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

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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. 4\textsuperscript{th} 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Winter Wheat (60 lb bu)</th>
<th>Oats (32 lb bu)</th>
<th>Barley (48 lb bu)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres plt.</td>
<td>Bu/a</td>
<td>Acres plt.</td>
</tr>
<tr>
<td>2008</td>
<td>730,000</td>
<td>69</td>
<td>75,000</td>
</tr>
<tr>
<td>2009</td>
<td>630,000</td>
<td>69</td>
<td>70,000</td>
</tr>
<tr>
<td>2010</td>
<td>530,000</td>
<td>70</td>
<td>75,000</td>
</tr>
<tr>
<td>2011</td>
<td>700,000</td>
<td>75</td>
<td>40,000</td>
</tr>
<tr>
<td>2012</td>
<td>570,000</td>
<td>76</td>
<td>50,000</td>
</tr>
<tr>
<td>2013</td>
<td>620,000</td>
<td>75</td>
<td>50,000</td>
</tr>
<tr>
<td>2014</td>
<td>570,000</td>
<td>74</td>
<td>50,000</td>
</tr>
<tr>
<td>2015</td>
<td>530,000</td>
<td></td>
<td>60,000</td>
</tr>
<tr>
<td>() 8-yr/7-yr Avg.</td>
<td>585,000</td>
<td>72</td>
<td>58,750</td>
</tr>
</tbody>
</table>

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

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

**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

U.S. Beer Production Volume 2014

18\% CRAFT

Overall Beer 0.5\%

2014 Craft Beer Industry Production Volume

- Contract Brewing Companies 1.2\%
- Microbreweries 14.3\%
- Brewpubs 5.3\%
- Regional Craft Breweries 79.2\%

Source: Brewers Association, Boulder, CO
National craft beer trend

Historical Craft Brewery Production by Category

- Contract
- Brewpubs
- Microbreweries
- Regional

Production (bbls)

- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014

1 barrel = 31 US gallons
U.S. Beer Sales Volume Growth 2014

Overall Beer: 0.5% growth
- 197,124,407 bbls

Craft Beer: 17.6% growth
- 21,775,905 bbls

Import Beer: 6.9% growth
- 29,430,185 bbls

Export Craft Beer: 36% growth
- 383,422 bbls

Overall Beer Market: $101.5 billion

Craft Beer Market: $19.6 billion, 22% dollar sales growth

Craft Share in 2014: 11% (21,775,905 bbls)

Source: Brewers Association, Boulder, CO
Craft Brewing in Michigan

- **159 Craft Breweries** (RANKS 6th)
- **2.2 Breweries per Capita*** (RANKS 14th) *per 100,000 21+ Adults
- **$1,852 Million Economic Impact** (RANKS 9th)
- **260.03 Impact per Capita** (RANKS 20th)
- **825,103 Barrels of Craft beer produced per year** (RANKS 10th)
- **3.6 Gallons per 21+ Adult** (RANKS 13th)

**Number of Breweries per Year**

<table>
<thead>
<tr>
<th>Year</th>
<th>100</th>
<th>120</th>
<th>140</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

![Map of Michigan with counties shaded in green, yellow, and red to indicate different acreage categories: green for < 10 acres, yellow for 10 - < 100 acres, and red for > 100 acres.]
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)

• **Variety selection is important:** brewers want certain varieties or types. Find out before you buy seed.

• **Crop quality measurements:** 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

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:

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>P$_2$O$_5$</th>
<th>K$_2$O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain (Bu)</td>
<td>0.88</td>
<td>0.38</td>
<td>0.25</td>
</tr>
<tr>
<td>Straw (ton)</td>
<td>13</td>
<td>3.2</td>
<td>52</td>
</tr>
</tbody>
</table>

- Example: 60 bu/a + 0.75 T straw =
  - 63 lb N (136 lb urea)
  - 25 lbs P$_2$O$_5$ (54 lbs 0-46-0)
  - 54 lbs K$_2$O (90 lbs 0-0-60)
- 280 lbs total fertilizer X $525/ton (est.) = $73.50/a

Soil test target:
- P: 50-75 ppm
- K: 135-150
- Mg: 35-75
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 not 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 early – 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 leaf 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.
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 shiveled 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.
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, deoxynivalenol (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 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
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 Weissinger
   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 Markiewicz
   jeff@greatlakessmalting.com
   (231) 714-4551

5. Michigan Malt
   Wencell Banks
   wencell@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
asbioresearch.msu.edu/research/upre/maltng_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

<table>
<thead>
<tr>
<th>Crop</th>
<th>Acres</th>
<th>Fixed</th>
<th>Variable</th>
<th>Total</th>
<th>All Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preharvest Machinery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray herbicide/fungicide (2X)</td>
<td></td>
<td>$11.50</td>
<td></td>
<td>$11.50</td>
<td>$288</td>
</tr>
<tr>
<td>Tandem disk w/harrow (2 times)</td>
<td></td>
<td>18.54</td>
<td></td>
<td>$18.54</td>
<td>$464</td>
</tr>
<tr>
<td>Spread fertilizer</td>
<td></td>
<td>6.21</td>
<td></td>
<td>$6.21</td>
<td>$155</td>
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<tr>
<td>Seed (drill)</td>
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<td>10.00</td>
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<td>$10.00</td>
<td>$250</td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td>$0.00</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total per acre</strong></td>
<td>$46.25</td>
<td>$0.00</td>
<td></td>
<td>$46.25</td>
<td>$1,156</td>
</tr>
<tr>
<td><strong>Total all acres</strong></td>
<td>$1,156</td>
<td>$0</td>
<td></td>
<td>$1,156</td>
<td>----</td>
</tr>
</tbody>
</table>

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.
# Example malting barley budget

<table>
<thead>
<tr>
<th>Seed, fertilizer, etc.</th>
<th>37.38</th>
<th>37.38</th>
<th>$934</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td>$14.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bushels per acre</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.00</td>
<td>$0.00</td>
<td>$0</td>
</tr>
<tr>
<td>Nitrogen (urea)</td>
<td>$0.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pounds per acre</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td>$0.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pounds per acre</td>
<td>25</td>
<td></td>
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</tr>
<tr>
<td>Potash</td>
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<tr>
<td>pounds per acre</td>
<td>54</td>
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<tr>
<td>Total Seed Cost</td>
<td>$37.38</td>
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<tr>
<td>Total Fertilizer Costs</td>
<td>$87.41</td>
<td>$87.41</td>
<td>$2,185</td>
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<tr>
<td>Herbicide/fungicide</td>
<td>$21.15</td>
<td>$21.15</td>
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</tr>
<tr>
<td>Lime (estimated annual cost)</td>
<td>$15.00</td>
<td>$15.00</td>
<td>$375</td>
</tr>
</tbody>
</table>
## Example malting barley budget

<table>
<thead>
<tr>
<th><strong>Labor (seeding and harvesting)</strong></th>
<th>$33.00</th>
<th>----</th>
<th>$33.00</th>
<th>$825</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hours per acre</strong></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rate per hour</strong></td>
<td>$11.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Land</strong></th>
<th>$30.00</th>
<th>----</th>
<th>$30.00</th>
<th>$750</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash rent equivalent, before seeding</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Harvesting Costs</strong></th>
<th>$29.09</th>
<th>$29.09</th>
<th>$727</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combine</strong></td>
<td></td>
<td></td>
<td>$2.75</td>
</tr>
<tr>
<td><strong>Haul Grain</strong></td>
<td>1.10</td>
<td>1.65</td>
<td>$2.75</td>
</tr>
<tr>
<td><strong>fixed cost per bushel</strong></td>
<td>0.02</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>variable cost per bushel</strong></td>
<td>0.03</td>
<td></td>
<td>$0.00</td>
</tr>
</tbody>
</table>

| **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    |         | $2.70  | $68  |
| **variable cost per ton**         | 1.60    |         | $2.70  | $68  |

| **Total Grain/Straw Harvest**     | $108.73 | $3.25  | $111.98 | $2,800 |
### Example malting barley budget

<table>
<thead>
<tr>
<th>Costs and Returns</th>
<th>Cost per Acre</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fixed</td>
<td>Variable</td>
</tr>
<tr>
<td>Per acre</td>
<td>$217.98</td>
<td>$164.19</td>
</tr>
<tr>
<td>Returns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected Price per bu.</td>
<td>$6.50</td>
<td></td>
</tr>
<tr>
<td>Grain Yield</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Expected Straw Price per ton</td>
<td>$110.00</td>
<td></td>
</tr>
<tr>
<td>Straw Yield</td>
<td>$0.75</td>
<td></td>
</tr>
<tr>
<td>Total returns</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Net Return per Acre Over</th>
<th>Variable Costs</th>
<th>Total Costs</th>
<th>Net Return All Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$275.82</td>
<td>$57.84</td>
<td>$1,446</td>
</tr>
</tbody>
</table>
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

March 16-17, 2016
Grand Traverse Resort • Acme, Michigan
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

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