

► Effects Of Potassium And Fungicide On Cotton Leaf Spot Disease And Yield

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The objective of this study was to study the affect of granular potassium applied prior to planting, and/or a fungicide application at mid-bloom, on the development of *Alternaria* Leaf Spot and cotton yield.

Cotton plants require substantial quantities of potassium for several plant functions, but particularly for boll development. As bolls develop they require constant internal turgor pressure in order to optimize lint development, and the potassium ion is utilized by cotton plants to maintain this constant pressure. This need for abundant levels of potassium during boll fill subjects cotton to periods of high potassium demand, and less than adequate level of potassium are thought to result in diminished boll development, resulting in reduced yield potential. Recently, *Alternaria* and *Cercospora* leaf spot diseases were identified in several cotton fields in Louisiana. Leaves exhibited necrotic ring spots and older leaves often senesced from the plant during the mid-summer months. Growers have many questions about how to slow or stop the spread of the disease, as well as the potential impact on yields in affected fields. Trials were conducted on the Dean Lee Research Station in central Louisiana and the Northeast Research Station near the Mississippi River examining the effects of potash and/or fungicide applications on cotton leaf spot disease as well as overall yields.

This study was designed so that three cotton varieties (ST 5288B2F; DP 0912B2RF; PHY 499WRF) had two levels of potassium (none and sixty pounds of K₂O) applied immediately prior to planting, and/or a fungicide application was applied at mid-bloom to minimize or eliminate symptoms of *Alternaria* leaf spot disease. Disease ratings were conducted on August 17, 2012 and September 5, 2012 that were based on relative comparison of levels of symptomology (1=no disease, 2=few spots, 3= spots on all plants, 4<50% defoliation, 5>50% defoliation).

When yield was statistically analyzed as a response to the inputs of variety, potassium application, and fungicide application, there were no significant three-way or two-way interactions. However, all main effects were significant ($P=0.05$). ST 5288 yielded 1,279 lbs lint per acre, DP 0912 yielded 1,166 lbs lint per acre, and PHY 499 yielded 1,109. The application of potassium actually decreased yield an average of 94.6 lbs lint per acre over no application of potassium, but the application of a fungicide resulted in an 88.2 lbs of lint increase compared to no application of fungicide. These yield results were obtained under heavy disease pressure. On August 17th, the overall average disease rating for the trial was 3.35 and with no significant interactions, fungicide treatment was significant. The disease rating was higher (3.53) for the cotton with no fungicide than with (3.17) on that date, indicating the fungicide had a positive effect. Three weeks later, overall disease pressure was worse, with a trial average rating of 4.30. On that date, there was a significant two way interaction between variety and fungicide, with no difference between disease symptoms for two of the three varieties, but ST 5288B2F had significantly less disease pressure when a fungicide was applied compared to when no fungicide was applied.

This is the first year this trial has been conducted and no firm lessons can be drawn from a single year, but it is worth noting that applications of potassium on a field that had moderate soil potassium levels at the beginning of the season did not seem to reduce the incidence of leaf spot disease, yet the application of a fungicide at mid-bloom reduced disease pressure. Another year of study must be conducted to determine if these effects are repeated and reliable.