

A COMPARISON OF TRANSGENIC AND CONVENTIONAL COTTON VARIETIES

**Michael Robinson and Lloyd McCall
Stoneville Pedigreed Seed Company
Stoneville, MS**

Abstract

Transgenic variety development is in the limelight of today's industry. Most transgenic varieties are developed utilizing the backcross breeding method where traits of interest are crossed back into a selected variety. We currently offer for sale a Bollgard®, Bollgard® plus Roundup Ready®, Roundup Ready®, and BXN® version of ST 474 and a Roundup Ready® version of ST 239 that are all derived using a backcross breeding program.

Our current backcross program is performed in greenhouses with selections conducted primarily for transgenes of interest. A supply of BC4F2 seed is provided for field evaluations.

The goal of field evaluations is to identify lines that are homozygous for the desired trait and phenotypically similar to the recurrent parent. The BC4F2 plants are screened for target genes and "positive" plants are selected then harvested individually. The individual plants are grown as BC4F3 progeny rows at a winter nursery site where they are screened to determine homozygosity and evaluated for phenotypic similarity to the recurrent parent. Individual rows are then harvested.

The individual lines are agronomically evaluated in Beltwide yield and efficacy trials. The data collected is used to determine which lines will be bulked to form the transgenic variety.

Success of the backcross-breeding program can be measured by the varieties performance compared to the recurrent parent. In trials conducted in 1999 and 2000 the above-mentioned transgenic versions of ST 474 were not significantly different for yield or lint percent. There were slight differences noted for fiber length in ST 4793R and an improvement in micronaire was made in ST 4691B as compared to ST 474. In yield trials conducted on the Texas High Plains, no differences were detected between the recurrent parent ST 239 and the backcross derived lines ST 2454R and STX 0039 for lint percent; however STX 0039 was significantly higher in yield than either ST 239 or ST 2454R. There were measurable differences noted for fiber length, strength, and micronaire in STX 0039 compared to ST 239. Also, ST 2454R and STX 0039 have improved vigor, storm resistance, and STX 0039 is later maturing when compared to ST 239.

Although backcross derived varieties are approaching 97% of the recurrent parent at the BC4 stage, genetic variability exists within these populations. The breeding objective of our backcross program is to incorporate a transgene while maintaining or improving the performance of the recurrent parent. The procedures used by Stoneville Pedigreed Seed Company allow us to effectively evaluate then capture this genetic variability as a means to meet our objective.