Date Submitted November 2008 NCARS / NCCES CODE: **NC-19**

IMPACT STATEMENT

The transgenic lines developed in Virginia-type peanuts with tomato spotted wilt virus (TSWV) will be used for breeding superior cultivars to suppress the disease. The transgenic lines are completely immune to the virus and will give 100% suppression of the disease. The lines being developed have the potential to be incorporated into all U.S. cultivars and completely eliminate TSWV in peanut. The *Mod 1* transgenic lines that have been identified to inhibit *Aspergillus* and aflatoxin will benefit the processing industry and provide safer peanut products. If the gene can be incorporated into superior cultivars then much of this problem will be eliminated and have major economic impacts on the peanut industry. Aflatoxin causes suppression of immune responses and large quantities of contaminated peanut are consumed in lesser developed countries that have the toxin. Incorporation of *Mod 1* can into cultivars gown overseas also has the potential for helping solve many of the leading health problems in those countries.

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__ EXTENSION **X** RESEARCH
REPORT PERIOD **02/01/08 – 1/31/09**
__ INTERIM **X** FINAL +Summ

PROGRESS REPORT TO

National Peanut Board

and

North Carolina Peanut Growers Association

TITLE: **Development of Transgenic Peanut Varieties with Improved Agronomic Performance and Enhanced Protein Quality**

LEADERS: **H. Thomas Stalker and A.K. Weissinger**

DEPARTMENT: **Crop Science**

REPORT:

Multiple transgenic lines were developed in Virginia-type peanuts with tomato spotted wilt virus resistance and with a gene (Mod 1) from corn that was reported to inhibit *Aspergillus* and aflatoxin. Seeds were increased for three generations and tested disease reactions. The TSWV lines with the gene were completely immune to the virus. Selected lines were grown in the field at the Oxford Experiment Station in replicated plots to evaluate TSWV in a field situation. Unfortunately, no TSWV was observed in any plots, so evaluations could not be completed. Because plants from the lines are still segregating for resistance, tissue samples of all plants in the field were made to determine whether the gene was present in each individual. In the laboratory, molecular markers are being developed to quickly determine whether or not the gene was present, but addition research is needed to complete this phase of the project. Seeds were collected from all plants so that progenies can be evaluated after good molecular markers are established to identify homozygous lines for evaluations. Hybrids were made with TSWV transgenic lines and several large-seeded cultivars grown in North Carolina to initiate transferring the resistance to a wider range of cultivars. Nine Mod 1 transgenic lines were also grown in the field and seeds harvested from each plant. A molecular marker is also being developed for this gene to quickly identify plants with the transgene. Greenhouse experiments indicated that the nine Mod 1 lines have high resistance to aflatoxin production, and several are resistant to Sclerotinia and white mold. The evaluation programs will continue for both the TSWV and Mod 1 transgenic materials with the intention of developing improved cultivars for North Carolina peanut producers.