Growing Malt Barley for Yield and Quality in Northwest Ohio

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ABSTRACT

Two large regional malting facilities within a 100-mile radius of Northwest Ohio are proposed to come online in the next 2 years to supply not only the 336 craft breweries (2018) but also the existing macro breweries in Ohio. These malting facilities will be looking to contract with farmers in the region to grow high quality malting barley. Additionally, farmers in the region are looking for crops to diversify their rotation, improve water quality and add profitability.

Table 1. Barley Site Background

Grower	2020 Averages (n=26)	2019 Averages (n=11)	2018 Averages (n=9)
Plant Date	Sept 25	Oct 12	Sept 29
Field Size (ac)	48	41	23
Total Cohort Acres	1,293	530	208
Contract Malt Acres	9,400	7,600	300
Percentage Cohort	14%	17%	34%
Population (mill sds/ac)	1.46	1.36	1.39
Spring Nitrogen (#/ac)	80	52	79
Total Nitrogen (#/ac)	102	73	99

Since 2017, a malt barley peer learning group (research cohort) was established in Northwest Ohio. In anticipation of a growing demand for specialty malt to supply the craft brewing industry, a group of farmers worked with local Extension educators and other agricultural professionals to evaluate the possibility of growing high quality, high yielding winter malting barley in Northwest Ohio.

Healthy barley heads prior to harvest in 2018.

Farmers met regularly and shared concerns, questions and practices with each other. Whole fields served as both replicated and randomized data points to create simple averages. In 2018, a group of eight barley farmers produced baseline production data (simple averages) of 86.5 bu/ac dry grain yield, 13.5% harvest moisture, and a June 26th harvest date. Average quality data resulted in 11.6% protein, 87.7% plumpness, 98.5% germination and .5 ppm DON. In 2019, nine farmers with 12 field sites averaged 50.6 bu/ac dry grain yield, 13.7% harvest moisture, and a July 6th harvest date. Quality data from 2019 averaged 10.4% protein, 92.0% plumpness, 97.4% germination and 4.6 ppm DON. In 2020, 13 growers with 26 field sites averaged 71.7 bu/ac dry grain yield, 13.5% harvest moisture, and a June 24th harvest date. Quality data from 2020 averaged 10.3% protein, 78.0% plumpness, 98.4% germination and .2 ppm DON. Implications from the research indicate that farmers in the region can grow high quality and good quantity of malting barley if markets exist and the local weather cooperates.

Field tours, farmer panels, and regional research meetings were conducted to throughout 2018-2020 to transfer the knowledge from the research cohort to other farmers.

Cohort research data is shared on go.osu.edu/efields website and via a printed bulletin.

STUDY DESIGN - BARLEY

Several Northwest Ohio growers have been participating in field-scale winter (malting) barley production research since 2018 to determine yield and production economics. All barley fields considered were planted with variety Puffin. Growers were asked to plant barley within 10 days of the Hessian fly-free date (September 22-27 for NW Ohio sites), if possible. Fields were soil tested and nutrients applied accordingly on a per site basis. Each grower applied approximately 20-30 lbs. of starter nitrogen and 60-80 lbs. of spring nitrogen (Table 1). All field operations were performed with commercial equipment. In each of the three years, grower participation increased: eight growers (nine sites) in 2018, six growers (11 sites) in 2019 and 13 growers (26 sites). Simple averages of key data like moisture, yield, straw yield, protein, germination and DON were calculated (Table 2).

Table 2. Barley Results- Yield and Quality Metrics

Grower	2020 Averages (n=26)	2019 Averages (n=11)	2018 Averages (n=9)	Grand Means (n=46)
Harvest Date	June 24	July 6	June 26	June 27
Moisture (%)	13.5	13.7	13.5	13.2
Grain Yield (bu/ac)	71.7	50.6	86.5	69.9
Straw Yield (T/ac)	1.31	.55	1.01	1.1
Protein (9.5-12.5%)	10.3	10.4	11.6	10.6
Plump (>90%)	78	92	88	83
Thins (<5%)	4.8	1.7	1.6	3.5
Germination (>95%)	98.4	97.4	98.5	98.2
DON (<1 ppm)	.2	4.6	.45	1.4

STUDY DESIGN – DOUBLE CROP SOYBEANS

Simultaneously, growers who wished to participate were asked to created a 'paired-site' field of first crop soybeans adjacent to their barley field with the goal of comparing yields of double crop soybeans after barley to the yield of first crop soybeans (check). Participation in this portion of the cohort was eight growers (9 sites) in 2018, four growers (7 sites) in 2019, and 12 growers (20 sites) in 2020. Where possible, participating growers compared double crop soybean yields after barley and after wheat. Simple averages of key data like plant date, harvest date, seeding rate, harvest moisture, final stand and yield were calculated for comparison (Table 3).

Table 3. Double Crop Soybeans- Grand Means

2018-2020 (n=36)	First Crop Average	After Barley Average	After Wheat Average
Plant Date	May 23	June 30	July 9
Seed Rate (1,000 s/a)	171	195	204
Harvest Date	Oct 12	Nov 9	Nov 20
Moisture	13.0	15.1	15.9
Yield	54	30	23

Barley heads clipped by armyworms in 2020 (left); heads damaged by freeze damage in 2020 (right).

SUMMARY

- 2018 was a very good year to grow malt barley in Northwest Ohio and it kept growers interested. In 2019, growers faced a very wet grain fill period that led to DON issues. In 2020, growers experienced late spring freezes, armyworms and a dry grain fill period that led to some plumpness/thins issues. In the end, growers experienced many of the agronomic risks associated with growing a specialty crop like malt barley.
- **Answering the key questions with 2018-2020 averages:**
  - Barley yield: 69.9 bu/ac
  - Straw: 1.01 T/ac (25% less than wheat straw paired sites)
  - Barley Quality
    - Protein: 10.6%
    - Plumpness: 83%
    - Thins: 3.5%
    - Germination: 98.2%
    - DON: 1.4 ppm
  - Soybeans after barley: 9 days earlier, +7 bu/ac than paired soybeans after wheat
    - First Crop Soybeans: 54 bu/ac
    - Soybeans after Barley: 30 bu/ac
    - Soybeans after Wheat: 23 bu/ac

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