

Malt Barley Response to Nitrogen Rates Under Sprinkler Irrigation, Ric Rodriguez Farm, Heart Mountain 2008

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The University of Wyoming, Powell Research and Extension Center in cooperation with Ric Rodriguez Farms conducted a study designed to evaluate grain yield, protein and quality response of barley grown under sprinkler irrigation to different nitrogen application rates. With increased use of center pivot irrigation in the Big Horn Basin, growers are questioning accepted agronomic practices normally used in furrow irrigation systems. Several producers reported unacceptable protein levels in malt barley following sugar beets grown under sprinkler irrigation when following recommended nitrogen application rates for the area.

Materials and Methods

In 2008, a study was conducted on the Ric Rodriguez Farm located on Heart Mountain in Park County, Wyoming. A similar study was conducted in 2007. The field had a cropping history of beets in 2007. On 11 March, plots were established 8 ft by 20 ft with four replications in a RCBD. A soil sample taken from 0-6 inches showed the following: pH 7.9; OM% 1.3; N ppm 20.7; P ppm 18; K ppm 131. Treatments were applied consisting of six nitrogen rates in increments of 25 lbs of Nitrogen per acre using urea (46-0-0) from 0 lb N to 150 lb N/acre. In addition, three treatments were applied with the addition of 50 lbs Phosphorus (11-52-0) per acre. The field was worked with a field cultivator, and harrowed the same day, and planted by the grower using the variety Merit. The grower followed his normal irrigation practices for the growing season. Plots were harvested using a Wintersteiger plot combine on 9 September. Samples of each plot were collected and sent to Busch Ag for quality evaluation. Data were analyzed using SAS procedures for analysis of variance. The results are presented below.

Table 1. Malt barley response to nitrogen rates under sprinkler irrigation, Ric Rodriguez Farm, 2008.

Nitrogen Rate	Grain Yield	Protein	Lodge 1=upright 9=flat	Test	Plump	Thin
Lbs N/acre	bu/a	%	1-9	lb/bu	%	%
0	115.8	12.2	3.0	47.1	93.2	3.1
25	130.8	11.8	3.3	48.3	95.2	2.0
50	131.1	13.5	3.5	47.7	93.8	2.5
75	132.6	13.2	5.0	47.9	92.7	3.2
100	125.9	13.9	5.3	47.8	92.2	3.3
125	135.8	14.0	5.8	48.1	92.9	2.8
150	137.4	14.2	5.3	48.2	91.3	3.6
25N+50P	129.7	11.7	3.5	48.3	94.7	2.5
75N+50P	142.5	12.2	4.3	47.8	93.8	2.3
125N+50P	139.8	13.5	4.8	47.5	92.9	3.0
Mean	132.2	13.0	4.4	47.9	93.3	2.8
LSD _{0.05}	14.7	1.4	1.5	NS	NS	NS
CV%	7.7	7.3	24.5	1.9	2.6	34.8

NS= Non significant (0.05)

Results and Discussion

A general trend of grain yield increase was observed with increasing nitrogen rates. However, only the 75N + 50P treatment was significantly different from the check treatment of 0N. Percent protein increased with additional Nitrogen. Protein exceeded acceptable levels (Busch Ag Resources contract limit is 13.5%) at N rates over 100 lbs/acre. Lodging increased with increasing Nitrogen rates. The effect of Nitrogen rate on Test weight, plump %, and thins was not statistically significant.

The higher than expected yields on the check (0N) may be attributed to residual N in the soil. Preliminary soil samples from 0-6 inches showed soil Nitrate at 20.7 ppm or 37 lbs/a. A deeper soil sample should have been taken but equipment limitations in the rocky ground prevented that.

Appreciation is extended to Ric Rodriguez for his cooperation and to Busch Ag Resources for processing the samples for quality.