NPB Project Summary

Project Title; Uniform screening program for genetic resistance to peanut root knot nematode, leafspot, TSWV and soilborne diseases

Funding Year: 2011

Principle Investigators:

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The primary goal of the project is to help breeders develop new peanut cultivars for growers that are not only high yielding, but also have great disease resistance. The specific objective is to conduct disease screening trials under uniform conditions to evaluate the susceptibility of candidate germplasm to a wide variety of foliar and soilborne diseases important in the southeastern US. Our industry has a history of steadily increasing yields thanks to new cultivars with high yield potential. Unfortunately most of those cultivars are still susceptible to many of our major diseases which can be devastating if not controlled. Our salvation in this arena has been the availability of effective, reasonably priced fungicides, and the peanut industry in the humid southeastern United States has relied heavily on these fungicides. In fact, without fungicides our industry probably would not even exist. However, the cost of these products is one of the largest production inputs for growers. Also, the pathogens that cause disease are developing resistance to these fungicides, and even the better, new fungicides are not always as effective as we need them to be, especially on soilborne diseases. It is in the best interest of the industry to reduce our dependence on fungicides and utilize more genetic resistance. Therefore we need as much information as possible about the susceptibility of new cultivars to the many different peanut diseases growers must deal with. For example, if a grower in east Georgia has a bad CBR field, he needs to know ahead of time about the CBR-susceptibility of the new variety he wants to plant. Many growers rely on the Disease Risk Index for such information, and data from this project has been a big part of determining those rankings. New diseases occur sporadically also. One that flared last year was Rhizoctonia aerial blight, caused by Rhizoctonia solani AG-1. We isolated the pathogen and now have some data on the relative susceptibility of current cultivars to this unusual disease.

The impact of this program can most easily be quantified by the release of cultivars with resistance to one or more of the peanut diseases currently causing losses to our industry. Recent examples would be GA-07W with moderate resistance to white mold, and Georgia Greener with partial resistance to CBR. Apart from specific cultivars that have been released, data generated have guided breeders in selecting otherwise similar genotypes to avoid releasing a cultivar that may be highly susceptible to a common disease. Each year genotypes are identified that may have other desirable traits, but are highly susceptible to disease. The sooner these genotypes are eliminated from the selection process, the less resources are wasted on them in the breeding programs. As mentioned previously, knowledge of the disease reaction of cultivars has saved growers significantly by reducing fungicide inputs, or even just avoiding planting a susceptible cultivar in a problem field.

NATIONAL PEANUT BOARD/SOUTHEAST PEANUT RESEARCH INITITATIVE
QUARTERLY PROGRESS REPORT FOR WORK DONE UNDER RESEARCH AGREEMENT----------

Final Report

Oct. 25, 2012

INSTITUTION: University of Georgia

PROJECT TITLE: Uniform screening program for genetic resistance to peanut root knot nematode, leaf spot, TSWV and soilborne diseases

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RES. AGR. NO.: 25-21-RF332-577 PROJECT LEADER: Dr. Tim Brenneman

EXPIRATION DATE: December 31,2011
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PROGRESS REPORT: PROGRESS REPORT: Advanced germplasm from four different breeding programs has been collected to evaluate susceptibility to our major peanut diseases in the southeast. A total of 36 advanced lines plus 12 cultivars were planted in replicated plots to evaluate white mold, TSWV, and leaf spot, and a smaller set of those were inoculated with *Cylindrocladium parasiticum* to evaluate CBR. Another set was inoculated with *Rhizoctonia solani* AG1, a relatively new peanut pathogen observed in some grower fields in recent years. Severe white mold developed and nearly 100% of Georgia Green plants were infected, whereas over 50% of the plants from Bailey, York, or GA-10T had no symptoms. Other cultivars with intermediate levels of resistance like GA-07W had 25% incidence, and one experimental line had more than 60% disease-free plants. Leaf spot ratings varied from 2.8 (York) up to 6.6 (GA-09B), and very little TSWV was present. Some CBR developed but was not severe due to the warmer spring temperatures. Tifguard, Florida 07, and GA-06G had some of the higher ratings, and GA-06G had the highest yield loss of inoculated versus non-inoculated plots (1246 lb/A). Some symptoms developed in the plots inoculated with *R. solani* AG1, and Florida 07 had the most yield loss and a relatively high disease rating, although as with CBR the epidemic was not severe on any cultivars. All entries were screened in the greenhouse for resistance to root-knot nematodes as well. Tifguard had very low gall ratings and an egg mass index of 0. Other genotypes displayed varying degrees of response varying from nearly immune like Tifguard to very susceptible. This information will greatly assist breeders in selecting new peanut cultivars.