Understanding the Geospatial Performance of Cotton Varieties Across University and Seed Company Evaluation Trials in the United States

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Introduction

Each year agronomists conduct extensive field testing to evaluate the yield and quality of commercial cotton varieties. The results are published by local extensions, universities, seed company, and cotton organizations. These studies give a detailed view of local performance; however, it is also valuable to know how specific cotton varieties perform across the spectrum of environmental, soil, and agronomic conditions employed by growers across the US.

Seed companies attempt to identify and sell varieties which perform well across the complete spectrum of environments. By combining the results of yearly trials into a central database and geo referencing the trial to its latitude and longitude, a seed company can use geographic information systems (GIS) to develop advanced software for evaluating genetic performance in specific environments and on a national scale. This can help researchers identify varieties that perform well across a multitude of agronomic conditions. Such a system can allow growers to choose elite cotton varieties that meet there specific needs. This poster will summarize output from a GIS system developed by Dow AgroSciences for ®PhytoGen Seed Company.

Materials and Methods

- Data (2005-2008) from US cotton research trials were combined into a central rational database, consisting of yield, quality and trial specific agronomic data on almost 1500 trials.
- Individual trial locations were geo referenced to the nearest latitude and longitude using the best available location data.
- Dow AgroSciences proprietary software was used to generate maps and perform analysis of the data. The software uses an intuitive interactive platform that allows researchers and customer agronomists to interact with the data and generate their own custom maps and perform the specific statistical analysis they need.

Conclusions

By combining available cotton research trials from US locations into a geo referenced database researches can perform detailed analysis of yield and quality components by region, agronomic practices, and year. Breeders and agronomists can use this type of advanced software tool to study variety performance and select varieties that perform in a wide variety of agronomic and environmental conditions. These tools also allow for studying geo specific cotton fiber quality characteristics. The output of the analysis allows growers and their agronomists to identify elite cotton varieties across diverse growing regions and agronomic practices.

Results and Discussion: The screen shots below highlight the key capabilities

Figure 1: Geo-Referenced Maps Comparing Specific Cotton Variety Yield Performance.

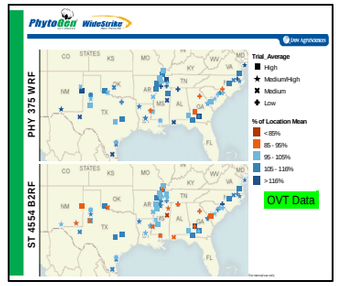

Figure 2. Geographic Dispersion of Cotton Fiber Micronaire

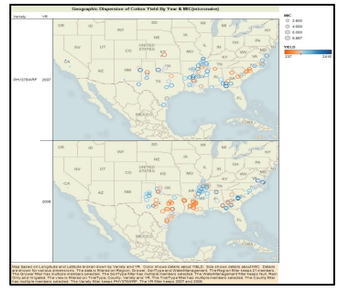

Figure 3: Multi year Analysis of Cotton Variety Yield by Soil Texture

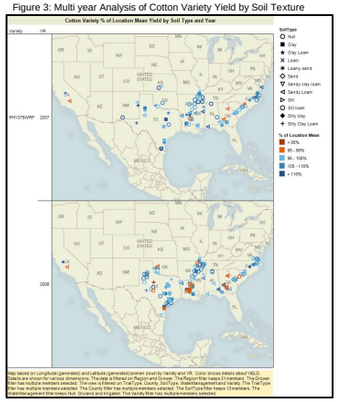

Figure 4: Multi-year Analysis of Yield with Trial Average Groupings.

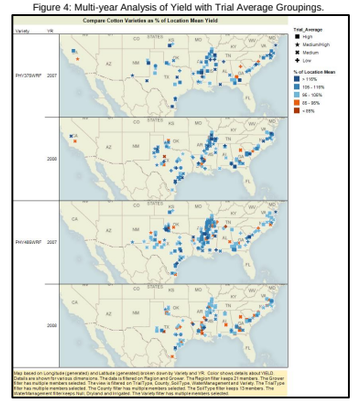

Figure 5. Yield by planting date effect across all varieties and trials in 2007 and 2008

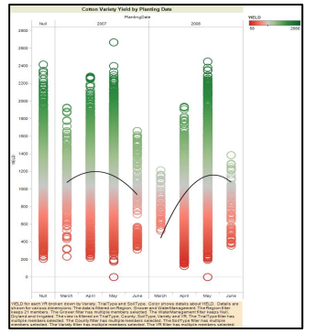

Figure 6. Cotton Variety Stability Analysis by Year and Water Management Interactive Analysis