

**MONTANA AGRICULTURAL EXPERIMENT STATION
RECOMMENDED BARLEY VARIETIES
FOR MONTANA BY DISTRICT**

Variety	Row Type	District					
		1	2	3	4	5	6
FEED							
Baronesse (P) +	2	DI	DI	DI	DI	DI	DI
Boulder (P) +	2	DI	DI	DI	DI	DI	DI
Calgary (P) +	2	IH	I	I	I	I	I
Eslick	2	DI	DI	DI	DI	DI	DI
Gallatin	2	DI	DI	DI	DI	DI	DI
Haxby	2	DI	DI	DI	DI	DI	DI
Lewis	2	DI	DI	DI	DI	DI	DI
Valier +	2	DI	DI	DI	DI	DI	DI
WestBred Xena (P) +	2	DI	DI	DI	DI	DI	DI
WestBred Medallion (P) +	6	IH	I	I	I	I	I
HAY							
Haybet	2	DI	DI	DI	DI	DI	DI
Hays	2	DI	DI	DI	DI	DI	DI
Stockford (P) +	2	DI	DI	DI	DI	DI	DI

(P) = Private variety

+ = "Protected" variety under the Plant Variety Protection Act

I = Irrigated

D = Dryland

H = High rainfall

**2005 American Malting Barley Association Approved Malting Barley
Varieties for Montana.**

Two-rowed Barleys

B1202	Harrington
Conlon	Merit

Six-rowed Barleys

Drummond	Morex
Excel	Robust
Foster	Stander
Legacy	Tradition

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BARLEY VARIETY PERFORMANCE SUMMARY FOR MONTANA

by

**P.F. Hensleigh, T.K. Blake, D.M. Wichman, G.R. Carlson, R.N. Stougaard, J.L. Eckhoff,
G.D. Kushnak, and K. D. Kephart**

The agronomic characteristics for barley varieties commonly grown or offered for sale in Montana are described in abbreviated form for quick reference (pages 21-23). A short paragraph on each variety follows the summary with information on development, primary strengths or weaknesses of the variety and its specific areas of adaptation. Varieties recommended for production in the respective areas are designated by an asterisk (*) on location means tables.

VARIETY TESTING PROCEDURES

The 2004 Spring Barley Intrastate Nursery was planted at 6 dryland sites: Havre, Sidney, Huntley, Moccasin, Conrad and Bozeman (high moisture conditions) and 5 irrigated sites; Sidney, Huntley, Conrad, Bozeman and Kalispell (high moisture conditions). All locations except Havre were harvested in 2004. Long term and 2004 precipitation and temperature for each location are summarized on pages 18 and 19. The data assembled herein summarize research information from intrastate yield nurseries grown by research personnel at the Montana Agricultural Research Centers. The data shown in this publication is from the years 2000 through 2004 while averages are from 1998 through 2004 .

Experimental Design and Data Collection

Varieties that are either currently recommended, widely grown, recently released, private entries (entered on a fee basis) and MSU experimental breeding lines are evaluated for agronomic performance at all locations. All entries are the same at the six dryland sites and at the five irrigated sites but some entries may not be grown in both nurseries. Nurseries are randomized separately at each location in a lattice design with three replications. Agronomic data including heading date, plant height, lodging, disease and insect symptoms is collected throughout the growing season as needed. Experimental plots are trimmed, measured and harvested with small plot combines. Grain from each plot is weighed for yield, then cleaned and test weights and plump percent are measured. Entries are also evaluated for protein at the MSU Cereal Quality Lab. Samples of potential malting varieties are sent to the USDA Cereal Crops Research Unit Malting Lab in Madison, Wisconsin, for malt quality analysis. Data is analyzed for each location, and summaries are made over years to provide data at each location. When sufficient data is collected and analyzed, promising varieties and/or lines may be submitted to the MAES Barley variety release and recommendation committee.

Data collected and units of measurements.

Yield = bushels /acre based on standard 48 lbs/bu

Test Weight = lb/bu actual based on one quart standard.

Plump Percent = seed above 6/64 x 3/4 slotted screen.

Heading Date = days from January 1.

Plant Height = inches

Protein percent = dry weight basis.

Comparable Average

The comparable average for barley is arrived at by using a pre-determined check variety (Haxby) to establish an "average check yield" -- as for example, a 7-year period. By using a comparable average, all varieties are then directly comparable to the 7-year average when three or more years of data are available. All varieties are then directly comparable to each other when in the same nursery. The more years of production data available for any particular variety, the more reliable is the "comparable average figure". Averages using less than three years data may be unreliable in predicting future performance and have been omitted from the tables.

Illustration of Formula: (Hays 3 years at Sidney-Irrigated--page 9)

Check Variety (Haxby) 7 year average = 111.9

Check Variety (Haxby):Average yield for last 3 years = 122.0

Variety (Hays) in question: Average yield for last 3 years = 100.4

$$\frac{\text{Hays yield}}{\text{Check yield}} \times 100\% \text{ or } \frac{100.4}{122.0} = 82.3\%$$

$$\frac{\text{Seven year average check yield}}{100} \times 82.3\% \text{ for Hays or } \frac{111.9 \times 82.3\%}{100} = 92.1 \text{ bu/A comparable average yield for Hays}$$

BARLEY RECOMMENDATION PROCEDURE FOLLOWED BY THE MAES

Recommendation of spring barley varieties is determined on a yearly basis by the Montana Agricultural Experiment Station (MAES) Barley Variety Release Committee. This committee is composed of one plant breeder, one cereal quality scientist, one plant pathologist, one entomologist, one weed scientist, one cropping system specialist, one representative of Foundation Seed Stocks, six Research Center agronomists, one Montana Wheat and Barley Committee member, one representative of the Montana Seed Growers Association and one MAES advisory board member.

A variety is eligible for recommendation when a minimum of 16 location-years of performance data is obtained from the MAES statewide spring barley performance trials. Test results must indicate that the variety is equal to or superior in overall merit to specified check cultivars and has end-use quality equal to or exceeding currently recommended varieties. For varieties originating from private companies, recommendation is considered at the request of the company when adequate data is available.

Recommendations of varieties are considered on a case by case basis. Yield performance of a variety is an important criteria, but test weight, plump percent, maturity, drought tolerance, grain protein content, disease and pest resistance and end-use quality data are also considered. In general, yield needs to be at least equal to currently recommended varieties in a particular district, unless the variety is being recommended for a specific purpose, such as disease resistance.

If a serious defect in the variety is identified during performance testing, the variety will not be recommended. Examples of defects resulting in non-recommendation include: high probability of low test weight, poor drought tolerance, lodging, etc. Lack of variety recommendation by MAES may occur due to a decision by the originating company not to test the variety in statewide performance trials. In this case the lack of recommendation is due to inadequate or no data rather than a specific varietal defect.

SEEDING RATE AND DATE

The following seeding rates and dates are general guidelines. The heavier seeding rate, where indicated, is applicable to plump seed of high test weight or for seed having a kernel size larger than normal for most other varieties (2-row types such as Stark or Haxby have a larger kernel than most other 2-row or 6-row type barleys). The lighter rates are for the smaller seeded varieties or when test weight is below normal for larger seeded varieties.

Crop	District ^{1/}	Pounds Per Acre		Seeding Date
		Dryland	Irrigation	
Barley - Feed	1	40-60 (11-17 seeds / sq ft)*	45-60 (13-17 seeds / sq ft)*	April or as soon as seedbed can be prepared.
Barley - Feed	2-6	45-60 (13-17 seeds / sq ft)*	80-96 (22-27 seeds / sq ft)*	April or as soon as seedbed can be prepared.
Barley - Malting	2-6	35-45 (10-13 seeds / sq ft)	80-96 (22-27 seeds / sq ft)	April or as soon as seedbed can be prepared.

^{1/} The map which appears on the cover shows the districts in the state for the purposes of reference for specific area of adaptation.

* Based on the average of 12,000 seeds per pound.

Barley seed lots may vary in the number of seeds per pound. This depends on the ratio of large-to-small seed in the seed lot. The average is approximately 12,000 seeds per pound.

Farmers who want to maintain a competitive advantage in the market should grow varieties recommended by the Montana Agricultural Experiment Station.

Plant Quality Seed

Plant only varieties adapted to the area where they have the ability to give the highest production. In areas where diseases are known to occur or cannot be controlled by seed treatments, resistant varieties should be used when available. In these instances genetic purity and variety identity is best assured with Certified classes of seed. Use approved fungicides that will control soil and seed borne diseases. Check labels on the container for control measures and proper application.

Always plant seed that is carefully cleaned and uniformly graded as to seed size. Plant large, plump, high test weight seed. It will give more uniform stands and produce a healthy, strong seedling with the potential to produce a better crop.

1998-2004 SPRING BARLEY VARIETY PERFORMANCE

District 1 Kalispell (High Moisture)

Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date (1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	149.4	7	53.2	7	87.0	7	175.2	7	35.4	6	13.8
Eslick * +	7	146.2	7	52.1	7	89.9	7	175.7	7	34.4	6	13.2
Baronesse * (P) +	7	146.5	7	52.2	7	91.0	7	177.3	7	33.9	6	13.7
Xena * (P) +	4	146.2	4	51.5	4	88.4	4	175.5	4	35.4	4	14.1
Boulder * (P) +	3	145.8	3	54.0	3	90.6	3	175.9	3	36.1	2	14.1
Valier * +	7	142.1	7	51.9	7	83.5	7	176.5	7	35.2	6	14.8
Gallatin *	7	143.2	7	52.5	7	87.9	7	173.4	7	36.5	6	13.8
Hays *	3	141.8	3	47.3	3	70.8	3	175.7	3	34.4	2	14.3
Haybet *	3	121.4	3	48.5	3	57.6	3	175.0	3	38.1	2	14.4
Calgary * (P) +	4	148.9	4	50.0	4	78.0	4	177.0	4	31.5	3	14.2
Harrington	7	144.1	7	50.5	7	83.3	7	175.9	7	35.3	6	14.0
Conlon +	4	143.2	4	52.6	4	96.6	4	170.3	4	35.8	3	13.3
Merit (P) +	7	139.6	7	50.6	7	89.8	7	176.8	7	34.7	6	14.3
Legacy (P) +	5	137.3	5	47.5	5	69.8	5	175.3	5	37.5	4	13.8
Tradition (P) +	3	156.4	3	49.3	3	90.6	3	172.7	3	38.7	2	13.3
Morex	5	127.1	5	49.4	5	80.9	5	171.1	5	41.3	5	14.6

(1) Heading Date = 180 = June 29

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	196.9	181.1	151.3	116.9	125.6	149.4	100.0	7
Eslick * +	190.7	147.6	139.2	125.0	139.5	146.2	97.9	7
Baronesse * (P) +	184.6	173.5	144.1	117.4	132.2	146.5	98.0	7
Xena * (P) +	0.0	0.0	0.0	109.3	140.4	146.2	97.9	4
Boulder * (P) +	0.0	161.9	151.4	0.0	133.8	145.8	97.6	3
Valier * +	179.0	173.6	146.4	114.2	124.2	142.1	95.2	7
Gallatin *	184.5	181.4	139.9	127.2	127.2	143.2	95.9	7
Hays *	0.0	0.0	131.1	105.8	137.0	141.8	94.9	3
Haybet *	0.0	0.0	110.3	97.9	111.7	121.4	81.2	3
Calgary * (P) +	0.0	187.3	147.2	100.0	138.6	148.9	99.7	4
Harrington	197.3	178.5	129.6	122.0	132.5	144.1	96.5	7
Conlon +	0.0	173.3	142.6	114.6	120.6	143.2	95.8	4
Merit (P) +	181.5	186.8	120.0	108.9	127.8	139.6	93.4	7
Legacy (P) +	167.6	174.1	140.9	101.6	125.1	137.3	91.9	5
Tradition(P)+	0.0	0.0	161.3	116.7	134.4	156.4	104.7	3
Morex	161.9	146.4	0.0	0	115.3	127.1	85.1	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 2 Bozeman Irrigated
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date (1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	121.3	7	54.6	7	80.7	7	181.1	7	33.7	7	12.4
Eslick * +	7	122.5	7	52.2	7	68.4	7	181.8	7	32.9	7	12.7
Baronesse * (P) +	7	122.5	7	52.6	7	73.1	7	182.2	7	31.7	7	13.1
Xena * (P) +	4	125.1	4	53.6	4	80.6	4	181.0	4	33.6	4	12.5
Boulder * (P) +	3	138.2	3	54.4	3	82.1	3	181.4	3	32.9	3	13.2
Valier * +	7	124.6	7	53.2	7	75.5	7	182.0	7	34.5	7	13.2
Gallatin *	7	116.7	7	54.0	7	73.3	7	180.4	7	34.3	7	12.8
Hays *	3	98.8	3	49.0	3	56.4	3	183.5	3	33.6	3	13.2
Haybet *	3	70.7	3	48.6	3	37.8	3	181.6	3	36.0	3	15.3
Calgary * (P) +	4	133.2	4	53.5	4	78.9	4	181.9	4	30.0	4	12.6
Harrington	7	113.7	7	51.2	7	70.9	7	181.8	7	33.7	7	13.0
Conlon +	4	118.6	4	53.8	4	82.0	4	176.9	4	32.0	4	13.3
Merit (P) +	7	118.7	7	50.8	7	76.2	7	182.2	7	33.6	7	13.0
Legacy (P) +	5	107.1	5	50.0	5	67.2	5	180.2	5	37.6	5	13.5
Tradition(P)+	3	104.9	3	52.0	3	84.4	3	179.5	3	37.6	3	13.3
Morex	5	94.8	5	51.2	5	72.0	5	177.9	5	41.3	5	13.3

(1)Heading Date = 180 = June 29

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	155.7	131.4	98.3	127.2	144.8	121.3	100.0	7
Eslick * +	150.1	131.6	100.5	128.0	148.2	122.5	101.0	7
Baronesse * (P) +	163.1	127.3	98.2	126.2	136.1	122.5	101.0	7
Xena * (P) +	0.0	0.0	0.0	132.9	147.9	125.1	103.1	4
Boulder * (P) +	0.0	146.6	123.0	0.0	157.1	138.2	114.0	3
Valier * +	161.8	139.6	98.9	122.2	145.1	124.6	102.7	7
Gallatin *	137.6	134.6	95.0	119.1	134.8	116.7	96.2	7
Hays *	0	0.0	76.5	120.7	104.2	98.8	81.4	3
Haybet *	0.0	0.0	52.7	77.9	85.3	70.7	58.3	3
Calgary * (P) +	0.0	154.6	113.9	131.4	151.1	133.2	109.8	4
Harrington	139.6	138.4	90.7	120.4	125.6	113.7	93.7	7
Conlon +	0.0	145.4	104.2	113.7	127.4	118.6	97.8	4
Merit (P) +	140.0	146.6	105.7	114.8	134.4	118.7	97.9	7
Legacy (P) +	142.2	133.8	76.3	109.3	118.8	107.1	88.3	5
Tradition(P)+	0.0	0.0	75.2	113.8	131.1	104.9	86.5	3
Morex	119.0	105.2	0	0.0	100.2	94.8	78.2	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

*** Recommended variety (P) Private + Protected variety**

1998-2004 SPRING BARLEY VARIETY PERFORMANCE

District 3 Huntley Irrigated

Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date (1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	6	141.2	6	53.6	6	91.0	6	166.6	6	36.4	6	12.1
Eslick * +	6	152.7	6	52.3	6	87.6	6	168.3	6	35.6	6	11.8
Baronesse * (P) +	6	142.3	6	51.9	6	87.7	6	169.5	6	32.7	6	11.7
Xena * (P) +	3	148.6	3	52.1	3	88.1	3	167.0	3	37.2	3	12.3
Boulder * (P) +	3	147.3	3	52.5	3	89.9	3	168.3	3	34.5	3	12.4
Valier * +	6	141.8	6	52.7	6	89.5	6	169.8	6	35.7	6	12.3
Gallatin *	6	129.7	6	52.1	6	86.0	6	164.9	6	35.5	6	12.4
Hays *	3	111.2	3	47.3	3	74.3	3	170.3	3	33.0	3	12.9
Haybet *	3	100.4	3	46.8	3	55.2	3	166.3	3	37.9	3	14.5
Calgary * (P) +	4	141.6	4	52.7	4	91.3	4	169.8	4	29.5	4	11.8
Harrington	6	127.0	6	50.3	6	84.8	6	169.8	6	36.0	6	12.2
Conlon +	4	110.5	4	51.8	4	93.9	4	161.8	4	34.8	4	13.1
Merit (P) +	6	134.7	6	50.3	6	91.5	6	169.2	6	33.8	6	12.0
Legacy (P) +	5	132.1	5	49.7	5	90.2	5	163.9	5	37.9	5	12.7
Tradition(P)+	3	130.1	3	50.3	3	90.7	3	163.4	3	36.1	3	12.7
Morex	4	124.5	4	49.9	4	88.9	4	163.8	4	40.2	4	12.9

(1)Heading Date = 165= June 13

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	120.5	163.3	164.6	133.3	138.0	141.2	100.0	6
Eslick * +	152.4	172.6	163.7	144.5	157.4	152.7	108.1	6
Baronesse * (P) +	135.3	158.4	141.6	137.4	153.7	142.3	100.7	6
Xena * (P) +	0.0	0.0	0.0	133.2	157.7	148.6	105.2	3
Boulder * (P) +	0.0	157.6	166.1	0.0	162.3	147.3	104.3	3
Valier * +	124.8	166.7	151.8	124.7	139.9	141.8	100.4	6
Gallatin *	132.6	144.7	131.9	122.1	128.1	129.7	91.9	6
Hays *	0.0	0.0	120.2	97.4	125.8	111.2	78.8	3
Haybet *	0.0	0.0	116.6	83.9	109.3	100.4	71.1	3
Calgary * (P) +	0.0	164.3	158.5	133.1	145.2	141.6	100.3	4
Harrington	130.7	131.5	135.9	124.2	129.0	127.0	90.0	6
Conlon +	0.0	160.3	116.0	111.8	80.5	110.5	78.2	4
Merit (P) +	129.4	138.2	154.8	125.5	132.9	134.7	95.4	6
Legacy (P) +	105.0	175.7	139.7	111.3	141.4	132.1	93.5	5
Tradition(P)+	0.0	0.0	135.7	119.8	146.0	130.1	92.1	3
Morex	107.8	148.8	0	0	133.5	124.5	88.1	4

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 5 Conrad Irrigated
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	108.0	7	54.7	7	93.3	6	180.5	7	33.1	7	11.8
Eslick * +	7	115.0	7	53.7	7	92.1	6	182.0	7	30.8	7	11.2
Baronesse * (P) +	7	114.5	7	52.6	7	89.7	6	181.5	7	31.2	7	11.5
Xena * (P) +	4	106.3	4	52.0	4	87.5	4	181.0	4	33.7	4	12.2
Boulder * (P) +	3	107.8	3	54.1	3	93.0	3	179.8	3	32.4	3	11.8
Valier * +	7	104.4	7	53.2	7	87.4	6	182.2	7	33.2	7	12.3
Gallatin *	7	101.5	7	53.6	7	88.1	6	178.8	7	34.1	7	11.7
Hays *	2	84.4	2	47.5	2	71.2	2	180.5	2	35.1	2	11.7
Haybet *	2	70.6	2	47.2	2	49.5	2	180.0	2	38.7	2	12.6
Calgary * (P) +	4	110.5	4	53.1	4	92.1	4	180.8	4	29.1	4	11.8
Harrington	7	95.5	7	51.0	7	88.0	6	181.7	7	31.5	7	11.7
Conlon +	4	97.6	4	53.0	4	93.8	4	177.5	4	32.0	4	11.9
Merit (P) +	7	106.3	7	49.9	7	90.7	6	181.8	7	32.3	7	11.9
Legacy (P) +	5	92.3	5	49.1	5	81.9	4	179.5	5	35.4	5	12.4
Tradition(P)+	3	98.9	3	50.6	3	92.0	3	179.2	3	33.7	3	12.0
Morex	5	75.7	5	49.6	5	80.9	4	178.5	5	36.9	5	12.8

(1)Heading Date = 180 = June 29

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	88.6	76.9	123.9	126.9	105.9	108.0	100.0	7
Eslick * +	111.1	83.0	118.4	133.8	102.6	115.0	106.5	7
Baronesse * (P) +	104.4	85.9	119.9	124.1	123.5	114.5	106.1	7
Xena * (P) +	0.0	0.0	0.0	123.1	123.8	106.3	98.4	4
Boulder * (P) +	0.0	81.2	123.0	0.0	101.9	107.8	99.8	3
Valier * +	113.1	74.7	106.0	121.6	101.3	104.4	96.7	7
Gallatin *	88.4	70.0	117.1	117.8	95.9	101.5	94.0	7
Hays *	0.0	0.0	103.4	92.7	0.0	84.4	78.2	2
Haybet *	0.0	0.0	76.9	87.2	0.0	70.6	65.4	2
Calgary * (P) +	0.0	73.8	125.9	120.1	124.3	110.5	102.4	4
Harrington	80.7	67.7	106.9	118.3	90.5	95.5	88.4	7
Conlon +	0.0	74.9	104.4	117.5	95.1	97.6	90.4	4
Merit (P) +	88.3	73.2	118.1	132.6	124.0	106.3	98.5	7
Legacy (P) +	71.4	70.2	105.3	107.8	91.9	92.3	85.5	5
Tradition(P)+	0.0	0.0	101.3	120.4	105.2	98.9	91.7	3
Morex	59.6	51	0.0	0.0	69.8	75.7	70.2	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE

District 6 Sidney Irrigated

Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	111.9	7	50.4	7	78.6	7	175.7	7	31.9	7	12.3
Eslick * +	7	109.2	7	47.9	7	72.3	7	177.5	7	31.6	7	11.9
Baronesse * (P) +	7	110.5	7	48.5	7	78.4	7	178.3	7	29.2	7	11.7
Xena * (P) +	4	110.0	4	48.0	4	79.5	4	176.3	4	30.6	4	12.3
Boulder * (P) +	3	97.2	3	50.2	3	89.4	3	176.2	3	30.2	3	12.4
Valier * +	7	105.1	7	48.7	7	70.9	7	177.9	7	31.1	7	12.6
Gallatin *	7	105.9	7	48.8	7	69.4	7	174.4	7	32.8	7	12.0
Hays *	3	92.1	3	45.2	3	58.9	3	178.1	3	31.0	3	12.4
Haybet *	3	79.5	3	43.6	3	43.5	3	175.5	3	32.8	3	13.3
Calgary * (P) +	4	104.6	4	47.1	4	75.0	4	177.3	4	25.2	4	11.9
Harrington	7	97.1	7	46.3	7	76.0	7	177.8	7	30.7	7	12.2
Conlon +	4	96.4	4	47.8	4	76.8	4	172.3	4	29.0	4	12.2
Merit (P) +	7	100.9	7	45.6	7	81.1	7	177.8	7	30.9	7	12.5
Legacy (P) +	5	107.4	5	45.6	5	76.2	5	175.4	5	32.2	5	12.1
Tradition(P)+	3	105.5	3	47.2	3	81.2	3	174.2	3	32.0	3	12.2
Morex	5	105.0	5	45.5	5	67.0	5	171.9	5	36.5	5	12.5

(1) Heading Date = 175 = June 24

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	130.6	73.2	87.3	128.3	150.5	111.9	100.0	7
Eslick * +	132.0	60.7	82.9	126.1	139.6	109.2	97.6	7
Baronesse * (P) +	133.3	64.2	77.8	137.3	135.4	110.5	98.7	7
Xena * (P) +	0.0	0.0	0.0	130.1	137.6	110.0	98.2	4
Boulder * (P) +	0.0	64.1	81.2	0.0	124.9	97.2	86.9	3
Valier * +	124.2	63.3	80.0	120.3	138.6	105.1	93.9	7
Gallatin *	115.4	64.2	85.6	119.4	143.3	105.9	94.6	7
Hays *	0.0	0.0	69.3	112.4	119.6	92.1	82.3	3
Haybet *	0.0	0.0	65.2	87.2	107.7	79.5	71.0	3
Calgary * (P) +	0.0	61.2	82.1	132.9	134.6	104.6	93.5	4
Harrington	113.6	61.9	71.0	118.8	126.2	97.1	86.8	7
Conlon +	0.0	58.6	77.1	116.7	125.9	96.4	86.1	4
Merit (P) +	113.5	53.2	77.1	121.6	138.5	100.9	90.1	7
Legacy (P) +	135.6	68.3	81.7	130.5	130.7	107.4	95.9	5
Tradition(P)+	0.0	0.0	88.2	130.8	126.1	105.5	94.3	3
Morex	125.2	79.3	0.0	0.0	121.1	105.0	93.8	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY Variety Performance

Irrigated Locations ⁽¹⁾

Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	34	125.9	34	53.3	34	86.0	33	175.9	34	34.0	33	12.5
Eslick * +	34	128.4	34	51.6	34	81.9	33	177.2	34	33.0	33	12.2
Baronesse * (P) +	34	126.8	34	51.5	34	83.9	33	177.9	34	31.7	33	12.3
Xena * (P) +	19	126.4	19	51.4	19	84.8	19	176.3	19	34.0	19	12.6
Boulder * (P) +	15	127.2	15	53.0	15	88.7	15	176.5	15	33.1	14	12.7
Valier * +	34	123.1	34	51.9	34	81.1	33	177.8	34	33.9	33	13.0
Gallatin *	34	119.1	34	52.2	34	80.8	33	174.5	34	34.6	33	12.5
Hays *	14	105.1	14	47.3	14	66.0	14	177.9	14	33.1	13	12.9
Haybet *	14	88.0	14	47.0	14	48.5	14	175.8	14	36.4	13	14.1
Calgary * (P) +	20	127.5	20	51.3	20	83.0	20	177.5	20	28.9	19	12.4
Harrington	34	115.1	34	49.9	34	80.5	33	177.5	34	33.3	33	12.6
Conlon +	20	112.7	20	51.8	20	88.4	20	171.9	20	32.6	19	12.8
Merit (P) +	34	119.6	34	49.4	34	85.7	33	177.7	34	33.0	33	12.7
Legacy (P) +	25	114.8	25	48.4	25	76.9	24	175.0	25	36.0	24	12.9
Tradition(P)+	15	118.3	15	49.9	15	87.7	15	173.9	15	35.5	14	12.7
Morex	24	105.0	24	49.1	24	77.6	23	172.7	24	39.2	24	13.2

(1) Irrigated locations: Sidney, Huntley, Conrad, Bozeman, Kalispell (high moisture).

(2) Heading Date = 175 = June 24

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 2 Bozeman Dryland
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	104.5	7.0	53.8	7	66.1	7	178.1	7	32.2	7	13.6
Eslick * +	7	104.2	7	51.0	7	54.7	7	179.0	7	31.9	7	13.9
Baronesse * (P) +	7	103.8	7	51.0	7	57.9	7	178.9	7	30.1	7	14.2
Xena * (P) +	6	102.7	6	51.1	6	60.3	6	178.1	6	31.9	6	14.6
Boulder * (P) +	3	113.2	3	53.6	3	70.6	3	178.7	3	31.3	3	14.4
Valier * +	7	98.0	7	51.7	7	52.7	7	179.4	7	32.4	7	15.2
Gallatin *	7	94.8	7	52.3	7	56.7	7	177.0	7	32.3	7	14.5
Hays *	3	101.8	3	47.8	3	47.0	3	181.6	3	31.9	3	14.1
Haybet *	3	74.0	3	48.2	3	18.7	3	178.6	3	35.8	3	14.9
Harrington	7	93.2	7	49.7	7	58.0	7	179.0	7	32.2	7	14.8
Conlon +	4	98.6	4	53.0	4	88.1	4	174.7	4	32.3	4	13.9
Merit (P) +	7	92.2	7	48.6	7	56.0	7	179.3	7	31.4	7	15.0
Legacy (P) +	5	87.6	5	47.9	5	36.7	5	178.0	5	35.6	5	14.6
Tradition(P)+	3	100.4	3.0	49.9	3	49.2	3	177.2	3	36.5	3	14.2
Morex	5	85.3	5	50.1	5	44.2	5	175.4	5	38.5	5	15.0

(1)Heading Date = 179 = June 28

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	133.3	113.1	76.9	0.1	135.6	104.5	100.0	7
Eslick * +	132.5	120.5	75.9	74.5	133.3	104.2	99.6	7
Baronesse * (P) +	129.7	117.6	68.3	80.8	134.0	103.8	99.2	7
Xena * (P) +	122.1	121.5	0.0	76.1	139.1	102.7	98.3	6
Boulder * (P) +	0.0	126.7	89.8	0.0	136.1	113.2	108.3	3
Valier * +	123.9	119.4	63.4	72.0	127.8	98.0	93.7	7
Gallatin *	122.7	100.4	57.7	72.3	125.2	94.8	90.7	7
Hays *	0.0	0.0	81.1	74.3	133.5	101.8	97.4	3
Haybet *	0.0	0.0	36.1	73.7	100.2	74.0	70.8	3
Harrington	118.7	104.5	52.6	72.1	124.8	93.2	89.2	7
Conlon +	0.0	111.5	68.7	80.8	125.3	98.6	94.3	4
Merit (P) +	112.7	110.7	64.8	61.9	119.1	92.2	88.2	7
Legacy (P) +	112.9	98.4	53.8	74.9	115.1	87.6	83.8	5
Tradition(P)+	0.0	0.0	65.4	86.0	133.5	100.4	96.1	3
Morex	115.6	79.0	0.0	0.0	113.0	85.3	81.6	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 3 Huntley Dryland
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	6	47.8	5	50.5	6	49.7	5	171.6	6	29.1	6	16.0
Eslick * +	6	46.9	5	48.6	6	50.1	5	173.0	6	27.5	6	15.7
Baronesse * (P) +	6	47.2	5	47.6	6	51.1	5	174.4	6	25.5	6	17.3
Xena * (P) +	5	45.5	4	48.5	5	49.8	5	173.1	5	28.4	5	16.9
Boulder * (P) +	3	44.9	3	48.4	3	50.5	2	174.7	3	26.4	3	15.8
Valier * +	6	44.4	5	48.8	6	46.0	5	174.3	6	27.3	5	17.7
Gallatin *	6	43.1	5	48.3	6	49.3	5	168.7	6	28.7	6	15.9
Hays *	3	35.4	3	46.1	3	42.5	2	174.1	3	27.1	3	15.2
Haybet *	3	37.7	3	45.5	3	26.3	2	168.6	3	29.5	3	16.1
Harrington	6	40.1	5	47.0	6	55.1	5	171.7	6	28.0	6	16.4
Conlon +	4	45.0	4	49.8	4	68.0	3	165.0	4	30.1	4	16.4
Merit (P) +	6	41.0	5	45.8	6	48.4	5	173.6	6	26.7	6	16.6
Legacy (P) +	5	40.9	4	44.1	5	44.0	4	165.0	5	28.2	5	16.2
Tradition(P)+	3	41.0	3	46.7	3	58.7	2	162.9	3	29.7	3	16.0
Morex	4	39.6	3	46.5	4	45.9	4	161.7	4	34.2	4	16.9

(1)Heading Date = 170 = June 19

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	33.0	47.2	26.6	61.6	53.3	47.8	100.0	6
Eslick * +	42.5	45.3	15.4	58.0	51.1	46.9	98.2	6
Baronesse * (P) +	34.4	48.2	23.1	61.7	48.0	47.2	98.8	6
Xena * (P) +	27.8	50.6	0.0	60.5	48.8	45.5	95.3	5
Boulder * (P) +	0.0	46.8	21.7	0.0	51.0	44.9	94.0	3
Valier * +	38.9	49.0	13.6	60.8	41.5	44.4	93.0	6
Gallatin *	38.6	44.3	18.5	49.1	39.8	43.1	90.3	6
Hays *	0.0	0.0	6.2	53.0	45.6	35.4	74.1	3
Haybet *	0	0.0	17.9	49.2	44.6	37.7	79.0	3
Harrington	35.3	39.3	11.6	53.5	37.2	40.1	84.1	6
Conlon +	0	45.5	37.4	51.9	43.2	45.0	94.3	4
Merit (P) +	41.6	44.4	8.7	55.4	42.4	41.0	86.0	6
Legacy (P) +	40.2	29.5	19.4	58.9	42.0	40.9	85.7	5
Tradition(P)+	0.0	0.0	23.9	52.4	45.2	41.0	85.9	3
Morex	17.9	36.1	0.0	0.0	48.0	39.6	83	4

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 4 Moccasin Dryland
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	6	66.1	6	50.9	5	56.1	6	181.6	5	29.3	6	15.2
Eslick * +	6	65.0	6	48.2	5	58.0	6	183.9	5	28.2	6	15.2
Baronesse * (P) +	6	63.4	6	46.4	5	48.2	6	185.6	5	27.1	6	15.9
Xena * (P) +	5	63.8	5	47.9	4	63.6	5	183.9	4	28.4	5	15.2
Boulder * (P) +	3	66.8	3	50.0	3	53.6	3	185.5	2	27.8	3	14.9
Valier * +	6	58.0	6	47.9	5	44.5	6	185.0	5	28.4	6	16.4
Gallatin *	6	60.0	6	48.1	5	42.8	6	180.8	5	29.7	6	15.7
Hays *	3	54.4	3	46.1	2	52.2	3	185.6	2	26.3	3	16.1
Haybet *	3	36.8	3	46.2	2	23.3	3	182.9	2	28.5	3	16.6
Harrington	6	55.4	6	45.5	5	51.4	6	184.3	5	27.9	6	16.6
Conlon +	4	61.0	4	48.9	3	81.7	4	178.1	3	29.9	4	14.8
Merit (P) +	6	54.9	6	44.4	5	37.7	6	185.1	5	27.8	6	16.6
Legacy (P) +	4	48.0	4	43.5	3	32.1	4	182.1	3	28.9	4	15.7
Tradition(P)+	3	54.3	3	47.0	2	57.0	3	182.6	2	29.2	3	14.6
Morex	4	49.6	4	44.7	4	41.8	4	179.5	3	32.9	4	16.2

(1) Heading Date = 182 = July 1

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	71.1	77.4	56.6	34.8	77.7	66.1	100.0	6
Eslick * +	75.1	73.4	53.6	32.6	74.9	65.0	98.3	6
Baronesse * (P) +	77.2	71.7	51.8	31.9	72.4	63.4	95.9	6
Xena * (P) +	66.7	75.7	0.0	28.0	78.7	63.8	96.4	5
Boulder * (P) +	0.0	81.5	52.9	0.0	79.3	66.8	101.0	3
Valier * +	67.0	69.7	42.7	24.8	71.3	58.0	87.6	6
Gallatin *	72.8	71.1	48.1	29.1	70.9	60.0	90.7	6
Hays *	0.0	0.0	49.8	20.7	68.7	54.4	82.3	3
Haybet *	0.0	0.0	38.3	9.4	46.3	36.8	55.6	3
Harrington	70.6	62.8	43.3	22.2	63.3	55.4	83.8	6
Conlon +	0.0	70.0	46.9	38.7	71.8	61.0	92.3	4
Merit (P) +	72.2	60.3	41.6	24.7	63.6	54.9	83.0	6
Legacy (P) +	0.0	48.1	45.1	27.3	58.5	48.0	72.6	4
Tradition(P)+	0.0	0.0	45.0	27.5	66.5	54.3	82.1	3
Morex	63.6	53	0	0	61.9	49.6	75	4

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 5 Conrad Dryland
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	76.4	7	53.8	7	75.9	6	180.0	7	29.9	7	13.0
Eslick * +	7	78.8	7	51.1	7	74.6	6	181.5	7	29.1	7	13.1
Baronesse * (P) +	7	77.5	7	50.3	7	77.4	6	181.3	7	27.4	7	13.2
Xena * (P) +	6	72.2	6	50.2	6	74.6	5	181.2	6	29.2	6	13.5
Boulder * (P) +	3	81.4	3	53.4	3	80.2	2	180.0	3	31.9	3	14.2
Valier * +	7	76.1	7	51.6	7	69.6	6	182.2	7	30.2	7	13.5
Gallatin *	7	73.5	7	50.4	7	67.9	6	179.8	7	30.4	7	13.6
Hays *	2	76.1	2	46.4	2	59.9	2	182.0	2	32.4	2	12.9
Haybet *	2	63.7	2	46.3	2	49.8	2	179.5	2	33.8	2	14.1
Harrington	7	69.9	7	49.4	7	76.0	6	181.7	7	29.6	7	13.5
Conlon +	4	67.2	4	50.9	4	88.6	3	177.4	4	29.4	4	13.6
Merit (P) +	7	67.8	7	47.6	7	78.6	6	181.7	7	29.0	7	13.5
Legacy (P) +	5	63.0	5	47.6	5	62.2	4	179.5	5	33.8	5	13.3
Tradition(P)+	3	76.0	3	49.3	3	72.0	3	179.7	3	33.5	3	13.5
Morex	5	59.1	5	47.8	5	51.4	4	177.5	5	34.7	5	13.4

(1)Heading Date = 180 = June 29

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	62.8	22.4	76.2	87.2	91.0	76.4	100.0	7
Eslick * +	58.8	21.4	91.3	83.0	87.2	78.8	103.1	7
Baronesse * (P) +	57.8	27.9	82.6	88.7	90.5	77.5	101.5	7
Xena * (P) +	53.1	23.3	0.0	71.7	95.5	72.2	94.5	6
Boulder * (P) +	0.0	23.5	81.8	0.0	96.6	81.4	106.5	3
Valier * +	62.9	22.5	78.9	79.8	93.3	76.1	99.7	7
Gallatin *	50.9	23.9	78.7	78.1	94.8	73.5	96.2	7
Hays *	0.0	0.0	81.5	81.2	0.0	76.1	99.6	2
Haybet *	0.0	0.0	65.7	70.7	0.0	63.7	83.4	2
Harrington	53.2	20.4	81.7	80.5	80.0	69.9	91.5	7
Conlon +	0.0	20.2	60.7	89.2	73.5	67.2	88.0	4
Merit (P) +	45.5	16.9	72.2	81.6	79.0	67.8	88.8	7
Legacy (P) +	39.9	16.0	67.2	76	81.1	63.0	82.5	5
Tradition(P)+	0.0	0.0	78.2	89.0	86	76.0	99.5	3
Morex	48.8	18.9	0.0	0.0	77.4	59.1	77.3	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 5 Havre Dryland
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	6	50.7	6	50.8	6	68.0	6	182.4	6	23.5	6	15.3
Eslick * +	6	52.7	6	48.7	6	62.5	6	185.4	6	23.1	6	15.0
Baronesse * (P) +	6	53.5	6	48.1	6	62.8	6	186.5	6	22.4	6	15.7
Xena * (P) +	5	49.6	5	48.5	5	61.6	5	186.0	5	22.8	5	16.1
Boulder * (P) +	2	56.9	2	49.3	2	70.5	2	182.6	2	23.2	2	15.3
Valier * +	6	50.2	6	49.1	6	58.9	6	186.0	6	22.4	6	16.4
Gallatin *	6	49.4	6	49.2	6	59.2	6	181.3	6	23.2	6	16.1
Hays *	2	51.9	2	45.2	2	58.0	2	181.9	2	23.0	2	15.7
Haybet *	2	34.8	2	44.9	2	36.1	2	180.5	2	24.5	2	17.0
Harrington	6	47.0	6	47.1	6	59.8	6	184.9	6	23.5	6	15.9
Conlon +	3	51.0	3	50.0	3	79.3	3	180.4	3	21.9	3	14.9
Merit (P) +	6	45.8	6	46.2	6	56.3	6	184.8	6	22.6	6	16.1
Legacy (P) +	4	42.6	4	45.3	4	60.4	4	181.2	4	22.9	4	15.3
Tradition(P)+	2	48.2	2	47.0	2	67.2	2	179.4	2	23.0	2	14.9
Morex	4	40.0	4	46.0	4	55.4	4	178.3	4	25.6	4	15.6

(1)Heading Date = 180 = June 29

Yield in bushels per acre

Pedigree	1999	2000	2001	2002	2003	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	65.9	66.0	28.9	54.6	11.6	50.7	100.0	6
Eslick * +	80.6	63.5	28.1	58.6	11.3	52.7	104.0	6
Baronesse * (P) +	85.3	62.5	32.2	56.6	14.1	53.5	105.6	6
Xena * (P) +	65.2	61.8	29.0	0.0	11.6	49.6	97.9	5
Boulder * (P) +	0.0	0.0	32.9	61.0	0.0	56.9	112.4	2
Valier * +	71.0	62.4	30.1	53.6	11.8	50.2	99.1	6
Gallatin *	63.8	65.5	31.6	54.4	11.6	49.4	97.4	6
Hays *	0.0	0	0.0	56.3	11.5	51.9	102.4	2
Haybet *	0.0	0.0	0.0	37.8	7.7	34.8	68.7	2
Harrington	71.8	53.5	31.2	53.5	12.4	47.0	92.7	6
Conlon +	0.0	0.0	30.1	55.1	10.6	51.0	100.7	3
Merit (P) +	71.9	54.9	28.5	47.8	12.0	45.8	90.4	6
Legacy (P) +	0.0	53.8	21.9	51.6	8.1	42.6	84.0	4
Tradition(P)+	0.0	0.0	0.0	54.9	8.2	48.2	95.2	2
Morex	43.1	54.6	20.7	0.0	0	40	78.9	4

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1998-2004 SPRING BARLEY VARIETY PERFORMANCE
District 6 Sidney Dryland
Overall Agronomic Summary

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(1)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	7	86.8	7	52.1	7	78.9	7	171.0	7	27.4	7	12.7
Eslick * +	7	87.5	7	49.9	7	83.1	7	172.0	7	25.8	7	12.3
Baronesse * (P) +	7	88.5	7	50.1	7	73.9	7	172.8	7	25.5	7	12.9
Xena * (P) +	6	83.7	6	49.7	6	75.7	6	173.3	6	27.1	6	12.5
Boulder * (P) +	3	82.2	3	51.5	3	85.5	3	171.8	3	27.9	3	12.9
Valier * +	7	86.3	7	50.5	7	74.9	7	173.4	7	27.0	7	13.1
Gallatin *	7	83.7	7	51.0	7	78.4	7	170.4	7	28.6	7	12.7
Hays *	3	78.5	3	46.4	3	69.2	3	172.9	3	25.8	3	13.8
Haybet *	3	76.4	3	43.9	3	17.8	3	170.3	3	28.3	3	14.2
Harrington	7	80.8	7	48.7	7	81.3	7	172.5	7	26.0	7	12.8
Conlon +	4	82.8	4	50.4	4	98.7	4	167.5	4	29.0	4	12.9
Merit (P) +	7	77.5	7	47.5	7	80.9	7	173.3	7	26.8	7	12.9
Legacy (P) +	5	82.1	5	47.0	5	77.2	5	169.2	5	29.2	5	12.9
Tradition(P)+	3	86.9	3	49.1	3	87.8	3	169.9	3	28.7	3	13.4
Morex	5	74.4	5	48.6	5	74.4	5	168.1	5	31.6	5	13.5

(1)Heading Date = 170 = June 19

Yield in bushels per acre

Pedigree	2000	2001	2002	2003	2004	Comp Avg.	% of Check	# of Yrs.
Haxby * + (Check)	86.7	78.2	51.2	86.5	110.5	86.8	100.0	7
Eslick * +	92.5	93.6	54.4	84.2	99.0	87.5	100.8	7
Baronesse * (P) +	93.3	95.5	51.2	84.5	103.0	88.5	102.0	7
Xena * (P) +	82.9	96.2	0.0	84.5	100.4	83.7	96.5	6
Boulder * (P) +	0.0	85.7	52.1	0.0	89.3	82.2	94.7	3
Valier * +	79.9	98.1	45.4	80.2	102.7	86.3	99.5	7
Gallatin *	87.4	83.4	52.4	89.8	96.1	83.7	96.4	7
Hays *	0.0	0.0	41.9	85.5	97.2	78.5	90.5	3
Haybet *	0.0	0.0	48.4	77.2	92.8	76.4	88.0	3
Harrington	84.5	83.5	49.5	74.8	102.5	80.8	93.1	7
Conlon +	0.0	85.2	51.0	79.4	95.5	82.8	95.3	4
Merit (P) +	80.1	82.9	51.1	78.2	92.6	77.5	89.2	7
Legacy (P) +	78.4	75.6	49.0	78.1	109.7	82.1	94.6	5
Tradition(P)+	0.0	0.0	54.6	91.5	102.5	86.9	100.2	3
Morex	70.0	60.8	0.0	0.0	98.8	74.4	85.8	5

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

1997-2004 SPRING BARLEY VARIETY PERFORMANCE

All Locations ⁽¹⁾

Overall Agronomic Performance

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(3)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	73	97.8	72	52.7	72	75.8	70	176.7	72	31.2	72	13.4
Eslick * +	73	99.3	72	50.6	72	72.7	70	178.2	72	30.2	72	13.2
Baronesse * (P) +	73	98.4	72	50.2	72	72.8	70	178.9	72	28.9	72	13.6
Xena * (P) +	52	96.3	51	50.3	51	74.1	51	178.0	51	30.8	52	13.8
Boulder * (P) +	32	99.5	32	52.1	32	78.6	30	177.7	31	30.5	31	13.7
Valier * +	73	94.8	72	51.0	72	69.3	70	178.9	72	30.8	71	14.2
Gallatin *	73	92.2	72	51.1	72	69.9	70	175.5	72	31.6	72	13.7
Hays *	30	84.4	30	46.9	29	60.0	29	178.9	29	30.3	29	13.8
Haybet *	30	70.3	30	46.5	29	38.0	29	176.4	29	33.1	29	14.8
Calgary * (P) +	26	98.4	26	50.6	26	72.5	25	178.6	26	26.5	25	13.5
Harrington	73	88.7	72	48.9	72	72.1	70	178.3	72	30.5	72	13.8
Conlon +	43	89.0	43	51.2	42	86.1	41	172.9	42	30.7	42	13.6
Merit (P) +	73	90.1	72	48.0	72	72.8	70	178.7	72	30.1	72	14.0
Legacy (P) +	53	86.9	52	47.2	52	64.8	50	175.5	52	32.9	52	13.8
Tradition(P)+	32	92.1	32	49.0	31	76.2	31	174.9	31	32.8	31	13.6
Morex	51	80.5	50	48.2	51	64.4	49	173.1	50	36.0	51	14.2

(1) Dryland locations: Havre, Sidney, Moccasin, Huntley, Conrad, Bozeman.

Irrigated locations: Sidney, Huntley, Conrad, Bozeman, Kalispell (high moisture).

Low Moisture Locations ⁽²⁾

Pedigree	# Yrs	Yield (bu/ac)	# Yrs	Test Wt (lb/bu)	# Yrs	Plump (%)	# Yrs	Heading Date(3)	# Yrs	Plant Ht. inches	# Yrs	Protein %
Haxby * + (Check)	25	63.8	24	51.1	24	64.1	24	176.6	24	27.2	25	14.7
Eslick * +	25	64.0	24	48.9	24	64.5	24	178.5	24	26.1	25	14.5
Baronesse * (P) +	25	64.2	24	48.2	24	60.1	24	179.7	24	25.0	25	15.3
Xena * (P) +	21	61.6	20	48.7	20	63.1	21	179.0	20	26.6	21	15.1
Boulder * (P) +	11	63.0	11	49.9	11	66.2	10	178.7	10	26.2	11	14.7
Valier * +	25	60.8	24	49.1	24	57.3	24	179.6	24	26.2	24	15.8
Gallatin *	25	60.0	24	49.2	24	58.9	24	175.4	24	27.5	25	15.0
Hays *	11	54.8	11	46.1	10	56.1	10	178.8	10	25.5	11	15.1
Haybet *	11	48.0	11	45.2	10	25.5	10	175.8	10	27.7	11	15.8
Harrington	25	56.8	24	47.1	24	63.1	24	178.4	24	26.3	25	15.3
Conlon +	15	60.5	15	49.8	14	82.7	14	172.8	14	27.9	15	14.7
Merit (P) +	25	55.7	24	46.1	24	57.6	24	179.2	24	25.9	25	15.5
Legacy (P) +	18	54.8	17	45.1	17	56.6	17	174.4	17	27.3	18	14.9
Tradition(P)+	11	58.4	11	47.5	10	69.5	10	174.2	10	27.7	11	14.7
Morex	17	51.8	16	46.5	17	56.0	17	172.0	16	31.0	17	15.5

(2) Low moisture locations: Havre, Sidney, Moccasin, Huntley.

(3) Heading Date = 177 = June 26

Check Variety = Haxby, all varieties are directly comparable based on Haxby (see page3)

* Recommended variety (P) Private + Protected variety

Long term averages and September 2003 to August 2004 monthly precipitation for the Montana Agricultural Research Centers.

Locality Years	Sept '03	Oct '03	Nov '03	Dec '03	Jan '04	Feb '04	Mar '04	Apr '04	May '04	June '04	July '04	Aug '04	Total
Havre 2004	1.37	0.56	0.28	0.64	0.92	0.18	0.16	1.07	4.36	2.13	1.08	1.68	14.43
Havre (1916-2004)	1.16	0.66	0.42	0.45	0.44	0.32	0.55	0.97	1.81	2.59	1.49	1.24	12.10
Sidney Irrigated	1.08	0.39	0.78	1.20	0.20	0.21	0.29	2.10	1.77	1.21	1.08	1.17	11.48
Sidney Dryland	0.44	0.39	0.78	1.20	0.20	0.21	0.29	1.92	2.56	2.19	3.05	1.19	14.42
Sidney (1958-2004)	0.87	0.50	0.43	0.42	0.36	0.53	1.10	1.96	2.84	2.11	1.43	1.28	13.83
Huntley 2004	0.20	1.49	0.37	0.59	0.21	0.85	0.14	1.01	0.90	1.95	1.63	0.09	9.43
Huntley (1911-2004)	1.29	1.02	0.63	0.59	0.56	0.45	0.79	1.32	2.08	2.38	1.13	0.94	13.16
Conrad 2004	1.07	1.15	0.25	0.17	0.25	0.03	0.08	0.53	2.99	1.83	0.58	1.99	10.86
Conrad (1984-2004)	1.08	0.54	0.35	0.16	0.1	0.24	0.44	0.89	1.83	2.84	1.47	1.30	11.30
Moccasin 2004	1.30	0.99	0.25	1.71	0.61	0.47	0.57	0.94	2.52	2.00	0.97	1.15	13.48
Moccasin (1909-2004)	1.41	0.87	0.57	0.56	0.57	0.46	0.72	1.17	2.52	3.17	1.73	1.61	15.36
Bozeman 2004	0.08	0.66	0.29	0.86	0.26	1.09	0.70	1.46	2.62	2.25	1.49	1.60	13.36
Bozeman (1958-2004)	1.50	1.33	0.91	0.57	0.57	0.51	1.05	1.55	2.63	2.68	1.39	1.27	15.96
Kalispell 2004	2.56	1.29	0.59	1.04	2.02	0.42	0.57	2.23	1.97	1.31	1.24	3.60	18.84
Kalispell (1949-2004)	1.55	1.35	1.52	1.58	1.47	1.16	1.20	1.55	2.30	2.89	1.56	1.51	19.65

Long term averages and September 2003 to August 2004 monthly temperatures for the Montana Agricultural Research Centers.

Locality Years	Sept '03	Oct '03	Nov '03	Dec '03	Jan '04	Feb '04	Mar '04	Apr '04	May '04	June '04	July '04	Aug '04	Ave
Havre 2004	56.6	50.6	22.2	25.3	12.6	18.9	38.7	47.6	49.9	58.5	69.8	65.7	43.0
Havre (1916-2004)	56.7	46.3	30.2	19.8	15.3	20.1	30.1	44.1	54.7	62.5	69.8	68.0	43.1
Sidney 2004	61.2	52.1	21.7	24.5	9.4	17.9	37.8	48.1	54.0	61.3	70.9	66.1	43.8
Sidney (1949-2004)	57.5	45.9	29.7	18.1	12.0	19.7	29.9	44.4	56.0	64.4	69.7	68.5	43.0
Huntley 2004	57.4	51.8	27.9	27.8	18.1	28.6	42.0	48.7	52.8	60.0	70.1	66.2	46.0
Huntley (1911-2004)	58.2	47.3	33.7	24.2	20.5	25.6	33.8	45.4	54.9	63.2	70.6	68.9	45.5
Conrad 2004	55.9	49.2	25.4	28.5	18.0	26.8	36.7	45.8	47.3	56.2	66.2	64.0	43.3
Conrad (1984-2004)	57.4	45.4	31.8	24.9	23.0	24.7	33.3	43.8	52.4	59.9	66.5	66.4	44.1
Moccasin 2004	55.5	50.1	26.5	28.1	20.0	27.9	38.5	45.2	47.0	54.4	66.0	63.5	43.6
Moccasin (1911-2004)	54.6	44.8	32.7	25.0	21.2	24.5	30.1	40.8	50.1	57.9	65.6	64.8	42.7
Bozeman 2004	55.8	49.1	27.4	26.7	21.4	27.6	40.2	47.3	50.7	57.5	67.6	63.0	44.5
Bozeman (1958-2004)	55.3	45.2	31.3	23.7	22.1	26.9	33.2	42.4	51.3	58.8	65.4	64.6	43.4
Kalispell 2004	55.5	46.3	27.3	24.2	21.1	27.	39.5	45.1	51.0	57.3	66.0	64.0	43.7
Kalispell (1949-2004)	53.7	42.9	32.5	25.5	22.7	27.6	33.8	43.2	51.6	58.1	64.1	62.1	43.2

2004 AGRONOMIC AND SEED CHARACTERISTICS FOR SPRING FEED AND HAY BARLEYS IN MONTANA

Variety	Released by	Year Released	Plant Height	Maturity	Awn Type	Rachilla Hair*	Row Type	P.V.P. Status**
B1202	Busch Agricultural	1989	Medium	Medium	Rough	L	2	PVP-TITLE V
Baronesse	Germany	1988	Medium-Short	Medium	Rough	L	2	PVP
Boulder	Western Plant Breeders	2005	Medium	Medium	---	---	2	PVP-(Pending)
Calgary	Arizona Plant Breeders	2002	Short	Medium	---	S	2	PVP-(Pending)
Eslick	Montana	2002	Medium	Medium	Rough	L	2	PVP-TITLE V (Pending)
Gallatin	USDA-Montana-Idaho	1987	Medium	Medium	Rough	S	2	None
Harrington	Canada	1981	Medium	Medium	Rough	L	2	None
Haxby	MSU	2002	Medium	Medium	Semi-Smooth	L	2	----
Lewis	USDA-Montana	1985	Medium	Medium	Rough	L	2	None
Medallion	Western Plant Breeders	1990	Medium-Short	Medium-Late	Rough	L	6	PVP
Merit	Busch Agricultural	1999	Medium	Medium-Late	Rough	L	2	PVP-(TITLE V)
Moravian 37	Coors Brewing Company	2000	Medium-Short	Medium-Late	Rough	L	2	PVP-(Pending)
Morex	Minnesota	1978	Medium-Tall	Early	Smooth	S	6	None
Tradition	Busch Agricultural	---	Medium	Early	Semi-Smooth	L	6	PVP-(Pending)
Valier	Montana	1999	Medium	Medium	Rough	L	2	PVP-(TITLE V)
Xena	Western Plant Breeders	1999	Medium	Medium	Semi-Smooth	L	2	PVP-(Pending)
Hay or Forage Barleys								
Hays	MSU	2003	Medium-Short	Medium	Hooded	---	2	PVP- (Contemplated)
Haybet	MSU	1989	Medium	Early	Hooded	---	2	None
Stockford	Western Plant Breeders	2005	Medium	Early	Hooded	---	2	PVP-(Pending)

*S =Short, L = Long

** Variety registration status under U.S. Plant Variety Protection Act.

ADDITIONAL DESCRIPTIVE INFORMATION FOR BARLEY VARIETIES

B1202 - “BA1202 is a two-rowed malt barley developed from the cross of RPB70-268/2B75-1223//Klages by Busch Agricultural Resources, Inc. The awn on the lemma is long and rough. Rachilla, rachis and glume hairs are all long. The glume awns are equal in length to the glume and glumes are completely covered with hair. The hull is adhered and slightly to semi-wrinkled. Aleurone is colorless. B1202 is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed.

BARONESSE - Developed in Germany from the cross of 5238.8/74 X 754465 and tested in cooperation with Montana State University . Baronesse is a two-rowed, rough-awned spring barley that is medium-short in height and medium in maturity. This variety is merchandised in the western United States by WestBred, LLC. Baronesse is protected under the Plant Variety Protection Act.

BOULDER - “Boulder” is a two-rowed, spring feed barley developed by WestBred, LLC from crossing Baronesse onto a composite cross for diverse cytoplasm’s. This initial composite cross was developed by crossing 400 diverse accessions from the World Collection of Barley’s, as the female parents, with F1 plants that were heterozygous for the male sterile genes, msg1 and/or msg2. Boulder is a high yielding barley with excellent test weight. Boulder is approximately one day later than Haxby and one day earlier than Baronesse. Plant Variety Protection is being applied for.

CALGARY - A two rowed feed barley developed by Serasem in France. The pedigree is (Dominique x Blenheim) x (Barleta x Chapka). Calgary has short rachilla hairs, white aleurone with semi-erect heads. Calgary will be marketed in the U.S. by Arizona Plant Breeders. Calgary has good yields and lodging tolerance under irrigated conditions in Montana trials. Plant Variety Protection is being applied for.

CONLON – A two-rowed malting barley developed by North Dakota Agricultural Experiment Station and released in 1996. Conlon was selected from the cross Bowman*2/Brigitta mutant//ND10232 made in 1988. F3 selection was made in 1990 and was tested as ND 13299. Conlon has been accepted for malting in Montana by the American Malting Barley Association.

Conlon is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed.

GALLATIN - Developed from the cross of Summit/Hector cooperatively by the Agricultural Research Service, USDA, and the Montana Agricultural Experiment Station. It was released jointly by the Agricultural Research Service, USDA, and the Montana and Idaho Agricultural Experiment Stations. Gallatin is a two-rowed, rough-awned, spring barley. The spike is mid-long, mid-lax and semi-nodding prior to maturity, but nodding at maturity. The awn glumes are equal to the length of the hair-covered glume. The rachis is edged with hairs. The kernels are mid-sized, with short rachilla hairs.

HARRINGTON - A two-rowed malting barley variety developed by the University of Saskatchewan from the cross of Klages/3/Gazelle/Betzes//Centennial selection. It was released through the SeCan Association. It is susceptible to leaf diseases (net blotch, scald), stem rust, and loose smut. It has a long, rough awn and a white aleurone. It has a tendency for kernel skinning unless carefully threshed. This variety has been accepted for malting in Montana by the American Malting Barley Association.

ADDITIONAL DESCRIPTIVE INFORMATION FOR BARLEY VARIETIES (continued)

HAXBY - Haxby is a two-rowed feed barley developed by Montana State University and released in 2003. The cross between MT860756 (Gallatin / Bellona) and MT83533 (Clark / Lamont) was made in 1990 and Haxby was tested as MT950186 in Montana trials from 1995-2002. Haxby has had high test weights under dryland and irrigated trials in Montana. It should be adapted to dryland and higher moisture areas in Montana and the Northern Great Plains.

HAYBET- Haybet is a two-rowed, white-kerneled barley developed and released by USDA-ARS and Montana Agricultural Research Center in 1989. The initial cross of 'Betzes*7/'Stripe Tease' was made in 1960 and hooded progeny were utilized in all backcrosses to Betzes. Haybet is taller than and similar to Gallatin in maturity.

HAYS - Hays is a two-rowed, hooded barley developed by Montana Agricultural Research Center and released in 2003 as a hay barley. Hays was derived from a cross of Haybet/Baronesse made in 1993. Hays was tested in grain and forage trials from 1998 to 2004 as MT981060. Forage yields were similar to Haybet and higher than Westford over 17 forage trials. Grain yields were higher than Haybet and similar to Harrington while test weights have been similar to Haybet. Hays is approximately three inches shorter and two days later in heading than Haybet. Plant Variety Protection is contemplated.

LEGACY- Legacy is a six rowed malting barley developed by Busch Agricultural Resources, Inc. In 1989 the cross of 6B86-3517/Excel was made and selection as an F4 head row was made in 1992. Legacy is moderately susceptible to leaf and stem rust and moderately resistant to net blotch. Legacy was similar in maturity and slightly taller than Gallatin over all Montana intrastate locations. Legacy has been accepted for malting in Montana by the American Malting Barley Association. Legacy is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed.

MEDALLION - Medallion was developed by Western Plant Breeders. Medallion is a short semi-dwarf six rowed awned barley with blue aleurone. It has very good straw strength and is best suited to irrigated and high moisture conditions. Medallion is protected under the Plant Variety Protection Act.

MERIT- Developed by Busch Agricultural Resources and released for malt production in 1998. Merit is medium in plant height and medium late in maturity. It has a nodding head type with rough awns. Glume length is one half the length of the kernel with glume hairs confined to a band. Seed is finely wrinkled with wax present. The aleurone is colorless. Merit is resistant to net blotch and moderately resistant to scald. It has not been tested for any other plant disease, or insect resistance. Merit is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed.

MOREX - Developed from the cross of Cree/Bonanza by the Minnesota Agricultural Experiment Station and released in 1978. Morex is a six-rowed, smooth awned variety. The spike is semi-erect and medium long. Under some conditions the straw of Morex tends to break off prior to maturity, and kernel shattering and rachis breaking occur; therefore, Morex probably should be swathed prior to harvest. It is resistant to stem rust and loose smut, and moderately resistant to spot blotch. Morex has been accepted as a malting barley for production in Montana by the American Malting Barley Association.

ADDITIONAL DESCRIPTIVE INFORMATION FOR BARLEY VARIETIES (continued)

TRADITION - 'Tradition' is a six-rowed malt barley developed by Busch Agricultural Resources Inc. from the cross of 6B89-2126 / ND10981 made in 1992. Tradition was evaluated in Montana trials from 2002 to 2004 under the line designation 6B95-2482. Tradition is approximately 1 day later than Morex and 2 days earlier than Robust in maturity. Tradition is pending approval as a six-row spring malting barley. Title V Plant Variety Protection has been applied for.

VALIER - Developed by Montana State University from a cross of Lewis / Baronesse and released in 1999. Valier is a two-rowed, white aleurone, mid-season maturity, feed barley. The spike has long rough awns equal to the length of the hair-covered glume. Kernels have adhering, finely wrinkled hulls and long rachilla hairs. Valier retains sterile lateral florets. Valier is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed.

XENA - Developed from a Stark/ Baronesse cross by Western Plant Breeders. Xena is a two rowed standard height hulled spring feed barley, with mid-season maturity. Stem has waxy coating, closed collar, and the neck is straight. The head is semi-erect, strapped shaped, slightly waxy, and semi-nodding at maturity. Glume length is more than half the length of lemma and is covered with short hairs. The lemma has long rough awns and the rachilla hairs are long. Seed is mid-long, wrinkled with white aleurone. Lateral florets are extremely reduced in size. Xena is protected under the Plant Variety Protection Act.

PLANT VARIETY PROTECTION (PVP)

The developer of a new distinct variety may obtain protection (essentially a patent) for that variety if he/she chooses to do so, provided the variety meets the requirements of the Plant Variety Protection Act of 1970. This Act permits the owner or developer of a variety to prohibit others from selling, sexually multiplying, using for propagation for seed, or using to produce a hybrid, seed of his variety.

Two options, for plant variety protection, are available to the developer of the variety. Under the first option, the developer of the variety or his/her agent may sell either certified or uncertified seed of the variety. If the developer of the variety has reason to believe that anyone is infringing on his/her rights, he/she may resort to civil action.

The other option ("certification option") for protecting a variety utilizes the provision of Title V of the Federal Seed Act. A variety protected in this manner may be sold by variety name only as a class of certified seed.

It is the responsibility of the seller to inform the buyer if the variety is protected. Each container of seed sold should be labeled with a tag indicating the type of protection which the owner has. Under the first option, the label will state: "Unauthorized Propagation Prohibited - U.S. Protected Variety."

If the owner of the variety has chosen the other option for variety protection, the label will state, "Unauthorized Propagation Prohibited - To be Sold by Variety Name Only as a Class of Certified Seed - U.S. Protected Variety."

PLEASE NOTE: Varieties protected under the 1994 PVP act no longer can be sold without permission of the variety owner (the farmer exemption has been excluded)'

A complete listing of all protected varieties is available in the "Official Journal of the Plant Variety Protection Office" which may be obtained upon request from:

**Plant Variety Protection Office
Warehouse Division, AMS
U.S. Dept. of Agriculture
National Agricultural Library
Beltsville, MD 20705
Phone: (301) 504-5518
Internet: <http://www.ams.usda.gov/science/pvpo/pvpindex.htm>**

Publication prepared by:

**Mr. Patrick Hensleigh, Research Associate in Agronomy, Plant Sciences and Plant Pathology Dept.
Montana State University, Bozeman, Montana**

**Dr. Tom Blake, Professor, Plant Sciences and Plant Pathology Dept, Montana State University,
Bozeman, Montana**

**Mr. Gregg Carlson, Associate Professor of Agronomy, Northern Agricultural Research Center, Havre,
Montana.**

**Dr. Joyce Eckhoff, Associate Professor of Agronomy, Eastern Agricultural Research Center, Sidney,
Montana.**

**Dr. Ken Kephart, Superintendent & Associate Professor of Agronomy, Southern Agricultural Research
Center. Huntley, Montana.**

**Dr. Gregory D. Kushnak, Superintendent and Associate Professor of Agronomy, Western Triangle
Research Center, Conrad, Montana.**

**Dr. Robert Stougaard, Associate Professor of Weed Science, Northwestern Agricultural Research
Center, Kalispell, Montana.**

**Mr. Dave Wichman, Superintendent and Assistant Professor of Agronomy, Central Agricultural
Research Center, Moccasin, Montana.**

**Mr. Ron Larson, Manager, Montana Seed Growers Association, Montana State University, Bozeman,
Montana.**

**Ms. Deanna Nash, Cereal Quality Lab Manager, Plant Sciences and Plant Pathology Dept, Montana
State University, Bozeman, Montana.**