

## 2022 Peanut Variety Trials & Breeding Lines

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### Summary

The TAMU Peanut project had replicated yield trials located in South Texas, (Pearsall, Dilley, and Derby). 5 small plot Advanced Line Tests (ALT's) and 2 large plot Combine Trials across Texas as well as two replicated screening nurseries for Sclerotinia and Leafspot resistance. We narrowed down lines developed for drought tolerance to one high performing line in our ALT test in order to continue to get more accurate information on the line's performance. Two top performing candidates were included from previous year's results. Thirteen new breeding lines were included that were top candidates for the Multiple Disease Resistance Test and from the High Yield and Grade tests and 5 commercial checks Georgia 16HO, AG18, Georgia 09B, Georgia 14N, Webb and NemaTAM II. Across the state results for individual test were statistically revealing however when combined the yield and value per acre results did not prove to be statistically significant. However, for brevity the combined analysis is presented for discussion.

Although yield was not statistically significant, numerically the two top release candidates, Tx144370 and TxL100212-03-03 performed better than all commercial checks with yields of 5379.5 lbs/ac and 5251.6 lbs/ac. Additionally, each also performed statistically equal to or better than all the commercial checks at 74.0% and 74.5% respectively. TP200606-3-10 was the top yielding breeding line in the analysis numerically for yield at 5610.7 lbs/ac, while the top grading line for the combined analysis was 76.5%.

We also conducted 2 high yield and grade trials with materials bred specifically for increased yield and grade, as well as 4 multiple disease resistance trials. This is the first year of testing for some of this material with lines that performed well in 2020 being in test 1 or 2 either the high yield and grade trials or the multiple disease resistance trials. All these new tests were significant and are presented in summary charts 1a-7 although in some cases variability between replications was higher than we would have liked which again we are attributing to environmental effects during the season. TP200608-1-8 performed at the top of the West Texas location (Table 1a) for yield with a yield of 4423 lbs/ac. The top grading line in the test was TP200606-3-7 with a grade of 76.3%. Results continued to be encouraging for the new breeding lines performing well in this test.

## Results and Discussion

In addition to conducting trials for improved yield and grade we also continued testing several new populations that were created in an effort to combine sclerotinia resistance and nematode resistance. Multiple Disease Resistance Trial #1 (Table 2) was grown in South Texas and contained lines from several years of crossing programs and represents the lines that have been tested in multiple seasons. Weather conditions in the area in 2021 were conducive for fungal diseases. The best yielding line at this location was the release candidate Tx144370 that yielded 6710 lbs/ac and was statistically equal to Georgia 09B which had yield of 6620 lbs/ac. The top grading breeding line was TP200606-2-1 with a grade of 77.1% which was statistically equal to the high grading check Georgia 14N which graded 77.3%.

**Table 2. Multiple Disease Resistance Test #1 South Texas**

Cultivar	Pods/Ac Lbs.		Value/Ac \$		TSMK %		Seed Wt g/100		Seed/Lbs		SS%	
Tx144370	6710	A	1232.37	A	73.4	GHI	60.7	EFG	747	DE	2.9	CDEF
Georgia 09B	6620	AB	1234.02	A	74.5	DEFGH	65.8	BCD	690	FGH	2.2	DEF
TP200609-2-15	6417	ABC	1186.22	AB	72.9	HI	60.1	EFGH	759	CDE	3.9	CD
TP200610-2-13	6309	ABCD	1206.35	A	76.7	ABCD	59.3	EFGHIJK	766	BCDE	3.8	CD
TP200610-4-5	6058	ABCDE	1155.41	ABC	76.3	ABCDE	58.7	FGHIJK	773	ABCDE	7.8	A
TP200610-2-2	6047	ABCDE	1136.89	ABCD	75.1	ABCDEF	55.8	JK	813	AB	3.8	CD
TP200610-3-3	5975	ABCDEF	1119.14	ABCD	74.0	FGHI	61.7	DEF	741	DEF	4.3	BC
TP200610-3-1	5890	ABCDEF	1098.59	ABCD	75.5	ABCDEF	66.0	BC	688	FGH	4.2	BCD
TP200610-2-3	5848	BCDEF	1105.67	ABCD	74.9	BCDEF	55.3	K	822	A	3.5	CDE
TP200610-4-6	5839	BCDEF	1080.22	ABCD	74.1	EFGHI	63.0	CDE	722	EFG	4.1	CD
Georgia 14N	5801	BCDEF	1122.65	ABCD	77.3	A	59.0	EFGHIJK	769	ABCDE	3.5	CDE
TP200610-3-12	5789	BCDEF	1081.31	ABCD	74.8	BCDEF	59.6	EFGHI	762	BCDE	3.3	CDE
TP200610-1-16	5753	CDEF	1092.74	ABCD	75.7	ABCDEF	57.3	GHIJK	792	ABCD	3.7	CD
TP200610-2-8	5691	CDEFG	1092.01	ABCD	76.3	ABCDE	56.0	HIJK	810	ABC	3.4	CDE
TP200610-1-13	5629	CDEFG	1079.39	ABCD	76.9	ABC	55.8	JK	813	AB	4.1	CD
TP200610-3-6	5584	CDEFG	1048.54	BCD	75.8	ABCDEF	69.9	AB	649	H	2.8	CDEF
TP200610-3-14	5565	DEFG	1047.90	BCD	74.7	CDEF	59.6	EFGHI	761	BCDE	6.2	AB
Georgia 16HO	5421	EFG	1009.73	CDE	74.8	CDEF	71.2	A	637	H	2.9	CDEF
TP200606-2-11	5140	FG	985.64	DE	77.1	AB	66.5	BC	682	GH	1.5	EF
AG-18	4862	G	886.15	E	72.0	I	60.0	EFGHI	756	DE	1.2	F
<b>Mean</b>	5847		1100.05		75.1		61.1		748		3.7	
<b>CV(%)</b>	11.1		11.1		2.4		8.2		8.0		49.0	
<b>Entry "F"</b>	0.026		0.0219		0		<.0001		<.0001		<.0001	

Multiple Disease Resistance test #2 was grown in South Texas as well. At this location several new breeding lines also performed very well with respect to yield with TP200610-2-6 yielding the most at 5721 lbs/ac. It was also in the top statistical grouping for grade with a TSMK of 73.5%. This line numerically and statistically outperformed the commercial checks Georgia 09B and AG18 for both yield and grade which were 4150 lbs/ac and 3824 lbs/ac respectively and in the top statistical grouping for the grade.

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**Table 3. Multiple Disease Resistance Test #2 in South Texs in 2021**

	Pods/Ac Lbs.		Value/Ac \$		TSMK %		Seed Wt g/100		Seed/Lbs		SS%	
Cultivar												
TP200610-2-6	5721	A	1060.72	A	73.5	ABC	55.8	DE	814	AB	2.6	DEF
TP200609-1-2	5640	A	1022.57	A	71.6	BCD	53.6	E	848	A	4.1	ABCD
Georgia - 14N	5527	AB	1015.40	AB	73.7	ABC	58.2	DE	780	ABCD	1.6	F
TP200610-2-10	5444	ABC	1014.41	AB	74.4	AB	58.4	DE	777	ABCD	2.6	CDEF
TP200608-3-7	5279	ABCD	997.50	ABC	75.3	A	63.8	BCDE	719	BCDEF	3.1	BCDEF
TP200610-1-17	5173	ABCD	943.89	ABCD	72.9	ABC	58.5	DE	781	ABC	1.9	EF
TP200610-2-4	5125	ABCD	961.68	ABCD	73.8	ABC	72.2	ABC	628	FGHI	2.8	BCDEF
TP200610-4-4	5104	ABCD	949.95	ABCD	73.9	ABC	64.9	BCDE	700	CDEFG	4.5	AB
TP200609-2-11	4968	ABCDE	910.85	ABCDE	73.6	ABC	67.4	BCD	674	DEFGH	2.6	CDEF
TP200610-4-9	4740	BCDEF	851.06	CDEFG	71.9	ABC	63.5	BCDE	715	BCDEFG	4.3	ABC
Georgia 16HO	4654	CDEFG	861.52	BCDEF	74.7	AB	75.4	AB	610	GHI	3.7	ABCD
TP200609-3-11	4594	DEFGH	822.96	DEFGH	71.3	BCD	72.5	ABC	639	EFGHI	1.4	F
TP200608-2-4	4528	DEFGH	812.80	DEFGH	70.5	CD	80.5	A	575	HI	2.9	BCDEF
TP200609-2-1	4486	DEFGH	821.18	DEFGH	73.2	ABC	83.4	A	555	I	3.7	ABCD
Georgia - 09B	4150	EFGH	769.05	EFGH	74.6	AB	65.7	BCDE	691	CDEFG	4.1	ABCD
TP200609-3-18	4077	FGH	710.68	FGH	68.5	D	59.1	DE	785	ABC	3.9	ABCD
TP200610-3-5	3990	FGH	730.97	FGH	73.3	ABC	65.7	BCDE	691	CDEFG	5.0	A
AG-18	3824	GH	700.11	GH	72.7	ABC	67.6	BCD	678	CDEFGH	2.9	BCDEF
Tx144370	3809	H	688.46	H	71.9	ABC	61.2	CDE	741	ABCDE	3.4	ABCDE
TP200610-4-1	3777	H	699.74	GH	74.1	AB	60.6	CDE	749	ABCD	3.8	ABCD
<b>Mean</b>	4730		867.28		73.0		65.4		707		3.2	
<b>CV(%)</b>	15.9		16.7		3.2		15.2		13.3		39.2	
<b>Entry "F"</b>	<.0001		<.0001		0.0483		0.0004		<.0001		0.01	

**Table 4. Multiple Disease Resistance Test #4 in South Texas in 2021**

	Pods/Ac Lbs.		Value/Ac \$		TSMK %		Seed Wt g/100		Seed/Lbs		Splits	
Cultivar												
TP200609-3-14	7104	A	1364.70	A	77.1	AB	73.1	ABC	623	HI	1.7	DEF
TP200628-1-1	6913	AB	1273.59	AB	73.9	CDEF	65.8	BCDE	701	EFGHI	1.6	EF
TP200625-3-1	6440	ABC	1182.63	ABC	74.7	CDE	75.3	AB	603	HI	3.7	BC
TP200645-1-3	6201	ABCD	1075.94	BCD	67.8	G	54.8	EFGHI	832	BCDEF	2.4	BCDEF
TP200613-6-1-3	5868	ABCDE	1069.04	BCD	72.3	EF	53.7	FGHI	852	BCD	3.0	BCDEF
TP200627-5-1	5851	ABCDE	1062.57	BCD	71.9	F	57.6	EFGH	791	BCDEFG	1.8	DEF
Tamrun OL18L	5767	BCDEF	1035.15	CD	72.3	EF	69.7	ABCD	655	GHI	3.4	BCDE
TP200624-3-2	5750	BCDEF	1066.55	BCD	74.1	CDEF	65.3	BCDEF	709	DEFGH	2.9	BCDEF
TP200615-2-2-3	5607	CDEF	997.21	CDE	68.8	G	48.8	HI	933	AB	2.8	BCDEF
Georgia 16HO	5159	DEFG	951.71	CDE	74.7	CDE	69.5	BCD	656	GHI	2.3	CDEF
Georgia - 14N	5016	DEFG	947.99	CDE	75.1	BCD	62.0	CDEFG	738	CDEFGH	2.3	BCDEF
TP200615-2-2-1	4839	EFG	856.11	DE	68.8	G	51.8	GHI	877	BC	2.7	BCDEF
Tx144370	4802	EFG	876.42	DE	73.5	DEF	62.7	CDEFG	736	CDEFGH	4.1	AB
Georgia - 09B	4667	EFG	875.83	DE	76.1	BC	64.1	BCDEF	711	DEFGH	2.4	BCDEF
TP200629-3-1	4662	EFG	867.50	DE	74.5	CDE	54.2	EFGHI	845	BCDE	5.6	A
AG-18	4649	EFG	845.81	DE	74.4	CDE	65.4	BCDEF	703	EFGHI	1.2	F
TP200613-5-1-1	4537	FG	878.68	DE	78.9	A	81.6	A	562	I	2.7	BCDEF
TP200626-2-1	4309	G	787.28	E	73.8	CDEF	65.8	BCDE	696	FGHI	3.7	BC
TP200629-2-2	4141	GH	780.36	E	75.9	BCD	59.3	DEFGH	782	CDEFG	3.5	BCD
TP200643-1-1	2958	H	527.01	F	68.5	G	44.2	I	1038	A	1.2	F
<b>Mean</b>	5262		966.10		73.3		62.2		752		2.8	
<b>CV(%)</b>	22.2		22.6		4.3		17.7		18.2		52.8	
<b>Entry "F"</b>	<.0001		<.0001		<.0001		<.0001		<.0001		0.0048	

MDR#3 was not found to be significant and is not presented. MDR #4 was a test with breedinglines being evaluated for the first time. It contained 5 commercial checks Tamrun OL18L, AG18, Georgia 09B, Georgia 16HO and Georgia 14N. Interesting TP200609-3-14 yielded 7104 lbs/ac and graded 77.1% which performed numerically and statistically at the top of the trial for yield which outperformed all commercial checks. Additionally it was also equal or better than all the commercial checks for grade. Another line of note was TP200628-1-1 which yielded 6913 lbs/ac and graded 73.9 and had a seed size that was 65.8 g/100sd which is generally more desired by the industry.

The South Texas combine trial included specific lines that are under consideration for to release. Release candidate TxL100212-03-03 was the top yeilding breeding line in the test at 9711 lbs/ac. which was numerically and statistically greater than Georgia 09B which yielded 8480 lbs/ac. Similarly TP2000610-3-2 had a TSMK% or 76.5% which was numerically and statistically higher that both of the commercial checks NemaTAM II and Georgia 09B which had grades of 72.4% and 72.1% respectively.

**Table 6. Large plot combine trail planted in South Texas in 2021.**

Cultivar	Pods/Ac Lbs.		Value/Ac \$		TSMK %		Seed Wt g/100		Seed/Lbs		Splits	
NemaTAM II	10176	A	1825.06	A	72.4	B	71.1	A	639	C	15.7	A
TxL100212-03-03	9711	AB	1793.86	A	75.4	AB	65.5	B	694	AB	13.3	B
TP 200606-7-10	9518	AB	1773.78	A	75.9	A	72.6	A	629	C	9.8	C
Tx144370	9080	BC	1672.43	AB	74.1	AB	63.4	B	719	A	14.6	AB
TP 200610-3-2	8812	BC	1640.18	AB	76.5	A	68.1	AB	667	BC	13.0	B
Georgia 09B	8480	C	1508.04	B	72.1	B	63.8	B	712	AB	15.3	A
<b>Mean</b>	9296		1702.22		74.4		67.4		677		13.6	
<b>CV(%)</b>	9.9		10.0		3.6		7.8		7.7		17.7	
<b>Entry "F"</b>	0.0368		0.0543		0.1		0.0044		0.0055		<.0001	

**Photos:**



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## **Conclusions**

### **Current Releases**

We have Foundation seed available of NemaTAM II, which is a high-yielding, high oleic fatty acid, runner-type peanut cultivar with resistance to root-knot nematodes. The cultivar was developed to provide growers with a nematode resistant replacement option for the former Webb cultivar which had excellent nematode resistance, but also had a very large vine size that made harvest difficult for peanut farmers. NemaTAM II maintains the resistance to root-knot nematodes of Webb, has proven to yield equal to or better than Webb, and has higher grade potential. NemaTAM II has a shorter canopy than Webb which leads to easier digging and inverting at harvest than its predecessor. We have also received limited seed available of AG18, Tamrun OL19, Tamrun OL11, Schubert, Olin and Tamnut OL06.

### **Future Runner Releases**

The Tx144300's were developed for resistance to Root knot nematodes and Sclerotinia. While they performed lower in yield to the drought lines mentioned above, Tx144370 has performed well in South Texas which is where they were developed to give growers a nematode resistant line with better characteristics than the previously released Webb variety. These two lines have yielded from 400-600 lbs/a better than Webb and graded 1-3 percentage points higher. Additionally, Tx144370 continues with the shorter growth habit found in NemaTAM II and a slightly smaller seed size in most of the trials over the past four years. The decision was made to move forward with the breeding lines for release. Tx144370 being submitted for release in 2022 to the Texas A&M Plant Release Committee.

Of materials developed from the runner drought testing, several lines have done well in irrigated trials. In particular, TxL100212-03-03 has been in advanced trials for a couple of years now and has always done well and is being targeted for release.

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