

Project Title: Effects of Plant Growth Regulators (PGR's) and Growth Stage (GS) on Spring Wheat Yield and Quality, 2011.

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Objective: To evaluate the effect of plant growth stage on spring wheat response to plant growth regulators.

Materials and Methods:

This study was conducted to compare the efficacy of the PGR's Cerone and Palisade when applied alone or in combination at five growth stages. The study area had been planted to spring wheat the previous six years and had a history of moderate orange wheat blossom midge densities. The soil type was a Creston silt loam, with a pH of 7.5 and an organic matter content of 4.5 percent. The site was fertilized with a blend of N-P-K-S at rates of 150-30-120-24 lb/A, respectively. Hank spring wheat was seeded on May 19 at a rate of 85 lb/A in 8-inch wide rows.

The treatments were applied at jointing, flag leaf, boot, heading, and watery ripe GS's, on July 2, 7, 11, 14, and 29, respectively. Crop height at application measured 17, 20, 23, 24, and 34 inches, respectively. Treatments were applied to plot areas measuring 10 by 15 feet at 20 GPA with a backpack sprayer. Tilt was applied at 4 oz/A on June 24 to control stripe rust. The study was harvested on September 21.

Results:

Both PGR's reduced plant height, but height reductions were greatest with the combination of the two products. Growth stage impacted efficacy, with the greatest height reductions being observed with applications made at the boot and heading stages. Yields were low, averaging only 19 bu/A. This occurred as a result of a severe orange wheat blossom midge infestation. Yields were not affected by PGR, but GS did impact yields. The lowest yields were observed when treatments were applied at the watery ripe stage. At the same time, protein content was highest when treatments were applied at the watery ripe stage. Growth stage also impacted test weight, thousand kernel weight and falling numbers. Applications made at boot and heading had the greatest test weights and thousand kernel weights, but the lowest falling numbers. When comparing products, Palisade resulted in higher protein and test weight, but lower falling numbers relative to Cerone.

Summary:

Cerone and Palisade reduced plant height with the greatest impact being observed when treatments were applied at boot and heading. These timings also corresponded to the highest test weights and thousand kernel weights, and the lowest falling numbers.

Table 1. Plant growth regulator effects on spring wheat yield and quality, 2011.

Growth stage	Height inches	Yield bu/A	Protein %	TWT lb/bu	TKW g	OWBM no./spk	PPO	FN sec	moist %
Palisade									
Check	33	19	16.57	52	32	232	0.220	188	17
Jointing	32	18	16.73	53	30	247	0.180	149	17
Flag leaf	34	20	16.87	53	32	264	0.230	145	17
Boot	31	19	16.90	54	35	240	0.240	110	17
Heading	31	20	16.93	54	35	206	0.220	112	17
Watery ripe	34	17	17.43	53	33	196	0.230	144	16
Cerone									
Check	34	24	16.57	52	33	205	0.220	240	16
Jointing	33	16	16.63	51	28	222	0.250	253	16
Flag leaf	33	19	16.43	52	30	227	0.200	204	16
Boot	33	21	16.60	52	32	174	0.230	202	17
Heading	32	21	16.37	53	33	287	0.250	214	17
Watery ripe	35	17	16.77	53	31	219	0.190	181	17
Palisade + Cerone									
Check	36	19	16.67	52	31	177	0.180	216	17
Jointing	30	19	16.77	53	30	119	0.180	239	17
Flag leaf	28	21	16.53	54	33	233	0.200	168	16
Boot	27	23	16.40	54	33	208	0.250	152	17
Heading	28	27	16.67	55	34	186	0.270	123	18
Watery ripe	35	16	17.07	53	32	208	0.170	217	15
Mean	32.12	19.76	16.72	52.98	31.97	214.04	0.22	180.87	16.75
CV	4.52	21.61	1.62	2.25	9.45	24.25	25.34	26.04	8.68
LSD	2.422	7.12	0.451	2.00	5.035	86.555	0.092	78.516	2.424
TRT Pr>F	0.0001	0.2142	0.0055	0.0408	0.3862	0.1328	0.5469	0.006	0.8417
PGR LSD									
Palisade	1.03	NS	0.18	0.79	NS	35.16	NS	31.90	NS
Cerone	32.5	18.7	16.90	53.2	32.7	231.0	0.218	141.3	17.0
Palisade + Cerone	33.2	19.8	16.56	52.2	31.2	222.0	0.223	215.6	16.5
Palisade + Cerone	30.5	20.8	16.68	53.4	32.1	189.0	0.208	185.7	16.7
Growth stage LSD									
Check	1.46	4.09	0.26	1.12	2.89	NS	NS	45.11	NS
Jointing	34.3	20.6	16.6	52.2	32.0	204.5	0.205	241.5	16.6
Flag leaf	31.2	17.8	16.7	52.2	29.5	196.3	0.199	213.3	16.6
Boot	31.5	20.1	16.6	52.8	31.6	241.3	0.208	172.5	16.5
Heading	30.6	20.8	16.6	53.4	33.6	207.4	0.241	154.5	17.1
Watery ripe	30.2	22.6	16.6	54.0	33.6	226.5	0.248	149.7	17.3
Watery ripe	34.5	16.5	17.1	53.1	31.7	208.0	0.196	180.4	16.1