



American Malting Barley Association, Inc.

Anheuser-Busch, Inc.

Bell's Brewery, Inc.

Briess Malt & Ingredients Company

Boston Beer Company

Cargill Malt

Great Western Malting Company

InteGrow Malt LLC

Malteurop

MillerCoors

New Belguim Brewing Company

New Glarus Brewing Company

Rahr Malting Company

Sierra Nevada Brewing Company, Inc.

Summit Brewing Company

Boulevard Brewing Company

Dogfish Head Craft Brewery

The Gambrinus Company

Rogue Brewery

Schlafly Beer

Nov 2011



American Malting Barley Association, Inc.

REGULAR MEMBERS (18)

AB-InBev

Bell's Brewery

Boston Beer

Briess Malt & Ingredients

Brooklyn Brewery

Brown-Forman

Cargill Malt

Craft Brew Alliance

Deschutes Brewery

Great Western Malting

InteGrow Malt

Malteurop

MillerCoors

New Belgium Brewing

New Glarus Brewing

Rahr Malting

Sierra Nevada Brewing

Summit Brewing



American Malting Barley Association, Inc.

ASSOCIATE MEMBERS (34)

Abita Brewing

Alaskan Brewing

Allagash Brewing

Anchor Brewing

Avery Brewing

Bear Republic Brewing

Boulevard Brewing

Corsair Artisan Distillery

Dogfish Head Craft Brewery

Firestone Walker Brewing

Flying Dog Brewery

Founders Brewing

Full Sail Brewing

Gambrinus Company

Harpoon Brewery

Langunitas Brewing

Lakefront Brewery

Leopold Bros Distillery

Long Trail Brewing

Lost Coast Brewery

Madison River Brewing

Matt Brewing

Odell Brewing

Real Ale Brewing

Rogue Ales

Russian River Brewing

Saint Arnold Brewing

Schlafly Beer

Schell's Brewing

Smuttynose Brewing

Stone Brewing

Urban Chestnut Brewing

Valley Malt

Victory Brewing

MALTING BARLEY BREEDING GUIDELINES

IDEAL COMMERCIAL MALT CRITERIA - 2010

Barley Factors	Two-Row Barley	Six-Row Barley
<u>Plump Kernels (on 6/64)</u>	<u>> 90%</u>	<u>> 80%</u>
Thin Kernels (thru 5/64)	< 3%	< 3%
Germination	> 98%	> 98%
<u>Protein</u>	<u>11.0-13.0%</u>	<u>11.5-13.5%</u>
Skinned & Broken Kernels	< 5%	< 5%

MALTING BARLEY BREEDING GUIDELINES

IDEAL COMMERCIAL MALT CRITERIA - 2010

Malt Factors	Two-Row	Six-Row
<u>Total Protein</u>	<u>10.8 - 12.8%</u>	<u>11.3 - 13.3%</u>
On 7/64 Screen (plump)	> 70%	> 60%
Malt Modification		
<u>β-Glucan (ppm)</u>	<u>< 100</u>	<u>< 120</u>
F/C Difference	< 1.2	< 1.2
Soluble/Total Protein	40 - 47%	42 - 47%
Turbidity (NTU)	< 10	< 10
Viscosity	< 1.50	< 1.50

MALTING BARLEY BREEDING GUIDELINES

IDEAL COMMERCIAL MALT CRITERIA - 2010

Congress Wort	Two-Row Barley	Six-Row Barley
<u>Soluble Protein</u>	<u>4.4 – 5.6%</u>	<u>5.2 – 5.7%</u>
<u>Extract (f.g. d.b.)</u>	<u>> 81.0%</u>	<u>> 79.0%</u>
Color (ASBC)	1.6 – 2.2	1.8 – 2.2
FAN	> 180	> 190
Malt Enzymes		
<u>Diastatic Power</u>	<u>> 120</u>	<u>> 140</u>
Alpha Amylase	> 45	> 45

"There is a demand for lower protein (soluble protein and FAN), and lower enzymes within the Craft Brewing industry."

2013 AMBA Recommended Malting Barley Varieties

Two-Rows

AC Metcalfe	(2005)
CDC Copeland	(2007)
CDC Meredith	(2013)
Charles*	(2009)
Conlon	(2000)
Conrad	(2007)
Expedition	(2013)
Harrington	(1989)
Hockett	(2010)
Merit	(2000)
Merit 57	(2010)
Moravian 37	(2010)
Moravian 69	(2010)
Pinnacle	(2011)
Scarlett	(2008)
Wintmalt*	(2013)

Six-Rows

Celebration	(2011)
Lacey	(2000)
Legacy	(2001)
Quest	(2011)
Robust	(1984)
Stellar-ND	(2006)
Tradition	(2004)

Variety name & year first recommended

*Winter



American Malting Barley Association, Inc.

AMBA Strategic Plan Development Allocation Goals

	1994	1999	2006	2012
MIDWEST				
Spring 6-Row	59.5%	55.5%	48.1%	34.3%
Spring 2-Row	7.1%	10.0%	0.0%*	14.0%
Winter 6-Row				1.4%
Winter 2-Row				6.9%
Subtotal	66.6%	65.5%	59.8%	56.6%
*Funding for Midwest 2-Row eliminated for 2006.				
WEST				
Spring 6-Row	14.3%	15.6%	14.3%	2.1%
Spring 2-Row	13.1%	15.6%	13.1%	26.3%
Winter 6-Row				3.8%
Winter 2-Row				11.2%
Winter	6.0%	3.3%	9.7%	
All WINTER	6.0%	3.3%	9.7%	23.3%

AMBA Research Grant Program

★ Direct funding of public sector malting barley research



AMBA Quality Evaluation Program

Pilot Scale Evaluation

- Qualifying Data Submission – 4 Station Years of US Grown Material
- Two out of Three Satisfactory Years of Testing
 - 2 Sites Tested by 4 Collaborating Labs
 - West, Midwest & Winter Nurseries
 - Eastern Nursery in Future?

Plant Scale Evaluation

- Advancement - Quality and Agronomic Summary
- Commercial Malting and Brewing Trials

Canadian Material?

- Thorough testing in PRCOB makes additional US trials redundant

Eligible for Plant Scale Evaluations

ND26891 (*ND21376/ND20299*) Six-row spring, North Dakota State University

ND27177 (*Stellar-ND/ND23530*) Six-row spring, North Dakota State University

05037-079 Two-row spring, Malteurop North America

02Ab671 (*93Ab428/93Ab835*) Two-row winter, USDA-ARS, Aberdeen, ID

02Ab669 (*93Ab428/93Ab835*) Two-row winter, USDA-ARS, Aberdeen, ID
It's lower DP and FAN make it best suited to the craft brewing industry.

02Ab431 (*93Ab428/93Ab835*) Two-row winter, USDA-ARS, Aberdeen, ID
It's lower DP make it best suited to the craft brewing industry.

AMBA Plant Scale Evaluations

02Ab17271 (USDA-ARS, Aberdeen, ID) outyields Harrington and AC Metcalfe and is equal to Conrad and Merit. First year brewing trials are underway with 2012 crop production, and planned with 2013 crop, with contracting and malting by Briess.

PARENTS: 85Ab2323/Merit

Evaluating Brewer: New Glarus

Endeavor (USDA-ARS, Aberdeen, ID) AB-InBev is evaluating previous crop year production in brewing trials that others did not due to low protein, including the 2012 crop. AB-InBev rated 2010 crop satisfactory and is evaluating the 2012 crop in additional trials.

PARENTS: ORWM8406/Harrington

Evaluating Brewers: AB-InBev; GModelo; MillerCoors

2Ab04-X01084-27 (Spring 2-Row, USDA-ARS, Aberdeen, ID) has yields greater than Harrington and AC Metcalfe, is shorter and lower in protein.

PARENTS: 98Ab11993/Garnet

Evaluating Brewers: New Belgium; Sierra Nevada

AMBA Plant Scale Evaluations

Stout: ND22421 (North Dakota State University) is a semi-dwarf line with strong straw which makes it well suited for irrigated production and possibly straight combining. Brewing trials were conducted with 2010 crop production contracted and malted by Cargill, with GModelo rating satisfactory/continue testing and MillerCoors with concerns, second year evaluation needed.

PARENTS: (ND18546/ND19656)

Evaluating Brewers: GModelo (2012 crop); MillerCoors (2013 crop)

2ND25276 (North Dakota State University) has slightly higher yield potential than Pinnacle and Conlon, with DON more than Conlon but less than Lacey and Pinnacle. 2ND25276 has better resistance to spot-form net blotch than Pinnacle and net form of net blotch than Pinnacle and Conlon, and lower malt beta-glucans levels than Pinnacle and Conlon.

PARENTS: ND20802/3/ND19922//ND19929/ND20177

Evaluating Brewers: AB-InBev; Bells; GModelo; MillerCoors

Agronomic Improvements

Yield
Lodging
Scab & DON
Net Blotch
Spot Blotch, Septoria, Stem Rust

Six-Row
Lacey, Tradition
Stellar-ND
Robust, Quest
Tradition, Stellar-ND
Current Varieties

Two-Row
Conlon, Pinnacle
Conlon, Pinnacle
Conlon
Stellar-ND, Tradition
Current Varieties

Yield
Lodging
Stripe Rust, Scald, Net Blotch

Six-Row
Tradition
Tradition
Current Varieties

Two-Row
Conlon, Pinnacle
Conlon, Pinnacle
Current Varieties

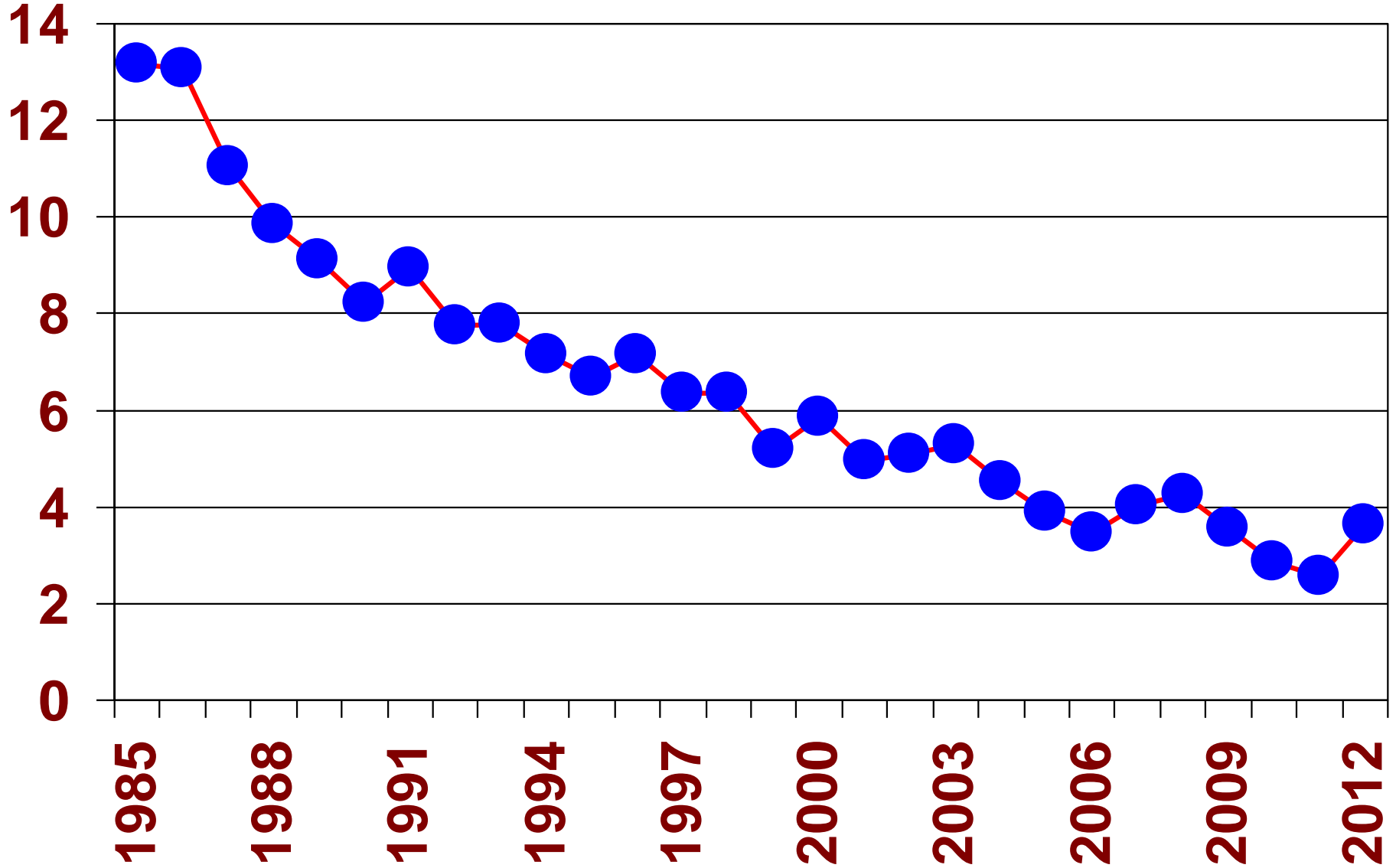
Yield
Lodging
Winter Hardiness
Stripe Rust, Scald, Net Blotch

Six-Row
Eight Twelve
Eight Twelve
Eight Twelve
Current Varieties

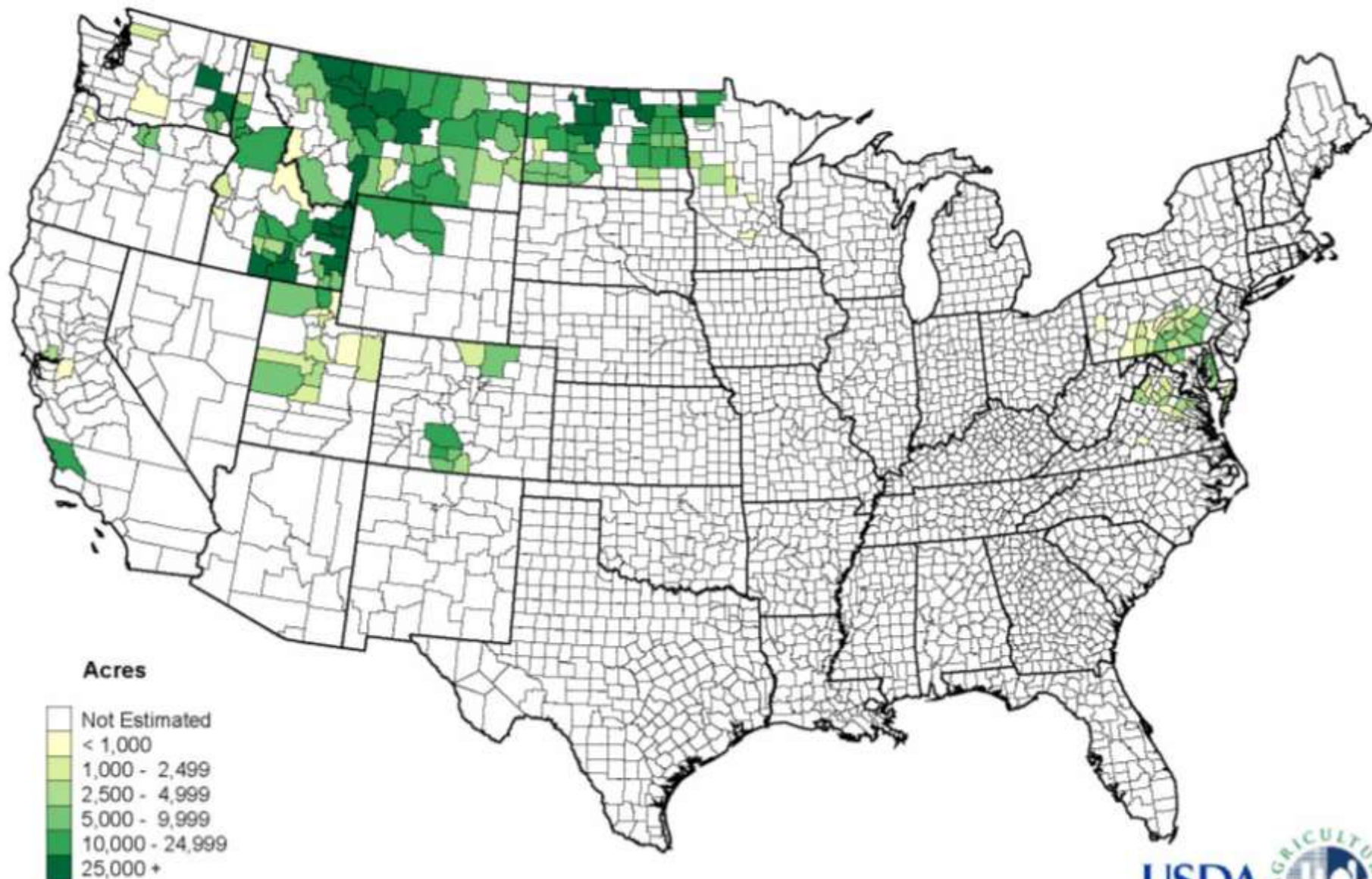
Two-Row
Eight Twelve
Eight Twelve
Eight Twelve
Current Varieties

US Barley Acreage

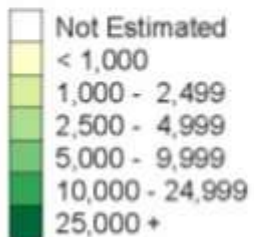
Millions of Acres



Barley 2012 Planted Acres by County for Selected States



Acres



Challenges & Opportunities

Hassel Factors

Competing Crops

Clearfield Technology – plant-back

Rotations

Craft Brewing & Malting

Buy Local

Food Safety Legislation

Bioterrorism Act 2002 – Grain handlers had to register with government and comply with safety procedures

Food Safety Modernization Act (FSMA) 2011 – Grain handlers should have reregistered. Processors required to file and follow a HACCP plan. Inspections and fines.

FDA Proposal for FSMA 2013

- Farms exempt from filing plans unless processing other farmers grain.
- Storage of raw agricultural commodities (RAC) other than fruits and vegetables exempt unless fumigating or screening the RAC.
- Rules for imported grain to come later

Comments then legislative fix

Research Update

- Elimination of \$4.71 million in funding for the US Wheat and Barley Scab Initiative
- Dr. Marcus Vinje joined the Cereal Crops Research Unit (CCRU), Madison, Wisconsin in December
- Dr. Kathy Esvelt Klos began work at the National Small Grains Germplasm Research Facility, Aberdeen, Idaho in May, 2013
- A commitment has been received from the ARS to fill the open CCRU position created in March, 2013 when Dr. Ron Skadsen retired

A vibrant rainbow arches across a clear blue sky, spanning from the upper left to the lower right. Below the rainbow, a rural landscape is visible, featuring a white barn with a red roof, a blue silo, and a line of green trees. The foreground consists of a flat, golden-brown field.

THANK YOU