Title: Small grain variety performance under no-till conditions.

Year: 2000.

Location: Western Triangle Research Center, Conrad, MT.

Personnel: Gregory D. Kushnak, Research Center, Conrad; Luther Talbert and Tom Blake, MSU Plant Science Dept.

Objectives: Identify small grain varieties which are adapted to no-till conditions.

Methods: Spring wheat and barley varieties were no-till planted into barley stubble at right angles to the previous crop. Crop history for the site was barley in 1999, fallow in 1998, and barley in 1997. Planting was accomplished with a double-disk no-till plot planter constructed by our Research Center Staff. Row space was 12 inches. Fertilizer included 60 pounds/acre ammonium phosphate (11-52-0) and 60 pounds/acre actual nitrogen top-dressed as urea. Roundup herbicide was used for preplant weed & volunteer control. Achieve and Bronate herbicides were used for wild oat and broadleaf control, respectively.

Results: Data for 2000, along with 5-year averages, are presented in Tables 1 and 2 for spring wheat, and Tables 3 and 4 for barley. Year-2000 was a good test for tolerance to environmental stress. Rainfall was 58% of normal for the growing season, and preplant soil moisture-depth was only 6 inches.

Drought stress had considerable impact on yield, test weight and plant height. Yields ranged from 10 to 17 bu/a for spring wheat, and 21 to 26 bu/a for barley. Spring wheat test weights were very low, ranging from 40 to 55 lbs/bu. Barley test weights were only fair, ranging from 45 to 48 lbs/bu. Barley kernel plumps ranged from 1 to 9%.

Spring wheat varieties ranking high for both yield and test weight were McNeal, Newana, Ernest, WB926, Hiline, Conan and Reeder.

Barley varieties ranking high for yield, while maintaining at least 48 lbs/bu for test weight, were MT-950186 and MTLB-5. Stark, Bowman, Xena and Baroness also ranked high for yield, but with a slightly lower test weight of 47 lbs/bu. MT-950186 ranked very high for yield and test weight in all fallow and recrop trials over the past two years, indicating a broad range of adaptation, including drought tolerance.

Future Plans: Continue the no-till continuous-crop variety evaluations in efforts to include more seasons of disease and environmental stress, and to include new genetic lines.

Table 1 Dryland Recrop No-till Spring Wheat variety trial grown north of Conrad, 2000. Mont. Agr. Expt. Station. Western Triangle Ag. Research Center, Conrad, Montana.

Variety		Yield bu/ac.	Test wt. lbs/bu.	Plant hgt. inches	% protein
MCNEAL		16.7	50.5	24	18.0
AMIDON	*	16.0	48.8	24	17.4
NEWANA		14.8	53.1	22	17.6
ERNEST	*	14.5	55.5	21	18.5
WESTBRED 926		14.5	53.8	20	19.4
WESTBRED EXPRESS		14.0	53.0	21	17.6
HI-LINE		14.0	53.9	23	18.7
MTHW 9710	**	13.9	54.8	21	19.0
CONAN	*	13.8	54.5	22	17.7
REEDER		13.8	53.7	22	18.5
SCHOLAR	*	13.7	50.0	24	.0
LEW		13.2	39.7	24	18.6
MTHW 9420	**	13.2	52.1	21	18.6
MT 9955		13.2	51.1	22	19.0
FORTUNA	*	12.9	54.1	23	17.8
WESTBRED 936		12.6	53.2	19	19.0
RAMBO	*	12.1	50.5	20	.0
FERGUS		11.8	53.2	21	19.3
GRANDIN		11.5	52.4	23	18.0
ID377S		10.2	46.9	22	18.7

Cooperator: Western Triangle Ag. Research Center.
Location: Ten miles north of Conrad, MT. (Pondera County)
Applied fertilizer: 66-31-0 (N-P-K)
Previous crop: Barley.
Date seeded: April 25, 2000, into no-till standing stubble.
Date harvested: August 3, 2000.
Rainfall: From planting to harvest was 3.51 inches.
Moist soil depth at planting: 6 inches.
* = Sawfly resistant varieties. (Amidon, Conan, Rambo and Scholar have partial resistance.)
** = Hard white wheat.
Yield experimental mean: 13.51
Error degrees of freedom: 38
F test for var: 2.05 ---- C.V. 2: 7.65 ---- LSD (0.05): 2.96

Table 2 Five-year summary for No-till Recrop Spring Wheat varieties grown near Conrad, MT. 1996 - 1997 - 1998 - 1999 - 2000. Mont. Agr. Expt. Station, Western Triangle Agr. Research Center, Conrad, MT.

Variety		5 - year comparable average				
		Yield bu/ac	Test wt lbs/bu	Plant hgt. inches	Head date 1/	% Protein
WESTBRED 936		38.1	59.4	25	179	13.8
AMIDON	*	37.9	58.0	32	178	13.4
SCHOLAR	*	37.5	59.5	32	179	13.4
NEWANA		37.4	59.8	28	181	12.6
ERNEST	*	37.3	60.6	31	179	14.0
RAMBO	*	37.1	59.5	27	180	12.4
WESTBRED EXPRESS		37.1	59.1	25	178	13.6
WESTBRED 926		36.5	59.5	27	177	14.2
MCNEAL		36.3	58.4	29	179	13.6
FERGUS		36.1	59.5	27	177	14.3
HI-LINE		35.7	60.1	27	177	13.7
MT HW9420	**	35.3	58.5	27	177	13.4
LEW	*	34.8	57.0	30	180	13.5
FORTUNA	*	34.5	59.8	33	179	13.6
GRANDIN		33.4	59.5	30	179	13.9

Cooperator: Western Triangle Ag. Research Center.
Location: North of Conrad, MT. (Pondera County)
* = Sawfly resistant varieties. (Amidon, Rambo and Scholar have partial resistance.)
** = Hard white wheat.
1/ = Head dates based on 2 years average. (1998 - 1999)

Table 3 Dryland Recrop No-till Barley variety trial grown north of Conrad, 2000. Mont. Agr. Expt. Station, Westerm Triangle Ag. Research Center, Conrad, MT.

Variety	Yield bu/ac	TestWt lbs/bu	Plant hgt. inches	% Plump	% Thin	% Protein
Xena	25.9	46.6	21	6	61	17.0
MT960099	25.0	45.4	19	2	91	19.9
MT950186	24.7	48.2	20	4	70	19.3
Baronesse	24.7	47.0	20	9	55	19.6
MTLB 5	24.5	48.8	20	2	77	19.6
Stark	24.3	47.2	24	5	66	17.5
Bowman	23.7	46.5	22	8	58	18.0
Hector	23.7	45.7	23	3	74	18.4
Harrington	23.3	45.2	20	3	71	19.8
MTLB 13	23.2	47.0	21	2	86	18.6
MT960228	23.1	46.1	21	4	69	19.1
Chinook	22.9	45.7	23	2	85	19.5
MT960100	22.6	44.9	20	9	66	21.0
Gallatin	22.6	44.0	20	1	82	18.1
Valier	21.4	48.0	20	2	74	19.3
Lewis	21.2	46.9	23	6	64	19.5

Cooperator: Western Triangle Ag. Research Center.
Location: Ten miles north of Conrad, MT. (Pondera County)
Applied fertilizer: 66-31-0 (N-P-K)
Previous crop: Barley.
Method of seeding: Double-disc dril1 into standing stubble.
Date seeded: April 25, 2000.
Date harvested: July 31, 2000.
Soil moisture depth at seeding: 6 inches.
Rainfall: From planting to harvest was 3.51 inches.
Yield experimental mean: 23.55
Error degrees of freedom: 30
F test for var.: 2.07
C.V. 2: 3.78
LSD (0.05): 2.57

Table 4 Five-year summary for Recrop Dryland No-Till Barley varieties grown north of Conrad, MT. 1996 - 1997 - 1998 - 1999 - 2000. Mont. Agr. Expt. Station, Western Triangle Agr. Res. Center, Conrad, MT.

	5 - year comparable average						
Variety	Yield bu/ac	Tst wt lbs/bu	Plant hgt. inches	% Plump	% thin	Head date *	% Protein
BARONESSE	64.4	49.7	25	64	17	180	12.1
MTLB 5	57.6	51.4	26	67	19	179	12.4
GALLATIN	56.0	49.9	26	68	20	179	11.7
STARK	55.5	51.3	28	74	15	177	11.9
HECTOR	55.0	49.5	29	62	21	179	12.2
HARRINGTON	55.0	48.1	26	67	18	181	12.3
BOWMAN	54.0	50.4	27	75	13	177	12.5
CHINOOK	53.7	49.4	27	61	24	179	13.7
LEWIS	52.4	50.8	27	64	18	180	12.9

Cooperator: Western Triangle Ag. Research Center.
Location: Ten miles north of Conrad, MT. (Pondera County)
* = Head dates based on 2 years average. (1998-1999)