

343  
1086  
1087  
1088

NATIONAL PEANUT BOARD/SOUTHEAST PEANUT  
RESEARCH INITIATIVE  
FINAL REPORT FOR WORK  
DONE UNDER RESEARCH AGREEMENT

Final Report  
Oct 25, 2012

INSTITUTION: University of Georgia

PROJECT TITLE: **Development of a Low-Cost & High Output System for Peanut  
Genotyping & Molecular Markers Associated with Resistance  
to TSWV, Leafspots, and Other Traits**

RES. AGR. NO.: 2521RF324354  
GACCP Control NO.: 4-962

PROJECT LEADER: Albert K. Culbreath

EXPIRATION DATE: June 30, 2012

NPB CONTACT: Marie Fenn or M Mehok  
NPB Control NO.: 343

**FINAL REPORT:** Peanut cultivar development has been dominated by conventional breeding methods, which have and will continue to play an important role. Applications of marker-assisted selection (MAS) have been used in peanut breeding selection but the cost of genotyping is still a considerable factor. The objective of this study was to introduce a simple, low-cost, and high-throughput protocol for peanut community. The developed system was based on a smaller (10.5 cm in length) polyacrylamide gel size system to separate PCR amplified DNA fragments and silver staining to visualize the bands. This system is very easy to operate, having one electrophoresis unit holds two vertical 52-sample gels, and the cost for purchasing the unit is less than \$200. For instance, the electrophoresis runs about 1 hr and 40 min at 180 V for 9% polyacrylamide gel to separate small to medium sized DNA bands (< 500 bp) or 1 hr and 20 min at 160 V for 6% polyacrylamide gel preferably for larger band separation ( $\geq$  500 bp), but the gel concentrations and running times could be adjusted according to the polymorphic banding patterns and sizes to mitigate the drawback of this system of small gel-size. The silver staining takes about 30 min. After staining, the gels are placed on a light-box for genotype scoring and then photographed using a digital camera. The cost per gel is estimated at \$0.54 and the cost for silver staining is estimated at \$0.37. Therefore, the cost could be as low as \$0.018 per data point, excluding PCR reaction and DNA preparation cost. A scientist has the potential to generate over 1,200 data points per day. This method has been used in the construction of a peanut genetic linkage map and QTL studies in our laboratory in conjunction with other methods.