CFAES

HORTICULTURE AND CROP SCIENCE

Winter Malting Barley Nitrogen Rate Trials- Year 1

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In fall 2017, a spring nitrogen (N) rate trial was established at three locations in Ohio- Northwest Agricultural Research Station (NWARS) in Wood Co., Ohio Agricultural Research and Development Center (OARDC) in Wayne Co., and Western Agricultural Research Station (WARS) in Clark Co. Treatments included five N rates of: 0, 40, 80, and 120 lb N/acre. The barley cultivar 'Puffin' was planted at all locations. All plots received ~20 lb N/acre in the fall. Spring N source was urea applied at Feekes 5-6.

Table 1. Cultural practices by test site.

	NWARS	OARDC	WARS
Previous crop	Soybean	Soybean	Soybean
Soil type	Hoytville	Canfield	Strawn-Crosby
Tillage	Disc; field cultivator	In-line ripper; vertical	Disc; culti-mulcher
Fly-free date	Sept. 23	Sept. 26	Sept. 29
Plant date	Sept. 29	Oct. 7	Oct. 19
Soil pH	6.7	6.4	6.2
Soil test P (ppm)	66	47	39
Soil test K (ppm)	226	164	144
CEC	21.6	8.8	14.5
OM (%)	4.0	2.4	2.6
Herbicides	Stinger	Harmony Extra SG, Broclean, Compadre	Harmony Extra SG, Maestro 2EC
Fungicides	Prosaro on May 16	Prosaro on May 16	Prosaro on May 15
Insecticides	None	None	None
Harvest Date	June 21	June 29	June 25

Effect of Nitrogen Rate on Grain Yield

Winter malting barley grain yield response to spring N application is shown in Figure 1. (Grain yield was standardized to 13.5% moisture concentration.)

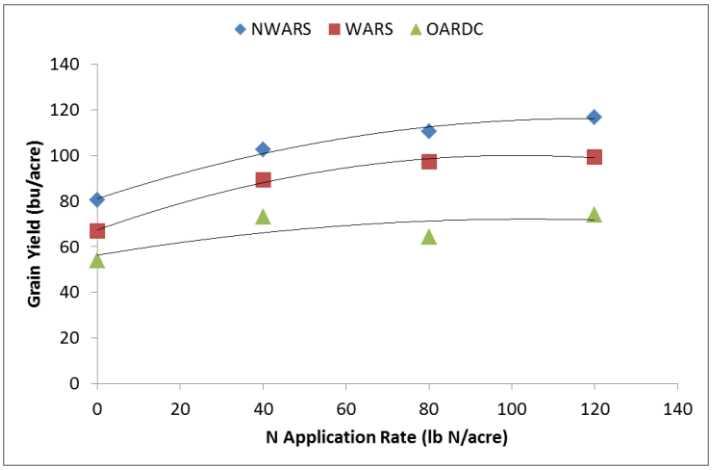

Figure 1. Barley yield response to spring N application rate.

The agronomic optimum N application rate (where grain yield is greatest) was calculated for each location and is shown in Table 2. **HOWEVER, PROTEIN CONTENT OF THE GRAIN IS EXTREMELY IMPORTANT FOR THE MALTING INDUSTRY.** See the next page of the report for protein data.

Table 2. Agronomic optimum N application rate.

	NWARS	OARDC	WARS
Optimum N rate for highest yield	119 lb N/acre	100 lb N/acre	101 lb N/acre

Effect of Nitrogen Rate on Grain Protein

Grain protein concentration should be **9.5-12.5%** on a dry weight basis. Table 3 shows the minimum, average, and maximum protein concentration for each N rate treatment by location. Grain protein varied by location. At the NWARS location, N application rates up to 120 lb N/acre resulted in an average protein concentration ≤ 12.5%. At the WARS and OARDC locations, N application rates up to 40 lb N/acre resulted in an average protein concentration ≤ 12.5%.

Table 3. Minimum, average, and maximum protein concentration for each N rate treatment by location.

NWARS (Wood County)			
N treatment (lb N/acre)	Minimum protein concentration (%)	Average protein concentration (%)	Maximum protein concentration (%)
0	8.6	8.8	9.0
40	9.9	10.0	10.5
80	10.5	11.2	11.7
120	11.7	12.5	13.3

WARS (Clark County)			
N treatment (lb N/acre)	Minimum protein concentration (%)	Average protein concentration (%)	Maximum protein concentration (%)
0	10.5	11.3	11.9
40	11.5	12.5	12.9
80	12.5	12.9	13.4
120	13.4	13.6	13.7

OARDC (Wayne County)			
N treatment (lb N/acre)	Minimum protein concentration (%)	Average protein concentration (%)	Maximum protein concentration (%)
0	10.5	10.8	11.2
40	11.0	11.5	12.4
80	12.3	12.9	13.2
120	12.9	13.4	14.1

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