



Michigan State University Malting Barley Program

ASHLEY MCFARLAND

UPPER PENINSULA RESEARCH AND EXTENSION CENTER

Malting barley research

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- ▶ Established research program in 2013
 - ▶ Variety trials
 - ▶ Cultural management
 - ▶ Facilitation of industry growth
- ▶ Developed to respond to demand from craft beverage market



Research Trials

- ▶ Eastern Spring Barley Nursery
- ▶ Spring Two-Row Genotype x Environment Trial
- ▶ UK Heritage Barley Trial
- ▶ Organic Barley Grain Trial
- ▶ Thumb Region Malting Barley Trials
- ▶ Winter Malting Barley Trial
- ▶ Winter Malting Barley Management Trials
- ▶ Oregon Promise Flavor Nursery

Eastern Spring Barley Nursery

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- ▶ Collaborative trial across 12 locations in 10 states
- ▶ Screen 25 spring varieties, primarily two-row
- ▶ Managed by North Dakota State University in cooperation with the Craft Maltsters Guild



Eastern Spring Barley Nursery

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	Chatham (UPREC)	Hillman (Hardie Farm)	Hickory Corners (KBS)
Soil type	Eben very cobbly sandy loam	Omena fine sandy loam	Kalamazoo loam
Previous crop	Soybeans	Soybeans	Soybeans
Planting date	5-10-17	5-15-2017	4-18-2017
Fertility applied	50 lbs N/ac	50 lbs N/ac	50 lbs N, 100 lbs P, 50 lbs K, 12 lbs S/ac
Herbicide applied	13.5 ozs/ac Huskie	13.5 ozs/ac Huskie	12 ozs/ac Huskie, 16.4 ozs/ac Axial
Fungicide applied	8.2 ozs/ac Prosaro	8.2 ozs/ac Prosaro	8.2 ozs/ac Prosaro
Insecticide applied	NA	NA	2.32 ozs/ac Grizzly Z
Harvest date	8-21-2017	8-31-2017	7-26-2017

Eastern Spring Barley Nursery



Eastern Spring Barley Nursery – Chatham

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
2ND28065	2	7/15/2017	52.8	22.3	62	0.15	10.2	192	90.7
2ND33710	2	7/8/2017	51.7	24.4	67	0.00	10.0	151	91.7
2ND33757	2	7/12/2017	52.4	24.2	80	0.35	9.4	172	93.6
2ND33760	2	7/12/2017	52.2	25.1	77	0.00	9.4	176	95.2
2ND33821	2	7/13/2017	48.9	22.4	58	0.21	10.0	46	98.5
AAC Synergy	2	7/15/2017	50.1	23.4	63	0.00	9.7	84	96.8
Acorn	2	7/20/2017	49.4	19.4	66	0.30	9.1	172	95.7
Bettina	2	7/20/2017	50.4	20.4	67	0.07	9.4	130	95.7
Conlon	2	7/6/2017	51.5	22.1	67	0.17	10.3	155	98.1
Esma	2	7/18/2017	50.6	18.5	89	0.20	9.4	155	95.6
Explorer	2	7/18/2017	50.4	18.0	75	0.09	9.2	146	95.5
KWS Beckie	2	7/20/2017	48.6	16.3	58	0.52	9.0	175	96.4
KWS Fantex	2	7/20/2017	49.8	17.7	72	0.24	9.1	188	94.9
KWS Josie	2	7/20/2017	50.2	16.7	65	0.07	8.9	179	95.8

Eastern Spring Barley Nursery – Chatham

Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
KWS Tinka	2	7/19/2017	48.9	21.6	75	0.25	9.2	145	95.4
LCS Genie	2	7/20/2017	50.1	19.6	70	0.39	9.3	185	94.8
LCS Odyssey	2	7/20/2017	45.9	17.9	64	0.20	8.8	176	95.4
Manta	2	7/19/2017	49.6	17.6	64	0.43	10.0	121	96.1
ND Genesis	2	7/14/2017	51.7	20.4	64	0.11	9.4	189	92.4
Newdale	2	7/17/2017	50.1	22.7	53	0.00	10.5	165	89.4
Pinnacle	2	7/13/2017	48.7	22.7	34	0.14	10.1	157	82.2
Quest	6	7/8/2017	51.2	29.0	66	0.28	11.2	173	90.6
Sangria	2	7/18/2017	50.8	16.2	49	0.49	10.3	116	90.8
Sirish	2	7/18/2017	50.2	17.0	52	0.45	9.7	186	96.1
Tradition	6	7/6/2017	50.6	27.7	67	0.14	11.0	134	95.2
	Mean	7/15/2018		20.9	64.9				
	CV %	4.6		2.2	19.1				
	LSD	3.5		3.2	20.4				

Eastern Spring Barley Nursery – Chatham

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- ▶ Average yield 65 bu/acre
- ▶ Less sprout damage than normal
- ▶ Lower protein than normal

Eastern Spring Barley Nursery – Hickory Corners

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
2ND28065	2	6/17/2017	48.5	23.5	48	0.00	10.5	170	77.3
2ND33710	2	6/16/2017	48.2	24.0	51	0.00	10.7	195	86.3
2ND33757	2	6/18/2017	50.6	23.9	60	0.00	10.3	170	94.3
2ND33760	2	6/16/2017	50.3	22.6	62	0.11	11.1	179	94.6
2ND33821	2	6/17/2017	45.8	22.6	50	0.00	10.6	166	92.0
AAC Synergy	2	6/26/2017	47.8	23.7	58	0.00	11.8	113	93.1
Acorn	2	6/27/2017	49.7	22.0	69	0.00	11.5	185	98.9
Bettina	2	6/26/2017	49.0	24.0	58	0.00	12.4	148	96.4
Conlon	2	6/16/2017	48.8	24.7	59	0.00	11.6	162	95.3
Esma	2	6/18/2017	50.2	23.6	78	0.00	11.0	162	92.3
Explorer	2	6/22/2017	49.7	23.0	85	0.00	11.1	176	95.2
KWS Beckie	2	6/26/2017	47.1	20.0	74	0.00	10.8	163	98.4
KWS Fantex	2	6/23/2017	48.4	19.7	73	0.09	11.7	186	96.9
KWS Josie	2	6/25/2017	51.3	20.0	74	0.05	12.4	187	98.7

Eastern Spring Barley Nursery – Hickory Corners

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
KWS Tinka	2	6/26/2017	48.3	23.7	58	0.00	13.0	157	96.5
LCS Genie	2	6/27/2017	49.0	22.0	56	0.00	13.0	191	96.8
LCS Odyssey	2	6/26/2017	49.4	23.3	55	0.00	11.5	188	96.9
Manta	2	6/23/2017	50.2	21.7	60	0.14	12.3	178	95.9
ND Genesis	2	6/17/2017	49.0	24.6	60	0.00	10.8	105	95.5
Newdale	2	6/26/2017	48.0	23.9	49	0.00	13.4	146	83.7
Pinnacle	2	6/16/2017	47.1	23.0	36	0.00	10.9	185	93.2
Quest	6	6/17/2017	47.7	24.2	38	0.01	12.3	206	76.8
Sangria	2	6/18/2017	50.5	25.3	81	0.00	11.9	158	96.4
Sirish	2	6/27/2017	50.1	23.4	69	0.00	11.0	173	98.7
Tradition	6	6/17/2017	45.7	23.3	38	0.00	11.0	168	71.6
	Mean	6/21/2017		23	60.0				
	CV %	9.1		1.4	15.1				
	LSD	3.2		2.4	15.0				

Eastern Spring Barley Nursery – Hickory Corners

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- ▶ Average yield 60 bu/acre
- ▶ Virtually no sprout damage
- ▶ Protein range excellent
- ▶ Kernels less plump

Eastern Spring Barley Nursery – Hillman

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
2ND28065	2	7/5/2017	49.9	30.9	93	0.00	12.0	60	89.9
2ND33710	2	7/10/2017	49.3	28.6	103	0.00	12.4	117	89.8
2ND33757	2	7/18/2017	50.0	24.3	123	0.00	11.3	75	93.3
2ND33760	2	7/17/2017	48.9	23.1	112	0.00	12.1	43	90.2
2ND33821	2	7/12/2017	46.7	23.0	95	0.18	11.6	43	95.8
AAC Synergy	2	7/13/2017	47.3	28.4	98	0.00	11.9	5	92.2
Acorn	2	7/11/2017	47.9	27.9	92	0.00	11.8	177	94.1
Bettina	2	7/11/2017	47.1	27.9	69	0.00	11.9	42	87.4
Conlon	2	7/14/2017	47.2	28.5	79	0.00	12.5	71	88.9
Esma	2	7/10/2017	46.7	26.4	109	0.11	11.8	53	89.9
Explorer	2	7/14/2017	45.4	26.1	83	0.00	11.9	117	80.6
KWS Beckie	2	7/11/2017	46.4	29.2	105	0.00	11.4	178	94.4
KWS Fantex	2	7/13/2017	47.3	27.6	103	0.00	11.4	178	90.8
KWS Josie	2	7/11/2017	47.2	26.4	100	0.02	11.4	134	92.0

Eastern Spring Barley Nursery – Hillman

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
KWS Tinka	2	7/14/2017	46.7	29.4	101	0.00	12.2	70	93.0
LCS Genie	2	7/15/2017	48.6	23.9	59	0.00	13.5	146	88.4
LCS Odyssey	2	7/13/2017	43.3	26.4	48	0.00	11.5	166	77.2
Manta	2	7/11/2017	46.8	28.1	68	0.00	12.5	156	78.6
ND Genesis	2	7/12/2017	48.2	26.0	125	0.21	10.7	18	96.9
Newdale	2	7/7/2017	46.7	28.6	87	0.05	12.7	6	80.4
Pinnacle	2	7/9/2017	42.4	27.0	36	0.07	12.2	39	70.1
Quest	6	7/13/2017	48.3	25.4	101	0.00	13.2	187	84.2
Sangria	2	7/13/2017	47.0	26.6	89	0.11	11.9	101	84.3
Sirish	2	7/12/2017	47.7	22.8	72	0.13	12.3	80	88.6
Tradition	6	7/10/2017	47.0	30.3	102	0.00	12.4	139	85.0
	Mean	7/11/2017		26.9	90.1				
	CV %	12.6		16.8	13.4				
	LSD	8.7		7.4	25.7				

Eastern Spring Barley Nursery – Hillman

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- ▶ Average yield 90 bu/acre
- ▶ Severe sprout damage – variety dependent
- ▶ Protein range excellent
- ▶ Kernels less plump, more thins

Eastern Spring Barley Nursery – Variety Origin

Variety CHATHAM	Test wt	DON (ppm)	% Protein	% Plump	RVA	Bu/ac
Europe	49.3	0.3	9.3	95.2	159.4	67
NDSU	51.2	0.1	9.8	92.8	154.8	64
Canada	50.1	0.0	10.1	93.1	124.3	58

Variety HICKORY CORNERS	Test wt	DON (ppm)	% Protein	% Plump	RVA	Bu/ac
Europe	49.5	0.0	11.8	96.8	173.2	66
NDSU	48.5	0.0	10.8	91.1	166.5	54
Canada	47.9	0.0	12.6	88.4	129.6	56

Variety HILLMAN	Test wt	DON (ppm)	% Protein	% Plump	RVA	Bu/ac
Europe	46.8	0.0	12.0	87.6	122.9	85
NDSU	47.8	0.1	11.9	89.4	58.3	96
Canada	47.0	0.0	12.3	86.3	5.6	92

Eastern Spring Barley Nursery – Variety Watch List

Variety CHATHAM	Type	Heading Date	Test wt	Ht (in)	Bu/ac	DON (ppm)	% Protein	RVA	% Plump
LCS Genie	2	7/20/2017	50.1	19.6	70	0.39	9.3	185	94.8
LCS Odyssey	2	7/20/2017	45.9	17.9	64	0.20	8.8	176	95.4
Pinnacle	2	7/13/2017	48.7	22.7	34	0.14	10.1	157	82.2
Conlon	2	7/6/2017	51.5	22.1	67	0.17	10.3	155	98.1
Manta	2	7/19/2017	49.6	17.6	64	0.43	10.0	121	96.1

Variety HICKORY CORNERS	Type	Heading Date	Test wt	Ht (in)	Bu/ac	DON (ppm)	% Protein	RVA	% Plump
LCS Genie	2	6/27/2017	49.0	22.0	56	0.00	13.0	191	96.8
LCS Odyssey	2	6/26/2017	49.4	23.3	55	0.00	11.5	188	96.9
Pinnacle	2	6/16/2017	47.1	23.0	36	0.00	10.9	185	93.2
Conlon	2	6/16/2017	48.8	24.7	59	0.00	11.6	162	95.3
Manta	2	6/23/2017	50.2	21.7	60	0.14	12.3	178	95.9

UK Heritage Barley Trial

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- ▶ Screening heritage barley varieties for useful traits in modern breeding programs
- ▶ Specific interest in resistance to Fusarium head blight



UK Heritage Barley Trial

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- ▶ Typically lower than average yield
- ▶ Overall, general resistance to pre-harvest sprout
- ▶ Some lines showing promise for FHB resistance
- ▶ UK research team beginning to cross lines



Organic Barley Varieties

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- ▶ **Planted April 25th**
- ▶ **Plot area rototilled twice and cultipacked**
- ▶ **Barley seeding rate 120 lbs/acre**
- ▶ **300 lbs/acre Midwestern BioAg (4-1-11) top-dressed Feekes stage 7**
- ▶ ***Good success with oats***
- ▶ ***Corn planted twice, both lost due to bird depredation***



Organic Barley Varieties

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- ▶ **Harvested August 14th**
- ▶ **Challenged by weeds and lodging**
- ▶ **Cool, wet season led to high moisture at harvest**



Organic Barley Variety Trial



Quest



Robust



Conlon



Pinnacle

Organic Barley Varieties

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Variety	Pinnacle	Robust	Conlon	Quest
Yield (bu/acre)	15	57	28	46
% Moisture	16.6	15.7	15.9	15.4
Test Weight (lbs/bu)	46	49	51	49
% Crude Protein	11.4	12.1	11.6	11.5
DON (ppm)	<0.03	<0.03	<0.03	<0.03
Lodging	9	4	9	6
Height (in)	26	36	29	32
Heading Date	6/30/2017	6/28/2017	6/30/2017	6/28/2017





Organic Barley Fertility

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- ▶ **Test 2 treatments + control**
 - ▶ **Compost**
 - ▶ **Midwestern BioAg**
- ▶ **Planted on May 26th**
- ▶ **Compost and fertilizer spread and incorporated on June 1st – barley just starting to emerge**
- ▶ **Compost – screened, 3.5 lbs/plot applied by hand**
- ▶ **BioAg – 300 lbs/acre (4-1-11) with Gandy drop spreader**



Organic Barley Fertility

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- ▶ **Used tine weeder on June 13th**
- ▶ **No visual differences amongst treatments throughout growing season or at harvest**
- ▶ **Harvested September 12th**

Organic Barley Fertility

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Organic Barley Fertility

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Treatment	Yield (bu/acre)	% Moisture	Test Weight (lbs/bu)	% Crude Protein
Control	53	14.4	47	12.3
Compost	55	14.4	47	12.5
Midwestern BioAg	59	14.2	47.5	12.0



Thumb Winter Malting Barley Trials

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- ▶ Trial in Applegate, MI
- ▶ Planted 9/25/16 after edible dry beans
- ▶ Seeding rate 2.8 bu/acre
- ▶ Harvested 7/16/17
- ▶ Tested treatments across three varieties – Puffin, Scala, and Wintmalt

Thumb Winter Malting Barley Trials

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- ▶ Three replications of each variety x treatment combination
- ▶ Treatments with 84 lbs. N or 135 lbs. N/acre
 - ▶ Untreated control + fertility
 - ▶ Prosaro + fertility
 - ▶ Prosaro + Stratego Yld + fertility
 - ▶ Prosaro + Stratego Yld + Palisade + fertility

Thumb Winter Malting Barley Trials

Table 1: Response of three winter barley varieties to fertilizer nitrogen, fungicides and plant growth regulator

treatment product *	N rate lbs/ac	<i>Puffin</i>					<i>Scala</i>					<i>Wintmalt</i>				
		yield	test	harv.	plant	plant	yield	test	harv.	plant	plant	yield	test	harv.	plant	plant
		bu/ac 14 % M	wt lbs	moist. %	height inches.	lodge %	bu/ac 14 % M	wt lbs	moist. %	height inches.	lodge %	bu/ac 14 % M	wt lbs	moist. %	height inches.	lodge %
1. untreated	84	118	48	15.9	--	65	139	48	12.1	--	63	125	49	12.4	--	18
2. Prosaro	84	121	48	15.9	--	39	134	49	12.3	--	60	127	48	13.0	--	24
3. Prosaro, Stratego Yld	84	123	48	15.4	34.2	53	140	48	12.6	30.2	54	131	49	12.7	32.7	53
4. Prosaro, StrategoYld, Palisade	84	130	48	15.5	34.0	40	133	48	12.9	29.6	44	136	49	12.5	32.5	27
5. untreated	135	123	48	15.7	--	74	140	49	12.9	--	81	133	49	12.0	--	13
6. Prosaro	135	120	48	15.5	--	64	142	49	12.1	--	88	131	48	12.9	--	37
7. Prosaro, StrategoYld	135	123	48	16.0	34.2	59	135	49	11.8	30.5	57	144	49	12.3	30.5	33
8. Prosaro, StrategoYld, Palisade	135	127	48	15.6	32.9	42	138	49	12.4	30.6	72	139	49	12.5	31.7	26

* Stratego Yld (2.3oz/ac) and Palisade (12 oz/ac) applied at g.s.7 on April 29; Prosaro (7oz/ac) applied at g.s 10.5 on May31

Table 2: Effects of fertilizer nitrogen, fungicides, and growth regulator on the quality of three winter barley

treatment	N rate lbs/ac	<i>Puffin</i>					<i>Scala</i>					<i>Wintmalt</i>				
		protein dry,%	plump > 6/64	thin ≤ 5/64	RVA	DON ppm	protein dry,%	plump > 6/64	thin ≤ 5/64	RVA	DON ppm	protein dry,%	plump > 6/64	thin ≤ 5/64	RVA	DON ppm
1. untreated	84	13.0	92	0.9	150	< 0.3	12.9	95	0.9	150	< 0.3	12.6	93	0.8	142	< 0.3
2. Prosaro	84	12.8	93	0.8	150	< 0.3	13.2	94	0.7	140	< 0.3	12.5	92	0.8	139	< 0.3
3. Prosaro, Stratego Yld	84	12.9	91	0.9	142	< 0.3	12.6	96	0.8	148	< 0.3	12.4	92	1.1	144	< 0.3
4. Prosaro, StrategoYld, Palisade	84	12.8	91	0.9	148	< 0.3	12.7	95	0.9	147	< 0.3	12.6	90	1.1	138	< 0.3
5. untreated	135	13.2	89	1.3	144	< 0.3	13.6	94	1.1	150	< 0.3	12.9	90	1.4	136	< 0.3
6. Prosaro	135	13.4	89	1.2	149	< 0.3	12.7	92	1.1	155	< 0.3	13.2	88	1.4	135	< 0.3
7. Prosaro, StrategoYld	135	13.4	90	1.5	151	< 0.3	13.3	95	0.8	143	< 0.3	14.4	92	1.0	137	< 0.3
8. Prosaro, StrategoYld, Palisade	135	12.8	92	1.2	146	< 0.3	13.3	94	0.9	157	< 0.3	12.5	93	0.9	142	< 0.3

analysis performed by MSU Malting Barley Quality Lab, Upper Peninsula Research & Extension Center

Winter Malting Barley Variety Trial

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- ▶ Trial at MSU W.K. Kellogg Biological Station, Hickory Corners, MI
- ▶ Planted 9/27/16
- ▶ Fertility @ planting – 20 lbs N, 100 lbs P, 50 lbs K/acre
- ▶ Fertility 4/12/17 – 12 lbs S, 102.5 lbs N/acre
- ▶ Fungicide 5/26/17 – 8 oz/acre Prosaro
- ▶ Harvest 6/30/17

Winter Malting Barley Variety Trial

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
Calypso	2	5-16-17	48	33	155	<0.3	12.7	147	79.5
Charles	2	5-12-17	41	26	109	<0.3	12.5	6	87.7
Endeavor	2	5-14-17	48	35	115	<0.3	10.6	9	81.2
Flavia	2	5-17-17	49	29	151	<0.3	11.5	142	95.2
Hirondella	6	5-16-17	45	33	156	<0.3	11.1	92	82.6
McGregor	6	5-16-17	47	34	163	<0.3	11.6	160	72.4
Mission	2	5-18-17	44	29	117	<0.3	12.2	131	78.8
Puffin	2	5-17-17	51	30	127	<0.3	11.8	151	92.3
SU-Mateo	2	5-17-17	49	34	152	<0.3	12.0	136	85.9
Thoroughbred	6	5-11-17	49	38	161	<0.3	11.1	150	77.4
Violetta	2	5-16-17	49	33	140	<0.3	13.1	85	88.8
Wintmalt	2	5-19-17	47	30	128	<0.3	11.3	137	88.8

Winter Malting Barley Variety Trial

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Variety	Type	Heading Date	Test wt	Ht (in)	Yield Bu/ac	DON (ppm)	% Protein	RVA	% Plump
Calypso	2	5-16-17	48	33	155	<0.3	12.7	147	79.5
Charles	2	5-12-17	41	26	109	<0.3	12.5	6	87.7
Endeavor	2	5-14-17	48	35	115	<0.3	10.6	9	81.2
Flavia	2	5-17-17	49	29	151	<0.3	11.5	142	95.2
Hirondella	6	5-16-17	45	33	156	<0.3	11.1	92	82.6
McGregor	6	5-16-17	47	34	163	<0.3	11.6	160	72.4
Mission	2	5-18-17	44	29	117	<0.3	12.2	131	78.8
Puffin	2	5-17-17	51	30	127	<0.3	11.8	151	92.3
SU-Mateo	2	5-17-17	49	34	152	<0.3	12.0	136	85.9
Thoroughbred	6	5-11-17	49	38	161	<0.3	11.1	150	77.4
Violetta	2	5-16-17	49	33	140	<0.3	13.1	85	88.8
Wintmalt	2	5-19-17	47	30	128	<0.3	11.3	137	88.8

Winter Malting Barley Management Trials

- ▶ Trial at MSU W.K. Kellogg Biological Station, Hickory Corners, MI
- ▶ Planted 10/12/16 and harvested 6/30/17
- ▶ Tested treatments across four varieties – Puffin, Scala, Tepee, and Wintmalt

Winter Malting Barley Management Trials

- ▶ Four replications of each variety x treatment combination
- ▶ Each fertility treatment with or without fungicide
 - ▶ 0 lbs. N/acre
 - ▶ 75 lbs. N/acre
 - ▶ 150 lbs. N/acre

Winter Malting Barley Management Trials

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Parameter	0 lbs. N/acre	75 lbs. N/acre	150 lbs. N/acre
Yield	61	91	98
% Plump	96	94	91
Protein	8.6	10.1	12.6

Mean averages across all varieties for each treatment

- ▶ RVA high and acceptable across all treatments
- ▶ No difference between treated and untreated in DON

Spartan Barley

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- ▶ Heritage variety over 100 years old
- ▶ Very conservative yields
- ▶ Must manage N and protein – tendency to lodge and have high protein
- ▶ Seed available through the Michigan Crop Improvement Association – www.michcrop.com



Quality Lab

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- ▶ 80+ samples processed in 2016
- ▶ 200+ samples processed in 2017
- ▶ 500+ research samples processed in 2017
- ▶ Grain quality analysis only
- ▶ Malt quality offered through:
 - ▶ <https://www.hartwick.edu/about-us/centers-institutes/center-for-craft-food-and-beverage/>
 - ▶ <http://www.montana.edu/barleybreeding/malt-quality-lab/index.html>

Malting

MICHIGAN MALTHOUSES

Map updated September 2017



1. U.P. Malt Company
2. Superior Malt
3. Valley View Farm
4. Empire Malting Co.
5. Great Lakes Malting Co.
6. Michigan Malt
7. Koops' Malt Haus
8. Fedora Malthouse
9. Mushroom Head Malts
10. Pilot Malt House
11. Emergent Malt
12. Mitten State Malt
13. Motorcity Malt
14. Arrowhead Malt
15. Macon Creek Malt

To be listed on this map, contact Ashley McFarland
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Craft Maltsters Guild

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