

**Michigan Craft Beverage Council**  
**FINAL REPORT**

**Cover Page**

**Point of Contact:**

Dean Baas  
Michigan State University Extension  
612 E. Main Street  
Centreville, MI 49032  
[baasdean@msu.edu](mailto:baasdean@msu.edu)  
269-967-9672

**Grant Given Number:**

190000002127

**Date Report Submitted:**

June 30, 2020

## **Project Title**

*Evaluation of Cereal Rye Varieties for the Michigan Craft Distilling Industry*

## **Abstract (100 words)**

*Rye is commonly used as a cover crop by Michigan's farmers, and variety selection has been based on performance as a cover crop more so than grain quality. Thus, we know little about the grain quality of common or improved rye varieties as it relates to distilling, brewing or food purposes. This multi-year project is testing 16 different varieties across three locations in Michigan to evaluate agronomic and quality differences between rye varieties as well as their response to different management practices. Harvest and analysis will be completed in summer and fall of 2020.*

## **Project Goals and Objectives**

*We hypothesize that rye varieties differ in qualities important to the craft beverage industry. These qualities include agronomic characteristics such as lodging and pest pressure, yield, mycotoxin contamination and grain quality, as well as distilling properties like spirit yield, and spirit flavor. Additionally, we hypothesize that varieties will respond differently to agronomic management practices, such as fungicide or plant growth regulator application. Specific objectives of the project include:*

- 1. Conduct replicated variety trials with 15 varieties at three locations in Michigan*
- 2. Evaluate the effects of plant growth regulators on lodging, yield and grain quality of the rye varieties being evaluated*
- 3. Evaluate the prevalence of Fusarium head scab and leaf diseases across different varieties, and the efficacy of a fungicide to reduce its severity.*
- 4. Produce 500 pounds of three contrasting varieties of rye (Wheeler vs. hybrid vs. heirloom) for batch spirit production and evaluation at American Fifth Spirits.*

## **Results and Conclusions**

*Rye is planted in the fall and harvested in the summer. Thus, harvest has not occurred, and we do not have results and conclusions other than observations made during the growing season. All variety trials were planted according to plans, and treatments have been initiated. We are now awaiting harvest in the coming month. The results and conclusions will be reported under the MCBC 2020 grant number 200000001786, the continuation of this project.*

*The varieties are showing significant variation in growth type, and the growth regulator treatment appears to be having a significant effect on plant height at one location, but not the other. The bulk plantings of seven different varieties are all thriving, and barring a disaster, we should have adequate quantities of all seven varieties for batch distilling analysis. Based on these observations, we expect to see significant differences in yield and grain quality across the varieties.*

## **Time Period**

*Since rye is a fall planted cereal grain, the bulk of the work for this project is to be completed starting in the fall of 2019 through 2020, when the grain will be harvested and analyzed. So far, we've identified and sourced varieties for the trial, purchased a*

used plot combine harvester, increased collaborations with the industry, planted the trials, evaluated field characteristics and implemented management treatments. Harvest will occur in July of 2020, as well as grain analysis and much of our communication with the industry. This project will continue under the MCBC 2020 grant number 200000001786.

### **Work Accomplished**

The work accomplished is very similar to the work proposed in the original proposal. The only changes are that we added more bulk plantings of varieties (increased from 3-7, see Table 1) and added distiller partners to conduct test batches with these varieties. Long Road Distillers, Mammoth Distilling and Dr. Nicole Shriner at MSU are the partners that will be doing the batch distilling. Also, the MSU grain quality lab at the Upper Peninsula Research and Extension Center will be doing the grain quality analysis, and Hartwick College will be doing the spirit yield and sensory analyses.

<b>Accomplishment</b>	<b>Relevance to Objective and/or Outcome</b>
<i>Purchased used Plot Harvester</i>	<i>Plot harvester is needed to accurately and efficiently harvest the replicated plots of rye varieties.</i>
<i>Sourced Rye Seed for Trials</i>	<i>Pure rye varieties can be difficult to obtain, so some work was needed to identify sources and secure seed. Sixteen varieties were sourced (see Table 1).</i>
<i>Assisting with Rosen Rye re-introduction</i>	<i>Rosen rye was once the standard for rye production and distilling in Michigan. We are partnering with Mammoth Distilling and several other colleagues to accomplish this goal.</i>
<i>Increased partnerships</i>	<i>A number of industry partnerships have been added since the writing of the proposal, including Diageo, Mammoth Distilling, New Growth Associates, Empire Malting, Long Road Distillers and Mitten State Malt. We've also developed a partnership with Dr. Nicole Shriner at MSU.</i>
<i>Planted variety trials and larger plots of seven varieties</i>	<i>Three locations across Michigan were planted with the 16 varieties (see Table 1), which is essential for comparing the varieties across different climates and locations.</i>
<i>Evaluated heading dates and growth characteristics of varieties</i>	<i>Understanding the different characteristics of the varieties is important to understand for making recommendations to farmers that grow rye for the craft beverage industry.</i>
<i>Implemented fungicide and growth regulator applications at KBS and UPREC</i>	<i>This is also a direct objective of the project, which aims to understand how different varieties respond to these different management techniques.</i>

### **Communication Activities, Accomplishments and Impacts**

*Information related to plans for this cereal rye project was presented and discussed at the Great Lakes Hop and Barley Conference in March, 2020. We intended to highlight the plots during summer field days at the Kellogg Biological Station and Upper Peninsula Research and Extension Center, but those events were cancelled due to COVID-19. Our revised approach will include videos and written articles as well as publications and presentations once we have data to report. Additional activities, accomplishments and impacts will be reported under the MCBC 2020 grant number 200000001786, the continuation of this project.*

### **Budget Narrative**

*Below are the actual expenditures as of 6/30/20.*

<b>Cost Category</b>	<b>Amount Approved in Budget</b>	<b>Actual Expenditures To Date</b>
<b>Personnel</b>	4,459	3,362.63
<b>Fringe Benefits</b>	1,563	1,691.32
<b>Travel</b>	500	846.67
<b>Equipment</b>	5,000	5,000
<b>Supplies</b>	500	1,527.51
<b>Contractual</b>		
<b>Other</b>	1,500	1,000
<b>Direct Costs Sub-Total</b>	13,523	
<b>Indirect Costs</b>		
<b>Total Costs</b>	13,523	13,428.13

*The project was conducted consistent with the budget proposed by the principal investigator and approved by the State of Michigan.*

*No other sources of funding have been leveraged for this project directly. However, the work with the rye varieties is complementary to many other barley and small grain projects that the project team is leading, which are funded from a variety of sources including the American Malting Barley Association, The Brewers Association, Michigan Crop Improvement Association and the Sustainable Agriculture Research and Education Program. Crop Improvement Association and the Sustainable Agriculture Research and Education Program.*

*Bayer Crop Science provided support (\$3,000) for education and outreach related to sustainable crop production at the Kellogg Farm in 2020. Long Road Distillers, Mammoth Distilling and Dr. Nicole Shriner are planning to provide batch distilling services to evaluate the different varieties through the production process.*

**Charts, Tables, Photos**

*Table 1. Cereal rye varieties, type and purpose in the variety trials and bulk produced.*

	<b>Variety</b>	<b>Type</b>	<b>Purpose</b>		<b>Variety</b>	<b>Type</b>	<b>Purpose</b>
1	AC Hazlett*	Open	Grain	9	Wrens Abruzzi	Open	Grain
2	Danko	Open	Grain	10	FL401	Open	Grain
3	ND Dylan	Open	Grain	11	Merced	Open	Cover
4	Aroostook*	Open	Cover	12	Guardian	Open	Cover
5	Elbon	Open	Forage	13	KWS Brasetto*	Hybrid	Grain
6	Maton*	Open	Forage	14	ProPower	Hybrid	Forage
7	KWS Bono*	Hybrid	Dual	15	KWS Serafino	Hybrid	Forage
8	Wheeler*	Open	Cover	16	VNS Byron Seeds*	Open	Cover

*\*Denotes varieties bulk planted for batch spirit production and evaluation by partners.*



*Figure 1. Aerial image of rye variety trials (lower block) and the Maton variety bulk planting (upper block) at the MSU W.K. Kellogg Biological Station, Hickory Corners, MI. Photo taken June 23, 2020. (Kevin Kahmark)*



*Figure 2. Rye variety plots at the Upper Peninsula Research and Extension Center in June, 2020 (James DeDecker).*

The Authorized Individual must sign this statement after the applicable report form is completed.

I certify that the statements and information contained in these documents are true, accurate, and complete.

Signature of Responsible Official:

Date:



6/30/20

---