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Final Report to the National Peanut Board
Funding year 2002

Title of Project:

Quality evaluations of Peanut Breeding lines in developing new Varieties with Resistance to Root-knot Nematode, Sclerotinia blight, Southern Blight, Leafspot, and Tomato Spotted Wilt Virus and with High O/L and Early maturity.

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Statement of problem and need

One of the most important parts of a peanut breeding program is selection of materials for potential release that have high quality in addition to the high yield, disease resistance, or other traits being bred for. The determination of most of the quality attributes of our breeding materials has not been done until the very last step for many years, primarily because of a lack of financial resources to run the tests at earlier stages. The exception to this is the program supported by The Oklahoma Peanut Commission and the Texas Peanut Producers Board for developing high O/L varieties for the Southwest. Hundreds of lines have been evaluated in early generations for this one character in the past seven years, but additional trait evaluations are needed at these earlier generations to make our breeding program more efficient. Another area of evaluation is the shelling properties of samples. Some evaluation is available on a commercial level for a small number of samples so we have been getting some limited data on lines when they are ready for release, but we need more data earlier in the development process to make better decisions in earlier generations. For the past two years we have been getting some additional data on the UPPT, but this still is on advanced lines ready for release and, although of some benefit, still not the needed effort to help the variety development program

Objectives

Our objectives for this project were to conduct quality analyses on as many materials as we could, including earlier generation materials, and to get shelling data on the same samples, including early generations if we had sufficient size samples. We wanted to get analyses done on oil, sugar, and protein percent, free fatty acid composition, peroxide values, flavor, and blanchability . Also, we wanted to get milling characteristics on as many samples as possible. These samples will in most cases be from some of the same lines as the quality evaluations discussed above but not necessarily in all cases.

Methods and Materials

The quality analyses we wanted done were:

Fatty acid composition
Peroxide values
Free Fatty acid
Fat %
Sugar %
Protein %
Moisture %
Flavor
Blanchability.

In the shelling, the data we gathered were:
Shelling %
Jumbo %
Medium %
US # 1 %
Oil Stock %.
Bulk density of pods and seed
Several breakdowns as to percentage shell-out by size distribution.

The first lines tested this year were materials from 32 samples that we had run in the fall of 2001, but the analyzing laboratory overlooked the sugar analyses. When the oversight was found, we resubmitted those samples to get the sugar analyses completed. All of those data are not shown in this report, but a summary of what we gained out of the data is shown in **Table 1**. We had learned from another report at the TPPB Research Reports session in Lubbock on March 6, 2002, that the Tamrun OL01 was higher in sugar content than other varieties. Since our sugar analyses did not get run, we did not have the information before that meeting. Table 1 shows the high sugar content of Tamrun OL01 very well, but it also shows that Tamrun OL02 is lower than most other varieties, even in West Texas.

Table 1. Sugar Content

2001 test samples

Measurements in percent

	West TX ALT	South TX ALT	WTPGRF ALT	Mean
Tamrun OL02	4.8	3.9	5.2	4.63 c*
Tamrun OL01	5.4	4.4	5.9	5.32 a
Tamrun 96	4.9	4.1	5.3	4.77 bc
Florunner	4.5	3.8	5.0	4.43 d
Flv. Runner 458	4.9	4.2	5.6	4.90 b

*Means followed by the same letter are not different, DMRT (P=0.05)

A second set of samples was sent to the J. Leek lab. in June, 2002. The second shipment included 132 samples for chemical analyses, to include fat %, moisture %, and sugar %. A summary of results of the check varieties in these tests are shown in **Table 2**. Information was gathered on 90 breeding lines in various stages of development. The information was very helpful in our making decisions on some lines which should be eliminated and others to move forward in the development process.

Table 2. Check varieties from 132 samples submitted for analyses.

ALT W. TX Variety Fat % SUGAR %	
M02-1 Tamrun 96 50.2*	4.9
M02-9 Flav. Run 458 50.8	4.9
M02-10 Tamrun OL02 49.5	4.8
M02-11 Florunner 50.8	4.5
M02-12 Tamrun OL01 48.9	5.4
M02-2 NemaTAM 51.0	4.4
ALT Phillips **Variety**	
M02-21 Tamrun 96 47.6	4.1
M02-22 NemaTAM 47.2	3.7
M02-29 Flav. Run 458 47.7	4.2

M02-30
Tamrun OL02
48.3
3.9

M02-31
Florunner
47.9
3.8

M02-32
Tamrun OL01
47.6
4.4

WTPGRF 7100's
Variety

M02-44
Florunner
52.6
5

M02-45
NemaTAM
52.4
4.9

M02-47
Tamrun OL01
48.3
5.9

M02-48
Tamrun 96
4804
5.3

M02-52
Tamrun OL02
48.7
5.2

M02-54
Flav. Run 458
51.7
5.6

Johnson Ru OL 8100's

Variety	
M02-64 Flav. Run 458 51.8	4.9
M02-77 Tamrun OL01 47.8	5.5
M02-79 Florunner 50.5	4.6
M02-80 Tamrun 96 48.9	5

MDR So. TX 6100's
Variety

M02-97 Tamrun OL01 46.6	4.5
M02-99 Florunner 47.3	3.8
M02-100 Tamrun 96 46.7	4

Johnson Ru OL 8100's
Variety

M02-104 Flav. Run 458 45.3	4.4
M02-117 Tamrun OL01 45.5	4.3
M02-119 Florunner 49.6	3.9
M02-120 Tamrun 96 45.0	4

*These are sample data from tests run in 2002 that show the results for some check varieties. A total of 90 breeding lines were tested from six locations.

Results

We are not presenting all of the data that were gathered from our analyses because of space limitations here. We will submit a series of summary statements about general trends and some specific results on specific lines. If there is any interest in detailed information we can provide it in an appendix.

- Our data showed conclusively that the Tamrun OL01 does indeed have a higher sugar content, a condition that may even be enhanced in West Texas, however the line is higher in sugar content in other locations as well.
- The Tamrun OL02 (Tx977053) has a lower sugar content than Tamrun OL01, and is statistically significantly lower than Flavor Runner 458 in most of our test locations.

* General peanut industry information advises that sugar content on any specific line is expected to be higher in West Texas than in Central or South Texas. This was not true for all of our samples in 2001

* All of our new lines that were recently submitted for possible variety release (OLin, Tamrun OL01, NemaTAM, and Tamrun OL02) were all acceptable in all important attributes of quality and shelling

We did not use all of the funds requested and granted because our intention was to get analyses run on our 2002 crop West Texas samples after harvest, but before the 31st of

December, 2002 spending deadline . The significant delay in our harvest operation put our processing work behind schedule so we were unable to get any samples run before the December 31, 2002 deadline for encumbering funds.

Acknowledgement

We express our sincere appreciation to the National Peanut Board and to the Texas Peanut Producers Board for their support on this project. The data collected from these tests aided the decisions for release of the new variety, Tamrun OL02. This project is a significant "assist" to the peanut breeding program in Texas.