

BREEDING PRIORITIES IN THE UNIVERSITY OF ARKANSAS COTTON BREEDING PROGRAM**F. M. Bourland****University of Arkansas – NEREC****Keiser, AR****D. C. Jones****Cotton Incorporated****Cary, NC****Abstract**

Breeding priorities in the University of Arkansas Cotton Breeding Program are similar to those in other state-funded cotton breeding programs. These priorities include 1) investigate new breeding methods, 2) develop new traits by determining relationships and inheritance of traits, 3) explore and widen the genetic base of cotton, 4) train graduate students in cotton breeding, 5) provide a genetics perspective to research in other disciplines, 6) release germplasm lines (express specific traits) and cultivars (meet specific demands), and 7) evaluate and characterize materials from own and other programs. The number of U.S. cotton breeding programs funded by state experimental stations (AES) that address these priorities has declined from about 17 in 1974 to nine in 2014. The current AES cotton breeders share several common factors: 1) most have other responsibilities including breeding other crops, performing other cotton research, teaching, and/or administration; 2) most have limited funding which necessitates chasing other sources of funds; 3) most work relatively independently since the limited funding restricts assistance from other disciplines; 4) commercialization of public releases are restricted by the prevalence of transgenic varieties in the cotton industry; and 5) production of scientific publications (essential for promotion) are challenged by the approximately 10 years required from crossing to release of a line.

The specific objective of the University of Arkansas Cotton Breeding Program is to develop cotton germplasm lines and cultivars that meet the needs of cotton production in Arkansas. This objective is met by developing and evaluating lines which are selected for several specific traits. A promising line must first produce high yield over multiple environments. High yields should be obtained by improved yield-efficiency, i.e. lines that produce more or equal fiber using fewer internal (within plant) and external (applied to plant) inputs. Improved yield-efficiency traits now being used include 1) modified yield components, 2) increased resistance to insect pests, 3) increased resistance to disease pests, and 4) enhanced stress tolerance. Finally, enhanced fiber quality is sought using the Q-score index and by evaluating plant trichomes with the goal of reducing leaf trash. Detailed approaches and selection criteria used in this program are chronicled in two publications (Bourland, 2004; 2013).

Since 1986, I have released a total of 78 cotton germplasm lines (includes 15 released via the Mississippi Agricultural and Forestry Experiment Station) and four cotton cultivars. These releases are the direct result of developing a program that addresses the priorities listed above.

References

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