



Malting Barley Agronomy 101

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Inspired Brewing®



Project **GREEN**



American Malting Barley Association, Inc.



CRAFT MALTSTERS GUILD



Planning for Seeding

- If your only marketing option is for malting, have a contract in hand before planting
- Identify whether winter barley or spring barley are best for your region or contract





Planning for Seeding

- Crop rotation is more important than soil type. Avoid following another cereal grain or grass crop
- Select two row varieties that have performed well (Quality first) in regional trials and are accepted based on your contract





Seeding

- Tillage and no-till systems both work
- Start with a weed free field
- Plant at 1" deep!
- Plant 1 – 1.4 million seeds per acre (less early, more late)





Seeding

- Winter barley – plant anytime after Hessian Fly Free Date (~Sep. 20) through end of October
- Spring barley – plant as early as possible after field conditions allow





Fertility

- Adjust pH prior to planting; ideal pH is 6.5 but between 6-7 is OK
- Apply phosphorus fertilizers prior to planting
- Potassium and nitrogen fertilizers applied in early spring (both spring and winter barley)





Fertility

- Phosphorus and Potassium fertilizers according to soil test
- Nitrogen fertilizers balance between yield and grain protein (%)
 - 50-60 lbs/A on spring barley; 75-100 lbs/A on winter barley
 - Apply earlier in spring, not late





Weed Management

- Start with a clean seedbed
- One herbicide pass is usually enough in-crop to control weeds
- Winter and spring barley have different weed competitors
 - Winter annuals vs. summer annuals





Pest Management

- Consider an early season fungicide mixed with herbicide for leaf diseases such as powdery mildew
- Prioritize a fungicide application at flowering to attempt to control *Fusarium* and limit DON (1 or 2 passes)
- Watch out for cereal leaf beetle on flag leaf





Lodging

- Lodging can be a problem and significantly reduce grain yield and quality, and also makes harvesting difficult
- Plant growth regulators can be applied in spring around the jointing stage (with herbicide is common)





Harvest

- Barley can mature quite rapidly, and maturity can generally be determined by the heads moving from upright to hanging straight down
- Harvest ASAP after barley reaches maturity to avoid pre-harvest sprout
- Consider de-awning bars in combine to aid in cleaning





Harvest and Storage

- Dry with low temperature systems (< 100 F)
- Store in an insect free, dry environment at 13.5% moisture
- Send sample for lab analysis soon after harvest, and move to market as soon as possible to avoid declines in quality during storage





Barley Agronomy Summary

1. Seeds should be planted 1” deep at 1.0—1.4 million seeds per acre. Deep planting >1.25” can result in poor emergence.
2. Nitrogen fertilizer should be limited to 75 lbs N/A at spring green-up, to limit grain protein to 12% or less. Split applications of nitrogen are not recommended as late applied nitrogen can also increase grain protein content
3. Fungicides should be used to control diseases as needed. In particular, fungicide at flowering is recommended to protect against *Fusarium* infection (DON contamination), but is not a guarantee.





Barley Agronomy Summary

4. Plant winter barley as soon as possible after the Hessian Fly Free date to optimize yields and increase probability of winter survival. Barley can be planted through October in southern MI
5. Multiple herbicides are labelled for fall and spring application to control weeds. If lodging is a concern, consider utilizing a growth regulator at time of spring herbicide application
6. Barley should be harvested ASAP after grain reaches maturity. Drying grain is possible with low temperature (<100°F) systems. Barley should be stored at 13.5% moisture or less





Extension Bulletin GMI-035 · New · July 2014

Malting Barley Production in Michigan

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Because of the increasing demand for locally sourced ingredients in everything from the salads we eat to the beer we drink, barley, produced for malt, is being revisited as a potential crop for Michigan growers. This publication explores that potential and outlines best production practices for Michigan-grown malting barley.

Original State University Barley Project, 2011

Introduction

Barley – the most widely adapted cereal grain in the world – is an ancient crop that has been used for thousands of years for feed, food and production of beer. Its ability to thrive in adverse conditions makes it a suitable crop where other high-valued commodities such as corn, rice and wheat fail to yield. Although there is a wide spectrum of barley types, this text will focus on *Hordeum vulgare* L., the commonly cultivated species that dominates global production (Figure 1). The cultivation of barley, the fifth most-produced crop in the world, is widespread throughout North America and occurs on every other continent outside of Antarctica.

Worldwide, 125 million acres of barley were harvested in 2013. Only 3 million of those acres were harvested in the United States, which was nearly half of the 30-year national average (1984-2013, 5.9 million acres). U.S. acreage has steadily declined over this time period as barley competed for agricultural land with other high-value crops. Because of increased yields, however, domestic production of barley (in bushels) is down only 36 percent since 1984. In Michigan, only 10,000 acres of barley were harvested in 2013, with nearly all



Figure 1. Barley is the fifth most produced crop in the world.

production going to feed markets. Nationally, 55 percent to 60 percent of barley goes to feed and is cracked, ground or rolled before being fed to livestock (Figure 2). Protein levels in barley grain range from 10 percent to 15 percent and are heavily affected by crop management. Aside from feed uses, 30 percent to 40 percent of U.S. barley is malted for brewing, 2 percent to 3 percent is used in other foods, and 5 percent is harvested for seed. Unique varieties of barley have been developed to

MANAGEMENT OF WINTER BARLEY IN MICHIGAN - WINTER 2019

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With support from: MSUE AABI, MSU Project GREEN, WMBT, AMBA, Michigan Brewer's Guild & Bell's Brewery

Trials featuring winter malting barley varieties and management practices were initiated at Michigan State University in 2016, both at the W.K. Kellogg Biological Station (KBS) in SW Michigan and on farms in the Saginaw Valley region. Objectives include optimizing yield while also meeting quality parameters for malting. Winter barley has produced high yields of malting quality barley at both locations over 3 years. This report summarizes the data and observations made from these trials through January 2019.



Figure 1. The 2018 winter barley management trials at KBS

Barley is part of Michigan's agricultural history.

Production peaked at just over 300,000 acres harvest in 1919 and again in 1932.

Barley is suited to Michigan's climate, but winter barley is less winter hardy than other common cereal grains grown in the state, (e.g. wheat, rye). To obtain malting quality, it is important to implement specific management practices.

Winter Barley Management Guidelines

1. Seeds should be planted 1" deep at 1.0–1.4 million seeds per acre. Deep planting >1.25" can result in poor emergence.
2. Nitrogen fertilizer should be limited to 75 lbs N/A at spring green-up, to limit grain protein to 12% or less. Split applications of nitrogen are not recommended as late applied nitrogen can also increase grain protein content
3. Fungicides should be used to control diseases as needed. In particular, fungicide at flowering is recommended to protect against *Fusarium* infection (DON contamination), but is not a guarantee.
4. Plant winter barley as soon as possible after the Hessian Fly Free date to optimize yields and increase probability of winter survival. Barley can be planted through October in southern MI
5. Multiple herbicides are labelled for fall and spring application to control weeds. If lodging is a concern, consider utilizing a growth regulator at time of spring herbicide application
6. Barley should be harvested ASAP after grain reaches maturity. Drying grain is possible with low temperature (<100°F) systems. Barley should be stored at 13.5% moisture or less