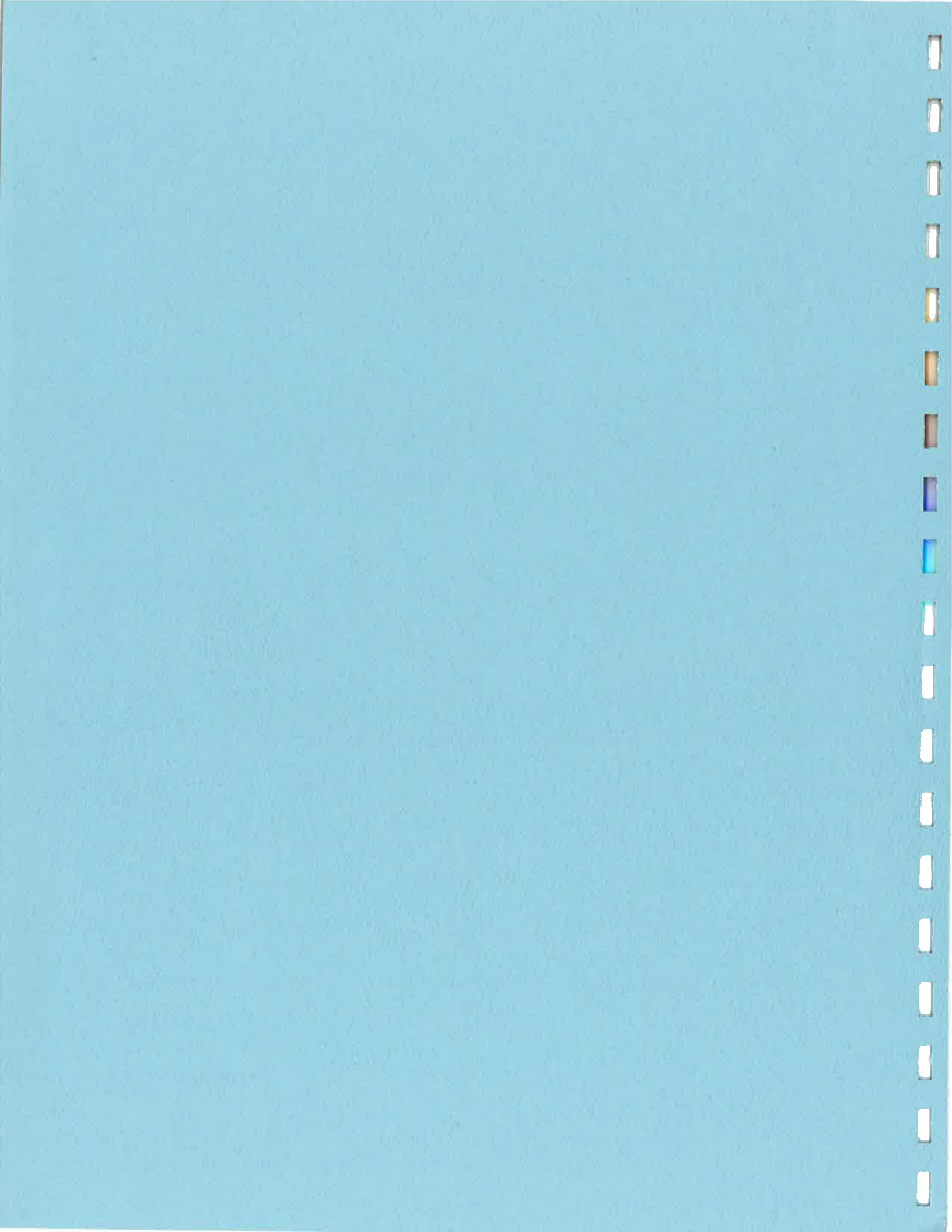


The 8th
ANNUAL REPORT
of the
WESTERN TRIANGLE AGRICULTURAL RESEARCH CENTER
Montana Agricultural Experiment Station
Conrad, Montana
1985

Submitted by
Dr. Gregory D. Kushnak, Superintendent & Crop Scientist

MAES Research Report

Montana State University is an Equal opportunity/Affirmative Action institution. Information contained herein is available without regard to race, creed, color, sex or national origin.



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Station Activities and Developments

The "dust bowl" conditions of 1985 prompted the use of chemical fallow on station fields instead of tillage to preserve an already short supply of stubble. Soil blowing during the winter was especially bad around the new office building, where the soil had been left bare from construction activities. Trees and streambank wheatgrass were planted around the office building during the spring. The trees included green ash, russian olive, blue spruce, and scotch pine.

Plans to fence the east boundary of the station to keep out trespass livestock were not carried out, as the soil was too dry to drive fence posts.

A weather station, consisting of an instrument shelter and rain gauge, was set up to allow more detailed climate monitoring. Readings include minimum and maximum daily temperatures, rainfall, and evaporation.

1985 was the 3rd dry year in a row; with growing season rainfall far below normal and soil reserves depleted. Crops were severely affected by the drought, with grain yields ranging from 5 to 30 bu/acre. Most winter wheat did not survive the dry conditions. Insects became unusually troublesome, requiring spray applications several times to prevent crop loss to cutworms, grasshoppers, and blister beetles (on pulse crops). Additionally, sawflys were an increasing menace.

There were approximately 49 experiments conducted this year, 29 of which were off station.

Field tours were held at some of the off-station plots, including Cut Bank, July 11; Whitlash, July 2; and twice at Fairfield, July 30 and August 16. The general station field day was cancelled due to drought, but approximately 35 visitors from Jack Baringers IPM group toured the plots on July 10.

A special grant of \$38,000 from the Yielder Company, which was partially matched with \$20,000 from the Montana Wheat Research & Marketing Committee and \$15,640 from the Montana Agr. Experiment Station was given to the three Research Centers at Conrad, Havre, and Moccasin to purchase a Yielder No-Till Drill, transport trailer, and truck. The 3 Research Centers will work together as a team, establishing plots in the Triangle Area. The truck was a used highway department snowplow rig, in good condition; and was purchased for \$6429.

Research Center staff during 1985 included Greg Kushnak, Superintendent; Research Technicians Ron Thaut and Larry Christiaens; and Gladys Dunahoo, secretary (half time). Dr. Alice Jones resigned last winter to take a job in Nebraska. Hiring of a scientist to replace Alice is underway.

The Advisory Committee held a meeting on June 11, with MAES Director Dr. Jim Welsh, regarding the hiring of a new scientist to replace Alice Jones. The committee felt that the new scientist should be oriented toward general agronomy and soils, rather than confined to a specific subject area.

Following is a list of Advisory Committee members:

Past Members

Richard Page, Bynum Teton Co.	1977-79
Dave Shane, Floweree, Cascade Co.	1977-82
Vade Hamma, Brady, Chouteau Co.	1977-82
Wilson Hodgskiss, Choteau, Teton Co.	1977-83
Don Buffington, Ledger, Liberty Co.	1977-83
Jerry Swenson, Cut Bank, Glacier Co.	1977-83
Karl Ratzburg, Ledger, Toole Co.	1977-84
Joe DeStaffany, Conrad, Pondera Co.	1977-84
Dale Vermulm, Cut Bank, Glacier Co.	1977-84
Jack Baringer, Conrad, Pondera Co.	1977-84
Bob LongCake, Shelby, Toole Co.	1982-84
Randy Weaver, Cut Bank, Glacier Co.	1982-84
Paul Kronebusch, Conrad, Pondera Co.	1977-85

Re-appointed through 1985

Arnold Gettal, Power, Teton Co.
Gary Iverson, Sunburst, Toole Co.

New appointment through 1985

Ted Neuman Vaughn, Cascade Co.
Bill McLean, Brady, Chouteau Co.

New appointment through 1986

Leif Larson, Choteau, Teton Co.

New appointment through 1987

Miles Lewis, Cut Bank, Glacier Co.
Bruce Bradley, Cut Bank, Glacier Co.
Joe Larsen, Galata, Toole Co.
Bob Layne, Valier, Pondera Co.
Richard Thieltges, Chester, Liberty Co.
Bill Richter, Choteau, CES Representative (ex-officio)

New appointment through 1988

Mark Grubb, Pondera Co.

Climatic summary for the 1985 calendar year at the Western Triangle Research Center, Conrad, MT.

	1985 Month												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Precipitation (inches)	.16	.33	.75	.83	1.98	.80	.16	2.79	4.95	.77	.73	.17	14.42
Mean Temperature (°F)	--	--	--	--	55.6	59.2	71.1	60.7	46.4	40.1	15.0	23.9	--
Last killing frost in spring *	-----May 17 (31°)												
First killing frost in fall *	-----September 6 (32°)												
Frost free period-----	-----112 days												
Maximum summer temperature-----	-----July 11 (96°)												
Minimum winter temperature-----	-----not available												

* In this summary, 32°F is considered killing frost.

Soil moisture probe depth = 18" on fallow (or 3" available water); 15" on stubble (or 2.5" available water).

TITLE: Winter Wheat Investigations
YEAR: 1985
LOCATION: Western Triangle Research Center, Conrad, Montana
PERSONNEL: Gregory D. Kushnak, Ron Thaut, and Larry Christiaens - Research Center, Conrad; Dr. Allan Taylor, MSU, Bozeman.

Winter wheat variety test plots at the "Knees" between Fort Benton and Brady, at Chester, and on Station failed to establish due to dry soil in 1985. In contrast, fairly good plot yields were obtained in the Dutton area, and also south of Great Falls near Eden. The 1985 Dutton data are presented in table 1, with a 3-year summary in table 2. Redwin and MT 8003 were among the top yielders in 1985, as well as having the best 3-year average. MT 8003 is a selection from Redwin, and shows a great deal of promise. Release and naming of MT 8003 is approximately 2 years away, pending a successful seed increase. Neeley was also a top yielder in 1985, but only one year of data was available at this location.

A seeding rate study was also conducted at Dutton, and the data are presented in another section of this report in tables 32 and 33.

The variety data from Eden are presented in table 3, with a 2-year summary in table 4. In addition to MT 8003, varieties with superior performance over the last two years included Centurk, Cree, Neeley, Winridge, and Cheyenne. Cree is a shatter resistant Cheyenne.

Table 1. Winter wheat variety trial east of Dutton, 1985.
 Mont. Agr. Expt. Sta.; Western Triangle Research
 Conrad, MT

Variety	Plant hgt. in.	Yield bu/a	Test wt.
Mt 8003 (Redw Sel)	31	45.4	59.8
Neeley	30	44.6	59.5
Redwin	30	43.0	57.6
Norwin	24	41.1	61.2
Winridge	29	41.1	58.1
Winalta	35	39.7	60.7
Cheyenne	32	38.0	59.1
Norstar	38	37.8	57.9
Cree *	33	37.5	60.7
Rocky	28	37.3	60.8
Teton Sel.	35	36.6	58.2
Centurk	28	35.9	60.9
Weston	32	35.9	60.9
Roughrider	32	33.7	59.8
Warrior	32	33.6	60.0
Rosebud	28	33.1	59.3
Agassiz	33	29.0	58.5
Citation	23	25.5	58.0

F-test L.S.D. = bu; C.V. =
 Cooperator: Darryl Goodmundson, 1 mile east of Dutton.
 Fertilizer: 11-51-0 actual with seed + 80 AA actual
 Previous crop: Fallow
 Date seeded: September 19, 1984
 Date harvested: July 25, 1985
 Shattering & sawfly damage: none
 *Cree is a shatter resistant cheyenne.

Table 2. Three-year summary for winter wheat varieties grown near Dutton, 1983-85. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Three - year average		
	Height inches	Yield bu/a	Test wt.
MT 8003 (Redw Sel.)	30	49.3	60.6
Redwin	30	46.9	59.6
Winridge	30	45.8	59.6
Centurk	29	45.6	61.9
Cree **	33	45.2	61.4
Rocky	29	45.1	61.6
Norwin	22	45.0	61.0
Cheyenne*	32	42.4	61.1
Winalta	34	41.0	61.8
Norstar	37	40.1	59.9
Rosebud	30	39.0	60.1
Citation	23	36.7	59.9
Roughrider	32	35.3	60.4

Cooperator and location: Darryl Goodmundson, east of Dutton

Previous crop: Fallow

Fertilizer (each year): 82#N as A.A. + 100# 11-51-0

Seed date: September 20, 1982-83; September 19, 1984.

*Cheyenne shattered severely in 1983.

** Cree is a shatter resistant Cheyenne.

Table 3. Winter wheat variety trial grown south of Great Falls near Eden, 1985. Mont. Co-op. Ext. Ser. & Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.
Brule	29	27.2	56.9
Centurk	27	25.3	58.6
Cree	30	24.9	58.6
MT 8003 (Redw. Sel.)	30	24.7	57.9
Winridge	27	24.6	56.4
Neeley	28	24.1	58.3
Cheyenne	31	23.8	58.6
Winalta	31	23.5	59.1
Vona	26	23.3	59.3
Roughrider	32	23.1	58.3
Norstar	34	22.4	57.8
Rocky	27	22.1	58.8
Norwin	23	22.1	59.6
Citation	23	22.0	59.0
Redwin	28	21.2	59.1
Rosebud	29	20.6	58.1

Cooperator: Tom Lorang, Eden.
 Previous crop: Fallow.
 Seed date: 17 Sept 84.
 Harvest date: 5 Aug 85.
 Winterkill: none
 Insect damage: none

Table 4. Two-year summary of winter wheat varieties grown south of Great Falls, 1984-1985. Mont. Co-op Ext. Service, and Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Two-year average	
	Yield bu/a	Test wt. #/bu
Cheyenne	27.1	61.0
Cree *	26.8	60.6
Centurk	26.7	60.8
Winridge	26.5	59.5
Neeley	26.4	60.5
MT 8003 (Redw. Sel)	26.3	60.6
Winalta	25.3	61.3
Vona	25.3	61.0
Rocky	24.6	60.9
Redwin	24.5	61.1
Roughrider	24.5	60.8
Norstar	24.3	60.2
Norwin	23.8	61.2
Rosebud	23.0	60.6
Citation	22.6	61.1

Cooperator & location : Tom Lorang, Eden

Previous crop : fallow

Seed dates : September 27, 1983, September 17, 1984.

* Cree is a shatter-resistant Cheyenne.

TITLE: Spring Wheat Investigations

YEAR: 1985

LOCATION: Western Triangle Research Center, Conrad, MT

PERSONNEL: Gregory D. Kushnak, Ron Thaut, and Larry Christiaens, Research Center, Conrad; Larry Alexander, USDA-SEA, MSU, Bozeman

Dryland spring wheat variety trials were grown near Conrad, Whitlash, Cut Bank, Choteau, Great Falls, and Sun River; and an irrigated trial at Fairfield. Data for 1985 are presented in tables 5, 7, 9, 10, 11, 13, 14, 15, 16, and 17; with multiple year averages in tables 6, 8, and 12. Data for variety evaluations on no-till recrop are presented in tables 7, 8, and 10.

Drought had a considerable impact on the varieties; as indicated by the 5 to 24 bu/acre dryland yields, and low test weights. Soil moisture and rainfall amounts are given in the table footnotes.

Sawflys influenced yields somewhat at all locations except Great Falls and Sun River. The new sawfly resistant, semidwarf 'Glenman' ranked fairly high for yield at all locations; which was consistent with previous years' tests. However, Glenman was below average in test weight, which would be a serious problem in dry years. The experimental sawfly resistant selection MT 7926 showed a yield advantage over Lew at some locations, but had a tendency to shatter. This line will be re-selected in efforts to obtain a shatter resistant type.

Table 5. Advanced yield spring wheat variety trial north of Conrad, 1985.
Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt in.	Yield bu/a	Test wt.	Heading date
Fortuna *	19	12.7	56.9	174
MT 8353	17	11.6	56.0	171
Lew*	19	11.4	56.2	175
MT 8407	18	11.4	55.6	172
Glenman*	19	11.4	51.5	172
MT 8447	17	10.8	54.6	173
Leader *	16	10.3	54.6	173
MT 8434		10.2	64.9	170
MT 8325	19	10.2	55.0	171
MT 8320	16	9.8	54.9	172
MT8455	18	9.7	57.6	170
Thatcher	17	9.5	53.3	174
MT 8336	17	9.4	56.9	171
HY 320 (Feed)	16	9.4	55.6	170
MT 8456		9.4	54.0	172
MT 8330		9.1	56.2	170
MT 8321	17	9.1	56.0	171
Medora durum	18	9.0	57.0	172
MT 8401	18	9.0	56.4	171
MT8328	18	8.9	56.4	170
MT8319	16	8.9	55.2	171
Lloyd durum	16	8.8	55.4	172
WRC 80-0	17	8.7	56.2	170
MT 8421	16	8.6	55.3	174
Monroe durum	19	8.6	55.0	170
Crosby durum		8.6	54.5	171
MT 8282		8.6	53.3	172
MT 8327	17	8.4	55.3	171
MT 8363	18	8.4	55.3	170
MT 8402	16	8.0	56.2	170
Stoa	17	8.0	54.6	172
MT 8441	18	7.8	57.0	173
Success	15	7.8	56.0	175

Table 5. continued

Variety	Plant hgt in	Yield bu/a	Test wt	Heading date
MT 8457	18	7.8	53.2	170
MT 8218	16	7.7	53.9	173
Ward durum	18	7.6	57.7	173
MT 8428	15	7.5	53.3	174
MT 8435	16	7.3	54.9	170
Newana	15	7.2	57.8	174
Pondera		7.2	55.4	171
MT 8446	16	7.0	55.2	170
MT 8436	16	7.0	53.3	170
MT 8304	17	6.9	53.8	170
MT 8423	16	6.7	55.6	171
Owens (white)	17	6.7	51.5	170
MT 8419	16	6.2	55.3	172
MT 7926*	17	5.8	54.5	174
Alex	16	5.5	57.1	174
NK 751		5.2	53.3	170

Location: Station

Seeding Date: April 16, 1985

Harvest Date: August 6, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 with the seed and 40#N Deep banded

Preseeding tillage: non in spring

* Sawfly resistant varieties

Moisture probe depth at time of seeding: 18"

Rainfall from seeding to harvest: 3.6"

Table 6. Two-year summary for spring wheat varieties grown at Conrad, 1984-1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Two - year Average		
	Plant hgt. inches	Yield bu/a	Test wt.
Fortuna *	22	20.9	58.7
Glenman *	21	19.1	54.7
MT 8320	20	18.1	57.4
Lew *	22	18.0	58.0
MT 8336	20	16.1	59.1
Thatcher	21	16.0	55.3
MT 7926 *	21	15.5	57.2
MT 8282	18	15.2	55.2
Stoa	20	15.1	57.8
MT 8328	21	15.0	58.2
MT 8321	20	14.5	56.3
Pondera	20	14.2	57.8
MT 8218	18	13.8	55.9
Newana	18	13.7	59.2
MT 8330	20	13.6	57.9
Crosby durum	20	13.6	57.3
Ward durum	21	12.9	58.8
Lloyd durum	18	12.9	57.4
Alex	20	11.6	58.5
Owens (white)	19	11.5	54.9

Location : Station

* Sawfly resistant varieties

Previous crop : fallow

Seed dates : April 13, 1984; April 16, 1985

Growing season precipitation : 1984 = 4.1"; 1985 = 3.6" + 3" soil water

Table 7. Spring wheat variety trial on no-till recrop north of Conrad, 1985.
Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	Heading date
MT 7819 (Glenman)*	23	20.9	52.1	175
Fortuna *	25	20.5	54.2	176
Lew*	24	19.0	56.2	175
Newana	20	17.5	55.6	175
Lloyd durum	19	17.4	53.1	175
Cando durum	21	17.1	53.6	176
Monroe durum	17	16.4	55.4	173
Ward durum	21	15.6	55.8	175
MT 8218	23	15.4	54.0	173
Leader *	21	14.3	52.1	175
Waverly (white)	21	13.7	51.6	175
MT 8218	18	13.3	51.1	173
Owens (white)	21	13.0	51.0	174
MT 7926 *	20	12.7	52.9	175
Stoa	24	11.7	54.6	175
McKay	19	11.6	51.5	175
NK 751	23	11.2	50.5	175
Alex	19	11.1	51.2	176
Pondera	18	10.7	54.6	174

Cooperator & Location: Research center, north of Conrad
 Seeding Date: April 16, 1985
 Harvest Date: August 6, 1985
 Previous crop: Barley
 Fertilizer: 100# 11-51-0 with the seed and 40#N deep banded
 * Sawfly resistant varieties
 Moisture probe depth at seeding: 15"
 Rainfall from seeding to maturity: 3.6"

Table 8. Two-year summary for spring wheat varieties grown on no-till recrop at Conrad, 1984-85. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Two - year Average		
	Plant hgt. inches	Yield bu/a	Test wt.
MT 7819 (Glenman) *	21	18.9	54.6
Fortuna *	23	17.8	57.2
Lew *	22	17.1	57.5
Lloyd durum	18	15.7	55.4
Cando durum	19	15.2	56.9
Waverly (white)	19	14.7	53.8
Newana	19	14.5	57.2
Ward durum	20	14.1	57.0
Owens (white)	20	13.0	54.4
Stoa	22	12.5	56.8
McKay	19	11.9	53.9
Pondera	19	10.9	57.1

Location : Station

* Sawfly resistant varieties

Previous crops : spring wheat for 1984; barley for 1985

Fertilizer : 11-51-0 with seed + 40 N deep banded

Seed dates : April 13, 1984, April 16, 1985

Growing season precip : 1984 = 4.1"; 1985 + 3.6" + 2" soil water

Table 9. Spring wheat variety trial on fallow near Whitlash, 1985.
Mont. Agr. Expt. Sta., Western Triangle Research Center,
Conrad.

Variety	Plant hgt. in.	Yield bu/a	% Protein
Owens (white)	21	23.8	
MT 7926 *	22	23.1	
McKay	20	22.7	
Newana	19	22.5	
MT 8218	18	21.8	
MT 7819 (Glenman)*	18	21.8	
Leader *	23	21.7	
MT 8321	20	21.4	
Alex	18	19.9	
Stoa	22	19.8	
Pondera	20	19.7	
NK 751	15	19.6	
Waverly (white)	19	18.1	
Lew *	19	17.7	
Fortuna *	22	17.1	
Monroe durum	23	16.2	
Carmen triticale	24	15.8	
Lloyd durum	18	14.1	
Cando durum	16	11.1	
Ward durum	19	10.3	

Cooperator & Location: Robert Parsell Jr, west of Whitlash

Seeding Date: May 7, 1985

Harvest Date: August 27, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 with the seed

Preseeding tillage: yes

Moisture probe depth at seeding: 48"

Rainfall from seeding to harvest: 4.25"

* Sawfly resistant varieties

The recrop trial sustained a moderate amount of sawfly damage, while the fallow trial had minimal damage.

Table 10. Spring wheat variety trial on no-till recrop west of Whitlash, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt in.	Yield bu/a	Test wt.	% Protein
Fortuna *	23	20.9	55.9	
MT 8321	20	20.8	55.5	
Lloyd durum	17	20.7	49.0	
MT 7819 (Glenman)*	19	20.5	53.7	
Lew *	22	20.0	57.7	
Leader *	21	19.0	54.9	
Cando durum	16	19.0	57.8	
MT 7926 *	21	18.7	55.9	
Ward durum	23	18.3	58.2	
Newana	20	18.1	56.9	
Waverly (white)	19	18.1	55.7	
Pondera	21	17.6	56.0	
Owens (white)	21	17.5	54.1	
MT 8218	20	16.9	54.0	
Monroe durum	23	16.7	56.6	
NK 751	17	16.3	52.3	
Stoa	19	15.9	53.9	
McKay	20	15.0	56.2	
Alex	21	13.1	55.7	

Cooperator & Location: Robert Parsell Jr, west of Whitlash

Seeding Date: May 7, 1985

Harvest Date: August 27, 1985

Previous Crop: Barley

Fertilizer: 100# 11-51-0 with the seed and 90#N top dressed

Sprayed with Round-up prior to seeding

Moisture probe depth at seeding: 36"

Rainfall from seeding to harvest: 4.25"

* Sawfly resistant varieties

The recrop trial sustained a moderate amount of sawfly damage, while the fallow trial had minimal damage.

Table 11. Spring wheat variety trial north of Cut Bank, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt in.	Yield bu/a	Test wt.	% Protein
MT 7926 *	19	19.7	59.5	
Newana	18	18.4	60.4	
Waverly (white)	20	18.4	58.1	
Lew *	21	17.7	59.3	
Stoa	20	17.5	58.1	
Leader *	19	16.9	58.6	
Alex	19	16.7	60.2	
MT 8321	16	15.9	58.8	
MT 8218	16	15.9	57.4	
MT 7819(Glenman)*	19	15.7	56.7	
NK 751	17	15.7	54.2	
McKay	18	15.4	57.9	
Owens (white)	20	15.4	57.8	
Monroe durum	17	14.8	57.5	
Ward durum	18	14.7	59.3	
Pondera	20	14.2	60.0	
Lloyd durum	14	13.6	57.1	
Cando durum	12	13.2	59.1	
Fortuna*	20	12.8	60.4	

Cooperator + Location: Don Bradley, north of Cut Bank
 Seeding Date: May 6, 1985
 Harvest Date: August 20, 1985
 Previous Crop: Fallow
 Fertilizer: 100# 11-51-0 with seed
 Preseeding Tillage: yes
 * Sawfly resistant varieties:
 Moisture probe depth at seeding: 24"
 Rainfall from seeding to harvest: 4.51"

Table 12. Four-year summary of spring wheat varieties grown north of Cut Bank, 1982-1985. Mont. Agr. Expt. Sta; Western Triangle Research Center, Conrad, MT.

Variety	Four - year Average		
	Yield bu/a	Test wt.	Height in
Newana	31.9	59.3	23
Glenman *	31.7	57.3	25
Owens white	30.7	57.9	24
McKay	30.1	57.6	23
Pondera	29.3	59.3	24
Lew *	28.0	59.2	27
Lloyd durum	27.8	57.1	20
Fortuna *	26.9	59.3	27
Cando durum	26.6	59.5	19
Ward durum	25.4	58.6	27

* Sawfly resistant variety

Cooperator & location, all years : Don Bradley, N. of Cut Bank

Previous crop : fallow

Fertilizer : 11-51-0 actual with seed

Seed dates : May 5, 1982; May 23, 1983; May 4, 1984; May 6, 1985

Table 13. Spring wheat variety trial east of Choteau, 1985.
 Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	Protein %
Pondera	20	8.9	57.6	
MT 7819 (Glenman) *	18	8.7	53.6	
Newana	20	8.6	57.1	
MT 7926 *	21	8.3	57.1	
Leader *	18	7.7	54.3	
Fortuna *	17	7.4	56.0	
Lew*	18	7.3	56.0	
Lloyd durum	14	7.2	56.4	
Owens (white)	17	7.2	52.8	
Cando durum	13	7.0	56.2	
MT 8321	15	7.0	53.8	
Ward durum	17	6.8	56.3	
Waverly (white)	17	6.7	54.6	
McKay	19	6.7	52.8	
Monroe durum	18	6.6	55.3	
Stoa	15	6.0	55.3	
MT 8218	16	6.0	51.5	
NK 751	15	5.8	51.5	
Alex	17	5.3	56.2	

Cooperator and Location: Herb Corey, east of Choteau
 Seeding Date: April 9, 1985
 Harvest Date: July 29, 1985
 Previous Crop: Fallow
 Fertilizer: 100# 11-51-0 with the seed
 Preseeding Tillage: None in spring
 * Sawfly resistant varieties
 Moisture probe depth at seeding: 24"
 Sawfly damage moderate on non-resistant varieties.

Table 14. Spring wheat variety trial grown north of Great Falls, 1985. MAES, WTRC, CRD; and Mont. Co-op Ext. Service, Bozeman and Fort Benton.

Variety	Plant hgt. in.	Yield bu/a	Test wt.
MT 7926 *	22	20.2	50.4
Stoa	24	19.7	49.3
Pondera	20	17.1	50.5
NK 751	21	16.6	48.9
Ward durum	16	16.0	50.5
MT 8321	23	14.8	51.9
Fortuna*	21	14.8	50.5
Alex	25	14.7	51.0
MT 7819 (Glenman)*	22	14.2	48.9
Monroe durum	24	14.1	51.5
Waverly (white)	19	13.8	50.2
Lloyd durum	21	13.8	49.4
Lew *	23	13.6	51.3
Owens (white)	14	13.5	49.0
McKay	22	13.1	48.1
Newana	21	12.3	52.1
Cando durum	20	11.0	50.3
MT 8218	18	9.8	51.8

Exptl. Mean 14.8
 F test 1.22 N.S.
 C.V. = 29.1%

Cooperator & Location: Jack Reihl, approximately 20 miles north of Great Falls.
 Date Seeded: April 27, 1985
 Harvest Date: August 27, 1985
 * Sawfly resistant

Table 15. Spring wheat variety trial grown south of Sun River, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad; and Mont. Co-op Ext. Service, Bozeman and Great Falls.

Variety	Yield bu/a	Test wt.	Plant height
NK 751	13.5	42.1	18
MT 7926*	13.3	52.4	21
MT 7448	12.7	48.7	18
Monroe durum	12.4	53.8	22
Marberg	12.2	52.1	19
Owens (white)	11.9	41.8	18
Glenman*	11.8	49.7	18
Lew*	11.7	55.2	20
Fortuna*	11.5	54.8	21
Waverly (white)	11.5	39.1	18
Alex	10.9	55.0	21
Newana	10.7	38.6	18
Ward (durum)	10.6	47.5	20
McKay	10.5	24.8	19
Stoa	10.1	50.5	20
Lloyd (durum)	9.6	38.2	15
Cando (durum)	9.3	53.8	14
Pondera	9.3	52.2	18
Norseman	8.8	53.0	17

Cooperator and location: Chuck Merja, south of Sun River.
 Date Seeded: April 17, 1985, no pre-seeding tillage.
 Depth of moist soil at seeding = 8 to 12 inches.
 Soil texture: Sandy clay loam.
 Precipitation (seeding to harvest) = 4.47 inches.
 Previous crop: Tillage fallow.
 Fertilizer: 70 lbs. actual N as NH₃ during summer of 84.
 * Sawfly resistant

Table 16. Irrigated spring wheat variety trial north of Fairfield 1985.
 Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Protein
Waverly (white)	28	77.9	60.0	
MT 8218	30	77.7	61.9	
McKay	27	75.0	59.0	
Lloyd durum	25	74.4	61.5	
Glenman (7819) *	28	72.5	59.5	
Cando durum	25	71.5	61.7	
Newana	27	71.5	61.2	
MT 8321	31	69.5	61.8	
Lew *	34	66.8	62.6	
Owens (white)	28	65.6	60.3	
MT 7926 *	33	64.9	61.5	
Fortuna *	34	63.4	60.7	
Stoa	31	61.7	61.7	
NK 751	27	61.3	58.4	
Leader *	32	60.5	61.0	
Monroe durum	33	56.5	61.0	
Pondera	28	56.1	60.2	
Ward durum	34	52.9	60.0	
Alex	33	52.7	60.1	

Cooperator & Location: Al Meyer, north of Fairfield

Seeding Date: April 17, 1985

Harvest Date: August 26, 1985

Previous Crop: Fallow

Fertilizer: 110-60-40-10 worked in

Preseeding tillage: yes

* Sawfly resistant varieties

Irrigated method: Flood

Table 17. Regional durum variety trial, Station 1985.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Protein
Larker	20	17.6	59.0	
FA882268	19	13.5	57.0	
D79209	18	12.0	57.0	
D8194	18	11.7	57.8	
D81183	19	11.5	55.7	
Cando	17	11.3	56.6	
NHD81466	18	11.2	58.3	
D79168	18	10.9	58.1	
D8193	19	10.7	55.7	
D81114	18	10.6	57.3	
Lloyd	17	10.6	56.9	
D81154	19	10.5	57.0	
D81151	19	10.2	57.1	
Ward	21	10.2	57.1	
D8191	19	9.9	58.0	
Mindum	25	9.8	58.7	
D79104	18	9.8	57.8	
Monroe	21	9.4	57.4	
Rugby	17	9.3	57.3	
DT380	18	9.3	57.0	
D8012	18	9.3	56.7	
D7925	18	9.0	57.6	
D8172	18	8.7	56.4	
Medora	19	8.4	57.0	
D79103	20	8.3	57.8	
Vic	19	8.2	57.7	
Corsby	21	7.8	56.0	
NHD81485	20	7.7	57.6	
D8019	20	7.4	56.3	
D8016	17	7.0	54.3	

Location: Station

Seeding Date: April 16, 1985

Harvest Date: August 6, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 with the seed and 40#N deep banded

Preseeding tillage: None in spring

Moisture probe depth at seeding: 18"

Rainfall from seeding to harvest: 3.6"

TITLE: Barley and Oat Investigations
YEAR: 1985
LOCATION: Western Triangle Research Center, Conrad
PERSONNEL: Gregory D. Kushnak, Ron Thaut, & Larry Christiaens, Research Center, Conrad; Dr. Tom Blake, MSU, Bozeman

Dryland barley variety trials were grown near Conrad, Whitlash, Cut Bank, Choteau, Great Falls, and Sun River; and an irrigated trial at Fairfield. Data are presented in tables 18 - 30, and include 1985 as well as multiple year summaries. Tables 20, 21, and 23 pertain to variety evaluations on no-till recrop. Soil moisture and rainfall amounts are included in the footnotes to the tables.

Drought influenced the varieties considerably, and none of the dryland locations produced acceptable malting grades. Harrington approached malting grade on fallow at Whitlash, but this was offset by a low yield ranking. Of the malting types, Pirolina was the most consistent at maintaining a high relative yield over locations.

The two-row feed variety Bowman was the top yielder at all dryland locations. This variety may be specifically adapted to drier than normal conditions, and should be considered with caution for higher moisture conditions until more tests are conducted. 'Gallatin', a 2-row feed variety, ranked high at most locations; which is consistent with the previous year's tests.

On irrigated, the top yielding feed variety was Gallatin, followed closely by Karla, a 6-row malt type, at 122 bu/acre. The next highest yielding malt type was Clark at 103 bu/acre.

Oat varieties were grown on dryland at the Sun River location; and showed a definite response to drought, with yields from 16 to 30 bu/acre (table 31). Otana is the currently recommended variety with a status of superior yield and test weight. This is supported by the data in table 31. Monida is a new release with superior yield than Otana under favorable moisture, but with a test weight between Otana and Cayuse.

Table 18. Intrastate barley variety trial north of Conrad, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Kernel rows/head	Plant hgt. in.	Yield bu/a	Test wt.	% Plump	% Thin	Heading date
Bowman	2	23	29.1	48.1	41	14	171
Steptoe	6	22	28.2	37.4	16	47	171
Piroline	2	22	28.0	44.8	2	78	173
MT 41279	2	24	27.9	44.7	5	62	174
Apex	2	19	26.1	48.2	17	33	174
Ershabet	6	24	26.0	44.2	5	65	169
MT 140523	2	21	25.9	46.4	11	52	178
Lindy	6	19	25.9	36.4	10	61	170
Nova	2	19	25.5	48.6	5	55	169
Kimberly	2	19	25.4	47.5	21	39	174
Lewis	2	19	25.3	48.0	24	40	174
Gallatin	2	19	25.3	45.8	8	60	173
OR 8432	2	16	25.2	45.4	5	68	174
BA 26	6	18	25.1	38.7	18	48	168
ID 810099	2	20	25.0	45.9	21	42	175
MT 82949	2	20	24.9	45.1	11	62	174
MT 81619	2	17	24.7	44.7	14	54	174
MT 81192	2	21	24.7	48.9	23	32	178
MT 81143	2	17	24.7	48.1	14	44	174
MT 81161	2	18	24.5	47.4	4	62	174
Bollona	2	18	24.4	45.6	40	24	179
Morex	6	20	24.3	39.2	4	80	172
Fleet	2	17	24.2	46.1	9	58	180
MT 81502	2	19	24.0	45.8	11	43	174
Fairfield	2	17	23.9	47.3	23	41	178
VD 403582	2	17	23.6	46.6	11	40	177
MT 8226	2	21	23.4	45.9	10	52	175
Purcell	2	19	23.4	49.0	14	39	174
MT 138500	2	18	23.1	48.0	5	68	174
Robust	6	22	23.0	39.1	13	60	173
Russell	6	18	22.8	26.3	4	85	170
Munsing	2	17	22.7	43.6	6	62	172
Klages	2	21	22.6	48.2	7	67	175

Table 18. Intrastate barley continued.

Variety	Kernel rows/head	Plant hgt in.	Yield bu/a	Test wt	% Plump	% Thin	Heading date
Karla	6	16	22.4	40.9	9	69	174
MT 81616	2	21	22.1	45.6	8	55	178
Menuet	2	14	22.0	45.5	5	58	174
VD 30101	2	15	21.9	44.7	37	24	179
UT 1685	6	22	21.5	38.0	6	74	173
UT 1696	6	20	21.4	41.8	13	56	173
AYT 138575	2	18	21.4	46.7	13	52	174
Hazen	6	22	21.2	40.6	12	62	173
Summit	2	24	20.9	45.1	5	66	178
West Bred	2	23	20.9	48.3	11	55	178
WA 890878	2	18	20.8	47.8	15	42	174
AZ 2229	6	18	20.6	33.4	6	72	168
SK 76333	2	20	20.2	47.4	13	50	176
BA 280529	2	19	20.2	48.9	20	37	178
MT 81865	2	17	20.1	47.0	16	42	177
Clark	2	18	20.1	45.6	9	55	173
MT 82512	2	16	20.1	45.1	3	73	174
OR 8406	6	23	19.7	32.9	4	87	173
VD 02401	2	19	19.6	47.4	12	46	179
UT 1734	6	19	19.3	38.0	7	71	173
Hector	2	20	19.0	47.3	18	40	177
MT 8229	2	20	18.9	45.3	14	53	177
Spirit	2	20	18.4	46.4	6	54	178
UT 275248	6	19	18.4	39.9	34	36	175
Cornel	2	15	18.4	47.0	11	51	181
UT 1733	6	18	18.2	37.8	6	74	174
Piston	2	13	17.3	48.1	20	33	180
UT 1731	6	20	17.2	39.1	7	67	172
Western	2	18	15.7	45.6	9	52	174
AZ 2221	6	18	12.9	35.8	11	60	168
Premier	2	18	9.1	25.3	8	67	181

Location: Station

Seeding Date: April 6, 1985

Harvest Date: August 6, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 & 40#N. Deep banded

Preseeding tillage: None in spring

Moisture probe depth at time of seeding: 18"

Rainfall from seeding to ripening: 3.6"

Insecticide: Sevin - grasshoppers

Table 19. Two-year summary for barley varieties grown at Conrad, 1984-85.
 Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Kernel rows Per head	Plant hgt. inches	Two - year Average			
			Yield bu/a	Test wt.	% Plump	% Thin
MT 41279	2	22	40.6	46.9	27	42
Steptoe	6	22	40.3	41.2	42	28
MT 81619	2	19	40.0	46.0	32	38
Gallatin	2	20	39.6	47.1	23	42
Lindy	6	21	39.6	40.3	38	35
Bowman	2	22	39.0	49.8	66	9
Pirolina	2	22	38.4	47.8	29	45
Munsing	2	18	37.8	46.9	39	34
MT 81192	2	22	36.9	48.6	39	25
Apex	2	20	36.4	48.8	34	23
Summit	2	23	36.2	46.3	14	55
Lewis	2	20	36.1	48.7	43	27
BA 26	6	19	35.4	41.9	38	32
MT 81502	2	20	35.3	47.7	27	34
Bollona	2	19	35.2	46.1	42	23
Morex	6	22	35.2	42.7	25	48
Hector	2	21	35.0	48.2	27	34
Robust	6	22	34.8	43.1	34	38
Clark	2	20	34.6	46.3	24	40
MT 81143	2	19	34.4	49.6	46	26
ID 810099	2	21	34.1	46.3	40	29
Cornel	2	22	33.9	48.1	47	28
Menuet	2	17	33.4	47.0	26	39
Karla	6	18	32.9	43.1	19	51
Hazen	6	22	32.5	43.0	29	40
UT 1733	6	21	31.8	41.4	25	47
Piston	2	16	31.1	47.7	30	28
UT 1731	6	22	30.0	41.6	35	40
UT 1734	6	20	27.6	40.8	36	42
Klages	2	22	27.1	46.7	29	43
Premier	2	19	26.1	35.9	20	50

Location : Station

Previous crop :fallow

Seed dates : April 13, 1984; April 16, 1985

Growing season precipitation : 1984 = 4.1": 1985 = 3.6" + 3" soil water

Table 20. Barley variety trial on no-till recrop, north of Conrad, 1985.
Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% plump	% thin	Kernel rows/ head
Bowman	23	32.6	44.6	49	14	2
Lewis	27	29.6	44.5	18	47	2
Gallatin	25	28.8	42.8	10	62	2
Morex	27	28.3	36.8	5	79	6
Karla	23	26.7	36.5	8	75	6
Andre	22	26.7	43.9	5	77	2
Hector	25	26.1	41.1	19	53	2
Harrington	25	25.9	44.8	44	24	2
Steptoe	21	25.0	36.5	19	47	6
Piroline	24	24.3	41.1	3	82	2
Robust	23	21.9	36.3	12	62	6
Summit	18	19.2	45.8	11	56	2
Klages	25	18.2	41.6	5	71	2
Clark	19	18.1	42.2	3	75	2
Hazen	21	17.7	37.5	7	74	6
Premier	19	11.8	23.4	13	60	2

Cooperator & Location: Research center north of Conrad
 Seeding Date: April 16, 1985
 Harvest Date: August 1, 1985
 Previous crop: Barley
 Fertilizer: 100# 11-51-0 with the seed and 40#N deep banded
 Moisture probe depth at seeding: 15"
 Rainfall from seeding to maturity: 3.6"

Table 21. Two-year summary for barley varieties grown on no-till recrop at Conrad 1984-85. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Kernel rows/ head	Plant hgt inches	Two - year Average			
			Yield bu/a	Test wt.	% Plump	% Thin
Hector	2	22	26.0	44.8	34	38
Harrington	2	21	25.5	46.3	49	21
Gallatin	2	21	25.4	45.1	31	41
Karla	6	20	25.1	42.7	33	45
Lewis	2	22	24.7	47.0	33	33
Piroline	2	21	24.2	45.0	28	50
Clark	2	18	21.5	45.5	29	47
Robust	6	20	21.0	42.5	22	44
Summit	2	17	19.8	47.4	22	44
Hazen	6	19	19.5	41.3	28	46

Location ; Station

Previous crops : Spring wheat for 1984; barley for 1985

Fertilizer : 11-51-0 with seed + 40 N deep banded

Seed dates : April 14, 1984; April 16, 1985

Growing season precipitation : 1984 + 4.1"; 1985 + 3.6" +2" soil water

Table 22. Barley variety trial on fallow west of Whitlash, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt in.	Yield bu/a	Test wt.	% Plump	% Thin	Kernel rows/head
Bowman	21	31.0	45.7	72	7	2
Steptoe	17	30.3	37.0	45	24	6
Gallatin	22	29.8	46.6	57	14	2
Clark	20	29.4	44.9	42	22	2
Piroline	21	29.1	44.3	18	44	2
Karla	18	28.7	40.4	19	44	6
Robust	21	28.0	41.1	25	38	6
Hector	22	26.5	46.7	50	23	2
Hazen	19	26.0	39.6	24	43	6
Lewis	18	24.0	45.9	31	33	2
Morex	21	23.7	38.4	16	53	6
Summit	17	18.7	47.3	57	14	2
Andre	21	18.5	46.0	30	31	2
Harrington	19	14.0	47.8	80	5	2
Klages *	20	9.5	24.6	60	11	2
Premier *	16	9.3	23.7	59	12	2

Cooperator & Location: Robert Parsell Jr. west of Whitlash

Seeding Date: May 7, 1985

Harvest Date: August 27, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 with the seed and 40#N top dressed

Preseeding Tillage: yes

Moisture probe depth at seeding: 48"

Rainfall from seeding to harvest: 4.25"

* Moderate grasshopper damage due to late maturity

Table 23. Barley variety trial on no-till recrop west of Whitlash, 1985.
Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Plump	% Thin	Kernel rows/ head
Bowman	22	35.5	45.4	73	8	2
Piroline	21	34.7	41.6	11	55	2
Lewis	19	33.8	44.7	40	26	2
Steptoe	22	32.8	38.1	45	22	6
Karla	19	32.8	40.4	17	53	6
Morex	23	31.5	39.4	14	53	6
Hazen	24	31.2	39.5	31	40	6
Gallatin	20	31.0	45.0	44	24	2
Hector	19	30.2	46.1	48	19	2
Clark	19	30.2	41.7	24	39	2
Andre	16	29.7	44.1	29	34	2
Robust	21	29.6	37.8	16	54	6
Harrington	19	25.8	45.4	64	11	2
Summit	19	23.4	45.8	49	19	2
Premier *	18	18.0	46.7	50	17	2
Klages *	18	17.4	46.7	54	14	2

Cooperator & location: Robert Parsell Jr. west of Whitlash
 Seeding Date: May 7, 1985
 Harvest Date: August 27, 1985
 Previous Crop: Barley
 Fertilizer: 100# 11-51-0 with the seed and 90#N top dressed
 Sprayed with Round-up prior to seeding
 Moisture probe depth at seeding: 36"
 Rainfall from seeding to harvest: 4.25"
 * Moderate grasshopper damage due to late maturity

Table 24. Barley variety trial north of Cut Bank, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Plump	% Thin	Kernel rows/head
Bowman	24	27.0	45.0	60	12	2
Gallatin	22	23.0	46.4	47	21	2
Hector	19	22.5	45.9	44	26	2
Piroline	19	22.0	41.1	6	71	2
Karla	18	21.6	40.6	24	42	6
Clark	17	21.3	44.3	40	26	2
Lewis	18	20.2	47.1	50	18	2
Steptoe	19	19.5	35.6	14	55	6
Hazen	20	18.4	36.5	12	67	6
Morex	22	17.9	36.8	6	75	6
Robust	18	16.0	37.1	16	58	6
Summit *	16	14.1	48.8	11	50	2
Andre *	19	13.7	32.6	30	28	2
Harrington *	17	13.3	46.7	76	7	2
Klages *	17	6.5	47.7	58	13	2
Premier *	17	6.1	46.6	76	5	2

Cooperator & Location: Don Bradley, north of Cut Bank

Seed Date: May 6, 1985

Harvest Date: August 20, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 with seed

Preseeding Tillage: yes

* Grasshopper damage due to late maturity

Moisture probe depth at time of seeding: 24"

Rainfall from seeding to harvest: 4.5"

Table 25. Four-year summary of barley varieties grown north of Cut Bank, 1982-1985. Mont. Agr. Expt. Sta.; Western Triangle Research Center, Conrad, MT.

Variety	Four - year Average				
	Yield bu/a	Height in.	Test wt.	% Plump	% Thin
Hector	45.9	23	47.3	50	23
Piroline	44.4	23	47.1	34	38
Karla	43.8	24	43.8	34	34
Clark	41.9	22	46.5	50	22
Morex	41.8	25	43.0	30	59
Gallatin	41.4	25	47.2	55	29
Summit	40.8	22	48.6	37	32
Lewis	40.6	23	48.6	70	13
Robust	40.4	24	42.0	24	41
Harrington	39.9	22	45.9	60	17
Klages	33.0	23	44.6	41	43
Hazen	32.8	22	43.0	34	48

Cooperator & location, all years : Don Bradley, N. of Cut Bank
 Previous crop : fallow
 Fertilizer : 11-51-0 actual with seed
 Seed dates : May 5, 1982; May 23, 1983; May 4, 1984; May 6, 1985

Table 26. Barley variety trial east of Choteau, 1985. Mont. Agr. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Plump	% Thin	Kernel rows/head
Steptoe	16	12.7	34.3	4	85	6
Bowman	16	11.8	44.8	6	47	2
Piroline	12	10.2	44.8	1	87	2
Morex	16	10.2	44.8	3	82	6
Gallatin	16	9.5	44.8	2	76	2
Hazen	17	8.2	39.1	6	73	6
Andre	14	6.6	44.8	1	86	2
Karla	15	6.6	41.0	5	78	6
Hector	18	6.5	45.7	5	61	2
Summit	12	6.5	43.8	1	79	2
Robust	15	6.4	41.0	5	82	6
Harrington	12	4.9	43.8	5	64	2
Lewis	13	4.3	43.8	4	64	2
Klages *	15	3.5	44.8	3	70	2
Clark *	12	2.9	44.8	2	80	2
Premier *	14	2.2				2

Cooperator & Location: Herb Corey, east of Choteau

Seeding Date: April 9, 1985

Harvest Date: July 29, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 with seed

Preseeding Tillage: None in spring

* Grasshopper damage due to late maturity

Moisture probe depth at time of seeding: 24"

Table 27. Barley variety trial grown north of Great Falls, 1985.
 Mont. Agr. Expt. Sta, WTRC, Conrad, and Mont. Co-op Ext.
 Service, Bozeman and Fort Benton.

Variety	Plant hgt. in.	Yield bu/a	Test wt. lb/bu	% Plump	% Thin
Bowman	23	17.9	41.3	48	20
Steptoe	20	17.2	32.6	15	57
Piroline	15	17.1	38.7	9	54
Lewis	18	15.3	40.9	48	24
Gallatin	14	14.1	40.6	29	38
Hector	16	11.2	40.8	20	45
Morex	16	10.8	36.8	24	41
Clark	17	9.1	36.4	14	54
Hazen	20	8.4	35.7	37	34
Karla	14	8.3	35.1	30	37
Summit	15	8.1	37.8	24	42
Speltz	15	8.1	37.8	-	-
Andre	15	7.5	35.4	21	48
Harrington	15	6.7	38.7	30	36
Robust	16	5.6	37.7	27	40
Klages	16	4.9	37.2	14	50
Kimberly	21	4.7	35.0	28	40
Premier	14	3.0	41.7	33	34

Exptl. Mean 9.9
 F test 4.33 Sig .01
 C.V. = 39%

Cooperator and Location: Jack Reihl, approximately 20 miles north of Great Falls.
 Date Seeded: April 27, 1985
 Harvest Date: August 27, 1985

Table 28. Barley variety trial grown south of Sun River, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad; and Mont. Co-op Ext. Service, Bozeman and Great Falls.

Variety	Yield bu/a	Test wt.	% Plump	% Thin	Plant height	Kernel rows/ head
Bowman	28.5	43.3	25	26	20	2
Gallatin	25.0	40.2	4	76	19	2
Piroline	21.0	41.8	2	84	18	2
Lewis	20.0	45.5	14	55	17	2
Steptoe	20.0	33.2	4	80	21	6
Hector	18.9	45.2	7	60	19	2
Robust	18.4	36.1	7	75	14	6
Karla	17.1	36.9	4	80	14	6
Clark	16.4	42.2	5	73	16	2
Morex	15.7	36.0	5	91	21	6
Summit	14.7	42.0	3	83	17	2
Hazen	14.6	36.8	4	83	18	6
Andre	12.4	40.9	6	78	15	2
Harrington	10.9	40.9	10	66	17	2
Kimberly	8.2	38.0	8	68	--	2

Spelt	9.0	33.4				

Cooperator and location: Chuck Merja, south of Sun River.
 Date Seeded: April 17, 1985, no pre-seeding tillage.
 Harvest date: August 5, 1985.
 Depth of moist soil at seeding = 8 to 12 inches.
 Soil texture: Sandy clay loam.
 Precipitation (seeding to harvest) = 4.47 inches
 Previous crop: Tillage fallow.
 Pertilizer: 70 lbs actual N as NH3 during summer of 84.

Table 29 . Irrigated barley variety trial near Fairfield, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad.

Variety	Plant hgt in.	Yield bu/a	Test wt.	% Plump	% Thin	Kernel rows/head
Gallatin	32	122.4	53.1	95	1	2
Karla	34	122.1	50.0	89	2	6
Steptoe	31	120.3	48.4	98	1	6
Summit	33	110.8	53.8	94	2	2
Hector	35	110.4	53.1	97	1	2
Bowman	31	108.2	51.8	99	1	2
Andre	31	107.8	52.9	94	1	2
Clark	35	102.9	51.5	93	2	2
Hazen	37	101.9	49.2	92	2	6
Lewis	30	100.2	52.2	88	5	2
Harrington	32	99.5	52.4	89	4	2
Piroline	29	97.8	52.3	89	3	2
Robust	33	95.2	50.4	90	3	6
Premier	30	94.8	52.5	89	4	2
Klages	31	91.9	51.1	87	4	2
Morex	35	87.3	50.1	93	2	6

Cooperator & Location: Al Meyer, north of Fairfield
 Seeding Date: April 17, 1985
 Harvest Date: August 26, 1985
 Previous Crop: Fallow
 Fertilizer: 110-60-40-10 worked in.
 Preseeding Tillage: yes
 Irrigation Method: Flood

Table 30. Pedigree F5 barley variety trial, Conrad 1985.

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Plump	% Thin	% Protein
MT 83518	17	30.4	43.6	4	65	
MT 83500	17	28.8	42.5	7	65	
MT 83255	17	28.1	44.9	8	52	
MT 83424	15	28.1	43.4	5	70	
MT 83419	17	27.8	44.7	2	71	
Hector	20	27.5	45.1	9	56	
MT 83444	17	27.1	44.7	3	70	
MT 83533	16	26.9	43.0	7	61	
MT 83435	15	26.6	44.7	4	64	
MT 83669	18	26.3	44.0	9	65	
MT 834109	17	26.0	42.5	3	71	
MT 831598	15	25.7	44.4	3	74	
MT 831571	17	25.2	44.7	9	56	
Clark	19	24.7	43.3	5	68	
MT 831616	15	24.4	43.9	5	68	
Step toe	18	24.3	37.1	7	67	
Lewis	16	24.1	46.9	10	54	
MT 831312	14	24.1	44.9	5	60	
Gallatin	17	23.8	45.5	9	58	
MT 83632	17	23.7	45.7	5	64	
MT 831388	15	22.9	43.3	2	78	
MT 83767	15	22.4	42.3	7	64	
MT 83671	17	22.1	43.8	6	67	
MT 83469	18	21.9	43.7	2	80	
MT 83734	16	21.9	42.3	8	58	
MT 83422	16	21.8	46.1	6	59	
MT 83592	18	21.8	42.5	2	84	
MT 831622	15	21.6	44.5	13	48	
MT 83932	15	21.4	45.0	3	72	
MT 83590	17	21.1	44.0	4	74	

Table 30. continued

Variety	Plant hgt. in.	Yield bu/a	Test wt.	% Plump	% Thin	% Protein
MT 83491	18	20.2	44.9	5	64	
MT 83736	15	19.4	42.2	3	83	
MT 831818	15	19.3	44.5	10	46	
MT 831573	16	18.7	44.9	8	64	
Klages	17	16.9	47.3	4	78	
MT 831406	16	15.7	43.3	2	73	

Location: Station

Seeding Date: April 16, 1985

Harvest Date: July 30, 1985

Previous Crop: Fallow

Fertilizer: 100# 11-51-0 & 40#N. deep banded

Preseeding Tillage; None in spring

Moisture probe depth at time of seeding: 18"

Rainfall from seeding to harvest: 3.6"

Insecticide: Sevin - grasshoppers

Table 31. Oat variety trial grown south of Sun River, 1985.
 Mont. Agr. Expt. Sta., Western Triangle Research
 Center, Conrad; and Mont. Co-op Ext. Service, Bozeman
 and Great Falls.

Variety	Yield bu/a	Test wt. lbs/bu	Plant height
K71299/3 otana	30.0	26.2	16
Otana	25.6	25.7	23
Cayuse	24.4	20.7	18
Border	23.9	22.7	19
Monida	23.6	20.5	20
Cayuse/Otana	22.4	24.1	18
Lodi/Park	22.3	24.6	22
Appaloosa	22.1	20.2	18
Steele	19.2	30.2	21
Park	18.1	25.4	22
Cascade	16.0	20.1	20

Cooperator and location: Chuck Merja, south of Sun River.
 Date Seeded: April 17, 1985, no pre-seeding tillage.
 Harvest date: August 5, 1985.
 Depth of moist soil at seeding = 8 to 12 inches.
 Soil texture: Sandy clay loam.
 Precipitation (seeding to harvest) = 4.47 inches
 Previous crop: Tillage fallow.
 Fertilizer: 70 lbs actual N as NH₃ during summer of 84.

PROJECT TITLE: Small grain seeding rate studies.

PROJECT LEADER: Gregory D. Kushnak, Western Triangle Research Center,
Conrad, MT.

Results:

Seeding rate studies included two varieties of winter wheat on dryland fallow near Dutton (tables 33-34); dryland spring wheat and barley on no-till recrop vs. fallow at Conrad (tables 34-37); and spring wheat and barley under irrigation (tables 38-39). The rates tested are listed in the data tables, as seeds per foot and pounds per acre.

Growing conditions for the dryland tests were regarded as severe drought. The optimum range for dryland seeding rate was 15 to 20 seeds/sq foot, with 20 generally the best rate. However, the differences among rates were only suggestive, as none were considered statistically significant.

On the irrigated tests, the only definite trend was that 10 seeds/sq foot was below optimum.

Table 32. Seeding rate trial on two varieties of winter wheat grown on fallow near Dutton, 1985. Mont. Agr. Expt. Sta; Western Triangle Research Center, Conrad, MT.

Variety	Seed rate *		Plant height in.	Yield bu/a	Test wt.	% Protein
	Seed/ sq. ft	lbs. seed/ acre				
Centurk	10	36	28	35.3	59.8	
	15	54	28	36.5	60.4	
	20	72	28	36.6	60.6	
	25	90	28	36.6	60.9	
	30	108	28	34.2	61.0	
Redwin	10	34	29	38.2	58.3	
	15	51	29	39.0	58.6	
	20	68	29	40.7	59.5	
	25	85	29	40.0	59.5	
	30	102	29	38.3	59.3	

Seed rate means (over both varieties):

10	28.5	36.8	59.1
15	28.5	37.8	59.5
20	28.5	38.7	60.1
25	28.5	38.3	60.2
30	28.5	36.3	60.2

Variety means (over all rates):

Centurk	28	35.8	60.5
Redwin	29	39.2	59.0

Cooperator & location : Darryl Goodmundson, east of Dutton

Fertilizer : 11-51-0 actual with seed + 80 AA actual

Date seeded : September 19, 1984

Date harvested : July 25, 1985

Previous crop : double fallow

* Pure live basis

Table 33. Two-year summary of winter wheat seeding rates on fallow near Dutton, 1984-85. Mont. Agr. Expt. Sta; Western Triangle Research Center, Conrad, MT

Variety	Seed rate *		height in.	bu/a	wt.	Protein
	Seed/ sq. ft	lbs. seed/ acre				
Centurk	10	35	25.5	32.4	60.4	
	15	53	25.5	33.2	60.7	
	20	71	26.0	34.2	61.1	
	25	88	26.0	35.2	61.3	
	30	105	26.0	33.6	61.6	
Redwin	10	34	27.0	33.9	59.7	
	15	51	27.0	33.1	59.8	
	20	68	27.0	35.5	60.3	
	25	85	26.5	36.1	60.6	
	30	102	26.0	35.5	60.6	
Seed rate means (over both varieties)						
	10		26.3	33.2	60.1	
	15		26.3	33.2	60.3	
	20		26.5	34.9	60.7	
	25		26.3	35.7	61.0	
	30		26.0	34.6	61.1	
Variety means (over all rates)						
Centurk			25.8	33.7	61.0	
Redwin			26.7	34.8	60.2	

Cooperator & location : Darryl Goodmundson, east of Dutton

Fertilizer : 11-51-0 actual + 80 AA actual

Seeding dates : September 20, 1983 & September 19, 1984

* pure live seed basis

Precipitation both years was less than favorable

Table 34. Spring wheat seeding rate on fallow, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

SEED RATE								
Seeds/ sq.ft.	Lbs. seed/acre	Bu/acre yield	Test wt.	Plant hgt.	Heading date	% Protein		
10	32	14.8	57.6	18	173			
15	49	14.7	56.8	18	173			
20	66	16.5	56.4	18	173			
25	83	15.2	55.0	17	173			
30	99	16.5	56.1	17	173			

Cooperator & Location : Station

Seeding date : April 16, 1985

Harvest date : August 6, 1985

Previous drop : Fallow

Fertilizer : 100# 11-51-0 with the seed and 40# N. deep banded

Variety : Lew

Moisture probe depth at seeding : 18"

Rainfall from seeding to harvest : 3.6"

F-test 0.50 (non sig), c.v.=14.3%

Table 35. Spring wheat seeding rate trial on no-till recrop, 1985, Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

SEED RATE								
Seeds/ sq.ft.	Lbs. seed/acre	Bu/acre yield	Test wt.	Plant hgt.	Heading date	% Protein		
10	32	18.9	56.2	25	175			
15	49	20.5	54.2	26	175			
20	66	21.7	55.0	24	175			
25	83	19.5	54.4	23	175			
30	99	20.2	53.5	24	175			

Cooperator & Location : Station
 Seeding date : April 16, 1985
 Harvest date : August 6, 1985
 Previous crop : Barley
 Fertilizer : 100# 11-51-0 with the seed and 40# N. deep banded
 Variety : Lew
 Moisture probe depth at seeding : 18"
 Rainfall from seeding to harvest : 3.6"
 F-test 0.25 (non sig), c.v.-18.6%

Table 36. Barley seeding rate trial on fallow, Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

SEED RATE												
Seeds/ sq.ft	Ibs. seed/acre	Bu/acre yield	Test wt.	Plant hgt.	% Plump	% Thin	Heading Date					
10	35	21.3	44.1	16	8	43	174					
15	54	25.4	42.8	19	12	45	174					
20	70	25.6	43.2	18	9	44	173					
25	87	20.7	43.7	26	9	46	173					
30	105	23.3	43.4	17	8	65	173					

Cooperator & Location : Station
 Seeding date : April 16, 1985
 Harvest date : August 1, 1985
 Previous crop : Fallow
 Fertilizer : 100# 11-51-0 with the seed and 40# N. deep banded
 Variety : Clark
 Moisture probe depth at seeding : 18"
 Rainfall from seeding to harvest : 3.6"
 F-test 0.45 (non sig), c.v.=25.4%

Table 37. Barley seeding rate trial on no-till recrop, Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT

Seeds/ sq.ft.	SEED RATE		Bu/acre yield	Test wt.	Plant hgt.	% Plump	% Thin	Heading date	% Protein
	Lbs. Seed/acre	Bu/acre yield							
10	35	20.5	42.3	23	14	54	178		
15	54	27.0	40.9	22	8	66	178		
20	70	25.7	40.4	22	5	68	178		
25	87	24.3	41.2	21	4	71	178		
30	105	25.4	40.8	19	6	66	178		

Cooperator & Location : Station
 Seeding date : April 16, 1985
 Harvest date : August 1, 1985
 Previous crop : Barley
 Fertilizer : 100# 11-51-0 with the seed and 40# N. deep banded
 Variety : Clark
 Moisture probe depth at seeding : 18"
 Rainfall from seeding to harvest : 3.6"
 F-test 1.19 (non sig), c.v.=15.9%

Table 38. Irrigated spring wheat seeding rate study, north of Fairfield, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

SEED RATE						
Seeds sq.ft.	Lbs. seed/acre	Bu/acre yield	Test wt.	Plant hgt.	% Protein	
10	32	66.1	62.0	34		
15	49	73.4	62.1	34		
20	66	70.6	61.7	34		
25	83	74.1	61.9	34		
30	99	72.9	61.9	34		

Cooperator & Location : Al Meyer, north of Fairfield
 Seed date : April 17, 1985
 Harvest date : August 26, 1985
 Previous crop : Fallow
 Fertilizer : 110-60-40-10 worked in
 Irrigation method : Flood
 Variety : Lew

Table 39. Irrigated barley seeding rate study, north of Fairfield, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

SEED RATE												
Seeds/ sq.ft.	Lbs. seed/acre	Bu/acre yield	Test wt.	Plant hgt.	% Plump	% Thin	% Protein					
10	35	94.5	51.8	30	98	1						
15	54	109.6	51.5	30	97	2						
20	70	127.6	52.2	31	99	1						
25	87	101.9	52.7	30	98	1						
30	105	114.6	52.1	26	99	1						

Cooperator & Location : Al Meyer, north of Fairfield

Seed date : April 17, 1985

Harvest date : August 26, 1985

Previous crop : Fallow

Fertilizer : 110-60-40-10 worked in

Irrigation method : Flood

Variety : Clark

Table 40. Barley stand thinning trial under drought conditions, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Plot	Yield bu/acre	Test wt.	% Plump	% Thin	% Protein
Check	13.3	43.6	7	59	
Thinned	19.5	41.5	10	62	

Cooperator & Location : Station

Seeding date : April 20, 1985

Harvest date : August 1, 1985

Previous crop : Fallow

Fertilizer : 100# 11-51-0 with the seed and 40# N. deep banded

Preseeding tillage : none

Moisture probe depth at seeding : 18"

Rainfall from seeding to harvest: 3.6"

Variety : Clark

Seeding rate : 25 seeds/sq ft.

Thinning procedure: In the two-to-three leaf stage every 18" along each row, a 6" block of seedlings was mechanically removed; leaving a series of plant "clumps", each 12 inches long and separated by a 6 inch space within the row.

Table 41. Spring wheat seed depth trial, 1985. Mont. Agr. Expt. Sta;
Western Triangle Research Center, Conrad, MT.

Seed depth (inches)	bu/acre yield	test wt.	plant hgt.	# of seedlings	heading date	% protein
1.5	13.6	57.1	21	23	175	
2.0	10.5	55.4	20	24	175	
2.5	15.0	57.1	21	20	175	
3.0	16.2	57.3	21	19	175	
3.5	9.7	56.0	20	19	176	
4.0	14.3	58.1	20	14	177	

Cooperator & Location : Station
 Seeding date : April 16, 1985
 Harvest date : August 6, 1985
 Previous Crop : Fallow
 Fertilizer : 100# 11-51-0 with the seed and 40# N. deep banded
 Variety : Lew

Table 42. Barley seed depth trial, 1985. Mont. Agr. Expt. Sta;
Western Triangle Research Center, Conrad, MT.

Seed depth (inches)	bu/acre yield	test wt.	plant hgt.	heading date	% Plump	% Thin	# of seedlings
1.5	34.1	44.4	22	173	20	43	21
2.0	24.0	43.5	22	174	12	58	22
2.5	30.6	43.4	23	174	14	51	19
3.0	29.2	44.5	22	174	17	45	20
3.5	24.5	44.5	23	175	16	51	12
4.0	23.6	43.7	23	177	19	46	15

Seeding date : April 16, 1985
 Harvest date : August 1, 1985
 Variety : Clark
 see footnotes to Table 41.

Table 43. Comparison of pre-seeding tillage* vs. no-till on recrop barley and spring wheat, 1985. Mont. Agr. Expt. Sta; Western Triangle Research Center, Conrad, MT.

Crop/Variety	Yield (bu/a)		Test wt.		Height (in.)		% Plump		% Thin	
	till*	no-till	till	no-till	till	no-till	till	no-till	till	no-till
Spring wheat										
Fortuna	19.1	20.9	57.7	55.9	23	23				
Lew	17.2	20.0	54.7	57.7	22	22				
Wheat average	18.2	20.5	56.2	56.8	22.5	22.5				
Barley										
Hector	22.5	30.2	40.5	46.1	22	19	14	48	53	19
Klages	7.8	17.4	34.1	46.7	17	18	29	54	29	14
Barley average	15.2	23.8	37.3	46.4	19.5	18.5	21.5	51	41	16.5

Cooperator & location : Robert Parsell Jr., west of Whitlash

Seeding date : May 7, 1985

Harvest date : August 27, 1985

Previous crop : Barley

Fertilizer : 100# 11-51-0 with the seed and 90# N. top dressed

Sprayed with Roundup prior to seeding

Moisture probe depth at seeding : 36"

Rainfall from seeding to harvest : 4.25"

* The tilled ground was disced twice in the spring with minimal surface residue remaining

Table 44. Evaluation of seed treatments on spring wheat for sawfly control, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Treatment	Rate/cwt	Yield bu/a	Test wt.	Head date	Plant hgt inches	% Sawfly damage *
untreated check	0	10.8	56.7	173	18	20
Magnum + Escort	8 oz. ai. + 2 fl. oz.	10.5	56.6	173	18	20
Magnum + Escort	16 oz. ai. + 2 fl. oz.	9.0	55.6	173	18	20

Location : Station

Variety : Newana

Previous crop : chem. fallow (barley stubble)

Seeded : April 16, 1985; no-till

Harvested : August 6, 1985

Emergence : no differences in spring emergence were observed among treatments.

Cooperator : Wendell Morrill, Dept of Entomology, MSU, Bozeman

* Sawfly damage recorded as percent of stems laying on the ground 3 days after ripening.

Growing season precipitation : 3.6" + 3" soil water

PROJECT TITLE: Oilseed and pulse crop evaluation under no-till and recrop conditions.

PERSONNEL: Gregory D. Kushnak, Ron Thaut, & Larry Christiaens, Western Triangle Research Center, Conrad, MT.

INTRODUCTION/OBJECTIVES:

Oilseed and pulse crops in rotation can benefit grain production (soil amelioration, pest cycle disruption, etc.). The production potential of various oilseed and pulse crops has been determined for fallow systems, under average management levels, in the Western Triangle area. This study sought to determine production potential of these crops on recrop and no-till conditions, where they will most likely be grown in rotation with grain.

Results:

Oilseed and pulse crop experiments included the comparison of safflower varieties on recrop vs. fallow; the evaluation of oleic oil safflower lines for alternate energy sources; the evaluation of seeding rates for sunflowers and several pulse crops on recrop, tillage fallow, and no-till chemical fallow; and the evaluation of lupine varieties on no-till chemical fallow. Locations involved were Dutton and Conrad, both of which experienced drought conditions.

Safflower varieties ranked the same for yield on both recrop and fallow conditions (table 46). The selections 81B6078 and 81B3565 are potential replacements for Hartman and S-208, respectively; with 81B3565 intended primarily for birdseed markets. Each produced a higher yield and test weight than Hartman and S-208, respectively. Both lines were developed from the safflower breeding program at the Eastern Research Center, Sidney, MT.

The safflower yields on fallow were lower than for recrop, possibly due to soil drying from two preseeding tillage operations on the fallow. The recrop received only one tillage operation to incorporate Treflan.

The oleic safflower study was conducted in cooperation with the Eastern Research Center, Sidney; and oil tests are still being conducted in the lab. Agronomic data for the oleic lines are presented in table 45.

Optimum seeding rates for the pulse crops were difficult to assess, due to the drought related low yields. The rates (in both seeds/sq. foot and pounds/acre) and the corresponding agronomic data are presented in tables 47 and 48. There appeared to be considerable interaction between rates, location, and cropping system. In general however, the optimum rates for the various crops under drought conditions were: Lentil, 11 seeds/sq. foot; Austrian Pea, 6 to 9 seeds/sq. foot; and Fababean, Pinto Bean and Garbanzo bean, 1 to 2 seeds/sq. foot.

The lupine variety trial (table 49) was grown under the same conditions as the pulse crop seeding rate trial that was reported in table 47. The data in table 49 indicate that lupine has a similar yield potential to fababean, but less than for lentil and austrian pea. Seeding rates, however, may not have been optimum for the lupine; as this is a new, unknown crop to this area. Further study will be needed to determine what rate of seeding is needed.

Data for the sunflower study are not available do to crop loss to blackbirds.

Table 45. Safflower variety trial north of Conrad, 1985. Mont. Agr. Expt. Sta.; Western Triangle Research Center, Conrad, MT.

Variety	Plant hgt. inches	Yield lbs/ acre	% oil
80B1341	20	888	
82B2282	19	825	
81B3565 <u>1/</u>	20	808	
82B2909	18	765	
S-317	21	749	
Hartman	18	745	
82B2369	21	744	
82B1983	19	732	
82B3550	19	711	
82B2364	20	648	
Oker	19	643	
82B1606	18	640	
S-208	19	637	
82B2166	19	620	
W796-1-3	18	608	
81B6078 <u>2/</u>	19	593	
81B3697	19	587	
S-541	19	581	
82B2349	19	513	
Oleic Leed	17	482	

Location : Station

Seeding date : May 9, 1985

Harvest date : October 17, 1985

Previous crop : Chemical Fallow

Moisture Probe depth at planting : 18"

Rainfall from seeding to harvest : 2.94"

1/ white hull type, intended to replace S-208 as birdseed variety.

2/ potential for higher yield and oil than Hartman in some parts of Montana.

Table 46. Safflower variety trial on recrop and fallow, East of Dutton, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	FALLOW			RECROP		
	Plant hgt. inches	Yield lbs/a	Test lbs/bu	Plant hgt. inches	Yield lbs/a	Test lbs/bu
S-541	15.0	237	39.0	16.5	485	38.2
81B6078 <u>1/</u>	15.0	186	40.0	15.0	430	38.7
Hartman	14.0	166	38.1	13.0	292	35.2
81B3565 <u>2/</u>	15.5	133	41.0	15.0	291	38.1
S-208	15.0	110	40.0	14.0	276	37.1

Cooperator & location : Frank Loch, east of Dutton

Seeding date : May 8, 1985

Fertilizer : 100# 11-51-0 with the seed on both fallow and recrop with an additional 60# N (A.A.) + 65# 11-51-0 shanked in on the recrop

Herbicide : Treflan

Depth of moisture probe at seeding : 36"

Rainfall from May 8 - August 19 : 5.1"

Previous crop for the recrop : barley

Harvest date : October 17, 1985

1/ 6078 : potential for higher yield and oil than Hartman; naming and release is pending seed supply increase.

2/ 3565 : "white hulled", high test weight type, intended to replace S-208 as a birdseed market variety. Naming and release is pending seed supply increase.

Table 47. Seeding rate trial on pulse crops grown on fallow and recrop east of Dutton, 1985. Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Crop/Variety	Seed Rate*		Fallow		Recrop		Harvest Date
	seeds/ sq.ft.	lbs/ acre	Yield lbs/a	Plant hgt. and lowest pod (in.)	Yield lbs/a	Plant hgt. and lowest pod (in.)	
Lentil Red Chief	7	33	454	10/3	316	9/3	7/29/85
	11	51	492	10/3	315	9/3	57.1
	15	70	464	10/3	288	9/3	58.1
Aust. W. Pea Trapper	3	30	882	--	450	--	7/29/85
	6	61	812	--	692	--	61.0
	9	91	620	--	554	--	61.9
	12	121	592	--	552	--	62.9
Fababean Ackerperle	1	49	410	13/4	242	11/4	61.0
	2	99	274	13/4	228	11/4	62.9
	3	148	208	13/4	162	11/4	61.9
	4	198	168	13/4	144	11/4	61.0
Pinto Bean Nodak	1	45	192	8/2	54	8/2	10/17/85
	2	90	134	8/2	118	8/2	55.2
	3	135	16	8/2	22	8/2	--
	4	180	12	8/2	16	8/2	--
Garbanzo Bean UC-5	1	56	--	--	240	12/4	10/17/85
	2	112	--	--	260	12/4	55.2
	3	168	--	--	194	12/4	56.2
	4	224	--	--	178	12/4	55.2

Cooperator & location : Frank Loch, east of Dutton

Seeding date : May 8, 1985

Fertilizer : 100# 11-51-0 with the seed on both fallow and recrop with an additional 60# N (A.A.) + 65# 11-51-0 shanked in on the recrop

Herbicide : Treflan

Depth of moisture probe at seeding : 36" ; Rainfall from May 8-August 19, 1985 : 5.1"

Previous crop for the recrop : barley

* Pure live seed basis

Table 48. Pulse crop seeding rate trial grown on no-till chemical fallow, Conrad, 1985. Mont. Agr. Expt. Sta.; Western Triangle Research Center, Conrad, MT.

Crop/Variety	Seed rate *		Yield lbs/a	Plant hgt. and lowest pod (in.)	Test wt. lbs/bu	Harvest Date
	Seeds/ sq.ft.	lbs/ acre				
Lentils	7	33	610	9/3	61.0	8/1/85
Red Chief	11	51	678	9/3	60.0	
	15	70	546	9/3	60.0	
Aus. W. Pea	3	30	476	15	61.0	8/1/85
Trapper	6	61	530	15	62.9	
	9	91	676	15	61.9	
	12	121	604	15	61.0	
Fababean	1	49	446	14/5	63.8	8/9/85
Ackerperle	2	99	548	14/5	63.8	
	3	148	524	14/5	64.8	
	4	198	444	14/5	64.8	
Pinto Bean	1	45	296	8/3	61.0	9/26/85
Nodak	2	90	300	8/3	60.0	
	3	135	206	8/3	58.1	
	4	180	286	8/3	59.0	

Location : Station

Seeding date : May 8, 1985

Previous crop : Chemical fallow (barley stubble)

Fertilizer : 100# 11-51-0 with the seed

Depth of moisture probe at seeding : 18"

Rainfall May 8 - August 1 : 2.94"

* Pure live seed basis

Table 49. Lupine variety trial grown on no-till chemical fallow, Conrad, 1985.
Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Variety	Plant hgt. and lowest pod, inches	Yield lbs/acre	Test Wt. lbs/bu
Astra	12/7	471	57.1
Nyirsegi	12/6	471	56.2
Ultra	12/7	429	56.2
Kalina	12/7	418	58.1
Kiev	12/7	400	59.0
Lucky	13/7	319	55.2

Cooperator & Location : Station

Seeding date : May 8, 1985

Previous crop : Chemical fallow, barley stubble

Fertilizer : 100# 11-51-0 with the seed

Depth of moisture probe at seeding : 18"

Rainfall : May 8 - August 1, : 2.94"

Harvest date : August 19, 1985

Insecticide : Malathion for blister beetles; Sevin for hoppers

Lupine pods turned yellow by August 1; grasshoppers removed all leaves by August 9 when pods were still yellow and seeds green.

Table 50. Yield of peas when grown in mixture with barley and fababean, Mont. Agr. Expt. Sta., Western Triangle Research Center, Conrad, MT.

Mixture	Height of component crop inches	Yield of component crop lbs/a	Test wt. lbs/bu
Barley	23	1406	48.3
+peas	15	<u>44</u>	--
Total		1450	
Fababeans	14	286	62.9
+peas	15	<u>322</u>	62.0
Total		608	

Location : Station

Seed date : May 8, 1985

Previous crop : Chemical fallow (barley stubble)

Fertilizer : 100# 11-51-0 with seed

Depth of moisture probe at seeding : 18"

Growing season precipitation : 2.94"

Barley matured 6 days later than peas, and fababean approximately 10 days later.

Seeding rates : Peas = 6 seeds/sq.ft.; Fababean = 2 seeds/sq.ft.;
Barley = 6 seeds/sq.ft.

Barley stand was much too thick, and caused severe competition for the peas. The pea vines, however, did support themselves on the barley stems. The pea vines tended to avoid fababean stalk.

Table 51. Alfalfa variety trial near Fairfield, 1985. Mont. Agr. Expt. Sta; Western Triangle Research Center, Conrad, MT.

Variety	Yield (tons/acre) *		Total
	First cutting	Second cutting	
Vernal	1.27	1.48	2.74
Thor	1.15	1.56	2.70
Spectrum	1.22	1.46	2.68
Beaver	1.23	1.45	2.67
Advantage	1.26	1.42	2.67
NY 8301	1.16	1.51	2.66
Phytor	1.17	1.48	2.66
DK-120	1.10	1.55	2.64
532	0.98	1.65	2.63
Baker	1.16	1.46	2.62
NK1-82503-032	1.15	1.45	2.60
Jubilee	1.04	1.54	2.58
Ladak 65	1.10	1.48	2.58
Drummor	1.14	1.43	2.58
Wrangler	1.02	1.52	2.55
NAPB 20	1.03	1.49	2.53
526	1.11	1.41	2.52
Decathalon	1.14	1.34	2.47
Iroquois	1.24	1.22	2.47
Mohawk	1.14	1.33	2.46
Maxim	1.05	1.39	2.44
Apollo II	1.07	1.30	2.37
NY 8302	1.11	1.24	2.35
WL 316	0.89	1.44	2.32
DK-135	0.90	1.38	2.28
Challenger	1.01	1.26	2.26

Cooperator & location : Ross Peace, N. of Fairfield

Seed date : June 28, 1984

Harvest date : first cut June 25; second cut August 7, 1985

Fertilizer : 100# 11-51-0 with the seed

Previous crop : Barley 1983; verticillium infected alfalfa 1982.

No irrigation on first cutting

Second cutting irrigated twice.

* 12% moisture basis

Table 52. Alfalfa variety trial near Fairfield, 1985. Mont. Agr, Expt. Sta;
Western Triangle Research Center, Conrad, MT.

Variety	Yield (tons/acre) *		Total
	First cutting	Second cutting	
Vernema	0.99	1.32	2.31
Apollo II	0.94	1.35	2.30
Trumpetor	0.90	1.38	2.28
WL 316	0.89	1.34	2.23
Ladak 65	0.94	1.28	2.22
Ranger	0.77	1.43	2.20
Peak	0.85	1.27	2.11
Vernal	0.89	1.36	2.01

Cooperator & location : Ross Peace, N. of Fairfield

Seed date : June 13, 1983

Harvest date : first cut June 25; second cut August 7, 1985

Fertilizer : 100# 11-51-0 with the seed

Previous crop : alfalfa torn out in 1982 (Verticillium wilt infected),

No irrigation on first cutting

Second cutting irrigated twice

* 12% moisture basis

Table 53. Two-year summary for irrigated alfalfa grown near Fairfield, 1984-1985.
Mont. Agr. Expt. Sta.; Western Triangle Research Center, Conrad, MT.

Variety	Yield, tons/acre 1/		
	1984	1985 *	2 year average
Vernema	3.35	2.31	2.83
Apollo II	3.25	2.29	2.77
Ladak-65	3.30	2.22	2.76
WL-316	3.24	2.23	2.73
Peak	3.34	2.11	2.73
Trumpetor	3.16	2.28	2.72
Ranger	3.11	2.20	2.65
Vernal	3.24	2.01	2.62

Cooperator and Location : Ross Peace, N. of Fairfield

Seeding date : June 13, 1983

Fertilizer : 100# 11-51-0 with the seed

Previous crop : Alfalfa torn out in 1982 (Verticillium wilt infected)

* First cutting in 1985 was not irrigated

1/ 12% moisture basis

Table 54. Band application of Roundup on native range to simulate mechanical chiseling. Mont. Agr. Expt. Sta.; Western Triangle Research Center, Conrad, MT.

	Yield lbs./ acre *	% Forbs *	% Grasses *
Treated area	1,488	73.5	26.5
Non-treated area	810	68.2	31.8

Cooperator and location : Bill Jones, west of Bynum

Sprayed : July 8, 1982

Chemicals used : Roundup

Method of application : Conventional flat fan spray nozzles spaced 18" apart and lowered to a height of approximately 10" above ground level making a band of spray 6" wide.

Rate of application : 1 quart/acre total chemical (concentrated in bands to equal approximately 3 quarts/acre).

Date of cutting : June 27, 1985

* wet weight basis

Rainfall was much below normal during the period 1983-1985.