The Eastern Spring Barley Nursery:

Collaborative Variety Testing for a Non-Traditional Growing Area

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https://www.canr.msu.edu/malting_barley/

Malting Barley Needs in the Eastern U.S.

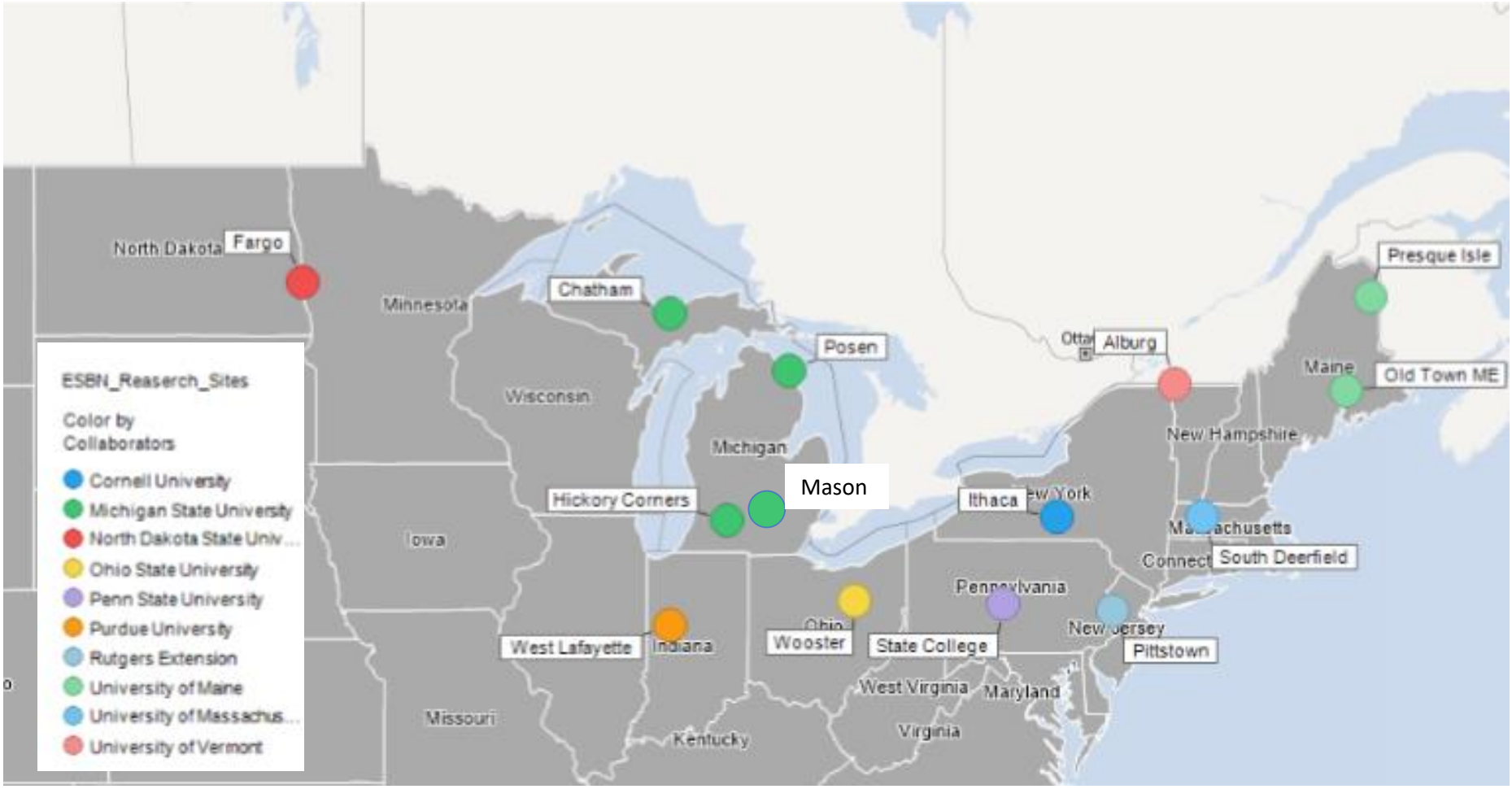
- Varieties suitable for craft malting and brewing
- Varieties adapted to warm nighttime temps, summer heat and drought
- Varieties with resistance to:
  - Pre-harvest sprouting
  - Net and spot blotch
  - Powdery mildew
  - Fusarium head blight and DON accumulation

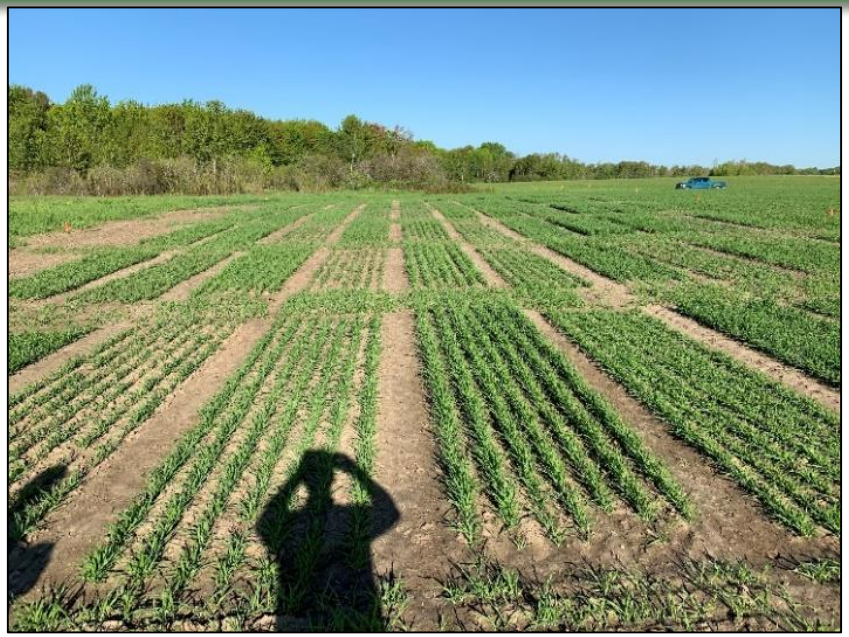
Eastern Spring Barley Nursery

- Investigating barley varieties for local, craft malt
- NDSU established the project & network in 2015
- 10 universities and 13 locations
- Common list of 20-25 barley varieties grown
- Varieties selected based on input from craft industry and research team
- Has included two and six-rowed varieties from the US, Canada and Europe
- The New Brewer feature article

NDSU BELL'S Michigan Crop Improvement Association American Malting Barley Association BA BREWERS ASSOCIATION

Eastern Spring Barley Nursery





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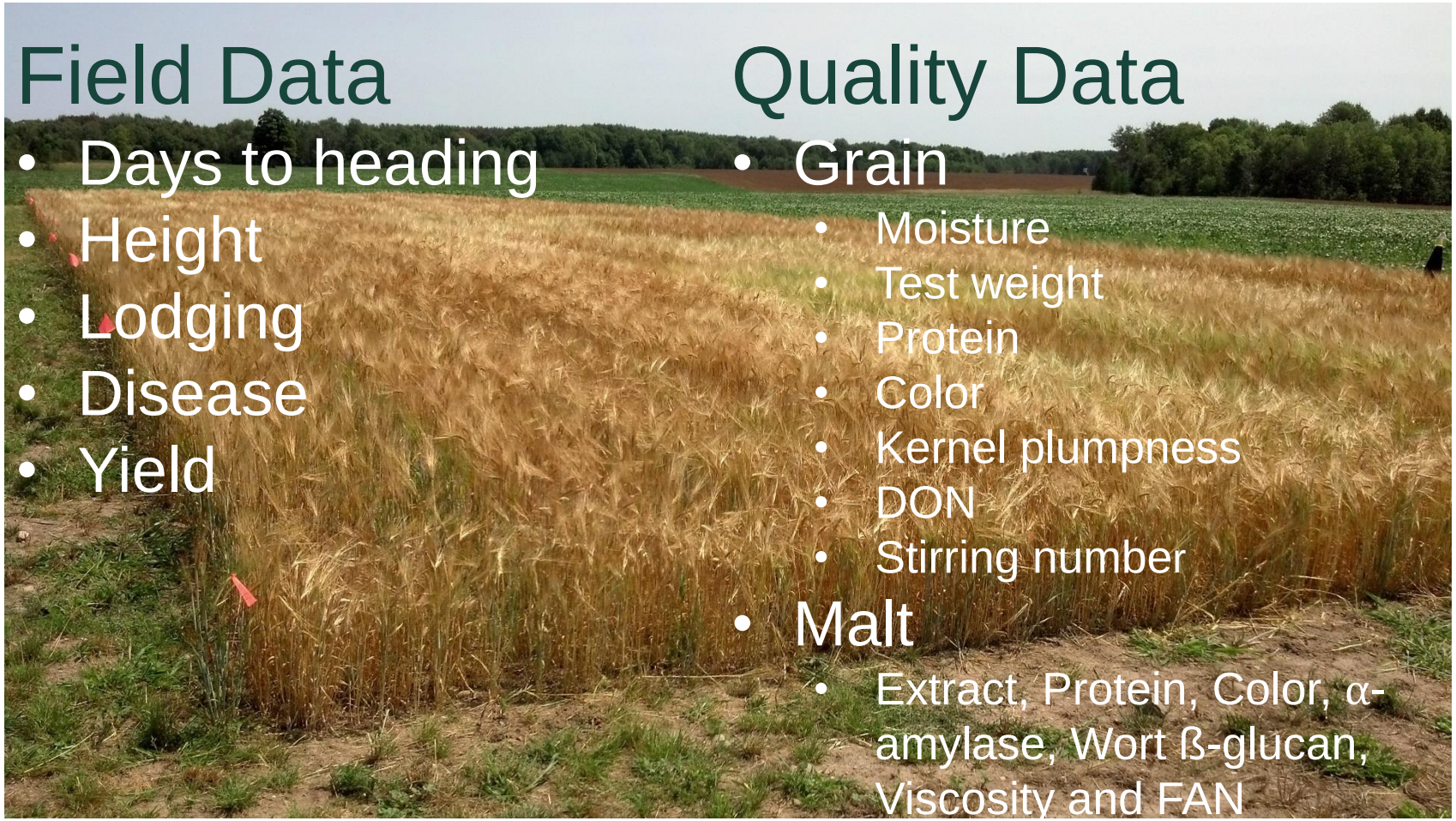


Field Data

- Days to heading
- Height
- Lodging
- Disease
- Yield

Quality Data

- Grain
  - Moisture
  - Test weight
  - Protein
  - Color
  - Kernel plumpness
  - DON
  - Stirring number
- Malt
  - Extract, Protein, Color, α-amylase, Wort ß-glucan, Viscosity and FAN

Analysis Methods

- Michigan agronomic and grain quality data 2015-21
- 73 lines filtered to 20 lines, each tested for 3+ years
- LME with variety as fixed, years and locations as random
- Multivariate hierarchical cluster analysis using least square means (Ward)
- PHS resistance used as base criteria for evaluating cluster/variety performance

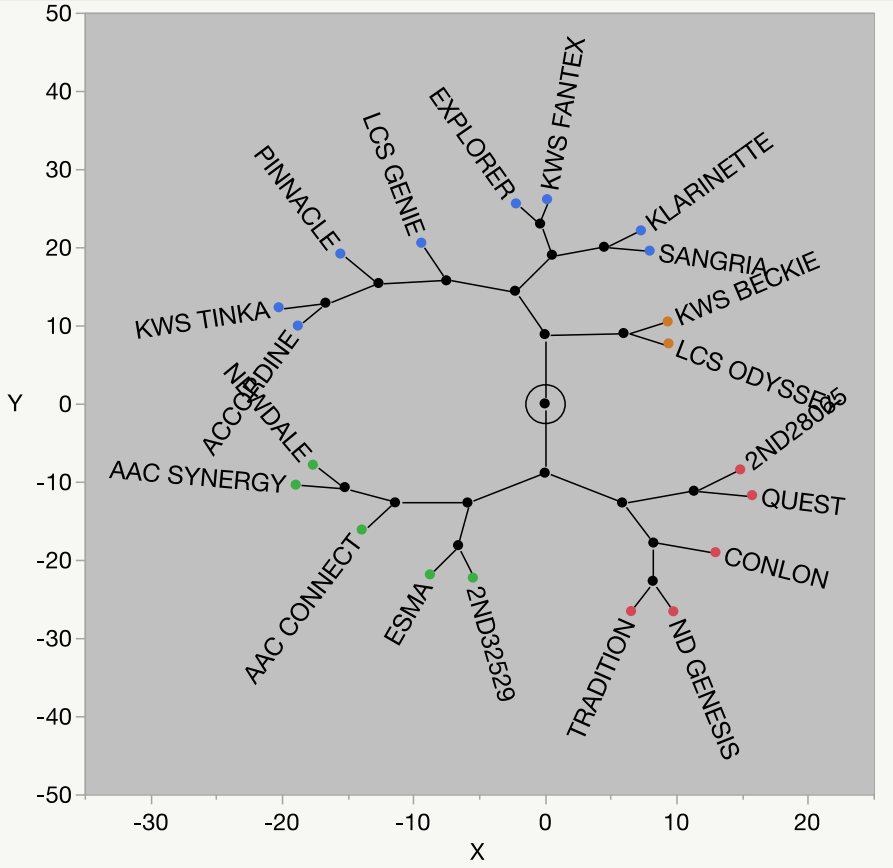
Varieties Included

1. 2ND28065
2. 2ND32529
3. AAC CONNECT
4. AAC SYNERGY
5. ACCORDINE
6. CONLON
7. ESMA
8. EXPLORER
9. KLARINETTE
10. KWS BECKIE
11. KWS FANTEX
12. KWS TINKA
13. LCS GENIE
14. LCS ODYSSEY
15. ND GENESIS
16. NEWDALE
17. PINNACLE
18. QUEST
19. SANGRIA
20. TRADITION

Location Means

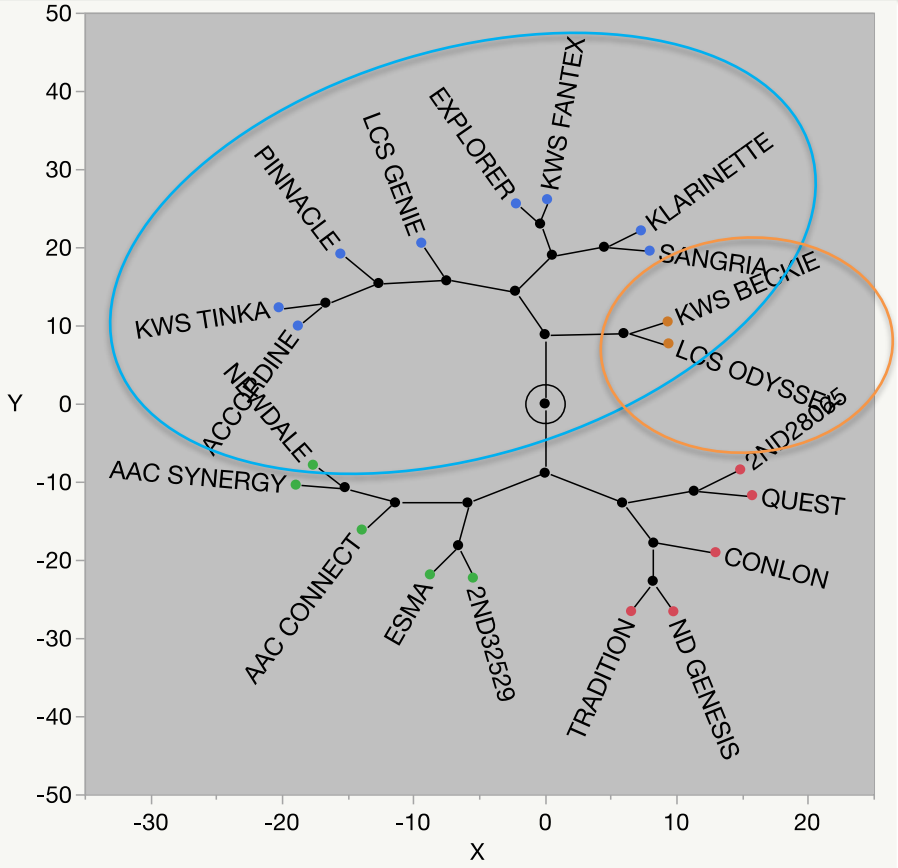
Location	Hddt	Ht	Lodging	Fol_dis	Yield	Moisture	Twt	Protein	RVA	DON
UP AVG	33.65	59.75	2.31	3.44	60.77	13.91	47.66	11.46	116.80	0.17
NE AVG	33.65	59.77	2.38	3.46	60.98	13.91	47.72	11.46	116.13	0.17
SW AVG	33.64	59.88	NA	NA	60.69	13.91	47.79	11.46	117.38	0.17
MI AVG	**33.65**	**59.80**	**2.35**	**3.45**	**60.81**	**13.91**	**47.72**	**11.46**	**116.77**	**0.17**

Upper Peninsula Results 2015-21



Cluster	Count	Hddt	Ht	Yield	Moisture	Twt	Protein	RVA	DON
1	5	29.8	65.0	60.3	13.7	48.6	11.7	120.5	0.2
2	5	34.3	61.8	63.7	13.9	47.6	11.6	81.0	0.0
3	8	35.0	56.9	58.6	14.1	47.5	11.3	126.8	0.2
4	2	36.5	53.0	63.1	13.8	46.0	11.1	157.1	0.3

Upper Peninsula Results 2015-21

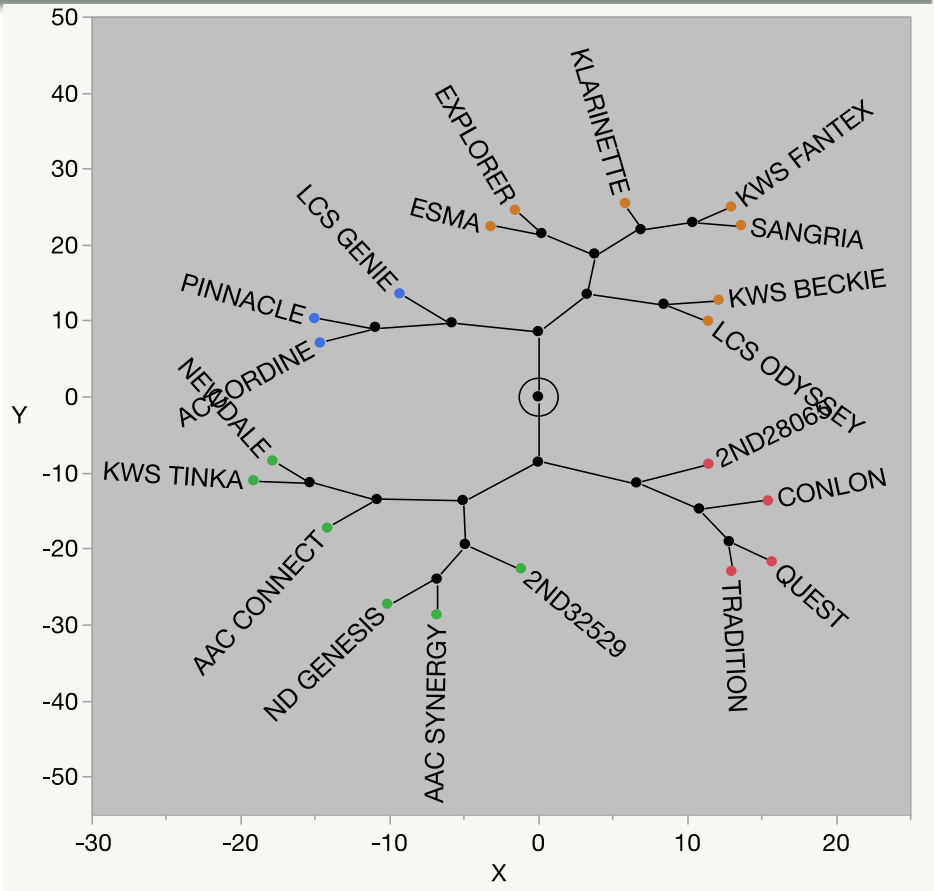


Cluster	Count	Hddt	Ht	Yield	Moisture	Twt	Protein	RVA	DON
1	5	29.8	65.0	60.3	13.7	48.6	11.7	120.5	0.2
2	5	34.3	61.8	63.7	13.9	47.6	11.6	81.0	0.0
3	8	35.0	56.9	58.6	14.1	47.5	11.3	126.8	0.2
4	2	36.5	53.0	63.1	13.8	46.0	11.1	157.1	0.3

Upper Peninsula Results 2015-21

Rank	Cluster	Variety	Hddt	Ht	Lodging	Fol_dis	Yield	Moisture	Twt	Protein	RVA	DON
1	3	EXPLORER	34.1	55.3	3.1	4.1	65.3	14.1	47.6	11.2	145.2	0.1
2	3	KWS FANTEX	36.1	52.4	1.9	3.9	63.5	14.0	47.5	11.3	154.7	0.2
3	4	KWS BECKIE	36.0	51.1	0.7	4.3	63.4	14.0	45.8	11.2	155.4	0.3
4	4	LCS ODYSSEY	36.9	55.0	5.1	5.2	62.8	13.7	46.3	10.9	158.7	0.4
5	3	SANGRIA	34.5	55.0	1.9	4.4	58.4	14.0	47.8	11.5	133.1	0.1
6	3	LCS GENIE	36.8	56.6	3.2	4.1	52.7	14.1	48.5	11.8	158.3	0.4

Northeast Lower Results 2015-21



Cluster	Count	Hddt	Ht	Yield	Moisture	Twt	Protein	RVA	DON
1	4	29.2	64.7	59.2	13.6	48.4	11.9	121.5	0.2
2	6	34.0	63.5	63.3	13.9	47.5	11.5	74.9	0.1
3	3	34.6	59.3	54.1	14.1	47.9	11.3	139.1	0.3
4	7	35.5	54.0	63.0	13.9	47.4	11.2	138.5	0.2

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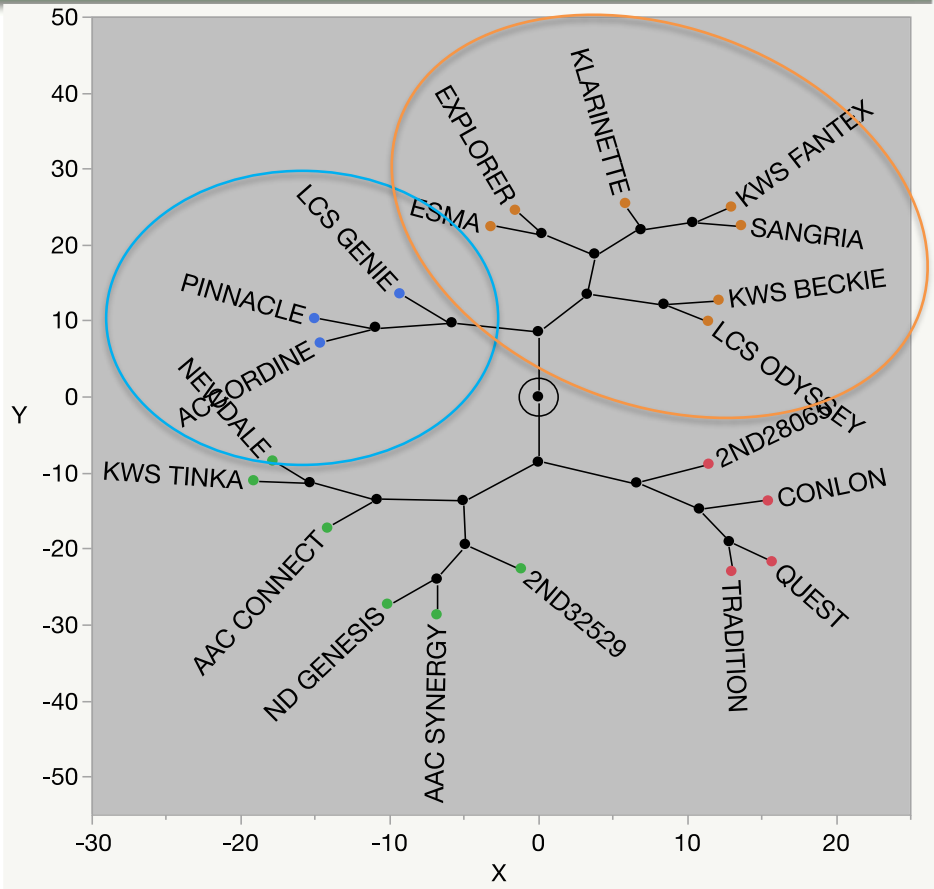
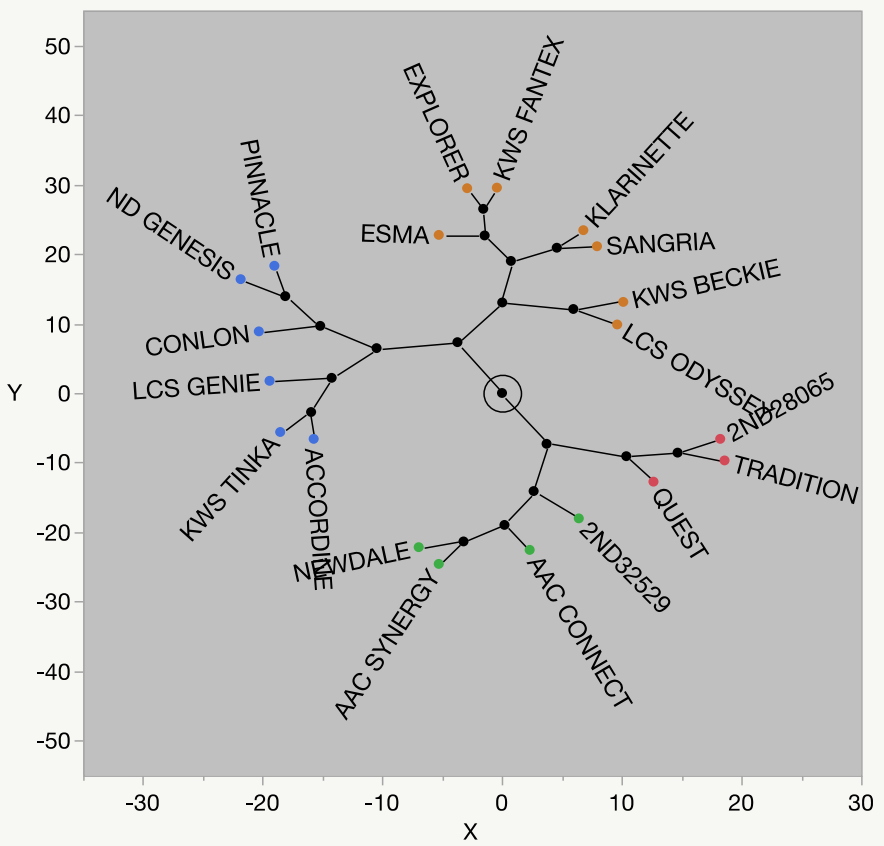


Cluster	Count	Hddt	Ht	Yield	Moisture	Twt	Protein	RVA	DON
1	4	29.2	64.7	59.2	13.6	48.4	11.9	121.5	0.2
2	6	34.0	63.5	63.3	13.9	47.5	11.5	74.9	0.1
3	3	34.6	59.3	54.1	14.1	47.9	11.3	139.1	0.3
4	7	35.5	54.0	63.0	13.9	47.4	11.2	138.5	0.2

Northeast Lower Results 2015-21

Rank	Cluster	Variety	Hddt	Ht	Lodging	Fol_dis	Yield	Moisture	Twt	Protein	RVA	DON
1	4	EXPLORER	34.1	53.9	2.0	4.2	66.7	14.1	47.3	11.2	139.8	0.1
2	4	KWS BECKIE	36.1	51.3	0.7	4.4	63.4	14.0	46.5	11.2	156.1	0.2
3	4	LCS ODYSSEY	37.0	55.6	3.9	5.8	61.8	13.8	46.8	10.9	163.0	0.4
4	4	KWS FANTEX	36.2	53.3	1.5	3.7	61.6	14.0	48.1	11.3	159.2	0.2
5	4	SANGRIA	34.5	55.0	1.4	4.3	58.5	13.9	48.0	11.5	136.5	0.1
6	3	LCS GENIE	36.9	56.0	3.2	4.4	53.6	14.1	48.8	11.7	170.6	0.4
7	3	PINNACLE	31.0	61.2	4.1	4.3	52.0	14.1	47.3	10.8	135.2	0.2

Southwest Lower Results 2015-21



Cluster	Count	Hddt	Ht	Yield	Moisture	Twt	Protein	RVA	DON
1	3	29.4	66.2	62.6	13.5	48.4	11.9	135.2	0.2
2	4	34.1	63.2	61.9	13.8	47.8	11.6	80.9	0.0
3	6	33.3	60.9	56.9	14.2	47.9	11.4	113.6	0.3
4	7	35.5	54.4	62.4	13.9	47.5	11.2	133.8	0.2

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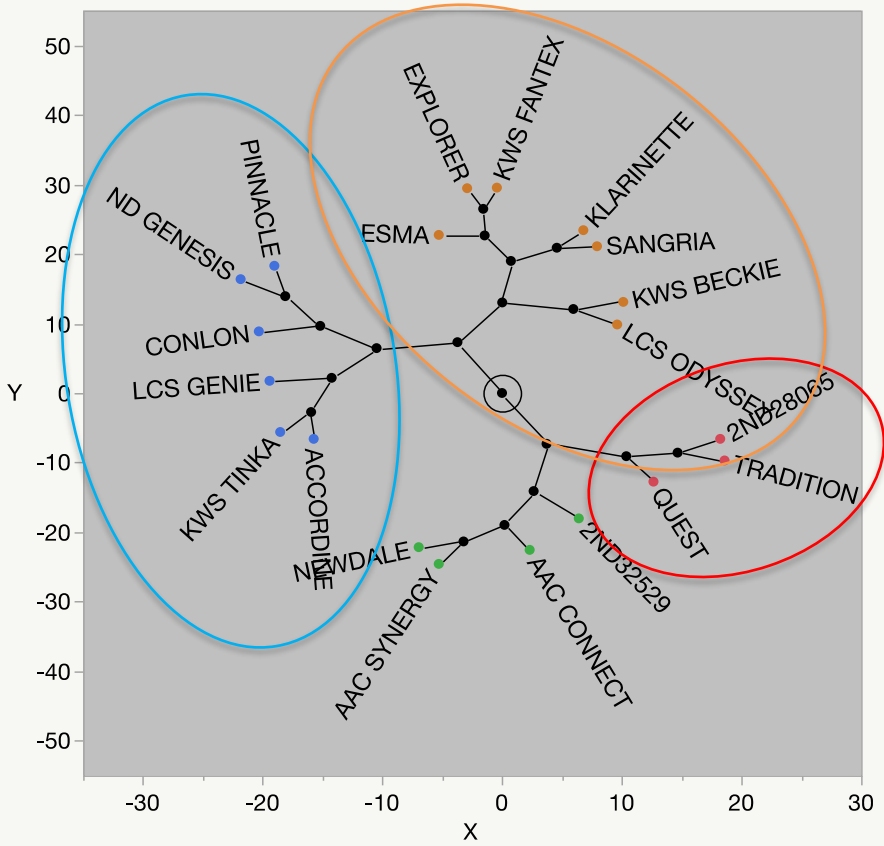

Cluster	Count	Hddt	Ht	Yield	Moisture	Twt	Protein	RVA	DON
1	3	29.4	66.2	62.6	13.5	48.4	11.9	135.2	0.2
2	4	34.1	63.2	61.9	13.8	47.8	11.6	80.9	0.0
3	6	33.3	60.9	56.9	14.2	47.9	11.4	113.6	0.3
4	7	35.5	54.4	62.4	13.9	47.5	11.2	133.8	0.2

Southwest Lower Results 2015-21

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1	4	EXPLORER	34.2	55.1	64.5	14.0	48.1	11.3	132.4	0.1
2	4	KWS FANTEX	36.1	52.5	63.9	14.0	47.8	11.3	150.2	0.2
3	4	KWS BECKIE	36.0	51.6	62.7	14.0	45.9	11.2	172.1	0.3
4	1	2ND28065	30.2	64.0	62.2	13.4	49.1	11.6	126.5	0.2
5	4	LCS ODYSSEY	36.9	56.3	61.0	13.6	46.8	10.9	138.6	0.4
6	3	LCS GENIE	36.9	56.3	54.2	14.5	48.8	11.7	142.3	0.5
7	3	PINNACLE	31.0	62.8	51.7	14.1	47.6	10.8	121.0	0.2

Discussion

- No one barley variety has it all
- Pre-harvest sprout will continue to be a major challenge
- European varieties with PHS resistance have performed best in Michigan
- Malting performance and quality will continue to drive variety selection
- LCS Odyssey and Conlon have been most popular, but Michigan should consider Explorer, KWS Fantex, Beckie, Sangria and Genie
- Winter barley may be a better fit for Southern Michigan

Industry Insights

"We devoted some acreage to Fantex in 2021 and it did not have good sprout resistance. In our experience, Odyssey continues to be the best performing spring barley for grain and malt quality."

– Jeff Malkiewicz, Great Lakes Malting Company

"I've mostly malted winter varieties for the last two years (Calypso, Violetta and Wintmalt) and Violetta is for sure the best of these three and nearly as easy to malt for me as Odyssey. Given the agronomic advantages of winter over spring barley in Michigan, this is mostly what I'm looking to grow and malt at this time."

– Larry Judge, Mitten State Malt

2022 ESBN Results

- 2022 preliminary report is available today
  - We are working on grain quality analysis this month, and will update the report online at www.canr.msu.edu/malting_barley
  - Both locations averaged around 70 bu/a
  - Spring barley had a much better year in Southern MI
  - Top yielding varieties: CU198, Esma, Klarinette, KWS Jessie, Kellie and Willis
  - I'm personally excited for CU198, Cornell's follow-up to Excelsior Gold

Plans for 2023 Spring Barley

- MCIA grant funding to support expansion of 5 elite barley varieties to farm scale in MI
- Cooperating farmers or farmer/maltsters run strip trials collecting agronomic data
- UPREC analyzes grain quality
- Cooperating maltsters malt small batches of each variety and document/share their experience
- Shriner Lab at MSU analyzes malt quality
- Great Lakes Malting Co., Empire Malting Co., and Mitten State Malt

Acknowledgements

- Richard Horsley & Paul Schwarz, North Dakota State
- Andrea and Christian Stanley, Valley Malt
- Heather Darby, Univ. of Vermont
- Ellen Mallory, Univ. of Maine
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- Mark Sorrells, Cornell
- Eric Stockinger, Ohio State
- Stephen Komar & William Bamka, Rutgers
- Aaron Mills, AAFC
- Brook Wilke & Christian Kapp, Michigan State
- Ashley McFarland, AMBA
- BA, AMBA, MCIA, Bell's, MBG
- Craft Maltsters Guild