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Cotton Variety Trials, 1998

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Introduction

Variety selection is one of the first decisions -- perhaps the single most important decision -- a cotton producer makes each season. This research is intended to be an aid in making this crucial decision. Certain data will also be of interest to ginners, millers, and other sectors of the cotton industry.

The varieties reported on in this information bulletin were submitted by the cottonseed companies. Varieties submitted for testing were divided into early-maturing and mid-maturity groups based on maturity classifications deter mined by these companies. Deltapine NuCotn 33B, Stoneville 474, and Suregrow 747 were used as check varieties in tests of both maturity groups.

All varieties, regardless of transgenes present, were evaluated in these tests under standard management practices, including chemical control of tobacco budworm and cotton bollworm with conventional insecticides. The potential advantage of transgenes is not the subject of these tests and was not evaluated.

The early-maturing cotton variety test included 46 varieties in the Delta and 44 varieties in the Hills region. The mid-maturity cotton variety test included 24 varieties in the Delta and 22 varieties in the Hills. Both groups were tested at five Delta locations: Stoneville, Tunica, Clarksdale, Rolling Fork, and Tribbett. They were also tested at six Hill locations: Mississippi State, Brooksville (planted on 30-inch rows), Raymond, Holly Springs, DeSoto County, and Verona. Test plots were also planted in Petal, MS, but were destroyed by Hurricane Georges; therefore, no data is provided.

In addition to the main early-maturing and mid-maturity variety tests discussed above, a separate combined maturity variety test consisting of 24 varieties was conducted at Choctaw (planted on 30-inch rows).

Methods

All tests, with the exception of Brooksville, were planted solid in 38- or 40-inch rows. Generally, each variety was replicated six times at each location; however, only four replications were used at Verona and Raymond due to limited land space. Yield determinations were based on the weight of seed cotton mechanically harvested from two-row plots that ranged from 40 to 45 feet in length. Determination of lint fraction, boll size, seed index (weight in grams of 100 fuzzy seeds), and fiber properties were made from handpicked, 100-boll samples or from machine-harvested grab samples from three replications at each location. Sample s were ginned on a 10-saw laboratory gin. HVI fiber property determinations were made by the Cotton Fiber Laboratory of Louisiana State University in Baton Rouge, LA.

In all tests, seeds of each variety were supplied by the company that submitted the variety for testing. Recommended management practices were followed in each test. The on-farm cooperators decided planting dates, fertilizer rates, amount of supplement al irrigation, defoliation date, insect and weed control strategies, and harvest date. These tests do not encompass all growing and environmental conditions in the state, but they provide a guide to producers in selecting among varieties best suited for their area or growing condit ions. A summary of weather data from three locations in the Mississippi Delta is included in this publication.

Statistical Analysis

At the bottom of each table are summary statistics that are very important in interpreting the test results. Despite efforts to provide a uniform test environment, all experiments are subject to a certain degree of error due to variation between plots ari sing from differences in soil type, fertility, insect damage, weed pressure, etc. Therefore, yield potential (and performance with respect to other characteristics) cannot be measured with complete accuracy. By conducting replicated trials, we can account for or remove some, but not all, of the effect of non-uniform conditions among plots. As a result, the mean performance of some va rieties may be numerically different due to natural variation in the data but not statistically different when variability in the test is taken into account. The least significant difference (LSD) is a statistic that estimates the smallest difference between two varieties that should be considered something other than natural variation. For example, if the LSD for lint yield in a gi ven trial is 80 pounds per acre, varieties that differ by less than 80 pounds should be considered equal in yield. In the tables, varieties shown with underlined values are not significantly different from the variety with the highest value in the same co lumn.

The coefficient of variation (CV) is a measure of relative precision of a given trial and is generally considered an estimate of the amount of unexplained variation in that trial. In general, the higher the CV, the less precise a given trial will be. T he R-squared value is another measure of relative precision: the higher the R-squared value, the more precise the trial.

In any single year or location, a given variety may perform extremely well or extremely poorly due either to chance variation or to its response to environmental conditions in that particular site and year. To avoid being misled by performance in a sin gle year and location, it is wise to base variety selection decisions on as many environments as possible. Consequently, we have provided tables that summarize lint yields over 2- and 3-year periods at each location, as well as average performance across locations. While it is hoped that newer varieties will perform better than older varieties, this is not always the case. Greater confidence can be put in varieties that have performed well over 2 or more years than can be put in varieties that are in their first year of testing.

Acknowledgments

Most of the variety trial locations are on research stations throughout the state; trials planted on commercial farms give an added dimension to the results. While on-farm trials present logistical obstacles to researchers and to producer-cooperators, data from these trials give an important indication of how varieties will perform in "real-world" situations. The authors wish to express their appreciation to the Mississippi cotton producers who allowed us to grow these variety trials on their farms and often put up with the aggravation of farming around small-plot research. Appreciation is also expressed to Chad Fieber and W.E. Clark of the Cotton Improvement Program at Delta Research and Extension Center for their tech nical assistance.