

NPB #7

National Peanut Board Check-Off Research  
Final Report- 2006

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FL PID 7  
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FL-03

I. Title: Peanut Breeding for Improved Seed Quality and Multiple-Pest Resistance

II. Investigators:

Project Leaders: B.L. Tillman ([btillman@ifas.ufl.edu](mailto:btillman@ifas.ufl.edu)),  
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Cooperators: Albert Culbreath, Jim Todd, Roy Pittman, Tim Brenneman, Maria Gallo Meagher, Jim Rich, Don Dickson

III. Objectives:

### **Peanut Breeding**

As the cost of growing peanuts rises, reducing costs and/or increasing yields continue to be very important factors to help peanut farmers maintain economically viable businesses. High yielding, disease resistant cultivars are one method of reducing costs and increasing yields. The University of Florida Peanut Breeding program is focused on developing varieties with disease resistance, high yield and good grades.

We currently screen our germplasm for resistance to tomato spotted wilt (TSWV), leafspots, white mold, CBR (Cylindrocladium black rot) and nematodes. We have the capability to screen large numbers of genotypes for reaction to TSWV and leafspot, but screening for white mold, CBR and nematodes is more difficult because of field variability. Much of the screening that we do for those diseases is limited to a few dozen genotypes. More progress could be made if we could screen more genotypes, so we propose to expand these capabilities to allow screening of larger populations.

In addition to the on-going program, in 2006, we propose to lease a portion of a field near Marianna, FL that is severely infested with the pathogen that causes CBR and utilize that site to screen our germplasm for resistance to CBR. We also propose to increase the number of lines tested for white mold resistance at the Marianna Research Unit.

### **Peanut Seed Quality**

Some disease resistant cultivars offer the opportunity to reduce fungicide applications thereby saving cost. Several peanut cultivars (C-99R, MDR-98, Hull and DP-1), with excellent disease resistant have been released from the University of Florida breeding program. As a group, these cultivars have been shown to have poor field germination and emergence. This is limiting producer acceptance of these cultivars. The objectives of a study to address this issue are listed below:

1. To investigate causes for poor field germination of different peanut cultivars
2. To investigate interaction of storage environment with reduced field germination of different peanut cultivars
3. To develop a field germination test for screening peanut cultivars.

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IV. Results:

A. On-going University of Florida Breeding Program

*In 2006, we planted and harvested over 5000 yield plots. Several experimental lines had pod yield of 6000 lbs./acre and were significantly better than Georgia Green and other commercial cultivars. We released three new cultivars, York, Florida-07, and McCloud. Each of these cultivars have high oleic oil chemistry with good pod yield and grade. Grading of the 2006 crop is underway. Based on the commercial variety test that is grown in Marianna, Jay, and Gainesville, we will update our EDIS publication on variety performance and distribute it during the 2006 winter meetings.*

B. Research to enhance selection efficiency and effectiveness

- a. *In 2006, we tested over 300 experimental lines for white mold resistance in Marianna. Several of the lines showed excellent resistance to white mold and will be tested further in the coming years. We also worked with a local farmer to test over 150 experimental lines for resistance to CBR. Prolonged periods of dry weather hampered disease development, but by October, the CBR was present in at least 80% of the test. Several lines showed promise, but the spotty nature of disease development will require at least another year of testing.*
- b. *We have studied the germination/vigor of several peanut cultivars over the past two years and have found that late maturing cultivars like DP-1 and, to a lesser extent, C-99R suffer greater loss of germination and vigor under commercial storage conditions than cultivars like AP-3. The exact cause of the increased rate of deterioration of seed quality of late maturing cultivars is still under investigation, but we think it may be related to a lower level of antioxidants that protect the seed from membrane oxidation. This work is very important to the future success of late maturing cultivars that could help farmers significantly reduce input costs.*

V. Responsibility:

A. On-going University of Florida Breeding Program

- a. These studies will be primarily conducted by B.L. Tillman and D.W. Gorbet with the support staff at Marianna and Gainesville, with input from the indicated cooperators to evaluate various factors (i.e., disease ratings), and produce disease inoculum for field tests.

B. Research to enhance selection efficiency and effectiveness

- a. We will work with plant pathologists to determine the most effective methods of inoculating large numbers of plots with the white mold fungus, and on methods to rate for CBR.
- b. B. Tillman and K. J. Boote will jointly supervise a Ph.D. graduate student in conducting research. B. Tillman will work with Tom Stadslev of the Florida Foundation Seed Producers, Inc. to collect

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samples throughout their seed handling chain. K. Boote will focus on the field germination issues of the same seed in Gainesville.

VI.	Budget	
A.	Technical support (OPS, student)	45,000
B.	Land Rent	2,000
C.	Supplies/equipment repair	<u>3,000</u>
		\$50,000

xc: Ken Barton, Jerry Bennett, George Hochmuth