CHAPERONE® EFFECTS ON COTTON FRUITING AND YIELD Josh B. Bynum and J. Tom Cothren Texas Agricultural Experiment Station Texas A&M University College Station, TX Robert G. Lemon Texas Cooperative Extension College Station, TX

Abstract

Six studies were conducted for a three-year duration (2001, 2002, 2003) in Burleson County, Texas, to evaluate the plant growth stimulator Chaperone®, for its effects on cotton lint production. Numerical increases for lint yield occurred in all six studies for plots treated with Chaperone® over an untreated control. Combining all studies over years resulted in a significant (12 %) increase for 20 oz/A over the untreated control (UTC). The 10 oz/A treatment also was significantly higher (7.5 %) than the UTC. No significant differences were observed at the 5 oz/A rate, although a (3.4 %) numerical increase was observed.

Introduction

Chaperone® is currently being investigated for its effect on cotton yield and quality. The compound, comprised of sodium *p*-nitrophenolate, sodium *o*-nitrophenolate, and sodium 5-nitroguaiacolate, is purported to elicit several responses within plants, including enhanced photosynthetic activity, increased enzyme/protein production, and membrane integrity. Petiole nitrate levels were increased as much as 2-fold with single applications of Chaperone® beginning at first bloom and thereafter for 5 weeks (Fernandez, et. al., 2003). The study is designed to test the hypothesis that cotton lint yield should increase with applications of Chaperone® due to the rapid translocation of nitrate and protein to developing fruit.

Materials and Methods

Studies to evaluate the effects of Chaperone® on cotton were conducted at the Texas Agricultural Experiment Station in Burleson, County, Texas. Six studies were conducted for a three-year duration (2001, 2002, 2003). All studies examined a single application at rates of 20, 10, and 5 oz/A applied at the early bloom stage of development versus an untreated control, except studies 2003-1 and 2003-3 which only examined the 10 and 5 oz/A rate against an untreated control. Studies were arranged in a randomized complete block design. All studies were replicated four times and planted on 40-inch row spacing. Plot size was four rows by 32 feet in length. Lint yield was determined from machine harvesting the middle two rows of each plot. In addition to yield, lint samples were sent to the International Textile Center in Lubbock, Texas, to examine fiber quality (not discussed in this paper). Texas Cooperative Extension guidelines were followed regarding insect control, weed control, and fertility. The general linear model in SAS (8.02) was utilized for statistical analysis, and means were separated using Fisher's Protected LSD at the ≤ 0.05 significant level.

Objective

Evaluate the effects of Chaperone® across studies for effects on cotton lint yield.

Results and Conclusions

Numerical increases for lint yield occurred in all six studies for plots treated with Chaperone® over an untreated control. Individual study results are given in Figures 1 through 6. Significant increases in lint yield were observed for the 2003-2 and 2003-3 studies (Fig. 5 and Fig. 6). Combining all studies over years resulted in a significant (12 %) increase for 20 oz/A over the untreated control (UTC). The 10 oz/A treatment also was significantly higher (7.5 %) than the UTC. No significant differences were observed at the 5 oz/A rate, although a (3.4 %) numerical increase was observed.

Future Research

Additional studies should be conducted over years, under various environments, with the same rates of Chaperone® and single or multiple applications of the chemical at different stages of crop development, to establish the best rate and timing for use of the chemical. Also, more intensive research is needed on the physiological responses of the plant on a molecular level.

References

Fernandez, C.J., A. Diaz-Delgado, and W.A. Harper. 2003. Effects of Timing of Application of the Plant Growth Regulator ARYSTA-Exp-NP321 on Petiole Nitrate-Nitrogen in Cotton. Proceedings of the Beltwide Cotton Conference, Nashville, TN. 6-10 Jan. 2003. National Cotton Council of America, Memphis TN.

SAS Institute. 1999. The SAS System for Windows - Release 8.02. SAS Institute, Cary, NC.



Figure 1. Lint yield (lb/A), 2001.



Figure 2. Lint yield (lb/A), 2002-1.



Figure 3. Lint yield (lb/A), 2002-2.



Figure 4. Lint yield (lb/A), 2003-1.



Figure 5. Lint yield (lb/A), 2003-2.



Figure 6. Lint yield (lb/A), 2003-3.



Figure 7. Lint yield (lb/A) compiled across all studies, 2001-2003.