
MT9929	CHOTEAU (sawfly resis.)	3			7.4	14.4	24.7	15.5	93.8	<b>21.7</b>			53.4	49.3	52.9	51.9	98.2	<b>52.8</b>
MTHW9420	MTHW9420 (hrd wht)	5	26.7	25.9	6.7	14.6	23.7	19.5	91.0	<b>21.0</b>	51.4	53.8	51.9	49.0	48.9	51.0	93.9	<b>50.5</b>
CI17429	LEW (sawfly resistant)	6	29.8	21.8	7.6	13.0	23.9	20.6	89.2	<b>20.6</b>	54.4	54.6	53.9	52.0	51.4	52.9	98.2	<b>52.9</b>
MEANS (For Entries Listed)			33.2	27.7	8.0	16.5	25.8			23.8	54.0	55.2	54.0	51.4	52.0			52.9
6/ Growing Season Precipitation (in.)			Pndg	Pndg	Pndg	8.75	3.15	5.95										
Soil PAW (in.) to SD @ Planting			Pndg	Pndg	Pndg	Pndg	8.43	8.43										
Total Plant Available Water (in.)			Pndg	Pndg	Pndg	Pndg	11.58	11.58										
Soil NO3 (lbs.) to SD at Planting			Pndg	Pndg	Pndg	Pndg	146.0	146.00										
SD (Sampling Depth in Inches)			48.0	48.0	48.0	48.0	48.0	48.00										
Fertilizer Applied																		
		(# N)	70.0	65.0	65.0	70.0	70	68.33										
		(# P <sub>2</sub> O <sub>5</sub> )	40.0	40.0	40.0	40.0	40.0	40.00										
		(# K <sub>2</sub> O)	25.0	25.0	25.0	25.0	25.0	25.00										

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 cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety

3/ Research is being conducted at this location is to evaluate varieties and breeding materials in the presence of wheat stem sawfly. Sawfly pressure was weak in 1998, but was significant in 1999 and 2000. Hail damage at the location confounded studies in 1999. Heat and drought stress was prevalent at critical growth stages during all three years. The plot combine was equipped with pick-up guards similar to those commonly used on full-scale combines for straight-cut harvest under sawfly damage conditions.

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

5/ 6-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given 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.

6/ Seeding to 14 days prior to harvest maturity.

**TABLE 10. Dryland Fallow Spring Durum Cultivar Evaluation Nursery Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-9851-SW)**

ID	CULTIVAR or SELECTION	1/			2/			
		STAND %	PLNT HT Inches	YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	PROTEIN %	SAWFLY % cut
WPBLAKER	LAKER	92.0	22.3	24.3	8.0	59.7	17.7	0.0
DT 380	SCEPTRE	87.8	22.6	23.6	7.7	58.0	18.6	5.0
D87130	BEN	94.1	26.1	22.7	7.9	59.9	18.4	6.7
CI 17789	VIC	88.2	25.9	22.6	8.1	59.9	18.5	5.0
PI574642	MCNEAL	93.4	22.7	22.2	8.0	56.6	18.2	16.7
D901313	MOUNTRAIL	92.4	22.4	21.9	8.1	58.4	18.3	5.0
NDMUNICH	MUNICH	91.3	23.3	21.9	7.9	58.2	18.5	5.0
PI478289	MONROE	93.4	24.3	21.8	7.9	58.9	18.6	6.7
PI510696	RENVILLE	92.7	25.3	21.8	8.0	58.7	18.3	5.0
D901442	LEBSOCK	91.0	22.7	21.4	8.1	59.7	18.2	5.0
CANKYLE	KYLE	97.2	27.0	21.4	8.1	59.8	18.9	5.0
D89135	MAIER	94.1	22.6	21.4	7.9	58.7	19.0	5.0
ACAVONLE	AC AVONLEA	95.8	24.1	21.2	7.9	59.2	18.8	3.3
D91080	PLAZA	94.1	20.6	20.9	8.0	58.8	18.8	1.7
DT 433	MEDORA	92.7	25.2	20.3	7.7	59.1	19.3	5.0
EXPERIMENTAL MEANS		92.7	23.8	22.0	8.0	58.9	18.5	5.3
LSD (0.05)		9.4	2.3	3.1	0.2	0.7	.	2.8
C.V.2: (S of MEAN / MEAN)*100		3.5	3.3	4.9	0.9	0.4	.	18.3

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for durum.  
2/ Protein values are adjusted to 12 percent grain moisture.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	72
Quarter		Soil Texture 0-6"	CL-	4" Soil Temp (°F) @ Plnt'g	55
Section	13	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	36N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plnt'g
Range	25E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude		Init Zn (ppm) 0-6"	0.5	Fert. Rate (lbs/ac) P2O5	40
Longitude		Init Mn (ppm) 0-6"	14.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	0.7	Herbicide App. Date	6/16
pH 0-6"	5.2	Init Fe (ppm) 0-6"	41.9	Herbicide Product	Achieve, MCPE
Org.Matter (%) 0-6"	1.4	CEC 0-6"	21.8	Herbicide Rate (/ac)	40 oz, 15.5 oz
Init N (lbs/ac) 0-6"	42	Init PAW (in.) 0-6"	0.87	Precip (in.) Plnt'g-Harvest	3.15
Init N (lbs/ac) 6-24"	78	Init PAW (in.) 6-24"	2.74	Precip (>.1) Plnt'g-Harvest	2.54
Init N (lbs/ac) 24-36"	28	Init PAW (in.) 24-36"	1.85	Harvest Date	8/21
Init N (lbs/ac) 36-48"	12	Init PAW (in.) 36-48"	1.50	Rooting Depth (in.)	35"
Init P (ppm) Olsen 0-6"	19	Cropping System	CT-MechFlw	Post PAW (in.) 0-6"	0.15
Init K (ppm) 0-6"	308	Planting Date	5/21	Post PAW (in.) 6-24"	0.87
Init S (ppm) 0-24"	40	Planting Depth (in.)	1.5	Post PAW (in.) 24-36"	0.62
Init Na (MEQ/100g) 0-6"	0.04	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	0.98
SaltHaz (MMHOS/cm) 0-6"	0.72	Dry Surf Soil (in.) @Plnt'g	0.5	Precip (>.1) Hvst-Post	0.00

<sup>1</sup>Cooperator applied pre-plant Anhydrous - 50 lb available N

**TABLE 11. Dryland Fallow Spring Durum Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-9857-SW)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/		2/	
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	PROTEIN %
PI478289	MONROE	94.8	29.6	25.6	6.4	55.8	19.2
DT 380	SCEPTRE	94.3	26.9	24.9	6.0	55.1	20.4
D87130	BEN	93.2	29.7	24.9	6.3	56.1	20.5
PI574642	MCNEAL	94.6	26.9	24.7	6.9	49.7	20.2
PI510696	RENVILLE	94.0	30.2	23.7	6.1	55.6	20.7
NDMUNICH	MUNICH	93.0	25.4	23.5	6.3	55.3	20.6
D901313	MOUNTRAIL	94.3	24.6	22.9	5.9	54.5	20.3
D89135	MAIER	94.0	27.3	22.7	6.2	55.3	21.3
CI 17789	VIC	94.6	29.8	22.7	6.3	56.9	19.2
WPBLAKER	LAKER	94.3	23.9	22.5	6.6	55.0	18.3
D91080	PLAZA	94.6	23.6	22.3	6.1	54.3	19.9
DT 433	MEDORA	94.3	29.4	22.2	5.8	55.8	20.4
ACAVONLE	AC AVONLEA	94.0	29.5	22.0	5.7	53.5	21.1
D901442	LEBSOCK	94.0	27.9	21.6	6.5	56.0	19.5
CANKYLE	KYLE	94.6	30.1	21.0	6.5	55.1	20.8
EXPERIMENTAL MEANS		94.2	27.6	23.1	6.2	54.9	20.2
LSD (0.05)		2.0	3.3	3.3	0.3	1.1	.
C.V.2: (S of MEAN / MEAN)*100		0.7	4.1	4.9	1.5	0.7	.

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for durum.  
2/ Protein values are adjusted to 12 percent grain moisture.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	70
Quarter	SE	Soil Texture 0-6"	CL	4" Soil Temp (°F) @ Plnt'g	60
Section	16	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	27N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	10E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude	N48 05.782'	Init Zn (ppm) 0-6"	0.5	Fert. Rate (lbs/ac) P2O5	40
Longitude	W110 27.174'	Init Mn (ppm) 0-6"	13.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	1.1	Herbicide App. Date	n/a
pH 0-6"	6	Init Fe (ppm) 0-6"	36.8	Herbicide Product	n/a
Org.Matter (%) 0-6"	1.2	CEC 0-6"	21.8	Herbicide Rate (/ac)	n/a
Init N (lbs/ac) 0-6"	20	Init PAW (in.) 0-6"	1.10	Precip (in.) Plnt'g-Harvest	4.08
Init N (lbs/ac) 6-24"	90	Init PAW (in.) 6-24"	3.89	Precip (>.1) Plnt'g-Harvest	n/a
Init N (lbs/ac) 24-36"	20	Init PAW (in.) 24-36"	1.53	Harvest Date	8/2
Init N (lbs/ac) 36-48"	16	Init PAW (in.) 36-48"	1.91	Rooting Depth (in.)	34"
Init P (ppm) Olsen 0-6"	27	Cropping System	NT-ChmFlw	Post PAW (in.) 0-6"	0.28
Init K (ppm) 0-6"	272	Planting Date	4/25	Post PAW (in.) 6-24"	1.23
Init S (ppm) 0-24"	30	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	0.62
Init Na (MEQ/100g) 0-6"	0.06	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	0.90
SaltHaz (MMHOS/cm) 0-6"	0.44	Dry Surf Soil (in.) @Plnt'g	0.25	Precip (>.1) Hvst-Post	0.00

<sup>1</sup>Cooperator applied pre-plant Anhydrous - 50 lb available N

**TABLE 12. Dryland Fallow Spring Barley Cultivar Evaluation Nursery Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-3651-SB)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/			PLUMP %	THIN %	2/	
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu			PROTEIN %	
BZ594-19	WPB XENA	79.5	19.3	40.2	9.2	46.4	34.3	31.8	17.8	
ND13299	CONLON	76.4	21.9	38.8	9.2	47.9	88.5	4.0	16.1	
MT950186	HAXBY	87.8	21.4	38.3	9.2	48.5	16.4	34.4	17.4	
PI491534	GALLATIN	85.4	22.1	37.8	9.0	43.9	21.1	45.5	17.9	
MT970229	MT970229	92.3	20.8	36.8	9.2	46.2	56.5	17.6	17.0	
MT970155	MT970155	83.3	20.9	35.8	9.2	45.4	35.8	25.8	18.0	
MT960099	MT960099	92.0	17.4	35.1	8.9	45.3	10.0	53.8	18.2	
PI568246	BARONESSE	92.4	17.9	34.3	8.9	44.3	25.7	35.6	18.4	
MT960228	ESLICK	93.1	19.6	34.3	9.1	45.8	20.5	41.0	17.4	
SK 76333	HARRINGTON	93.4	22.2	33.8	9.0	44.5	35.2	33.8	18.8	
MT970116	MT970116	92.7	23.2	33.6	9.2	46.2	31.7	28.9	18.1	
MT970148	MT970148	83.0	17.4	33.5	9.0	42.9	45.1	22.5	17.0	
PI610264	VALIER	93.8	20.9	32.6	9.4	46.1	9.9	55.4	18.9	
MT960101	MT960101	88.9	18.0	32.0	8.7	44.1	20.7	45.4	19.4	
MT981060	HAYS	96.2	18.5	12.1	8.9	40.6	14.5	53.3	18.1	
PI533600	HAYBET	93.4	16.2	5.8	8.1	38.6	5.3	79.5	18.8	
EXPERIMENTAL MEANS		89.0	19.9	32.2	9.0	44.8	29.5	38.0	18.0	
LSD (0.05)		10.4	2.6	7.0	0.3	1.3	.	.	.	
C.V.2: (S of MEAN / MEAN)*100		4.1	4.5	7.5	1.0	1.0	.	.	.	

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 48 lbs/bu as the standard test weight for barley.  
2/ Protein values are reported on a 100% dry matter basis.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	72
Quarter		Soil Texture 0-6"	CL-	4" Soil Temp (°F) @ Plnt'g	55
Section	13	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	36N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	25E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude		Init Zn (ppm) 0-6"	0.5	Fert. Rate (lbs/ac) P2O5	40
Longitude		Init Mn (ppm) 0-6"	14.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	0.7	Herbicide App. Date	6/16
pH 0-6"	5.2	Init Fe (ppm) 0-6"	41.9	Herbicide Product	Achieve, MCPE
Org.Matter (%) 0-6"	1.4	CEC 0-6"	21.8	Herbicide Rate (/ac)	40 oz, 15.5 oz
Init N (lbs/ac) 0-6"	42	Init PAW (in.) 0-6"	0.87	Precip (in.) Plnt'g-Harvest	3.15
Init N (lbs/ac) 6-24"	78	Init PAW (in.) 6-24"	2.74	Precip (>.1) Plnt'g-Harvest	2.54
Init N (lbs/ac) 24-36"	28	Init PAW (in.) 24-36"	1.85	Harvest Date	8/21
Init N (lbs/ac) 36-48"	12	Init PAW (in.) 36-48"	1.50	Rooting Depth (in.)	34"
Init P (ppm) Olsen 0-6"	19	Cropping System	CT-MechFlw	Post PAW (in.) 0-6"	0.21
Init K (ppm) 0-6"	308	Planting Date	5/21	Post PAW (in.) 6-24"	0.82
Init S (ppm) 0-24"	40	Planting Depth (in.)	1.5	Post PAW (in.) 24-36"	0.67
Init Na (MEQ/100g) 0-6"	0.04	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	1.51
SaltHaz (MMHOS/cm) 0-6"	0.72	Dry Surf Soil (in.) @Plnt'g	0.5	Precip (>.1) Hvst-Post	0.00

**TABLE 13. Ten-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Barley Variety Nurseries Grown Off-Station at the Leon Cederberg Farm, Turner, Northern Agricultural Research Center. Havre, Montana. 1994-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					10-YR COMP. AVE. YIELD 6/	10-YR COMP. AVE. TEST WT 6/				
		1999 4/	2000	2001	2002	2003	AVE. for YEARS TESTED 3/	% of CHECK YIELD 5/	1999 4/	2000	2001			2002	2003	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 5/
BZ594-19 WPB XENA (P+)	4		77.7	49.3	60.9	40.2	57.0	117.8	<b>60.9</b>		53.5	52.7	50.1	46.4	50.7	101.8	<b>50.3</b>
NS78054 BARONESSE (P+)	9		81.2	57.9	55.7	34.3	58.9	114.0	<b>58.9</b>		52.9	52.1	49.3	44.3	48.8	98.9	<b>48.8</b>
MT960100 MT960100	3		74.7	46.1	54.6		58.5	112.4	<b>58.1</b>		53.3	51.4	50.3		51.7	99.9	<b>49.3</b>
MT960099 MT960099	4		80.3	42.2	56.3	35.1	53.5	110.5	<b>57.1</b>		53.5	50.4	49.8	45.3	49.7	100.0	<b>49.4</b>
MTLB5 MTLB 5	3		74.1	47.0			66.1	108.2	<b>55.9</b>		53.5	52.2			52.6	100.6	<b>49.7</b>
PI610264 VALIER (+)	4		72.3	40.8	52.9	32.6	49.7	102.6	<b>53.0</b>		53.3	51.7	50.1	46.1	50.3	101.1	<b>49.9</b>
MT960228 ESLICK	4		76.2	44.0	44.0	34.3	49.6	102.5	<b>53.0</b>		54.3	53.3	50.5	45.8	51.0	102.4	<b>50.6</b>
ND13299 CONLON	3			47.8	41.2	38.8	42.6	102.2	<b>52.8</b>			45.0	48.9	47.9	47.3	97.7	<b>48.3</b>
PI491234 GALLATIN	9		68.7	43.9	43.3	37.8	51.7	100.0	<b>51.7</b>		53.9	51.8	49.4	43.9	49.4	100.0	<b>49.4</b>
CI12856 LEWIS	8		73.5	38.0	44.9		53.3	99.8	<b>51.6</b>		54.9	50.6	50.1		50.3	100.5	<b>49.6</b>
SK76333 HARRINGTON	9		68.4	33.9	49.1	33.8	50.4	97.5	<b>50.4</b>		52.9	48.0	49.2	44.5	47.7	96.7	<b>47.7</b>
MT950186 HAXBY	4		62.8	33.5	43.7	48.5	47.1	97.4	<b>50.3</b>		54.5	54.1	50.7	48.5	51.9	104.4	<b>51.5</b>
ND9866 STARK	7		51.6	40.9			53.3	97.1	<b>50.2</b>		54.1	52.9			50.3	100.3	<b>49.5</b>
MT970116 MT970116	3			38.0	42.9	33.6	38.1	91.5	<b>47.3</b>			51.2	49.4	46.2	48.9	101.2	<b>50.0</b>
MEANS (For Entries Listed)			71.8	43.1	49.1	36.9			53.7		53.7	51.2	49.8	45.9			49.6
7/ Growing Season Precipitation (in.)		Pndg	Pndg	Pndg	Pndg	3.12	6.48										
Soil PAW (in.) to SD @ Planting		Pndg	Pndg	Pndg	5.65	6.96	5.96										
Total Plant Available Water (in.)		Pndg	Pndg	Pndg	5.65	10.08	11.52										
Soil NO3 (lbs.) to SD at Planting		Pndg	Pndg	Pndg	36	160	63.43										
SD (Sampling Depth in Inches)		48	48	48	48	48.0	48.00										
Fertilizer Applied	(# N)	66	70	70	62	70.0	66.40										
	(# P <sub>2</sub> O <sub>5</sub> )	33	40	40	35	40.0	35.50										
	(# K <sub>2</sub> O)	25	25	25	0	25.0	12.10										

Check Variety is Gallatin

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

2/ P = Private Variety, + = Protected Variety

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

4/ Nursery not planted due to wet conditions extending throughout and beyond the normal seeding period for this location.

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

6/ 10-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Gallatin for the same years, and z = 10-Yr average yield or test weight for the check variety Gallatin.

7/ Seeding to 14 days prior to harvest maturity.

**TABLE 14. Dryland Fallow Spring Barley Cultivar Evaluation Nursery Grown Off-Station at the Flansaas-Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-3655-SB)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/			PLUMP %	THIN %	2/	
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu			PROTEIN %	
MT950186	HAXBY	99.3	26.0	56.2	9.4	48.9	21.1	41.7	16.6	
MT970148	MT970148	99.7	23.6	53.4	9.3	45.9	25.9	40.1	16.5	
MT970116	MT970116	99.3	26.3	53.3	9.4	47.2	29.1	34.9	16.1	
BZ594-19	WPB XENA	98.3	24.4	53.1	9.0	45.7	18.3	42.5	17.8	
MT970229	MT970229	96.9	25.7	53.0	9.3	45.5	39.7	23.5	17.8	
MT970155	MT970155	99.0	27.3	52.3	9.5	47.6	23.3	34.6	17.4	
MT981060	HAYS	99.3	24.8	52.3	9.1	45.8	11.8	55.5	16.8	
ND13299	CONLON	98.3	26.1	52.0	9.6	49.1	77.7	7.0	15.2	
MT960099	MT960099	99.7	21.6	51.9	9.4	46.5	9.8	55.2	17.2	
PI568246	BARONESSE	100.0	24.6	51.0	9.2	45.0	9.0	54.9	17.8	
PI491534	GALLATIN	99.0	24.7	50.9	9.2	46.1	13.6	51.1	16.9	
PI610264	VALIER	100.0	22.7	48.6	9.6	47.0	9.5	54.3	17.7	
MT960228	ESLICK	100.0	24.2	48.6	9.3	46.2	10.3	52.2	16.6	
MT960101	MT960101	100.0	24.8	48.5	9.3	46.1	13.2	57.1	17.5	
SK 76333	HARRINGTON	100.0	24.0	47.6	9.1	44.4	15.5	46.4	17.4	
PI533600	HAYBET	99.7	27.3	45.3	9.0	44.0	3.2	69.8	16.8	
EXPERIMENTAL MEANS		99.3	24.9	51.1	9.3	46.3	20.7	45.1	17.0	
LSD (0.05)		2.1	2.4	3.7	0.3	2.1	.	.	.	
C.V.2: (S of MEAN / MEAN)*100		0.7	3.4	2.5	1.3	1.6	.	.	.	

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 48 lbs/bu as the standard test weight for barley.  
2/ Protein values are reported on a 100% dry matter basis.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	62
Quarter		Soil Texture 0-6"	CL-	4" Soil Temp (°F) @ Plnt'g	53
Section	2	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	35N	Soil Texture 24-36"	SCL-	Fertilizer Placement	Bnd at Plntg
Range	29E	Soil Texture 36-48"	SCL-	Fert. Rate (lbs/ac) N	70
Latitude	N48 46.601'	Init Zn (ppm) 0-6"	0.6	Fert. Rate (lbs/ac) P2O5	40
Longitude	W107 53.036'	Init Mn (ppm) 0-6"	10.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	0.8	Herbicide App. Date	6/10
pH 0-6"	6.1	Init Fe (ppm) 0-6"	36.4	Herbicide Product	Bronate
Org.Matter (%) 0-6"	1.3	CEC 0-6"	21.8	Herbicide Rate (/ac)	16 oz
Init N (lbs/ac) 0-6"	22	Init PAW (in.) 0-6"	1.01	Precip (in.) Plnt'g-Harvest	6.63
Init N (lbs/ac) 6-24"	30	Init PAW (in.) 6-24"	3.12	Precip (>.1) Plnt'g-Harvest	6.09
Init N (lbs/ac) 24-36"	12	Init PAW (in.) 24-36"	2.06	Harvest Date	8/11
Init N (lbs/ac) 36-48"	12	Init PAW (in.) 36-48"	2.07	Rooting Depth (in.)	34"
Init P (ppm) Olsen 0-6"	9	Cropping System	CT-MechFlw	Post PAW (in.) 0-6"	0.47
Init K (ppm) 0-6"	317	Planting Date	4/29	Post PAW (in.) 6-24"	0.98
Init S (ppm) 0-24"	18	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	0.71
Init Na (MEQ/100g) 0-6"	0.04	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	1.03
SaltHaz (MMHOS/cm) 0-6"	0.48	Dry Surf Soil (in.) @Plnt'g	0.5	Precip (>.1) Hvst-Post	0.00

**TABLE 15. Eight-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Barley Variety Nurseries Grown Off-Station at the Flansaas/Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 1996-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					8-YR COMP. AVE. YIELD 5/	8-YR COMP. TEST WT 5/				
		1999	2000	2001	2002	2003	AVE. YEARS TESTED 3/	% of CHECK YIELD 4/	1999	2000	2001			2002	2003	AVE. YEARS TESTED 3/	% of CHECK TEST WT 4/
MT960100 MT960100	3		57.0	57.3	57.9		57.4	109.6	<b>56.2</b>		51.3	52.1	46.8		50.1	100.2	<b>48.9</b>
BZ594-19 WPB XENA (P+)	5	77.3	51.4	59.1	56.4	53.1	59.4	107.2	<b>54.9</b>	49.2	51.1	52.1	44.9	45.7	48.6	98.1	<b>47.9</b>
MT950186 HAXBY	5	74.9	54.8	54.7	56.1	56.2	59.3	106.9	<b>54.8</b>	52.5	53.7	53.4	47.6	48.9	51.2	103.4	<b>50.5</b>
NS78054 BARONESSE (P+)	8	79.5	56.7	57.8	57.3	51.0	54.4	106.1	<b>54.4</b>	49.4	50.8	51.3	43.4	45.0	47.4	97.1	<b>47.4</b>
MT960099 MT960099	4		57.4	53.5	55.1	51.9	54.5	104.7	<b>53.7</b>		52.5	51.0	45.4	46.5	48.8	99.7	<b>48.7</b>
MTLB13 MTLB 13	3	73.9	52.1	54.9			60.3	103.4	<b>53.0</b>	50.1	51.2	51.1			50.8	97.8	<b>47.8</b>
MTLB5 MTLB 5	4	73.0	52.7	57.2			56.8	103.2	<b>52.9</b>	50.9	52.3	52.5			50.7	100.7	<b>49.2</b>
PI610264 VALIER (+)	5	73.2	54.8	51.4	56.0	48.6	56.8	102.4	<b>52.5</b>	50.6	52.3	52.4	46.2	47.0	49.7	100.3	<b>49.0</b>
ND13299 CONLON	3			55.2	52.7	52.0	53.3	102.0	<b>52.2</b>			51.3	44.0	45.1	46.8	97.4	<b>47.6</b>
MT960228 ESLICK	5	74.6	56.1	51.2	52.2	48.6	56.5	101.9	<b>52.2</b>	51.0	51.6	51.6	45.3	46.2	49.1	99.2	<b>48.4</b>
PI491534 GALLATIN	8	69.4	51.2	54.4	51.5	50.9	51.2	100.0	<b>51.2</b>	51.7	51.9	52.2	45.8	46.1	48.8	100.0	<b>48.8</b>
CI15856 LEWIS	7	70.0	58.2	51.5	51.8		50.5	98.6	<b>50.5</b>	51.7	52.4	52.3	45.7		49.6	100.8	<b>49.2</b>
MT970116 MT970116	3			46.3	51.6	53.3	50.4	96.4	<b>49.4</b>			53.7	47.7	47.2	49.5	103.1	<b>50.4</b>
SK76333 HARRINGTON	8	69.0	52.8	53.0	49.6	47.6	48.8	95.3	<b>48.8</b>	49.6	50.9	50.6	44.5	44.4	47.7	97.6	<b>47.7</b>
ND9866 STARK	6	60.8	44.2	45.5			44.8	87.5	<b>44.8</b>	50.9	53.2	53.4			50.6	101.6	<b>49.6</b>
MEANS (For Entries Listed)		72.3	53.8	53.5	54.0	51.3			52.1	50.7	51.9	52.1	45.6	46.2			48.7
6/ Growing Season Precipitation (in.)		Pndg	Pndg	Pndg	Pndg	5.59	5.19										
Soil PAW (in.) to SD @ Planting		Pndg	Pndg	Pndg	Pndg	8.25	6.34										
Total Plant Available Water (in.)		Pndg	Pndg	Pndg	Pndg	13.84	11.53										
Soil NO3 (lbs.) to SD at Planting		Pndg	Pndg	Pndg	Pndg	76.0	71.50										
SD (Sampling Depth in Inches)		48.0	48.0	48.0	48.0	48.0	48.00										
Fertilizer Applied	(# N)	70.0	70.0	70.0	70.0	70.0	70.88										
	(# P <sub>2</sub> O <sub>5</sub> )	40.0	40.0	40.0	40.0	40.0	39.50										
	(# K <sub>2</sub> O)	25.0	25.0	25.0	25.0	25.0	21.38										

Check Variety is Gallatin

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

2/ P = Private Variety, + = Protected Variety

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

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

5/ 8-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Gallatin for the same years, and z = 8-Yr average yield or test weight for the check variety Gallatin.

6/ Seeding to 14 days prior to harvest maturity.



**TABLE 16. Dryland Fallow Spring Barley Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2003. (Exp# 03-3657-SB)**

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/			PLUMP %	THIN %	2/	
				YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu			PROTEIN %	PROTEIN %
ND13299	CONLON	94.3	26.5	54.1	8.0	50.1	62.5	14.2	17.7	
MT950186	HAXBY	95.1	24.5	47.3	8.3	50.8	2.4	62.8	18.7	
MT970148	MT970148	94.8	23.4	47.3	8.1	47.1	5.7	62.7	18.8	
PI533600	HAYBET	93.8	26.3	44.9	8.0	46.6	0.4	95.4	19.8	
MT970116	MT970116	95.1	27.1	44.1	8.3	49.4	10.0	50.5	18.9	
MT960099	MT960099	95.1	22.2	43.1	7.7	47.2	0.8	91.7	20.1	
MT970229	MT970229	93.2	24.0	42.9	8.0	48.5	10.4	48.5	19.8	
PI568246	BARONESSE	93.8	23.8	42.4	7.8	46.9	4.3	63.7	20.1	
MT960228	ESLICK	94.6	24.6	42.4	8.0	49.2	4.1	61.5	18.8	
PI491534	GALLATIN	94.8	24.6	42.1	8.0	47.3	4.4	70.9	19.6	
MT970155	MT970155	93.5	25.3	40.7	8.2	48.6	6.6	52.0	19.8	
BZ594-19	WPB XENA	94.3	22.9	39.6	7.8	48.0	2.0	78.1	20.7	
MT981060	HAYS	93.2	22.9	39.6	7.7	45.8	5.3	71.0	19.1	
MT960101	MT960101	94.8	21.4	38.5	7.9	47.6	1.7	85.4	20.8	
SK 76333	HARRINGTON	92.7	23.6	36.0	8.0	46.9	3.4	70.7	20.0	
PI610264	VALIER	94.8	23.3	34.4	7.8	48.5	1.1	82.1	20.6	
EXPERIMENTAL MEANS		94.3	24.1	42.4	8.0	48.0	7.8	66.3	19.6	
LSD (0.05)		2.2	2.6	6.2	0.4	1.1	.	.	0.7	
C.V.2: (S of MEAN / MEAN)*100		0.8	3.8	5.1	1.9	0.8	.	.	1.3	

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 48 lbs/bu as the standard test weight for barley.  
2/ Protein values are reported on a 100% dry matter basis.

Site Resource & Management Data:					
Field		SaltHaz(MMHOS/cm)6-24"	0.84	2" Soil Temp (°F) @ Plnt'g	70
Quarter	SE	Soil Texture 0-6"	CL	4" Soil Temp (°F) @ Plnt'g	60
Section	16	Soil Texture 6-24"	CL	Fertilizer Formulation	Gran.Blend
Township	27N	Soil Texture 24-36"	CL	Fertilizer Placement	Bnd at Plntg
Range	10E	Soil Texture 36-48"	CL	Fert. Rate (lbs/ac) N	20 <sup>1</sup>
Latitude	N48 05.782'	Init Zn (ppm) 0-6"	0.5	Fert. Rate (lbs/ac) P2O5	40
Longitude	W110 27.174'	Init Mn (ppm) 0-6"	13.6	Fert. Rate (lbs/ac) K2O	25
Soil Series		Init Cu (ppm) 0-6"	1.1	Herbicide App. Date	n/a
pH 0-6"	6	Init Fe (ppm) 0-6"	36.8	Herbicide Product	n/a
Org.Matter (%) 0-6"	1.2	CEC 0-6"	21.8	Herbicide Rate (/ac)	n/a
Init N (lbs/ac) 0-6"	20	Init PAW (in.) 0-6"	0.19	Precip (in.) Plnt'g-Harvest	4.08
Init N (lbs/ac) 6-24"	90	Init PAW (in.) 6-24"	1.20	Precip (>.1) Plnt'g-Harvest	n/a
Init N (lbs/ac) 24-36"	20	Init PAW (in.) 24-36"	0.72	Harvest Date	8/2
Init N (lbs/ac) 36-48"	16	Init PAW (in.) 36-48"	1.06	Rooting Depth (in.)	40"
Init P (ppm) Olsen 0-6"	27	Cropping System	NT-ChmFlw	Post PAW (in.) 0-6"	0.19
Init K (ppm) 0-6"	272	Planting Date	4/25	Post PAW (in.) 6-24"	1.20
Init S (ppm) 0-24"	30	Planting Depth (in.)	1.25	Post PAW (in.) 24-36"	0.72
Init Na (MEQ/100g) 0-6"	0.06	Moist Soil Depth @Plnt'g	48+	Post PAW (in.) 36-48"	1.06
SaltHaz (MMHOS/cm) 0-6"	0.44	Dry Surf Soil (in.) @Plnt'g	0.25	Precip (>.1) Hvst-Post	0.00

<sup>1</sup>Cooperator applied pre-plant Anhydrous - 50 lb available N

**TABLE 17. Five-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Barley Variety Nurseries Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 1999-2003.**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					5-YR COMP. AVE. YIELD 4/	5-YR COMP. AVE. TEST WT 4/				
		1999	2000	2001	2002	2003	AVE. for YEARS TESTED	% of CHECK YIELD 3/	1999	2000	2001			2002	2003	AVE. for YEARS TESTED	% of CHECK TEST WT 3/
ND13299 CONLON	3			11.0	41.2	54.1	35.4	108.4	<b>41.9</b>			42.5	48.9	50.1	47.2	100.5	<b>47.6</b>
MT960099 MT960099	4		45.8	9.6	56.3	43.1	38.7	107.4	<b>41.5</b>		45.8	44.3	49.8	47.2	46.8	100.6	<b>47.6</b>
MT950186 HAXBY	5	54.8	44.1	13.1	43.7	47.3	40.6	105.2	<b>40.6</b>	52.6	47.7	47.2	50.7	50.8	49.8	105.1	<b>49.8</b>
NS78054 BARONESSE (P+)	5	42.7	46.7	11.3	55.1	42.4	39.6	102.7	<b>39.6</b>	50.6	44.9	45.4	49.3	46.9	47.4	100.2	<b>47.4</b>
MT960228 ESLICK	5	56.3	43.2	11.3	44.0	42.4	39.4	102.1	<b>39.4</b>	49.4	47.2	46.3	50.5	49.2	48.5	102.5	<b>48.5</b>
BZ594-19 WPB XENA (P+)	5	42.7	42.4	10.9	60.9	39.6	39.3	101.8	<b>39.3</b>	49.6	45.9	46.1	50.1	48.0	47.9	101.3	<b>47.9</b>
MT970116 MT970116	3			11.2	42.9	44.1	32.7	100.2	<b>38.7</b>			47.0	51.0	49.4	49.1	104.7	<b>49.6</b>
PI491534 GALLATIN	5	48.9	46.0	12.7	43.3	42.1	38.6	100.0	<b>38.6</b>	50.6	45.4	44.1	49.4	47.3	47.3	100.0	<b>47.3</b>
MT960100 MT960100	3		38.7	7.3	54.6		33.5	98.5	<b>38.0</b>		45.3	46.5	50.3		47.3	102.3	<b>48.4</b>
ND9866 STARK	3	41.0	50.1	14.6			35.2	98.1	<b>37.9</b>	50.8	49.4	45.8			48.6	104.2	<b>49.3</b>
SK76333 HARRINGTON	5	48.4	42.1	10.3	49.1	36.0	37.2	96.3	<b>37.2</b>	48.6	44.6	44.7	49.2	46.9	46.8	98.9	<b>46.8</b>
MTLB13 MTLB 13	3	47.3	43.4	10.2			33.6	93.7	<b>36.2</b>	49.9	44.5	45.2			46.6	99.8	<b>47.2</b>
CI15856 LEWIS	4	43.3	39.0	12.7	44.9		35.0	92.7	<b>35.8</b>	51.3	46.3	45.5	50.1		48.3	102.0	<b>48.3</b>
PI610264 VALIER (+)	5	46.2	33.8	8.3	52.9	34.4	35.1	91.0	<b>35.1</b>	49.9	46.1	47.7	50.1	48.5	48.4	102.3	<b>48.4</b>
MTLB5 MTLB 5	3	42.3	39.1	5.8			29.1	81.0	<b>31.3</b>	50.9	46.3	46.9			48.0	102.9	<b>48.7</b>
MEANS (For Entries Listed)		46.7	42.6	10.7	49.1	42.5			38.1	50.4	46.1	45.7	50.0	48.4			48.2
5/ Growing Season Precipitation (in.)		Pndg	Pndg	Pndg	8.75	3.15	6.0										
Soil PAW (in.) to SD @ Planting		Pndg	Pndg	Pndg	Pndg	8.43	8.4										
Total Plant Available Water (in.)		Pndg	Pndg	Pndg	Pndg	11.58	11.6										
Soil NO3 (lbs.) to SD at Planting		Pndg	Pndg	Pndg	490.0	146.0	318.0										
SD (Sampling Depth in Inches)		48.0	48.0		48.0	48.0	48.0										
Fertilizer Applied	(# N)	70.0	65.0	70.0	61.0	70	67.2										
	(# P <sub>2</sub> O <sub>5</sub> )	40.0	40.0	40.0	52.0	40.0	42.4										
	(# K <sub>2</sub> O)	25.0	25.0	25.0	25.0	25.0	25.0										

Check Variety is Gallatin

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

2/ P = Private Variety, + = Protected Variety

3/ Percent of Gallatin yield or test weight for the same data years as those in which a given entry was tested.

4/ 5-Yr Comparable Average = (x/y) \* z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Gallatin for the same years, and z = 5-Yr average yield or test weight for the check variety Gallatin.

5/ Seeding to 14 days prior to harvest maturity.