ID #89 project continues to next year TX

Final Report **Peanut Genetics**
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Accelerating Development of Peanut Varieties through Molecular Markers

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Problem and Need

Enhanced resistance to disease, early maturity, water-use efficiency, and oleic:linoleic ratios are important peanut traits requiring improvement in Texas. Breeding for these traits, however, can be difficult. For example, selection for disease resistance can be complicated by years in which little disease pressure is present. Selection for early maturity requires multiple diggings and scoring of large numbers of pods from many breeding lines. Molecular markers are a method of helping breeders make selections under such circumstances. For example, breeders have long tried to use easy-to-score traits, such as pod reticulation or flower color, as proxies for ones that are harder to measure. DNA markers can assist selection of superior plants by scoring for the "DNA fingerprint" associated with desired traits obtained from one peanut parent or the other.

Results

The project was delayed by the departure of co-PI Dr. Henry Nguyen, who was to help with marker development. With the transfer of Dr. Yolanda Lopez to Lubbock, the project got underway, but emphasis was initially on population development.

(1) Growth and evaluation of populations for marker analysis. Two populations of 2,000 single F2:4 plants each were planted at the WTPGF and Sudan. The original parents were an African early-maturing Spanish peanut and high O/L Texas breeding lines (one was released as TamrunL01) selected for yield and disease resistance. The F2's had been planted evaluated the previous year and were increased in the greenhouse over the winter. Data were or are being taken for plant type and size, appearance, yield, seed size, seeds per pod, maturity, O/L ratio, and leaf size. Populations were observed to segregate for plant type (runner, bunch, and Spanish types), leaf size (from very small to large), pod size and seed size (for example, from 34g/100 to 131g/100 in a related experiment). O/L measurements are yet to be taken.

(2) Development of DNA clone libraries for additional markers. We collected leaf, flower, root, and seed tissue from peanuts, and have extracted mRNA (the first step in library synthesis). This will be used for library development.

(3) Design/synthesize PCR primers for distinguishing between cultivated accessions. We have tested several microsatellite markers for ability to amplify peanut DNA. The gel below shows that we have been able to detect DNA fragements with these primers, although we need to optimize the experimental protocols. Although few in comparison to our needs, they will allow us to test conditions for marker analysis.