

## MT981060

MT981060 is a two rowed hooded spring barley developed as a hay barley. The cross was made between Haybet and Baronesse in 1993. F1 plants were planted and harvested in 1994 and F2 populations were planted in 1995. Single seed descent in the ABS Plant Growth Center was utilized in 1995-1996 to advance two generations and F5 head rows were planted in the spring of 1996. F6 two row plots were planted in 1997 and selections were made based on agronomic and forage potential.

### Agronomic Performance

MT981060 was tested in the preliminary yield trial at Bozeman irrigated and Huntley dryland in 1998, the Bozeman dryland introduction trials from 1999- 2002, and the early yield trial in 2001 at Havre, Sidney, and Moccasin dryland and Bozeman irrigated. In 2002, MT981060 was entered in the dryland and irrigated intrastate trials. Mean grain yields over 18 locations from 1999 to 2002, MT981060 yielded 80.5 while Haybet, Harrington and Gallatin yielded 61.8, 79.8 and 83.9 bu/ac respectively (table 1). Under dryland conditions at 12 locations, Haybet yielded 50.7 bu/ac compared to 64.2 for Harrington, 67.7 for MT981060 and Gallatin with 67.8 bu/ac (table 2). Under irrigated conditions grain yields for Haybet, MT980160, Harrington and Gallatin were 83.9, 106.1, 111.1 and 116.1 bu/ac respectively (table 3). Overall test weights of Haybet and MT981060 were similar but lower than Harrington, Baronesse and Gallatin; 45.7, 46.3, 48.1, 49.3, and 49.8 lb/bu respectively (Tables 1& 7). MT980160 is later in heading date than Haybet and Gallatin but similar to Baronesse (tables 1&9). MT981060 is approximately three inches shorter than Haybet and similar to Baronesse in plant height (tables 1&10). MT981060 should have greater tolerance to lodging based on limited

lodging data and field increase observations (data not shown).

### Forage Yield and Quality

MT981060 was tested in forage trials at Bozeman irrigated in 1998 and 1999 and was in the statewide forage trials in 2001 and 2002. Forage yields and quality data for 15 Montana locations and Dickinson, North Dakota are presented in tables 12-19. Overall forage yields were 2.41, 2.58, and 2.73 (dry matter tons /ac) for Westford, Haybet and MT981060 respectively (table 12). Under irrigated conditions Westford yielded 3.27, Haybet 3.39 and MT981060 3.73 tons per acre. Dryland average yields were 1.65 tons per acre for Westford, 1.84 for MT981060 and 1.86 for Haybet (table 12). MT981060 and Haybet had higher forage yields than Westford over all locations (table 16). Quality analysis were run on eleven locations for Acid Detergent Fiber content (ADF) and Neutral Detergent Fiber content (NDF) and six locations for nitrate levels. ADF values averaged over 11 locations were 31.4 for Westford, Haybet 29.5 and MT981060 29.4. NDF values were 58.7 for Westford 55.2 for both MT981060 and Haybet (table 14). Mean nitrate levels for 6 locations were 1.44, 1.01 and 0.83 for Westford, MT981060 and Haybet respectively (table 15).

Table 1. 1999-2002 SPRING BARLEY MT981060 OVERALL SUMMARY

#### **All Locations**

ID	Pedigree	#	Yield	#	Test	#	Plump	#	Headin	#	Plant Ht.	#	Protein
		Yrs	(bu/ac)	Yrs	Wt (lb/bu)	Yrs	(%)	Yrs	g Date	Yr	inches	Yr	%
MT981060	Haybet/Baronesse	18	80.5	18	46.3	17	56.8	17	182.5	18	27.0	13	14.8
PI533600	Haybet	18	61.8	18	45.7	17	34.6	17	180.8	18	29.9	13	16.1
PI491534	Gallatin	18	83.9	18	49.8	17	66.0	17	179.6	18	28.8	13	14.8
MT950186	Haxby	11	95.3	11	51.8	11	67.4	10	181.4	11	28.5	10	14.8
PI610264	Valier	15	86.8	15	50.4	14	63.6	14	182.7	15	27.9	10	14.8
PI568246	Baronesse	18	87.4	18	49.3	17	70.2	17	182.2	18	26.7	13	15.2
SK 76333	Harrington	18	79.8	18	48.1	17	68.0	17	181.6	18	27.9	13	15.2
SITEMEAN	SITEMEAN	18	83.8	18	49.0	17	65.4	17	179.6	18	27.4	13	14.9

1999-2002 Spring Barley MT981060 Agronomic Summary Yield (bu/ac)

Table 2. Dryland Locations

Location	Havre		Sidney		Moccasin		Huntley	Conrad	Bozeman				Dryland Locations Ave.(12)
	Early	Intra	Early	Intra	Early	Intra	Intra	Intra	Introduction Trial			Intra	
	2001	2002	2001	2002	2001	2002	2002	2002	1999	2000	2001	2002	
MT981060	28.4	56.3	69.1	41.9	76.8	49.8	6.2	81.6	90.2	112.2	118.8	81.1	67.7
Haybet	21.8	37.8	50.8	48.4	47.6	38.3	17.9	65.6	79.3	77.2	87.8	36.1	50.7
Gallatin	35.4	54.4	82.8	52.4	65.5	48.1	18.5	78.7	88.4	117.1	114.3	57.7	67.8
Valier	34.6	53.6	91.6	45.4	67.2	42.7	13.6	78.9	***	***	***	63.4	***
Baronesse	28.0	56.6	83.1	51.2	74.6	51.8	23.1	82.6	93.9	128.8	124.6	68.3	72.2
Harrington	26.5	53.6	85.2	49.5	67.9	43.3	11.6	81.7	83.5	104.0	111.5	52.6	64.2

Table 3. Irrigated Locations

Location	Kalispell	Sidney	Huntley	Conrad	Bozeman		Irrigated Ave 6 locs	All Locations		
	2002	2002	2002	2002	2001	2002		% of Check	Comp Ave	# Locations
	Intra	Intra	Intra	Intra	Intra	Intra				
MT981060	131.1	69.4	120.2	103.4	136.1	76.5	106.1	100.0	80.5	18
Haybet	110.3	65.2	116.6	76.9	81.6	52.7	83.9	76.8	61.8	18
Gallatin	139.9	85.6	131.9	117.1	126.9	95.0	116.1	104.2	83.9	18
Valier	146.4	80.0	151.8	106.0	142.5	98.9	120.9	107.8	***	15
Baronesse	144.1	77.8	141.6	119.9	124.1	98.2	117.6	108.5	87.4	18

Harrington	129.6	71.0	135.9	106.9	132.4	90.6	111.1	99.2	79.9	18
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1999-2002 Spring Barley MT981060 Agronomic Summary

Table 4. Test Weight (lb/bu) Dryland locations

Location	Havre		Sidney		Moccasin		Huntley	Conrad	Bozeman				Dryland Locations Ave.(12)
	Exp	Intra	Early	Intra	Early	Intra	Intra	Intra	Introduction Trial			Intra	
									1999	2000	2001		
Year	2001	2002	2001	2002	2001	2002	2002	2002	2002	2002	2002	2002	
MT981060	47.0	45.3	44.5	45.8	46.6	49.5	38.9	46.8	47.1	49.5	46.9	46.7	46.2
Haybet	48.0	45.5	42.3	40.7	46.6	51.9	37.3	46.3	49.2	49.9	47.6	46.4	46.0
Gallatin	51.1	48.5	47.3	47.0	49.4	49.4	38.6	49.2	52.4	54.5	52.2	49.6	49.1
Valier	51.2	49.8	48.7	48.0	50.6	50.2	40.7	53.1	***	***	***	50.0	***
Baronesse	49.9	48.9	48.2	48.4	46.6	49.9	37.8	49.6	50.0	53.1	51.0	48.4	48.5
Harrington	48.5	48.4	46.0	45.6	47.2	49.8	37.4	52.6	49.4	51.7	48.8	47.0	47.7

Table 5. Test Weight (lb/bu) Irrigated Locations

Location	Kalispell	Sidney	Huntley	Conrad	Bozeman		Irrigated	Overall Ave.(18)
Exp Year	Intra 2002	Intra 2002	Intra 2002	Intra 2002	Early 2001	Intra 2002	Locations Ave.(6)	
MT981060	44.7	43.5	46.8	46.1	48.4	49.7	46.5	46.3
Haybet	43.4	42.5	46.4	44.7	45.2	48.9	45.2	45.6
Gallatin	50.2	46.7	50.4	52.1	53.8	54.5	51.3	49.7
Valier	50.2	48.1	53.0	52.3	51.9	53.0	51.4	50.1
Baronesse	50.2	48.1	50.0	51.8	51.8	53.0	50.8	49.2

Harrington	45.2	45.0	49.1	51.2	49.6	53.4	48.9	48.0
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1999-2002 Spring Barley MT981060 T-paired results All Locations

Table 6. Yield (bu/ac)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
PI533600	Haybet	61.8	18	-18.7	-4.7	.000
PI491534	Gallatin	83.9	18	3.3	1.3	.220
MT950186	Haxby	88.0	11	13.6	3.1	.011
PI610264	Valier	81.1	15	5.9	1.7	.106
PI568246	Baronesse	87.4	18	6.8	2.8	.012
SK 76333	Harrington	79.9	18	-.7	-.3	.798
SITMEAN	SITMEAN	83.8	18	3.3	1.2	.264

THE MEAN FOR THE REFERENCE VARIETY (MT981060) IS: 80.5 (N= 18)

Table 7. Test Weight (lb/bu)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
PI533600	Haybet	45.7	18	-.6	-1.4	.170
PI491534	Gallatin	49.8	18	3.5	7.9	.000
MT950186	Haxby	51.2	11	5.4	11.4	.000
PI610264	Valier	50.1	15	4.0	9.5	.000
PI568246	Baronesse	49.3	18	2.9	7.1	.000
SK 76333	Harrington	48.1	18	1.8	4.1	.000
SITMEAN	SITMEAN	49.0	18	2.7	4.9	.000

THE MEAN FOR THE REFERENCE VARIETY (MT981060) IS: 46.3 (N= 18)

Table 8. Plump Percent (over # 6 screen)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
PI533600	Haybet	36.7	16	-23.5	-7.6	.000
PI491534	Gallatin	70.2	16	9.9	2.8	.014
MT950186	Haxby	81.3	10	12.8	3.1	.014
PI610264	Valier	69.8	13	7.5	1.9	.086
PI568246	Baronesse	74.6	16	14.3	4.1	.001
SK 76333	Harrington	72.2	16	11.9	4.2	.000
SITMEAN	SITMEAN	69.4	16	9.1	2.3	.034

THE MEAN FOR THE REFERENCE VARIETY (MT981060) IS: 56.8 (N= 17)

1999-2002 Spring Barley MT981060 T-paired results All Locations

Table 9. Heading Date (days from Jan. 1)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
PI533600	Haybet	180.7	17	-1.8	-4.8	.000
PI491534	Gallatin	179.6	17	-2.9	-5.9	.000
MT950186	Haxby	183.4	10	-1.1	-1.3	.221
PI610264	Valier	183.9	14	.1	.3	.775
PI568246	Baronesse	182.2	17	-.3	-.5	.658
SK 76333	Harrington	181.6	17	-.9	-2.3	.036
SITEMEAN	SITEMEAN	179.6	17	-2.9	-1.6	.135

THE MEAN FOR THE REFERENCE VARIETY (MT981060) IS: 182.5 (N= 17)

Table 10. Plant Height (inches)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
PI533600	Haybet	29.9	18	2.9	7.1	.000
PI491534	Gallatin	28.8	18	1.8	4.3	.000
MT950186	Haxby	29.0	11	1.5	1.8	.101
PI610264	Valier	27.3	15	.9	2.0	.071
PI568246	Baronesse	26.7	18	-.3	-.7	.474
SK 76333	Harrington	27.9	18	.9	1.9	.069
SITEMEAN	SITEMEAN	27.4	18	.3	.8	.438

THE MEAN FOR THE REFERENCE VARIETY (MT981060) IS: 27.0 (N= 18)

Table 11. Protein Percent (dry weight basis)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
PI533600	Haybet	16.1	13	1.3	5.3	.000
PI491534	Gallatin	14.8	13	.0	-.0	.980
MT950186	Haxby	14.4	10	-.1	-.2	.852
PI610264	Valier	14.7	10	-.0	-.1	.940
PI568246	Baronesse	15.2	13	.4	1.6	.132
SK 76333	Harrington	15.2	13	.4	1.7	.123
SITEMEAN	SITEMEAN	14.9	13	.1	.4	.719

THE MEAN FOR THE REFERENCE VARIETY (MT981060) IS: 14.8 (N= 13)

# 1999-2002 Spring Barley MT981060 Forage Quality Summary

## Table 12. Forage Yields (tons/ acre dry matter)

### Dryland Locations

	Moccasin						Dickinson	Kalispell		Dryland
	2002	2002	2002	2002	2001	2001	2002	2002	2001	Average
Variety	SCFP	SE12a	SW3	SE12D	Fallow	Recrop	Chem Fallow	High Moisture		9 locs
Westford	1.16	1.46	1.68	1.28	2.09	1.58	1.70	2.23	1.65	1.65
Haybet	0.94	1.69	1.79	1.41	2.83	1.74	2.00	2.16	2.20	1.86
MT 981060	1.05	1.65	1.84	1.26	2.64	1.83	2.10	2.15	2.00	1.84
Isd(.05)	0.27	0.25	0.19	0.35	0.58	0.24	N.S.	0.70	0.26	***
CV%	17.02	11.55	7.17	12.24	11.83	8.66	15.3	22.90	9.00	***

### Irrigated Locations

	Bozeman						Corvallis		Irrigated	Overall
	2002	2001	2000	1999	1998	2002	2001	2002	Average	Average
Variety	Irrigated					Dry	Irrigated		8 locs	17 locs
Westford	2.96	2.51	3.76	2.03	4.01	3.17	3.82	3.91	3.27	2.41
Haybet	3.18	3.23	3.68	2.17	4.10	3.45	3.81	3.48	3.39	2.58
MT 981060	3.03	3.21	3.75	2.77	4.50	3.18	4.47	4.93	3.73	2.73
Isd(.05)	0.44	0.51	0.4 NS	0.41	0.34	0.30	0.86	0.64	***	***
CV%	10.2	11.8	7.2	12.11	4.68	6.36	13.48	9.89	***	***



1999-2002 Spring Barley MT981060 Forage Quality Summary

Table 13. Acid Detergent Fiber Content (ADF)

ADF

	Moccasin				Dickinson	Bozeman					Corvallis	Overall
	2002				2002	2002	2001	2000	1999	2002	2001	ave.
Variety	SCFP	SE12A	SW3	SE12D	Chem Fallow	Irrigated				Dry	Irrigated	11 locs
Westford	24.6	28.4	26.1	27.8	41.0	32.8	35.5	35.5	33.5	30.5	29.7	31.4
Haybet	26.4	26.2	25.3	25.2	38.0	28.4	30.3	28.8	29.2	35.6	30.7	29.5
MT 981060	25.3	26.4	24.6	25.1	38.0	30.4	33.7	33.8	30.5	31.0	24.6	29.4
Isd(.05)	---	---	---	---	2.0	11.67	3.6	1.68	2.71	n/a	4.43	---
CV%	---	---	---	---	3.6	7.7	7.9	7.5	6.09	n/a	n/a	---

**Table 14. Neutral Detergent Fiber (NDF)**

	Moccasin				Dickinson	Bozeman					Corvallis	Irr
	2002				2002	2002	2001	2000	1999	2002	2001	ave.
Variety	SCFP	SE12A	SW3	SE12D	Chem Fallow	Irrigated				Dry	Irrigated	11 locs
Westford	51.7	56.7	55.4	57.9	61.0	58.9	63.1	65.2	56.9	60.5	58.6	58.7
Haybet	54.5	52.1	53.0	51.1	57.0	54.8	54.9	58.9	52.5	59.2	59.3	55.2
MT 981060	51.5	53.6	52.2	51.5	58.0	55.3	58.0	62.6	53.1	61.2	50.2	55.2
Isd(.05)	---	---	---	---	3.0	29.13	2.3	0.82	3.58	---	4.12	
CV%	---	---	---	---	2.6	3.1	2.8	4.8	4.68	---	---	

**Table 15. Nitrate Levels (NO3)**

	Bozeman					Corvallis	Overall
	2002	2001	2000	1999	2002	2001	ave.
Variety	Irrigated				Dry	Irrigated	6 locs
Westford	0.77	0.52	2.18	1.89	1.35	1.91	1.44
Haybet	0.44	0.09	0.71	0.88	0.99	1.89	0.83
MT 981060	0.43	0.3	1.41	0.88	1.21	1.82	1.01
Isd(.05)	0.36	0.087	0.64	0.42	---	0.3	***
CV%	42.3	129.2	41.95	67.09	---	---	***

1999-2002 Spring Barley MT981060 T-paired Results

Table 16. Forage Yield (tons/acre dry matter)

FOR VARIABLE:	WESTFORD
COMPARED TO	HAYBET
DIF IN MEANS	= .1682
SE FOR DIF	= .7387E-01
0.95 LOWER LMT=	.1165E-01
0.95 UPPER LMT=	.3248
T (DF = 16)=	2.278
P-VALUE	= .0368

FOR VARIABLE:	MT981060	MT981060
COMPARED TO	HAYBET	WESTFORD
DIF IN MEANS	= -.1471	-.3153
SE FOR DIF	= .1037	.8098E-01
0.95 LOWER LMT=	-.3669	-.4870
0.95 UPPER LMT=	.7275E-01	-.1436
T (DF = 16)=	-1.418	-3.893
P-VALUE	= .1753	.0013

Table 17. Acid Detergent Fiber (ADF)

TESTS FOR EQUALITY IN PAIRS:

FOR VARIABLE: WESTFORD  
 COMPARED TO HAYBET

DIF IN MEANS	= -1.938
SE FOR DIF	= 1.039
0.95 LOWER LMT=	-4.253
0.95 UPPER LMT=	.3767
T (DF = 10)=	-1.866
P-VALUE	= .0917

FOR VARIABLE: MT981060 MT981060  
 COMPARED TO HAYBET WESTFORD

DIF IN MEANS	= .6545E-01	2.004
SE FOR DIF	= .9594	.4895
0.95 LOWER LMT=	-2.072	.9131
0.95 UPPER LMT=	2.203	3.094
T (DF = 10)=	.6823E-01	4.094
P-VALUE	= .9469	.0022

1999-2002 Spring Barley MT981060 T-paired Results

Table 18. Neutral Detergent Fiber (NDF)

FOR VARIABLE: WESTFORD  
 COMPARED TO HAYBET

-----  
 DIF IN MEANS = -3.514  
 SE FOR DIF = .9836  
 0.95 LOWER LMT= -5.705  
 0.95 UPPER LMT= -1.322  
 T (DF = 10)= -3.572  
 P-VALUE = .0051

FOR VARIABLE: MT981060 MT981060  
 COMPARED TO HAYBET WESTFORD

-----  
 DIF IN MEANS = -.3635E-02 3.510  
 SE FOR DIF = 1.060 .7696  
 0.95 LOWER LMT= -2.365 1.795  
 0.95 UPPER LMT= 2.357 5.225  
 T (DF = 10)= -.3431E-02 4.561  
 P-VALUE = .9973 .0010

Table 19. Percent Nitrate - NO<sub>3</sub>

FOR VARIABLE: WESTFORD  
 COMPARED TO HAYBET

-----  
 DIF IN MEANS = -.6033  
 SE FOR DIF = .2176  
 0.95 LOWER LMT= -1.163  
 0.95 UPPER LMT= -.4399E-01  
 T (DF = 5)= -2.772  
 P-VALUE = .0393

FOR VARIABLE: MT981060 MT981060  
 COMPARED TO HAYBET WESTFORD

-----  
 DIF IN MEANS = -.1750 .4283  
 SE FOR DIF = .1160 .1532  
 0.95 LOWER LMT= -.4732 .3462E-01  
 0.95 UPPER LMT= .1232 .8220  
 T (DF = 5)= -1.508 2.796  
 P-VALUE = .1918 .0382