Division of Extension
University of Wisconsin-Madison

2020 Malting Barley Nitrogen Application Study

Nitrogen is a primary nutrient to produce malting barley and the addition of nitrogen can influence yield. Nitrogen recommendations for growing malting barley in Wisconsin depend on soil type and organic matter content with a range of 15 to 70 pounds of nitrogen per acre[1]. Nitrogen not only can influence yield in malting barley, it can also influence protein levels in the grain.

The main purpose of the study is to determine if quality malting barley can be economically produced for the brewing industry. The primary factors measured are yield and protein. Protein levels can be increased above acceptable levels through nitrogen fertilization with some varieties. It is important to test levels at individual locations and varieties to be grown.

The 2020 Malting Barley Nitrogen Application Study was designed to determine impact of nitrogen application on yield. Protein level results were not available. The study was conducted at two locations in Buffalo and Chippewa Counties. Four treatments were part of the study at both locations including no treatment, 30, 60, and 90 pounds of actual nitrogen as urea-based nitrogen. Two additional treatments were conducted in Buffalo County with 60 and 90 pounds of nitrogen and 40 pounds of potash.

Two varieties (Full Pint and CU31) were planted in Buffalo County and one in Chippewa County (Full Pint) due to seed limitation. Research plots at each location were 4 feet x 10 feet and replicated four times in a randomized complete block. Individual replication data is available upon request of the authors.

Data results indicate in Buffalo County nitrogen rates at 60 or 90 pounds of N per acre with or without potash resulted in significantly higher yields. Application rates of 30, 60, or 90 pounds of nitrogen alone resulted in significantly higher yields with Full Pint.

In Chippewa County, no statistically significant difference was observed in any of the application rates. The highest yield was observed at the 30-pound application rate. These results indicate acceptable yields can be obtained with lower nitrogen application rates.

Trial Details

Planting Date:
Buffalo Site: April 21, 2020
Chippewa Site: April 15, 2020

Plot Layout:
All plots were four feet by ten feet and included four replications in a randomized complete block design.

Fertility:
Phosphorus, Potassium, and Lime were supplied according to soil test data.

Soil Type:
Buffalo Site: Seaton Silt Loam
Chippewa Site: Scott Lake Sandy Loam

Herbicide:
Chippewa County
Affinity Broadspec @ 1 oz/acre
Buffalo County
Huskie @ 12 oz./acre

Fungicide:
Approach: 12.0 oz/acre
Miravis Ace: 13.7 oz/acre

Harvested:
Buffalo Site: July 30, 2020
Chippewa: August 4, 2020

Growing Season Summary:
Buffalo Site: Hot and wet the last week in May, otherwise cool and wet the rest of the season.
Chippewa Site: Cooler temperatures early in season. Heavy rains in June, drier at the end of July.

Cooperators:
Chippewa County
Triple T Farms, Chippewa Falls, WI
DS Farms, Alma, WI
American Malting Barley Association
Rahr Malting

2020 Buffalo County Malting Barley Nitrogen Application Study			
Variety	Nitrogen Rate # N/acre	Percent Moisture	Yield bushels/acre
CU31	0	13.3b	74.64def
CU31	30	13.0bcd	99.37bc
CU31	60	13.0bcd	109.75ab
CU31	90	13.0bcd	118.35a
CU31	60 N + 40 K20	13.7a	110.42ab
CU31	90 N + 40 K20	13.9a	115.49a
Full Pint	0	13.0bc	68.68ef
Full Pint	30	12.9bcd	82.78de
Full Pint	60	12.7cde	86.60cd
Full Pint	90	12.6de	83.42de
Full Pint	60N + K20	12.3ef	69.06ef
Full Pint	90N + K20	12.1f	63.01f
LSD (P=.05)		*0.427*	*14.71*
Standard Deviation		*0.252*	*8.69*
CV		*1.95*	*9.64*

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

2020 Chippewa County Malting Barley Nitrogen Application Study			
Variety	Nitrogen Rate # N/acre	Percent Moisture	Yield bushels/acre
Full Pint	0	14.5a	44.49a
Full Pint	30	14.3a	53.13a
Full Pint	60	14.0a	47.57a
Full Pint	90	15.2a	47.18a
LSD (P=.05)		*1.204*	*18.25*
Standard Deviation		*0.603*	*9.14*
CV		*4.16*	*19*

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

[1]A2809 Nutrient application guidelines for field, vegetable and fruit crops in Wisconsin, C. Laboski, J.Peters, 2012

Division of Extension
University of Wisconsin-Madison

RAHR 1847

American Malting Barley Association

Authors: Jerry Clark, Division of Extension UW-Madison, Chippewa County
Carl Duley, Division of Extension, UW-Madison, Buffalo County