

PROJECT TITLE: Evaluation of spring wheat variety performance in off-station trials near Denton, Fort Benton and Winifred.

PROJECT LEADER: D.M. Wichman, Agronomist, Moccasin, MT

PROJECT PERSONNEL: L.E. Talbert, Spring Wheat Breeder, Bozeman, MT
 S.P. Lanning, Spring Wheat Research Associate, Bozeman, MT
 R.L. Murphy, Agricultural Research Specialist, Moccasin, MT
 J. Vavrovsky, Agricultural Research Specialist, Moccasin, MT
 Dave Philips, Fergus County Extension Agent, Lewistown, MT
 Judee Wargo, Chouteau County Extension Agent, Ft. Benton, MT

OBJECTIVES:

To evaluate the performance of spring wheat varieties in environments and cropping methods representative of the southern triangle and central Montana.

RESULTS:

Denton yields ranged from 28 to 37 bu/a with the average equal to 32 bu/a. Experimental line MT9433, named Scholar and scheduled for release to growers in the spring of 2000, was the top yielding variety. The average test weight was 56 lbs/bu, well below normal. McNeal has the high long-term yield average of 41 bu/a with Newana and Amidon a close second at 40 bu/a. The current year's data and multi-year summary are presented in Tables 1 and 2.

Fort Benton yields were well below normal and ranged from 17 to 22 bu/a with the average equal to 19 bu/a. There were no significant differences among yields. The trial was planted into barley stubble. Test weights were also below normal at 55 lbs/bu. Proteins were average at 14.5%. McNeal has the highest yield for the long-term yield average at 33.5 bu/a. The current year's data and multi-year summary are presented in Tables 3 and 4.

Winifred yields ranged from 34 to 53 bu/a with the average equal to 43 bu/a. Westbred 936 was the top yielding variety. This is the first year in many that a spring wheat variety trial has been at Winifred. The yields were good although the test weights were low, averaging 50.5 lbs/bu. Proteins were above normal, averaging 17%. The current year's data is presented in Table 5.

SUMMARY:

The amount of rainfall received at each location varied widely this year and is reflected in the yields. Denton had average yields, Fort Benton experienced drought conditions that led to low yields and yields at Winifred appeared to be a bit above average. Hot, dry, windy conditions were experienced during heading and grain-fill, which contributed to lower than normal test weights at all locations.

FUTURE PLANS:

Spring wheat variety evaluations will continue at Denton, Fort Benton and Winifred.

Table 1. 1998 Denton Spring Wheat Variety Trial – Exp. 9971. Central Agricultural Research Center. Moccasin, MT.

Id	Variety/Line	Grain Yield (bu/a)	Test Weight (lbs/bu)	Plant Height (in.)	Protein Content (%)
MT 9433	MT8808/MARBERG	36.8	59.2	29	15.2
PI483235	GLENMAN	35.8	55.6	28	14.1
WB 936	WESTBRED 936	35.0	56.2	26	15.0
MT 9609	FORTUNA/AMIDON	34.3	56.7	32	14.2
PI574642	MCNEAL	33.8	56.1	30	15.4
CI 17430	NEWANA	33.4	56.0	27	14.4
PNR 2375	PIONEER 2375	32.5	57.6	27	14.1
ND 626	GRANDIN	32.3	56.3	30	14.9
PI549275	HI-LINE	31.9	56.0	26	13.7
CI 13596	FORTUNA	31.9	57.2	32	14.6
WB 926	WESTBRED 926	30.6	55.5	28	14.7
ND 606	AMIDON	30.1	56.6	32	14.1
MTHW9420	MT8182/MT8289	30.0	54.7	25	14.6
ND 582	STOA	29.9	54.8	32	15.1
WBExpress	WESTBRED EXPRESS	29.8	54.1	25	14.3
CI 17429	LEW	29.4	56.1	33	15.8
CI 17790	LEN	29.4	56.0	28	14.1
ND 677	ERNEST	28.7	57.4	32	14.8
C982-324	RAMBO	28.7	56.0	26	14.5
ND 673	TRENTON	28.6	57.1	34	14.5
TR983239	FERGUS	27.9	55.4	27	14.9
Experimental Means		31.5	56.2	29	14.6
F Test for Var. (df=20)		2.8**	5.0**	-	-
C.V. 1: (S/Mean)*100		8.6	1.6	-	-
LSD (0.05)		4.5	1.4	-	-

** Denotes Statistical Significance at $P \leq 0.01$.

Planted: 4/23/98

Harvested: 8/10/98

Fertilizer: 60# N

Growing Season Precipitation (May – July): 8.35"

Producer/Cooperator: Richard Barber, Denton

Table 2. Denton Off-Station Spring Wheat Multi-Year Yield Summary of Selected Varieties, 1989-1998. Central Agricultural Research Center. Moccasin, MT.

Selected Varieties	1989	1990	1991	1992 ^{1/}	1993	1994	1995	1996 ^{1/}	1997 ^{1/}	1998	Avg.	Newana Same Yrs.
	-----bu/a-----											
Amidon	48	26	60	23	83	23	39	23	47	30	40.2	40.4
Len	40	26	52	21	72	20	37	20	44	29	36.1	40.4
Stoa	40	25	57	25	80	22	39	21	47	30	38.6	40.4
Glenman	38	24	51	27	74	22	35	22	39	36	36.8	40.4
Westbred 926		24	61	19	78	25	41	25	46	31	38.9	40.1
Grandin		23	60	25	81	24	36	20	44	32	38.3	40.1
Fortuna	38	23	62	17	66	20	33	22	42	32	35.5	40.4
Rambo	42	22	49	25	74	20	37	23	43	29	36.4	40.4
Lew	40	22	50	27	65	20	36	23	40	29	35.2	40.4
Newana	43	21	65	25	81	20	44	27	45	33	40.4	-
Hi-Line	41	17	59	26	76	23	45	23	46	32	38.8	40.4
McNeal				27	92	22	43	24	47	34	41.3	39.3
Ernest						19	41	25	46	29	32.0	33.8
Fergus							36	26	43	28	33.3	37.3
WB Express							41	24	41	30	34.0	37.3
Vanna							46	25	52		41.0	38.7
Westbred 936							39	26	43	35	35.8	37.3
Pioneer 2375							36	24	41	33	33.5	37.3
MT 9433								26	46	37	36.3	35.0
MTHW 9420								24	44	30	32.7	35.0
Nursery Mean	41	24	57	24	77	22	38	24	44	32		
Growing Season Precip. (in.)	10.5	7.6	8.6	6.8	15.6	7.3	12.7	5.4	10.8	11.7		
April Precip. (in.)	2.4	0.8	2.4	1.2	1.2	2.3	2.5	0.7	1.4	0.6		
May Precip. (in.)	2.9	4.2	2.2	1.0	1.9	1.6	3.3	3.3	2.5	3.3		
June Precip. (in.)	3.2	1.5	2.8	2.9	5.4	2.8	3.3	1.4	4.4	3.7		
July Precip. (in.)	1.9	1.0	1.1	1.7	7.0	0.6	3.6	0.1	2.5	4.1		

*Planted re-crop on field pea ground in 1992, re-crop on buckwheat ground in 1996, re-crop following millet in 1997. All other years the trial was planted on fallow ground.

Variety trials were located on Richard Barber's farm.

Table 3. 1998 Fort Benton Spring Wheat Variety Trial – Exp. 9972. Central Agricultural Research Center. Moccasin, MT.

Id	Variety/Line	Grain Yield (bu/a)	Test Weight (lbs/bu)	Plant Height (in.)	Protein Content (%)
PI574642	MCNEAL	22.1	55.2	29	15.2
CI 17429	LEW	21.0	57.1	28	13.4
WB 926	WESTBRED 926	20.9	56.3	25	13.8
CI 13596	FORTUNA	20.7	56.7	27	13.5
ND 606	AMIDON	20.2	55.2	31	15.3
TR983239	FERGUS	19.6	55.9	28	14.2
PNR 2375	PIONEER 2375	19.2	55.6	28	13.8
C982-324	RAMBO	19.0	55.4	25	15.4
MT 9433	MT8808/MARBERG	19.0	58.1	28	14.7
CI 17790	LEN	19.0	53.7	27	15.5
ND 582	STOA	18.9	54.8	27	15.3
CI 17430	NEWANA	18.8	55.6	26	12.1
ND 673	TRENTON	18.7	55.8	31	15.7
ND 677	ERNEST	18.7	55.5	30	15.5
MTHW9420	MT8182/MT8289	18.7	52.7	26	15.5
PI549275	HI-LINE	18.6	54.0	24	15.2
WBExpress	WESTBRED EXPRESS	18.5	52.7	22	13.9
PI483235	GLENMAN	18.4	55.3	25	13.4
WB 936	WESTBRED 936	17.6	53.0	27	13.7
ND 626	GRANDIN	17.0	52.7	29	15.2
MT 9609	FORTUNA/AMIDON	16.5	55.3	26	14.7
Experimental Means		19.1	55.1	27	14.5
F Test for Var. (df=20)		1.4ns	2.7**	-	-
C.V. 1: (S/Mean)*100		10.3	2.8	-	-
LSD (0.05)		3.2	2.6	-	-

** Denotes Statistical Significance at $P \leq 0.01$

ns Denotes NO Statistical Significance at $P \leq 0.05$

Planted: 4/23/98

Harvested: 8/14/98

Fertilizer: 50# N topdressed.

Previous crop: Barley

Growing Season Precipitation (May – July): 5.50"

Producer/Cooperator: Steve Birkeland, Fort Benton

Table 4. Highwood/Fort Benton Off-Station Spring Wheat Multi-Year Yield Summary of Selected Varieties, 1990-1998. Central Agricultural Research Center. Moccasin, MT.

Selected Varieties	1990	1991	1992	1993	1994	1995	1996	1998	Avg.	Newana Same Yrs.
	-----bu/a-----									
Amidon	45	25	15	40	36	46	34	20	32.6	30.4
Len	37	25	12	40	34	42	33	18	30.1	30.4
Stoa	38	34	12	41	37	37	36	19	31.8	30.4
Glenman	39	30	19	38	35	47	31	18	32.1	30.4
Westbred 926	44	31	11	41	34	37	34	21	31.6	30.4
Grandin	41	29	10	43	35	32	33	17	30.0	30.4
Fortuna	36	33	12	36	35	42	31	21	30.8	30.4
Rambo	35	27	15	43	36	46	35	19	32.0	30.4
Lew	40	24	23	41	31	43	32	21	31.9	30.4
Newana	35 ^{1/}	29	14	42	32	39	33	19	30.4	-
Hi-Line	40	22	12	44	32	44	34	19	30.9	30.4
McNeal			18	47	37	45	32	22	33.5	29.8
Ernest								19	19.0	19.0
Fergus						34	33	20	29.0	30.3
WB Express						41	33	19	31.0	30.3
Westbred 936								19	19.0	19.0
Pioneer 2375								19	19.0	19.0
MT 9433								19	19.0	19.0
MTHW 9420								19	19.0	19.0
Nursery Mean	38.9	28.2	14.2	40.8	34.3	40.8	32.9	19.1		
Growing Season Precip. (in.)	7.2	11.0	9.3	18.4	4.9	14.9	6.3	5.5		
April Precip. (in.)	0.9	2.8	1.7	2.3	1.8	1.5	1.5	na		
May Precip. (in.)	3.4	2.5	1.9	1.9	1.5	4.0	3.0	na		
June Precip. (in.)	1.7	4.5	2.3	5.5	1.1	7.0	1.3	na		
July Precip. (in.)	1.3	1.2	3.4	8.7	0.5	2.3	0.6	na		

1/ Probable mix-up of seed sources, interpret Newana rank with caution.

1990-1996 variety trials were located at Ron Long's farm, 1997-1998 trials were located at the Birkeland farm.

1997 trial was abandoned due to an extreme wild oat infestation.

All trials were planted on re-crop ground.

Table 5. 1998 Winifred Spring Wheat Variety Trial – Exp. 9973. Central Agricultural Research Center. Moccasin, MT.

Id	Variety/Line	Grain Yield (bu/a)	Test Weight (lbs/bu)	Plant Height (in.)	Protein Content (%)
WB 936	WESTBRED 936	53.3	49.4	31	17.9
WBExpress	WESTBRED EXPRESS	47.7	50.7	31	16.3
PNR 2375	PIONEER 2375	47.6	54.1	39	16.3
WB 926	WESTBRED 926	46.6	49.5	35	17.6
PI574642	MCNEAL	46.5	50.2	38	17.2
PI549275	HI-LINE	46.3	49.8	32	16.9
ND 626	GRANDIN	46.2	49.3	38	17.0
MTHW9420	MT8182/MT8289	44.2	47.8	34	17.2
TR983239	FERGUS	44.0	49.2	35	17.9
C982-324	RAMBO	42.7	52.4	35	16.7
CI 17790	LEN	42.5	48.9	36	17.4
CI 17430	NEWANA	42.3	48.8	31	16.9
ND 677	ERNEST	40.7	52.5	41	18.0
ND 606	AMIDON	39.5	50.6	40	17.6
CI 13596	FORTUNA	39.2	53.8	38	15.7
ND 582	STOA	39.0	49.2	44	18.4
PI483235	GLENMAN	38.7	50.6	35	15.8
MT 9433	MT8808/MARBERG	38.0	50.3	38	18.3
ND 673	TRENTON	37.8	48.5	46	17.5
MT 9609	FORTUNA/AMIDON	36.3	51.4	41	16.9
CI 17429	LEW	34.1	53.1	39	18.1
Experimental Means		42.5	50.5	37	17.2
F Test for Var. (df=20)		5.4**	7.1**	-	-
C.V. 1: (S/Mean)*100		8.2	1.3	-	-
LSD (0.05)		5.8	1.9	-	-

** Denotes Statistical Significance at $P \leq 0.01$.

Planted: 4/24/98 on fallow ground.

Harvested: 8/11/98

Fertilizer: 60# N

Growing Season Precipitation (April – July): 10.8"

<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>
0.59"	2.64"	4.46"	3.07"

Producer/Cooperator: Bruce Udelhoven, Winifred