

Final Summary

212
TX-59
928
2010

Subject: Peanut Breeding

June 22, 2011

Title: Early Generation Screening for the High O/L Trait in Segregating F₂ Peanut Populations Using NIR Technology

Personnel: **Michael R. Baring**, Soil and Crop Sciences Dept. 2474 TAMU, College Station, TX. 77843-2474. Ph# 979-845-4273 m-baring@tamu.edu
M.D. Burow, Soil and Crop Sciences Dept., Texas Agricultural Experiment Station, 1102 East FM 1294, Lubbock TX. 79403. Ph# 806-746-6101. mburow@tamu.edu

Final Report:

The National Peanut Board has been supporting the Texas peanut breeding program for several years by funding a project to screen early generation progeny for high oleic chemistry at J.L. Leek & Associates at a cost of \$1.00/seed. However, the cost rose to \$2.50/seed in 2009 which greatly limited the amount of materials that the project could test. Dr. Mark Burow received a grant to purchase a Nuclear Magnetic Resonance (NIR) machine for the peanut breeding project. Dr. Burow was able to purchase the machine in the Fall of 2009 which will allow us to perform non-destructive O/L testing on our breeding material in-house at a much lower cost.

We were granted funds through the NPB in 2010 to assist with the maintenance and labor cost associated with personnel physically loading individual seeds into the NIR and then separating the analyzed seeds into high, medium, and low oleic categories.

These funds were used to pay personnel salaries while developing calibrations and techniques for implementing the NIR machine. Personnel analyzed several hundred individual seeds on a gas chromatograph to determine fatty acid chemistry for each individual seed. Some of these seeds are currently being used to calibrate the NIR since their fatty acid chemistry is now documented via gas chromatography. The excess seeds that were determined to be high oleic were planted in the field in 2011 as high oleic seed increases.

Personnel also developed three trays for auto-sampling. These trays will allow the project to analyze 12 individual Virginia-type seeds simultaneously, 16 individual runner-type seeds simultaneously, or up to 25 Valencia-type or Spanish-type seeds simultaneously which will greatly increase the efficiency of the screening efforts. Fine tuning of the NIR is still needed to operate with a 95+% accuracy, but the machine should be fully operational this year.

The monies provided by the NPB via the TPPB for this project will result in saving the breeding program thousands of dollars each year in screening costs associated with the high O/L trait in our early generation materials. The ability to screen these early generation seeds will also save the program time, money, and effort when dealing with populations that are segregating for the high O/L trait as we will be able to discard all of the low O/L seeds before planting.