Project Title: 2021 Winter Wheat Plant Growth Regulator Efficacy Testing

Objective: To find benefits of plant growth regulator (PGR) treatments that improve yield and prevent lodging for wheat varieties.

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Methods: The experiment was laid out in randomized complete block design. 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

Seeding date:	Sept. 22, 2020	**Field Location:**	R13
Julian date:	266	**Harvest date:**	8/12/2021
Seeding rate:	130 lbs/a	**Julian date:**	224
Previous crop:	Barley	**Soil type:**	Creston Silt Loam
Herbicide:	CleansweepM (5/6/2021)	**Tillage:**	No-till
		Soil residual nutrient (NO3-, P, K lb/A):	51–28-604 (Fall, 2019)
Insecticide:	None		
		Nutrient fertilizer applied (N, P2O5, K2O lb/A):	5/5/2021 (150-0-0) (spring broadcast) Added 40lbs N/A only for treatments T2-T8
Fungicide:	Headline 9fl oz/a (6/11/2021)		

Results:

There was no observed statistical difference of all treatments for physiological maturity, stem diameter or thickness, NDVI, number of heads per area, and test weight (Table 2).

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 5th, May 26th, and June 11th. The wind speed at each application was within 2-6 mph. NOTE: We inadvertently had an error in T5 treatment application. Instead of Palisade, the test PGR was applied instead.

Treatments & rates of PGR on stages: tiller - node - flagleaf		PM (Julian)	HT (in)	Stem d (mm)	LOD (%)	NDVI	Heads (no/ft²)	Yield (bu/A)	Test Weight (lbs/bu)	TKW (g)	Protein (%)
T1	PGR-0-0-SF	204	35.8	3.4	2.5	0.8	71.3	127.8	61.2	40.4	10.4
T2	PGR-0-0-HF	206	36.3	3.5	5.0	0.8	76.5	138.2	61.3	40.5	11.3
T3	PGR-0-25-0-HF	208	31.9	3.4	1.2	0.82	77.5	134	60.6	38.3	11.1
T4	PGR-0-0-25-HF	206	34.2	3.4	0	0.81	68.5	138.7	61.2	39.4	11.4
T5	PEC-0-14.4-0-HF	206	34.2	3.4	0	0.81	72.5	135.4	61.1	38.9	11.4
T6	PGR-0-14-11-HF	207	32.8	3.3	0	0.82	69.5	132.3	61.0	38.2	11.5
T7	PGR-14-11-0-HF	208	33.1	3.4	0	0.82	72.3	131.4	61.0	38.7	11.3
T8	PGR-14-0-11-HF	207	33.5	3.4	0	0.82	72.3	133.8	61.1	38.5	11.5
MEAN		206	34	3.4	1.1	0.81	72.5	134	61.1	39.1	11.3
CV%		1.0	3.2	5.0	223.7	2.8	16.2	4.3	0.4	2.4	2.7
LSD		2.7	1.6	0.3	3.6	0.03	17.0	8.4	0.3	1.4	0.4
PR>F		*ns*	*<0.001*	*ns*	*0.04*	*ns*	*ns*	*0.04*	*0.03*	*0.01*	*<0.001*

PM, physiological maturity; HT, plant height; Stem d, stem diameter or thickness; LOD, lodging; NDVI, normalized difference vegetation index. TKW, thousand kernel weight; ns, not significant.