Project Title: Effects of Plant Growth Regulators (PGR's) and Growth Stage (GS) on Spring Wheat Yield and Quality, 2012 (4W4147).

Principal Investigator: Bob Stougaard

Project personnel: Brooke Bohannon

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 seven years. 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 12-40-30-10 lb/A, respectively. Hank spring wheat was seeded on May 4 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 June 14,25, 29, July 4, and 9, 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 in 20 GPA with a backpack sprayer. Headline was applied at 9 oz/A on June 21 to control stripe rust. The study was harvested on August 31.

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.

Funding Summary: Budget information to be provided by OSP. No other grant support for this project.

MWBC FY2013 Grant Submission Plans: Resubmittal is planned.

Table 1. Plant growth regulator effects on spring wheat yield and quality, 2012.

Growth stage	Height inches	Yield bu/A	Protein %	TWT lb/bu	TKW g	Heading Julian	FN sec	moist %
Palisade								
Check	31	50	14.15	57	42	185	274	11
Jointing	29	51	13.60	59	43	186	293	11
Flag leaf	29	52	13.34	58	44	186	279	11
Boot	27	47	14.15	58	43	186	248	11
Heading	30	50	14.09	59	44	185	278	11
Watery ripe	30	51	13.72	59	44	185	276	11
Cerone								
Check	31	49	13.66	57	43	185	278	11
Jointing	32	47	14.40	57	43	185	249	11
Flag leaf	29	50	13.57	58	43	186	312	11
Boot	28	53	13.60	58	43	186	326	11
Heading	29	53	14.12	58	43	185	311	11
Watery ripe	30	54	14.46	58	44	186	312	11
Palisade + Cerone								
Check	30	47	14.72	57	41	185	259	11
Jointing	29	42	14.55	58	41	189	292	12
Flag leaf	25	49	15.01	58	41	190	249	12
Boot	23	48	14.23	58	40	188	268	12
Heading	26	51	13.57	59	42	186	282	11
Watery ripe	29	52	14.38	59	44	186	231	12
Mean	28.77	49.76	14.07	58.02	42.72	186.2	278.7	11.27
CV	3.73	8.45	5.55	1.56	4.7	0.53	14.52	5.16
LSD	1.789	7.01	1.301	1.506	3.345	1.644	67.468	0.969
TRT Pr>F	0.0001	0.2045	0.4211	0.0803	0.2634	0.0001	0.2903	0.3417

TWT: test weight, TKW: thousand kernel weight, FN: falling numbers, Moist: grain moisture