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Project Title:

Development and evaluation of peanut varieties adapted to West Texas.

Personnel and Agency:

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Problem and Need:

The West Texas peanut growing region is unique from all other growing regions in the U.S. and is uncommon relative to peanut growing regions world wide. The combination of high altitude and arid climate sets the region apart from the humid coastal plains where most U.S. peanuts are produced. This unique growing region poses unique challenges to peanut production not experienced elsewhere. Peanut seed varieties grown in West Texas tend to mature more slowly and produce larger kernel size and lower O/L ratios by comparison when grown in other U.S. growing regions. West Texas needs an earlier maturing seed variety that is selected, developed, and tested in West Texas. The variety needs to have high yield and grade, disease resistance, and high oleic oil chemistry.

Plan of Action:

Currently, the most widely grow peanut seed variety in West Texas is 'Flavor Runner 458', developed by Mycogen Seeds. This is the chemically induced high oleic mutant of 'Florunner'. Flavor Runner 458' has the quality characters of 'Florunner' but is still a variety developed for the long hot growing season of the Southeast. After 'Flavor Runner 458' was released as a variety, crosses were

made between 'Flavor Runner 458' and early maturing parental lines. Uniform and segregating lines from these crosses were licensed to ACI by Mycogen/Dow AgroSciences. Over the past 5 years, uniform lines developed from those crosses have been evaluated for adaptability in West Texas. Other uniform lines from the Flavor Runner breeding program are still under evaluation and consideration for commercial production.

This is an ongoing peanut variety development program that requires two principal objectives.

Objective 1: Development of segregating lines for selection in West Texas

Starting in 2003 and continuing to the present, crosses were made between Flavor Runner 458 breeding lines and lines with sources of disease resistance and early maturity. Through generational advancements in the Puerto Rico winter nursery, these lines are in F₂₋₈ generations. Over the past 6 years plant selections have been made in West Texas with emphasis on yield, grade, early maturity, disease resistance and high oleic oil chemistry.

Objective 2: Evaluation of uniform lines

Uniform lines from the original Flavor Runner breeding program were tested in 2009 in multi-location replicated field trials. New uniform lines were selected in 2009 and will enter replicated field trials in 2010. These new lines will first be tested in a preliminary test. The best lines in the preliminary test will go on to be tested the following year in the advanced tests at multiple locations. The best lines in the advanced tests will be considered for seed increase and release.

Current project status

Since the revival of the Flavor Runner Breeding program in 2003, ACI has expanded the breeding program significantly. During the 2009 growing season, 880 breeding line plots were planted near Brownfield, Texas. Also planted at this site, were a preliminary and advanced test and seed increases of 7 potential releases. The preliminary test consisted of 70 uniform lines not previously tested. The advanced yield trial consists of advanced lines that had performed in other tests in other years and locations. Another advanced test with the same entries was planted in Gaines County.

In 2009, 47 new uniform lines were identified in the preliminary yield trial that were equal to or higher yielding than the check variety, Flavor Runner 458 (Table 1). The 2009 preliminary test in Brownfield, Texas was again large due to the increasing number of uniform lines selected in 2008. Lines in the upper 1/3 of this test will be moved into advanced multi-location tests in 2010. Preliminary visual evaluation indicated that many of these lines are earlier maturing than FR 458. The 2009 advanced tests in Gaines County and Terry County (Table 2 and

3) reconfirmed the superiority of 5 uniform lines over FR 458. These lines are in small seed increases for potential release in the coming year.

