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

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

PROJECT PERSONNEL: P.L. Bruckner, W.W. Breeder, Bozeman
J.E. Berg, W.W. Research Assoc., Bozeman
J. Vavrovsky, Research Spec., Moccasin
Dave Phillips, Fergus Cty. Extension Agent
Judee Wargo, Chouteau Cty. Extension Agent

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

RESULTS:
The Denton and Moore trials were planted on fallow, Fort Benton recrop on tilled barley ground, and Winifred recrop on spring wheat ground. Denton and Moore winter wheat yields were above average, at Winifred average, and at Fort Benton average to slightly below average. Test weights were average at Winifred, and above average at the other sites. Proteins were low at all sites.

Denton: Yields ranged from 67 to 51 bu/a, with (Hybritech) QT 542 producing the high yield. Test weights averaged 61.5 lbs/bu, while proteins averaged 10.9%. Judith, Neeley, Rocky, and Tiber have the high 9 yr ave. yields. Over 7 seasons, QT 542 has averaged 5 bu/a more than Neeley, and 4 bu/a more than Judith. Data for the Denton location are presented in Tables 1 & 2.

Fort Benton: Yields ranged from 56 to 45 bu/a with Rocky and Yuma producing the high yields. Test weights averaged 61.1 lbs/bu, while proteins averaged 10.3%. Sawfly damage was severe in some of the varieties. However, most stems remained standing and were picked up by the combine. Neeley has the high 9 yr average yield (58 bu/a) followed by Tiber (56 bu/a). Over 7 seasons, QT 542 has a 2 bu/a advantage over Neeley. Fort Benton-Highwood location data are presented in Tables 3 & 4.

Moore: Yields ranged from 60 to 48 bu/a with Bighorn and MT 9222 producing the high yield. Test weights averaged 61.3 lbs/bu, while proteins averaged 10.9%. Neeley has the high 10 yr ave yield (47 bu/a), followed by Tiber and Judith. QT 542 has a 4 bu/a advantage over Neeley in 7 comparable years. Data for this location are presented in Tables 5 & 6. Reps two and three were treated with a fungicide "Tilt" to address high incidence of leaf diseases resulting from late June rains. The Tilt alleviated most of the spotting, but did not show a clear yield enhancement.

Winifred: Yields ranged from 56 to 33 bu/a with Centurk producing the high yield. Test weights averaged 60.3 lbs/bu and proteins averaged 12.0%. QT 542 has the four year high average yield (51 bu/a). Data is presented in Tables 7 & 8. There was a high incidence of volunteer Tiber winter wheat due to a hailstorm in 1995.

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SUMMARY:
The sawfly resistant varieties, Rampart and Vanguard, did well at the Fort Benton location. At the other sites, where sawfly were not a problem, their yields were below the site averages. Kestrel and Judith had consistently low test weights at all locations, except Moore, where Judith was average.

FUTURE PLANS:
Winter wheat variety evaluations will continue at Denton, Fort Benton, Moore, and Winifred.

Table 1 1997 Denton Winter Wheat Variety Performance Trial
Exp. 3871 Central Agricultural Research Center, Moccasin, MT.

Variety	Plant Ht.	Grain Yield	Test Wt.	Protein Content
	"	bu/a	lbs/bu	%
QT 542	35	66.8	61.8	10.4
TIBER	38	65.4	62.4	11.5
MT 9222	38	64.9	61.6	10.8
MT 9432	36	64.2	63.3	10.6
NUWEST	32	64.0	61.0	10.7
BIGHORN	28	63.6	62.2	10.9
AGASSIZ	42	62.1	63.2	11.0
NEELEY	35	62.1	62.1	7.4
ERHARDT	31	62.1	62.3	11.7
ALLIANCE	28	61.0	60.4	10.1
KESTREL	33	59.9	59.9	10.4
MT 91192	32	59.8	60.0	10.1
ROCKY	37	59.4	62.4	10.4
JUDITH	33	58.6	58.6	11.2
YUMA	30	58.3	61.1	10.6
CENTURK	36	57.7	61.9	11.1
REDWIN	37	57.2	61.2	12.2
HAWK	30	56.5	60.6	10.8
PROMONTORY	30	56.0	61.9	11.4
VANGUARD	35	55.6	61.5	11.9
MANNING	29	55.2	59.1	11.7
NORSTAR	41	54.3	63.4	11.2
MCGUIRE	33	53.9	62.5	12.0
RAMPART	34	50.7	61.0	12.2
EXPERIMENTAL MEANS		59.56	61.47	10.93
F TEST FOR VAR. df=46		2.79	15.02	1.82
C.V. 1: (S/MEAN)*100		7.26	.91	11.47
LSD (0.05)		7.11	.92	2.06

Planted: 9-25-1996 on fallow ground.
Previous Crop: spring grain.
Harvested: 8-5-1997
Growing Season Precipitation (April-July): 10.76"

April	May	June	July
1.40"	2.54"	4.35"	2.47"

Producer: Richard Barber, Denton.

Table 2 Denton Off-Station Winter Wheat Multi-Year Summary
Central Agricultural Research Center, Moccasin MT.

Variety	1988	1989	1990	1991	1992	1993	1995	1996	1997	Ave.	Neeley Same Yrs
	bu/a										
CENTURK	24	53	48	59	25	55	74	44	58	49	52
NORSTAR	11	59	44	39	24	55	51*	35	54	41	52
NEELEY	20	52	55	64	24	66	82	44	62	52	--
ROCKY	26	67	50	60	22	57	73	46	59	51	52
TIBER	20	59	52	55	28	65	73	42	65	51	52
JUDITH	27	64	59	61	26	55	87	45	59	54	52
HYBRITECH 542		71	57		40	59	78	48	67	60	55
BIGHORN			48	60#	23	56	73	46	64	53	57
HAWK				62	17	50	77	30	57	49	57
AGASSIZ				46	15	51	61	38	62	45	57
NUWEST			50	54			67	43	64	56	61
KESTREL						60	80	44	60	61	63
ERHARDT							71	42	62	58	63
VANGUARD							56	41	56	51	63
RAMPART							76	40	51	56	63
McGUIRE							71	42	54	56	63
YUMA								43	58	50	53
PROMONTORY								53	56	54	53
Mean	20.5	55.3	49.0	53.2	22.2	56.0	73.1	42.9	59.6		

#Bighorn was planted on one end (not randomized).
1994 trial was abandoned due to variable stands resulting from wind damage.
*Suspected low germination resulted in low yields.
Trials were located on Richard Barber farm, Denton, MT.

Table 3 1997 Fort Benton Winter Wheat Variety Trial
Exp. 3872 Central Agricultural Research Center, Moccasin, MT.

Variety	Sawfly *	Plant Ht	Grain Yield	Test Wt	Protein Content
		"	bu/a	lbs/bu	%
ROCKY	2	34	55.9	62.4	9.9
YUMA	1	26	55.8	61.9	9.5
PROMONTORY	5	29	55.2	63.1	10.0
BIGHORN	2	26	55.0	61.8	10.2
MANNING	5	30	54.8	61.0	10.0
TIBER	3	36	54.5	61.5	10.2
QT 542	5	33	53.7	60.4	10.7
CENTURK	1	32	53.6	61.8	9.9
MT 91192	2	30	53.3	59.8	9.7
MT 9222	1	32	52.6	60.9	9.8
MT 9432	2	34	52.4	61.4	10.1
RAMPART	0	31	52.3	61.4	10.9
HAWK	2	26	51.5	62.2	10.8
NEELEY	4	31	51.1	60.5	10.5
ALLIANCE	1	29	51.1	62.5	10.3
MCGUIRE	1	30	50.8	61.9	11.1
JUDITH	4	30	50.6	59.0	10.1
VANGUARD	1	31	50.5	60.9	10.8
ERHARDT	1	29	49.5	61.6	11.1
KESTREL	2	31	48.9	57.8	9.9
NUWEST	1	33	48.8	60.0	9.8
REDWIN	5	35	48.4	61.6	11.1
AGASSIZ	3	35	46.3	61.4	10.3
NORSTAR	2	36	45.2	60.8	9.9
EXPERIMENTAL MEANS		31.22	51.74	61.15	10.27
F TEST FOR VAR. df=46		9.74	1.17	4.85	2.37
C.V. 1: (S/MEAN)*100		5.03	8.98	1.51	5.25
LSD (0.05)		2.58	7.64	1.52	.89

*Sawfly damage - 0=none, 3=moderate, 5=severe
Ratings are based on visual inspection. Most of the stems that were cut off were standing and able to be picked up by combine.

Planted: 9-27-1996
Harvested: 7-31-1997
Growing Season Precipitation (April-July): 8.65"

April	May	June	July
2.23"	2.54"	2.72"	1.16"

Producer: Steve Birkeland, Fort Benton.

Table 4 Fort Benton Off-Station Winter Wheat Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1988	1989	1990	1991	1993	1994	1995	1996	1997	Ave.	Neeley Same Yrs
	bu/a										
CENTURK	20	68	55	66	50	45	66	38	54	51	58
NORSTAR	21	74	53	55	49	43	56*	32	45	48	58
NEELEY	26	83	64	74	58	50	69	47	51	58	--
ROCKY	21	75	56	68	51	44	63	42	56	53	58
TIBER	24	76	59	66	56	47	74	46	54	56	58
JUDITH	24	70	67	63	39	44	70	36	51	52	58
HYBRITECH542		81	70		54	52	78	45	54	62	60
BIGHORN			59	66#	55	43	70	34	55	55	59
HAWK				66	53	42	59	33	51	51	58
AGASSIZ				57	48	40	62	32	46	47	58
NUWEST			58	63		41	66	36	49	52	59
KESTREL					58	44	70	43	49	53	55
ERHARDT						44	72	35	49	50	54
VANGUARD						40	68*	40	51	50	54
RAMPART						45	77	39	52	53	54
McGUIRE							59	34	51	48	56
YUMA								45	56	50	49
PROMONTORY								49	55	52	49
Mean	21.3	70.9	58.1	62.1	51.3	44.5	68.7	40.0	51.7		

#Bighorn was planted on one end (not randomized).
1992 Highwood Trial was abandoned due to volunteer barley infestation.
*Suspected low germination resulted in low yields.
1995 trial had a high incidence of volunteer spring wheat.
Trials were located on the Ron Long farm, Shonkin, MT. through 1996, at Steve Birkeland farm 1997.

Table 5 1997 Moore Winter Wheat Variety Performance Trial
Exp. 3873 Central Agricultural Research Center, Moccasin, MT.

Variety	Plant Ht.	Grain Yield	Test Wt.	Protein Content
	"	bu/a	lbs/bu	%
BIGHORN	27	60.1	61.1	11.0
MT 9222	32	60.0	60.6	11.5
MT 91192	30	59.5	60.2	10.6
QT 542	31	58.1	61.5	10.7
TIBER	36	57.4	61.8	10.8
ROCKY	32	56.8	61.5	10.6
ERHARDT	31	56.7	62.9	11.5
MT 9432	36	56.4	62.7	11.1
PROMONTORY	30	56.3	62.4	10.7
KESTREL	30	55.9	59.1	10.3
NEELEY	30	55.7	62.1	10.1
NUWEST	32	55.3	61.5	10.6
JUDITH	33	54.0	60.1	11.1
CENTURK	29	53.2	61.3	10.2
YUMA	26	52.9	60.8	10.2
VANGUARD	32	51.5	60.3	11.5
ALLIANCE	24	51.1	60.3	10.7
MANNING	29	50.4	60.3	10.7
REDWIN	36	49.6	62.2	11.9
AGASSIZ	39	49.6	62.1	11.1
RAMPART	32	49.0	60.8	11.8
HAWK	28	48.9	61.2	10.8
MCGUIRE	31	48.4	61.7	12.7
NORSTAR	42	48.0	62.0	10.4
EXPERIMENTAL MEANS		53.96	61.28	10.94
F TEST FOR VAR. df=46		2.83	22.25	12.19
C.V. 1: (S/MEAN)*100		7.47	.57	2.84
LSD (0.05)		6.63	.57	.51

Planted: 9-23-1996
Harvested: 8-25-1997
Producer: Gary Heilig, Moore.

Table 6 Moore Off-Station Winter Wheat Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1987	1988	1989	1990	1991 @	1992	1994	1995	1996 .	1997	Ave.	Neeley Same Yrs
	bu/a											
CENTURK	69	26	45	35	58	30	36	31	38	53	42	47
NORSTAR	71	9	47	35	49	28	37	31*	34	48	39	47
NEELEY	92	17	46	34	64	42	37	45	36	56	47	--
ROCKY	69	24	49	29	57	33	36	40	41	57	43	47
TIBER	86	20	50	33	56	41	35	43	39	57	46	47
JUDITH	78	28	49	36	56	32	34	47	35	54	45	47
HYBRITECH542			52	41		48	35	43	46	58	46	42
BIGHORN				42	58#	34	35	41	34	60	43	45
HAWK					62	31	35	32	20	49	38	47
AGASSIZ					49	35	33	42	41	50	42	47
NUWEST				47	55		42	46	34	55	46	45
KESTREL							34	41	36	56	42	43
ERHARDT							37	42	43	57	45	43
VANGUARD							29	29*	35	52	36	43
RAMPART							34	44	33	49	40	43
McGUIRE								41	37	48	42	46
YUMA									27	53	40	46
PROMONTORY									39	56	47	46
Mean	70.7	20.1	46.3	36.4	54.3	35.4	35.4	40.5	36.3	54.0		

Bighorn was planted on one end (not randomized).
@ 1990 Nursery suffered aphid damage.
1993 Nursery suffered hail damage
*Suspected low germination resulted in low yields.

Table 7 1997 Winifred Winter Wheat Variety Performance Trial
Exp. 3874 Central Agricultural Research Center, Moccasin, MT.

Variety	Plant Ht.	Grain Yield	Test Wt.	Protein Content
	"	bu/a	lbs/bu	%
CENTURK	35	56.0	61.4	11.6
BIGHORN	27	53.8	61.2	11.6
NORSTAR	41	51.5	61.9	12.7
REDWIN	37	51.4	61.9	12.6
NEELEY	36	50.6	61.3	11.9
MCGUIRE	34	50.6	61.9	12.5
HAWK	28	50.5	60.0	8.7
MT 9432	34	49.7	61.8	11.5
ERHARDT	30	49.6	60.9	12.1
NUWEST	32	46.5	60.9	11.2
MT 91192	30	46.0	58.2	11.2
ROCKY	36	44.8	60.5	11.3
QT 542	33	44.6	58.6	12.4
MT 9222	33	44.0	59.8	11.7
JUDITH	33	43.3	58.8	11.9
ALLIANCE	30	42.3	58.6	11.5
YUMA	29	41.7	60.2	11.7
PROMONTORY	32	40.9	60.9	12.5
VANGUARD	26	39.4	60.1	13.3
AGASSIZ	40	38.9	61.0	12.9
KESTREL	29	38.5	58.4	11.9
TIBER	29	38.2	60.6	12.7
MANNING	28	37.1	59.8	12.0
RAMPART	29	33.5	60.0	13.6
EXPERIMENTAL MEANS		45.14	60.35	11.96
F TEST FOR VAR. df=46		1.70	4.78	1.28
C.V. 1: (S/MEAN)*100		17.50	1.53	12.29
LSD (0.05)		12.98	1.51	2.42

Planted: 9-25-1996
Harvested: 8-5-1997
Fertilizer: 60 units N as Urea broadcast 10-1-1997.
Growing Season Precipitation (April-July): 9.95"

April	May	June	July
1.69"	2.82"	2.78"	2.66"

Producer: Bruce Udelhoven and Tom Econom, Winifred.

Table 8 Winifred Off-Station Winter Wheat Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1992	1994	1996	1997	Ave.	Neeley Same yrs.
	----------bu/a----------					
CENTURK	31	53	55	56	49	46
NORSTAR	30	50	50	51	45	46
NEELEY	40	52	43	51	46	--
ROCKY	32	50	55	45	45	46
TIBER	36	47	57	38	44	46
JUDITH	30	51	52	43	44	46
HYBRITECH 542	47	59	55	45	51	46
BIGHORN	31	53	50	54	47	46
HAWK	25	55	36	51	42	46
AGASSIZ	30	42	46	39	39	46
NUWEST		49	50	46	48	49
KESTREL		54	52	38	48	49
ERHARDT		52	52	50	51	49
VANGUARD		44	45	39	43	49
RAMPART		49	43	33	42	49
McGUIRE			49	51	50	47
YUMA			47	42	44	47
PROMONTORY			54	41	47	47
Mean	31.6	50.5	49.9	45.1		

The 1993 and 1995 trials were not harvested due to hail damage.