PROJECT TITLE: Intrastate, Early Yield, and Malt Barley Variety Performance

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OBJECTIVES: To evaluate agronomic performance of new experimental lines and existing barley varieties in central Montana.

RESULTS:

Intrastate Trial –
The Intrastate barley yield trial was harvested when much of the grain had 15% or higher moisture. Yields ranged from 56.4 bu/a for MT950186 down to 35.6 bu/a for Haybet (Table 40). Barley lines MT960228 and MT981060 (Hays), which are to be available to seed growers in 2004, yielded 50.5 and 49.3 bu/a, respectively. Baronesse, the current standard for high yield, produced 49.8 bu/a. Merit had the lowest test weight. Mean protein content was 14.5 %. Multi-year yield, test weight, plant height, plump kernels, and protein content are presented in tables 41-45, respectively.

Early Yield Trial –
The early yield trial was harvested on August 12 when the grain was well ripe. Yield range was tighter for the early yield trial than the yield range found in the intrastate nursery (Table 46). A few of the test lines had test weights greater than 50 lbs/bu while five had test weights of 47.6 lbs/bu or less. Protein data was not presented here.

Malt Barley Evaluations-
The malt barley trial has not been conducted at Moccasin in recent years because we seldom make malt quality barley on station. However, several area producers are interested in producing malt regularly. The potential of building malt plants in the area further increases the importance of malt barley variety evaluations at CARC.

Gallatin, the yield check, ranked high for both yield and test weight (Table 47). Garnett, an Idaho malt barley, had the top rank for percent plump kernels.

SUMMARY:
2002 turned out to be a fairly good barley year. Yields were not outstanding, but test weight and percent plump seed were better than anticipated for the dry weather experienced in mid-spring.

FUTURE PLANS:
The Intrastate Trial and Early Yield Trial will continue to be evaluated at the Central Agricultural Research Center. The future of the malt barley variety evaluation is uncertain.

Table 40 2002 Intrastate spring barley trial
Exp. 2107 Central Agricultural Research Center, Moccasin, MT

ID	Pedigree	Heading Date*	Plant Height	Grain Yield	Test Weight	--- Sieve Size --- Plump	Thin	Grain Protein
		day	inches	bu/a	lbs/bu	%	%	%
MT950186	MT860756/MT83533	181	25	56.4	52.0	65	10	14.9
BZ594-20	WPB BZ594-20	181	26	54.0	50.6	93	2	14.6
MT960222	Stark/Baronesse	186	24	52.5	51.2	87	2	15.1
MT981091	MT851195/MT140523	182	25	52.5	50.4	64	9	14.9
MT981210	MT910150/Stark	184	25	52.2	49.7	70	6	14.0
MT990244	MT890018/Stark	182	23	51.7	49.9	72	7	14.5
BZ596117	WPB BZ596-117	188	23	51.6	50.4	65	9	14.6
MT981042	H5860219/Baronesse	189	22	51.3	50.2	58	10	14.0
MT960228	Stark/Baronesse	185	24	50.5	50.9	87	3	14.4
MT970026	Baronesse/MT860756	1183	22	50.2	51.0	77	6	14.8
MT970148	MT861596/ND 11120	183	23	50.2	50.8	71	8	14.8
MTLB 13	Lewis/Baronesse #13	185	23	50.1	50.9	48	14	15.1
MT981212	MT910150/Stark	181	25	49.9	51.2	70	7	14.5
PI568246	Baronesse	189	27	49.8	49.9	77	4	15.0
MT960226	Stark/Baronesse	183	23	49.7	51.8	72	7	14.6
MT000047	Chinook/MT920161	181	25	49.6	49.8	70	8	14.5
MT981238	ND112311/Lewis	181	21	49.4	52.4	67	9	14.8
MT981060	Haybet/Baronesse (Hays)	185	21	49.3	49.5	39	24	14.6
B99AL621	B99AL-621	188	23	49.0	51.8	73	6	14.3
MT960101	Manley/Baronesse	189	23	48.5	51.6	53	13	14.2
MT990172	Apex/MT890070	185	23	48.3	50.4	75	7	14.4
ND13299	Conlon	178	25	48.2	52.4	97	1	14.4
MT970155	MT886610/MT140523	189	26	47.7	52.6	74	5	14.6
MT000130	MT910189/MT890070	182	23	47.4	51.4	83	5	15.0
MT990249	MT890018/Stark	179	24	47.0	31.6	78	5	14.1
MT000040	Chinook/MT920161	183	23	47.0	51.2	47	18	14.2
MT981030	Baronesse/MT910160	185	15	46.9	51.5	77	6	14.8
MT000138	MT920041/H1851195	181	22	46.8	51.9	69	9	14.5
MT000239	Harrington/MT920059	187	25	46.4	48.9	73	7	14.6
MT981177	MT910033/Targhee	182	23	46.2	49.7	37	17	14.5
MT000153	MT920059/Baronesse	181	23	46.1	51.9	61	7	14.6
MT970116	Klages/Baronesse	181	24	45.9	48.1	74	6	14.9
PI491534	Gallatin	180	21	45.8	49.4	60	10	14.3
MT000156	MT920059/Baronesse	180	25	45.8	51.1	81	5	14.5
MT000045	Chinook/MT920161	183	24	45.6	50.6	60	10	14.7
NORD1958	NORD 1958	186	23	45.3	49.3	63	9	14.8
MT000159	MT920059/Baronesse	188	23	45.1	49.3	55	9	14.8
MT000092	MT890008/Lewis	183	23	45.0	50.8	72	6	14.2
MT000157	MT920059/Baronesse	187	24	44.9	51.8	46	12	14.1
MT000177	MT930029/Baronesse	187	25	44.6	50.6	78	4	14.5
MT000063	H3860224/MT920041	185	22	44.6	50.6	48	14	14.5
MT990106	Apex/H1851195	185	25	44.0	51.6	49	13	14.1
N96/1116	Justina	186	23	43.8	50.1	84	4	14.8
MT960099	Manley/Baronesse	190	22	43.1	51.3	43	14	14.9
MT000178	MT930029/Baronesse	187	23	43.1	49.7	53	10	14.8

(continued)

Table 40 2002 Intrastate spring barley trial
Exp. 2107 (continued)

ID	Pedigree	Heading Date*	Plant Height	Grain Yield	Test Weight	--- Sieve Size --- Plump	Thin	Grain Protein
		day	inches	bu/a	lbs/bu	%	%	%
MT970229	MT890021/Stark	184	25	43.1	51.6	89	2	14.4
MT000237	Harrington/MT920059	189	24	42.9	50.4	73	6	14.1
PI605472	Garnet	187	24	42.8	51.1	77	5	14.5
MT000125	MT910189/Lewis	185	25	42.8	50.2	88	3	14.7
MT981006	Baronesse/H2860224	187	25	42.8	50.5	61	9	14.7
MT970110	Klages/Baronesse	186	22	42.7	51.0	80	4	14.3
MT000180	MT930029/Baronesse	185	24	42.7	50.9	64	7	14.5
NORD1963	NORD 1963	188	24	42.6	50.2	66	9	14.4
MT981004	Baronesse/H2860224	187	25	42.6	50.4	75	4	14.4
6B932978	Legacy	182	23	42.5	49.0	39	28	14.5
MT960100	Manley/Baronesse	189	25	42.3	51.2	44	14	14.7
6B952482	(BA6B95-2482) 6B89--2126/N	182	23	42.2	50.7	34	27	14.5
H3860224	Lewis/Apex (MT860224 HR#3	189	24	42.1	50.7	87	4	14.6
MT910189	ND 7293/Bearpaw	182	26	41.5	50.0	60	12	14.5
SK 76333	Harrington	184	24	41.3	49.8	64	10	14.5
MT000066	H3860224/MT920161	187	24	41.3	51.2	73	7	14.6
PI610264	Valier	187	24	40.8	50.2	49	13	14.9
2B914947	Merit	187	23	39.8	47.8	25	27	14.8
PI533600	Haybet	182	24	35.6	51.9	8	45	15.0
OVERALL MEAN =		184.60	23.59	46.21	50.40	60.84	12.42	14.56
F-RATIO TRTS =		15.30	2.51	2.95	1.38			
P-VALUE TRTS =		0.00	0.00	0.00	0.06			
CV (S/MEAN) % =		0.72	7.91	8.66	7.56			
LSD(0.05 by t)=		2.13	3.01	6.47	6.15			

* Heading date is the day from January 1, 2002. Day 180 = June 29th
Seeded: 4/16/02 Harvested: August 7, 2002
Fertilizer: 50 lbs 20-20-20-10 with seed; 30lbs of top dressed N
Herbicide: 14 oz/ac of Roundup Ultra post-plant, 1.5 pints/ac of Bronate
Previous Crop: Fallow
Soil Temperature: 50 F
Soil Moisture: 18-21"
Growing Season Precipitation (April-July): 7.49"
Growing Season Precipitation (April-July) 94 yr avg: 8.62"

Table 41 Yield summary of selected barley varieties, 1992-2002
Exp. 2107 Central Agricultural Research Center, Moccasin, MT

Selected Varieties	1992	1993	1994	1995	1996	1997[1/]	1998	1999	2001	2002	Average	Gallatin Same Yrs.
		---------- bu/a ----------										
Gallatin	81	81	48	50	38	67	69	73	71	46	62.4	--
Hector	75	98	48	40	43	69	76	70	--	--	64.9	63.4
Lewis	71	95	49	38	45	76	71	77	64	--	65.1	64.2
Harrington	74	92	49	43	33	71	70	71	63	41	60.7	62.4
Chinook[2/]	74	91	52	47	40	73	69	69	--	--	64.4	63.4
Stark	72	89	53	46	44	70	82	81	73	--	67.8	64.2
Baronesse	90	111	53	51	42	73	76	77	72	50	69.5	62.4
H1851195	80	90	53	55	39	78	80	78	--	--	69.1	63.4
H3860224		106	42	43	37	74	79	75	66	42	62.7	62.4
Xena						79	79	67	76	--	75.3	70.0
Valier						84	72	67	70	41	66.8	65.2
Haxby (MT950186)						82	79	71	77	56	73.1	65.2
Logan				50	46	65	75	74	--	--	62.0	59.4
Nursery Mean	74.6	90.8	49.8	43.8	40.4	71.7	72.7	74.1	69.8	46.21		

[1/] 1997 data is from the recrop nursery

[2/] Data prior to 1994 is from bulk line rows; data from 1994-1995 is from a single line.

Table 42 Test weight summary of selected barley varieties, 1992-2002
Exp. 2107 Central Agricultural Research Center, Moccasin, MT

Selected Varieties	1992	1993	1994	1995	1996	1997 [1/]	1998	1999	2001	2002	Average	Gallatin Same Yrs.
	lbs/bu											
Gallatin	54	50	51	51	45	54	50	51	48	49	50.4	--
Hector	52	49	51	49	45	53	49	50	--	--	49.8	50.8
Lewis	53	50	51	50	46	55	49	51	49	--	50.4	50.5
Harrington	52	48	49	48	46	53	43	48	45	50	48.2	50.4
Chinook[2/]	52	48	50	50	44	54	48	51	--	--	49.6	50.8
Stark	52	49	52	52	46	54	52	52	50	--	51.0	50.5
Baronesse	53	50	52	51	46	53	45	49	46	50	49.5	50.4
H1851195	52	48	50	50	44	53	48	51	--	--	49.5	50.8
H3860224		50	50	50	44	54	47	50	48	51	49.3	50.0
Xena						55	49	48	48	--	50.1	50.9
Valier						55	47	49	49	50	50.0	50.6
Haxby (MT950186)						56	52	52	51	52	52.4	50.6
Logan				51	45	55	51	51	--	--	50.7	50.2
Nursery Mean	52.3	48.4	50.1	49.9	45.1	53	47.2	49.9	47.4	60.35		

[1/] 1997 data is from the recrop nursery.

[2/] Data prior to 1994 is from bulk line rows; data from 1994-1995 is from a single line.

Table 43 Plant height summary of selected barley varieties, 1992-2002
Exp. 2107 Central Agricultural Research Center, Moccasin, MT

Selected Varieties	1992	1993	1994	1995	1996	1997[1/]	1998	1999	2001	2002	Average	Gallatin Same Yrs
	---------- inches ----------											
Gallatin	31	31	26	28	26	32	37	27	30	26	29.4	--
Hector	32	34	27	26	25	32	39	28	--	--	30.4	29.8
Lewis	30	35	27	26	26	31	38	29	31	--	30.3	29.8
Harrington	29	28	25	26	22	31	37	26	30	23	27.7	29.4
Chinook[2/]	28	31	27	26	23	32	41	29	--	--	29.6	29.8
Stark	33	34	28	28	27	32	38	30	32	--	31.3	29.8
Baronesse	30	31	23	24	20	27	35	25	29	24	26.8	29.4
H1851195	32	34	27	27	25	33	40	29	--	--	30.9	29.8
H3860224		32	25	25	25	29	37	28	30	24	28.4	29.2
Xena						31	37	27	30	--	31.3	31.5
Valier						31	38	28	29	23	29.8	30.3
Haxby (MT950186)						29	38	28	31	25	30.1	30.3
Logan				29	24	27	37	26	--	--	28.5	30.0
Nursery Mean	28.9	31.3	25.6	25.7	23.3	30.9	36.6	27.7	29.8	23.58		

[1/] 1997 data is from the recrop nursery.

[2/] Data prior to 1994 is from bulk line rows; data from 1994-1995 is from a single line.

Table 44 Plump kernel summary of selected barley varieties, 1992-2002
Exp. 2107 Central Agricultural Research Center, Moccasin, MT

Selected Varieties	1992	1993	1994	1995	1996	1997[1/]	1998	1999	2001	2002	Average	Gallatin Same Yrs
	%											
Gallatin	96	79	40	79	9	92	39	81	16	60	59.1	--
Hector	96	86	24	62	4	87	44	75	--	--	59.8	64.4
Lewis	96	88	26	72	17	91	51	84	12	--	59.7	59.0
Harrington	95	89	13	70	18	90	30	75	26	64	57.0	59.1
Chinook[2/]	95	84	24	60	1	90	43	77	--	--	59.3	64.4
Stark	98	94	47	94	12	95	89	93	39	--	73.4	59.0
Baronesse	98	92	31	76	12	91	33	83	21	77	61.4	59.1
H1851195	98		23	86	8	98	64	93	--	--	67.1	62.3
H3860224			47	84	7	96	50	88	41	87	62.5	52.0
Xena						95	62	73	35	--	66.3	57.0
Valier						93	32	80	18	49	54.4	57.6
Haxby (MT950186)						94	68	88	35	65	69.9	57.6
Logan				79		92	79	91	--	--	85.2	72.8
Nursery Mean	90.7	85.5	29.3	76.9	na	91.9	45.1	80.2	28.8			

[1/] 1997 data is from the recrop nursery.
[2/] Data prior to 1994 is from bulk line rows; data from 1994-1995 is from a single line.

Table 45 Grain protein summary of selected barley varieties, 1994-2002
Exp. 2107 Central Agricultural Research Center, Moccasin, MT

Selected Varieties	1994	1995	1996	1997[1/]	1998	1999	2001	2002	Average
Gallatin	11.5	9.2	14.3	8.6	12.7	12.0	18.6	14.3	12.7
Hector	12.4	10.1	13.7	8.4	13.3	13.1	--		11.8
Lewis	12.9	8.6	14.6	8.4	13.6	11.8	20.0		12.8
Harrington	11.4	8.6	14.4	8.2	13.5	12.7	17.8	14.5	12.6
Chinook[2/]	12.2	9.9	14.9	8.5	13.2	12.4	--		11.9
Stark	11.3	9.6	13.3	9.1	12.4	11.5	15.6		11.8
Baronesse	12.1	8.0	14.7	8.1	13.2	12.3	15.3	15.0	12.3
H1851195	12.9	10.0	14.8	8.8	13.2	12.6	--		12.1
H3860224	13.2	8.8	16.3	8.0	13.7	12.4	16.3	14.6	12.9
Xena				8.1	12.9	12.0	15.4		12.1
Valier				8.7	12.9	12.0	17.1	14.9	13.1
Haxby (MT950186)				8.5	12.5	11.8	17.0	14.9	12.9
Logan		8.5	13.5	9.1	12.7	12.4	--		11.2
Nursery Mean	12.2	9.4	14.3	8.6	13	12.1	16.9		

[1/] 1997 data is from the recrop nursery.
[2/] Data prior to 1994 is from bulk line rows; data from 1994-1995 is from a single line.

Table 46 2002 Early yield spring barley trial
Exp. 3107 Central Agricultural Research Center, Moccasin, MT

ID	Pedigree	Heading Date*	Plant Height	Grain Yield	Test Weight
		day	inches	bu/a	lbs/bu
MT010177	MT920041/MT890008	182	23	52.5	50.1
MT010155	MT920041/H1851195	181	24	49.6	49.6
MT010195	MT920053/Logan	185	22	49.5	48.2
MT010095	MT890008/Logan	183	23	48.9	49.4
MT010089	MT886610/MT910189	186	22	48.6	49.5
MT010183	MT920053/Baronesse	186	24	48.6	50.2
MT010097	MT890008/Logan	183	22	48.3	49.5
MT010176	MT920041/MT890008	184	24	48.1	50.8
PI491534	Gallatin	180	26	47.9	49.7
MT010123	MT910160/H1851195	186	23	47.8	51.1
MT010051	Chinook/ND 13300	181	25	47.6	51.3
MT010001	78A10274/Baronesse	183	23	47.4	50.2
MT010133	MT910189/Baronesse	187	21	47.3	50.8
MT010058	Elisa/Baronesse	190	22	47.2	49.8
MT010084	MT886610/MT890008	186	22	46.6	48.6
MT010091	MT890008/H2860224	189	23	46.0	47.0
MT010093	MT890008/H2860224	188	22	45.9	46.0
MT010022	Alexis/MT920059	185	24	45.5	49.7
MT010076	MT886610/H1851195	183	24	45.3	50.1
MT010035	Bridge/H1851195	183	24	45.1	50.3
PI610264	Valier	187	23	45.1	50.1
MT010101	MT890008/Logan	185	23	45.1	48.8
MT010096	MT890008/Logan	184	23	44.8	49.7
MT010191	MT920053/Harrington	188	21	44.3	49.1
MT010212	MT920073/Baronesse	184	24	44.1	49.1
PI568246	Baronesse	189	21	44.1	49.4
MT010098	MT890008/Logan	184	23	44.1	51.0
MT010194	MT920053/Logan	185	24	43.9	47.5
MT010114	MT890008/ND 13300	182	25	43.8	50.4
MT010099	MT890008/Logan	185	22	43.8	49.5
MT010159	MT920041/Harrington	185	22	43.4	50.5
MT010066	Elisa/H1851195	185	25	43.3	50.0
MT010156	MT920041/H1851195	181	25	43.2	49.9
MT010094	MT890008/H2860224	188	24	43.0	50.5
MT010179	MT920041/MT890008	186	23	43.0	49.3
MT010175	MT920041/MT890008	186	22	42.9	46.6
MT010081	MT886610/H1851195	183	24	42.7	48.5
MT010213	MT920073/Logan	186	22	42.4	50.5
MT010219	MT930029/Baronesse	185	24	42.4	48.3
MT010205	MT920073/Baronesse	190	22	42.4	49.4
MT010220	MT930029/Baronesse	184	23	42.4	50.9
MT010158	MT920041/Harrington	185	22	42.3	49.0
MT010166	MT920041/Logan	181	25	42.2	49.7

(Continued)

Table 46 2002 Early yield spring barley trial
Exp. 3107 (continued)

ID	Pedigree	Heading Date*	Plant Height	Grain Yield	Test Weight
		day	inches	bu/a	lbs/bu
MT010080	MT886610/H1851195	182	25	42.1	49.9
MT010061	Elisa/Baronesse	187	22	41.9	47.9
MT010178	MT920041/MT890008	186	23	41.9	47.9
MT010198	MT920059/ND 13300	181	25	41.9	50.3
MT010083	MT886610/H1851195	182	25	41.8	48.6
MT010174	MT920041/MT890008	185	24	41.7	49.8
MT010182	MT920053/Baronesse	188	24	41.6	49.1
SK 76333	Harrington	184	22	41.2	47.6
MT010151	MT920041/H1851195	182	24	41.0	50.4
MT010075	MT886610/H1851195	182	25	40.8	51.1
MT010056	Chinook/ND 13300	181	26	40.5	50.2
MT010160	MT920041/Harrington	183	24	40.4	49.7
MT010113	MT890008/ND 13300	184	24	40.4	51.2
PI605472	Garnet	189	21	40.0	48.8
MT010162	MT920041/Harrington	188	22	39.8	49.7
MT010060	Elisa/Baronesse	188	22	39.6	50.0
MT950186	MT860756/MT83533	182	24	39.1	51.2
MT010031	Bearpaw/MT920053	185	25	38.9	49.7
MT010090	MT890008/H2860224	186	24	38.3	50.1
MT010117	MT890008/ND 13300	183	24	38.1	50.0
MT010229	ND 13300/Lewis	183	24	38.0	50.2
Average		185	23	43.77	49.58
CV (s/mean)*100		0	3	6.89	1.86
LSD (0.05)		2	2	8.43	2.57

* Heading date is the day from January 1, 2002 Day 180 = June 29th

Seeded: 4/16/02 Harvested: August 12, 2002

Fertilizer: 50 lbs of 20-20-20-10 placed with the seed and 30 lbs of N top dress.

Herbicide: 14 oz/ac of Roundup Ultra post-plant, 1.5 pints/ac of Bronate

Previous Crop: No-till barley stubble

Soil Temperature: 50 F

Soil Moisture: 18-21"

Growing Season Precipitation (April-July): 7.49"

Growing Season Precipitation (April-July) 94 yr avg: 8.62"

Table 47 2002 Malt barley dryland variety evaluation
Exp: Malt02 Central Agricultural Research Center. Moccasin, Montana.

Species	Plant Height	Head Date	Grain Yield	Test Weight	---Kernel Plump	Sieve Size--- Thin
	inches	d of y	bu/a	lbs/bu	%	%
Gallatin	25	182	45.4	47.2	69	8
MT910189	26	181	43.7	47.0	73	7
Garnet	24	186	43.6	44.7	84	3
Harrington17	23	183	43.1	46.7	62	9
Conlon	22	185	43.1	46.0	36	19
Foster	26	181	42.5	45.2	49	16
Harrington20	23	184	41.9	45.7	58	12
Stander	24	181	41.2	46.3	62	10
B1202	22	185	40.5	43.8	60	11
Harrington23	24	184	40.4	45.7	59	12
Harrington	22	185	39.2	46.0	76	5
Merit	23	185	38.9	43.7	55	12
Legacy	24	182	38.9	44.0	36	29
Morex	30	181	37.6	45.0	16	48
	24.2	183.2	41.37	45.48	53	13.4
	5.775	0.4549	8.08	1.633	0	0
	2.4	1.416	5.684	1.261	0	0

Seeded: April 16, 2002 Harvested: August 6, 2002
Fertilizer: 50 lbs of 20-20-20-10 placed with the seed and 30 lbs of N top dress
Herbicide: 14 oz/ac of Roundup Ultra post-plant, 1.5 pints/ac of Bronate
Previous Crop: No-till barley stubble
Soil Temperature: 50 F
Soil Moisture: 18-21"
Growing Season Precipitation (April-July): 7.29"
Growing Season Precipitation (April-July) 94 yr avg: 8.62"