USING CORON® TECHNOLOGY TO FOLIAR DELIVER HM0539 & HM 0629 OLIGOSACCHARINS FOR MAXIMIZED COTTON YIELDS

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Introduction

Production costs, like all other costs, are increasing every year. Producers are being forced to improve yields in an effort to maximize profits. Supplementing the basic cotton soil fertility program with foliar fertilization has been reported to improve cotton yields (Roland, et al., 2006). In addition to foliar N and K applications there may be other foliar additives that would benefit cotton yields. Research conducted on viticultural and horticultural crops has indicated that physioactivators developed by Goëmar Laboratories, St. Malo, France have improved yields by stimulating plant development. Polyamines are substances that are naturally present in plants aiding or promoting growth. The concentrations of these polyamines are higher in young tissue promoting cellular multiplication and influence cellular differentiation during organogenesis. They also impact time of flowering and pollination promoting early fruit development (Costa et al. 1983).

The objectives of this study were to evaluate the effect of two oligosaccharins HM0539 and HM0629 with and without foliar CoRoN® on cotton reproduction and yield.

Materials and Methods

Field investigations were established in 2007 at selected locations in Arkansas, California, Georgia, Louisiana, Mississippi, Oklahoma, South Carolina, Tennessee, and Texas allowing a wide range of soil and environmental conditions. The trials were conducted on traditional cotton production areas utilizing agronomic practices recommended for the area. Stoneville cultivar 4554 B2RF was utilized at all study locations except California which utilized the Pima cultivar DP 340. Treatments consisted of foliar applying the oligosaccharins HM0539 and HM0629, with and without foliar CoRoN® 10-0-10 0.5B. An additional treatment was a non-foliar check consisting of the grower's normal fertilization practice (Table 1). Foliar treatments were applied at 1st bloom. Treatments 3, 4, and 5 were foliar applied with a gal/a of CoRoN 14 days later. All treatments, including the grower standard, received blanket applications of Pentia® or other PGRs as required based on growth conditions. Lint yield and quality were evaluated.

Statistical analyses were conducted utilizing SAS Mixed Model procedure (SAS Ins., 2001) to evaluate treatment effects on yields for each location and across locations. The Mixed Model procedure provides Type III F values. Mean separation was accomplished through a series of protected pair-wise contrasts among all treatments (Saxton, 1998).

Results and Discussion

The lint quality determinations have not been completed for all (each) locations and therefore the data will not be presented. Cotton produced at Corpus Christi, TX received an unusually high amount of rainfall throughout the growing season complicating both growth and harvesting and due to the resulting variability, this location is not included in the analysis.

The ANOVA (Table 2) indicates that yields for the eight locations (LOC) varied. This variation was expected since the sites were selected to evaluate a wide range of soil and environmental conditions on the treatments. Since this effect was expected the data will not be presented.

The ANOVA for yields averaged over the eight locations showed the treatments (T) had a significant effect on yields averaged over the eight locations (Figure 1). These foliar treatments were applied to supplement the basic soil fertility program that may have varied with location. There was no significant difference in yields produced by the first three treatments (treatments 1, 2, and 3); although the mean yields for treatments 2 and 3 were higher than the mean yield for treatment 1. Likewise there were no significant differences between yields produced by treatments 3, 4, and 5. The yield means for treatments 4 and 5 were higher when compared with treatment 3. Applying HM0539 at 8 oz/a in combination with 120 oz/a of CoRoN plus foliar CoRoN applied at 1 gal/a 14 days (Tmt 5) after the initial application increased yields relative to the non-foliar check (Tmt 1) and yields produced by applying HM0629 at 1 qt/a (Tmt 2). Treatments 4 and 5 significantly increased yields relative the non-foliar check. CoRoN applied in conjunction with HM0629 (Tmt 4) did not significantly increase yields relative HM0629 applied alone (Tmt 2) although, mean yields were 39 lbs higher. CoRoN applied in combination with HM0539 (Tmt 5) did not result in significantly higher yields relative to HM0629 applied in combination with CoRoN (Tmt 4) although, mean yields were 29 lbs/a different.

The location (LOC) by treatment (T) interaction (Table 2) indicates that the foliar treatment effects on yields were inconsistent with location. Additional evaluations indicated the interaction resulted from treatment variations at two locations. At one location, the mean non-foliar yield was higher than the foliar means, even though differences were not significant. At a second location, yields were significantly different within the foliar treatments and greater than the non-foliar check. Therefore, the data was not presented.

Conclusions

Although yields resulting from the individual treatments of HM0629 and CoRoN 10-0-10 0.5B were not significantly different from the non-foliar check, there were small numerical increases in both treatments. Applying either HM0539 or HM0629 in combination with CoRoN 10-0-10 0.5B resulted in significantly higher lint yields relative to the non-foliar check. These treatment effects on yields were not consistent across the cotton belt and are believed to be environmentally affected. Based on this multi-location study data suggests that either oligosaccharin, HM0539 or HM0629, applied with CoRoN 10-0-10 0.5B can effectively improve lint yields.

References

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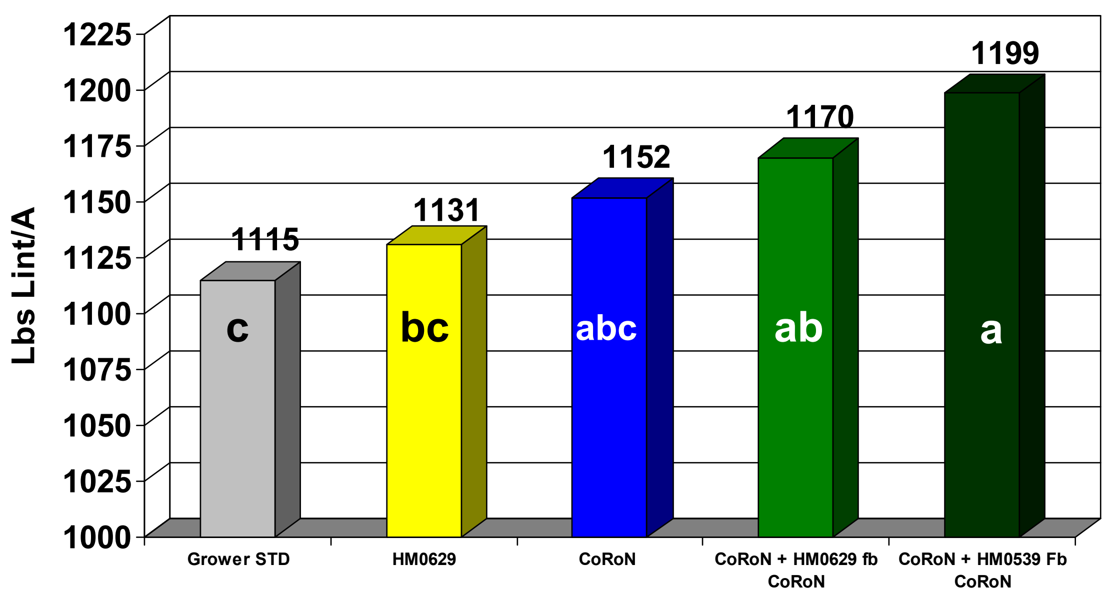
Table 1. Treatment number, description, rates, and application timings.

Treatment #	Treatment	Rate/A	Application Timing
1	Grower Standard – no foliar	-	-
2	HM0629	1 qt	1st Bloom
3	CoRoN 10-0-10 0.5B fb CoRoN 10-0-10 0,5B	1 gal 1 gal	1st Bloom 1st Bloom + 14 days
4	HM0629 + CoRoN 10-0-10 0.5B fb CoRoN 10-0-10 0,5B	1 qt + 1 gal 1 gal	1st Bloom 1st Bloom + 14 days
5	HM0539 + CoRoN 10-0-10 0.5B fb CoRoN 10-0-10 0.5B	8 oz + 120 oz 1 gal	1st Bloom 1st Bloom + 14 days

Table 2. ANOVA of treatment effects on cotton lint yields.

Source	df	Yield	
		"F"	Pr>F
Location (LOC)	7	225.5	0.001
Error a	21		
Treatment (T)	4	3.19	0.017
LOC * T	28	1.80	0.02
Error b	90		

Figure 1. Effect of oligosaccharins on cotton lint yield in 2007.



Cotton lint yields shown followed by the same letter are not significantly different at $p<0.05$.