MISSISSIPPI SOYBEAN PROMOTION BOARD

USING MULTI-STATE VARIETY TRIAL RESULTS–2015

Selecting varieties for Mississippi soybean farming is arguably the most important producer decision. Thus, Mississippi soybean producers should select varieties using knowledge from all available sources.

Fortunately, the adjoining states of Arkansas, Louisiana, and Tennessee publish soybean variety trial (SVT) results each year, and results from some locations in these states can be used to supplement the information provided by the Mississippi SVT's. In addition to yield, each state's results may also include varietal traits such as protein and oil content of harvested seed, height at maturity, maturity date or relative maturity, and tolerance/resistance to one or more disease and nematode pathogens.

Measurements of and ratings for traits provided in the results of the Midsouth states' SVT's provide a source of information that corroborates and/or supplements that provided by seed companies for important characteristics of their varieties. These information sources used together should provide effective resources to allow assessment of varietal traits that are considered important for the varied environments used in Mississippi soybean farming.

The below table contains links to adjoining states' SVT websites. Information in the table also includes test locations and their latitude, soil type and irrigation management at each location, and measurements reported in the results. Since the SVT's of these states will have several or many varieties that are common across states and will also have test locations with latitudes similar to those in Mississippi, data from some locations in each of these states can be used to aid in the selection of varieties for Mississippi soybean farming.

An explanation of some facts that pertain to SVT conduct and results is warranted here. The below topics are discussed to help you appropriately use data from the various locations within the states.

Latitude. Maturity date and/or relative maturity of soybean varieties are strongly influenced by latitude.

● Therefore, varieties considered for Mississippi soybean farming should be evaluated using SVT data from a location with a latitude that is similar to that of an intended planting site. Otherwise, days to maturity or maturity date of soybeans planted by the producer at that site may not be the same as that indicated in SVT data.

● Latitude of the location of an intended planting site can be found on the USGS website, and that of SVT locations is given in the below table. (Hint: one degree of latitude equals about 69.5 miles). For best results and if possible, use data from SVT's that are conducted within one degree of latitude to the north or south of an intended planting site.

Statistics. LSD (least significant difference) values are used as a statistical tool to determine significant differences among variety yields in SVT results. The average yields of any two varieties being compared must differ by more than the LSD value to be considered different in yield in a particular test.

Put another way, the LSD is the smallest difference between two varieties than can be attributed to an actual difference in the varieties' yield potential in a particular trial. Thus, a difference in the yields of two varieties that exceeds the LSD is attributable to a difference in the yield potential of the two varieties. Even though the average yield of two varieties may be numerically different, the two yields are not considered significantly different in terms of yield potential if that difference does not exceed the test LSD.

● Be aware that some states use a 10% level of probability while some use a 5% level. This means that a yield difference between two varieties that exceeds the LSD value will be expected to do so 9 times out of 10 at the 10% level of probability, and 19 times out of 20 at the 5% level. LSD values calculated at the 5% level are a more stringent statistical test.

- CV (coefficient of variation) and/or R^2 (coefficient of determination) values are often shown in tables of SVT data. These values are a measure of the relative precision of a given trial and can be used to compare the relative precision of different trials.

- The CV is generally considered to be an estimate of the amount of unexplained variation in a given SVT, while the R^2 is a measure of the amount of variation that is explained or accounted for in a given SVT. A CV below 10% (10% unexplained variation in a trial) is desired, while an R^2 above 0.90 (90% of the variation in a trial has been accounted for) is desired.

- CV and R^2 values calculated from irrigated test data should be lower and higher, respectively, than those calculated from nonirrigated test data. Using data from SVT's with a high CV or low R^2 may result in erroneous variety choices.

Irrigation vs. no irrigation. Yield potential of a variety and yield comparisons among varieties are best determined using data that are collected from irrigated SVT's. Properly applied irrigation removes the effects of drought-related stress that will affect and may differentially affect varietal performance at any location. Thus, a true comparison of how varieties perform in relation to each other is best determined from SVT's that are properly irrigated.

- When evaluating results from irrigated SVT's, it is important to determine if varieties within the different maturity group (MG) classifications were blocked so that irrigation was started and stopped at the proper stages for varieties within each MG class. This may not be stated in the Methods section of the reports, so contact with the Program Director may be needed to get this information.

- It is generally agreed that a variety that performs well under irrigated conditions will also perform well under nonirrigated conditions if all other conditions remain the same. Most varieties from both public and private breeding programs were and are selected and evaluated in irrigated environments.

Soil texture. Soil texture (also commonly referred to as soil type) of a test site should be considered when evaluating SVT results for three important reasons.

- Soil texture is a determining factor in whether or not a field is or will become infested with SCN. SCN infestations will be problematic on sandy and medium-textured soils, but will rarely be a production problem on clay soils, which are prevalent in the Midsouth. Thus, when selecting varieties for clay soils, resistance to SCN is not a major consideration.

- A given soybean variety planted on a given date will grow taller on sandy to silt loam soils than on a clay soil. This is an important consideration if height at maturity is important in a producer's environment.

- Seedling diseases are generally more problematic when soybeans are planted on clay soils. Thus, it is desirable to ascertain if a broad spectrum seed treatment was used to alleviate potential stand problems that might have affected and/or differentially affected yields of varieties in SVT's conducted on clay soil sites.

Disease and seed quality ratings. Disease ratings or scores can be helpful when selecting a variety for a particular environment. However, consider the following points when evaluating rating scores.

- Determine whether or not a disease rating is based on its response to a natural infestation of a pest, or on its response to an artificial introduction of the pathogen into the SVT environment. Level of response of varieties to the two levels of infestation likely will be quite different; therefore, peruse the methods used in each SVT to determine just what environment preceded the rating. Again, contact the

Program Director for the state if this information is not available in the procedures section of the SVT.

- No two specialists' ratings will be the same, so there likely will be some discrepancy among the scores from the different state SVT's based on this factor.

- Seed quality is very dependent on environmental conditions that prevailed before and after maturity, and that plus the inherent inconsistency among rating systems and criteria should be considered before assigning importance to a particular variety's seed quality rating.

Contacts. Often, background or supporting information that can or should be used to make a wise variety decision is lacking in SVT publications. The following contact information is provided if additional information about a particular SVT trial is needed.

- Arkansas: R.D. Bond at rbond@uark.edu or D.G. Dombek at ddombek@uark.edu.
- Louisiana: Ronald Levy at RLevy@agcenter.lsu.edu.
- Mississippi: Brad Burgess at bburgess@pss.msstate.edu
- Tennessee: Fred L. Allen at allenf@utk.edu.

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Location	Latitude[a] (deg./min.)	Soil type[b]	I[c]	NI[c]
Pertinent information for SVT's conducted in Midsouth states. Click on state name to retrieve variety trial results.				
Arkansas				
Keiser	35°40'	C	X	X
Marianna	34°46'	L	X	
Rohwer	33°45'	L & C	X	
Kibler	35°25'	L	X	
Stuttgart	34°29'	L	X	
Weiner	35°37'	L	X	
Measurements: Yield, maturity date, plant height at maturity, shatter score. **Ratings for resistance to root knot nematode; reniform nematode; SCN Races 2, 5, 14; stem canker; frogeye leaf spot; chloride.**				
Louisiana				
Alexandria	31°18'	L		X
Baton Rouge	30°26'	NA	NA	NA
Winnsboro	32°10'	L		X
St. Joseph	31°55'	C	X	
Crowley	30°12'	L		X
Bossier City	32°33'	NA	X	
Measurements: Yield, maturity (days after planting), plant height at maturity. **Ratings for cercospora leaf blight, frogeye leaf spot, aerial blight, and black root rot.**				
Mississippi				
Raymond	32°15'	L		X
Longwood	33°09'	C	X	
Stoneville	33°25'	C, L	X	X
Brooksville	33°14'	C		X
Clarksdale	34°11'	C, L	X	X
Falkner	34°50'	L		X
Olive Branch	34°57'	L		X
Verona	34°11'	C	X	
Measurements: Yield, relative maturity, plant height at maturity. **Ratings for frogeye leaf spot, cercospora blight, and septoria brown spot.**				
Tennessee				
Grand Junction	35°03'	L		X
Milan	35°54'	L	X	X
Measurements: Yield, maturity date (days after planting), plant height at maturity, seed quality rating at harvest, protein and oil content of harvested seed, shatter score. **Ratings for reaction to frogeye leaf spot, SDS, stem canker, and seed company ratings for susceptibility/resistance to SCN races 2, 3, 5, and 14.**				
[a]Latitude for a particular location can be found on the USGS website by entering the town in the feature box and selecting the state. [b]L = loam; C = silty clay or clay. [c]I = irrigated; NI = nonirrigated.				

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