Annually, Mississippi State researchers evaluate cotton varieties at numerous locations within the cotton growing regions in the state. The purpose of the Mississippi State Official Variety Trials is to provide an unbiased comparison of varieties across a range of environments. Trial evaluation of standard, commercially available, and new and upcoming cotton cultivars throughout the state provides producers data to make well informed variety selection decisions based upon how a particular cotton variety performed close to their base of operation.

The Official Variety Trial (OVT) for cotton is conducted annually at the Delta Research and Experiment Station, the North Mississippi Research and Extension Center, the R.R. Foil Plant Science Research Center at Mississippi State University, and at the Black Belt Branch Experiment Station in Brooksville as well as at cooperating producer locations in both the Delta and Hill cotton producing regions. At each location, all varieties entered into the trial are treated identical (conventional) with respect to herbicide and insecticide input to strive for unbiased evaluation of genetic potential. Mississippi State personnel attempt to conduct at minimum eight small-plot official variety trials per year in areas that well represent the majority of the state's cotton producing acreage.

Testing Procedures

All varieties submitted for testing are grown utilizing conventional chemical control for insect and weed pests. Each test plot consists of two rows of cotton 35 to 40 ft in length with a row spacing of 38 or 40". Each plot is analyzed statistically as a randomized complete block with four blocks or replications.

Input management for trials is determined by cooperators at each location based on soil texture, soil test value, and scouting for pest pressures. However, seeding rate and physical seeding is controlled by the cotton variety testing coordinator. A list of agronomically important input management dates is presented in Appendix 1. Agronomic date information allows the user to take into account management practices at each location when evaluating yield.

All fiber parameters (lint percent, individual boll weight) as well as HVI fiber quality assessment are based upon a hand-picked 25 boll sample or a random grab sample from each replicated plot at each location. Samples from all locations are ginned on the same 10-saw Continental laboratory gin to determine gin turnout. Utilization of the same gin for all samples is important to not bias fiber quality across locations. High Volume Instrumentation analysis for fiber property determinations are conducted by the Fiber and Biopolymer Research Institute at Texas Tech University in Lubbock, TX.

Lint yields are calculated using the seed cotton weight mechanically harvested from each plot, and the turnout percentage determined from hand-picked boll samples. Mean lint yields are presented as pounds lint per acre.

The commercial varieties utilized as standard checks for comparison in 2016 were as follows; Delta Pine and Land 1321 B2RF, Phytogen 499 WRF, and Stoneville 4946GLB2. These varieties were included to give the end user an idea of how newer cultivars compare to proven high yielding varieties adapted to the Mid-South growing region.

Interpreting the Data

Field variability is inherent to production research with any cropping system. Unlike strip trials, small plot research allows for replication with a very minimal footprint. The minimal footprint associated with small plot research generally allows for less variability among replications due to field variability (i.e. soil textural changes, pest variations). Reduced variability lends us a greater understanding of a varieties genetic potential cultivated under uniform conditions. However, strip trial research may lend greater information about how a variety will perform across a range of conditions (e.g. low spot in the field). Data from both small plot and strip trials should be considered when making final variety selection decisions.

Mississippi State separates the greatest performing varieties by use of a Fishers Protected Least Significant Difference (LSD) at a five percent level of significance. The LSD associated with the five percent level, lends us 95 percent positive identification of the greatest yielding varieties at each specific location. In each individual trial the collection of varieties that yield the greatest statistically is represented in bold. These varieties will all have a numerical difference less than the LSD value shown at the bottom of the data variable columns.

The varieties listed in bold may have slightly differing numerical yields, but will perform very similar at a given location. Statistical analysis is not conducted for across location averages. Producers should review data tables for the geographical closest location that is representative of their operation, but should also review yield information across locations to get an idea of a variety's yield stability over a wide range of production environments.

Selecting a Variety/Trait

Cultivar selection is one; if not the most important management decision a producer must make for the duration of growing season. Improper variety selection generally cannot be overcome with management. Starting with the greatest genetic potential will generally the highest yield with all other things being considered equal. Careful consideration should go into selecting varieties that are well adapted to Mid-South growing region and to certain geographical regions within the state due to the rising cost of seed and associated technology fees.

Multiple available transgenic traits can make selecting a variety cumbersome. At most locations the top yielding varieties represent a range of available trait packages. This lends the producer multiple options to choose from with respect to herbicide and insecticide traits. Below is a synopsis of the transgenic traits that were represented in this year's trials.

Glyphosate tolerance – generally indicated on the seed bag with either a G, RF, or XF. Varieties with these designations can tolerate over the top applications of glyphosate. The newer GlyTol and Flex varieties have completely replaced the older roundup ready varieties (R or RR). Glytol and Flex varieties allow for over the top applications to be made later into the season. XtendFlex (XF) varieties are tolerant also tolerant to Liberty and dicamba.

Glufosinate tolerance: - generally indicated on the seed bag with an LL. These varieties can withstand over the top applications of Liberty. XtendFlex (XF) varieties are tolerant also tolerant to Liberty and dicamba.

It is important to note that producers utilizing both glyphosate and glufosinate tolerant varieties in close proximity must use caution to avoid crop injury from spray drift, improperly cleaned applicators, and or a combination of both. For more information on utilizing herbicide resistant traits and alternative weed control practices consult MSU extension publication # 1532 "Weed Control Guidelines for Mississippi" available online at http://extension.msstate.edu/sites/default/files/publications/publications/p1532_1.pdf

Bollgard 2 – Varieties with designations B2 on the seed bag or in the brand name contain genes that produce protein toxic to heliothis. However, under high and persistent pressure supplemental chemical control strategies are necessary to prevent economic damage from caterpillar pests. For more information on utilization of transgenic traits with insecticidal properties consult MSU extension publication # 2471 " Insect control guide for agronomic crops" available online at https://extension.msstate.edu/sites/default/files/publications/publications/p2471_0.pdf

WideStike – Phytogen varieties with the designation W or W3 on the bag or in the variety name. Like Bollgard 2, Widestrike varieties contain two genes that produce proteins toxic to caterpillar pests. Additionally, W3 varieties contain three genes that produce proteins toxic to caterpillar pests. For more information on utilization of transgenic traits with insecticidal properties consult MSU extension publication # 2471 " Insect control guide for agronomic crops" available online at https://extension.msstate.edu/sites/default/files/publications/publications/p2471_0.pdf

TwinLink – Bayer varieties with the designation T on the bag or in the variety name. Like Bollgard 2, TwinLink varieties contain two genes that produce proteins toxic to caterpillar pests. For more information on utilization of transgenic traits with insecticidal properties consult MSU extension publication # 2471 " Insect control guide for

agronomic crops" available online at
https://extension.msstate.edu/sites/default/files/publications/publications/p2471_0.pdf

Considerations for Selection

Yield variability among calendar years within a variety is certain. Therefore, selection decisions should be made from within the range of top yielding varieties. Newer varieties with limited available data should be cultivated to minimal acreage until further testing validates performance across multiple years and locations. Generally, there is no one variety that is the 'silver bullet'; therefore, choosing multiple varieties allows for flexibility in relative maturity, management decisions, and risk aversion.

Lint yield and potential profitability should be the primary factor when attempting to select a variety, but do not discount fiber quality and traits contained within a given variety as well. Do not underestimate the discounts associated with high micronaire which can be significant.

A consideration to look at when selecting a variety is the overall mean of the trial. Comparing an individual variety to the trial mean can lend an indication of how that particular variety "stacked up" to the trial as a whole. A variety with a mean lint yield greater or much greater than the overall trial mean generally will perform well.

Remember, there can be a full 14 day difference in maturity between cotton varieties. However, most leading varieties including those submitted to this year's trial tend to be more mid to early maturing than varieties of the past.

Loan Valuation Decision Aid

For each trial conducted in 2016, data was submitted to the upland cotton loan valuation aid. This tool was developed by Dr. Larry Falconer and is supported by Cotton Incorporated. The tool allows for calculation of Commodity Credit Corporation cotton loan premium and discount values based on yields and HVI classing information. The program is updated annually.

Top Yielding Varieties

There are numerous methods to pick or highlight the top yielding varieties across locations to develop a "short list" of promising varieties for future plantings. For soybean and corn, the short list is a powerful aid in selecting varieties due to the sheer number of available varieties. However, for cotton the list of available varieties that perform well, and are adapted to the Mid-South is short on its own. The recent trend in cotton varieties submitted for testing to University OVT trials across the Mid-South has declined over the last ten years with changes in the cotton industry. Therefore, it is important to select a variety that has performed well in the Mississippi OVT or other Mid-South University OVT trials.