

**THE EFFECTS OF DNA HERBICIDES
ON COTTON GROWTH AND DEVELOPMENT**

**Wade L. Worley, William H. McCarty,
Michael M. Kenty and Christopher T. Leon
Worley Pest Management
Sumner, MS**

**Mississippi Cooperative Extension Service
Mississippi State, MS**

**American Cyanamid Company
Collierville, TN**

**Mississippi State University
Mississippi State, MS**

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 in 1996, 1997, and 1998. The test site consisted of fifteen pairs (1996, 1998) and twenty pairs (1997) 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, April 12, 1997, and April 10, 1998. DeltaPine NuCotn 33^B was planted in 1996 and 1997 and DeltaPine 20^B was planted in 1998. The following parameters were measured: stand, plant height, stem diameter (in.), 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 through the first week of August each year. Plant mapping was initiated on June 20, 1996, July 7, 1997, and June 18, 1998. Yield and quality were measured from a composite of each treatment across replications each year.

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 appeared to have a slight advantage over the strips treated with Treflan throughout all three seasons. Prowl's advantage was demonstrated as more robust plants that appeared to reach cutout quicker than the Treflan

treated plants. This season long advantage can perhaps be traced back to less root pruning exhibited in the Prowl strips. On May 21, 1996 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. No root ratings were made in 1997 or 1998.

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 following day the Treflan strips were harvested and ginned as a composite. In this study the Prowl strips out yielded the Treflan strips by 22.2, 123.0, and 3.7 lint lbs./A in 1996, 1997, and 1998 respectfully for an average of 49.6 lint lbs./A. While the mean yield of the three year study is not significant, it may suggest a trend. The classing information from the gin samples for length, strength, micronaire, uniformity, staple, trash, and leaf grade were averaged by treatment across years. There were no significant differences between treatments for strength, uniformity, trash, and leaf grade.

There were significant differences between treatments for length, micronaire, and staple with the slight advantage going to Treflan. Prowl produced less trash discounts in two of the three years. Averaged over three years it appears that Prowl had a positive impact on both yield and quality. Further research into the quality issue is needed to better understand the differences observed in this study.