

## 2012 National Peanut Board Grant Proposal

### I. Identification

- a. Project Title: Breeding for Disease Resistance in Runner Peanuts for the Southeast
- b. Funding Year: 2012
- c. Principal Investigator: Barry Tillman
- d. Cooperating Personnel: Tim Brenneman, Nicholas Dufault, Jianping Wang
- e. Total Funds Requested: \$12,000
- f. Location(s) where research will be performed: North Florida Research and Education Center, Marianna, Florida
- g. New or Continuing Project: Continuing

### II. Abstract/Project Summary

The University of Florida Peanut Breeding Program is a continuous effort to develop and deploy peanut varieties with improved yield, grade and disease resistance. New cultivars are one of the most cost effective ways to improve the competitiveness of peanut compared to other crops. Production costs continue to escalate forcing producers to find ways to increase yield and/or reduce costs. High yielding, disease resistant cultivars are a very important method of reducing costs and increasing yields. The ongoing University of Florida Peanut Breeding program is focused on developing varieties with disease resistance, high yield and good grades. We seek funding to continue the breeding effort with special emphasis on combining disease resistance to spotted wilt, white mold, and leaf spot with superior pod yield and grade.

### III. Project Description

The objective of the research is to test advanced breeding material for resistance to white mold, leaf spot, and spotted wilt. About 300 advanced breeding lines will be tested for reaction to these three diseases in Marianna, Florida in 2012.

### IV. Rationale

Peanut farmers spend millions of dollars to control diseases either directly with pesticides or indirectly through modified management practices. Cultivar resistance can be an important tool to help minimize crop loss to disease. During the past five years, we have classified the commonly grown commercial cultivars and evaluated several hundred new lines (potential cultivars) for resistance to the common diseases affecting peanut production in the southeastern US. This work has led to the identification of lines with superb resistance to white mold and/or tomato spotted wilt. These lines are being used as germplasm for crossing, in research studies and are being evaluate for their potential as cultivars.

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## V. Experimental Plan and Methods

Tests for white mold will be planted in mid-May and will be inoculated with *S. rolfsii* when the middles are closed during mid to late July. Tests for spotted wilt will be planted in mid-late April without Thimet. Tests for leaf spot will be planted in late May or early June and will not be sprayed with fungicides the entire season. In each case, the environment for disease expression is maximized to provide the best opportunity for differentiation among genotypes.

## VI. Measurable Outcomes and Potential Impact

This work has led to the identification of lines with superb resistance to white mold and/or tomato spotted wilt. In the case of white mold, two lines have been identified with resistance that is far superior to all commonly grown cultivars. These lines are being evaluated for their potential as cultivars and are being utilized in the crossing program. In the case of tomato spotted wilt virus, two additional lines have been identified that have resistance far superior to all commonly grown cultivars. One of these lines has been released for commercial production and the second is under further evaluation. Both are being used in the crossing program.

## VII. Results from 2012

- a. Three tests were conducted to evaluate breeding lines and cultivars for resistance to white mold. Figure 1 shows pod yield results from a test in which half of the plots were inoculated with *S. rolfsii* and the other half were not. The results show that there is significant variation among cultivars and new breeding lines for white mold resistance. As a percentage of maximum yield, pod yield loss ranged from about 20% to over 70%. New cultivars and breeding lines showed significant improvement over the popular cultivar Georgia-06G as well as Florida-07 and Tifguard. TUFRunner '727' showed resistance to white mold. Two other tests were designed to compare new breeding lines to existing resistant cultivars. A total of 116 new breeding lines were evaluated with about 20% of them showing resistance similar to the resistant cultivar York.

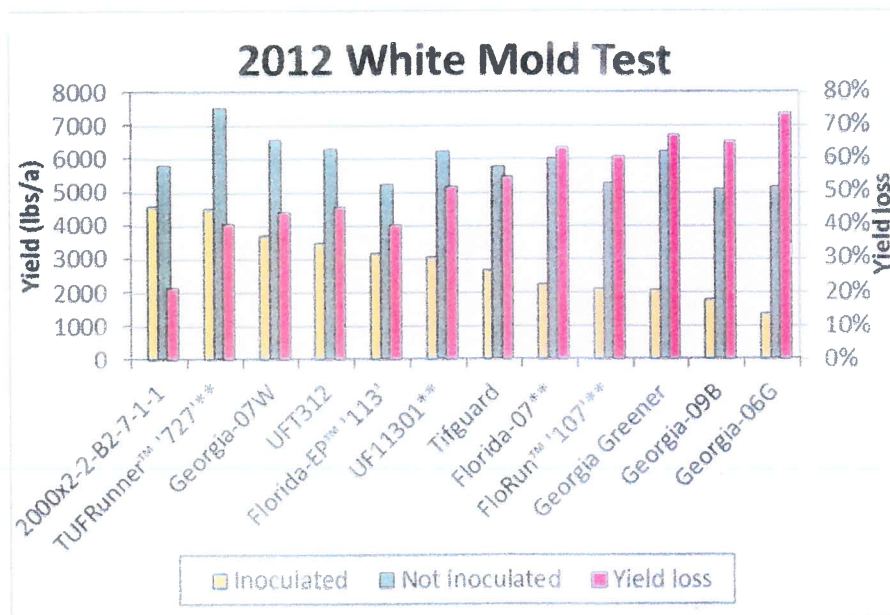


Figure 1. Test for white mold resistance in Marianna, FL in 2012.

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- b. Three tests were conducted to compare new breeding lines and cultivars for their reaction to leaf spot. One test (Figure 2) compared advanced breeding lines and commercial cultivars. Several new breeding lines and cultivars performed better than the popular commercial cultivar Georgia-06G and Tifguard as well. TUFRunner '727' showed very good resistance. Two other tests with a total of 116 breeding lines were conducted to compare leaf spot resistance with the resistant cultivar York. Unlike the resistance found in white mold, only a few breeding lines show resistance to leaf spot similar to that found in York. Breeding for resistance to leaf spot has proven to be more difficult than breeding for resistance to white mold.

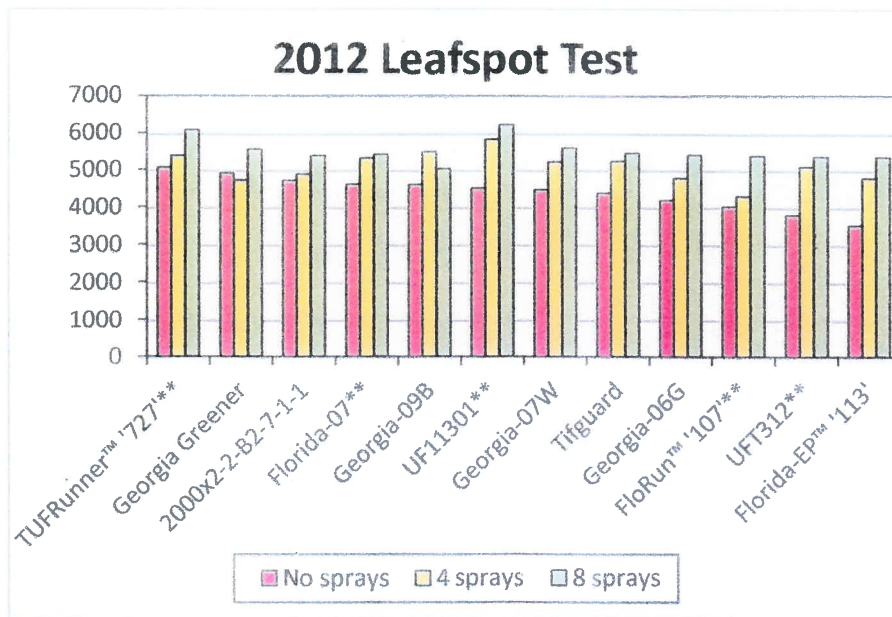


Figure 2. Leaf spot tests in Marianna, FL in 2013.

- c. Spotted wilt caused by TSWV is the third disease that we evaluated in 2012. Unfortunately, there is little that we can do to control the disease other than early planting and avoiding application of in-furrow insecticides. The tests were planted without phorate insecticide on April 25, 2012 which is within the window of highest risk for spotted wilt. On a scale of 1-10, the highest rating observed was a 2. 2012 was the fourth year in a row in which spotted wilt was minimal. This has made it nearly impossible to identify and eliminate resistant genotypes. Although the disease has been minimal, TSWV has not disappeared and we are at risk of releasing cultivars which are vulnerable to spotted wilt because we are unable to identify their susceptibility prior to release.
- d. Expenditure of funds
- a. All of the \$12,000 granted was expended for personnel.