MANAGEMENT OF WINTER BARLEY IN MICHIGAN - WINTER 2019

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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.

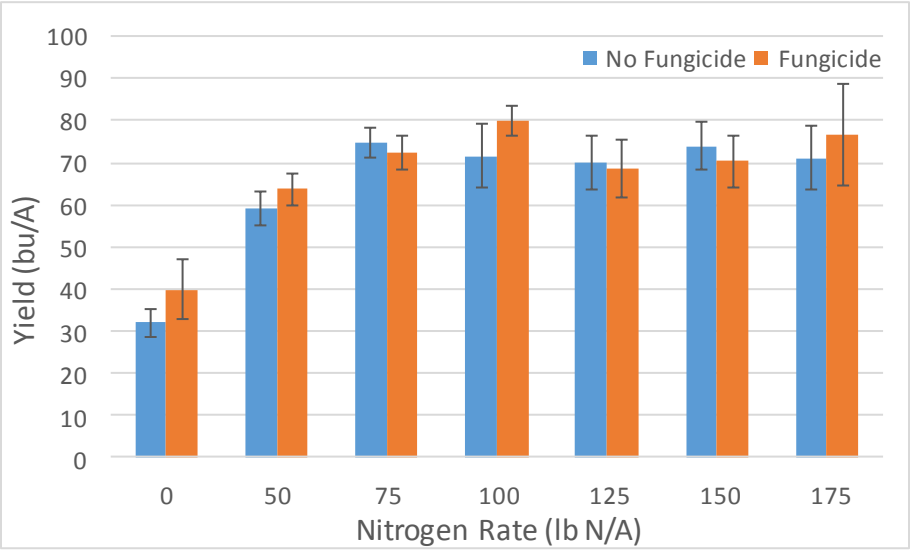
Barley is suited to Michigan's climate, but winter barley is less winter hardy than other common cereal grains grown in the state, (e.g. wheat, rye). To obtain malting quality, it is important to implement specific management practices.

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

2017/2018 Winter Barley Nitrogen Rate Data

Variety	Year	N Rate (lb/A)	Prosaro® Fungicide	Yield	% Plump	% Thin	% Crude Protein	RVA (Stirring Number)	DON (ppm)	Germ. Energy 4 mL %
Puffin	2017	0	No	57.2	91.9	0.6	8.9	150	< 0.3	
Puffin	2017	75	No	89.7	90.3	1.2	10.3	161	< 0.3	
Puffin	2017	150	No	93.2	88.9	1.6	13.2	160	< 0.3	
Puffin	2017	0	Yes	70.3	92.7	0.8	8.8	146	< 0.3	
Puffin	2017	75	Yes	96.8	90.3	1.1	10.4	160	< 0.3	
Puffin	2017	150	Yes	92.7	85.6	2	13	161	< 0.3	
Puffin	2018	0	No	32	99.9	0.2	10.5	160	< 0.3	97
Puffin	2018	50	No	59.2	99.7	0.1	10.6	160	0.5	98
Puffin	2018	75	No	74.8	99.7	0.3	11.3	167	0.6	98
Puffin	2018	100	No	71.5	99.5	0.5	12.6	152	0.7	99
Puffin	2018	125	No	70	99.7	0.3	14.0	164	0.8	98
Puffin	2018	150	No	74	99.6	0.5	14.3	157	1.2	99
Puffin	2018	175	No	71.2	99.7	0.3	14.8	159	1	90
Puffin	2018	0	Yes	39.9	99.8	0.2	10.3	158	< 0.3	99
Puffin	2018	50	Yes	63.8	99.8	0.2	10.4	147	0.3	98
Puffin	2018	75	Yes	72.2	99.4	0.5	11.9	143	0.5	98
Puffin	2018	100	Yes	79.9	99.7	0.3	12.4	152	0.4	94
Puffin	2018	125	Yes	68.5	99.7	0.4	14.1	144	0.4	97
Puffin	2018	150	Yes	70.3	99.7	0.2	14.7	147	0.5	97
Puffin	2018	175	Yes	76.7	99.5	0.5	14.8	120	1.1	98



The figure above shows data from 2018 for grain yield (bu/Acre) at each nitrogen rate with and without Prosaro® fungicide application applied at flowering. Error bars show the standard error of the mean.

Yields did not increase above 75 pounds of nitrogen per acre.

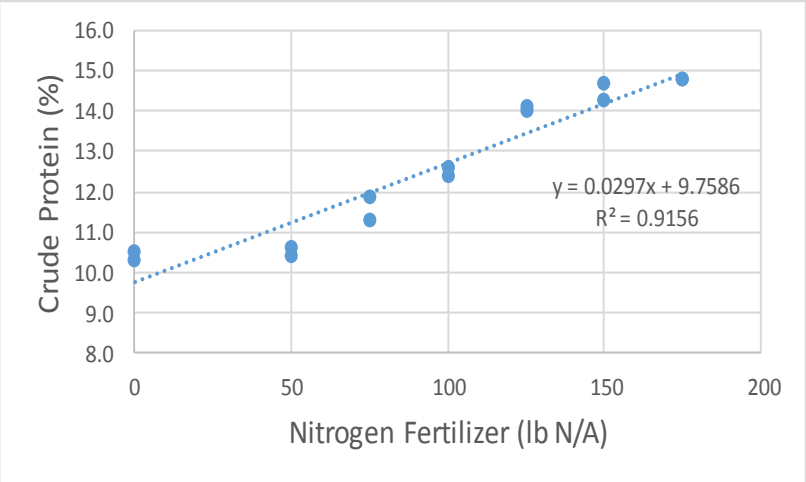
The data above include yield and quality data from the 2017/2018 winter barley nitrogen rate study at the W.K. Kellogg Biological Station. Plots were also split with a fungicide application (Prosaro) at flowering.Each treatment was replicated four times. Replications were combined for quality analysis.

Dark green highlighted cells indicate optimum yields / quality scores while **light green** cells indicate tolerable and **red** indicates unacceptable (based on the guidelines outlined by the American Malting Barley Association).

Nitrogen Fertilizer and Crude Protein

The figure above plots crude protein in barley grain against spring nitrogen fertilizer rates in 2018. There are two data points for each nitrogen rate, which include treatments with and without fungicide application respectively.

Crude protein was approximately 1.5% lower in 2017 than 2018 at each nitrogen rate (see table on page 2), indicating that growing conditions in a particular year can influence yield and grain protein.



2018 Winter Barley Planting Date Data

Variety	Planting Date	Prosaro® Fungicide	Yield	% Plump	% Thin	% Crude Protein	RVA (Stirring Number)	DON (ppm)	Germ. Energy 4 mL %
Puffin	20-Sep	No	60.9	99.7	0.3	13.6	135	1	100
Puffin	5-Oct	No	71.5	99.5	0.5	12.6	152	0.7	99
Puffin	20-Oct	No	58.3	99.5	0.6	13.4	132	0.5	98
Puffin	20-Sep	Yes	63.1	99.7	0.3	13.7	147	0.6	93
Puffin	5-Oct	Yes	79.9	99.7	0.3	12.4	152	0.4	94
Puffin	20-Oct	Yes	63.5	99.1	0.8	12.7	160	0.4	96
Scala	20-Sep	No	45.5	98.9	1.2	13.0	132	0.6	89
Scala	5-Oct	No	52.1	99.0	1.8	12.1	151	0.6	83
Scala	20-Oct	No	50.7	99.5	0.4	13.0	130	1.7	98
Scala	20-Sep	Yes	51.3	99.4	0.5	12.2	144	< 0.3	95
Scala	5-Oct	Yes	48.6	99.4	0.6	12.6	157	< 0.3	91
Scala	20-Oct	Yes	49.3	99.6	0.5	13.0	156	2.4	92

The data above include yield and quality data from the 2018 winter barley planting date study at the W.K. Kellogg Biological Station. Each plot was supplied with 100 lbs of nitrogen fertilizer per acre at spring green-up. Plots were also split with a fungicide application (Prosaro®) at flowering. Each treatment was replicated four times. Replications were combined for quality analysis.

Dark green highlighted cells indicate optimum yields / quality scores while **light green** cells indicate tolerable and **red** indicates unacceptable (based on the guidelines outlined by the American Malting Barley Association).

The picture on the right was taken in January, 2018 and shows the difference in fall growth between the September 20th and October 20th planting dates