Instructions for Webinar Participation

Getting Started

- The webinar will start soon
- Audio is through your computer speakers or headset – ***you may not hear sound until webinar begins***
- Audio check - use the Audio Settings [Audio Settings] options to do a sound check
- If you see presenters talking but do not hear audio, use the Question & Answer feature to indicate you are not getting sound

How to Ask Questions

1. Click on [Questions and Answers] icon found at the upper part of your screen
2. A box will open where you can type in questions, comments, indicate sound problems, etc.
3. You can use this throughout this webinar to ask questions

Technical Help

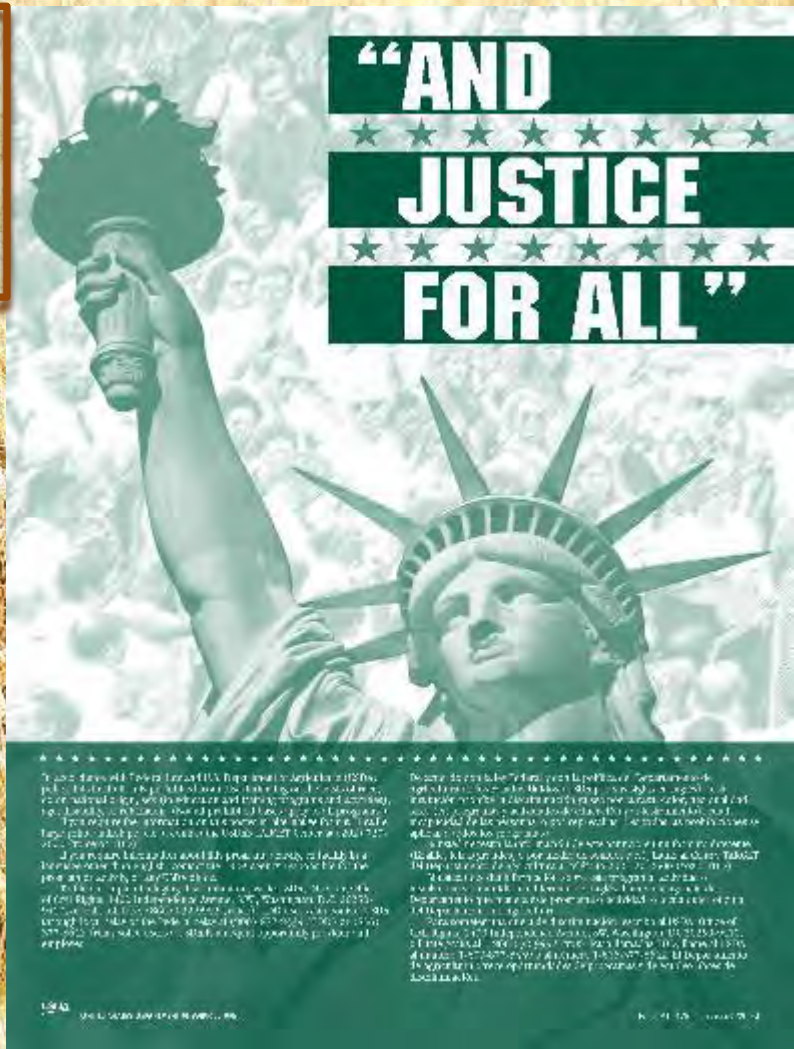
- Do your own sound check using the [Audio Settings] option.
- Telephone (800) 500-1554 for technical support.

MSU EXTENSION 2016 BEGINNING FARMER WEBINAR SERIES

✧✧✧✧

VENTY THREE EVENING WEBINARS FOR PEOPLE WANTING TO 'GET STARTED' FARMING

January 18, 2016 7:00pm eastern
Getting started with growing and selling malting barley



MSU is an affirmative-action, equal-opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, sex, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status.

MICHIGAN STATE UNIVERSITY | Extension

Getting started with growing and selling malting barley

MSU Extension 2016 Beginning Farmer Webinar Series
January 18, 2016

Presenters

Jim Isleib, MSU Extension Upper Peninsula Crop Production Educator
Ashley McFarland, coordinator, MSU U.P. Research and Extension Center

Host

Frank Wardynski, MSU Extension ruminant educator

Tonight's agenda

- Intro
- Overview of small grains in Michigan
- Craft brewing in Michigan and the interest in local malt
- Malting barley production considerations
  - Seed, soil, fertility, equipment and growing season requirements
- --5 MINUTE BREAK--
- Malting barley research in Michigan
- Marketing opportunities for Michigan malting barley growers
- Economic and risk considerations for malting barley production
- Wrap-up

Introduction

- **Who we are…**

  Jim Isleib, isleibj@anr.msu.edu 906-387-2530

  MSU Extension Upper Peninsula Crop Production Educator

  26 years with MSU Extension

  Based in Alger County (Munising), serving entire U.P.

  Ashley McFarland, ashleymc@msu.edu 906-439-5176

  Coordinator at MSU Upper Peninsula Research and Extension Center, Community Foods Educator

  3 years with MSU Extension, previously with University of Idaho Extension

Small grains in Michigan

- Wheat -

- **Wheat – By far the largest acreage small grain crop in Michigan**
  - **Soft white winter wheat, winter annual**
    - **Produces white flour. Used for cakes, pastries, Asian noodles, Middle Eastern flat breads**
  - **Soft red winter wheat, winter annual**
    - **Cookies, crackers, pretzels, pastries, flat breads**
  - **Hard red spring wheat (very small acreage in U.P.), spring annual**
    - **Pan bread, Asian noodles, hard rolls, flat breads, general purpose flour and cereal**

Widely adapted.

Small grains in Michigan

- Oats -

- **Oats – Second largest acreage small grain crop in Michigan**
  - **Two general types:**
    - **White and yellow. No important difference unless growing for food grade.**
    - **Market may prefer one over the other**
  - **Important uses:**
    - **Livestock and horse ration component**
    - **Nurse crop in forage establishment**
    - **Cash crop**
    - **Forage crop (harvested in boot stage)**
    - **Cover crop**
    - **Straw production**

Very widely adapted

Small grains in Michigan

- Rye -

- Rye – acreage difficult to determine. 4th largest small grain crop?
  - Winter annual.
  - Planted in fall, often late.
  - Very hardy.
  - Excellent nutrient scavenger
  - Good cover crop in many situations
  - Tall, good straw producer
  - Wildlife seedings

Very widely adapted.

Small grains in Michigan
- Barley -

- **Barley – Third largest acreage small grain crop in Michigan**
  - **Two general types:**
    - **Spring barley and winter barley**
    - **Also 6-row and 2-row**
  - **Feed grade and malting grade**
    - **Very different quality parameters and management**
    - **The malting industry maintains a list of approved varieties**
  - **Main uses:**
    - **Livestock feed component in areas where corn grain production is not dependable.**
    - **Nurse, forage, cover or cash feed crop**
    - **Malting**

Widely adapted, though less than oats or rye

Michigan barley history

1932 -- 303,000 acres of barley (all time high acreage)

1978 -- 20,000 acres of barley

1988 -- 40,000 acres of barley

2015-- 10,000 acres of barley

- **Nearly all spring planted barley**
- **Shift from majority of Michigan barley grown for malting to nearly all grown for feed**

Recent Michigan small grain acreage and yield history

	Winter Wheat (60 lb bu)		Oats (32 lb bu)		Barley (48 lb bu)	
	Acres plt.	*Bu/a*	*Acres plt.*	*Bu/a*	*Acres plt.*	*Bu/a*
2008	730,000	69	75,000	66	12,000	46
2009	630,000	69	70,000	63	13,000	51
2010	530,000	70	75,000	68	11,000	54
2011	700,000	75	40,000	64	10,000	48
2012	570,000	76	50,000	60	11,000	48
2013	620,000	75	50,000	62	10,000	52
2014	570,000	74	50,000	69	8,000	53
2015	530,000		60,000		10,000	
8-yr/7-yr Avg.	***585,000***	***72***	***58,750***	***65***	***10,625***	***50***

Fall rye - Acreage not easily accessible. Yields: 25 – 45 bu/a (56 lb bushel)

***

Better management can result in significantly better yields than these state averages

Prices

- Weighted state average prices from Michigan Agricultural Statistics Service

	Wheat	Oats	Feed Barley
	$/bu	$/bu	$/bu
2015	5.82*	1.89*	-
2014	5.75	3.40	3.89
2013	6.71	3.68	4.75
2012	7.91	4.02	5.00
2011	6.71	3.58	3.50
2010	5.72	2.45	2.45
2009	4.25	2.21	2.80
2008	5.63	3.40	3.25
2007	5.01	2.91	2.50
2006	3.41	1.93	1.80
2005	3.13	1.89	1.80
2004	3.01	1.72	1.80
2003	3.25	1.65	1.70
2002	3.28	1.80	1.60

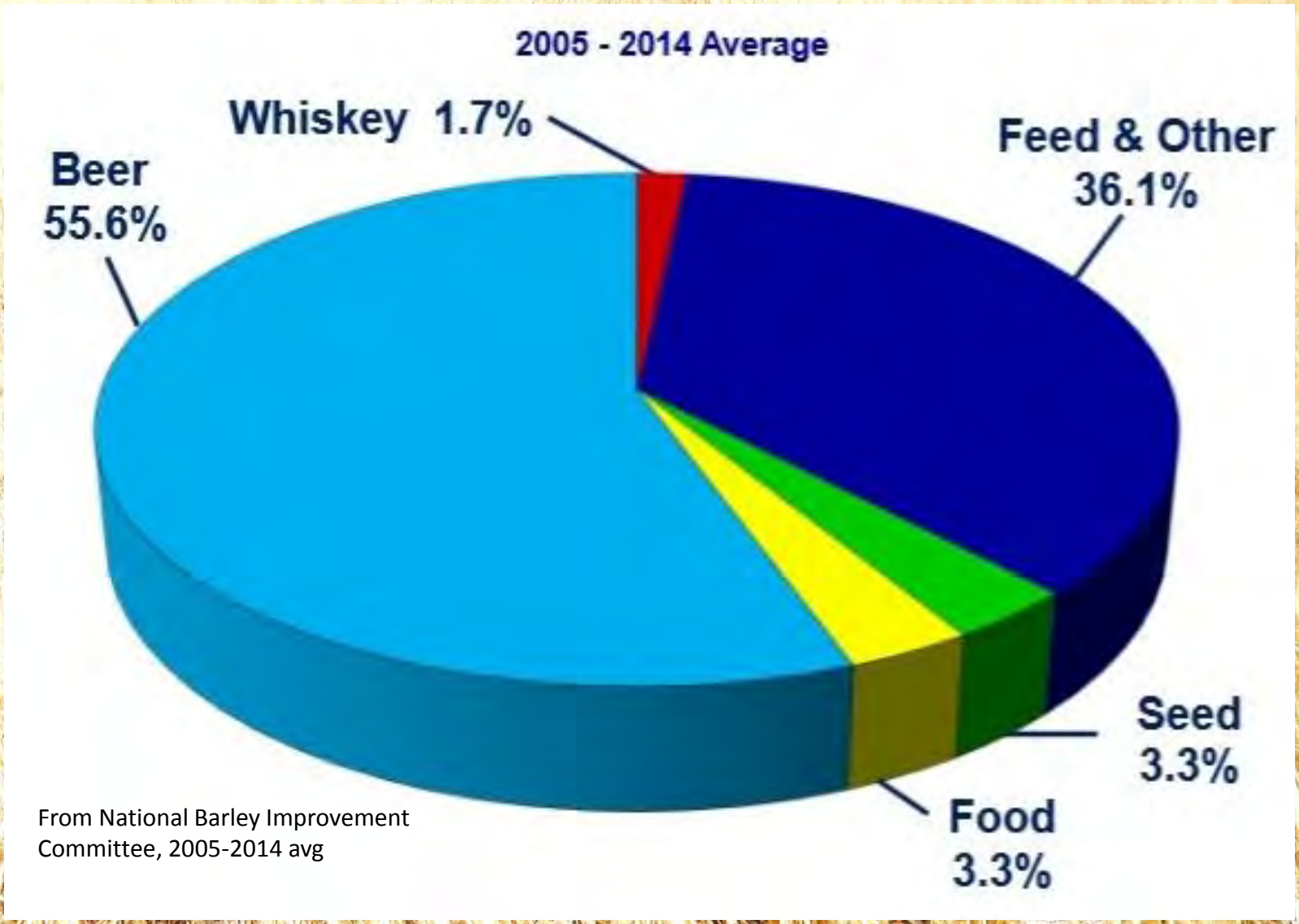
Fall rye - Prices not easily accessible. Prices as seed: $5 - $9/bushel??

US barley production vs Michigan

2005 – 2013 averages

- **US total barley production – 212,000,000 bushels**
  - **8 states produced over 5,000,000 bushels each:**
    - **Arizona – 5 million**
    - **Minnesota – 5.4 million**
    - **Wyoming – 6 million**
    - **Colorado – 7.8 million**
    - **Washington – 11.4 million**
    - **Montana – 38.1 million**
    - **Idaho – 49.7 million**
    - **North Dakota – 60.8 million**
  - **Michigan produced 500,000 bushels (1/2 million)**

Domestic use of barley in the US

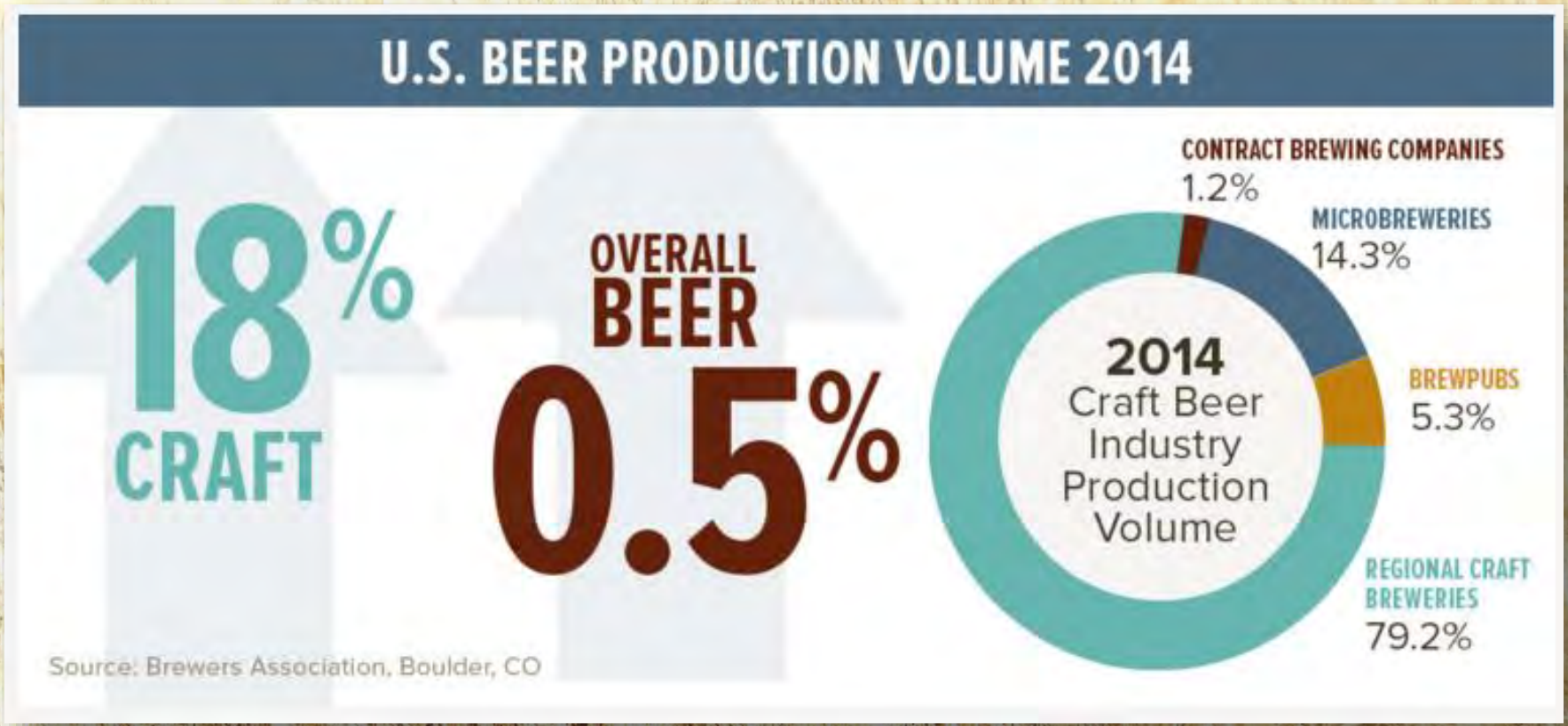


From National Barley Improvement Committee, 2005-2014 avg

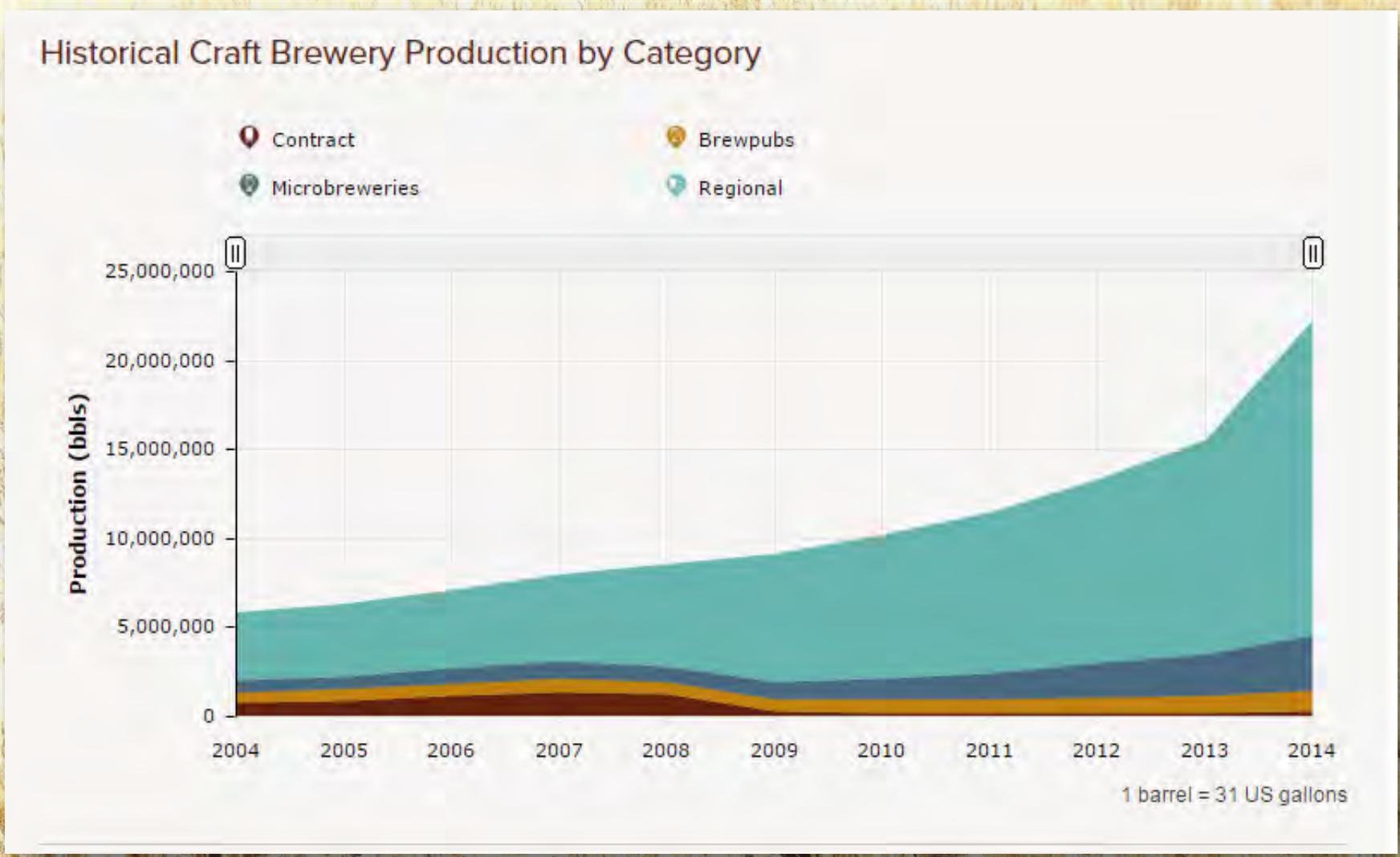
Brewers Association defines a craft brewer:

An American craft brewer is small, independent and traditional

National craft beer trend



National craft beer trend



U.S. BEER SALES VOLUME GROWTH 2014

OVERALL BEER
0.5%
197,124,407 bbls

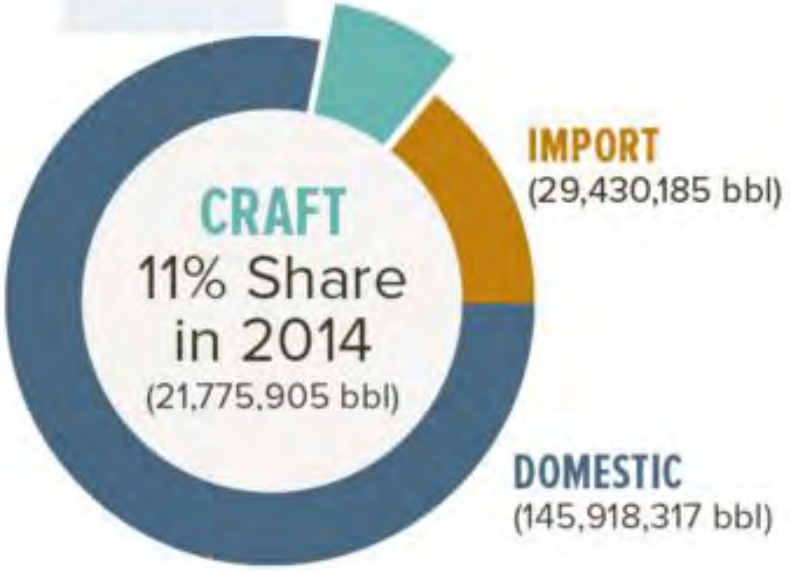
17.6%
CRAFT
21,775,905 bbls

IMPORT BEER
6.9%
29,430,185 bbls

36%
EXPORT CRAFT BEER
383,422 bbls

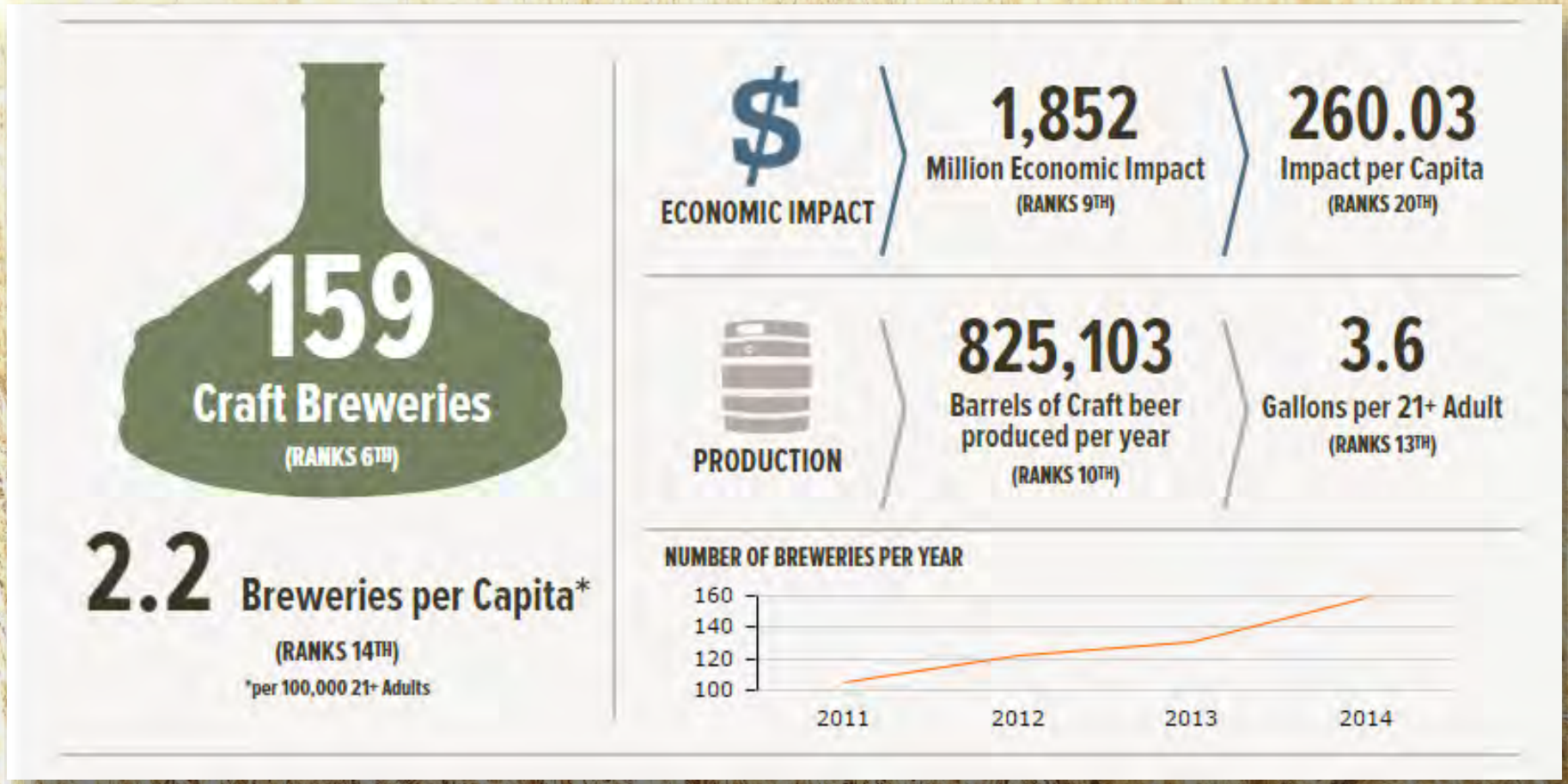
OVERALL BEER MARKET
$101.5 BILLION

CRAFT BEER MARKET
$19.6 BILLION
22% DOLLAR SALES GROWTH

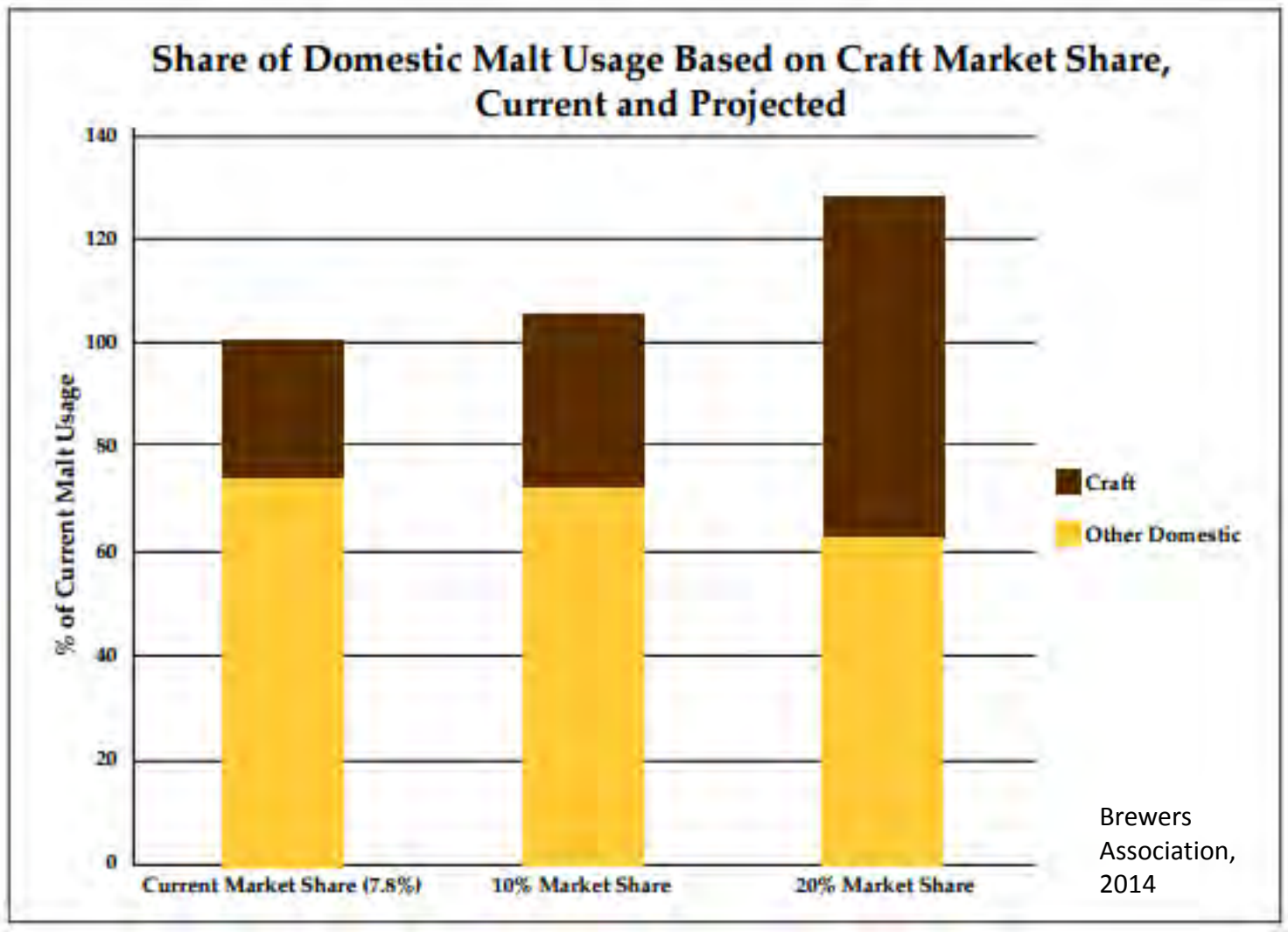


Source: Brewers Association, Boulder, CO

Craft Brewing in Michigan



Malt usage



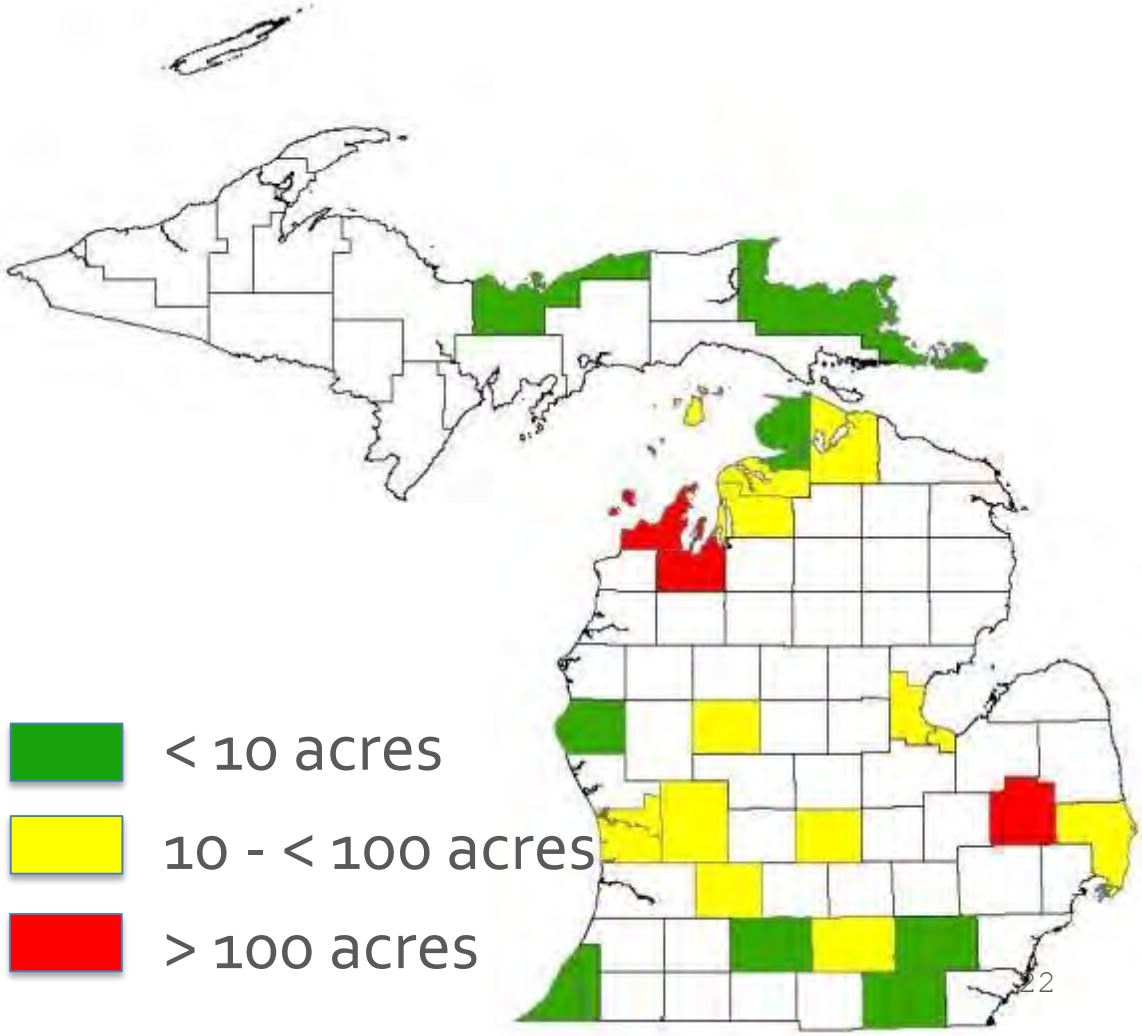
Brewers Association, 2014

Industry survey

- Establish a baseline for the barley and malt industries
- Survey distributed and open through December
- Gain perspective on the future of the industry

Malting barley production survey

- Twenty-five responses representing 22 counties



How many acres of malting barley did you plant for the 2015 harvest?

- 900+ acres
- Primarily spring varieties; Pinnacle and Conlon
- 800+ acres actually harvested
- Average yield 50 bu./acre

If your malting barley did not meet quality standards, what parameters inhibited that?

- DON – likely infected with *Fusarium* head blight
- Poor germination
- Pre-harvest sprout, protein, purity

How many acres do you plan to grow in 2016?

- 1,000 + acres
- Many "undecided" responses
- Nearly ¾ respondents expressed interest in winter malting barley varieties

Challenges

- Wet weather
- Cleaning and bagging
- Communication
- Analysis
- DON
- Lodging
- Weed control in organic production
- Long-term storage
- Marketing
- Experience
- Harvesting

Malting barley production considerations

What's special about malting barley?

(and what do I need to do to get there)

MICHIGAN STATE UNIVERSITY | Extension

- **<u>Variety selection is important</u>: brewers want certain varieties or types. Find out before you buy seed.**
- **<u>Crop quality measurements:</u> much higher than feed grade**
  - **DON quantiation limit is around 0.2 ppm. DON is caused by fusarium disease. Fungicide spray is necessary to control.**
  - **Protein < 13.5% is desired for 6-row and < 12.5% for 2-row**
  - **Moisture should be <13% for storage. Germination deteriorates at higher moistures and mold risk is greater**
  - **Germination should be >95%**
  - **Minimal pre-harvest sprouting**
  - **Good, bright grain color**
  - **Good seed plumpness**
- **No 'commodity market' in Michigan. Growers should contract with a malting business before committing to the crop**

What if your crop doesn't make malting grade?

- **Feed it to your livestock, if you have any. Barley should be ground or rolled before use as feed. With good test weight, it contains slightly less energy than corn, and more protein.**
- **Sell it to a local elevator. *If* they will buy feed grade barley. Many won't.**
- **Sell it to a local livestock farmer as feed barley. Look into this option before you commit to the crop.**
- **Store it while you look for a solution. If you have on-farm grain storage capability, great! If not, you should seek out a storage option before you plant.**

Barley

MICHIGAN STATE UNIVERSITY | Extension

48 lbs/bu @ 14.5% moisture

Average yield

- **U.P. avg 2008-2011 (MI Ag Stats): 40 bu/a**
- **MSU U.P. Research Center:**
  - **2008-2014, 7 yrs avg: 62 bu/a**

Barley

- Soil considerations
  - Well-drained, fertile soils best
- Fertility
  - pH 6.0 or higher
  - Nutrient removal:

Soil test target:
P: 50-75 ppm
K: 135-150
Mg: 35-75

		N	P_2O_5	K_2O
Grain	Bu	0.88	0.38	0.25
Straw	ton	13	3.2	52

- Example: 60 bu/a + 0.75 T straw =
  - 63 lb N (136 lb urea)
  - 25 lbs P_2O_5 (54 lbs 0-46-0)
  - 54 lbs K_2O (90 lbs 0-0-60)
- 280 lbs total fertilizer X $525/ton (est.) = $73.50/a

Nitrogen management

- Protein content of your crop is affected by nitrogen fertilization
- Do no over-apply nitrogen
- You may consider compromising crop yield (influenced by N fertilizer rate) to gain the desired low protein content

Barley Seed

(The following examples are <u>not</u> endorsements or recommendations)

- American Malting Barley Assn lists recommended varieties, updated annual
- Identify varieties desired by intended purchaser
- State Crop Improvement Associations
  - MI, WI, MN Crop Improvement Assns.
  - 2-row varieties grown for 2016 certified seed in Michigan
    - Conlon: 2 growers, 114 acres, spring barley
    - Pinnacle: 3 growers, 66 acres, spring barley
- Seed "houses"
  - Albert Lea Seeds
  - Welter Seed and Honey
- Certified seed is recommended

Barley Agronomics

- 14,300 seeds/lb
- Plant about 2-2.5 bu seed/a (96-120 lbs)
- Seed 1 – 1.5” deep in 7 – 10” drill strips w/press wheels
- N, P & K before planting
- Plant <u>early</u> – as soon as soil can be prepared, after oats. Soil temp in low 40’s is OK.

Barley Agronomics

- Avoid weedy fields, corn,barley
  or oat stubble (fusarium)
- Avoid grass herbicide carry-over
- Disease control: Fusarium head blight - fungicide applied at flag lea emergence can enhance yield and quality
- Include N credits in fertilizer rates
- Weed control: Refer to MSU Weed Control Guide. Many options are available including 2,4-D, Buctril, MCPA/Banvel, and others
  - Spray when weeds are small. Physical damage to barley will be more than compensated by reduction of weed competition.

2012 Barley fungicide plots, Chatham, MI

WHEAT DISEASES

Fusarium head blight

Symptoms of Fusarium head blight include tan or light brown lesions encompassing one or more spikelets. Some diseased spikelets may have a dark brown discoloration at the base and an orange fungal mass along the lower portion of the glume. Grain from plants infected by Fusarium head blight is often shriveled and has a white chalky appearance. Some kernels may have a pink discoloration.

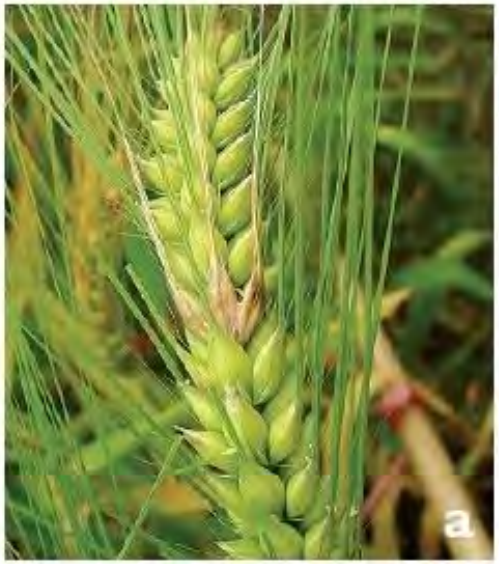
Management: Avoid the most susceptible varieties and planting into corn residue, foliar fungicides.

Source: "Wheat Disease Identification", USDA-NIFA Extension Integrated Pest Management Program, 2011

MICHIGAN STATE UNIVERSITY | Extension

Fusarium (head scab) on barley

P. Schwarz, 2014



P. Schwarz, 2014

P. Schwarz, 2014

Figure 17. Fusarium head blight (FHB) is the most devastating disease in barley produced for malt though decreases in yield and quality.
a. The first noticeable symptom of FHB is bleaching of some or all of the grain spikelets while the remaining head is healthy and green.
b. Infected grain kernels are commonly called tombstones and can appear shriveled, discolored, and will have a low test weight.
c. FHB infected grain is likely to contain the mycotoxin, deoxynivalenon (DON), also known as vomitoxin, which at certain levels can be toxic to humans and livestock.

Controlling fusarium disease

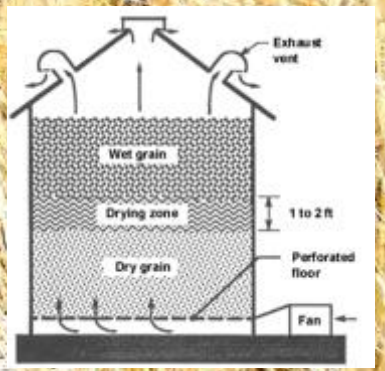
- Spray recommended rate when flag leaf is fully emerged and barley head is emerging
- Labeled products include Prosaro, Caramba, Stratego YLD, Twinline and others
- From 2012 fungicide trial at Chatham, MI:
  - $10.97 Stratego fungicide/acre (7 oz/acre at $200.60/gallon)
  - $19.91 Caramba fungicide/acre (14 oz/acre at $182.00/gallon)
  - $18.19 Twinline fungicide/acre (9 oz/acre at $258.65/gallon)
  - $6.50 Machinery cost
- No yield impact from this 1 year/1 location study
- Disease protection -- sort of like 'insurance policy'

Harvest management

- Grain moisture at harvest: wait for grain to reach 13.5% or less if possible
  - Early planted barley will ripen sooner
- Clean and service combine well ahead of harvest
- Set up combine according to manufacturer recommendations and/or based on your best experience
- Go slow and careful
- Hire someone who knows knows what they're doing!
- Grain handling can cause physical damage to seed.
  - Make sure your equipment (augers, etc) is in order and operate carefully
- Check into grain drying and storage opportunities in your area

Equipment needs

- Fertilizer, lime spreader
- Tractor and tillage equipment
- Seeder: grain drill or no-till grain drill
- Sprayer
- Combine
- Grain wagon
- Grain handling equipment: tub, auger, bin




MICHIGAN STATE UNIVERSITY | Extension
BREAK TIME
BACK IN 5 MINUTES

Research – Variety Trials

- Collaborate in Eastern Spring Barley Nursery – organized by Craft Maltsters Guild
- On-farm trials in Thumb
- Test additional UK lines, both public and private
- Expand into winter malting barley research in 2016

Research – Spartan Barley

- Historical line bred in early-1900s
- Resurrected from a seed bank
- Currently vacationing in Arizona
- Showing early promise!

Research – Management Trials

- Harvesting methods to manage pre-harvest sprout
- Seeding rate

Malthouse production

- End of 2015 – 3 malthouses operational
- 7 more slated to open in 2016
- 2015 production just under 100 tons
- 2016 production estimated at 1,000 tons

Malthouse production

- Malthouses purchased 700+ acres of barley in 2015
- Wheat, rye and other grains also malted
- Challenges very similar to barley producers

Michigan Malthouses

Map updated January 2016

1. U.P. Malt Company
Bill Weisinger
bweising@yahoo.com
(906) 202-2128

2. Superior Malt
Clem Geiger
cgeiger@hotmail.com
(906) 399-9966

3. Empire Malting Co.
Alison Babb
alison@empiremalting.com
(352) 226-1644

4. Great Lakes Malting Co.
Jeff Malkiewicz
jeff@greatlakesmalting.com
(231) 714-4551

5. Michigan Malt
Wendell Banks
wendell@michiganmalt.com
(989) 954-5962

6. Fedora Malthouse
Julie Baker
fedorabaker1ja@gmail.com
(989) 289-5135

7. Pilot Malt House
Ryan Hamilton
ryan@pilotmalthouse.com
(616) 209-8388

8. Mitten State Malt
Larry Judge
Larry.judge1@gmail.com
(517) 490-5245

9. Arrowhead Malt
David Burdick
david@arrowheadmalts.com
(517) 474-0447

10. Motorcity Malt
Tom Laboda
tlaboda@motorcitymalt.com
(248) 425-9402

To be listed on this map, contact Ashley McFarland
ashleymc@anr.msu.edu or (906) 439-5176

Maintained by:
MSU Upper Peninsula Research and Extension Center
Chatham, Michigan
agbioresearch.msu.edu/centers/uprc/malting_barley

New initiatives

- Representation on National Barley Improvement Committee
- Collaboration brews
- Malting barley grain quality analysis lab

New initiatives

- Enhancing seed availability
- Further explore crop insurance and contracting options

Economic and risk considerations

- What will it cost to produce a crop of quality malting barley?
- What price can I expect to receive for my crop?
- How will my yield turn out?
- ***What can go wrong?***

Example malting barley budget

MICHIGAN STATE UNIVERSITY | Extension

Ag Decision Maker -- Iowa State University Extension

Estimated Costs of Pasture and Hay Production has information on using small grains as a companion crop for hay production. This worksheet calculates the annual costs for small grain production.

Place the cursor over cells with red triangles to read comments.

U.P. Barley - without hay seeding

Crop

U.P. Barley without hay seeding	**Acres**	25	
Field Name	**Expected Grain Yield**	55	bu. / acre
Example	**Straw Production Level**	0.75	tons / acre

	Cost per Acre			Total Cost
Preharvest Machinery	Fixed	Variable	**Total**	**All Acres**
Spray herbicide/fungicide (2X)	$11.50		$11.50	$288
Tandem disk w/harrow (2 times)	18.54		$18.54	$464
Spread fertilizer	6.21		$6.21	$155
			$0.00	$0
Seed (drill)	10.00		$10.00	$250
Other			$0.00	$0
Total per acre	$46.25	$0.00	**$46.25**	**$1,156**
Total all acres	$1,156	$0	**$1,156**	----

Example malting barley budget

Seed, fertilizer, etc.					
Seed			37.38	$37.38	$934
price per bushel	*$14.95*				
bushels per acre	*2.5*				
Other			0.00	$0.00	$0
price per pound					
pounds per acre					
Total Seed Cost			**$37.38**	**$37.38**	**$934**
Nitrogen (urea)			42.84	$42.84	$1,071
price per pound	*$0.68*				
pounds per acre	*63*				
Phosphorus			$13.25	$13.25	$331
price per pound	*$0.53*				
pounds per acre	*25*				
Potash			$31.32	$31.32	$783
price per pound	*$0.58*				
pounds per acre	*54*				
Total Fertilizer Costs			**$87.41**	**$87.41**	**$2,185**
Herbicide/fungicide			$21.15	$21.15	$529
Lime (estimated annual cost)			$15.00	$15.00	$375

Example malting barley budget

Labor (seeding and harvesting)		$33.00	----	$33.00	$825
Hours per acre	*3*				
Rate per hour	*$11.00*				
Land					
Cash rent equivalent, before seeding		$30.00	----	$30.00	$750
Harvesting Costs					
Combine		$29.09		$29.09	$727
Haul Grain		1.10	1.65	$2.75	$69
fixed cost per bushel	*0.02*				
variable cost per bushel	*0.03*				
				$0.00	$0
Bale straw (small bales)		77.44		$77.44	$1,936
Haul Straw		1.10	1.60	$2.70	$68
fixed cost per ton	*1.10*				
variable cost per ton	*1.60*				
Total Grain/Straw Harvest		**$108.73**	**$3.25**	**$111.98**	**$2,800**

Example malting barley budget

Costs and Returns					
			Cost per Acre		Total Cost
Total Costs		**Fixed**	**Variable**	**Total**	**All Acres**
Per acre		$217.98	$164.19	$382.17	$9,554
Returns				**Total**	**All Acres**
Expected Price per bu.	*$6.50*			$357.50	$8,938
Grain Yield	*55*				
Expected Straw Price per ton	*$110.00*			$82.50	$2,063
Straw Yield	*$0.75*				
Total returns				**$440.00**	**$11,000**
			Net Return per Acre Over		
			Variable	**Total**	**Net Return**
			Costs	**Costs**	**All Acres**
Net Returns			**$275.82**	**$57.84**	**$1,446**

MSU Farm Management Team

- **MSU Extension FIRM team has good resources for estimating cropping costs in Michigan.**

- **Websites**
  - **FIRM team**
  - **MSU Extension Farm Management Educator Dennis Stein**

Great Lakes Hop y Barley Conference

MICHIGAN STATE UNIVERSITY | Extension

Michigan State University AgBioResearch

March 16-17, 2016

Grand Traverse Resort • Acme, Michigan

MICHIGAN STATE UNIVERSITY | Extension

Questions? Wrap-up

Great Lakes Hop and Barley Conference:
www.events.anr.msu.edu/hopandbarley16

MSU U.P. Research and Extension Center
http://agbioresearch.msu.edu/centers/uprc

How to contact us…

Ashley McFarland, ashleymc@msu.edu 906-439-5176 (listserv option!)
Jim Isleib, isleibj@anr.msu.edu 906-387-2530