

**SELECTION FOR TOLERANCE TO EARLY
FOLIAR DECLINE IN PIMA COTTON**

R. G. Percy

USDA-ARS

Phoenix, AZ

H. Moser

University of Arizona

Maricopa, AZ

R. B. Hutmacher

University of California

Shafter, CA

S. D. Wright

University of California

Visalia, CA

Abstract

In recent years a phenomenon variously referred to as bronzing, bronze wilt, or early foliar decline (EFD) has occurred in Pima cotton in the San Joaquin valley of California, where it has been implicated in yield and fiber quality losses. A project was begun in 1998 with the objectives of determining the heritability of tolerance to EFD, demonstrating the relationship between EFD severity and plant maturity, and creating earlier, tolerant germplasm. In 1998, 100 individual plants from each of three F_2 hybrid populations were rated for EFD severity in a nursery at Buttonwillow, CA. In 1999, F_3 progeny of the individual plant selections were grown and evaluated for EFD in small plots at Buttonwillow and Tulare, CA. Replicated trials of F_4 progeny (20 lines per population) were conducted at the above locations in 2000, and evaluated for EFD, maturity, lint yield, and fiber quality. At the Tulare location, EFD ratings among F_4 lines of the three populations were negatively correlated with nodes above bloom counts (0.47 - 0.84), plant heights (0.60 - 0.73), and yield (0.60 - 0.82). At the Buttonwillow location where EFD expression occurred later in the season, EFD ratings correlated negatively with plant height (0.60 and 0.71) and yield (0.46 and 0.63) in two of the three populations. Fiber micronaire was negatively associated with EFD severity in all populations at Tulare (0.59 - 0.80), as was fiber elongation in two populations (0.44 and 0.55). Fiber strength was negatively correlated with EFD in one population at both locations. The heritability of EFD expression between individual plants and individual progeny rows of the F_2 and F_3 generations was low (14-19%), and did not improve appreciably between the F_3 and F_4 generation progeny (18-24%). Heritability of EFD expression within lines of the F_4 generation, as measured by variance component estimates, was quite high (83-89%). Moderate gains were made in identifying EFD tolerance within earlier maturing lines.