

Subject: Peanut Breeding **September 13, 2010**

Title: Testing for Interactions between Leafspot Resistance, O/L Ratios, Yield Potential, TSWV Resistance, and Sclerotinia Resistance

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Problem:

Early Leafspot caused by *Cercospora arachidicola* is prevalent in the peanut industry. It is a disease that can be controlled by chemical means, however, with the ever increasing cost of production and the lower prices paid to farmers for contracted peanuts, the need for leafspot resistant varieties has become increasingly important.

The Texas peanut breeding program has developed breeding lines over the past two decades (Lines Tx964117 & Tx964120 for example) with excellent Early Leafspot resistance when compared to susceptible check varieties. There are several problems associated with our leafspot resistance breeding lines which include; low O/L ratios, close association between leafspot resistance and low yield, and a lack of multiple-disease resistance package for TSWV and *Sclerotinia*.

Plan of Action:

Crosses were made between 'Tamrun OL07' and breeding line Tx964117 in the spring of 2007. Tamrun OL07 is a high O/L runner-type peanut with resistance to both *Tomato spotted wilt virus* and *Sclerotinia*. It has good yield potential in the presence of each of these diseases, but it has no early Leafspot resistance. Line Tx964117 has excellent resistance to early Leafspot, but it does not have the high O/L trait nor does it have resistance to either TSWV or *Sclerotinia*. It only has approximately 50% to 60% of the yield potential of Tamrun OL07. The original 2008 proposal had the following goals;

Original Proposal:

- Cross Tamrun OL07 (TSWV res. & Sclerotinia res.) with Tx964117(leafspot res.)
- Screen F₂ seeds for O/L ratios and increase as individuals in winter greenhouse
- Increase resulting greenhouse seeds as F_{2:3} families in 2008 field nursery
- Replicated yield tests in leafspot, TSWV, Sclerotinia, and disease-free nurseries beginning in 2009
- Rate individual plots for resistance to each of the three diseases in this study
- Once the disease ratings and yield characteristics have been analyzed, we will determine whether or not there are any interactions between Leafspot resistance, TSWV resistance, *Sclerotinia* resistance, O/L ratios, and yield potential

Progress:

As stated in the 2009 proposal, the seed increase from 2008 was not sufficient enough to provide us with the seed needed to plant replicated yield trials at the different nurseries for disease screening. We planted seed increase plots again in 2009 at the J.L. Leek nursery in Brownfield, Texas. The plots were 2-row in configuration and

approximately 11 feet in length. They were planted on April 28, 2009 and harvested during the first week of October. We narrowed the test down to 90 F2:4 derived breeding lines which will enable us to place 10 entries as checks for a total of 100 entries in our replicated yield trials in 2010. All of the lines that were increased produced the necessary amount of seed that we needed to plant replicated trials at all of the disease nurseries in 2010 for screening and yield testing.

Project Duration:

This study was projected to take three years to complete with a year for seed increase and two years of yield testing and disease ratings. Unfortunately, it will be extended by one year due to lack of seed production during the first year of seed increase.