

Table 1. Agronomic trait means of the 2011-2012 Winter Malting Barley Trial (WMBT)<sup>a</sup> at 11 locations.

Trial location	Winter Survival (%)	Yield (Bu/A)	Heading date (Julian day)	Height (cm)	Lodging degree (0-9)	Lodging incidence (%)	Straw breakage (%)	Test Weight (lb/Bu)	Grain Protein-breeder measure (%)	Plump-breeder measure (%)	Thin grain (%)	BYDV susceptibility (0-9)	Leaf Rust susceptibility (0-9)	Leaf Scald reaction (0-9)	Net blotch (net form) reaction (0-9)	Powdery Mildew susceptibility (0-9)	Stripe Rust infection (0-9)
Aberdeen, ID	.	101.0	138.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Filer, ID	.	132.5	138.0	71.5	0.4	.	.	.	.	.	.	.	.	.	.	.	.
Saint Paul, MN	62.0	56.1	143.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carrington, ND	12.9	11.4	.	.	.	.	.	44.4	.	79.5	3.7	.	.	.	.	.	.
Mead, NE	.	60.2	120.4	68.5	.	.	.	.	.	.	.	.	.	.	.	.	.
Ithaca, NY	79.6	111.3	136.9	95.2	3.7	.	.	61.2	.	.	.	.	.	1.7	.	3.2	.
Corvallis, OR	.	106.8	122.0	110.2	.	69.6	50.4	49.3	10.3	75.4	11.5	.	.	4.2	.	.	1.6
Logan, UT	.	155.1	143.2	68.1	0.0	.	.	52.5	.	.	3.1	.	.	.	.	.	.
Blacksburg, VA	.	76.5	101.1	73.7	1.2	.	.	40.6	.	.	.	5.6	2.1	.	3.6	.	.
Warsaw, VA	.	123.4	99.2	75.9	0.6	.	.	45.6	.	.	.	2.3	1.6	.	2.4	2.9	.
Pullman, WA	99.8	113.0	149.3	89.3	.	.	.	51.5	12.3	92.0	3.5	.	.	.	.	.	.
GRAND MEAN	63.6	95.2	129.1	81.6	1.2	69.6	50.4	49.4	11.3	82.3	5.4	4.0	1.9	2.9	3.0	3.0	1.6

<sup>a</sup> Agronomic data reported for 11 of 14 locations planted

Table 2. Malt quality<sup>a</sup> trait means of the 2011-2012 Winter Malting Barley Trial (WMBT)<sup>b</sup> at 10 locations.

Trial location	Kernel weight (mg)	Plump grains (%)	Malt extract (%)	Grain Protein (%)	Wort Protein (%)	S/T (%)	Diastatic Power °ASBC	Alpha Amylase (20°DU)	Beta Glucan (ppm)	Free Amino Nitrogen (ppm)	Grain color (°ASBC)	Wort color (°ASBC)	Wort clarity (1-3)
Aberdeen, ID	37.8	95.6	80.4	10.7	4.2	41.9	86.1	57.2	271.5	142.5	55.6	2.1	1.6
Filer, ID	43.5	97.1	80.6	10.1	4.2	43.2	96.2	51.3	241.5	135.7	75.6	2.1	1.7
Saint Paul, MN	36.2	85.4	75.5	16.5	6.2	38.5	156.3	71.3	264.1	252.3	39.9	2.3	1.3
Mead, NE	34.4	88.7	73.4	17.2	5.4	32.5	146.3	57.4	293.9	191.3	33.3	2.1	1.5
Ithaca, NY	33.9	88.4	79.0	11.3	4.5	42.1	115.9	63.9	293.6	170.4	38.9	1.9	1.3
Corvallis, OR	31.9	79.9	79.9	10.7	4.7	46.7	126.4	70.7	190.1	175.1	31.5	2.3	1.3
Logan, UT	40.3	92.9	76.4	14.0	4.5	33.2	136.1	59.7	202.0	156.7	61.5	1.8	1.4
Blacksburg, VA	36.3	90.2	78.1	12.2	4.4	38.3	122.0	65.3	185.4	164.1	27.5	2.0	1.1
Warsaw, VA	29.4	73.3	74.8	14.1	5.2	38.2	157.8	74.8	161.0	189.9	27.0	2.6	1.1
Sturgeon Bay, WI	29.1	60.6	72.5	15.7	4.8	31.2	129.4	60.0	190.2	162.4	52.2	1.9	1.2
GRAND MEAN	35.3	85.2	77.0	13.3	4.8	38.5	126.6	62.8	233.5	173.4	44.6	2.2	1.4

<sup>a</sup> Malt quality data courtesy of the USDA-ARS Cereal Crops Research Unit, Madison, WI

<sup>b</sup> Malt quality data reported for 10 of 14 locations planted

Table 3. Winter Survival (%) line means for 2011-2012 Winter Malting Barley Trial (WMBT) entries at four locations.

Line	Line Mean	Saint Paul, MN	Carrington, ND	Ithaca, NY	Pullman, WA
CHARLES	54.9	40.0	6.7	73.0	100.0
STRIDER	67.2	73.3	12.3	83.0	100.0
MCGREGOR	69.1	76.7	6.7	93.0	100.0
MAJA	69.1	73.3	15.0	88.0	100.0
OR76	69.1	83.3	20.0	73.0	100.0
OR818	70.8	73.3	22.7	87.0	100.0
LCS_SATURN	67.4	63.3	28.3	78.0	100.0
10467P2	65.9	66.7	10.0	87.0	100.0
10467R2	70.0	70.0	20.0	90.0	100.0
10467R4	70.8	73.3	17.7	92.0	100.0
02AB431	53.0	40.0	5.0	67.0	100.0
02AB671	58.5	40.0	14.0	80.0	100.0
02AB669	56.8	53.3	11.7	62.0	100.0
2AB08-X05W061-208	57.0	56.7	8.3	63.0	100.0
AC03x220x158	67.0	76.7	8.3	83.0	100.0
AC04x153x2	64.9	70.0	6.7	83.0	100.0
AC04x002x23	60.8	36.7	16.7	90.0	100.0
AC04x028x36	58.2	63.3	9.3	60.0	100.0
THOROUGHbred	70.0	73.3	16.7	90.0	100.0
VA09B-29	50.8	16.7	6.7	80.0	100.0
VA09B-34	62.8	46.7	16.7	88.0	100.0
VA10B-43	66.8	86.7	7.7	73.0	100.0
KWS_SCALA	56.1	53.3	7.7	70.0	93.3
MYSTIC	65.8	63.3	15.0	85.0	100.0
SALAMANDRE	65.5	63.3	16.7	82.0	100.0
ETINCEL	71.9	86.7	20.0	81.0	100.0
TEPEE	63.7	76.7	8.3	70.0	100.0
SY209-72	55.9	40.0	6.7	77.0	100.0
GRAND MEAN	63.6	62.0	12.9	79.6	99.8

Table 4. Yield (Bu/A) line means for 2011-2012 Winter Malting Barley Trial (WMBT) entries at 11 locations.

	Line Mean	Aberdeen, ID	Filer, ID	Saint Paul, MN	Carrington, ND	Mead, NE	Ithaca, NY	Corvallis, OR	Logan, UT	Blacksburg, VA	Warsaw, VA	Pullman, WA
CHARLES	78.9	88.9	124.3	34.7	7.0	36.8	81.8	68.2	158.3	50.4	95.8	122.0
STRIDER	91.0	119.8	154.6	42.7	10.3	50.0	117.1	81.6	159.0	49.7	97.1	119.3
MCGREGOR	109.6	108.9	110.0	80.5	7.0	101.5	124.3	110.7	171.8	124.6	160.1	106.0
MAJA	86.8	110.4	135.8	61.0	12.5	60.7	73.9	80.9	171.7	51.8	91.8	104.2
OR76	95.6	90.2	128.9	83.3	20.3	70.2	91.4	132.9	158.3	58.8	105.4	112.2
OR818	97.9	121.5	148.7	66.4	23.3	57.3	96.3	103.5	167.2	70.1	102.8	119.2
LCS_SATURN	103.5	114.6	128.3	49.3	28.4	43.1	142.5	156.3	166.6	56.0	141.7	111.9
10467P2	101.3	89.8	123.1	67.5	8.9	63.0	136.7	155.5	166.2	56.8	116.2	131.1
10467R2	104.7	88.5	125.0	82.3	20.7	54.8	137.8	130.6	150.4	94.9	141.2	125.3
10467R4	103.7	93.2	110.4	90.2	10.8	72.4	134.3	123.6	157.6	86.7	141.1	120.9
02AB431	82.5	113.3	152.3	19.7	3.9	49.0	82.7	67.5	149.0	45.1	110.4	114.3
02AB671	82.0	91.3	155.1	23.0	10.8	50.7	102.4	76.2	151.9	30.9	99.0	110.3
02AB669	88.4	116.2	161.4	19.3	10.2	55.2	94.6	83.4	151.9	55.4	102.5	121.9
2AB08-X05W061-208	80.0	115.5	166.7	25.3	7.9	44.1	74.7	68.5	158.4	27.0	78.7	113.4
AC03x220x158	107.7	114.0	139.1	56.3	7.6	70.2	132.4	150.6	160.6	90.9	143.3	120.2
AC04x153x2	99.6	107.1	134.1	49.6	3.3	61.2	124.5	128.0	147.9	91.7	129.7	118.7
AC04x002x23	95.8	102.2	107.9	33.7	10.5	73.0	108.9	122.2	166.7	70.3	129.6	129.5
AC04x028x36	85.5	97.0	132.2	26.4	9.2	30.8	99.3	142.6	133.3	71.0	93.6	104.8
THOROUGHbred	103.4	80.7	102.0	133.5	19.1	108.1	104.0	70.5	148.6	128.7	146.2	96.5
VA09B-29	91.7	84.3	110.7	42.8	2.9	83.8	96.7	64.7	152.3	111.0	148.7	110.2
VA09B-34	94.9	61.6	91.0	71.8	10.6	83.5	119.9	76.3	149.7	131.8	145.9	102.1
VA10B-43	100.5	93.6	116.1	103.1	7.5	60.2	112.7	91.1	117.1	136.7	166.7	100.8
KWS_SCALA	93.7	105.7	135.3	24.0	7.7	43.7	123.8	119.2	153.6	90.9	121.9	104.4
MYSTIC	84.4	80.1	109.0	45.2	10.9	49.7	114.3	116.2	132.3	48.9	119.7	101.9
SALAMANDRE	92.8	91.6	140.6	43.3	13.3	48.2	109.7	105.7	156.4	68.1	129.8	113.5
ETINCEL	121.1	108.5	198.7	127.6	18.6	60.5	137.4	121.8	171.3	119.4	168.1	100.0
TEPEE	93.7	112.7	125.6	41.8	6.5	40.5	121.1	136.6	156.7	69.5	107.9	111.8
SY209-72	95.1	126.4	144.3	27.6	8.1	63.6	120.8	105.4	157.9	54.5	120.1	117.4
GRAND MEAN	95.2	101.0	132.5	56.1	11.4	60.2	111.3	106.8	155.1	76.5	123.4	113.0

Table 5. Agronomic trait line means for 2011-2012 Winter Malting Barley Trial (WMBT) entries.

Line	Winter Survival (%)	Yield (Bu/A)	Heading date (Julian day)	Height (cm)	Lodging degree (0-9)	Lodging incidence (%)	Straw breakage (%)	Test weight (lb/Bu)	Grain Protein-breeder measure (%)	Plump-breeder measure (%)	Thin grain (%)	BYDV susceptibility (0-9)	Leaf Rust susceptibility (0-9)	Leaf Scald reaction (0-9)	Net blotch (net form) reaction (0-9)	Powdery Mildew susceptibility (0-9)	Stripe Rust infection (0-9)
CHARLES	54.9	78.9	127.5	73.1	2.2	96	90	44.9	11.5	86.9	4.2	4.5	6.0	5.0	3.2	2.0	.
STRIDER	67.2	91.0	129.9	81.4	0.8	88	70	47.3	10.6	75.0	7.8	6.5	1.5	2.5	3.5	2.3	0
MCGREGOR	69.1	109.6	127.1	84.0	1.8	60	58	49.4	11.7	84.6	3.4	0.7	0.5	2.2	0.8	2.9	1
MAJA	69.1	86.8	128.4	81.4	2.0	91	98	47.6	11.2	60.0	17.7	5.0	5.0	4.0	2.8	5.6	0
OR76	69.1	95.6	124.9	91.5	2.0	57	53	48.9	11.7	85.7	3.0	3.3	4.0	4.8	2.7	5.3	0
OR818	70.8	97.9	128.9	83.0	1.2	90	53	47.9	10.5	77.1	6.6	3.3	3.7	6.0	2.3	5.7	1
LCS_SATURN	67.4	103.5	131.1	77.9	0.7	20	10	47.9	11.2	88.9	3.1	4.0	1.0	1.5	3.2	1.3	0
10467P2	65.9	101.3	128.3	76.8	0.7	23	18	49.4	11.2	85.7	3.3	4.8	0.7	2.7	3.2	3.0	2
10467R2	70.0	104.7	128.2	83.4	0.6	60	38	51.3	10.4	90.7	2.0	3.7	0.5	1.8	2.8	2.2	1
10467R4	70.8	103.7	128.5	78.5	1.0	70	37	50.5	10.0	89.9	2.3	4.8	0.7	2.8	4.2	1.6	0
02AB431	53.0	82.5	129.9	86.1	1.6	98	62	49.4	10.9	84.7	3.8	4.8	3.3	5.5	2.7	5.5	1
02AB671	58.5	82.0	132.8	84.3	1.8	97	32	48.0	10.6	85.8	4.9	5.3	3.8	4.7	3.2	4.3	1
02AB669	56.8	88.4	131.3	87.1	0.8	95	85	49.4	10.6	86.6	4.6	4.3	4.3	5.5	2.7	6.4	1
2AB08-X05W061-208	57.0	80.0	136.4	74.8	1.3	100	67	45.2	11.0	74.4	7.9	7.5	4.0	4.7	2.2	6.0	1
AC03x220x158	67.0	107.7	132.2	85.1	0.6	40	47	48.9	11.1	90.5	3.2	3.8	0.5	1.0	3.0	2.0	1
AC04x153x2	64.9	99.6	132.4	90.4	0.4	93	77	52.0	11.7	93.9	1.9	4.5	0.7	1.0	3.7	1.8	1
AC04x002x23	60.8	95.8	127.6	78.3	1.6	83	53	48.1	11.8	70.4	8.7	3.8	0.7	1.3	4.7	1.7	0
AC04x028x36	58.2	85.5	130.5	79.1	0.4	7	10	50.4	12.5	95.2	1.4	6.0	0.7	1.3	2.5	1.6	2
THOROUGHBRED	70.0	103.4	126.0	84.1	2.4	87	67	49.4	11.2	58.1	17.4	0.0	4.3	4.2	1.7	4.0	7
VA09B-29	50.8	91.7	126.4	78.5	2.0	93	20	49.2	12.0	45.0	20.6	1.7	0.8	5.8	4.5	2.1	7
VA09B-34	62.8	94.9	123.0	84.4	1.5	77	52	52.0	12.4	73.7	6.0	0.0	1.0	2.8	1.5	3.7	5
VA10B-43	66.8	100.5	126.4	81.8	1.5	90	18	51.0	11.5	67.7	8.4	0.0	0.8	1.7	0.8	1.7	4
KWS_SCALA	56.1	93.7	129.1	77.9	0.4	73	73	49.8	11.8	95.0	1.8	4.8	0.7	1.8	2.8	2.6	2
MYSTIC	65.8	84.4	128.6	77.9	0.7	45	40	51.2	11.4	94.3	1.1	6.0	0.5	1.2	3.8	1.5	2
SALAMANDRE	65.5	92.8	129.2	75.2	0.8	63	60	51.3	12.1	95.2	1.6	4.8	0.8	1.5	5.3	2.5	0
ETINCEL	71.9	121.1	127.5	83.5	1.4	53	60	50.8	11.0	89.7	2.3	2.7	0.7	1.3	3.5	2.7	1
TEPEE	63.7	93.7	129.8	80.9	0.3	32	33	51.3	12.9	87.7	1.2	4.3	0.7	2.0	2.8	1.0	2
SY209-72	55.9	95.1	133.8	83.0	0.6	67	30	50.2	10.3	91.4	2.3	5.5	0.5	1.2	3.7	2.3	1
GRAND MEAN	63.6	95.2	129.1	81.6	1.2	69.6	50.4	49.4	11.3	82.3	5.4	4.0	1.9	2.9	3.0	3.0	1.6
# of Env.	4	11	10	8	5	1	1	7	2	3	4	2	2	2	2	2	1

Table 6. Malt quality<sup>a</sup> trait line means for 2011-2012 Winter Malting Barley Trial (WMBT) entries at 10 locations.

Line	Kernel weight (mg)	Plump grains (%)	Malt extract (%)	Grain Protein (%)	Wort Protein (%)	S/T (%)	Diastatic Power °ASBC	Alpha Amylase (20°DU)	Beta Glucan (ppm)	Free Amino Nitrogen (ppm)	Grain color (°ASBC)	Wort color (°ASBC)	Wort clarity (1-3)
CHARLES	35.1	89.8	79.1	13.2	5.7	46.2	133.3	98.8	174.0	237.6	45.0	2.3	1.0
STRIDER	33.5	75.7	75.0	13.5	4.2	32.6	60.6	42.5	504.2	132.5	47.8	2.9	2.9
MCGREGOR	33.9	84.8	75.4	12.9	4.0	32.1	66.1	47.2	426.1	125.2	32.4	1.9	1.1
MAJA	27.7	66.7	76.8	13.2	5.1	40.1	164.4	69.6	120.7	206.4	49.6	2.4	1.7
OR76	32.5	80.3	76.2	13.5	4.8	37.5	117.0	70.7	229.2	176.5	54.9	2.1	1.3
OR818	29.2	78.3	78.1	12.6	5.4	45.7	135.6	90.1	200.9	224.1	40.2	2.5	1.3
LCS_SATURN	37.5	88.0	73.2	13.1	4.3	35.0	121.0	43.2	431.7	136.9	48.7	2.9	2.8
10467P2	33.3	87.3	75.9	13.8	4.9	37.8	125.9	57.1	281.1	173.5	41.0	2.0	1.0
10467R2	35.4	90.1	78.8	12.7	5.0	42.4	130.6	56.6	115.4	184.8	45.8	2.2	1.0
10467R4	34.0	89.0	78.6	13.0	5.1	41.5	135.9	58.7	83.8	182.1	44.8	2.3	1.3
02AB431	35.7	85.8	79.6	12.7	6.0	50.6	125.2	104.2	94.6	248.9	48.2	2.4	1.1
02AB671	34.6	83.8	79.2	12.7	5.8	49.0	134.3	103.2	100.4	234.0	49.2	2.3	1.0
02AB669	34.8	81.6	79.3	12.5	5.8	49.1	121.1	103.2	63.2	233.3	46.5	2.2	1.2
2AB08-X05W061-208	32.4	81.6	78.1	13.1	5.5	45.1	128.0	103.5	144.4	213.3	48.6	2.2	1.1
AC03x220x158	36.7	88.4	77.0	13.4	4.4	36.0	169.3	60.9	203.8	157.3	54.4	1.8	1.0
AC04x153x2	40.5	91.0	77.2	12.9	4.4	36.1	134.2	42.4	252.5	131.2	50.3	2.7	2.7
AC04x002x23	31.0	76.8	77.4	13.0	4.8	39.0	116.2	52.6	144.6	178.2	39.1	2.1	1.1
AC04x028x36	42.9	93.5	78.4	14.5	5.3	37.9	172.5	53.8	66.4	184.5	40.6	2.2	1.2
THOROUGHbred	31.2	79.4	76.3	12.7	4.0	33.4	142.5	50.3	249.6	131.6	47.6	1.8	1.2
VA09B-29	28.5	71.2	74.0	13.6	4.0	31.0	57.6	38.8	675.8	128.6	33.6	2.3	1.5
VA09B-34	33.2	89.8	74.1	14.1	4.2	30.7	72.4	47.8	481.1	142.9	45.8	1.8	1.2
VA10B-43	30.2	84.3	75.0	13.2	4.3	33.8	58.9	50.8	453.8	156.1	32.6	2.0	1.1
KWS_SCALA	43.2	95.6	77.9	13.8	4.7	36.1	179.1	59.9	98.1	159.6	45.2	1.8	1.1
MYSTIC	41.7	92.7	76.4	14.4	4.8	35.4	151.3	49.1	160.1	162.6	40.9	2.1	1.1
SALAMANDRE	42.4	90.7	77.2	14.4	4.5	32.7	143.5	55.8	260.5	149.5	44.9	1.7	1.0
ETINCEL	35.3	90.3	76.7	12.6	4.1	35.0	129.9	52.7	338.0	135.8	46.0	1.9	1.2
TEPEE	42.3	92.3	78.0	13.9	5.2	39.7	187.9	53.0	52.3	190.0	42.7	1.8	1.1
SY209-72	40.3	86.7	78.5	12.4	4.3	37.3	129.1	40.7	132.3	139.2	42.5	2.2	1.7
GRAND MEAN	35.3	85.2	77.0	13.3	4.8	38.5	126.6	62.8	233.5	173.4	44.6	2.2	1.4

<sup>a</sup> Malt quality data courtesy of the USDA-ARS Cereal Crops Research Unit, Madison, WI

Table 7. Line entry details available for submissions to the 2011-2012 Winter Malting Barley Trial (WMBT).

Entry	Line	Row type	Submitter
1	CHARLES	2	
2	STRIDER	6	
3	MCGREGOR	6	
4	MAJA	6	Oregon State U
5	OR76	6	Oregon State U
6	OR818	6	Oregon State U
7	LCS_SATURN	6	Breun
8	10467P2	6	Breun
9	10467R2	6	Breun
10	10467R4	6	Breun
11	02AB431	2	USDA-ARS Aberdeen
12	02AB671	2	USDA-ARS Aberdeen
13	02AB669	2	USDA-ARS Aberdeen
14	2AB08-X05W061-208	2	USDA-ARS Aberdeen
15	AC03x220x158	6	Ackermann Saatzucht GmbH
16	AC04x153x2	2	Ackermann Saatzucht GmbH
17	AC04x002x23	6	Ackermann Saatzucht GmbH
18	AC04x028x36	2	Ackermann Saatzucht GmbH
19	THOROUGHBRED	6	Viginia Tech
20	VA09B-29	6	Viginia Tech
21	VA09B-34	6	Viginia Tech
22	VA10B-43	6	Viginia Tech
23	KWS_SCALA	2	KWS
24	MYSTIC	2	
25	SALAMANDRE	2	Secobra
26	ETINCEL	6	Secobra
27	TEPEE	2	AgriPro Syngenta
28	SY209-72	2	AgriPro Syngenta