MCIA SPRING OAT & BARLEY VARIETY TRIAL – 2025 RESULTS

In memory of Martin Nagelkirk, MSU Extension Educator

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Michigan State University conducted spring oat and barley variety trials in 2025 with support from the Michigan Crop Improvement Association (MCIA). Locations included Chatham, MI at the MSU Upper Peninsula Research and Extension Center (UPREC), Sklarczyk Seed Farm in Johannesburg, MI and West Acres Farm in Croswell, MI. Our project included a three-location strip trial designed to compare leading genetics for Michigan from field to glass at pilot scale, plus replicated small plot studies at Chatham only. The 2025 barley strip trial included three elite two-row spring barley varieties, two from Limagrain Cereal Seeds and one from Cornell University / New York Seed Improvement Program. Our oat trial included four white oat varieties, three from MCIA and one from South Dakota State University (SDSU). Small plot studies included the strip trial varieties plus 12 barley and 11 oat entries from three private seed companies and SDSU (data reported elsewhere). This research represents an expanded effort to understand oat and barley adaptability and performance in Michigan for both traditional markets and emerging opportunities in craft malting, milling, and distilling.

Temperature and precipitation were near normal from planting through harvest at Chatham. However, hours of rainfall were above normal due to frequent lake effect rains. Temperature was near normal at Johannesburg, but precipitation was slightly above normal. Temperature was slightly below normal and precipitation slightly above normal at Croswell from planting through harvest. Moderate perennial weed pressure (dandelion and alfalfa) and Sandhill crane damage were observed at Chatham. Late season armyworm damage was observed at Croswell. Significant lodging occured in oats and barley at Croswell and in barley at Johannesburg, perhaps due to higher stand densities and nitrogen rates. Raw grain quality was analyzed at MSU-UPREC, with micro malting and malt quality analysis forthcoming from the USDA-ARS Cereal Crops Research Unit in Madison, WI. Craft maltsters at Great Lakes Malting Company, Mitten State Malt and/or Emergent Malt will also be malting small batches of grain from the trial to share their observations with the project team and funders. Variety performance and quality data were analyzed within and across locations using ANOVA (alpha = 0.10) and Tukey's HSD test in the Agricolae package for R. Oat yield data from Croswell is presented as an average of yield monitor and combine scale numbers. Grain quality data from Johannesburg was not replicated nor statistically analyzed.

Significant differences were observed among barley varieties in stand density, heading date, height, lodging, test weight, protein, germination energy (GE) and stirring number (RVU) ($P < 0.10$). LGBU17-1320-A produced denser stands than other varieties at two locations, likely due to its smaller seed size, and was also more prone to lodging. HudsonNY headed significantly earlier and was generally taller than other varieties. Mean yield was 61.9 bu/a, which varied significantly by location but not variety. Mean test weight was 47.8 lbs/bu with HudsonNY and northern locations showing significantly higher grain density. HudsonNY also had significantly higher grain protein and GE than other entries. Dormancy was observed in LCS Odyssey and HudsonNY grain from Johannesburg. Pre-harvest sprout (PHS) was observed in HudsonNY and LGBU17-1320-A at Chatham, while LCS Odyssey demonstated good PHS resistance. DON above 1 ppm was detected in all barley varieties from the Croswell location despite fungicide applications, the timing of which may have been somewhat early. In general, our results indicate that HudsonNY and LGBU17-1320-A are fairly comparable to LCS Odyssey in agronomic performance, but likely lack suffecient PHS resistance for reliable malting barley production in Michigan.

Significant differences were observed among oat varieties for all parameters, except lodging, test weight, germination (GE 8 ml, GC) and DON. Stand density was above our target at Croswell, for Rushmore especially, which made it more prone to lodging. Rushmore headed earlier, and Ida later, than other varieties. SD Buffalo was significantly taller than other entries. Rushmore showed more disease susceptibility than other varieties at two locations. Mean yield was 84.6 bu/a with SD Buffalo and Hayden producing significantly higher yields than other entries. Mean test weight was 36.9 lbs/bu with northern locations producing significantly higher grain density. Rushmore had the highest grain protein concentration and percentage of thin kernels, while SD Buffalo showed the highest germination energy (GE 4 ml) and stirring number (RVU) among the entries. DON was higher in oats from Croswell, but below 1 ppm for all locations and varieties. In general, our results indicate that SD Buffalo could be a suitable variety for oat production in Michigan, a conclusion further supported by our 2025 small plot results. Drs. DeDecker and Wilke presented preliminary results of the project at the KBS Food Grade Grains field day in June 2025, at the UPREC Twilight Tour in August 2025 and at Thumb Ag Day in December 2025. We would like to thank MCIA for supporting this research and all our cooperators for making it happen!

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TRIAL DETAILS

Planting date:

- May 20th at Chatham
- May 17th at Johannesburg
- April 21st (oats) & 22nd (barley) at Croswell

Seeded at 28 seeds/ft^2

Fertility:

- 60 lbs N, 30 lbs P, 78 lbs K/a at Chatham
- 58 lbs N, 23 lbs P, 45 lbs K/a at Johannesburg
- 89 lbs N, 30 lbs P, 78 lbs K/a at Croswell

Herbicide:

- 3 oz/a Dicamba, plus 12 oz/a MCPA at Chatham
- 13.5 oz/a Huskie (barley), 8 oz/a 2,4-D Amine plus 0.5 oz/a Harmony Extra (oats) at Johannesburg
- 19 oz/a Barrage 2,4-D Ester at Croswell

Fungicide:

- 4 oz/a Priaxor, plus 13.7 oz/a Miravis Ace at Chatham
- 5 oz/a Tarian, plus 13.7 oz/a Miravis Ace (barley only) at Johannesburg
- 12 oz/a Acadia (oats), 8oz/a Prosaro (barley), plus 13.7 oz/a Miravis Ace at Croswell

Harvest Date:

- August 30th at Chatham
- August 2nd (barley) & 27th (oats) at Johannesburg
- July 30th (barley) & August 11th (oats) at Croswell

Table 1a. Barley Performance by Location and Variety (entries followed by the same letter are not significantly different)															
Location	**Variety**	**Stand (1 ft²)**		**Heading Date**		**Height (in)**		**Lodging (0G-5B)**		**Disease (0G-5B)**		**Yield (bu/a)**		**TW (lbs/bu)**	
Chatham	HudsonNY	27.5	a	10-Jul	b	28.9	a	0.0	a	0.8	b	48.5	a	52.7	a
Chatham	LCS Odyssey	25.0	a	13-Jul	a	22.0	b	0.0	a	0.5	a	46.6	a	50.8	a
Chatham	LGBU17-1320-A	28.0	a	12-Jul	a	20.6	b	0.0	a	0.3	c	52.2	a	47.6	b
Johannesburg	HudsonNY	19.8	b	NA	NA	23.1	a	0.4	a	3.1	NA	118.8	a	46.9	NA
Johannesburg	LCS Odyssey	19.8	b	NA	NA	20.2	b	0.4	a	2.5	NA	131.8	a	45.8	NA
Johannesburg	LGBU17-1320-A	23.1	a	NA	NA	20.6	b	1.1	a	2.4	NA	119.5	a	47.0	NA
Croswell	HudsonNY	22.3	b	22-Jun	NA	24.6	b	2.3	a	1.0	a	56.9	a	46.6	a
Croswell	LCS Odyssey	20.3	b	25-Jun	NA	25.4	b	0.3	b	2.0	a	60.5	a	44.8	ab
Croswell	LGBU17-1320-A	33.0	a	24-Jun	NA	32.0	a	3.7	a	1.7	a	57.6	a	42.8	b
Average	**HudsonNY**	**23.3**	**b**	**1-Jul**	**b**	**25.6**	**a**	**0.8**	**ab**	**1.6**	**b**	**60.5**	**a**	**49.7**	**a**
Average	**LCS Odyssey**	**21.8**	**b**	**4-Jul**	**a**	**22.3**	**b**	**0.2**	**b**	**1.7**	**a**	**62.5**	**a**	**47.9**	**b**
Average	**LGBU17-1320-A**	**27.6**	**a**	**3-Jul**	**a**	**23.7**	**ab**	**1.4**	**a**	**1.4**	**b**	**62.8**	**a**	**45.7**	**c**
	Mean	**24.2**		**2-Jul**		**23.9**		**0.8**		**1.6**		**61.9**		**47.8**	
	P-Value	**0.002**		**<0.001**		**0.095**		**0.015**		**0.420**		**0.579**		**<0.001**	

Table 1b. Barley Grain Quality by Location and Variety																	
Location	**Variety**	**Protein (%)**		**Plump (%)**		**Thin (%)**		**GE (%) 4 ml**		**GE (%) 8 ml**		**GC (%)**		**SN (RVU)**		**DON (ppm)**	
Chatham	HudsonNY	10.2	a	98.5	ab	0.1	a	92	a	40	a	98	ab	51	b	0.40	a
Chatham	LCS Odyssey	9.5	a	97.9	b	0.2	a	89	a	39	a	99	a	140	a	0.36	a
Chatham	LGBU17-1320-A	9.3	a	98.6	a	0.2	a	88	a	32	a	95	b	34	c	0.40	a
Johannesburg	HudsonNY	12.4	NA	95.4	NA	1.0	NA	34	NA	16	NA	35	NA	137	NA	0.62	NA
Johannesburg	LCS Odyssey	11.2	NA	99.1	NA	0.1	NA	37	NA	18	NA	27	NA	138	NA	0.86	NA
Johannesburg	LGBU17-1320-A	11.6	NA	98.6	NA	0.2	NA	92	NA	68	NA	91	NA	156	NA	0.53	NA
Croswell	HudsonNY	12.6	a	91.7	a	0.7	ab	96	a	73	a	96	a	145	a	1.20	a
Croswell	LCS Odyssey	11.9	b	93.5	a	0.5	b	96	a	71	a	96	a	160	a	2.47	a
Croswell	LGBU17-1320-A	11.0	c	92.4	a	0.9	a	94	a	63	a	95	a	135	a	2.47	a
Average	**HudsonNY**	**11.4**	**a**	**95.5**	**a**	**0.5**	**a**	**93.4**	**a**	**56.1**	**a**	**96.3**	**a**	**96.9**	**b**	**0.73**	**a**
Average	**LCS Odyssey**	**10.6**	**b**	**96.4**	**a**	**0.3**	**a**	**85.3**	**a**	**48.5**	**ab**	**88.8**	**a**	**147.5**	**a**	**1.21**	**a**
Average	**LGBU17-1320-A**	**10.2**	**b**	**96.3**	**a**	**0.5**	**a**	**83.6**	**a**	**41.5**	**b**	**87.4**	**a**	**86.9**	**b**	**1.19**	**a**
	Mean	**10.7**		**96.1**		**0.4**		**87.4**		**48.7**		**90.8**		**110.4**		**1.00**	
	P-Value	**0.003**		**0.369**		**0.227**		**0.224**		**0.056**		**0.334**		**0.002**		**0.146**	

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Table 2a. Oat Performance by Location and Variety

Location	Variety	Stand (1 ft²)		Heading Date		Height (in)		Lodging (0G-5B)		Disease (0G-5B)		Yield (bu/a)		TW	
Chatham	Hayden	35.0	a	9-Jul	a	32.8	a	0.0	a	0.0	a	79.7	b	38.7	ab
Chatham	Ida	32.3	a	9-Jul	a	33.0	a	0.3	a	0.0	a	76.2	b	38.0	b
Chatham	Rushmore	32.5	a	7-Jul	b	32.7	a	0.0	a	0.0	a	75.9	b	41.5	a
Chatham	SD Buffalo	30.8	a	8-Jul	b	35.2	a	0.0	a	0.0	a	84.3	a	37.9	b
Johannesburg	Hayden	30.0	a	NA	NA	25.7	ab	0.0	a	2.8	b	78.4	NA	35.4	NA
Johannesburg	Ida	29.3	a	NA	NA	28.5	a	0.0	a	3.0	b	73.4	NA	36.3	NA
Johannesburg	Rushmore	28.8	a	NA	NA	24.6	b	0.0	a	4.0	a	85.3	NA	36.7	NA
Johannesburg	SD Buffalo	27.7	a	NA	NA	27.1	ab	0.0	a	2.8	b	80.5	NA	35.9	NA
Croswell	Hayden	33.3	ab	20-Jun	NA	40.1	a	1.8	ab	1.8	a	101.9	a	35.5	ab
Croswell	Ida	33.7	ab	23-Jun	NA	40.5	a	0.5	b	1.5	a	90.8	ab	34.6	ab
Croswell	Rushmore	44.7	a	19-Jun	NA	40.3	ab	3.5	a	1.8	a	76.0	b	34.3	b
Croswell	SD Buffalo	29.3	b	21-Jun	NA	41.0	a	2.8	ab	1.0	a	97.4	a	36.0	a
Average	**Hayden**	**33.0**	**ab**	**29-Jun**	**b**	**33.5**	**ab**	**0.6**	**a**	**1.4**	**ab**	**89.4**	**a**	**36.9**	**a**
Average	**Ida**	**32.0**	**ab**	**1-Jul**	**a**	**34.5**	**ab**	**0.3**	**a**	**1.4**	**ab**	**82.3**	**ab**	**36.3**	**a**
Average	**Rushmore**	**35.9**	**a**	**28-Jun**	**c**	**33.2**	**b**	**1.2**	**a**	**1.7**	**a**	**77.0**	**b**	**37.7**	**a**
Average	**SD Buffalo**	**29.4**	**b**	**29-Jun**	**bc**	**35.1**	**a**	**0.9**	**a**	**1.1**	**b**	**89.7**	**a**	**36.8**	**a**
	Mean	**32.6**		**29-Jun**		**34.1**		**0.7**		**1.4**		**84.6**		**36.9**	
	P-Value	**0.066**		**<0.001**		**0.076**		**0.152**		**0.071**		**0.009**		**0.285**	

Table 2b. Oat Grain Quality by Location and Variety

Location	Variety	Protein (%)		Thin (%)		GE (%) 4 ml		GE (%) 8 ml		GC (%)		SN (RVU)		DON (ppm)	
Chatham	Hayden	10.9	NA	0.01	NA	96.0	a	87.3	a	98.5	a	122.7	a	0.38	a
Chatham	Ida	11.6	NA	0.20	NA	97.0	a	91.0	a	99.3	a	97.3	b	0.37	a
Chatham	Rushmore	11.1	NA	0.06	NA	96.3	a	92.0	a	99.5	a	100.1	ab	0.39	a
Chatham	SD Buffalo	10.2	NA	0.02	NA	97.5	a	85.3	a	99.0	a	118.5	ab	0.38	a
Johannesburg	Hayden	12.2	NA	0.35	NA	100.0	NA	97.0	NA	94.0	NA	100.1	NA	0.35	NA
Johannesburg	Ida	12.7	NA	0.27	NA	99.0	NA	89.0	NA	97.0	NA	100.7	NA	0.42	NA
Johannesburg	Rushmore	12.8	NA	0.22	NA	97.0	NA	95.5	NA	99.0	NA	85.6	NA	0.58	NA
Johannesburg	SD Buffalo	12.6	NA	0.16	NA	97.5	NA	95.0	NA	98.0	NA	74.5	NA	0.44	NA
Croswell	Hayden	12.4	b	0.41	b	94.3	b	78.3	b	95.8	a	107.3	ab	0.81	a
Croswell	Ida	12.5	ab	0.27	b	95.0	ab	82.3	ab	95.8	a	107.0	ab	0.80	a
Croswell	Rushmore	12.9	a	0.91	a	94.3	b	83.3	ab	95.3	a	99.9	b	0.63	a
Croswell	SD Buffalo	12.5	ab	0.18	b	97.5	a	88.0	a	95.5	a	114.8	a	0.58	a
Average	**Hayden**	**12.1**	**b**	**0.34**	**ab**	**95.6**	**b**	**87.5**	**a**	**96.1**	**a**	**113.3**	**a**	**0.51**	**a**
Average	**Ida**	**12.4**	**ab**	**0.26**	**b**	**96.2**	**ab**	**87.4**	**a**	**97.3**	**a**	**99.1**	**b**	**0.53**	**a**
Average	**Rushmore**	**12.6**	**a**	**0.65**	**a**	**95.4**	**b**	**90.3**	**a**	**97.9**	**a**	**98.4**	**b**	**0.53**	**a**
Average	**SD Buffalo**	**12.1**	**ab**	**0.15**	**b**	**97.8**	**a**	**89.4**	**a**	**97.5**	**a**	**114.8**	**a**	**0.47**	**a**
	Mean	**12.3**		**0.40**		**96.3**		**88.7**		**97.2**		**106.4**		**0.50**	
	P-Value	**0.057**		**0.006**		**0.001**		**0.103**		**0.871**		**0.001**		**0.182**	

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