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**PROGRESS REPORT  
TO  
NORTH CAROLINA PEANUT GROWERS ASSOCIATION, INC.**

**TITLE:** Transfer of Disease Resistance Genes from Diploid *Arachis* Species into Peanut Cultivars

**LEADERS:** S. P. Tallury

**DEPARTMENT:** Crop Science

**REPORT:**

**Early Leaf Spot (ELS) selections:**

- In the summer of 2009, 300 plots from *A. hypogaea* cultivars (Gregory, Perry, NC 12C, NC-V11, VA 98R, and Georgia Green) x *A. cardenasii* derived interspecific hybrids, were evaluated in field tests at Lewiston for ELS resistance. The plots received no fungicidal sprays to control leaf spots.
- Based on low defoliation scores, plant and pod characteristics, a total of 102 whole plots were selected. Of these, 43 had defoliation scores of 2.0 and 59 with a score of 3, whereas the susceptible and resistant checks averaged 7.8 and 6.3 (1 = resistant and 9 = susceptible).
- Also, another 14 interspecific breeding lines were evaluated for yield and ELS resistance along with several other breeding lines from Dr. Isleib's program, totaling 127 lines. Overall, the interspecific breeding lines out-yielded or yielded similar to the existing cultivars with two lines, SPT 07-01, and SPT 09-02 yielding 3800 lb/ac with no leaf spot control.
- In collaboration with Dr. Isleib, an additional 10 best performing interspecific hybrid derived breeding lines were evaluated in comparison with his breeding lines in a replicated advanced yield test at Lewiston and Rocky Mount for a second year testing. At the time of writing this report, yield, grade and disease data are being compiled to make selections of the best performing lines for further field-testing in 2010.

**TSWV selections:**

- In the summer of 2009, the same 300 lines evaluated for ELS resistance, were also evaluated at Lewiston for TSWV resistance. The plots were selected based on TSWV incidence by counting diseased/dead plants every 2 weeks starting in late June until late September. Also, plant and pod characters were considered in making the final plot selections.
- Thirty-one whole plots were selected and 19/31 plots also exhibited high levels of ELS resistance with defoliation scores of 3.0 or less (1 = resistant and 9 = susceptible). These selections will be evaluated at Lewiston in replicated yield and disease tests in 2010. Lines selected will be entered into uniform peanut performance tests in the coming years to develop commercial cultivars with TSWV resistance.
- Selfing of hexaploid hybrids of Gregory x *A. diogeni*, Gregory x *A. correntina* and VA 98R x *A. correntina* was continued at Sandhills Research Station in 2009.

- The seeds obtained from Sandhills will be in F<sub>9</sub> generation and they will be planted again at the same station in 2010 for seed production and also identify any tetraploid segregants. Continued selfing of these progenies would be expected to result in stable tetraploid progenies with introgression of novel TSWV resistance genes from *A. diogo* and *A. correntina*.

## IMPACT STATEMENT

Early leaf spot (ELS) and Tomato Spotted Wilt Virus (TSWV) have been the most chronic disease problems for NC peanut growers. We have identified several diploid *Arachis* species with very high levels of resistance to these two diseases and also to CBR and Sclerotinia blight. As a result, development of genetic resistance by transferring resistance genes from diploid *Arachis* species into susceptible *A. hypogaea* cultivars aid NC peanut growers reap good quality peanuts with less input costs. We have selected 102 whole plots with high levels of ELS resistance. Also, we have selected 31 whole plots for TSWV resistance and 19/31 plots were also highly resistant to ELS. Additionally, we are also in the process of developing new interspecific hybrid (Gregory x *A. diogeni*, Gregory x *A. correntina* and VA 98R x *A. correntina*) populations with TSWV resistance. It is anticipated that the selections resulting from these materials will provide lines with high levels of multiple disease resistance.