National Peanut Board –Progress Report

Date: 15 March 2004

Project Title: Introgression of nematode resistance into peanut genotypes with resistance to the tomato spotted wilt virus

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Proposed achievements for 2003:

For 2003 we proposed to complete a third backcross of nematode resistance into peanut cultivars that are resistant to the tomato spotted wilt virus and to field test selected lines from the BC2 generation for virus resistance.

Achievements:

The BC3F1 and BC3F2 generations of the introgression effort were developed. Recurrent parents in this breeding program included Tamrun 96 and Georgia Green. We used molecular markers to screen for nematode resistance in over 200 individuals in 22 lines that also carry resistance to the tomato spotted wilt virus. Only individuals that appear to be homozygous for nematode resistance were selected. Plants that were nematode resistant will be used in another generation of backcrossing and for seed increase.

In one set of unreplicated observation plots planted in south Texas for evaluation of virus resistance, 5 BC2 generation have levels of TSWV that were similar to that of Tamrun O/L/ 02 under moderate disease pressure. Eighteen BC1 lines were sent to Georgia for evaluation of TWSV resistance, unfortunately there was too little virus disease pressure at that location for a meaningful evalution.

Ten lines from the BC1 generation (J-lines) were planted in replicated yield trials at four locations in 2003. Yields across the four locations were variable (see Tables 1 to 4). At the Keith farm test site (Table 2), there was moderately severe nematode disease pressure as shown by the relative ranking of nematode resistant cultivars and lines compared to the susceptible Florunner, Tamrun 96, and Tamrun O/L 02, which had the lowest yields in this test. At the south Texas location (Table 4, J. Seay farm), peanut grades were poor due to an undiagnosis pod mold problem. Nematode resistance data from this location indicates that 7 of 10 lines with resistance to TSWV also had nematode resistance equal to that of the resistant cultivars NemaTAM and COAN, however nematode disease pressure was not high enough to have a major effect on yield. Over the four tests, the line J-211 was among the top five entries in pod yield in 3 of the 4 tests. Pod yield of line J-56 was in the top five in 2 of 4 tests and in the upper half in 3 of 4 tests. These data suggest that we will be able to select one or more lines that combine nematode and TSWV resistance with very competitive yield potential.

In 2004, we will concentrate on seed increase of lines with nematode and virus resistance with limited field testing for yield potential.

Table 1. Yield data from a replicated test in Erath County

Peanut line	Pods/A (lbs)	Value/A $	SMK
Tamrun 96	5422	1,020.93	76.65
Tamrun O/L 02	5042	949.18	76.48
Florunner	4530	849.92	76.81
NemaTAM	4637	895.85	78.50
COAN	3849	727.26	76.92
TP300-2-9	4417	843.89	77.76
TP298-3-10	4588	884.09	78.60
TP296-4-4	4453	854.46	78.09
TP294-1-4	4142	770.58	75.61
TP281-4-9	4737	909.04	77.88
J-211	5275	1,005.77	78.03
J-206	4956	938.25	77.08
J-178	4563	848.88	75.36
J-135	4744	871.16	74.60
J-90	4548	860.3	76.85
J-86	4670	883.75	77.07
J-83	4898	914.84	76.14
J-56	4908	887.70	73.4
J-54	4521	826.23	73.80
J-46	4796	906.61	77.03
$LSD_{0.05}$	598	117.68	1.41

Table 2. Yield data from a replicated test on the Keith farm.

Peanut line	Pods/A (lbs)	Value/A $	SMK
Tamrun 96	3075	449.63	66.57
Tamrun O/L 02	2923	423.11	65.73
Florunner	2652	302.84	58.82
NemaTAM	3922	717.84	74.75
COAN	2948	534.35	73.70
TP300-2-9	4010	735.28	74.71
TP298-3-10	4211	779.35	75.70
TP296-4-4	3889	671.44	72.41
TP294-1-4	3486.5	608.35	71.39
TP281-4-9	4146	760.14	75.51
J-211	4102	748.25	74.37
J-206	3665	636.59	71.67
J-178	3647	611.53	68.06
J-135	3696	626.82	69.21
J-90	3720	659.57	71.88
J-86	4103	757.38	75.32
J-83	3751	656.69	71.3
J-56	3531	617.68	70.75
J-54	3175	486.17	65.10
J-46	3763	655.09	71.90
$LSD_{0.05}$	516	130.41	4.71

Table 3. Yield data from a replicated test on the Koonce farm.

Peanut line	Pods/A (lbs)	Value/A $	SMK
Tamrun 96	5464	988.51	72.32
Tamrun O/L 02	5399	954.30	73.11
Florunner	4972	869.39	72.72
NemaTAM	5002	864.93	71.57
COAN	4285	785.05	74.49
TP300-2-9	4816	739.19	69.09
TP298-3-10	5383	988.51	75.35
TP296-4-4	5069	874.55	71.82
TP294-1-4	4611	774.44	69.92
TP281-4-9	5247	953.44	74.55
J-211	4218	482.32	61.82
J-206	4885	729.00	68.57
J-178	4885	683.00	65.02
J-135	4392	689.96	66.42
J-90	4527	754.25	68.59
J-86	4285	616.48	67.87
J-83	5084	892.85	71.34
J-56	5052	866.62	71.02
J-54	4515	773.24	69.42
J-46	4598	535.20	62.06
$LSD_{0.05}$	548	184.14	4.80

Table 4. Yield data from a replicated test in south Texas.

Peanut line	Pods/A (lbs)	Value/A $	SMK	Nematodes No./500 cm^3
Tamrun 96	3037	312.96	61.94	19,308
Tamrun O/L 02	3197	402.22	65.73	1,419
Florunner	2549	336.58	67.64	6,455
NemaTAM	2234	284.58	66.38	0
COAN	2004	193.97	59.26	0
TP300-2-9	2642	290.36	63.24	0
TP298-3-10	2753	352.60	68.04	0
TP296-4-4	3086	431.93	68.35	0
TP294-1-4	2699	383.98	68.05	0
TP281-4-9	2730	377.18	67.34	0
J-211	3288	485.08	69.87	0
J-206	2713	283.48	62.39	0
J-178	2857	271.32	57.79	1,278
J-135	2880	294.64	60.85	0
J-90	3038	423.92	66.771	1,824
J-86	2801	304.36	59.94	0
J-83	3333	521.39	68.20	0
J-56	3475	539.57	68.20	0
J-54	2921	346.91	62.94	3,170
J-46	3197	442.95	66.39	0
$LSD_{0.05}$	817	371.14	2.02	