

**Project Title:** 2021 Barley Plant Growth Regulator (PGR) Study

**Objective:** To assess the performance of plant growth regulator application amounts and timings for barley.

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**Methods:** The experiment was laid out in randomized complete block design. The prescribed treatments are detailed in Table 1. There were two fertility control treatments: one was T1 with a standard fertility and second was T2 with high fertility, both of which had no PGR applied. To attain the higher fertility level in T2, we added extra 40 lbs of nitrogen/A using urea. The same amount of extra nitrogen was added to T3 through T8. The detailed nutrient applied and other management information is provided in Table 1. The data were analyzed using R statistical package and the results are presented in Table 2.

**Table 1.** Management Information

<b>Seeding date:</b>	4/28/2021	<b>Field Location:</b>	Y3
<b>Julian date:</b>	112	<b>Harvest date:</b>	8/13/2021
<b>Seeding rate:</b>	110 lbs/A	<b>Julian date:</b>	225
<b>Previous crop:</b>	Spring Wheat	<b>Soil type:</b>	Creston Silt Loam
<b>Herbicide:</b>	Cleansweep 1pt/A (6/1/2021)	<b>Tillage:</b>	Conventional
<b>Insecticide:</b>	None	<b>Soil residual nutrient (NO<sub>3</sub><sup>-</sup>, P, K lb/A):</b>	97-16-286 (Fall, 2020)
<b>Fungicide:</b>	(6/21/2021) Headline 3.5 fl oz/A	<b>Nutrient fertilizer applied (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O lb/A):</b>	50-30-50-10S (5/21/2021)

**Results:**

There was no observed statistical difference of all treatments for physiological maturity, stem thickness, test weight, and seed size or thousand kernel weight (Table 3). Importantly, there was no significant difference in yield among the treatments with PGR (T3 through T8) applied at various stages in relation to the T2 (which had no PGR applied but the same fertility level as T3 through T8). The difference in yield is related with the fertility level (T1 vs. the rest of the treatments). This observation is the same as the number of heads per area, and NDVI – where the responses are only related to the fertility level. The observed reduction in plant height in relation to T2 (high fertility with no PGR application) were observed significantly in T5 and T1, and moderately in T6. However, the reduction in lodging was only observed in T5 and T1 treatments. For protein, other than T1, only T7 had an observed protein depression in relation with T2.

**Table 2.** Mean treatment effects of the various traits measured. The standard fertility control is designated as SF whereas, the treatments that received additional nitrogen is designated as high fertility (HF). The dates of PGR applications at stages: tiller, node, and flagleaf were May 5, June 11, and June 21, respectively.

Treatments & rates of PGR on stages: Tiller - node - flagleaf	PM (Julian)	HT (in)	Stem d (mm)	LOD (%)	NDVI	Heads (no/ft <sup>2</sup> )	Kernels /Head (no.)	YLD (bu/A)	TWT (lbs/ bu)	TKW (g)	PRO (%)
<b>T1</b> PGR-0-0-SF	205	30.8	2.8	10.0	0.72	75.5	21	90.1	52.9	45.0	9.3
<b>T2</b> PGR-0-0-SF	207	36.7	3.1	70.0	0.8	125.7	21	116.0	53.1	44.7	10.7
<b>T3</b> PGR-0-31-0-HF	207	35.5	2.9	75.0	0.8	97.0	17	119.3	52.9	44.9	9.9
<b>T4</b> PGR-0-0-31-HF	206	36.2	3.0	78.7	0.79	94.7	22	116.5	53.2	46.1	10.1
<b>T5</b> PAL-0-14.4-0-HF	207	31.4	2.9	23.7	0.77	98.2	23	113.5	52.9	45.2	10.1
<b>T6</b> PGR-0-15.5-15.5-HF	207	33.3	3.0	61.2	0.78	94.2	23	114.9	53.1	45.7	10.0
<b>T7</b> PGR-15.5-15.5-0-HF	207	34.0	2.9	67.5	0.79	95.2	23	114.0	53.1	44.3	9.8
<b>T8</b> PGR-15.5-0-15.5-HF	207	36.3	2.9	78.7	0.8	102.5	22	116.2	53.3	44.2	10.6
<b>MEAN</b>	206	34.3	2.9	58.1	0.8	97.9	21.5	112.6	53.1	45.1	10.1
<b>CV%</b>	1.0	5.1	8.0	21.5	2.5	22.2	17.4	5.5	0.8	2.9	5.8
<b>LSD</b>	-	2.6	-	18.2	0.03	31.7	5.5	9.0	-	-	0.9
<b>PR&gt;F</b>	<i>ns</i>	<i>&lt;0.001</i>	<i>ns</i>	<i>&lt;0.001</i>	<i>&lt;0.001</i>	<i>0.03</i>	<i>0.03</i>	<i>&lt;0.001</i>	<i>ns</i>	<i>ns</i>	<i>0.04</i>

PM, Physiological maturity; HT, plant height; d, diameter or thickness; LOD, lodging; NDVI, normalized difference vegetation index; YLD, yield; TWT, test weight; TKW, thousand kernel weight; PRO, protein; ns, not significant.