

The Journey: From a breeder's cross to a malting barley variety.

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AMBA 2010 Recommended Malting Barley Varieties

Six-Row

Variety	Year*	Variety	Year*
Robust	1984	Lacey	2000
Legacy	2001	Drummond	2002
Tradition	2004	Stellar-ND	2006
Rasmusson	2009		

Two-Row

Variety	Year*	Variety	Year*
Harrington	1989	Conlon	2000
Merit	2000	AC Metcalfe	2005
CDC Copeland	2007	Conrad	2007
Scarlett	2008	Charles	2009
Hockett	2010	Merit 57	2010
Moravian 37	2010	Moravian 69	2010

*Year the variety was first added to the AMBA list of recommended malting barley varieties.

The Journey

Part 1: Breeder

F1 to F5: The cross and sorting out

Part 2: Breeder and QA Lab

F5 and beyond: Agronomic evaluation and malt quality evaluation at CCRU

Part 3: Breeder and AMBA

Formal evaluation of Malting and Brewing quality

What is Malting Quality?

Agronomics (Yield, Heading date, Lodging, Straw strength)

Disease resistance (FHB, stem rust - Ug99)

Protein

Plumpness

Color

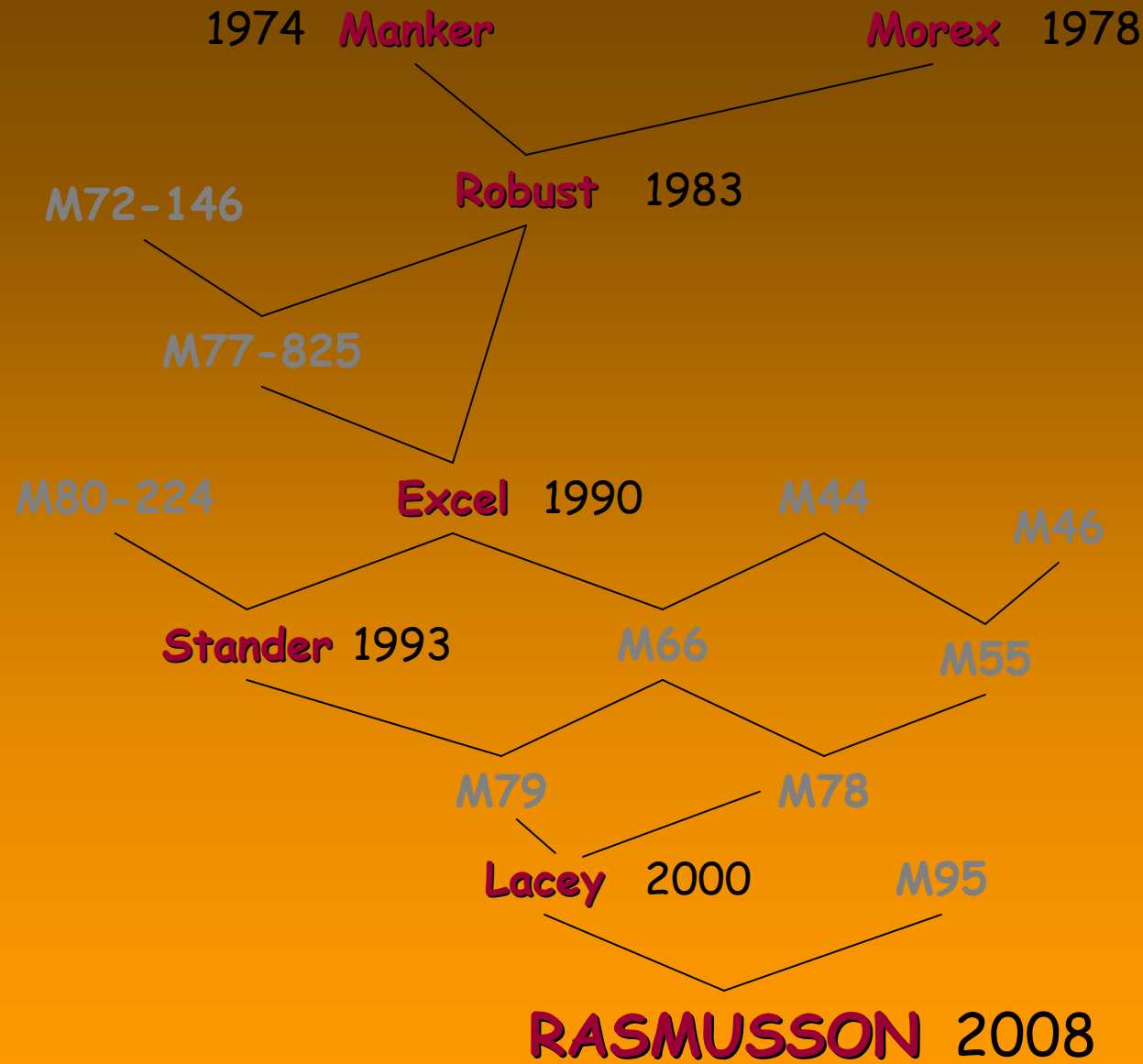
Wort (% extract, protein, FAN, color, β -glucan, turbidity, viscosity)

Enzymes (diastatic power, α -amylase)

Malting and Brewing Performance

Taste

Slide Courtesy
of K. Smith



Rasmusson (M109)

1996 Fall GH Lacey x M95

1996-97 Winter GH F1

1997 Summer F2

1997 Fall GH F3

1997-98 Winter GH F4

1998 Summer F5

1998-99 Winter F5:6

1999 Summer 1st Year Yield Trials

2000 Summer 2nd Year Yield Trials

2001 Summer 3rd Year Yield Trials, MVN, 1st Year AMBA Pilot

2002 Summer 4th Year Yield Trials, MVN

2003 Summer MVN, 2nd Year AMBA Pilot

2004 Summer MVN, Seed Increase

2005 Summer MVN, 1st Year AMBA Plant Scale

2006 Summer Seed Increase

2007 Summer 2nd Year AMBA Plant Scale (Conducted in 2008)

2008 Summer Seed Increase (AMBA Recommended Barley in 2009)

Head Rows

1 location; 1
replication

Selection for:
height, heading
date, lodging, straw
breakage
Micro-Malt

Agronomic comparisons of M109 compared to check varieties 2002-2003 in Minnesota On-Farm trials
(mean of 12 trials)

Variety /line	Yield (Bu/A)	Test Weight	Protein (%)	Plump (%)	Lodging (1 – 9)	DON (ppm)
Robust	88	43.7	13.6	86.1	4.3	0.9
Legacy	94	42.7	13.1	87.1	3.3	1.0
Foster	95	42.2	12.8	90.2	3.4	1.2
Lacey	97	44.9	13.4	86.9	4.2	0.8
Conlon	87	46.4	13.3	91.5	7.2	0.6
Drummond	88	43.2	13.4	85.3	4.1	1.3
M109	101	44.5	13.1	85.1	3.8	1.3

Mississippi Valley Uniform Barley Nursery

	Malt Extract	Barley Protein	Wort Protein	DP	AA	BG	Quality Score
2001CY							
Morex	78.3	14.5	5.97	166	64.4	155	27
Robust	79.0	14.0	5.77	160	51.5	200	38
M109	80.7	12.8	5.59	149	62.1	120	41
2002CY							
Morex	78.2	14.4	6.05	165	68.8	152	40
Robust	78.7	13.7	5.88	162	53.0	216	45
M109	79.8	12.9	5.81	165	63.6	142	51
2003CY							
Morex	77.8	14.5	5.52	179	59.9	314	30
Robust	77.9	14.0	5.22	163	47.3	470	38
M109	79.7	12.9	5.24	164	60.4	303	54
2004CY							
Morex	77.5	14.0	5.41	170	63.3	314	34
Robust	78.3	13.6	5.36	160	49.8	385	44
M109	79.8	12.9	5.41	166	62.5	321	50
2005CY							
Morex	78.4	13.9	5.62	179	68.7	183	41
Robust	78.2	13.9	5.74	184	53.6	220	43
M109	79.3	13.4	5.81	179	65.4	133	51
M122	78.4	13.4	5.69	169	65.5	261	41

AMBA Pilot Malting Data

	Extract	Barley Protein	Wort Protein	DP	AA	BG
2001CY						
Robust	79.1	13.4	5.59	147	54.5	257
M109	80.9	11.5	5.03	134	64.8	226
2003CY						
Robust	79.2	14.0	5.94	181	58.7	256
M109	80.0	13.2	5.79	166	74.1	220
2005CY						
Robust	78.6	12.1	5.67	182	61.0	82
M122	79.4	11.2	5.24	157	69.5	113
2006CY						
Robust	79.8	13.1	5.35	173	57.3	234
M122	79.9	12.8	5.17	162	68.9	198

Rasmusson (M109)

4 Greenhouse harvests

1 Winter harvest

10 Summer harvests (143 Station Years)

5 years in the Mississippi Valley Uniform Barley Nursery

9 years Malted and analyzed in the QA lab 70 times

2 years in the AMBA pilot scale program

2 years in the AMBA plant scale program

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