

167
NC-15
462
2007

Date Submitted 12/07

NCARS/NCCES CODE NC 15
EXTENSION RESEARCH
REPORT PERIOD 01/07 - 12/07
INTERIM FINAL

PROGRESS REPORT
To
National Peanut Board

TITLE: DEVELOPING HIGH-OLEIC PEANUT VARIETIES WITH
MULTIPLE DISEASE RESISTANCE

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DEPARTMENT: CROP SCIENCE

REPORT:

A total of 1071 individual F_2 generation seeds from 9 different interspecific hybrids were analyzed for fatty acid composition.

Only the homozygous high-oleic seeds (O/L ratio of > 7) were picked and planted in Lewiston in 2007 summer. At harvest, single plant selections were made based on plant and pod characteristics.

Seeds from these plants were planted in the winter nursery in Puerto Rico (November 12-16th, 2007) for generation advancement.

Segregating F_2 generation seeds from other hybrids were also planted in Lewiston in 2007 summer and single seed descent procedure was conducted for generation advancement. Seeds from these pods were also planted in the winter nursery in Puerto Rico (November 12-16th, 2007) for generation advancement.

In the greenhouses, 67 new crosses were made between 14 different interspecific hybrid derived breeding lines and high-oleic cultivars to produce F_1 hybrids. All of these breeding lines were highly resistant to ELS and some to TSWV, CBR and Sclerotinia blight.

F_1 hybrid seeds from 58 of the 67 hybrids were planted in 2007 winter nursery in Puerto Rico.

Flavor profiles of 16 different early leaf spot resistant interspecific hybrid derived breeding lines along with the industry flavor standard, NC 7, were analyzed and the data indicated that none of the breeding lines were significantly different from NC 7.

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IMPACT STATEMENT

High-oleic peanuts are becoming an important part of peanut snack consumption mainly because of their potential health benefits and extended shelf life of the peanuts and their derived products. The latter trait particularly influences the maintenance of good flavor for longer periods of time. However, the high-oleic virginia-type peanut varieties becoming available for commercial production are, in general, susceptible to one or more of the commonly occurring diseases of peanut. For example, the high-oleic Gregory (N000980l) is highly susceptible to early leafspot and Sclerotinia blight and high-oleic Perry (N020600l) is susceptible to early leafspot, CBR and TSWV. Overall, both the conventional and high-oleic commercial peanut varieties available to V-C peanut growers lack stable resistance to many of the common peanut diseases, thereby resulting in significant yield losses annually and reduced profit margins. The peanut genetics program at NCSU maintains several germplasm lines derived from diploid *Arachis* species with very high levels of resistance to many important diseases and insect pests of peanut. For example, two of the germplasm lines, GP NC WS 12 and 15 were derived from *A. hypogaea* x *A. cardenasii*, a diploid wild species with high levels of resistance to leafspots, CBR, TSWV, Sclerotinia and several insect pests. Additionally, we have several agronomically improved experimental lines derived from *A. cardenasii*, *A. diogeni* and *A. stenosperma*, with resistance to TSWV, Early Leaf Spot, CBR and Sclerotinia blight. Our goal is to transfer these resistant genes into susceptible, high-oleic peanut cultivars to develop genetically resistant cultivars with superior oil chemistry. The Universities of Florida and Georgia are also conducting research to develop high-oleic runner cultivars with multiple disease resistance using Plant Introductions (PIs) as sources of disease resistance.