

**F1 COMBINING ABILITY FOR FIBER QUALITY
IN THE MS DELTA AND CALIFORNIA**
Joel F. Mahill, Randall McPherson and David M. Anderson
Phytogen Seed Company, LLC
Corcoran, CA – Leland, MS

Abstract

Phytogen Seed Co. LLC has engaged in research involving early generation testing of parental breeding lines for combining ability and potential contribution to genetic gain in cotton breeding efforts. Thirty-six (36) F1 “diallel” lines were made in India between a diverse group of cotton varieties as parents. The parent varieties were comprised of three groups: 1) early maturity Upland varieties PSC 355, SG 747, and FM 958, 2) late maturity Upland varieties DP Pearl, FM 966, X-6348 Argentine, and 3) San Joaquin Valley, CA [SJV] Acala varieties PHY 72, GTO, DP 6211. The 36 F1 lines and parent varieties were field tested in 2001 at three locations in the Mid-South region and two locations in the San Joaquin Valley, CA. Fiber properties (HVI) were analyzed for general combining abilities (GCA) and specific combining abilities (SCA) by Griffins Diallel procedures– Method 2 or Method 4. The analyses and approaches for interpretations were: 1) GCA and SCA effects for fiber traits were determined for each parent by location, 2) Average GCA was calculated for parents over locations, and 3) Difference of the average [Diff. Avg.] was determined as the deviation of the parent trait mean from the mean of all parents and correlated to the average GCA parent effect. Combining ability analyses revealed that GCA effects were of a much greater magnitudes than SCA effects for all fiber traits tested. Average GCA parent effects were highly correlated (0.90+) with Diff. Avg. for all fiber quality traits. The SJV Acala varieties PHY 72, GTO, and DP 6211 had the best GCA for fiber length and strength along with DP Pearl for fiber length and FM 966 for fiber strength. Acala GTO and PSC 355 had the best GCA for fiber uniformity. The Mid-South varieties PSC 355 and SG 747 had the best GCA for fiber elongation followed by the Acala variety PHY 72. The SJV Acala varieties had the best GCA for lower fiber micronaire. Early generation combining ability analyses indicate that breeding gain among diversely adapted varieties across growing regions. Performance of parents for fiber traits in this study is indicative of performance in early generation hybrid combinations. Research and continued investigations of early generation testing is warranted in the F1 and F2 as tools to identify the best combining parents in cotton breeding and variety development.