2002 BELTWIDE COTTON CONFERENCES, ATLANTA, GA – JANUARY 8-12

EFFECTS OF FOLIAR APPLICATIONS OF MESSENGER™ ON COTTON

Cassandra Meek and Derrick Oosterhuis
Department of Crop, Soil, and Environmental Sciences
University of Arkansas
Fayetteville, AR

Abstract

Over the last few decades, concern for the protection of the environment has escalated. This has inspired agricultural researchers to develop non-toxic crop protectants, often borrowing from nature itself. One such product is Messenger™ (Eden Bioscience, Seattle, WA), which contains the protein, harpin, isolated from bacterial plant pathogens. Harpin is responsible for eliciting a system acquired resistance response. In 2001, a field study was conducted in Fayetteville, Arkansas to determine the effects of Messenger™ on cotton yields. Treatments consisted of an 1) untreated control, foliar treatment (2.23 oz/acre) applied at 2) 2nd true-leaf (2TL), 3) pinhead square (PHS), 4) first flower (FF), 5) 2TL, PHS, & FF, and 6) PHS & FF. At FF + 3 weeks, all Messenger™-treated plots had significantly higher photosynthetic rates, indicating that Messenger™ enhanced physiological function in cotton. Treatment with Messenger™ at the 2nd true leaf stage resulted in significantly higher numbers of sympodial branches with 2nd position bolls. Although not significant, Messenger™-treated plants generally had more total bolls, outer position bolls, effective sympodia, and monopodial branches. While no significant differences were present in yield components, untreated control plants had the lowest seedcotton yield. Messenger™-treated plants generally had higher boll number and decreased boll weights when compared to untreated plants. Leaf potassium levels were deficient early in flower and boll development, and did not improve with foliar application of additional potassium and Messenger™. No trends in regards to treatment or replication were observed in leaf potassium levels, but nutrient deficiencies at FF+3 weeks were more pronounced in untreated control plants, suggesting that Messenger™ can possibly aid in the maintenance of optimal nutrient status. Future work will thoroughly examine physiological and biochemical responses of cotton to Messenger™ in a controlled environment with and without water deficit, temperature and disease stresses.