BioFuels Project NPB
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Final Report

Title: **Development of High-Oil Peanuts for Use as Biodiesel Fuel**

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Objective.

The objective of this project is to improve the competitiveness of peanut as a biofuel. To do this we propose to increase the oil content of peanut from about 48% to near 60%. This will result in an increase of 25% of the gallons of oil that can be produced. We have wild species accessions that have oil content in this range, and cultivated accessions containing 50 to 55% oil. These and the "ugly peanut" do not have appearance in shape and size typical of normal peanut varieties. However, the shape and size is not a primary concern for oil production. The Tamrun 98 variety has improved shell out, which could increase the oil extracted by 5%. We propose to combine the high oil trait with the high yield and improved shelling percent to develop a variety that can be more competitive for use as biodiesel fuel and give growers another market for peanuts. We have set up a system for oil analysis of plots. The TAES-Lubbock Center has a NMR spectrometer for measurement of oil content and we have developed standards by using conventional chemical analyses.

Results.

(a)We have screened the core of the U.S. peanut core collection plus additional accessions to identify additional materials that may have high oil content. In addition, we have 175 breeding lines derived from a current interspecific cross, some with potentially very high yields, and numerous new populations developed this past year that were tested. We are still in the process of evaluating data and interpreting results but we know we have identified some valuable materials and we have also identified some discrepancies in the literature. Year, environment, location, and other factors may have caused these differences. Further evaluations will be necessary

(b) We are also testing varieties under multiple combinations of irrigation and spacing to determine profitability of peanut production under reduced inputs. We will determine the oil content and yield per acre to determine effects of reduced input-cultivation on oil yields. Again, we are still evaluating our data and do not have conclusions at this time.

(c)We have crossed numerous lines that are identified in the literature as higher in oil content, and we have many of those hybrids growing in the greenhouse now for seed increase. We also are preparing to make backcrosses and multiple crosses of these potential high-oil peanuts with lines that are high-yielding, disease resistant and/or drought-tolerant

(d) For the longer term material, we have made several crosses with the wild peanuts that have been reported to have at least 64% oil. We have harvested most of these hybrid seed and will be planting those soon. Some of these hybrids will be important as we progress toward developing an introgression pathway to get the 64% oil content genes into the cultivated peanut. The results of these interspecific crosses from the past year are very encouraging in that we were apparently able to accomplish some very distant crosses that will be essential in the introgression pathway. We were also successful in our Germplasm Collection Expedition to Paraguay (Other funding) to obtain a new wild peanut species that we feel will be an important bridge in the introgression pathway.

Acknowledgment

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Respectfully submitted,
Charles E. Simpson, Co-PI