

**A PROJECT TO DEVELOP BROADLY ADAPTED, HEAT
TOLERANT, HIGH FIBER QUALITY GERMPLASM**

**Richard G. Percy
USDA-ARS, WCRL**

Phoenix, AZ

Lloyd May

University of Georgia

Tifton, GA

Mauricio Ulloa

USDA-ARS

Shafter, CA

Roy Cantrell

Cotton Incorporated

Cary, NC

Abstract

A cooperative project has been initiated in 2003 with the goals of developing adapted, elite cotton germplasm for the improvement of fiber quality and heat tolerance in the Southeast and Midsouth, and providing parental materials for the improvement of heat tolerance in Acala cottons in the West. A 'shuttle breeding' scheme has been developed whereby potential heat tolerant parents will be evaluated at Maricopa, AZ; hybrid population creation will occur at Maricopa, AZ and Tifton, GA; early generation individual plant selection will occur at Maricopa, AZ; and progeny row selection and evaluation will occur at Maricopa, AZ, Tifton, GA, and Shafter, CA. Potential parent lines are being evaluated on the basis of plant mapping for fruit retention and pollen sterility ratings. Individual plant selection for heat tolerance within progeny is being practiced through indirect selection based upon first position fruit set. Plant selection and progeny evaluation for fiber quality is being practiced using HVI and AFIS data. Seventy progeny lines, from two previously created populations, have been evaluated at Maricopa, AZ, Tifton, GA, and Shafter, CA in 2003 using un-replicated, single plot tests and flexible analytical methods selected by location (AS-REML, moving mean from Gardner's grid, etc). Fourteen progeny lines have been selected for replicated testing across locations in 2004 based upon the results of 2003 evaluations. These 14 lines exhibit superior fiber characteristics; with lint percents ranging from 34.0 to 40.0 percent, upper half mean lengths ranging from 1.16 to 1.24 inches, and strengths ranging from 27.3 to 35.0 grams/tex.