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COTTON RESEARCH AND DEVELOPMENT CORPORATION

PROJECT CODE: CSP24C

PROJECT TITLE: Mr PE Reid - study tour of USA cotton research institutions and cotton breeding organisations.

FINAL REPORT

During August 1990, in company with Dr Norm Thomson, Mr Reid visited a number of research institution and companies form California to Mississippi. The main purpose of the trip were to survey trends in US cotton breeding, to get to know American breeders personally, and to become more familiar with the US cotton belt.

Some key observations and conclusions are as follows.

(1) *Disease resistance.* Using conventional breeding Californian and New Mexican breeders claim that they have developed varieties which at least equal G. *barbadense* varieties for Verticillium wilt tolerance.

(2) *Host plant resistance to insects.* While research continues with the okra leaf, nectariless, glabrous and frego bract characters, only nectariless has been used commercially to any significant extent. Some work continues on high terpenoids although the quantitative geneticist Meredith stated that above normal levels of terpenoids, yield drops linearly with increasing levels of the chemicals. The most encouraging feature of HPR in cotton was that the Bt transformation was giving good *Heliothis* control and does not appear to adversely affect plant growth.

(3) *Hybrids.* Much research on F1 hybrids has been abandoned by the University of New Mexico and a Texan company have apparently developed good restorers for the cytoplasmic male sterility system. However the belief is generally held that it will be difficult to obtain sufficient yield advantage where yields are 7 ba/ha or better. A massive program is being mounted by Chembred to produce F2 hydrids and while they have not yet had outstanding success there was general agreement that there is some commercial possibility with this approach.

(4) *Quality*. There was a general realization by US breeders of the importance of raising quality levels. However it also appeared that the market place is still failing to adequately reward quality.

(5) *Breeding organisation*. There have been considerable changes of ownership and a number of new companies entering the scene. Deltapine are dominating the market at the expense of Stoneville.

(6) *Growth of CSIRO varieties in the field*. Trials in a number of states were inspected and while in most CSIRO varieties appeared competitive, in some they were noticeably later and ranker.

Overall the study tour provided valuable new insights into the US cotton research and breeding activities. As a result of observations made further studies have commenced on the magnitude of F1 and F2 heterosis under Australian conditions. Another positive result is the access gained to useful new germplasm including new HPR material and Verticillium tolerant lines.

Greater detail of the project is contained in the following unpublished report already submitted to CRDC:

Thomson, N.J. and Reid, P.E. Report on a visit to USA cotton research institutions during August 1990.