

National Peanut Board Check-Off Research
Final Report- 2015

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2015

I. Identification

- a. Title: Developing Methods to Test Breeding Material for Seed Germination and Vigor
- b. Funding Year: 2015
- c. Principle Investigator: B.L. Tillman (btillman@ufl.edu), University of Florida, 3925 Hwy. 71, Marianna, FL 32446
- d. Cooperators: Dr. Diane Rowland, University of Florida
- e. Total Funds Requested: \$25,000
- f. Location: North Florida REC, Marianna, Florida
- g. New or Continuing (more than three years)
 - i. This is a new NPB-SPRI project.

II. Layman's Summary

Peanut cultivars released over the past 10-15 years trace a high percentage of their parentage to plant introductions including PI203396. Several cultivars developed from PI203396 had poor seedling germination and vigor which limited and/or halted commercial production. Continued breeding with cultivars derived from PI203396 has resulted in variation in seedling germination and vigor that borders on unacceptable. Given the ever present threat of spotted wilt and the inherent cost in peanut seed, improved germination and seedling vigor would be of great benefit to peanut growers. Breeding programs do not routinely evaluate germplasm for germination and seedling vigor largely because methods for doing so are not available.

For 2015, we request funding to develop and test methods of testing for improved seed germination and seedling vigor. During early 2014 (January-April), we hosted an intern from Bolivia who developed preliminary data on this topic and we plan to extend the work he started.

III. Project Purpose

The purpose of the proposed project is to develop a laboratory or field method to allow rapid assessment and discrimination of germination and seedling vigor among peanut breeding lines.

IV. Hypothesis and Objectives

- 1) Hypothesis: Heritable differences in germination and seedling vigor exist among various peanut germplasm and a method exists whereby peanut lines can be classified according to their germination and seedling vigor.
Objective: Evaluate several methods for discriminating germination and seedling vigor with the potential to be used routinely in a peanut breeding program.

V. Results

Several methods were used to assess seed germination and seedling growth including 1) deep planting into a cool soil, 2) root tube tests in a germinator under cool conditions, 3) accelerated aging using heat and humidity, 4) standard rolled towel tests in a germinator under cool conditions. Root growth after seven days was found to have potential for predicting seedling germination and vigor as measured by standard germination tests and accelerated aging tests. Root growth in clear tubes was visible about 3-5 days prior to the emergence of shoots. Evaluating peanut seeds in clear tubes as shown in Figure 1 could be a rapid method for discerning among genotypes for their germination and emergence potential. However, it is likely that seeds will need to have some manner of stress or aging in order to distinguish among genotypes.

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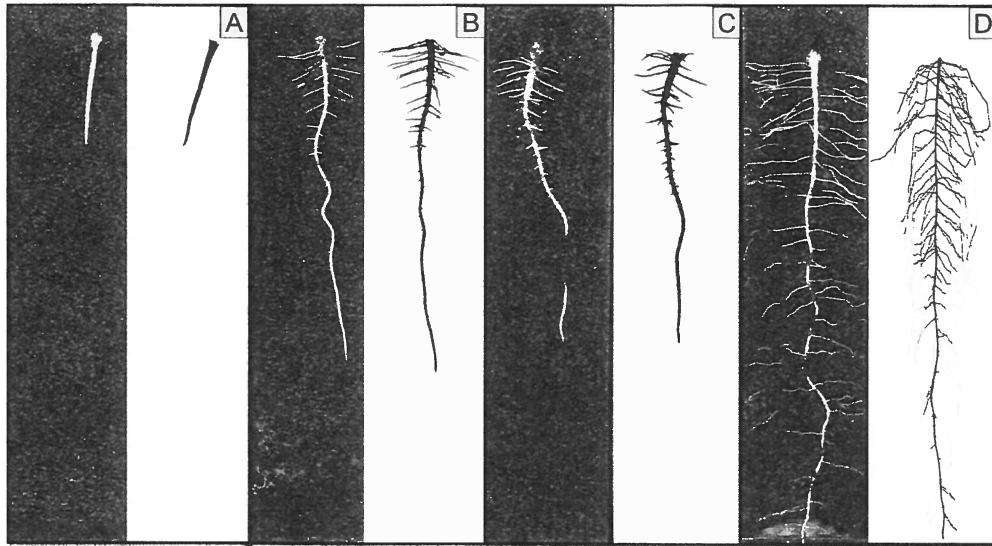


Figure 1. Plastic tubes and harvested roots scans at 7 DAP from cold (A) and normal (B) conditions; and at 14 DAP from cold (C) and normal (D) conditions.