EFFECTS OF DNA HERBICIDES ON COTTON GROWTH IN LARGE SCALE FIELD STUDIES

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Abstract

Prowl® (pendimethalin) and Treflan® (trifluralin) are the leading dinitroanilines used in the cotton industry. Over the years many studies have proven the importance of early season stand health on cotton development and yield. Rapid early root development is essential for the uptake and utilization of nutrients and systemic insecticides. "Root pruning" has long been associated with the use of DNA herbicides. This study was conducted compare the effect of the two most widely used DNA herbicides on cotton development and yield.

A large scale field study was conducted on Mitchener Farms near Sumner, MS. The test site consisted of fifteen pairs of ten row strips for each preplant incorporated (PPI) treatment. The PPI treatments of Prowl at 1.0 lbs. ai/A and Treflan at 1.0 lbs. ai/A were applied on April 12, 1996. DeltaPine NuCotn 33^B was planted on May 1. The following parameters were measured: stand, plant height, root ratings, stem diameter (in.), number of leaves, leaf area index (cm^2), number of nodes, node number of first fruiting branch, first position squares retained, missing first position squares, first position white flower at node number, and first position bolls retained. The parameters were measured for each plot weekly throughout the season until August 10. Plant mapping was initiated on June 20. Yield and quality were measured from a composite of each treatment across replications.

Only the results from the stand count, plant height, root ratings, stem diameter, number of nodes, first position squares retained, and first position bolls retained are discussed. For each of these parameters the strips treated with Prowl had an advantage over the strips treated with Treflan throughout the season. This advantage was demonstrated as more robust plants that appeared to reach cutout quicker than the Treflan treated plants. This season long advantage can be traced back to less root pruning exhibited in the Prowl strips. On May 21, root ratings were made by rating 10 plants from each strip on a 1 - 10 scale with a 10 = best. Prowl had a mean rating (across 15 strips) of 5.9 and Treflan had a mean rating of 4.5, which demonstrates that Prowl appeared to be safer on cotton roots.

Due to the inability to harvest and maintain the integrity of each individual strip, the Prowl strips were harvested and ginned as a composite. The next day the Treflan strip were harvested and ginned as a composite. In this study the Prowl strips out yielded the Treflan strips by 22.2 lbs./A. The classing of the gin samples for length, strength, micronaire, and uniformity were essentially the same for both treatments. However, there appears to be an advantage of Prowl over Treflan when looking at the percentage of bales by grader class. The Prowl strips had 69.4% of the bales classed in Grades 31 and 41 where only 29.2% of the bales from the Treflan strips classed in Grades 31 and 41. It appears that Prowl had a positive impact on both yield and quality, but further research is needed to validate the results from this study.

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