Spring Malting Barley Variety Trial
2019 Results

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Twenty-eight varieties of two- and six-row spring malting barley and one feed barley were trialed at two locations in Maine in 2019 (Table 1). The trials were conducted in collaboration with 9 other institutions as part of the Eastern Spring Barley Nursery project (ESBN), organized by North Dakota State University and funded in part by the Brewers Association.

Table 1. Spring malting varieties evaluated in Old Town and Mapleton, Maine in 2019.

Variety	Type	Years in Maine Trials	Developer
AAC Connect	2-row	1	Meridian Seeds
AAC Synergy	2-row	5	Agriculture and Agri-Food Canada (Brandon)
Accordine	2-row	2	Ackermann (Germany)
Cerveza	2-row	2	Agriculture and Agri-Food Canada (Brandon)
Crescendo	2-row	2	Secobra (France)
Esma	2-row	3	Ackermann (Germany)
Explorer	2-row	1	Secobra (France)
Fangio	2-row	1	Secobra (France)
Iconic	2-row	1	Secobra (France)
Klarinette	2-row	1	Secobra (France)
KWS Amadora	2-row	1	KWS (Germany)
KWS Fantex	2-row	4	KWS (Germany)
KWS Tinka	2-row	3	KWS (Germany)
LCS Genie	2-row	4	Limagrain Cereal Seeds
LCS Odyssey	2-row	4	Limagrain Cereal Seeds
ND Genesis	2-row	5	North Dakota State University
Newdale	2-row	5	Agriculture and Agri-Food Canada (Brandon)
Pinnacle	2-row	5	North Dakota State University
Robust	6-row	4	University of Minnesota
Sangria	2-row	3	Ackermann (Germany)
Tradition	6-row	5	Busch Agricultural Resources, LLC
2ND32529	2-row	2	North Dakota State University
2ND34634	2-row	1	North Dakota State University
2ND34954	2-row	2	North Dakota State University
2ND35530	2-row	2	North Dakota State University
2ND35693	2-row	1	North Dakota State University
80675-52	2-row	1	Secobra (France)
AAC Starbuck	2-row, hulless, feed	1	Agriculture and Agri-Food Canada (ECORC)

METHODS

The trials were conducted at the University of Maine Rogers Research Farm, in Old Town, and Buck Farms in Mapleton. The locations were managed using organic practices in Old Town and conventional practices in Mapleton. Agronomic practices for both locations are described in Table 2. Agronomic and basic grain quality data were collected by the University of Maine and grain samples were submitted to North Dakota State University for comprehensive grain quality analysis.

Seed lots for a number of the varieties had low germination. Where possible, additional seed lots were included in the trial and are indicated with a "-2" after the variety name.

Table 2. Agronomic practices in Old Town and Mapleton, Maine in 2019.

	Old Town	Mapleton
Previous Crop	Potato	Potato
Soil Type	Nicholville very fine sandy loam	Caribou gravely loam
pH	6.2	5.9
Pre-plant Fertility	16 tons/acre solid dairy manure (approx. 50 lb/acre of nitrogen)	340 lb/acre of 19-0-19 at planting
Planting Date, Rate	May 7, 1.45 million live seeds/acre	May 24, 1.45 million live seeds/acre
Topdress Nitrogen	June 4, 124 lb/acre Chilean nitrate (20 lb/acre of nitrogen)	None
Weed Control	May 31, cultivation and tine harrow	June 24, 2-4D (1 pt/acre), Treaty Extra (0.6 oz/acre), and NIS (1.5 pt/100 gal)
Fungicide	None	July 23, Prosaro (6.5 oz/acre)
Harvest Date	August 7	September 1

RESULTS

Monthly average weather conditions are presented in Table 3, agronomic results in Table 4, and grain quality results in Table 5. For each column in Tables 4 and 5, the greatest value is indicated with underlining and bold type. Varieties that are not significantly different from the greatest value are also in bold type. The site average, least significant difference (LSD), and coefficient of variation (CV) appear at the bottom of each column. The LSD is the minimum difference needed between two varieties to consider them statistically different at a 95% confidence level. The CV measures the variability of the data, which influences how easy it is to detect difference among the varieties. For some of the grain quality parameters in Table 5, tests were only run on composite samples, without replication, so statistics could not be run.

Several varieties had stands well below the intended 1.45 million plants/acre at both locations and have been indicated by a star (Table 4). Low plant populations could have negatively impacted the outcome for these varieties and should be considered when interpreting the results.

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Table 3. Monthly rainfall totals and average temperatures in Old Town and Caribou in 2019.

	Total Rainfall (inches)				Temperature (F)			
	Old Town		Caribou†		Old Town		Caribou†	
Month	2019	30-yr avg.	2019	30-yr avg.	2019	30-yr avg.	2019	30-yr avg.
April	3.8	3.8	4.8	2.5	41	41	38	39
May	3.0	3.8	3.2	3.4	49	53	49	52
June	3.6	4.1	2.9	3.4	60	62	60	61
July	1.9	3.6	2.5	3.7	69	67	69	66
August	6.4	3.3	2.5	3.7	65	66	65	64
Total	18.8	18.6	15.9	16.7				

† The weather station in Caribou is approximately 20 miles from the Mapleton site. 30-year norms are from 1981 to 2010.

Table 4. Agronomic characteristics of malting barley varieties grown in Old Town and Mapleton in 2019. Entries marked * had low plant stands.

	Yield† (bu/acre)		Grain Moisture‡ (%)		Foliar Disease Severity (1-9) §		Spike Emergence (1-5) #		Stand Count ≠ (#/ft²)		Heading date (days after 5/31)	
Variety	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**
AAC Connect	71	**85**	15.4	-	2.7	-	**5**	5	35	29	31	-
AAC Synergy	76	**94**	15.7	-	2.0	-	**5**	5	**40**	**32**	32	-
Accordine	59	76	17.1	-	4.7	-	**5**	5	18	15	34	-
Cerveza	76	**90**	15.2	-	2.7	-	**5**	5	28	30	31	-
Crescendo*	45	73	**27.0**	-	3.3	-	4	5	11	12	**38**	-
Esma	73	**95**	15.3	-	2.7	-	**5**	5	29	24	31	-
Explorer	73	81	15.7	-	3.0	-	**5**	5	**44**	30	33	-
Fangio*	56	61	22.1	-	3.3	-	**5**	5	11	10	35	-
Iconic*	53	80	16.5	-	3.0	-	**5**	5	16	11	34	-
Klarinette	59	81	16.0	-	4.0	-	**5**	5	24	21	33	-
KWS Amadora	53	80	16.1	-	**6.0**	-	4	5	20	14	32	-
KWS Fantex	51	**88**	16.8	-	3.3	-	**5**	5	20	15	34	-
KWS Tinka	80	75	15.8	-	2.3	-	**5**	5	26	20	32	-
KWS Tinka-2	80	**87**	15.5	-	3.0	-	**5**	5	**36**	29	30	-
LCS Genie	49	**86**	15.8	-	5.0	-	**5**	5	35	31	34	-
LCS Odyssey*	57	82	16.2	-	**5.7**	-	4	5	20	13	34	-
ND Genesis	77	80	15.4	-	2.3	-	**5**	5	**43**	25	28	-
Newdale	62	**89**	15.8	-	2.7	-	**5**	5	**39**	**32**	32	-
Newdale-2	69	**84**	15.3	-	3.7	-	**5**	5	35	**32**	31	-
Pinnacle	51	**90**	15.9	-	**7.7**	-	**5**	5	**38**	**35**	27	-
Robust	74	**85**	15.5	-	3.3	-	**5**	5	**38**	**33**	28	-
Sangria*	56	76	16.8	-	4.0	-	**5**	5	22	18	33	-
Tradition	70	82	15.4	-	3.3	-	**5**	5	**39**	**33**	28	-
2ND32529	**92**	**95**	15.6	-	4.3	-	**5**	5	**36**	31	29	-
2ND34634	77	**95**	15.6	-	3.0	-	**5**	5	**40**	**32**	28	-
2ND34954	70	**91**	15.8	-	2.7	-	**5**	5	**40**	31	28	-
2ND35530	72	81	15.3	-	2.0	-	**5**	5	**45**	31	28	-
2ND35693	70	**90**	15.9	-	4.7	-	**5**	5	**43**	**36**	28	-
80675-52*	37	77	21.6	-	3.0	-	4	5	11	6	**38**	-
AAC Starbuck*	58	66	16.7	-	2.7	-	**5**	5	16	18	36	-
Site average	65	83	16.6	-	3.5	-	5	5	30	24	32	-
LSD (0.05)	9	12	3.3	-	2.1	-	1	NA	9	4	2	-
CV%	21	13	18	-	47.7	-	10	-	38	42	10	-

† Yield is reported at 13.5% moisture. ‡ Measured at harvest. § 1 = none to 9 = high. # on a scale from 1 = 0% emerged to 5 = 100% emerged. ≠Target population was 33 plants/ft².

Table 5. Grain quality characteristics of malting barley varieties grown in Old Town and Mapleton in 2019.

	Test Wt. (lbs/bu)		TKW† (g)		DON‡ (ppm)		Protein§ (%)		Plump Kernels≠ (%)		RVA# (stirring number)		Germ. Energy¥ (%)	
Variety	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**	**Old Town**	**Mapleton**
AAC Connect	47	50	46	48	0.0	0.0	8.6	10.1	91	97	67	50	**97**	**97**
AAC Synergy	47	51	44	49	0.0	0.0	8.2	9.7	94	98	147	60	**96**	**97**
Accordine	43	51	44	51	0.0	0.0	8.8	10.5	88	98	165	104	**93**	87
Cerveza	45	50	43	47	.	.	.	.	.	.	.	.	**96**	**97**
Crescendo	38	**51**	47	**58**	0.0	0.0	9.6	11.0	93	99	114	167	90	**90**
Esma	47	50	**48**	53	0.0	0.0	7.7	9.8	95	99	176	158	**93**	**98**
Explorer	47	**51**	**49**	50	0.0	0.0	8.0	10.0	96	99	139	93	**94**	**97**
Fangio	40	50	**51**	**59**	0.0	0.0	8.5	10.4	91	99	98	98	87	**94**
Iconic	42	51	44	**57**	0.0	0.0	8.1	10.3	90	99	168	177	**94**	88
Klarinette	46	**52**	41	52	0.0	0.0	8.3	10.2	88	99	176	175	**95**	**93**
KWS Amadora	44	**52**	44	**56**	0.0	0.0	8.4	10.7	93	98	92	91	**94**	89
KWS Fantex	43	50	42	52	0.0	0.0	9.0	10.2	89	98	167	171	**95**	**97**
KWS Tinka	46	51	**49**	54	0.0	0.0	8.4	10.1	93	99	103	127	88	**99**
KWS Tinka-2	46	50	**48**	51	.	.	.	.	.	.	.	.	**95**	**97**
LCS Genie	46	**52**	43	48	0.0	0.0	9.1	10.3	95	98	161	145	**93**	89
LCS Odyssey	42	**53**	42	55	0.0	0.0	8.7	10.0	89	99	142	164	**93**	**90**
ND Genesis	**50**	51	**49**	52	0.0	0.0	8.6	10.2	96	99	143	50	**94**	89
Newdale	47	50	42	47	0.0	0.0	8.7	9.8	86	94	170	95	**94**	**95**
Newdale-2	**48**	51	43	45	.	.	.	.	.	.	.	.	**94**	**100**
Pinnacle	46	50	46	52	0.0	0.0	8.8	9.9	90	98	190	111	**98**	**95**
Robust	**48**	49	39	41	.	.	.	.	.	.	.	.	**96**	**98**
Sangria	44	51	40	52	0.0	0.0	8.2	9.8	86	99	161	153	**93**	87
Tradition	**48**	50	38	43	0.0	0.0	9.7	10.5	92	99	170	104	**97**	**97**
2ND32529	47	49	47	52	0.0	0.0	8.2	9.5	96	98	149	40	**93**	**90**
2ND34634	45	50	**51**	49	0.0	0.0	9.0	9.7	98	96	128	48	**96**	**92**
2ND34954	**48**	51	**50**	54	0.0	0.0	9.0	10.0	96	99	147	137	**96**	**99**
2ND35530	47	49	**50**	51	0.0	0.0	8.6	9.9	95	98	125	58	**97**	87
2ND35693	47	50	**51**	53	0.0	0.0	8.7	9.2	95	99	132	103	**98**	**98**
80675-52	39	50	44	**59**	0.0	0.0	9.2	11.4	88	99	173	167	87	86
AAC Starbuck	.	.	45	50	.	.	.	.	.	.	.	.	89	**94**
Site average	45	51	45	51	0.0	0.0	8.6	10.1	92	98	144	114	94	94
LSD (0.05)	1.6	1	2.9	3	.	.	.	.	.	.	.	.	5	10
CV%	6.7	2	8.7	9	.	.	.	.	.	.	.	.	4	7

† Thousand kernel weight. ‡ Deoxynivalenol (DON) is a mycotoxin caused by *Fusarium* head blight. § Protein is reported on a dry matter basis. Acceptable range is 9.5-12.5%.

≠ Kernel plumpness is measured as the percentage of barley that remains on top of a 6/64" by 3/4" slotted sieve after shaking. # Rapid Visco-Analyzer (RVA) indicator pre-harvest sprout damage. Samples with RVA>120 are considered sound with high probability of maintaining germination energy in storage. Values below this level indicate sprout damage with severity increasing as values decrease. ¥ Germination energy is the percentage of kernels that germinate over 3 days under controlled moisture and temperature conditions. >95% is considered acceptable.