

#87
continues to 2005

National Peanut Board –Annual Report for 2004

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

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Proposed achievements for 2004

- 1: To increase seed of several backcross three lines such that we could be testing in 2005
- 2: Develop populations from crosses between lines with nematode and TSWV resistance and lines with resistance to nematodes, Sclerotinia blight and have the high O/L trait.
- 3: Continue field tests of lines with resistance to nematodes and TSWV.

Achievements:

1: Seed of 37 lines with resistance to nematodes and TSWV were sent to a winter nursery in Puerto Rico for the final stages of seed increase. These seed will be harvested in the spring of 2005 in time for processing and planting two to three field tests for yield potential in 2005.

2: Seed of the F1 generation from these crosses were planted in a greenhouse (Stephenville) and the F2 generation will be available in the spring of 2005. These individuals will be screened to selected nematode resistant individuals and for the high O/L trait in 2005. Individuals with both traits will be planted to increase seed with yield tests of these lines with multiple disease resistance and the high O/L trait to be tested for yield in subsequent years.

3: Field tests of progeny of the initial crosses between nematode resistant and TSWV resistant parents were again conducted in south Texas for continued evaluation of levels of resistance and yield potential. Another test for yield was planted in central Texas.

In the south Texas test, lines with nematode resistance had higher yields than the susceptible cultivars (Tamrun 96, Tamrun O/L 0 2, and Florunner (Table 1). Nematode populations density were high enough to cause the yield suppression in the susceptible cultivars (Fig. 1). At a separate location there was sufficient TSWV to obtain ratings for virus resistance and several lines from this program have both nematode and TSWV resistance (Fig.2) .

The central Texas test site, which had no nematodes or TSWV, but did have excellent weather in 2004. Yields in this test were outstanding, with many lines having yields of greater than 6000 lbs/acre (Table 2).

Summary:

In 2004 we achieved our primary objective of advancing several breeding lines that should have resistance to both root-knot nematodes and the Tomato Spotted Wilt Virus. Our field tests of early generation lines from this effort continue to provide evidence that these breeding lines will contain individuals with desired levels of resistance and a high yield potential. Sufficient seed will be available to begin field tests of the more advanced generation lines for yield in 2005.

We also have achieved our second objective in that we now have early generation breeding lines that have multiple disease resistance (nematodes, TSWV and Sclerotinia Blight) along with the high O/L trait. We complete the initial screening of these materials in 2005 with field tests to begin in later years.

Acknowledgements:

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Table 1. Evaluation of several peanut cultivars and breeding lines for yield in a field infested with root-knot nematodes in south Texas. Lines marked with an asterisk (*) have resistance to root-knot nematodes and tomato spotted wilt.

Cultivar or Entry	Value/Ac \$		Pods/Ac lbs.		TK	TSMK		DK	OK	Seed Wt g/100				
						-----%	-----							
15	603.1	a	3894	a	72.8	c-f	64.3	a-d	2.2	c	6.3	a-f	45.6	e-h
13	597.4	ab	3599.6	ab	76.5	a	66.8	a	2.7	c	7.0	a-d	50.0	cd
COAN	578.7	a-c	3446.9	a-e	75.0	a-d	66.3	ab	2.5	c	6.3	b-f	49.7	c-e
11	563.3	a-c	3497.5	a-d	73.7	a-e	67.5	a	3.5	a-c	2.7	g	48.5	d-f
9*	536.0	a-d	3301.8	b-e	75.6	a-c	66.8	a	3.3	bc	5.5	c-g	47.3	d-f
6*	533.1	a-d	3344.8	b-e	73.1	b-e	63.1	a-d	1.9	c	8.1	a-c	53.6	bc
1*	528.1	a-d	3571.2	a-c	72.9	c-f	65.7	ab	1.9	c	5.2	c-g	59.8	a
5*	517.5	a-d	3054.4	c-e	73.2	b-e	66.9	a	1.9	c	4.5	d-g	48.5	d-f
12	492.0	a-d	3044.1	c-e	72.4	d-g	62.3	a-d	1.2	c	8.9	ab	47.2	d-g
10*	474.9	a-e	3217.8	b-e	74.0	a-e	65.1	a-c	3.8	a-c	5.2	c-g	59.9	a
4*	473.5	a-e	3309.1	b-e	71.6	e-g	63.2	a-d	3.4	a-c	5.0	d-g	52.7	bc
3*	471.0	a-e	3017	d-f	68.3	h	60.9	b-d	2.9	c	4.5	d-g	48.5	d-f
14	459.3	a-e	3512.6	a-d	75.9	ab	66.3	ab	3.8	a-c	5.8	c-f	47.7	d-f
NemaTAM	454.7	a-e	2930	e-g	73.2	b-e	62.7	a-d	3.5	a-c	6.9	a-d	46.6	d-g
8*	448.3	b-e	3214.8	b-e	71.5	e-g	60.9	b-d	1.8	c	8.9	ab	41.8	h
7*	439.1	c-e	3212.1	b-e	71.8	e-g	59.9	cd	2.7	c	9.2	a	44.8	f-h
Tamrun96	408.1	d-e	3001.4	d-f	71.1	e-h	60.9	b-d	6.8	a	3.4	fg	50.3	cd
2*	338.7	ef	2459.9	g	69.8	gh	59.9	cd	3.4	a-c	6.5	a-e	43.1	gh
Florunner	334.3	ef	2461.9	g	71.3	e-g	58.9	d	6.5	ab	5.9	b-f	47.5	d-f
TamrunO/L02	294.8	f	2481.5	gf	70.0	e-h	59.5	d	6.7	ab	3.9	e-g	55.7	b

Table 2. Yield response of selected cultivars and breeding lines in plots not infested with root-knot nematodes in central Texas. Lines marked with an asterisk (*) have resistance to root-knot nematodes and tomato spotted wilt.

Cultivar or Entry	Value/ AC \$	Pods/ AC lbs.	TK	TSMK	DK	OK	Seed Wt g/100				
								ab	0.6	c-d	2.8
Florunner	1316.7	a	81.1	77.7	ab	0.6	c-d	2.8	cd	51.4	b-e
14	1253.9	ab	81.6	78.2	a	0.4	c-d	3.0	cd	48.7	d-f
13	1218.7	a-c	80.5	76.0	a-c	0.4	c-d	4.1	bc	51.5	b-e
TamrunO/L02	1218.3	a-c	78.2	74.8	e-h	0.3	cd	3.2	cd	53.7	bc
Tamrun96	1207.0	a-c	78.2	75.0	e-h	0.5	c-d	2.7	cd	49.4	d-f
NemaTAM	1206.0	a-c	80.3	75.8	a-c	0.6	c-d	3.9	cd	48.9	d-f
15	1199.3	b-c	79.9	75.4	b-d	0.4	c-d	4.1	bc	51.0	c-d
5*	1183.1	b-d	78.5	75.4	e-g	0.6	c-d	2.5	d	53.5	bc
11	1170.8	b-e	81.0	77.8	ab	0.3	cd	2.9	cd	50.0	de
3*	1139.3	c-e	76.6	71.8	gh	0.5	c-d	4.3	bc	44.3	gh
1*	1136.2	c-e	77.1	73.5	hi	0.5	c-d	3.1	cd	54.9	b
12	1134.4	c-e	79.2	74.5	c-e	0.6	c-d	4.1	bc	46.2	fg
4*	1134.1	c-e	77.0	72.7	hi	0.3	c-d	4.0	cd	48.5	ef
7*	1132.9	c-e	77.2	72.7	f-i	0.2	cd	4.2	bc	43.7	g-i
9*	1111.0	c-e	78.6	74.4	e-f	0.9	b	3.3	cd	52.0	b-d
10*	1082.6	de	77.9	73.2	e-h	1.8	a	2.9	cd	60.8	a
6*	1082.5	de	77.9	71.9	e-h	0.3	c-d	5.7	ab	50.7	c-e
2*	1078.1	de	77.2	70.6	hi	0.4	c-d	6.2	a	40.3	i
8*	1067.3	e	77.5	70.4	f-i	0.1	d	7.0	a	42.3	hi
COAN	938.3	f	78.8	74.6	de	0.8	bc	3.4	cd	51.3	c-e

Figure 1. Nematode reproduction on selected peanut cultivars and on breeding lines developed for resistance to root-knot nematodes and Tomato Spotted Wilt Virus.

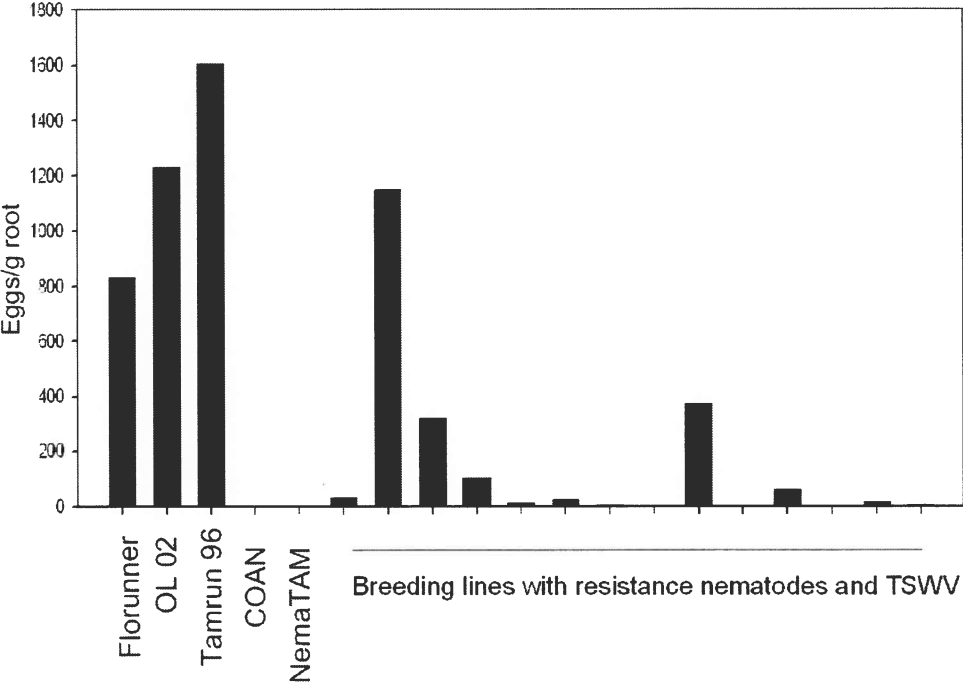


Figure 2. Incidence of Tomato Spotted Wilt Virus infection on breeding lines with resistance to root-knot nematodes.

