353
NC-23
1127
2012

Progress Report for NC 23:

Bob, this below report is in addition to the one that I turned in at the end of last year.

From the 2012 seed increases, 3 advanced interspecific hybrid breeding lines, all of which were high-oleic, were selected based on their resistance to early leaf spot (ELS) and overall plant health. These 3 lines were entered in 2013 PVQE as well as in the UPPT. Based on their performance in these regional testing programs in 2013, we will make the decision to either continue them for one more year in regional testing for release considerations. These lines were planted for bulk seed increases in 2013.

Two other ELS resistant, presumably high-oleic advanced breeding lines were observed to be segregating for high-oleic trait. These 2 lines were planted in 2013 seed increase plots and we will be harvesting individual plants to purify them.

Additionally, 5 random seeds of each of 20 different F2 families were tested for high-oleics and only 4 seeds out of 100 were found be normal oleic.

Results and Discussion

Leaf Spot Evaluations:

Five high-oleic advanced interspecific breeding lines were selected with low leaf spot defoliation scores (Table 1). Defoliation scores correspond to 1 = resistant and 9 = susceptible. These lines received no fungicidal sprays for leaf spot control. GPNCWS 9 and 15 are interspecific hybrid germplasm lines derived from a diploid species, *Arachis cardenasii* which has been documented as highly resistant to leaf spots.

Table 1: High Oleic Breeding lines Evaluated for Leaf Spot Resistance

ID	Pedigree	Defol.Score
SPT 10-12ol	[NC 12C/GPNCWS 15//N02060ol]	2.5
SPT 10-13ol	[NC 12C/GPNCWS 15//N02064ol]	4.0
SPT 10-14ol	[NC 12C/GPNCWS 15//Brantley]	3.5
SPT 10-16ol	[NC 12C/GPNCWS 13//Sun Oleic 97R]	4.0
SPT 11-01ol	Hull x GPNCWS 9	2.0
VA 98R (Susceptible)		7.5

Screening of individual F_2 seeds for high oleic acid

Five individual F_2 seeds of each of several segregating progenies have been evaluated to identify high-oleic seeds (Table 2). We consider O/L ratio above 10 as high oleic and as we can see from the table below 155-1-5 has a O/L ratio of 2.2 which is considered normal oleic. The identified high-oleic seeds will be planted for disease evaluations in 2012.

Table 2. Screening of individual F_2 seeds for high oleic acid

Sample ID	Oleic acid (O)	Linoleic acid (L)	O/L ratio
155-1-1	81.7	4.1	19.9
155-1-2	81.4	5.5	14.8
155-1-3	81.5	6.1	13.4
155-1-4	83.2	4.6	18.1
155-1-5	58.9	27.3	2.2

155 = {[Tifguard x (SPT 06-06 x Brantley)] x PI 561917) x Florida Fancy}

Tifguard = Root-Knot Nematode resistant runner cultivar
SPT 06-06 = Interspecific breeding line with high leaf spot resistance
Brantley = High-oleic Virginia cultivar
PI 561917 = Resistant to thrips feeding and matures in 110 days (Spanish)
Florida Fancy = High-oleic variety from the Univ. of Florida

TSWV Evaluations:

The same five lines from table 1 were also evaluated for TSWV incidence in 2011 at PBRS and the percentage symptomatic plants for TSWV ranged from 14 to 54% among the lines with the susceptible check, NC 3033 exhibiting 89% damage as shown in table 2.

Table 2. Percent TSWV damage among advanced high-oleic breeding lines derived from *A. cardenasii*

ID	% TSWV incidence
10-12ol	29
10-13ol	39
10-14ol	14
10-16ol	32
11-01ol	54
NC 3033 (susceptible)	89

Conclusions:

This proposal highlights the utilization of *Arachis* species accessions and germplasm lines derived from them to improve disease resistance of high-oleic peanut varieties becoming available for commercial production in North Carolina. It is anticipated that the hybrid materials resulting from this proposal will help growers harvest good quality peanuts with less input costs and the peanut industry at large by providing disease-free, high-oleic peanuts.