Research Report (FY 2014-2015) to
the Georgia Peanut Commission

TITLE: **Development and Evaluation of Cultivars with Disease Resistances to Increase Farm Profitability**

C. Corley Holbrook, USDA-ARS, Tifton
Peggy Ozias-Akins, UGA, Tifton
Ye (Juliet) Chu, UGA, Tifton
Albert Culbreath, UGA, Tifton
Tim Brenneman, UGA, Tifton
Patty Timper, USDA-ARS, Tifton

PROGRESS REPORT:

Breeding for Resistance to the Peanut Root-knot Nematode.

- Continued breeding program to combine resistance to the PRN with high yield and grade, resistance to other pathogens such as leaf spot and white mold, and high oleic acid content. This included continued hybridization and generation advance for breeding populations involving 83 cross combinations. Material is first advanced to the F_4 generation when individual plants are harvested. This material is then evaluated in the greenhouse for nematode resistance. Material showing resistance is then evaluated in the field for yield and other characteristics. We have several late generation breeding lines that we will be evaluating over the next two years for possible release.
- During the past year we continued working with Drs. P. Ozias-Akins and Y. Chu to use marker assisted selection for nematode resistance and high oleic fatty acid. These procedures are greatly speeding the process of developing future resistant varieties. The first product of these efforts is TifNV-High O/L. This is a high yielding variety with resistance to nematodes and high O/L ratio. Using conventional breeding approaches, it would have taken several years to develop this variety. Using marker assisted selection, this was accomplished much more rapidly and efficiently.

Breeding for Resistance to Leaf Spot and TSWV.

- Continued breeding program to combine resistance to leaf spot with high yield and grade and high oleic acid content. This included continued hybridization and generation advance for breeding populations involving 42 cross combinations. Material is first advanced to the F_4 generation when individual plants are harvested. This material is grown the following year with no fungicide sprays. Progeny that show resistance and high yield are selected. These selections are then tested in replicated yield trials. We have several late generation breeding lines that have a high levels of resistance to leaf spot and good yields when grown with no fungicide sprays. We are also cooperating with plant pathologist and economists to examine the net return of growing these lines under sprayed, and reduced or non sprayed conditions.
- Continued breeding program to combine resistance to TSWV with acceptable yield and grade. This included continued hybridization and generation advance for breeding populations involving 128 cross combinations. We have numerous late generation breeding lines that have a higher level of resistance than GA-06G.