GENETIC DIVERSITY AND AGRONOMIC POTENTIAL OF CULTIVARS WITHIN THE U.S. COTTON COLLECTION Lori Hinze Richard Percy USDA-ARS College Station, TX Jane Dever Texas AgriLife Research Lubbock, TX

<u>Abstract</u>

Broadening the range of cotton (*Gossypium hirsutum* L.) germplasm to introduce genetic diversity would be useful in minimizing risks to production, introducing unique traits, or improving trait performance. Within the U.S. Cotton Germplasm Collection is a subset of improved cultivars, collected world wide, that represent the most accessible and immediately useful germplasm to breeders, but whose diversity has not been adequately characterized. Objectives of this research include: 1) determining the genetic diversity and relationships among cultivars from cotton-growing regions of the world – divided into five groups including Africa (northern and southern), China, and the U.S. (recent and obsolete); 2) identifying within these cultivars agronomic traits with potential for enhancing the breeding programs for cotton; and 3) more fully characterizing a portion of the U.S. Cotton Germplasm Collection. Groups and cultivars within groups varied widely for agronomic and fiber traits. Molecular genetic relationships indicate that these five groups are closely related, with the largest genetic distances occurring between African and U.S. cultivars. The range of values for agronomic and fiber traits along with molecular diversity measures indicate a large pool of genetic diversity with the potential to provide alleles useful in developing new cultivars.