Peanut Research & Educational Review for

Texas Peanut Producers Board

2005

Preliminary Information Not for Publication

2005 Texas Peanut Producer Board Reports

Report #	Title and Authors	Page #
Plant Breeding		
1	Peanut Breeding and Testing. M.D. Burow, M.R. Baring, C.E. Simpson, Y. Lopez, J. Ayres, J.M. Cason, and B.A. Besler	1
2	Breeding for Quality Peanut - Maturity, Oil, and Sugar Content. Mark D. Burow, Charles E. Simpson, Yolanda Lopex, Michael R. Baring, A. Michael Schubert, John Cason, Jamie Ayers, and Jacob Reed	13
3	Development of Peanuts with High O/L Ratios and Root-Knot Nematode Resistance. James L. Starr and Charles E. Simpson	20
Plant Pathology		
4	Devising and Demonstrating Control Schemes for Peanut Diseases. Thomas A. Lee, Jr.	23
5	Use Of Fungicides, Varieties and Spray Program in South Texas Peanut Production. A.J. Jaks, W.J. Grichar and M.R. Baring	41
6	Efficacy of Fungicides in Soil with Different Application and Watering Practices. Terry Wheeler and Dana Porter	44
Weed Science		
7	Weed Control in the High and Rolling Plains and in South Texas Peanut Production. Peter A. Dotray, W. James Grichar, and Todd A. Baughman	49

Agronomy

8	Peanut Management Systems. Todd A. Baughman, W. James Grichar, and Calvin Trostle	77
9	Peanut *Rhizobium* Research. Calvin Trostle and Kyle Long	100
10	West Texas Crop Management and Handling Practices to Improve Market Quality and Competitive Position of Peanuts in Texas. A. Michael Schubert, Timothy H. Sanders, Diane L. Rowland, and Christopher L. Butts	108

2005 National Peanut Board Reports

Peanut Breeding and Genetics

1	Accelerating Development of Peanut Varieties through Molecular Markers. Mark D. Burow, Yolanda Lopez, Arun M. Jesubatham, and Charles E. Simpson	112
2	Breeding for Early-Maturing Peanuts. Mark D. Burow, Charles E. Sipmson, Michael R. Baring, Yolanda Lopes, Jamie Ayers	115
3	Heritability Estimates for High Yield Traits Transferred from Wild Species Hybrids to a Conventional Peanut. M.R. Baring, C.E. Simpson, and M.D. Burow	121
4	Peanut Quality Evaluations of Texas Peanut Breeding Lines (in developing new Varieties with Early Maturity and/or Resistance to Root-knot Nematode, Sclerotinia blight, Southern blight, Leafspot, and Tomato Spotted Wild Virus and with High O/L.) Charles E. Simpson, Mark D. Burow, and Michael R. Baring	122
5	Introgression of Nematode Resistance into Peanut Genotypes with Resistance to the Tomato Spotted Wilt Virus. James L. Starr and Charles E. Simpson	127

Plant Pathology

6	Spotted Wilt Related to Runner Peanut Canopy Characteristics. Mark C. Black, Noel N. Troxclair, and Michael R. Baring.	132
7	Peanut Defoliation as Related to Salt Scorch and Temperature Extremes. Thomas A. Lee, Jr.	144
8	Grower Application of AU-Pnut Fungicide Spray Advisory on Peanut in South Texas. A.J. Jaks and W.J. Grichar	152

Weed Science

9	Tolerance of Spanish Peanut to Soil Applied Cotton Herbicides after Crop Failure and Control of Volunteer Spanish Peanut in Cotton. Peter A. Dotray, J. Wayne Keeling, John D. Everitt, Todd A. Baughman	155

Agronomy

10	Effects of Calcium on Yield, Grade, and Hull Degration with Virginia-Type Peanut. Todd A. Baughman, Thomas A. Lee, W. James Grichar, and Mark McFarland	161
11	AgriPartners Peanut Irrigation and Production Summary, 2004. Leon New	165
12	Long-term P & K Fertility for West Texas Peanut-Cotton Cropping System. Calvin Trostle and Kevin Bronson	203

PEANUT BREEDING AND TESTING

M.D. Burow, M.R. Baring, C.E. Simpson, Y. Lopez, J. Ayres,
J.M. Cason, and B.A. Besler

Collaborators: A.M. Schubert, M.A. Black, J.L. Starr, J.D. Reed,

SUMMARY

We had twenty-two (Burow 11, Baring 7, Simpson 4) test sites for breeding and testing plots in 2004, and most sites began the crop season with sufficient to excess moisture from rainfall for land preparation and planting. Most planting in Central Texas was on a timely basis but record cold temperatures occurred for a second consecutive year in early to mid June. From June through harvest some sites experienced brief periods of limited rainfall, but in total, the summer was relatively mild over almost the entire state, raising considerable concern about the maturity (and thus, quality) of the crop as the shorter, cooler days of fall arrived. However, in the final analysis of the 2004 Texas peanut crop, it was probably one of the most mature crops in recent memory. Our plot yields in some tests were exceptional, and we were able to gather some valuable yield data, evaluation results, seed increases and generation advances. We were pleased with plot yields above 6000 pounds per acre in five sites and some plot yields above the 7700 pound range in plots in at least two locations; Erath and Gaines (south) Counties. These two test means for yield were among the highest for entire tests that we have had in more that 35 years of testing (Loc 2 and Loc 3, **Table 3** ALT 1 WO.), comparing favorably with the 2003 yields in South Texas.

Seed increase of our Spanish high O/L variety, OLin, had to revert to the Breeder/Foundation stage because of contamination of the Registered and Certified classes. Limited quantities of OLin should be available for Certified planting seed in 2006. Our yield data continue to indicate that OLin will probably be slightly lower yielding than Tamspan 90 but still has the potential to produce well over 5000 pounds of pods per acre, a very acceptable yield for an early maturing variety. Also, sclerotinia disease ratings indicate that OLin has at least as much resistance as Tamspan 90.

Our first runner high O/L variety, Tamrun OL 01 has performed well in South and West Texas and has not appeared to suffer any ill effects in the market place because of 1:1 ratio of jumbo to medium seed. The other high O/L runner, Tamrun OL 02, was only available in limited quantities for 2004, but seed quantities should be better for 2005, with seed available for commercial production. Yields continue to be very good for both varieties and the O/L of both varieties is well above the normal range. Processor complaints about hard kernels seem to be coming on peanuts grown in the northern part of our area. We are working to identify the source of the hard seed trait so we can initiate selection efforts to eliminate the trait from future variety releases.

The "new" seed increase of NemaTAM, our second root-knot nematode resistant variety, was less than anticipated in 2004, but there should be enough seed to plant approximately 48 acres in 2005. This should increase to something over 700 acres in 2006; which, by conservative estimate, could provide seed to plant 11,000 acres in 2007.

Breeding populations have been built and/or evaluated in studies on early maturity, multiple disease resistance, and leaf spot resistance. As part of another project, we anticipate developing molecular markers to use in selecting within these populations.

INTRODUCTION

The cool, wet summer months of 2004 point out, again, that we must develop peanut varieties that will have a broad genetic base so they have the potential to perform well in every conceivable set of environmental conditions. Mild summer temperatures in 2004 were expected to result in peanut plants that were smaller, with seed that was not mature. However, that is not what happened. Plants appeared to grow to normal size, fruiting and growth and maturation progressed very well. Apparently in very hot summers, when the afternoon temperature reaches well above 100 degrees F, the peanut leaves will fold, and plant growth processes shut down. If temperatures remain below the "shut-down" threshold as in 2004, the plants continue to respire, transpire, and the growth and maturation processes continue. This would explain why the 2004 crop was more mature than many previous crops. The cooler, wetter year resulted in savings in irrigation, but the higher moisture also resulted in outbreaks of sclerotinia and/or botrytis in West Texas, sclerotinia in Central Texas, tomato spotted wilt virus in South Texas, and leafspot in all three areas. The wetter conditions also contributed to an earlier breakdown of herbicides, resulting in many fields with weed problems. The extra moisture also stimulated some of the perennial weeds that are more difficult to control to become a constraint on production.

There were three advanced Spanish yield tests planted at four locations during the 2004 growing season. The test sites were located at; Loc 1 = Terry County west of Brownfield, Loc 2 = Terry County north of Brownfield, Loc 3 = Lamb County near Earth, Loc 4 = Erath County in a disease-free site as well as a Sclerotinia inoculated site at the TAEX in Stephenville. The only real setback for any of these locations occurred at Location 1. Heavy rainfall after planting resulted in soil crusting, which caused slow and in some instances no seedling emergence. Many additional rainfalls occurred during the growing season which broke down early herbicide treatments and several more herbicide treatments were required which included Strongarm. Historical yield tests at this location indicate, that overall, yields were lower by 1000 lbs/a due to excessive rain, weed pressure, and additional herbicide applications.

The Spanish O/L 1 tests (**Table 5**) revealed that several entries performed statistically equal to the three check varieties; Tamspan 90, OLin, and Spanco. Yields were excellent at Location 2 with a test mean of 5671 lbs/a. Entries 6 and 9 were in the same statistical grouping for yield as Spanco and Tampsan 90 and had *Sclerotinia* ratings of 4 and 3 respectively which were equal to Tamspan 90 which rated 3.3. Entry 6 is considered to be a large seeded Spanish and had good numbers for quality analysis with a flavor score of 5.2, 46.8% fat, and 4.7% sugar. Not all of the entries have been analyzed for quality characteristics due to cost constraints.

The Spanish O/L 2 tests (**Table 6**) has several lines with large seed size when compared to the check varieties. Data from the combined analysis shows that at least seven breeding lines performed equal in terms of yield and value/a to Tamspan 90 and OLin and significantly better than Spanco. Yields were again exceptional at Location 2 in Terry County with the test mean at 6418 lbs/a. Location 3 had no significant difference between entries for yield. The combined analysis showed that entry 2 had the highest numerical yield at 5504 lbs/a as compared to Tamspan 90 at 5390 lbs/a, and *Sclerotinia* ratings of 5.7 and 5.3 respectively. *Sclerotinia* ratings for this test in Erath County ranged from 4.7 to 9 due to heavy disease pressure brought on by mechanical inoculation.

The Spanish O/L 3 tests did not have any lines that performed superior to the check varieties. Data from this test indicates that more selection work will be needed on this material to make improvements on uniformity, yield and grade

Uniform Peanut Performance Test (UPPT)

Three locations of the 2004 UPPT runner/Virginia test were conducted in Texas; one each in Northwest, South, and Central Texas. The sites were the Western Peanut Growers Research Farm in Gaines County, the Bennet farm in Frio County, and Texas Agricultural Experiment Station in Erath County. A total of twelve breeding lines plus two check cultivars, Florunner and NC-7, made up the multi-state test. The tested lines included five Virginia and seven runner lines. The runner lines were submitted as follows: Georgia – 2 lines, Peanut CRSP – 2 lines, Florida – 3 lines. The Virginia type lines were submitted from Georgia (1). North Carolina (3), and Virginia (1). We also added some local checks, including Tamrun 96, Flavor Runner 458, Tamrun OL 01, Tamrun OL 02, and three of our more promising high O/L/multiple disease resistant lines (Table 1).

The data from the three tests are summarized in **Table 1**. We think the differences in environment were too great to average the three locations together into one analysis, so individual test data are shown. In the Gaines County test (WPGRF) yields were in the "good" range, but still lower than desired. In a complete switch from 2003 at this location, the Virginia lines were at and near the bottom of the tests in average yield and value, and the runners were at the top. The same was true for the Virginia lines at the Central Texas location as they were mostly at or near the bottom. In South Texas the Virginia lines performed much better, and one line had the top value per acre of all lines tested. The old variety, Florunner, still yields very well, being 1 or 2 in two of the tests, but quite low in the South Texas test. The University of Florida breeding lines were near the top in all three tests, but it was not always the same line or lines performing the best. It is interesting to us that our local checks, Tamrun OL01 and Tamrun OL02, were in the highest statistical group in yield and value per acre in all three tests. We had put these two lines in as local checks to compare their performance to other states best materials. One of our local entry breeding lines, Tx. Line 1, did very well, being top at Stephenville, in the top statistical group in Gaines, and yielding just less than 6000 lbs in the Frio County test. The CRSP 14 line probably would never make a commercial variety, but could be good breeding material in that it may provide us with another source of sclerotinia resistance genes that here-to-fore we have not known.

Drought Testing

We began testing for drought tolerance at a new site, as this will be the last year of use of the WPGRF farm. We will attempt to establish stress conditions and begin intercrossing materials with evidence of drought tolerance.

Twelve runner/Virginia and 12 Spanish/Valencia lines were planted at the Texas Tech Farm in Lubbock, with the goal of evaluating at 75% and 50% E.T. replacement. Rainfall for 2004 was far above average, and in excess of what was allowed in the experiment. There was no difference in field ratings (flowering, row width) taken during the season. We have not measured yield, but expect no difference between treatments. Nevertheless, we have set up the farm for drought work, and will repeat the experiment to test our conditions in 2005.

Virginia Maturity Evaluation Test

We have performed a second year of evaluation on Virginia varieties (including a couple of runners for comparison) for yield and maturity. The goal was to determine whether Virginia peanuts are later than runners or whether some may be earlier. The experiment was planted at Denver City, Earth, and Wellington. To date, complete data are available only for the experiment evaluated at Earth, and the more-complete data set will give a better idea of these materials.

Initial data (**Table 2**) indicate that Jupiter was significantly earlier (PctBlkBr) than all other Virginia peanuts, with NC-7 also possessing some earliness. It should be noted that Earth is too far north for cultivating runners and Virginias for good maturity. All but Gregory and NC-7 were in the top statistical category for value per acre (ValAc) and yield (LbPodAc). The runners Tamrun OL01 and Georgia HiOL were very immature, as were the other Virginia varieties.

Table 2. Virginia Maturity Evaluation Test

Genotype	ValAc	LbPodAc	PctBlkBr	G100SMK	PctELK	PctTSMK
Jupiter	860 a	4797 ab	30.00 a	77.20 c	44.07 d-f	68.65 a-c
VC2	858 a	4960 a	6.62 cd	76.77 c	18.38 g	68.50 bc
Perry	842 ab	4450 a-c	4.67 c-e	76.50 c	50.20 c-e	71.87 a
VA-98R	833 ab	5013 a-d	2.67 de	76.73 c	38.94 ef	67.55 c
NC-12	778 ab	4136 bc	0.67 de	90.97 a	74.83 a	70.63 a-c
Wilson	769 ab	4607 a-c	10.67 c	74.50 c	34.91 f	63.90 d
TamrunOL01	766 ab	4179 bc	0.00 e	66.43 d	32.72 f	71.55 ab
GeorgiaHiOL	743 ab	4768 ab	1.33 de	79.97 bd	55.23 b-d	70.23 a-c
Gregory	699 b	3980 c	3.99 de	86.77 a	65.65 ab	67.91 c
NC-7	444 c	3075 d	20.50 b	89.60 a	56.34 bc	62.20 d

Advanced Line #1 Runner Test

We conducted seven high O/L advanced line runner yield tests in 2004 and each contained twenty entries. The ALT#1 included fifteen lines selected for multiple disease resistance and five commercially available cultivars used for comparison measures. The tests were conducted at two locations in Gaines County, two locations in Frio County, one location in Atascosa County, and two locations in Erath County. One of the tests in Frio County was grown in the tomato spotted wilt virus nursery and one test in Erath County was conducted in the *Sclerotinia minor* nursery to test for resistance and yield potential under adverse conditions. The purpose of this test was to

compare our best breeding lines to the best varieties being grown by peanut farmers. **Table 3** shows the combined data analysis from the disease free tests. In addition there are four columns at the right-center of the table that show average yields for each of the locations, and the right hand three columns show the quality analyses for some of the lines from location 4 in northern Gaines County.

The combined analysis shows a yield average of 6575 lbs/ac. for the 20 entries in these tests. That yield level was higher than anticipated. There were three lines, entries 2, 4, and 9 that yielded in the top statistical group along with the five commercial varieties. There were two additional lines, entries 15 and 3, ranked in the same statistical group as four of the five varieties. The fact that the lowest yield of any line in these four tests was 4917 lbs/a, indicates that all of these lines have a large genetic potential to produce yield. The key we must use is to look at the disease ratings and determine which of the top yielding/grading lines has disease resistance sufficient to make the line stand out as a potential new variety.

Combined analysis of the two ALT #1 tests conducted in our disease screening nurseries revealed that entries 2 and 4 were in the top statistical grouping for yield just as they were in the disease free combined analysis (**Table 4**). Entry 15 had the highest combined yield across both disease nurseries and was equal to four of the five checks in the above mentioned disease free test sites. Disease pressure at the TSWV screening site was the highest that we have observed in the last seven growing seasons. Entries 2, 4, and 15 had 16.7%, 21.8%, and 26.9% TSWV infection respectively while Tamrun 96, Tamrun;-OL-01, Tamrun-OL-02, and Flavorrunner 458 had 47%, 55%, 66%, and 60% TSWV infection respectively. It should be noted that Tamrun-OL-02 had a higher rate of infection due to poor seed quality at planting leading to a thin stand which resulted in a lower yield and increased TSWV pressure.

The *Sclerotinia* screening nursery in Erath County also had heavy disease pressure due to weather conditions and inoculation procedures. There were several entries that yielded in the top statistical grouping and had excellent disease ratings. Ratings were given to individual plots on a scale of 0=no disease symptoms to 10=total plant death. Once again entry 2 was in the top grouping for yield and it had a disease rating of 1.3 which was the best rating of the test. Entries 4 and 15 had Sclerotinia ratings of 4.7 and 3 respectively. The commercial varieties were at the bottom of the test for yield and all ranged from 5 to 7 on the disease rating scale. It should be noted that due to inoculation practices, *Sclerotinia* pressure was heavier than under natural environmental conditions.

Crosses between Tamrun 98 (high grade, *Sclerotinia* resistance) and several of our breeding lines including Tamrun OL 01 and Tamrun OL 02 were made in 2002 in an effort to increase grade performance and the level of Sclerotinia resistance of Tamrun 98. One hundred fifty individual F_2 plant selections were made under heavy Sclerotinia pressure in 2003. Each individual selection was analyzed for O/L ratio and lines with high O/L were planted under Sclerotinia minor pressure for further selection in 2004. A total of 24 lines were identified as having high O/L ratios and disease ratings as good as or better than the check varieties. These lines will be screened again for Sclerotinia resistance in 2005 and increased for yield testing in 2006.

Root-knot Nematode Resistance

We are continuing our effort to incorporate the root-knot nematode resistance into multi-resistant and high O/L lines through a backcrossing program we initiated in 1987. We released COAN and NemaTAM from this program and we are in the 4th backcross in incorporating the genes into Tamrun 96. Most of these lines have now also been merged with the high O/L genes and some of these lines are in Puerto Rico for winter increase at present. Several other lines are also being increased in the Stephenville greenhouses. We expect the Puerto Rico increase to provide enough seed for multiple-location testing in 2005. The lines in the greenhouse will be a year away from multiple location tests which will begin in 2006. We anticipate that we will have at least one line good enough to release by 2007 that has TSWV, RK nematode, and sclerotinia resistance, with the high O/L genes. Our yield data from 2004 is limited to two tests, one at Stephenville (data may be seen in Nematology report, Dr. Starr's report) and one in Atascosa County (data not shown). These lines were the best performing lines from the sister material of NemaTAM, or from the first cross of the nematode resistance with the tomato spotted wilt tolerant Tamrun 96. The decision has been made that none of these lines have enough increase in yield or in disease resistance to justify trying to release one of them as a new variety. We anticipate releasing two or three of the sister lines of NemaTAM as Germplasm lines in the future. The usefulness of these lines as breeding material lies in the very consistent higher TSMK counts and/or higher yields. Data gathered over the past four years indicate that we may need to release a different nematode resistant line for South Texas than what performs best in North Central Texas.

Transfer of root-knot nematode resistance to using molecular markers.

Our investigation of the DNA of the root-knot nematode resistant materials has helped us identify molecular markers that are closely associated with the resistance gene that we have transferred into the cultivated peanut. We are now able to make selections for resistant nematode lines using these markers, which speeds the process of variety development for nematode resistant lines because we can make selections without having to produce an entire generation (six weeks instead of 5 months).

We are currently have progeny from the third and fourth backcross generation using the molecular markers in a program where we are transferring the RK nematode resistance gene into tomato spotted wilt resistant material, lines with high O/L and TSWV resistance, lines with high O/L and sclerotinia resistance and still other lines with high O/L, sclerotinia resistance, and leafspot resistance.. Our objective is to develop a tomato spotted wilt resistant variety that is also resistant to RK nematodes as well as having the high O/L genes and sclerotinia resistance. More details of this program can be found in the Nematology report.

Leafspot resistance

Resistance to both Early and Late Leafspot has been developed in the form of two germplasm lines; Tx964117 and Tx974120. The two lines have excellent resistance to leafspot, but do not have the agronomic traits necessary for variety release.

A crossing program directed at introgression of the leafspot resistance into our high O/L TSWV resistant lines was started in 1999. Four high O/L lines have been selected with moderate resistance to Leafspot. These lines were used in a backcrossing

scheme to increase the resistance potential in 2003. Approximately 1500 individual F_2 BC_1's were planted at Yoakum in the summer of 2004. Excessive rains immediately following planting drowned out the entire nursery and the crosses are being duplicated in the 2005 spring crossing program.

Breeding for Higher Yields

Due to the nature of breeding for disease resistance, the majority of work done in the breeding program is done through backcrossing. The backcross method is excellent for the introgression of individual traits such as a particular disease resistance or for example the high O/L trait while maintaining all of the other desirable characteristics of a variety. However, the method is not conducive to promoting significant increases in yield, but rather maintaining the original yield characteristics.

A crossing program was initiated in 2004 using high yielding wild species derived hybrids from Simpson's program at Stephenville. The goal was to increase yield potential in the multiple disease resistant lines that have already been developed. Two hundred F_1's were increased in the 2004 nursery and produced approximately 20,000 F_2's for evaluation in 2005. Selections will be made based on individual plant yield, growth habit, and pod characteristics. Due to the undesirable traits associated with the wild species, a significant amount of crossing followed by intense selection work will be necessary to develop lines with all of the characteristics that are acceptable to industry standards.

ACKNOWLEDGMENTS

We express our sincere appreciation to the Texas Peanut Producers Board and thus, the Texas Peanut Producers, for assisting our program again in 2004. A large part of the work reported here would not have been possible without this generous support.

We also acknowledge the support of our several cooperators and collaborators. We especially thank James Overstreet & Bennet Partnership, Murray Phillips, and Brad Easterling (IPM), Frio County; Otis Lee Johnson, and Members of the Western Peanut Growers Research Farm and Jeremy Grissom, Gaines County; Andy Timmons, Terry County; Haldon Messamore, and James Grichar, and the entire staff at the Yoakum Research Station.

Table 1. Uniform Peanut Performance Test - Three Texas Locations

Gaines County - W.P.G.R.F.

Cultivar	Value/A	Pods/A	TSMK	100Sd
	$	Lbs.	%	Wt. g.
Florunner	779a	4323a	74.0a-d	62.3h-j
UF03326	778a	4202ab	75.6a-d	75.6de
UF03514	765ab	4103a-d	76.4a-c	64.6gh
Flavor458	756ab	4131a-c	75.1a-d	60.0ij
GA011557	754ab	4041a-e	77.3a	72.9de
T-OL- 02	725ab	4037a-e	73.6a-e	64.3g-i
CRSP14	720ab	3933a-e	74.9a-d	71.5ef
T-OL-01	712a-c	3979a-e	73.7a-e	71.0ef
Tx. Line 1	700a-c	3888a-f	75.1a-d	58.4j
NO2006	695a-c	3973a-e	70.8c-f	92.3b
NO1013T	679a-d	3886a-f	71.6b-f	86.3c
CRSP08	666a-e	3648d-g	74.7a-d	71.9ef
Tx. Line 2	646b-e	3765b-g	73.1a-f	61.2h-j
UF03325	642b-e	3430f-h	76.6ab	74.5de
Tx. Line 3	585c-f	3741b-g	68.0e-g	59.9ij
GA012534	563d-f	3564e-g	70.5d-f	76.6d
VT003069	536e-g	3400gh	70.0d-f	94.7ab
N00098ol	504fg	3704c-g	65.0g	93.6ab
GA002501	414g	2994hi	67.8fg	67.6fg
NC7	255h	2805i	56.3h	97.2a
MEAN	643	3777	72	73.8
CV%	14.5	9	5.6	4.5
LSD	132	480	5.7	4.7
(p=.05)	0.0001	0.0001	0.0001	0.0001

Frio County - Pearsall, Tx.

Cultivar	Value/A	Pods/A	TSMK	100Sd
	$	Lbs.	%	Wt. g.
N02006	1334a	7063ab	71.8gh	102.4a
GA011557	1325a	6920a-c	78.1a	66.5c-e
T-OL-01	1306a	7361a	72.7e-h	66.7c-e
UF03514	1281ab	6834a-d	76.5a-c	58.9de
VT003069	1248a-c	6544a-e	73.7c-g	95.9ab
T-OL- 02	1247a-c	6982ab	72.7e-h	57.9e
UF03326	1219a-c	6522a-e	76.1a-d	70.7c-e
N01013T	1193a-d	6186b-g	74.4b-g	79.0bc
NC7	1189a-d	6221b-g	73.4d-g	104.8a
GA012534	1182a-d	6283b-g	76.9ab	76.3cd
Tx014138	1175a-e	6569a-e	72.2f-h	57.8e
UF03325	1165a-e	6452a-f	73.7c-g	67.2c-e
Tx Line 1	1087b-f	5969c-h	73.7c-g	55.7e
N00098ol	1086b-f	5704e-i	72.9e-g	75.9cd
CRSP08	1079c-f	5895d-h	74.9b-f	68.1c-e
Florunner	996d-g	5327g-i	76.0a-d	57.5e
GA002501	991d-g	5365g-i	75.4a-e	58.0e
CRSP14	980e-g	5466f-i	72.8e-g	65.4c-e
Tx. Line 2	949fg	5186hi	74.8b-g	63.4c-e
Tx. Line 4	835g	4837i	69.7h	56.6e
MEAN	1143	6183	74.1	70.2
CV%	12.5	11.3	2.9	17.8
LSD	202	988	3	17.7
(p=.05)	0.0001	0.0001	0.0001	0.0001

Erath County - Stephenville, Tx.

Cultivar	Value/A	Pods/A	TSMK	100Sd
	$	Lbs.	%	Wt. g.
Tx. Line 1	931a	4952a	76.1b-e	52.7kl
Florunner	933a	4859ab	78.3ab	59.7g-i
UF-03325	908ab	4713a-c	78.4ab	67.8e
CRSP-14	905ab	4831ab	76.1b-e	64.1e-g
T-OL-01	903ab	4769a-c	77.4a-d	73.1d
GA-011557	895ab	4570a-c	79.7a	66.0e
T-OL-02	852a-c	4585a-c	75.4c-e	57.3h-j
Tx. Line 2	844a-d	4373a-d	78.5ab	49.1l
UF-03326	823a-e	4398a-d	76.5b-e	64.9ef
UF03514	817a-e	4283a-e	77.8a-c	60.4f-h
Tx. Line 5	812a-e	4421a-d	74.7d-f	56.3h-k
CRSP-08	747a-f	4056a-e	74.6d-f	65.3e
GA12534	737b-f	3953b-f	72.5fg	72.5d
VT-003069	667c-f	3504d-h	74.5ef	87.3b
Flavor458	660d-f	3406e-h	78.6ab	60.1gh
N-02006	636e-f	3834c-g	68.8h	88.6b
N-00098ol	595fg	3405e-h	70.4gh	94.9a
NC-7	575fg	3016f-g	71.9fg	89.3b
GA-002501	548g	2953gh	76.1b-e	63.5e-g
N-01013T	547g	2852h	72.0fg	81.9c
MEAN	777.2	4140.1	75.5	67.5
CV%	17.1	16.4	2.6	4.8
LSD				
(p=.05)	< 0.00	< 0.00	< 0.00	< 0.00

All means followed by the same letter are not significantly different by Fisher's LSD (p=.05).
Pounds/acre are based on four replications and entries are ranked in order of highest to lowest value per acre.

Table 3

2004 Combined Advanced Line Test 1 Without Disease					Yield Data for Individual Locations Without Disease				Quality Analysis From Location 4		
Cultivar	**Value $**	**Lbs./A**	**TSMK%**	**100Sd/g**	**Loc 1**	**Loc 2**	**Loc 3**	**Loc 4**	**Flavor**	**%Fat**	**%Sugar**
Tamrun OL 01	1324a	7245a	74.6b-e	75.0a	6926ns*	7711a	8169ab	6175b-e	4.8	45.1	5.3
Flavor 458	1277ab	6732a-d	77.4a	60.6fg	6077	6574c-e	7440b-d	6400a-d	5.3	46.4	4.6
Tamrun 96	1274a-c	6993ab	74.3c-e	62.4e-g	6511	7592ab	7355b-e	6512a-c			
Florunner	1273a-c	6834a-c	75.8b	62.0e-g	6951	6462c-f	7211c-f	6711ab	5	45.9	4.6
4	1269a-c	6873a-c	75.1bc	70.9b	6523	6672b-e	8178ab	6118b-e	4.8	46	4.8
Tamrun OL 02	1254a-d	6983ab	73.2ef	64.7c-e	7046	6834a-e	8077a-c	5975c-e	5	46.2	4.7
2	1250a-e	6785a-d	74.7b-d	63.3d-f	5789	6660b-e	8628a	6062c-e	5	46.1	4.8
9	1245a-f	6684a-e	76.0ab	63.0d-g	6048	6570c-e	7203c-f	7030a	5	46.3	4.7
15	1241a-f	6668b-e	75.9b	72.5ab	6551	6622b-e	7341b-d	6157b-e	5	45.8	4.4
3	1228a-f	6661b-e	75.0bc	67.4c	5930	7216a-c	7956a-d	5542ef			
13	1183b-g	6377c-f	75.2bc	66.3c	5141	6492c-f	7739a-d	6136b-e	5	46.6	4.5
1	1182b-g	6760a-d	70.7h	61.4fg	6960	6668b-e	7377b-e	6035c-e			
12	1168b-g	6400c-f	74.3c-e	65.8cd	5480	6889a-e	7128d-f	6105b-e	5.2	47.2	4.8
6	1166c-g	6496b-e	72.7fg	62.1e-g	5787	6977a-d	7072d-f	6158b-e			
5	1159d-g	6254d-f	75.2bc	63.0d-g	6218	6380c-f	6370fg	6050c-e			
11	1150d-g	6149ef	76.0b	60.3g	6739	5552f	6515e-g	5791de	5	46.7	4.6
10	1143e-g	6366c-f	73.3d-f	66.3c	6177	6636b-e	7083d-f	5569ef			
8	1136fg	6236d-f	74.0c-f	60.4fg	5607	6172d-f	7446b-d	5720ef			
7	1087g	6161ef	71.5gh	60.2g	6281	5963ef	7301b-e	5099f			
14	1077g	5873f	74.7b-d	60.6fg	4917	6834a-e	5848g	5895c-e			
Mean	1204	6575	74.5	64.4	6187	6673	7372	6046			
CV(%)	11.2	10.7	2.4	5.6	14.6	9	7.5	6.4			
LSD	109	569	1.4	0.0001	1679	991	918	645			
(p=.05)	0.0001	0.0001	0.0001	0.0001	0.1979	0.0318	0.0001	0.0016			

Means followed by the same letter are not significantly different by Fisher's LSD (p=0.05).

Value/acre and pounds/acre based on four replications. All other data based on two replications.

Location 1=Frio County Location 2=Erath County Location 3=South Gaines Location 4=North Gaines

Table 4.

2004 Combined Analysis-ALT #1 in Disease Nurseries					TSWV Nursery		Sclerotinia Nursery	
Cultivar	**Value/Ac$**	**Lbs./Ac**	**TSMK%**	**Seed Wt**	**Lbs./A**	**TSWV%**	**Lbs./A**	**0=none**
15	727a	3957a	75.9ns	67.1ab	5406ab	26.9e-h	2508ab	3.0bc**
2	711a	3958a	73.2	51.9j	5646a	16.7gh	2270a-d	1.3a
4	694ab	4007a	68.4	65.8b	5933a	21.8f-h	2081c-g	4.7c-e
3	667ab	3658ab	74.6	62.6c	5117a-c	29.5d-g	2199a-f	3.7cd
11	666a-c	3552a-c	76.8	51.4j	5194a-c	9.0h	1910d-h	3.3cd
7	654a-c	3570a-c	77.3	55.2g-i	4584b-e	21.8f-h	2557a	1.3a
5	646a-c	3513a-d	74.5	56.1f-i	5235a-c	23.1f-h	1791f-h	4.7c-e
1	622a-d	3718ab	68.4	54.7hi	5349a-c	10.3gh	2088b-g	4.3cd
10	608a-e	3480a-d	71.0	59.3de	4537c-e	23.1f-h	2423a-c	2.3ab
8	589b-f	3281b-e	73.7	56.0f-i	4756b-d	20.5f-h	1807e-h	4.3cd
6	586b-f	3455a-d	69.4	54.6hi	4684b-e	25.6e-h	2227a-e	3.3cd
13	547c-f	3005c-e	75.2	61.2cd	3663f	56.4a-c	2348a-c	3.0bc
14	520d-g	2935d-f	72.5	57.8e-g	4044d-f	56.4a-c	1825e-h	4cd
Florunner	513d-g	2808e-g	74.6	56.5f-h	4721b-e	31.8c-f	895i	8.3g
12	502e-h	2831e-g	73.2	59.3de	4012d-f	44.9b-e	1650h	5.0d-f
Tamrun 96	497e-h	2931d-f	71.0	56.1f-i	4089d-f	47.4a-d	1774gh	5.3d-f
Tamrun OL 01	477f-h	2707e-g	73.1	69.2a	3887ef	55.1a-c	1528h	6.3e-g
9	420gh	2376fg	74.0	56.3f-i	3962d-f	57.7ab	791i	8.3g
Flav. Run. 458	389h	2286g	71.0	53.8ij	3511f	60.3ab	1061i	7.0fg
Tamrun OL 02	387h	2269g	71.0	58.5ef	3505f	66.7a	1032i	7.0fg
Mean	571	3215	72.9	58.2	4592	35.5	1838	4.5
CV(%)	18.4	15.8	7.5	3.9	11.1	2.02	13.9	22
LSD	121	583	6.3	2.6	845	19.9	423	
Entry "F"	0.0001	0.0001	0.18	0.0001	0.0001	6.66	0.0001	

Means followed by the same letter are not significantly different by Fisher's LSD (p=0.05).
Value/acre and pounds/acre based on three replications. All other data based on two replications.
**Sclerotinia disease ratings taken at Stephenville Experiment Station in Sclerotinia innoculated nursery.

Table 5.

Spanish O/L 1 Combined Analysis for West Texas					Location 1 Terry Co.	Location 2 Terry Co.	Location 3 Lamb Co.	Quality Analysis on selected Lines from Location 2			Sclerotinia Ratings
Entry	**Value$**	**Lbs./A**	**%TSMK**	**g100sd.wt.**	**Lbs./A**	**Lbs./A**	**Lbs./A**	**Flavor**	**%Fat**	**%Sugar**	**0=none**
Spanco	958a	5403a	72.9ab	53.2ij	5173a	6330ab	4706ab				6cd
Tamspan90	956a	5388a	72.5a-c	45.5l	5049ab	6228ab	4887ab	4.6	45.3	4.3	3.3ab
6	928ab	5319ab	70.6c-f	56.4gh	4681a-c	6870a	4407b-d	5.2	46.8	4.7	4a-c
9	928ab	5270ab	71.5b-d	56.5gh	4807a-c	6232ab	4772ab				3a
Virugard	925ab	5088a-c	74.3a	81.8a	4929a-c	5270b-e	5066a				6.3d
10	921a-c	5226a-c	71.6b-d	60.7ef	4946a-c	6094a-c	4637ab	5	45	4.6	6.3d
7	915a-d	5312ab	70.3c-f	57.8f-h	5048ab	6247ab	4641ab				5a-d
OLin	914a-d	5189a-c	72.0bc	50.7jk	4843a-c	6374ab	4350b-d	5	46.5	4.3	3.3ab
3	902a-d	5166a-c	71.0b-e	59.6fg	4744a-c	5852a-d	4902ab	5	45.1	4.7	5.3b-d
4	874a-d	5030a-d	71.2b-d	55.2hi	5029a-c	5389b-e	4672ab				4.3a-d
12	864a-d	5139a-c	68.5f	58.9fg	4704a-c	6239ab	4475bc	5	45.9	4.6	6.3d
2	826b-e	4681cd	71.6bc	58.9fg	4356b-d	6359ab	3327fg	5.2	45.9	4.6	6cd
8	818c-e	4813b-d	69.4d-f	62.9de	4829a-c	5003b-e	4605ab				5.7cd
5	814de	5067a-c	65.4g	47.9kl	4549a-c	6080a-c	4572ab				4a-c
16	757ef	4474de	68.8f	63.6de	4297cd	5139b-e	3985c-e				4.3a-d
13	703fg	4116ef	68.9ef	64.6cd	3535e	5406b-e	3405fg				5a-d
15	656fg	3996ef	66.1g	67.1c	3700de	4701c-e	3587e-g				4.7a-d
11	650g	4105ef	64.7g	74.8b	3806de	4618de	3890d-f				4a-c
14	624g	3838f	65.5g	74.2b	3448e	4377e	3690e-g				5a-d
1	610g	3718f	65.6g	64.5cd	3391e	4617de	3148g				5.3b-d
MEAN	827	4817	69.6	60.7	4493	5671	4286				4.9
CV%	13.9	12.5	3.4	5.6	9.9	14.9	8.1				22
(p=.05)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0151	0.0001				
LSD	107	562	2.2	3.2	737	1401	576				

***Yields at Location 3 in Lamb county were not significantly different at the p=.05 level according to Fisher's LSD.**
All means followed be the same letter are not significantly different by Fisher's LSD (p=.05).

Table 6.

Spanish O/L 2 Combined Analysis for West Texas					Location 1 Terry Co.	Location 2 Terry Co.	Location 3 Lamb Co.	Quality Analysis on selected Lines from Location 2			Sclerotinia Ratings
Entry	Value$	Lbs./A	%TSMK	g100sd.wt.	Lbs./A	Lbs./A	Lbs./A	Flavor	%Fat	%Sugar	0=none
2	978a	5504a	71.9b-d	59.2bc	5174a	6784ab	4554ns*	4.8	46.1	4.6	5.7a-d
Tamspan90	958ab	5390ab	72.5a-d	49.1f	4765a-c	6643a-d	4761	4.6	45.3	4.3	5.3a-c
16	953ab	5311a-d	72.8a-c	58.1b-d	4612a-c	6929a	4392	5.3	45.3	4.7	6.3a-d
7	944ab	5301a-d	72.4a-d	62.1b	4609a-c	6820ab	4473	5.2	45.4	4.7	7.7c-e
4	942ab	5240a-e	73.4ab	58.9bc	4648a-c	6694a-c	4377	5	46	4.6	5.7a-d
5	942ab	5294a-e	72.7a-c	57.9b-d	4489bc	6853ab	4539	5	45.9	4.7	6.7a-e
3	938ab	5296a-e	72.2a-d	58.3bc	4659a-c	6759a-c	4471	5	45.6	4.6	6.3a-d
15	923a-c	5159a-f	72.7a-c	58.0b-d	4452bc	6496a-d	4531				7a-e
OLin	922a-d	5155a-f	73.0a-c	57.9b-d	4511bc	6460a-e	4492	5.3	46.6	4.3	4.7a
Virugard	919a-d	5108b-f	73.8a	69.3a	4230c	6653a-d	4441				8de
1	910a-e	5376a-c	69.3f	49.8ef	4954ab	6601a-d	4573	5	46.5	4.7	5ab
14	889b-e	5113a-f	71.4c-e	56.2cd	4228c	6587a-d	4524				7.3b-e
9	887b-e	5040b-f	71.8b-d	54.0c-f	4194c	6202c-e	4723				5.7a-d
12	885b-e	5042b-f	71.2c-e	58.0b-d	4418bc	6576a-d	4132	4.8	45.3	4.7	6.3a-d
Spanco	854c-e	4907ef	71.4c-e	54.4c-f	4291c	6308b-e	4123				7.7c-e
10	853c-e	4909ef	70.8d-f	50.1ef	4151c	6372a-e	4204				5ab
13	849c-e	4835f	71.4cd	58.9bc	4452bc	5906e	4149				5.3a-c
6	848de	4987c-f	69.6ef	56.6cd	4194c	6408a-e	4358				5ab
8	840e	4942d-f	69.3f	54.9c-e	4365bc	6109de	4354				6a-d
11	672f	3959g	69.4f	52.9d-f	3356d	4194f	4328				9e
MEAN	895	5093	71.6	56.7	4438	6418	4425				6.3
CV%	8.9	8.2	2.7	10.1	9	5.5	8.3				20
(p=.05)	0.0001	0.0001	0.0001	0.0001	0.0066	0.0001	0.7857				
LSD	74	391	1.8	5.4	657	579	608				

***Yields at Location 3 in Lamb county were not significantly different at the p=.05 level according to Fisher's LSD.**
All means followed by the same letter are not sinificantly different by Fisher's LSD (p=.05).

Subject Area: Peanut Breeding

Title: Breeding for Quality Peanut - Maturity, Oil, and Sugar Content

Personnel and Agency:
Mark D. Burow, Charles E. Simpson, Yolanda López, Michael R. Baring,
A. Michael Schubert, John Cason, Jamie Ayers, Jacob Reed
Texas Agricultural Experiment Station

Statement of Problem and Need:

Peanut quality is a major problem for marketability of West Texas peanuts. The two major constraints are maturity and seed composition (oil and sugar quality). A breeding project for maturity is underway, but is limited by the labor-intensive nature of testing for maturity, oil, and sugars, as well as the large number of accessions that must be tested to combine these traits and high yield. High-O/L varieties are needed for the West Texas area, and would be useful for Central and South Texas also. Tamrun OL01 had an abnormally-high sugar content, which could cause problems with over-roasting or low roasted peanut flavor intensity. Therefore, we will also select for sugar content.

Objective:

The ultimate goal of this work is to release varieties with early maturity, high O/L fatty acid composition, and an acceptable sugar content.

Results:

(a) Perform field evaluation of advanced materials selected for maturity. We have used these funds to allow testing of F2:6 runner and bunch lines segregating for high O/L at additional locations, namely Wellington, Stephenville (under Sclerotinia pressure) and Pearsall (TSWV infection.) Data from Denver City and Earth are given in a different report.

Runner and bunch lines were evaluated for yield, maturity, seed weight, disease incidence, and O/L ratio. Data on runner lines are given below, as we have not finished analysis on the bunch experiments. Oil data given are from the 2003 field year, as we have just finished field measurements on the 2004 crop and have not yet been able to perform oil analysis on this material.

Wellington. At Wellington, Entries 10, 11, and 31 rank at the top in terms of value and yield. Line 10 was a top early performer at Denver City, although shelling needs to be improved. Entries 11 and 31 are more mature, but these either yield less or do not shell as well.

F2:6 Runner Test - Wellington 2004

Entry	ValAc	LbPodAc	PctBlkBr	G100SMK	PctELK	PctTSMK
32	724 a	3763 ab	30.00 gh	64.50 f-h	20.50 gh	78.42 a-d
TX966205	708 a	3739 ab	44.67 e-g	64.13 f-h	26.98 c-e	77.58 a-e
Florunner	669 ab	3417 a-c	40.00 f-h	64.77 f-h	23.20 d-g	79.85 a-c
10	646 a-c	3856 a-c	55.33 d-f	70.80 c-e	25.58 d-g	68.85 d-f
31	640 a-c	3246 b-d	62.00 c-e	65.43 e-h	37.20 b	80.40 ab
TX972505	622 a-c	3352 a-d	26.00 gh	62.97 gh	28.29 cd	76.21 a-e
TX977235	579 b-d	3094 cd	22.00 h	60.40 hi	9.86 j	76.03 a-f
17	552 b-e	3091 cd	56.99 d-f	66.40 d-g	11.23 j	72.65 b-f
11	547 b-f	3337 a-d	78.60 a-d	72.88 c	20.75 f-h	66.44 ef
NC7	546 c-f	2839 d-f	61.33 c-f	101.57 a	44.05 a	74.01 b-f
9	500 d-g	2953 c-e	58.00 d-f	71.10 cd	23.16 d-g	69.17 d-f
12	440 e-h	2505 e-g	58.67 d-f	65.00 f-h	32.11 bc	71.66 b-f
15	431 f-i	1993 gh	59.61 d-f	83.67 b	25.92 d-f	85.41 a
13	420 f-i	2356 f-h	85.24 ab	68.53 c-f	22.14 e-h	72.90 b-f
7	395 g-i	2238 gh	65.33 b-e	41.30 k	0.85 k	70.74 b-f
19	358 h-j	2030 gh	82.00 a-c	47.87 j	2.62 k	70.28 b-f
30	330 h-j	1781 hi	76.60 a-d	63.93 f-h	21.67 e-h	75.51 a-f
20	318 ij	1799 hi	77.82 a-d	64.63 f-h	9.52 j	71.53 b-f
27	318 ij	1815 hi	85.31 ab	57.03 i	9.06 j	71.31 b-f
28	261 jk	1429 ij	62.00 c-e	61.43 g-i	17.00 hi	74.32 b-f
16	187 kl	1133 jk	28.00 gh	69.57 c-f	12.81 ij	65.89 f
14	138 l	813 kl	75.00 a-d	71.00 cd	13.65 ij	67.91 ef
BSS56	-0 m	575 l	90.00 a-e	48.97 j	9.50 j	69.76 c-f
LSD =	120	547	21.85	5.42	5.26	10.14
CV =	15.9%	13.2%	22.4%	5.0%	16.6%	8.4%

Stephenville. The purpose of the experiment at Stephenville was to identify lines with some resistance or tolerance to Sclerotinia. This will be of increasing importance after the spread of this disease to West Texas in 2003. Seed was limiting, and so many accessions could not be tested at Stephenville in 2004. However, among them, many lines performed better than Florunner or NC-7 for disease incidence, as well as yield. Entry 10 performed significantly better than most accessions. Although yield was only 2525 lb/acre, Florunner and NC-7 yielded 668 and 468 lb./ac., respectively, giving an indication of the severity of the disease this year. Entry 13 also fared well at Stephenville, but did not yield well at Wellington.

Entry	ValAc	LbPodAc	G100SMK	PctELK	PctTSMK	Sclerotinia
13	493 a	2800 a	65.20 ab	31.44 a	73.19 a	3.5 f
10	411 a-c	2525 ab	59.70 a-e	25.65 ab	67.75 a-c	3.7 ef
12	405 a-c	2476 ab	55.70 c-f	20.93 bc	67.67 a-c	5.2 c-f
15	300 b-d	1801 a-c	63.90 a-c	21.76 bc	68.36 a-c	4.7 b-f
7	278 b-d	1674 b-d	43.40 g	1.91 f	67.29 b-d	5.5 b-f
6	272 b-d	1622 b-d	57.30 b-f	16.04 cd	68.63 a-c	4.7 c-f
14	271 b-d	1550 b-e	61.70 a-c	10.75 de	71.03 ab	6.0 a-d
27	217 c-e	2082 a-c	52.33 d-f	8.43 d-f	62.07 d	4.2 d-f
4	213 de	1240 c-f	51.17 e-g	5.85 ef	69.43 ab	5.5 b-f
5	199 de	1243 c-f	58.97 a-e	14.72 cd	67.24 b-d	5.8 a-e
28	164 de	1162 c-f	55.47 c-f	16.35 cd	69.52 ab	6.0 a-d
Florunner	119 de	668 d-f	60.60 a-d	19.93 bc	72.28 ab	7.7 ab
NC-7	77 e	468 ef	67.53 a-e	27.37 ab	67.27 b-d	6.8 a-c
BSS 56	48 e	400 f	49.83 fg	8.56 d-f	63.31 cd	8.0 a-d
	188	1115	8.85	8.64	5.56	2.3
	42.7%	40.2%	8.62%	0.29725	4.5%	24.2%

Pearsall. The purpose of the experiment at Pearsall was to identify lines with some resistance or tolerance to TSWV. Unlike the situation with Sclerotinia, most lines were very susceptible to TSWV. None of the entries did well at this location, as all but one had numerically-higher infection rates than did Florunner - most significantly higher rates. The only entry with a comparable incidence yielded poorly, and this is probably a consequence of the plants being very small. Crosses with TSWV-tolerant lines will be necessary if varieties developed from these lines are to be grown in South Texas.

Entry	ValAc	LbPodAc	G100SMK	PctELK	PctTSMK	PctTSWV091504
TX972505	616.82 a	3454 a	52.80 c-f	9.35 c-f	72.08 a	17.90 fg
TX966205	582.71 a	3282 ab	52.35 c-f	13.37 b-d	71.72 a	12.80 g
TX977235	574.52 a	3216 ab	52.20 c-f	6.51 d-f	71.96 a	19.20 fg
NC7	560.29 ab	2817 b	83.15 a	35.81 a	66.52 a-c	24.40 e-g
Florunner	469.83 b	3396 a	50.00 d-f	7.69 c-f	55.86 ef	19.20 fg
14	335.25 c	2144 c	73.25 b	14.23 b-d	64.00 b-d	48.70 b-d
20	323.98 c	2026 cd	73.13 b	19.03 b-e	68.09 ab	32.10 d-f
12	312.60 c	2084 c	50.90 d-f	14.75 b-d	60.26 b-e	33.30 d-f
15	299.02 cd	1904 cd	69.10 b	16.71 bc	65.34 a-d	35.90 de
16	289.04 cd	1767 c-e	53.42 c-e	10.53 c-e	66.79 ab	34.60 de
17	267.96 c-e	1838 c-e	58.15 cd	11.29 b-e	59.08 c-e	41.00 cd
19	243.39 c-f	1701 c-e	36.63 g	0.73 f	53.91 e-h	15.40 fg
9	220.01 c-f	1777 c-e	51.36 c-f	13.89 b-d	54.73 d-h	32.10 d-g
11	203.30 d-f	1486 d-f	51.25 c-f	7.99 c-f	56.36 ef	55.10 a-c
7	185.70 ef	1413 d-f	37.20 g	1.53 f	50.50 f-i	62.80 ab
13	159.98 fg	1294 ef	60.00 c	14.13 b-d	58.78 de	69.20 a
10	130.63 f-h	949 fg	50.80 d-f	13.65 b-d	54.84 e-g	67.90 a
27	56.68 gh	486 gh	45.00 fg	2.41 ef	44.88 hi	60.30 ab
BSS56	45.75 h	478 gh	50.30 d-f	8.75 c-f	48.16 g-i	43.60 cd
28	43.63 h	361 h	48.90 ef	6.11 d-f	49.24 f-i	69.20 a
LSD=	103.62	562	8.94	9.31	7.58	16.08
CV=	21.3%	18.0%	9.8%	39.2%	7.6%	24.2%

(b) Perform oil and sugar analyses on promising advanced lines at an early-enough stage of development that good ones can be selected. We have performed oil analysis on the 2003 F2:5 lines, from which the 2004 F2:6 lines were selected. A summary of this data is presented below. The values are averages, but averages are only an indication of the proportion of high-O/L seeds in each entry.

We will begin screening the lines grown in the field in 2004, and have begun analysis of single seeds from the F2:5 runner and bunch population s to select individual seeds with high O/L values and good pod shape from the best selections of these populations. Many of the top-performing lines have low average O/L ratios, and therefore we will need to screen many seeds of these varieties to obtain a sufficient number for crossing and advancement.

Entry	O/L Ratio
NC7	n.d.
Florunner	n.d.
21	11.41
TX966205	n.d.
TX972505	n.d.
9	1.20
10	1.21
TX977235	n.d.
12	0.90
7	3.57
17	0.89
13	1.57
20	1.55
8	4.91
25	1.79
18	1.14
31	n.d.
24	1.81
23	14.29
11	1.71
19	1.51
14	2.60
15	10.52
27	2.67
28	1.73
26	1.77
30	3.60
16	1.42
22	3.48
BSS56	n.d.

We were not able to perform sugar analyses on this material due to the breakdown of the HPLC machine, but are exploring acquisition of an unused HPLC.

(c) Backcross promising lines with early maturity by lines with high yield, good %TSMK, high O/L, and disease resistance to combine earliness with other desirable traits. We have made crosses between the best early-maturing, high-yielding lines based on screenings in earlier years, and F1 plants are currently in the greenhouse. The F2 generation from these will be planted in the summer of 2005.

(d) Continue making crosses with additional early materials that have been identified. We evaluated short rows of Spanish F3 plants at the Western Peanut Growers' research Farm. These were derived from a cross between early maturing x high-O/L Spanish varieties. The goal is to combine early maturity and high O/L in one variety that is earlier than OLin. These were space-planted because of low seed availability, so some yields are lower than would be expected at higher density. We will make selections from these and evaluate progeny rows at multiple locations in 2005.

Entry	LbPodAc	PctBrBlk	G100SMK	PctTSMK
29	4929 a	62.70 c-n	48.17 a-k	75.85 a-i
27	4742 ab	75.09 a-e	48.87 a-i	77.48 a-e
17	4299 a-c	57.00 f-q	46.65 d-o	75.06 a-k
1	4224 a-d	67.04 b-k	49.00 a-i	77.31 a-f
4	4095 a-e	76.87 a-d	47.47 c-n	75.02 a-k
11	3975 a-f	61.81 c-o	48.75 a-j	73.52 a-m
23	3926 a-f	59.74 e-p	43.96 m-t	74.49 a-l
10	3912 a-f	60.68 c-o	48.82 a-i	73.74 a-m
13	3872 a-f	71.96 a-g	45.17 i-s	69.64 i-n
31	3862 a-f	61.32 c-o	44.79 j-s	71.05 e-n
35	3862 a-f	43.32 p-t	41.67 r-t	74.85 a-k
2	3859 a-f	70.40 a-i	49.40 a-f	77.96 a-c
18	3810 a-g	61.18 c-o	46.50 d-o	73.24 a-m
36	3768 a-g	48.23 l-t	44.77 j-s	73.38 a-m
38	3755 a-g	73.32 a-f	48.07 a-k	79.80 a
8	3752 a-g	81.65 ab	46.48 d-o	73.66 a-m
15	3748 a-g	59.35 e-p	47.35 c-n	70.00 h-n
5	3748 a-g	55.35 g-r	47.37 c-n	71.36 c-n
25	3712 a-h	73.37 a-f	42.41 p-t	74.36 a-l
16	3704 a-h	64.25 c-m	45.75 f-q	71.22 e-n
37	3688 a-h	63.32 c-m	51.83 ab	74.90 a-k
9	3637 a-h	65.35 b-k	47.27 c-n	76.36 a-h
14	3601 a-h	62.02 c-o	43.07 o-t	72.06 b-n
20	3561 a-h	58.95 e-p	47.89 b-m	72.66 b-m
26	3519 a-h	63.24 c-m	43.81 n-t	65.91 n-p
32	3501 a-h	63.32 c-m	49.77 a-f	75.52 a-j
12	3499 a-h	45.24 o-t	45.30 h-r	71.25 d-n
21	3455 a-h	53.90 h-r	48.09 a-k	72.18 b-n
30	3448 a-h	33.32 t	43.97 l-t	70.11 h-n
28	3408 a-i	85.78 a	42.84 o-t	70.81 f-n
Starr	3392 a-j	58.87 e-p	45.23 i-s	68.66 k-o
33	3368 a-j	65.32 b-l	51.06 a-c	70.49 g-n
34	3368 a-j	47.32 m-t	45.27 h-s	75.63 a-j
44	3328 b-j	53.32 i-r	49.93 a-e	61.96 p
3	3326 b-j	67.17 b-k	41.76 q-t	72.73 b-m
7	3321 b-j	52.68 j-r	46.17 d-p	67.10 m-p
6	3312 b-j	54.74 h-r	48.83 a-i	74.47 a-l
Olin	3219 b-j	56.93 f-q	49.95 a-e	72.16 b-n
50	3181 b-j	58.85 e-p	45.17 i-s	76.46 a-h
22	3165 c-l	61.35 c-o	50.07 a-d	73.27 a-m
Spanco	3143 c-l	65.85 b-k	49.74 a-f	72.40 b-n
24	2972 c-m	45.74 n-t	48.00 a-l	70.13 h-n
42	2768 c-n	41.32 q-t	52.00 a	70.09 h-n
19	2672 d-n	57.84 f-q	48.15 a-k	72.80 b-m
41	2648 e-o	59.82 d-p	50.87 a-c	79.50 a
46	2621 e-o	57.32 f-q	47.87 b-m	74.90 a-k
43	2608 e-o	66.41 b-k	44.03 l-t	69.82 h-n
39	2501 f-o	50.26 k-t	48.87 a-i	74.58 a-l
53	2274 g-p	69.32 a-j	44.77 j-s	77.91 a-d
45	2274 g-p	77.32 a-c	44.67 k-s	73.63 a-m
51	2261 g-p	55.50 g-r	50.01 a-d	69.08 j-o
40	2168 h-p	35.32 st	49.36 a-g	72.49 b-n
54	1861 i-q	60.95 c-o	45.27 h-s	76.99 a-g
52	1848 i-q	70.49 a-h	41.32 r-t	68.06 lm
48	1834 j-q	63.32 c-m	45.34 g-r	70.37 g-n
56	1621 k-q	50.65 k-s	50.97 a-c	74.02 a-l
57	1607 l-q	61.32 c-o	49.59 a-f	67.15 m-p
49	1594 l-q	42.77 p-t	45.97 e-p	62.73 op
47	1514 m-q	39.32 r-t	49.27 a-h	72.68 b-m
Tamspan90	1481 m-q	39.52 r-t	41.33 r-t	70.58 g-n
55	1314 n-q	61.32 c-o	40.57 t	78.19 ab
60	1087 o-q	n.d.	41.27 st	76.09 a-i
58	807 pq	n.d.	n.d.	n.d.
59	554 q	n.d.	n.d.	n.d.
	1572	17.12	4.03	6.67
	23.022%	13.84%	4.19%	4.46%

(e) Repeat the Spanish UPPT test at the WPGRF. This was to allow comparison of Spanish and Valencia varieties under development to standard checks, and to obtain quality data at no additional cost to the project on materials that are near release. A total of 10 entries were evaluated, and a summary of the data is provided in the following table:

Entry	ValAc	LbPodAc	G100SMK	PctTSMK	StndCnt
Olin	661 a	3603 a	47.88 b	74.94	57.25 bc
Spanco	616 ab	3415 ab	49.50 b	73.96	60.13 ab
Tamspan90	607 a-c	3341 ab	41.15 c	74.14	57.38 bc
NMValC	604 a-c	3245 bc	49.70 b	72.17 nsd	62.38 a
Starr	595 a-d	3282 a-c	42.78 c	74.21	58.75 ab
Entry 1	563 b-e	3114 b-d	50.58 b	73.88	57.63 bc
NMValA	540 c-f	2926 cd	49.15 b	71.83	60.13 ab
H&W101	539 d-f	2857 d	49.48 b	73.11	46.25 d
Entry 2	511 ef	2937 cd	54.70 a	71.39	54.75 c
H&W136	490 f	2834 d	55.10 a	66.74	41.75 e
LSD =	68	343	3.17	10.20	3.84
CV =	8.2%	7.5%	4.5%	7.2%	4.8%

Two Spanish varieties being considered for release (Lines 1 and 2) were included. It should be noted that the stand counts of H&W 101 and 136 were lower than for other entries, and this may explain in part the low yields obtained by those entries. Additional data are available in the official UPPT publications for the 2004 growing season.

ACKNOWLEDGMENTS

We express our sincere appreciation to the National Peanut Board and Texas Peanut Producers Board for assisting our program again in 2004. A large part of the work reported here would not have been possible without this generous support.

We also acknowledge the support of Doug Sims (Earth, Lamb County) and Members of the Western Peanut Growers Research Farm, Denver City, Gaines County.

Texas Peanut Producers Board
Annual Research Report for 2004

Development of Peanut Cultivars with High O/L Ratios and Root-knot Nematode Resistance

J. L. Starr and C. E. Simpson
Dept. Plant Pathology & Microbiology, TAES, College Station; and TAES Stephenville

SUMMARY

Fatty acid analysis by gas chromatography for determination of O/L ratio and RFLP analysis of nematode resistance was completed on 1140 individuals from 114 lines to select those individuals with both a high O/L fatty acid trait and nematode resistance. Seed of several lines has been sent to Puerto Rico for increase. Seed increases of other lines are being done in a greenhouse at the Stephenville center. Several additional backcrosses were made to introgress nematode resistance and the high O/L trait into lines that are also resistant to Tomato Spotted Wilt virus. Many of these lines also have resistance to Sclerotina Blight in their pedigree. Efforts to develop and release peanut cultivars wirh multiple disease resistances and a high O/L ratio are on schedule.

INTRODUCTION

The peanut nematology and breeding program has been successful in its attempts to identify, characterize and develop resistance to the root-knot nematode. We have released two cultivars with high levels of resistance to the root-knot nematode (COAN and NemaTAM). This resistance will permit growers to control nematodes without the costly expense of nematicide treatments. We also expect that growers will find that nematode control with these resistance cultivars will be superior to the level of control typically observed following an application of a nematicide. Our current efforts are now aimed at the introgression of nematode resistance into peanut cultivars that also possess such important traits as a high O/L ratio and resistance to Sclerotina blight. This project compliments a sister project to introgress nematode resistance into peanut cultivars that are also resistant to the tomato spotted wilt virus, which is funded by the National Peanut Board. This report documents the progress made during the past year.

MATERIALS AND METHODS

Introgression of nematode resistance into high O/L peanut lines.

After the desired crosses were made (in 2003) and the F1 generation was harvested, these seed were planted to produce the F2 generation. The F2 individuals were then screened for the high O/L trait by cutting a small piece (about 30 mg) from the top of the seed. The fatty acids were extracted from these seed pieces with organic solvents. The ratio of oleic to linoleic fatty acids in these extracts was then measured using gas-chromatography. Those seed that had the desired high O/L trait were then planted. Nematode resistance was identified using molecular markers linked to resistance that we developed previously. When the plants were approximately 4 weeks old leaf tissue samples were collected for extraction of DNA. The DNA was digested with the restriction enzyme Eco RI, separated by electrophoresis on agarose gels, transferred to nylon

membranes, and then probed to identify individuals that were either homozygous or heterozygous for the gene for nematode resistance. Individuals with both the high O/L trait and nematode resistance were saved for use as donor parents for a fourth back cross generation. Most importantly, these individuals will be used to produce seed. Our goal was to produce sufficient seed of these lines in 2004 to begin yield testing at multiple locations in 2005.

RESULTS

About 1140 individuals were tested for fatty acid content using gas chromatography and approximately 200 of were identified as having a O/L ratio of greater than 10:1 (the range of values was 11:1 to 64:1). The high O/L individuals were then subjected to DNA analysis using restriction fragment length polymorphisms (RFLP) to identify those that also had the required nematode resistance. Where possible, only individuals that were apparently homozygous for nematode resistance were selected for seed increase, although in a few cases it was necessary to select individuals that were heterozygous for resistance.

We also grew out the F1 generation of crosses that combine resistance to nematodes, Sclerotina blight, and Tomato Spotted Wilt Virus with the high O/L trait. These seed were then planted to produce an F2 generation that will be screened for several traits in 2005.

Table 1. Summary of numbers of individuals screened for high O/L trait by gas chromatography and for nematode resistance using DNA markers.

Group	No. Individuals Tested	No. with High O/L and Nematode resistance
High O/L	560	44
High O/L + Resistance to Sclerotina Blight	440	40
COAN x Tamrun OL 02	30	4
NemaTAM x Tamrun OL 02	30	6
NemaTAM x high O/L	80	9

DISCUSSION

During 2004 we completed the process of developing several breeding lines that have both the high O/L trait and nematode resistance. Many of these lines also resistance to Sclerotinia blight. Seed increase of numerous lines in the greenhouse and in Puerto Rico will be completed in time for limited tests for yield potential in 2005. Larger scale yield tests will be conducted in 2006 and in 2007. By the end of the 2007 season we hope to select at lease one line for release as a cultivar. Additionally we have completed the first round of crosses that will combine these traits

(nematode resistance, high O/L, and resistance to Sclerotinia blight) with lines having resistance to nematodes and Tomato Spotted Wilt Virus. We will complete the initial screening of these lines with multiple disease resistance and high O/L in 2005. Individuals have these multiple traits will be selected for increase and yield tests in 2006.

ACKNOWLEDGMENTS

We express our sincere appreciation to the Texas Peanut Producers Board for supporting our efforts to develop improved peanut varieties for the Texas peanut farmer. We also want to acknowledge the efforts of Ms. Elizabeth Morgan, a Research Assistant for J. L. Starr, who has become proficient in both gas chromatography and DNA analysis.

1. Subject Area:

   Plant Pathology

2. Title:

   Devising and Demonstrating Control Schemes for Peanut Diseases

3. Personnel and Agency:

Thomas A. Lee, Jr.
Extension Plant Pathologist
Texas Cooperative Extension
1229 North U.S. Hwy. 281
Stephenville, TX 76401
Phone: 254-968-4144
Fax: 254-965-3759
E-mail: t-lee@tamu.edu

4. Introduction:

   Peanut disease continues to be one of the primary problems associated with profitable production. Significant changes in production areas within Texas make continued work to develop new peanut disease control schemes and then demonstrate them to growers just as important as it has ever been. This project continues to be the only comprehensive evaluation of peanut fungicides in Texas.

5. Summary:

   As the accompanying data sheets will show, numerous fungicides and rates were tested in 2004. Some worked well while others performed poorly. This data has all been submitted to the various companies in support for new and improved labels. As new chemicals are cleared, market share competition should drive down the price.

6. Materials and Methods:

   Plots were established in Dawson, Gaines and Erath counties to compare numerous fungicides and combinations. All plots were replicated three times and each plot was 2 rows x 100 feet. All chemicals were hand sprayed with a CO_2 backpack sprayer. Seed treatment plots were planted with pre treated seed.

7. Results and Discussion:

See accompanying data for specific results on specific farms.

Rhizoctonia pod rot control plots were conducted in Dawson and Gaines Counties. A Sclerotinia Blight control plot was located in Western Gaines County. Peanut seedling disease chemicals were tested in Erath and Gaines County.

In the Dawson County location there was not a rateable level of any disease present in any plot. Yields did tend to increase in most plots from rep 1 to rep 3. This appears to be due to efficiency increases in the pivot irrigation system as plots were located closer to the pivot point.

In the Gaines County location there was also no detectable disease. Uniformity of yields and grades testifies to the uniformity of the soil and irrigation.

In the Gaines County Sclerotinia plot we were trying to see what a known severely infected field would produce when planted to Spanish peanut. Although 2004 was a severe Sclerotinia/Botrytis year in this county, this plot when planted to a Spanish type peanut produced no Sclerotinia or Botrytis infection sites. However, Southern blight (*Sclerotium rolfsii*) was a significant problem throughout the plot accompanied by a uniform Rhizoctonia infection.

The seedling disease plots were another study in contrast. The Gaines County location displayed only marginal differences in any chemical although all exceeded the untreated check. Erath County was a different story. The checks again came out on bottom and there was considerable breakout among fungicide treatments. Anything which contained the fungicide Vitavax appeared to out perform all other fungicides. This “old” fungicide is still an outstanding peanut fungicide.

Lamesa Rhizoctonia
Dawson County

Treatment	Chemical	Rate/acre	Days After Planting
1	Artisan 3.6	32 fl oz	60, 90
2	NAI 301	45 fl oz	60, 75, 90
3	Abound	12.3 fl oz	60, 90
4	Abound	18.4 fl oz	60, 90
5	Headline Bravo	9 fl oz 1.5 pts	45, 75, 105, 135 60, 90, 120
6	Echo 720 Folicur Induce	1.5 pts 7.2 fl oz 1.5 oz	45, 60, 135 75, 90, 105, 120 75, 90, 105, 120
7	Endura Headline	9 oz 9 oz	60, 90, 120 45, 75, 105, 135
8	Untreated Check		

45 Day Spray = June 22, 2004

Harvest Date = October 21, 2004
Type = Runner
Soil = Sandy Clay Loam

Lamesa Rhizoctonia
Dawson County

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
1	1	4905	74%	0%	1%	884	982
	2	5559	74%	1%	0%	998	
	3	5821	75%	1%	1%	1063	
2	1	4578	74%	0%	1%	824	945
	2	5363	76%	0%	0%	989	
	3	5755	73%	0%	1%	1023	
3	1	4513	74%	0%	1%	813	942
	2	5559	76%	0%	0%	1025	
	3	5363	76%	0%	0%	989	
4	1	5036	74%	0%	1%	907	972
	2	5232	76%	0%	1%	968	
	3	5624	76%	0%	1%	1041	
5	1	5297	75%	0%	1%	967	991
	2	5428	75%	1%	1%	992	
	3	5559	75%	1%	1%	1015	
6	1	4905	73%	1%	1%	871	904
	2	4970	73%	1%	2%	887	
	3	5297	74%	1%	1%	954	
7	1	5363	74%	0%	1%	966	1038
	2	5494	74%	1%	1%	990	
	3	6213	75%	1%	1%	1135	
8	1	4251	75%	0%	1%	776	923
	2	5297	75%	0%	1%	967	
	3	5624	75%	0%	1%	1027	

There was not a rateable level of any disease present in any plot.

Yields tended to increase in most plots from rep 1 to rep 3. This appears to be due to efficiency increases in the pivot irrigation system as plots are located further from the end.

All values are based on a loan value of $356.06/ton with quality parameters.

Seminole Rhizoctonia
Gaines County

Treatment	Chemical	Rate/acre	Days After Planting
1	Artisan 3.6	32 fl oz	60, 90
2	NAI 301	45 fl oz	60, 75, 90
3	Abound	12.3 fl oz	60, 90
4	Abound	18.4 fl oz	60, 90
5	Headline Bravo	9 fl oz 1.5 pts	45, 75, 105, 135 60, 90, 120
6	Echo 720 Folicur Induce	1.5 pts 7.2 fl oz 1.5 oz	45, 60, 135 75, 90, 105, 120 75, 90, 105, 120
7	Endura Headline	9 oz 9 oz	60, 90, 120 45, 75, 105, 135
8	Untreated Check		

45 Day Spray = June 22, 2004

Harvest Date = October 20, 2004
Type = Runner
Soil = Almost a pure sand

Due to an excellent rotation program in this field there was no detectable disease in this location. Uniformity of yields and grades testifies to the uniformity of the soil and irrigation.

All values are based on a loan value of $356.06/ton with quality parameters.

Seminole Rhizoctonia
Dawson County

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
1	1	6006	79%	1%	0%	1151	1173
	2	5610	79%	1%	1%	1079	
	3	6732	79%	1%	0%	1288	
2	1	6072	80%	0%	1%	1182	1104
	2	5610	80%	0%	1%	1092	
	3	5412	79%	0%	0%	1037	
3	1	5478	80%	0%	0%	1063	1042
	2	5214	80%	1%	1%	1015	
	3	5444	79	0%	1%	1047	
4	1	5544	80%	1%	0%	1076	1133
	2	6402	80%	0%	1%	1247	
	3	5808	76%	0%	1%	1075	
5	1	5478	81%	1%	0%	1076	1171
	2	6600	80%	0%	1%	1285	
	3	6070	78%	1%	1%	1153	
6	1	5544	80%	1%	1%	1080	1031
	2	5082	79%	0%	1%	977	
	3	5346	80%	0%	0%	1037	
7	1	6336	80%	0%	1%	1234	1163
	2	5742	79%	1%	1%	1104	
	3	6006	79%	1%	0%	1151	
8	1	5742	79%	1%	1%	1104	1090
	2	5478	80%	0%	0%	1063	
	3	5874	80%	0%	0%	1140	

Seminole Sclerotinia
Gaines County

Treatment	Chemical	Rate/Acre	Days after Planting
1	Omega 500	1.5 pts	60, 90
2	Endura	9 oz	60, 90
3	Untreated Check		

Spanish Peanuts

Harvest Date = October 21, 2004
Soil = Sandy Loam

Seminole Sclerotinia
Gaines County

Treatment	Rep	Pod Rating	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
	1	3	3703	75%	1%	1%	690	
1	2	3	3194	76%	1%	1%	603	647
	3	3	Spill	74%	0%	1%	-	
	1	1	3485	75%	1%	1%	649	
2	2	2	3340	75%	1%	1%	622	617
	3	1	3122	75%	1%	2%	584	
		2	2323	76%	1%	1%	438	
3	1	1	2759	75%	0%	1%	514	466
	2	2	2396	75%	1%	1%	446	

This plot was designed to test against *Sclerotinia minor*. We wanted to see what a severely infected field would produce when planted to Spanish peanut. Although 2004 was a severe Sclerotinia/Botrytis year in this area, this heavily infested field when planted to a Spanish type produced no detectable Sclerotinia or Botrytis infection sites. However *Sclerotium rolfsii* was a significant problem throughout the field accompanied by a uniform Rhizoctonia infection. Pods were rated on a 1-3 scale with a 1 showing about 25% discoloration and a 3 showing about a 50% discoloration.

All values are based on a loan value of $356.06/ton with quality parameters.

Syngenta & Gustafson
Peanut Seed Treatment and Fungicide
Seedling Counts
Denver City, TX (Gaines County)
May 12,17,24, & June 7, 2004

3,7,14,28 days after 1st emergence counts																	
57	25	60	67	64	54	59	44	55	62	60	73	47	41	64	40	56	61
78	63	80	76	74	79	81	72	70	81	78	86	55	72	87	59	78	83
86	68	84	82	80	85	87	81	72	87	83	91	60	81	91	63	85	81
78	60	76	70	70	76	80	76	66	80	76	85	56	76	86	60	78	78
310	311	312	313	314	315	316	317	318	307	308	309	301	302	303	304	305	306
Rep. 3																	
56	32	48	41	47	54	47	45	41	75	64	65	58	36	60	55	51	44
72	58	74	76	70	77	59	75	68	83	77	75	74	63	68	68	74	79
79	70	85	85	76	82	65	84	79	88	88	79	77	70	74	78	82	86
75	64	80	83	70	79	62	80	75	87	82	74	73	66	77	69	74	79
213	214	215	210	211	212	201	202	203	204	205	206	216	217	218	207	208	209
Rep. 2																	
52	27	34	62	68	61	55	41	45	63	46	63	63	45	51	49	35	50
65	72	75	85	92	78	78	78	78	87	59	72	74	75	80	77	65	78
65	77	81	87	95	84	84	88	83	81	63	83	81	78	86	81	71	83
64	79	83	84	88	80	71	79	76	79	60	71	76	75	80	74	67	75
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Rep. 1																	

Notes:

- **Planted at 30 lbs/acre**

Treatments:

1. Gustafson- Check
2. Gustafson- VitavaxPctops (L0293)
3. Gustafson- L1292-A1
4. Gustafson- L1294-A1
5. Gustafson- L1332-A1
6. Gustafson- L1226-A1, Thiram 42S, Allegiance, L0283-A1, Pro-Ized Seed Col.
7. Gustafson- Thiram 42S, RTU PCNB, L0283-A1, Pro-Ized Seed Col.
8. Gustafson- L1226-A1, Thiram 42S, Allegiance, RTU PCNB, L0283-A1, Pro-Ized Col./ Blue
9. Gustafson- L1138-A1
10. Gustafson- L1402
11. Syngenta- Check
12. Syngenta- Dynasty 12.25
13. Syngenta- Dynasty 14.0
14. Syngenta- Vitavax
15. Syngenta- Vitavax, **Abound (infurr) 1.0 mls**
16. Syngenta- Vitavax, **Abound (infurr) 0.5 mls**
17. Syngenta- Vitavax
18. Syngenta- Dynasty 14.0, **Abound (infurr) 0.5 mls**

The Gustafson and Syngenta Treatments were different seed lots all planted together on the same day.

On the yield sheets Syngenta was assigned 11-18 and Gustafson was assigned 1-10.

Denver City Seed Treatment
Gustafson

Treatment #	Chemical
1	Check
2	VitavaxPctops (L0293)
3	L1292-A1
4	L1294-A1
5	L1332-A1
6	L1226-A1, Thiram 42S, Allegiance, L0283-A1, Pro-Ized Seed Col.
7	Thiram 42S, RTU PCNB, L0283-A1, Pro-Ized Seed Col.
8	L1226-A1, Thiram 42S, Allegiance, RTU PCNB, L0283-A1, Pro-Ized Col./Blue
9	L1138-A1
10	L1402

There is considerable variability in this plot and yields are not up to expectation. Lack of sufficient irrigation water availability is probably the culprit.

Denver City Seed Treatment
Gustafson

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
1	1	3036	74%	2%	1%	547	565
	2	3432	73%	0%	2%	619	
	3	3036	72%	1%	3%	530	
2	1	2772	75%	1%	1%	504	612
	2	3564	73%	1%	2%	631	
	3	3960	73%	0%	3%	701	
3	1	3696	74%	1%	2%	663	619
	2	2640	74%	0%	2%	474	
	3	3960	75%	1%	1%	720	
4	1	3564	76%	0%	1%	657	614
	2	3432	75%	1%	1%	624	
	3	3168	73%	1%	2%	561	
5	1	3036	76%	0%	1%	560	615
	2	3432	74%	1%	1%	616	
	3	3828	72%	0%	3%	669	
6	1	3036	75%	0%	1%	552	672
	2	4092	76%	0%	1%	754	
	3	3960	74%	0%	2%	711	
7	1	3168	71%	3%	1%	540	665
	2	3696	74%	1%	2%	663	
	3	4356	75%	0%	1%	792	
8	1	3300	75%	1%	1%	600	605
	2	3300	72%	1%	3%	576	
	3	3564	74%	1%	2%	640	
9	1	2772	74%	3%	1%	493	642
	2	3564	73%	1%	1%	631	
	3	4356	76%	0%	1%	803	
10	1	1980	73%	3%	1%	347	652
	2	4224	74%	1%	1%	758	
	3	4620	76%	0%	1%	852	

Plot Size = 2 rows x 40” x 50’
Soil type = sandy loam
Planting date = April 27, 2004
Type = Runner
Planting weather: Air = 72° F
Soil = 62° F
Moisture = excellent

Harvest Date = October 20, 2004
All values are based on a loan value of $356.06/ton with quality parameters.

Denver City Seed Treatment
Syngenta

Treatment #	Chemical
11	Check
12	Dynasty 12.25
13	Dynasty 14.0
14	Vitavax
15	Vitavax, Abound (infurr) 1.0 mls
16	Dynasty 14.0, Abound (infurr) 0.5 mls
17	Vitavax
18	Dynasty 14.0, Abound (infurr) 0.5 mls

Lack of sufficient irrigation water at critical times may account the variability.

Denver City Seed Treatment
Syngenta

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
11	1	2904	75%	0%	1%	528	650
	2	3696	74%	0%	2%	663	
	3	4224	74%	1%	2%	758	
12	1	3432	75%	0%	1%	624	702
	2	4224	74%	1%	1%	758	
	3	4092	73%	1%	1%	725	
13	1	3168	73%	0%	2%	561	686
	2	4488	74%	0%	1%	806	
	3	3696	77%	0%	1%	690	
14	1	3168	73%	1%	2%	561	675
	2	3960	72%	2%	2%	685	
	3	4224	76%	0%	1%	779	
15	1	4224	74%	0%	2%	758	779
	2	4620	75%	0%	1%	840	
	3	3960	77%	1%	1%	740	
16	1	3300	76%	0%	1%	608	657
	2	4224	73%	1%	2%	748	
	3	3432	74%	0%	1%	616	
17	1	2904	73%	1%	2%	514	600
	2	4224	71%	0%	2%	727	
	3	3036	76%	0%	2%	560	
18	1	2376	77%	0%	1%	444	657
	2	4488	74%	1%	1%	806	
	3	3960	75%	0%	1%	720	

Plot Size = 2 rows x 40” x 50’
Soil type = sandy loam
Planting date = April 27, 2004
Type = Runner
Planting weather: Air = 72° F
Soil = 62° F
Moisture = excellent
Harvest Date = October 20, 2004
All values are based on a loan value of $356.06/ton with quality parameters.

Syngenta & Gustafson
Peanut Seed Treatment and Fungicide
Seedling Counts
Stepenville, TX (Erath)
May 4,10,14,& June 4, 2004

3,7,14, 28 days after 1st emergence																
8	8	6	3	3	16	2	6	2	7	10	4	5	7	8	X 1	5
53	51	28	7	29	51	18	32	34	30	36	30	21	36	23	25	38
52	58	39	11	35	58	22	33	40	34	37	40	32	45	28	24	40
37	42	29	9	31	43	25	29	29	27	32	31	26	34	25	25	39
303	304	307	301	308	310	313	316	314	306	312	309	317	302	311	315	305
Rep. 3																
4	9	3	0	6	X 8	1	3	21	3	2	8	2	4	4	4	3
31	37	32	28	31	37	14	23	40	33	29	27	15	37	45	25	33
42	40	36	38	35	45	18	33	38	42	36	31	19	46	46	31	40
31	34	32	31	29	37	17	27	35	37	31	37	20	36	26	28	33
206	209	215	202	214	205	211	203	212	208	213	217	201	210	204	207	216
Rep. 2																
3	0	0	4	0	0	0	3	13	1	2	3	1	1	X 17	1	0
10	22	12	24	6	12	11	29	43	27	10	32	20	27	21	20	6
16	46	35	43	23	36	33	45	53	43	17	45	28	33	21	24	28
15	34	33	35	33	30	30	34	39	27	14	32	26	26	18	22	31
101	102	103	104	105	106	107	108	109	110	111	112	113	114	117	116	115
Rep. 1																
Gravel Road																

Corn

Notes:
- X indicates wildlife damage.
- Double Rate of Herbicide

Treatments:
1. Gustafson- Check
2. Gustafson- VitavaxPctops (L0293)
3. Gustafson- L1292-A1
4. Gustafson- L1294-A1
5. Gustafson- L1332-A1
6. Gustafson- L1226-A1, Thiram 42S, Allegiance, L0283-A1, Pro-Ized Seed Col.
7. Gustafson- Thiram 42S, RTU PCNB, L0283-A1, Pro-Ized Seed Col.
8. Gustafson- L1226-A1, Thiram 42S, Allegiance, RTU PCNB, L0283-A1, Pro-Ized Col./ Blue
9. Gustafson- L1138-A1
10. Gustafson- L1402
11. Syngenta- Check
12. Syngenta- Dynasty 12.25
13. Syngenta- Dynasty 14.0
14. Syngenta- Vitavax
15. Syngenta- Vitavax, Abound (infurr)
16. Syngenta- Dynasty 14.0, Abound (infurr)
17. Syngenta- Vitavax

The Gustafson and Syngenta treatments were different seed lots all planted on the same day.

Erath County Seedling Disease
Gustafson

Treatment #	Chemical
1	Check
2	VitavaxPctops (L0293)
3	L1292-A1
4	L1294-A1
5	L1332-A1
6	L1226-A1, Thiram 42S, Allegiance, L0283-A1, Pro-Ized Seed Col.
7	Thiram 42S, RTU PCNB, L0283-A1, Pro-Ized Seed Col.
8	L1226-A1, Thiram 42S, Allegiance, RTU PCNB, L0283-A1, Pro-Ized Col./Blue
9	L1138-A1
10	L1402

All treatments received a 2 X rate of Treflon herbicide preplant. This severely damaged seedling stand and vigor.

Plot size was 2 rows x 50' x 36"
Soil type = Sandy Loam
Planting date = April 22, 2004
Type = Runner
Planting weather: Air = 68°F
Soil = 62°F
Moisture = wet + additional 5" rainfall received within 72 hours after planting
Harvest Date = October 15, 2004

Erath County Seedling Disease
Gustafson

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
1	1	1452	73%	1%	2%	259	218
	2	1307	68%	1%	5%	220	
	3	1016	69%	0%	5%	174	
2	1	1888	71%	2%	3%	329	349
	2	2033	72%	1%	3%	359	
	3	2033	72%	0%	2%	358	
3	1	1888	73%	0%	3%	338	340
	2	1888	72%	1%	3%	334	
	3	2033	70%	1%	3%	349	
4	1	1888	73%	0%	3%	340	370
	2	1888	68%	0%	5%	348	
	3	2468	71%	0%	2%	422	
5	1	1016 W	70%	0%	4%	175	239
	2	2033	72%	0%	2%	358	
	3	1307	72%	0%	3%	183	
6	1	1742	73%	0%	4%	313	357
	2	2033	70%	0%	3%	349	
	3	2323	71%	0%	4%	408	
7	1	726	66%	1%	6%	119	273
	2	1742	71%	1%	3%	304	
	3	2323	69%	0%	5%	397	
8	1	1597	73%	0%	3%	286	285
	2	1888	71%	1%	3%	329	
	3	1452	67%	0%	5%	241	
9	1	1742	72%	2%	3%	308	331
	2	1597	73%	0%	2%	285	
	3	2323	70%	0%	4%	401	
10	1	1742	70%	1%	4%	301	345
	2	1888	68%	0%	5%	322	
	3	2323	72%	0%	3%	411	

W = Wildlife Damage

All values are based on a loan value of $356.06/ton with quality parameters.

Erath County Seedling Disease
Syngenta

Treatment #	Chemical
11	Check
12	Dynasty 12.25
13	Dynasty 14.0
14	Vitavax
15	Vitavax, Abound (infurr)
16	Dynasty 14.0, Abound (infurr)
17	Vitavax

All treatments received a 2 X rate of Treflon herbicide preplant. This severely damaged seedling stand and vigor.

Plot size was 2 rows x 50' x 36"
Soil type = Sandy Loam
Planting date = April 22, 2004
Type = Runner
Planting weather: Air = 68°F
Soil = 62°F
Moisture = wet + additional 5" rainfall received within 72 hours after planting
Harvest Date = October 15, 2004

Erath County Seedling Disease
Syngenta

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
11	1	1307	67%	0%	7%	219	269
	2	581 W	66%	0%	5%	-	
	3	1888	68%	0%	5%	318	
12	1	1888	62%	2%	9%	296	281
	2	1307	73%	1%	2%	233	
	3	1888	67%	0%	5%	313	
13	1	1597	67%	0%	7%	267	298
	2	1888	71%	0%	3%	329	
	3	726 W	69%	0%	5%	-	
14	1	1742	70%	1%	5%	302	297
	2	1452	70%	0%	4%	251	
	3	1888	73%	1%	3%	338	
15	1	1597	60%	1%	10%	244	330
	2	2323	73%	1%	2%	415	
	3	1016 W	69%	1%	4%	-	
16	1	1452	63%	2%	8%	230	299
	2	1742	71%	1%	4%	305	
	3	2033	73%	0%	2%	363	
17	1	726 W	71%	0%	4%	-	320
	2	2033	69%	0%	5%	347	
	3	1742	68%	1%	5%	293	

W = Wildlife damage = Not counted in average

All values are based on a loan value of $356.06/ton with quality parameters.

Use of Fungicides, Varieties and Spray Program in South Texas Peanut Production

A. J. Jaks, W. J. Grichar and M. R. Baring

SUMMARY

Heavy rainfalls following planting damaged plots resulting in skips and reduced yield. Some varieties, which were sprayed with fungicide, five times and four times by advisory had dollar per acre values which were not different from the same varieties which were unsprayed. However, Flavor Runner 458, Carver and Tamrun OLO1, yield and dollar per acre amounts were greater for each of the spray programs over the unsprayed. The AU-Pnut advisory sprayed above varieties had higher numerical dollar per acre values than the five spray respective varieties. Tamrun-96, Tamrun OLO1, Tamrun OLO2 and Nematam varieties sprayed five times and four times by advisory had significantly less rust than the unsprayed of these varieties. All sprayed varieties regardless of spray program had less leaf spot under severe pressure than unsprayed varieties. Southern blight did not occur in quantities sufficient for measurement.

INTRODUCTION

Grower use of peanut varieties, fungicides and spray programs must result in effectiveness, efficiency and profit in today's market. Growers face decisions in selection of peanut varieties, fungicides and time of application. Peanut varieties, fungicides and spray programs need to be evaluated on a continuing basis to help growers, consultants and farm managers make these decisions.

MATERIALS AND METHODS

Seven peanut varieties were selected for use in this study. The varieties were Flavor Runner 458, Tamrun-96, Carver, Tamrun OLO1, Tamrun OLO2, Nematam and an advanced breeding line (ABL). The varieties were planted in a split plot design with four replications. Plots for each variety were two rows spaced 36-inches apart, each 20 feet long. Varieties were planted (101 lb/A) using a Monosem precision vacuum planter. In this test, blocks of each of the varieties in each replicate were unsprayed, sprayed five times, and sprayed according to the AU-Pnut advisory. Variety blocks sprayed five times were done at random times instead of by calendar schedule. Variety blocks sprayed by AU-Pnut advisory resulted in four sprays. The AU-Pnut advisory uses "rain events" (0.1 inch or greater) from rainfall or irrigation to count up these events which lead to advised sprays. In the five-spray program, the first spray was grower directed by airplane at 34 days after planting (DAP). Bravo 720 at 1.5 pt./A was used in this spray and Echo 720 (chlorothalonil) was used in the fifth spray. Sprays two, three and four used Folicur at 7.2 fl. oz./A. The AU-Pnut advisory sprays used Bravo 720 1.5 pt./A by airplane on the first spray and Echo 720 1.5 pt./A on the final fourth spray. Folicur 7.2 fl. oz./A was used for sprays two and three. Except for the initial spray by airplane, fungicides were sprayed using a CO_2 pressurized (56 psi) belt-pack sprayer equipped with a two row hand-held boom with three nozzles (D2 tips, #23 cores and slotted strainers) per row. Spray rate was 15 gallons per acre at 3.0 mph walking speed. The grower followed standard practices for land preparation, fertility and weed control. Circle pivot irrigation provided supplemental water during the growing season. Assessment of

leaf spot was made by visual ratings using the Florida scale where 1=no disease, and 10=plants dead, completely defoliated from leaf spot. Rust was evaluated using the ICRISAT scale where 1=no disease, and 9=plants severely affected, 50-100% leaves withering. Plots were dug, inverted, dried in the field and combined with a small plot thresher. Plot samples were then force air dried to 10% moisture, cleaned of debris and weighed to determine yield per acre. Samples were removed from plot harvest to determine grade and economic value. Disease ratings, yield, grade and dollar value per acre were analyzed statistically.

RESULTS AND DISCUSSION

Two four inch rains following planting severely washed out portions of some plots in one of the replicates and no doubt hindered total germination of some of the varieties. Rainfall continued through the growing season resulting in severe leaf spot pressure. Fungicide applications had a tough time controlling leaf spot. The above factors no doubt affected yield and resulting dollar value per acre of the varieties under the two spray programs. In addition to those statements in the summary, the AU-Pnut advisory program saved one fungicide spray while providing disease control, which was not significantly different from the five-spray program. In the case of Flavor Runner 458, Carver and Tamrun OLO1 yield and dollar value per acre were similar from the two different spray programs. Southern blight infection was not a yield-limiting factor for the varieties at this location. Grade data for the varieties was variable and is presented in Table 1 with leaf spot, and economic data.

ACKNOWLEDGEMENTS

The researchers extend special thanks to the Texas Peanut Producers Board for interest in and financial support of this research study and program. Special appreciation is extended to Mr. Jimmy Seay, TPPB member and producer from Atascosa County who has interest in and allowed us to conduct this research. Appreciation is extended to Bill Klesel, Dwayne Drozd and Kevin Brewer for technical assistance with this research.

Table 1. Variety/Fungicide Test Data from Atascosa County, 2004.

Variety/Schedule	Leaf spot[2] 10-13-04	Rust[3] 10-13-04	Yield Lbs/A	Grade	$/Acre
Flavor Runner 458 (NO SPRAY)	9.3 a[1]	3.9 b-e	1575 i	69 c-e	276.62 g
Flavor Runner 458 (5 SPRAY)	7.1 b	2.6 c-f	2889 a-f	75 ab	536.21 a-d
Flavor Runner 458 (AU-Pnut)	7.1 b	2.0 ef	2933 a-e	74 a-c	541.50 a-d
Tamrun-96 (NO SPRAY)	9.5 a	6.1 a	2187 d-i	70 a-e	384.40 d-g
Tamrun-96 (5 SPRAY)	7.4 b	2.5 c-f	2075 f-i	68 de	354.53 e-g
Tamrun-96 (AU-Pnut)	7.4 b	2.3 d-f	2452 b-h	71 a-e	433.20 c-f
Carver (NO SPRAY)	9.3 a	4.5 a-c	2106 e-i	66 e	351.76 e-g
Carver (5 SPRAY)	7.0 b	2.0 ef	3020 a-d	72 a-d	544.79 a-c
Carver (AU-Pnut)	7.1 b	2.9 c-f	3440 a	72 a-d	620.95 a
Tamrun OLO1 (NO SPRAY)	9.1 a	5.6 ab	1921 hi	70 a-e	337.83 fg
Tamrun OLO1 (5 SPRAY)	7.3 b	2.0 ef	2850 a-g	71 a-e	508.22 a-e
Tamrun OLO1 (AU-Pnut)	7.4 b	2.4 d-f	3268 ab	72 a-d	588.33 a-c
Tamrun OLO2 (NO SPRAY)	9.1 a	6.0 a	2026 g-i	69 de	354.12 e-g
Tamrun OLO2 (5 SPRAY)	7.4 b	2.0 ef	2867 a-f	70 a-e	502.94 a-e
Tamrun OLO2 (AU-Pnut)	7.3 b	1.8 f	2483 b-h	71 a-e	440.33 b-f
Nematam (NO SPRAY)	9.0 a	4.3 a-d	1576 i	67 de	271.57 g
Nematam (5 SPRAY)	7.3 b	2.0 ef	2107 e-i	69 b-e	366.96 e-g
Nematam (AU-Pnut)	6.8 b	1.5 f	2554 b-h	70 b-e	449.74 b-f
ABL (NO SPRAY)	9.0 a	4.5 a-c	2377 c-i	75 ab	442.62 b-f
ABL (5 SPRAY)	7.4 b	2.9 c-f	3191 a-c	75 ab	593.96 ab
ABL (AU-Pnut)	7.0 b	2.6 c-f	2915 a-f	74 a-c	535.57 a-d

[1]Means in a column followed by the same letter indicate Duncan's New Multiple Range groupings of treatments that do not differ significantly (P=0.05).

[2]Leaf spot disease rating based on Florida leaf spot assessment scale where 1=no disease, 10=plants dead, completely defoliated from leaf spot.

[3]Rust disease assessed using the ICRISAT Rust scale where 1=no disease, 9=plants severely affected, 50-100% leaves withering.

Title: Efficacy of fungicides in soil with different application and watering practices.

PI: Terry Wheeler, Texas Agricultural Experiment Station, Rt. 3, Box 219, Lubbock, TX 79403

CoPI: Dana Porter, Texas Cooperative Extension, Texas Agric. Exp. Station, Lubbock.

Objectives:

1) In the greenhouse, compare concentration of a fungicide applied with chemigation, and then irrigated with different rates.
2) In the greenhouse, compare concentration of a fungicide with chemigation and followed by the first irrigation after application at 1, 3, or 5 days later.
3) In the field, compare pod rot and yield after chemigation followed by a irrigation (½-acre inch/acre) applied at 2, 4, or more days.
4) In the field, compare pod rot and yield after banded or broadcast chemical application over-the-top at 0, 2, and 4 days after application.

The overall goal of this research project was to determine if irrigation timing or rate could impact the concentration of fungicide in the soil, and therefore efficacy, for 28 days after application. There have been a number of occurrences in west Texas, where fungicides were either ineffective, or did not remain effective for the expected period of time. In several of these cases, it was verified that the product being tested was correct for the pathogens present in the field (*Pythium*) and that an isolate of *Pythium* obtained from those fields had normal sensitivity to that fungicide in petri plate cultures. The next hypothesis to test was whether irrigation practices could impact the concentration or efficacy of fungicide over time.

Greenhouse tests

Five-gallon buckets had 1.5-inch holes drilled at four points at a depth of four and eight inches (8 holes per bucket) from the top of the soil. These provided the entry point for soil samples taken at 1, 7, 14, 21 and 28 days after fungicide application. Each soil core sampled was 1-inch in diameter and 4-inches in length. Fungicide free soil was used to plug the areas where a core was removed. At the four-inch depth, horizontal cores were taken at 1, 7, 14, and 21 days, while at the 8-inch depth, horizontal cores were taken at 7, 14, 21, and 28 days. The days represented days after application of 1 ml of Ridomil Gold EC, which was applied in a total of 30 ml of water to the foliage in each pot and then watered with the equivalent of ½-acre inch of water/acre. The treatments were: +/- fungicide, irrigation rate (applied three times/week) of 0.5, 1, or 1.5-acre inches/acre, with the first irrigation after chemigation applied at either 1, 3, or 5 days later. There was also a treatment of Ridomil Gold EC which was sprayed on the foliage, but was not immediately watered in. The fungicide would only have been washed down to the soil after the first irrigation event (1/2-acre inches of water/acre) applied at either 1, 3, or 5 days after planting. This treatment was to test the loss of product that may occur if people apply it off label (i.e. without chemigation, but by banding it) and then wait for the pivot to water it in several days later. The concentration of the fungicide was measured using an Envirologix metalaxyl sensitive antibody kit (Envirologix, Portland, ME, www.envirologix.com), that measured concentrations of metalaxyl from 0 to 1.75 ppb. The soil core taken from the bucket was frozen until assayed. For the assay, the soil core was mixed well and 40 g of soil was shaken in 100 ml methanol for 3 minutes, and allowed to settle. Then 0.1 ml was drawn through

a millipore filter (to clean it of any soil particles) and diluted by 1,000 to 5,000 times. The diluted concentration was then applied to the metalaxyl antibody kit, run through the protocol and read for concentration using a Statfax 2100 microplate reader from Awareness Technologies, Inc. (Palm City, FL). The factors of fungicide (+/-), day of first irrigation after application, irrigation rate (0.5, 1, and 1.5), sample depth (4 versus 8 inches), and sample date (7, 14, or 21 days for combined depth analyses; 1, 7, 14, or 21 days for 4-inch depth only analyses; and 7, 14, 21, and 28 days for 8-inch depth only analyses), and all possible interactions were tested against the measured fungicide concentration from the antibody kits (adjusted for dilution). The factor of plant application versus soil application and time of first irrigation after application was also tested. Since the plant application was only irrigated with ½-acre inch per acre, there was no irrigation affect. All treatments were arranged in a randomized complete block design with four replications. The entire experiment will be repeated once.

The fungicide factor was highly significant, which means that there was a higher concentration of metalaxyl in the soil where fungicide was applied than where it was absent. Fungicide also interacted with all other factors significantly, meaning the response to metalaxyl measured was different in the presence of fungicide than in the absence. This means that our antibody test was reasonably sensitive and the background noise was low. The rest of the data presented will be for only fungicide treated pots.

Irrigation rate vs. fungicide concentration. Fungicide concentration was significantly higher (P=0.05) in the 1.5-acre inch of water irrigation rate (1,964 ppb metalaxyl) than the 1.0 (1,397 ppb metalaxyl) or 0.5 (1,235 ppb metalaxyl) acre-inch treatments, when averaged over both depths and 7-21 days. Metalaxyl concentration versus irrigation for the four-inch (Fig. 1A) depth was not significantly different at each measurement time. At the eight-inch depth (Fig. 1B), the highest irrigation treatment had significantly higher concentrations of metalaxyl at 7, 14, and 21 days compared with the lowest irrigation treatment (Fig. 1B). At 28 days after application and at eight inches, there were no differences in fungicide concentration with respect to irrigation treatment, though the highest irrigation rate treatment had dropped compared with 21 days, while the concentration at the lower irrigation rates had increased. It appeared that the highest irrigation rate was washing more fungicide down to the 8-inch depth, compared with the other irrigation treatments. It is interesting that we did not see a corresponding decrease in the concentration at the four-inch depth, compared to the other irrigation treatments. This test does NOT support the hypothesis that higher irrigation rates are washing fungicides out of the profile and therefore running out sooner than lower irrigation rates.

Fungicide concentration versus time. Metalaxyl concentration was significantly higher, averaged over all other treatments at 14 days (1,781 ppb) after application compared to 7 days (1,150 ppb) after application. At 21 days, fungicide concentration (1,433 ppb) was intermediate between 7 and 14 days. This result was consistent across all depths, irrigation treatments, etc. This result suggests that metalaxyl concentration is higher initially near the soil surface, and can take 14 days to increase to its highest concentration at the four-inch depth. This result supports the idea of treating before a problem is severe, because it will take time for the fungicide to distribute all through the area of interest.

Fungicide concentration versus depth. Fungicide concentration averaged over all irrigation levels, date of first irrigation treatment, and 7 - 21 days was 3.3 times higher at four inches (2,235 ppb) than at 8-inches (680 ppb).

Number of days between chemigation and next irrigation event. The number of days between chemigation event and the first irrigation had very little affect on concentration of metalaxyl. In the full model, which tested for interactions between depth, date, irrigation, etc., there was no significant interaction between day of the first irrigation and any other factor. Day of first irrigation was only marginally significant at P =0.09, where irrigation at 1 day averaged 1,419 ppb, irrigation at 3 days averaged 1,237 ppb, and irrigation at 5 days averaged 1,682 ppb.

The affect of leaving fungicide on the foliage or washing it immediately to the soil surface was investigated. There was no significant difference in fungicide concentration at any measured time or depth between these two application methods. It is unknown why the plant did not uptake a substantial part of the fungicide, reducing the subsequent amount that made it to the soil surface. One possibility is that the initial application of fungicide in 30 ml of water was sufficient to wash most of the product down to the soil.

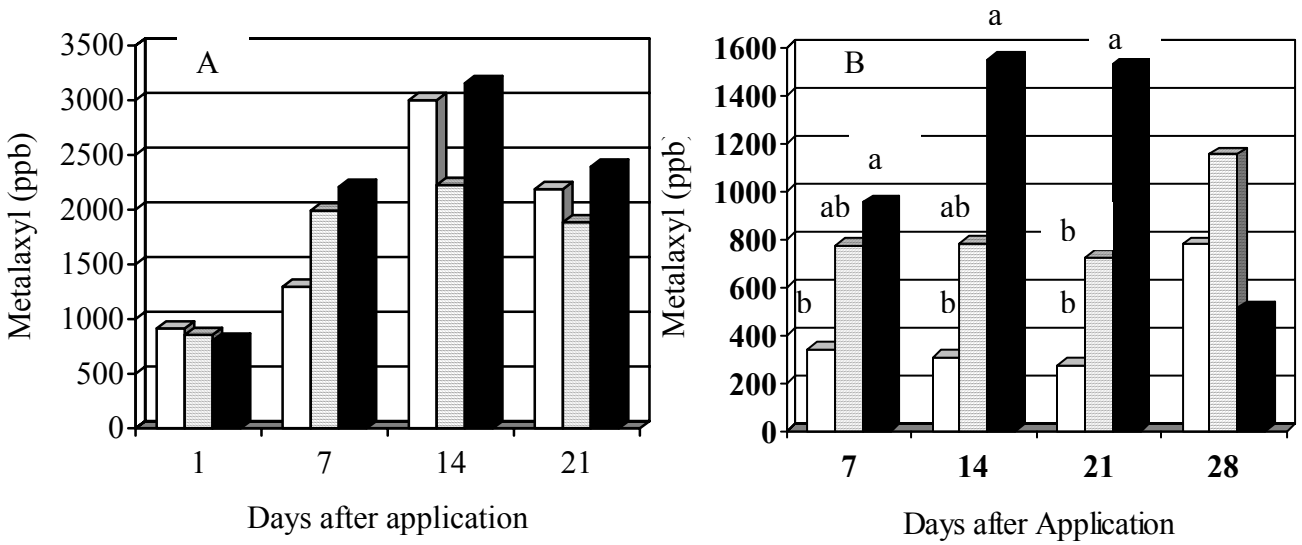


Figure 1. Concentration of metalaxyl at four (A) and eight (B) inch depths when pots were irrigated with 0.5 (□), 1.0 (▤), or 1.5 (■)-acre inches/acre for 28 days after irrigation application. Different letters indicate a significant difference in metalaxyl concentration between irrigation treatments, for a specific date (*P*=0.05).

Field Tests

The field tests were conducted at the Western Peanut Growers Research Farm at the drip irrigation area. These tests correspond to objectives 3 and 4 listed earlier.

Test 1 (objective 3). A series of 12 foot long, 4 row wide areas were selected for the test. Each plot had fairly uniform growth within the middle two rows throughout the test area. Since the entire drip irrigated area was set up for experiments by USDA-ARS, the plots were positioned within existing irrigation regimes. For this test, the drip irrigation was under every row, and two replications were irrigated by drip with 100% ET (evapotranpiration) and two replications were irrigated by drip with 75% ET. The test site was chosen so that there would not be any interference with over-the-top irrigation, as would occur with a center pivot system. There was also a history of pod rot the previous two years at this site. The area was planted in the first week of May with Flavorunner 458. Ridomil Gold EC (8 oz/a) was applied to 3 plots in each replication at 60 days after planting, and 3 plots were left untreated. The fungicide was immediately watered in with ½-acre inch of water/acre. At 2 days after fungicide application, ½-acre inch of water/acre was applied to one fungicide sprayed plot, and one plot which did not receive a fungicide, in each replication. A different set of plots was watered at 4 days after planting. A third set did not receive any additional water over-the-top, until the next rainfall. At 90 days after planting, pods were examined for disease and a second set of applications were made similar to the first set, except that Moncut 70 DF (29.6 oz/a) was combined with Ridomil Gold EC, since *Sclerotium rolfsii* was the most commonly isolated fungus from the plot area. Ridomil Gold EC has no activity on *Rhizoctonia* or *S. rolfsii*. The irrigation treatments were done exactly the same to the same plots as at 60 days after planting. The plots were dug on October 11 and thrashed on October 20. After digging the number of pods that could be easily seen with pod rot were counted in each plot. The pods in each plot were weighed and a 250-gram subsample removed for subsequent grading. Kernels were graded for size (sound mature kernels), sound splits, diseased kernels, and other kernels. The value/acre in a plot was calculated by earning \$4.974 x (% sound mature kernels + sound splits) + \$0.81 x (other kernels) – the penalties for diseased kernels and sound splits. The cost of fungicides was also factored into the value/acre.

At 90 days after planting, *S. rolfsii* was isolated about 6 times more frequently than *Rhizoctonia*, and *Pythium* was not isolated at that time. At harvest, *Rhizoctonia* was the most commonly isolated pathogen. It was found 5 times more frequently than *Pythium*, and 15 times more frequently than *S. rolfsii*. Disease was severe enough to affect the grade, % diseased kernels, and yield. The fungicide treated plots had higher yields than those that did not receive fungicides (Table 1). The efficacy of a fungicide after chemigation was unaffected by the timing of irrigation after chemigation. The results from the field test measuring pod rot and yield came to a similar conclusion as the greenhouse test measuring concentration of metalaxyl.

Test 2 (objective 4). This test was set up near the previous field test. Differences included the drip irrigation was spaced at every other row, rather than every row, and the fungicide applied over-the-top was Abound FL at 12.3 oz/acre banded at 60 days, and broadcast at 24.6 oz./acre at 90 days after planting. Since this test did not involve chemigation, the fungicide was allowed to remain on the plant surface, and the irrigation treatments applied over the top were at 0, 2, or 4 days after application. There were also four replications of each treatment arranged in a randomized complete block design, similar to the previous test.

Irrigation timing had no impact on the amount of disease per plot; only the application of the fungicide versus no fungicide affected disease and yield (Table 2). The plots without fungicide averaged more disease (67 pods/plot) compared with the fungicide treated plots (31 pods/plot). They also averaged poorer grade (68 versus 75), more diseased kernels (5.1% versus 2.0%), lower yields (2,375 lbs/a versus 3,660 lbs/a) and had lower value/a ($347.51 versus $597.76).

Table 1. Effect of timing of irrigation and application of Ridomil Gold EC + Moncut 70 DF on pod rot of peanuts.

Ridomil Gold EC + Moncut DF	Day of irrigation after applic.	# of rotted pods/plot	Grade	% Diseased kernels	lbs/ acre (Yield)	$/acre
0	2	153 a	61.2 b	9.6 a	1,898 b	218.10 b
0	4	104 a	65.5 b	7.8 a	2,195 b	319.52 b
0	first rain	221 a	60.2 b	9.1 a	1,722 b	190.41 b
8+29.6 oz/a	2	73 b	75.2 a	2.6 b	4,271 a	467.93a
8+29.6 oz/a	4	58 b	72.4 a	2.4 b	4,077 a	440.27 a
8+29.6 oz/a	first rain	66 b	75.8 a	2.9 b	3,863 a	431.27 a

$/acre include the value of the pods, minus deductions for disease and splits, and minus fungicide costs for two applications of Ridomil Gold EC at 8 oz/a, and one application of Moncut DF at 29.6 oz/a.

Table 2. Effect of timing of irrigation after application over-the-top with Abound FL.

Abound FL	Day of irrigation after applic.	# of rotted pods/plot	Grade	% Diseased kernels	lbs/ acre (Yield)	$/acre
0	0	38	70.8	4.2	2,875	434.84
0	2	100	65.2	6.3	1,754	222.50
0	4	63	67.7	4.9	2,497	385.19
24.6 oz/a	0	30	75.7	1.5	3,729	639.12
24.6 oz/a	2	36	71.9	3.1	3,495	506.06
24.6 oz/a	4	26	76.0	1.2	3,755	648.13

$/acre included the value of the pods, minus deductions for disease and splits, and minus fungicide costs for two applications of Abound FL (one banded at 60 days [12.3 oz/a], and one broadcast at 90 days [24.6 oz/a]). Averages over the 0 fungicide rate (across the three irrigation treatments) and the 24.6 oz fungicide rate were significantly different for all measurements presented in Table 2.

WEED CONTROL IN THE HIGH AND ROLLING PLAINS AND IN SOUTH TEXAS PEANUT PRODUCTION

Peter A. Dotray[1], W. James Grichar[2], and Todd A. Baughman[3]

OVERALL SUMMARY OF WEED CONTROL PROGRAMS IN 2004

Weed science related studies were conducted in the various peanut growing regions of the state. These studies addressed two main areas: peanut tolerance and peanut weed management systems using existing herbicides as well as newly developed herbicides that do not yet have a label in peanut. We also focused on reduced rates of herbicides. Many of the most troublesome weeds in peanut were studied to determine which herbicide systems were most efficacious. Most of these studies were conducted because of the support of the Texas Peanut Producers Board with only minimal support from private industry. Many of these studies are reported in the following pages of this report. The data collected has been and will continue to be discussed at county meetings this spring and summer and at professional meeting such as the American Peanut Research and Education Society annual meeting. This report is divided into two parts with a discussion on weed research in the High and Rolling Plains and in south Texas.

INTRODUCTION

Weeds continue to be a major concern for most peanut producers in the state. Weeds compete with the peanut plant throughout the growing season for moisture, nutrients, and sunlight. Because of the low growing nature of peanuts, weeds that generate early and are not controlled "escape" relatively late in the growing season. Covering peanuts and weeds with soil during cultivation is not practical and can lead to more problems. Weed removal is extremely difficult once they have become established in the peanut row. After both peanut and weeds achieve some growth, mechanical removal with tractor-mounted cultivators is impossible. Hand weeding is difficult, costly, and unrealistic under modern day conditions. Consequently, peanut growers have readily accepted chemical weed control practices. During digging and combining operations, under weedy conditions, the peanut pods can become detached from the peanut vines and are left on the soil surface. These detached peanut pods cannot be recovered with current mechanized harvesting equipment. Peanut growers apply preplant incorporated and preemergence herbicides to control annual grasses and small-seeded broadleaf weeds. Postemergence herbicides are applied to control larger-seed weeds, hard-to-kill weeds, perennial weeds, or escaped weeds. Due to major differences in environmental and edaphic characteristics, problem weeds can vary from region to region.

---

[1]Professor and Extension Weed Specialist, Lubbock; [2] Research Scientist, Beeville; and [3] Associate Professor and Extension Agronomist, Vernon.

MATERIALS AND METHODS

Field experiments were established using traditional small plot techniques. Plot sizes ranged from 2 rows by 25 to 50 ft to 4 rows by 30 feet. Herbicides were applied with a CO_2 backpack sprayer or tractor-mounted compressed air sprayer. Carrier water volumes were 10 to 20 gallons per acre. Visual weed control and peanut injury ratings were made at various intervals during the growing season on a scale of 0 = no weed control or peanut injury to 100 = complete control or peanut death. In some experiments, peanuts were dug, combined, cleaned, and weighed for yield and grade comparisons.

RESULTS AND DISCUSSION

Part One: *HIGH AND ROLLING PLAINS*

Prowl/Sonalan PRE and incorporated by water. Growers using reduced tillage or no-till practices do not incorporate the dinitroaniline herbicides using mechanical incorporation. This study examine the use of Prowl and Sonalan surface applied at 2, 3, and 4 pints per acre followed by irrigation to incorporate these herbicides. Prowl at 4 pints caused up to 8% visual peanut injury on Jun 10, but this injury decreased to 3% near the end of the growing season (Table 1). Sonalan at 3 and 4 pints caused peanut injury early and mid-season (4 to 8%), but no injury was observed at harvest. Sonalan at 4 pints caused a reduction in canopy width mid-season, but no canopy reduction was observed at harvest. Plots treated with Prowl or Sonalan produced 5376 to 6369 lb/A and were not reduced when compared to the untreated check, which yielded 5992 lb/A (Table 1). Although not statistically different, plots treated with Prowl and Sonalan at 4 pints numerically produced the lowest yields. According to the current Sonalan label, this herbicide cannot be chemigated and information on the label suggests mechanical incorporation only. On the Prowl label, chemigation and surface applications followed by 0.5 to 0.75-inches of water are suggested. Since the 2003 and 2004 data produced slightly different results, this study will be repeated in 2005 (Table 1). An additional study will examine the use of Prowl at 2 pints followed by different amounts of irrigation water to incorporate the herbicide.

Peanut tolerance to AIM and ET (I). FMC has applied for a label for AIM (chemical name carfentrazone). Both sulfentrazone and carfentrazone belong in the PPO family of herbicides which kills weeds by rapidly destroying cell membranes. Until 2004, little university data had been collected on the use of Aim in peanut and no data came from experiments in west Texas. Field experiments were conducted in 2004 to gain some experience with a herbicide that may be registered for use in peanut as early as 2005. Another new PPO inhibitor, ET (manufactured by Nichino America), may also be available in the future for use in peanut. Three tests in west Texas and one test in the Rolling Plains and south Texas were established in 2004. AIM and ET were applied at 1.5 and 2.0 ounces per acre at AG-CARES. Applications were made 31 and 120 days after planting. Peanut injury was evaluated after each application and yield and quality determined at the end of the growing season. In order to ensure that plant injury and yield and quality loss was the result of an herbicide treatment, plots were maintained weed-free. Visual injury was observed following AIM and ET applied early postemergence regardless of rate (Table 2). Injury ranged from 47 to 62% following

AIM treatments and 35 to 40% following ET treatments 14 days after treatment. All peanut injury decreased over time, but was still visible at harvest (2 to 7%). Visual injury from applications made at 120 DAP did not exceed 5%. Peanut yield was reduced following early season applications of AIM at 2 ounces and ET applied at 1.5 and 2 ounces and following ET at 2 ounces applied late season (Table 2).

Peanut tolerance to AIM and ET (II). In a second tolerance test, AIM and ET were applied at 1.5 and 2.0 ounces per acre at the Western Peanut Growers Research Farm (WPGRF) near Denver City. Applications were made 29 and 119 days after planting. Peanut injury was evaluated after each application and yield and quality determined at the end of the growing season. In order to ensure that plant injury and yield and quality loss was the result of an herbicide treatment, plots were maintained weed-free. Visual injury was observed following AIM and ET applied early postemergence regardless of rate (Table 3). Injury ranged from 22 to 47% following AIM treatments and 33 to 48% following ET treatments 14 days after treatment. All peanut injury decreased over time, but was still visible at harvest (2 to 3%). Visual injury from applications made at 119 DAP did not exceed 7%. Peanut yield was not reduced following any herbicide treatment at this location (Table 3). This study and additional weed control studies using AIM and ET will be conducted in 2005 at several locations.

Varietal tolerance to several herbicides. Differences in varietal tolerance have been studied since 2000, when Strongarm applied preemergence (PRE) caused significant injury to peanut. Studies since 2000 have confirmed that Flavor Runner 458 is more susceptible to Strongarm PRE compared to Tamrun 96. At WPGRF in 2004, a study was conducted to examine peanut tolerance to Valor applied preemergence and Strongarm and Cadre applied early postemergence. A randomized block design with split-plot arrangement and three replications was used. The main plot factor was variety (Tamrun 96, Tamrun OL01, Tamrun OL02, Florunner, Flavor Runner 458, Tamspan 90, OLIN) and the subplot factor was the treatment (Valor PRE at 0.094 (3 oz) and 0.188 lb ai/A (6 oz), Strongarm early postemergence (EPOST) at 0.016 (0.3 oz) and 0.032 lb ai/A (0.6 oz), and Cadre EPOST at 0.063 (1.44 oz) and 0.126 lb ai/A (2.88 oz), and an untreated control). Subplots were 2 rows by 30 feet. Four weeks after the PRE treatments were applied (May 26), injury was observed following Valor at 6 oz (2X rate) (Table 4). This injury ranged from 5 to 25% and was greatest in Flavor Runner 458. Injury from Valor at 3 oz ranged from 0 to 8%. By the end of the season (Oct 13), Valor injury did not exceed 10% and this injury was observed in Flavor Runner 458. Four weeks after the postemergence (POST) treatments were applied (June 23), Strongarm at 0.6 oz (2X rate) injured peanut 0 to 8% whereas Strongarm at 0.3 oz cause 0 to 5% injury. Cadre at 2.88 oz (2X rate) injured peanut 6 to 18% whereas Cadre at 1.44 oz caused 3 to 10% injury. Flavor Runner 458 was more susceptible than Tamrun 96, OL01, Florunner, and OLIN following Cadre at 2.88 oz. End of season injury did not exceeded 5% following any Strongarm treatment and was most apparent following Cadre at 2.88 oz (5 to 17%). Within peanut variety, no herbicide treatment reduced yield relative to the non-treated control (Table 4). Three other varietal tolerance studies were conducted (two on Runner varieties and one on Virginia varieties). Valor, Strongarm, and Cadre were applied at their 1X rate. No major differences were observed among the runner or Virginia varieties following each herbicide (data not shown). A varietal tolerance will be conducted in 2005 using Cobra, which will be available for use in peanut.

Valor timing (I) and (II). The current Valor label states that Valor may be used at 2 to 3 ounces per acre and must be applied preemergence or within 2 days after planting. Injury has been observed in past years and part of this injury was believed to be the result of delayed applications. We conducted two studies in 2004 to address Valor timing. Valor was applied at 3 and 6 ounces at 1, 3, and 6 days after planting. At WPGRF, Valor caused up to 7% injury by mid season, but no differences were observed between application timing nor rate (Table 5). At Lamesa, peanut was injured 10% on May 24 and 11% on June 10 (Table 6). Injury was often greater as rate increased, but injury was not greater with delayed application timing. Results from Georgia showed that yield and grade were reduced when applications were delayed from the traditional preemergence application which was made at planting. Although our data does not show this yield and grade reduction, intense rainfall after application may be needed for Valor injury to occur. Crop injury was observed following Valor use if proper tank clean out procedures are not followed.

Ivyleaf morningglory control with reduced rates of Cadre and Strongarm. There is much interest to use reduced herbicide rates to reduce peanut injury and carryover problems to susceptible crops; however, reduced rates may lead to poor weed control. Cadre and Strongarm were used at their full rates (1.44 and 0.3 ounces, respectively) and at the following ratios: 75%:25%, 50%:50%, and 25%:75% of their full rates. The objective of this study was to determine differences in peanut tolerance and ivyleaf morningglory when reduced rate combinations were compared to full rates of either Cadre or Strongarm applied postemergence. Peanut injury early season (June 10) was greatest with the full rate of Cadre and decreased following the lowest rate of Cadre (25%) plus a reduced rate of Strongarm (75%). Peanut injury was 6% or less by Oct 11 and no differences were observed across rates. Ivyleaf morningglory control was similar for all treatments early season. By the end of the season, ivyleaf morningglory control was greatest with the full rate of Cadre (85%), and the 75:25 and 50:50 Cadre:Strongram rates (75 to 82%). Strongarm alone controlled ivyleaf morningglory 65% (Table 7). Yield was not different across treatments.

Ivyleaf morningglory control following reduced rates of Cadre or Pursuit plus other postemergence herbicides. Full rates of Cadre and Pursuit were compared to reduced rates plus the addition of other postemergence herbicides. End of season ivyleaf morningglory was controlled 84% following Cadre applied alone at 1.44 ounces per acre. A reduced rate of Cadre (0.72 ounces) plus 2,4-DB, Storm, or Ultra Blazer provided similar ivyleaf morningglory control (77 to 92%). Pursuit alone at 1.44 ounces per acre controlled ivyleaf morningglory 91%. Reduced rates of Pursuit plus 2,4-DB, Ultra Blazer, or Strom was less effective at controlling this weed (67 to 75%) compared to the full rate of Pursuit alone. No differences in peanut yield were observed following all treatments (Table 8).

Yellow nutsedge control following reduced rate combinations of Cadre or Pursuit plus Dual Magnum or Strongarm. Reduced rates of Cadre and Pursuit plus Dual Magnum or Strongarm were used to determine peanut injury and control of yellow nutsedge compared to control following full rates of Cadre and Pursuit applied alone. On June 21 and September 20, peanut injury following reduced rates of Cadre plus Strongarm or Dual Magnum decreased compared to the full rate of Cadre alone. End of season yellow nutsedge control was similar following the full rate of Cadre (95%) and the

reduced rate of Cadre plus Dual Magnum (94 to 98%). The reduced rate of Cadre plus Strongarm was less effective at controlling yellow nutsedge (80 to 85%). The full rate of Pursuit alone and reduced rates of Pursuit plus Dual Magnum or Strongarm did not injury peanut more than 11%. Peanut injury was not reduced when the rate of Pursuit was reduced in tank mix with Dual Magnum or Strongarm. End of season yellow nutsedge control following the full rate of Pursuit was 77%. The reduced rate of Pursuit plus Dual Magnum or Strongarm provided similar control of yellow nutsedge (Table 9). Yield was not affected by any herbicide treatment.

Yellow nutsedge control following Pursuit plus Outlook application timings. The application timing of Pursuit tested to determine which timing was most effective at controlling yellow nutsedge. Pursuit was applied early-postemergence (EP), mid-postemergence (MP), and late-postemergence (LP). All treatments contained an additional application of Outlook LP. Peanut injury did not exceed 8% during the growing season. End of season yellow nutsedge was controlled 88% by Pursuit MP followed by Outlook LP. Pursuit EP or LP followed by Outlook LP controlled yellow nutsedge 83% (Table 10). Several growers prefer to cultivate early and use herbicides later in the season. This data would support using herbicides MP and LP, assuming that weeds are control by cultivation early season and that cultivation does not prune peanut roots and hurt the pegging process.

SOUTH TEXAS

Weed Control Using Cadre and Pursuit in combination with 2,4-DB, Storm, and Ultra Blazer. Studies were initiated to evaluate the effects on weed control when Cadre and Pursuit was applied at one-half and full rates in combination with three commonly used broadleaf herbicides.

Smellmelon (*Cucumis melo* L.) control was greater than 90% when Cadre was used at the full rate (1.44 oz/A) alone or in combination with 2,4-DB, Storm, or Ultra Blazer (Table 11). When Cadre was used at the ½ X rate, the addition of Storm to Cadre reduced smellmelon control when compared with the full rate of Cadre. The addition of 2,4-DB or Ultra Balzer to the ½ X rate of Cadre controlled greater than 90% smellmelon while the ½ X rate of Cadre alone controlled 88%. Pursuit alone or in combinations did not control smellmelon as well as Cadre. Pursuit alone at the ½ X or full rate controlled only 45 and 51% smellmelon, respectively (Table 11). The addition of Ultra Blazer to the ½ X rate of Pursuit improved smellmelon control to 92% while 2,4-DB or Storm combinations with the ½ X rate of Pursuit controlled no greater than 51%. When the full rate of Pursuit was used, the addition of 2,4-DB improved control to 80% while Pursuit alone or in combination with Storm or Ultra Blazer controlled no greater than 55%. Storm, Ultra Blazer, or 2,4-DB alone controlled less than 60% smellmelon (Table 11).

Only Cadre treatments which included the full rate (1.44 oz/A) controlled at least 81% horse purslane (*Trianthema portulacastrum* L.) (Table 11). Cadre at the ½ X rate or Pursuit at the ½ X or full rate failed to provide acceptable horse purslane control (<80%). Storm alone controlled horse purslane 83% while 2,4-DB or Ultra Balzer controlled 70% or less.

Palmer amaranth control was 83 to 88% when Cadre or Pursuit was used alone at either the ½ or full rate (Table 11). The addition of the three broadleaf herbicides to Pursuit or Cadre improved control to at least 94% while 2,4-DB, Storm, or Ultra Blazer alone controlled 88 to 98% Palmer amaranth.

Smellmelon, Horse purslane, and Palmer Amaranth Control with POST Herbicides. These three broadleaf weeds continue to be a problem in many peanut fields in the south Texas growing region. Studies were initiated to study the effects of commonly used postemergence (POST) broadleaf herbicides when applied to weeds less than 6 inch tall (early postemergence [EPOST]) or weeds 10 to 12 inch tall (late postemergence [LPOST]).

Strongarm controlled smellmelon better when applied EPOST than LPOST (Table 12). Cobra controlled 78% smellmelon when applied EPOST and only 53% when applied LPOST. Pursuit controlled 83% when applied LPOST and 68% applied EPOST while Cadre controlled smellmelon 80 to 92% when applied EPOST or LPOST. Herbicides such as 2,4-DB, Ultra Blazer, and Basagran controlled no greater than 63% smellmelon.

Only Cobra applied EPOST provided effective (93%) control of horse purslane (Table 12). None of the other herbicides provided better than 62% control when applied EPOST or LPOST.

Most POST herbicides controlled Palmer amaranth better when applied EPOST than LPOST (Table 12). Only 2,4-DB and Basagran did not control Palmer amaranth better when applied EPOST than LPOST. Neither herbicide controlled better than 69% Palmer amaranth.

Smellmelon, Horse Purslane, and Palmer Amaranth Control with Soil-applied Herbicides. These weeds are difficult to control with POST herbicides alone; therefore, studies to determine effective control measures with soil-applied herbicides alone or followed by POST herbicide applications were initiated.

Smellmelon control was 93% with Valor at 2 oz/A while the 3 oz/A rate of Valor controlled only 70% (Table 13). Prowl alone controlled smellmelon 60% while combinations of Prowl plus Valor, Pursuit, or Strongarm provided at least 83% control. Dual Magnum or Outlook alone or in combination with Prowl controlled no greater than 58%. When Prowl was followed by POST applications of Cadre, Ultra Blazer, or Cobra, smellmelon control was at least 89%. A split-rate of Cadre following Prowl provided 100% control.

Prowl alone controlled 37% horse purslane while combinations of Prowl plus Pursuit, Strongarm, Dual Magnum, and Outlook provided at least 85% control (Table 13). Dual Magnum and Outlook alone controlled no greater than 40% smellmelon while Valor alone controlled no greater than 64% at either rate. Prowl followed by Valor applied preemergence (PRE) controlled 77% horse purslane. Prowl followed by a POST application of Cobra controlled 89%. POST applications of Cadre following Prowl controlled no better than 70%.

Prowl or Outlook alone controlled less than 55% Palmer amaranth while Pursuit alone or Prowl applied PPI plus Pursuit applied PRE controlled 100% (Table 13). Valor alone at 2 oz/A provided 43% control while the 3 oz/A rate of Valor alone controlled 80%. Dual Magnum alone controlled 80% Palmer amaranth. POST applications of 2,4-DB or Basagran following Prowl provided less than 70% control. All other herbicide combinations which included Prowl controlled at least 80% Palmer amaranth.

Comparison of Prowl Formulations. A new formulation of Prowl referred to as Prowl H_20 has been released for use during the 2005 growing season. It will be in limited supply this year but should eventually replace Prowl EC in the next few years. BASF claims the new formulation will be easier to clean up, use at slightly lower rates, and will remain on the soil surface longer without incorporation. BASF is targeting Prowl H_20 for the reduced-tillage market in 2005. Studies were initiated in 2004 to compare the two Prowl formulations for weed control and peanut response. Texas panicum control with either formulation was equivalent when rated 4 and 8 weeks after treatment (Table 14). Peanut yield and grade did not differ with either formulation.

Controlling Volunteer Peanuts in Cotton with Cotton Herbicides. With the increase in the past few years of a crop rotation in south Texas of cotton following peanuts, we have had more questions about controlling volunteer peanuts in cotton. This was especially true in the early portion of the 2004 growing season which had above average rainfall. Due to the wet conditions in the fall of 2003, many peanut pods were left in the field at harvest, resulting in excessive number of volunteer peanuts during the 2004 spring and early summer. Studies were initiated to determine response of six peanut cultivar to commonly used POST cotton herbicides. Cultivars used included: Carver, OL02, Hull, Tamrun 96, Georgia 02C, and Georgia 01R. Plots were rated 1, 2, and 4 weeks after herbicide application for peanut injury and death. The response of peanuts to the herbicides gradually increased over time and culminated in maximum injury approximately 4 weeks after herbicides were applied.

No differences in peanut cultivar response was noted; therefore, data were combined over varieties and presented by herbicide treatment (Table 15). Ignite provided the quickest kill (96%) while Roundup at 36 fl oz/A controlled peanut 71% when rated 1 week after treatment. Herbicides which provided at least 98% peanut death when rated 4 weeks after treatment included MSMA, Roundup at 36 fl oz/A, Roundup at 24 fl oz/A applied 3 plus 5 weeks after peanuts were planted, Ignite at 32 and 40 fl oz/A, Direx, Envoke at 0.1 and 0.15 oz/A, Suprend at 1.25 and 1.5 lb/A, and the mixture of Direx plus MSMA. Cotoran, and Buctril alone controlled less than 50% peanut while the tank mixture of Cotoran plus MSMA controlled 80%.

Comparison of Split-Rates of Cadre, Pursuit, and Strongarm with Full Labeled Rates for Weed Control. In earlier weed control work with yellow nutsedge, we have seen better nutsedge control with Cadre when applied at 1/2 X rate approximately 2 to 3 weeks after planting followed by another ½ X rate approximately 2 to 3 weeks later. Studies were undertaken to evaluate weed control of Cadre, Pursuit, or Strongarm applied at the full labeled rate EPOST or LPOST or when applied two times at the ½ X rate approximately 3 weeks apart on three broadleaf weed species.

Pursuit control of smellmelon was best (71%) when applied at the split-rate compared with the one time application of the full rate (Table 16). Cadre controlled smellmelon equally well when applied EPOST at the full labeled rate or with the split application. Strongarm applied POST failed to control smellmelon effectively at any application.

Pursuit control of tall waterhemp (*Amaranthus tuberculatus*) was at least 86% with the full rate applied EPOST or the split application while the LPOST application at the full rate controlled only 70% (Table 16). Although Cadre effectively controlled tall waterhemp with any application timing ($\geq$ 83%), slightly better control was noted with the EPOST or split application. Strongarm applied POST controlled tall waterhemp no better than 71% with the full rate applied EPOST or split application but control was less than 50% when applied LPOST at the full rate.

Pursuit control of ivyleaf morningglory (*Ipomoea hederacea* L.) was best with the full rate at the LPOST application (Table 16). The split application of Pursuit did not control ivyleaf morningglory any better than the EPOST application at the full rate. Cadre control did not differ greatly with any application timing while Strongarm control was best with the split application.

Weed Control, Peanut Injury, and Yield When Using Aim and ET Herbicides. Aim and ET are contact herbicides similar to Paraquat that are being evaluated for use in peanuts. FMC has applied for a label for Aim in peanut and we have not had the opportunity to do much research with either herbicide. These herbicides are in the PPO family of herbicides and studies were undertaken to determine weed efficacy and peanut tolerance. Aim and ET, at four rates, were applied at three different times during the growing season in a weedy area and in another area kept weed-free with Prowl applied PPI, to evaluate weed control and peanut response independent of weed pressure.

Both Aim and ET effectively controlled tall waterhemp but did not control broadleaf signalgrass when rated 4 weeks after herbicide application (Table 17). Since neither of these herbicides have any residual activity, late-season ratings would not have shown any effective control. Under weed-free conditions, both herbicides caused peanut injury in the form of chlorosis and necrosis when rated 7 days after herbicide application. Peanut injury was worse with the 28 and 56 days after cracking application compared with at cracking application (Table 17). When yields were compared, only 2,4-DB and ET at 0.5 oz/A applied at crack did not result in an yield increase over the untreated check.

Peanut Response to Aim and ET. Aim and ET at 1.5 and 2 oz/A were compared when applied early-season (28 days after crack) versus a late-season application (90 days after crack) for peanut response.

More peanut injury was visible with the 28 DAC application than the 90 DAC application with both herbicides (Table 18). No differences in peanut yield was noted among any of the Aim and ET treatments but all herbicide treatments were greater in yield than the untreated check.

ACKNOWLEDGMENTS

The authors wish to express thanks to the Texas Peanut Producers' Board and the National Peanut Board for their continued interest and financial support of our weed science research efforts. We would also like to thank our cooperators of which they contributed not only interest and effort but in many instances time as well: Marsh Brothers, Atascosa County; Greg Tshirhart, Frio County; and James Overstreet, Frio County, Shelby Elam, Gaines County; Mark Boardman, Dawson County. A special thanks to Dwayne Drozd, Kevin Brewer, Bill Klesel, Marty McCormick, Lyndell Gilbert, and John Everitt for their help in plot maintenance and peanut harvest.

Table 1. Peanut injury and yield as affected by Prowl and Sonalan applied preemergence and activated by 0.75-inch of irrigation immediately after application at AG-CARES, Lamesa, TX.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)				Canopy Width (in.)		Yield (lb/A)
			May 24	Jun 10	Jul 5	Sep 24	Jun 10	Jul 5	
Non-treated	---	---	0	0	0	0	14	24	5992
Prowl 3.3 EC	0.825	2 pints	0	0	0	0	14	25	5813
Prowl 3.3 EC	1.24	3 pints	0	0	0	0	14	25	5746
Prowl 3.3 EC	1.65	4 pints	0	8	6	3	13	23	5376
Sonalan 3 EC	0.75	2 pints	0	0	0	0	14	25	5911
Sonalan 3 EC	1.125	3 pints	0	4	5	0	12	23	6369
Sonalan 3 EC	1.5	4 pints	0	8	4	0	11	23	5580
$LSD_{(0.05)}$			NS	2	2	2	2	NS	NS

Table 2. Peanut injury and yield as affected by AIM and ET applied early- and late-postemergence at AG-CARES near Lamesa, TX.

Treatment	Rate (lb ai/A)	Rate (oz/A)	Peanut Injury (%)					Yield (lb/A)
			Jun 10	Jun 24	Jul 22	Aug 30	Sep 24	
Non-treated	---	---	0	0	0	0	0	6591
AIM + COC	0.024 + 1%	1.5	47	32	12	2	5	6066
AIM + COC	0.032 + 1%	2.0	62	38	13	4	7	5225*
ET + COC	0.00234 + 0.5%	1.5	35	28	10	4	2	5795*
ET + COC	0.00313 + 0.5%	2.0	40	37	13	4	3	5705*
Gramoxone Max + Basagran + NIS	0.1875 + 0.25 + 0.25%	8 + 8	28	27	7	2	2	6621
AIM + COC	0.024 + 1%	1.5	--	--	--	3	3	6261
AIM + COC	0.032 + 1%	2.0	--	--	--	4	3	6050
ET + COC	0.00234 + 0.5%	1.5	--	--	--	5	5	5991
ET + COC	0.00313 + 0.5%	2.0	--	--	--	5	5	5870*
CV								5.91
$LSD_{(0.05)}$			6	6	3	1	2	607

*yield is less than the non-treated control based on $p< 0.05$.

Table 3. Peanut injury and yield as affected by AIM and ET applied early- and late-postemergence at WPGRF near Denver City, TX.

Treatment	Rate (lb ai/A)	Rate (oz/A)	Peanut Injury (%)					Yield (lb/A)
			Jun 09	Jun 23	Jul 21	Sep 22	Oct 13	
Non-treated	---	---	0	0	0	0	0	4507
AIM + COC	0.024 + 1%	1.5	22	18	9	1	2	4146
AIM + COC	0.032 + 1%	2.0	47	35	10	1	2	4160
ET + COC	0.00234 + 0.5%	1.5	33	23	7	2	3	4861
ET + COC	0.00313 + 0.5%	2.0	48	35	15	1	2	4593
Gramoxone Max + Basagran + NIS	0.1875 + 0.25 + 0.25%	8 + 8	23	22	3	1	0	4492
AIM + COC	0.024 + 1%	1.5	--	--	--	2	4	4127
AIM + COC	0.032 + 1%	2.0	--	--	--	4	7	4121
ET + COC	0.00234 + 0.5%	1.5	--	--	--	5	3	3944
ET + COC	0.00313 + 0.5%	2.0	--	--	--	6	4	3756
2,4-DB + COC	0.4 + 1%	25.6	--	--	--	4	0	4034
CV								12.8
$LSD_{(0.05)}$			6	6	4	1	1.5	NS

Table 4. Peanut varietal tolerance to Valor applied preemergence and Strongarm and Cadre applied postemergence at the Western Peanut Growers Research Farm near Denver City, TX.

Variety	Herbicide	Rate (lb/A)	Rate (prod./A)	Peanut Injury (%)					Yield (lb/A)
				May 26	Jun 9	Jun 23	Jul 21	Oct 13	
Tamrun 96	none	---	---	0	0	0	0	0	3503
Tamrun 96	Valor 50WG	0.094	3 oz	3	0	3	0	0	3594
Tamrun 96	Valor 50WG	0.188	6 oz	15	12	13	10	5	3351
Tamrun 96	Strongarm 84WG	0.016	0.3 oz	0	2	5	2	0	3503
Tamrun 96	Strongarm 84WG	0.032	0.6 oz	0	0	7	7	3	3244
Tamrun 96	Cadre 70DG	0.063	1.44 oz	0	5	6	2	3	3548
Tamrun 96	Cadre 70DG	0.126	2.88 oz	0	10	11	13	13	3427
Tamrun OLO1	none	---	---	0	0	0	0	0	3047
Tamrun OLO1	Valor 50WG	0.094	3 oz	0	3	3	0	0	3472
Tamrun OLO1	Valor 50WG	0.188	6 oz	5	5	6	5	3	2832
Tamrun OLO1	Strongarm 84WG	0.016	0.3 oz	0	0	2	2	3	3076
Tamrun OLO1	Strongarm 84WG	0.032	0.6 oz	0	0	3	2	0	2986
Tamrun OLO1	Cadre 70DG	0.063	1.44 oz	0	3	3	3	3	3015
Tamrun OLO1	Cadre 70DG	0.126	2.88 oz	0	8	11	17	11	2696
Tamrun OLO2	none	---	---	0	0	0	0	0	3655
Tamrun OLO2	Valor 50WG	0.094	3 oz	4	2	2	0	0	3823
Tamrun OLO2	Valor 50WG	0.188	6 oz	14	15	12	5	5	3396
Tamrun OLO2	Strongarm 84WG	0.016	0.3 oz	0	0	3	0	2	3396
Tamrun OLO2	Strongarm 84WG	0.032	0.6 oz	0	0	2	2	3	3609
Tamrun OLO2	Cadre 70DG	0.063	1.44 oz	0	7	5	7	7	3625
Tamrun OLO2	Cadre 70DG	0.126	2.88 oz	0	14	18	20	17	3366
Florunner	none	---	---	0	0	0	0	0	3960
Florunner	Valor 50WG	0.094	3 oz	4	2	0	2	2	4022
Florunner	Valor 50WG	0.188	6 oz	10	8	3	5	0	3837
Florunner	Strongarm 84WG	0.016	0.3 oz	0	0	0	0	0	4005
Florunner	Strongarm 84WG	0.032	0.6 oz	0	0	0	5	0	3868
Florunner	Cadre 70DG	0.063	1.44 oz	0	2	3	8	4	4189
Florunner	Cadre 70DG	0.126	2.88 oz	0	12	12	17	5	3732

Favor Runner 458	none	---	---	0	0	0	0	0	3716
Favor Runner 458	Valor 50WG	0.094	3 oz	8	5	7	9	3	3838
Favor Runner 458	Valor 50WG	0.188	6 oz	25	18	13	15	10	3716
Favor Runner 458	Strongarm 84WG	0.016	0.3 oz	0	0	3	2	3	3686
Favor Runner 458	Strongarm 84WG	0.032	0.6 oz	0	2	8	6	5	3747
Favor Runner 458	Cadre 70DG	0.063	1.44 oz	0	3	10	13	7	3381
Favor Runner 458	Cadre 70DG	0.126	2.88 oz	0	10	18	20	15	3564
Tamspan 90	none	---	---	0	0	5	0	0	3533
Tamspan 90	Valor 50WG	0.094	3 oz	4	0	0	5	2	3518
Tamspan 90	Valor 50WG	0.188	6 oz	10	12	11	13	2	3290
Tamspan 90	Strongarm 84WG	0.016	0.3 oz	0	0	2	3	0	3457
Tamspan 90	Strongarm 84WG	0.032	0.6 oz	0	0	3	3	2	3915
Tamspan 90	Cadre 70DG	0.063	1.44 oz	0	2	7	7	3	3351
Tamspan 90	Cadre 70DG	0.126	2.88 oz	0	8	8	20	10	3351
OLIN	none	---	---	0	0	0	0	0	3761
OLIN	Valor 50WG	0.094	3 oz	0	2	0	2	3	3841
OLIN	Valor 50WG	0.188	6 oz	10	4	0	0	7	3920
OLIN	Strongarm 84WG	0.016	0.3 oz	0	0	0	0	2	4239
OLIN	Strongarm 84WG	0.032	0.6 oz	0	0	2	0	2	3379
OLIN	Cadre 70DG	0.063	1.44 oz	0	3	3	5	5	3841
OLIN	Cadre 70DG	0.126	2.88 oz	0	9	6	12	10	3618
$LSD_{(0.05)}$				4	5	6	6	5	1136

Table 5. Peanut tolerance to Valor applied at 1, 3, and 6 days after planting (DAP) at WPGRF.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Applic. timing[a]	Peanut Injury (%)			
				May 26	Jun 09	Jun 23	Jul 05
Non-treated	---	---		0	0	0	0
Valor 51	0.094	3 oz	1 DAP	0	3	3	5
Valor 51	0.0188	6 oz	1 DAP	0	3	2	7
Valor 51	0.094	3 oz	3 DAP	0	0	0	0
Valor 51	0.188	6 oz	3 DAP	0	0	2	0
Valor 51	0.094	3 oz	6 DAP	0	0	3	3
Valor 51	0.188	6 oz	6 DAP	0	0	3	3
$LSD_{(0.05)}$				--	4	6	8

[a]DAP = days after planting

Table 6. Peanut tolerance and ivyleaf morningglory control following Valor applied at 1, 3, and 6 days after planting (DAP) at Lamesa.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Applic. timing[a]	Peanut Injury (%)			Ivyleaf MG Control (%)		
				May 24	Jun 10	Jul 05	May 24	Jun 10	Jul 05
Non-treated	---	---		0	0	0	0	0	0
Valor 51	0.094	3 oz	1 DAP	5	3	2	84	88	68
Valor 51	0.0188	6 oz	1 DAP	10	11	8	92	97	82
Valor 51	0.094	3 oz	3 DAP	3	5	3	84	78	73
Valor 51	0.188	6 oz	3 DAP	10	10	8	85	92	78
Valor 51	0.094	3 oz	6 DAP	6	8	2	83	91	65
Valor 51	0.188	6 oz	6 DAP	8	8	3	96	94	91
$LSD_{(0.05)}$				2	6	5	6	10	14

[a]DAP = days after planting

Table 7. Ivyleaf morningglory control with reduced rates of Cadre and Strongarm applied postemergence herbicides in peanut at Mark Boardman's farm near Lamesa, TX.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)			Ivyleaf Morningglory Control (%)			Yield (lb/A)
			Jun 10	Jun 24	Oct 11	Jun 10	Jul 22	Oct 11	
Non-treated	---	---	0	0	0	0	0	0	2937 b
Cadre 70DG + COC	0.063 + 1 qt	1.44 oz	6	7	6	92	97	85	4785 a
Cadre 70DG + Strongarm 84DG + COC	0.047 + 0.004 + 1 qt	1.08 oz + 0.08 oz	5	6	6	95	95	82	4241 a
Cadre 70DG + Strongarm 84DG + COC	0.032 + 0.008 + 1qt	0.72 oz + 0.15 oz	5	6	6	92	76	75	4169 a
Cadre 70DG + Strongarm 84DG + COC	0.016 + 0.012 + 1qt	0.36 oz + 0.225 oz	2	0	6	91	77	71	4169 a
Strongarm 84DG + COC	0.016 + 1qt	0.3 oz	0	0	5	94	66	65	3983 a
$LSD_{(0.05)}$			2	2	2	7	24	10	941

Table 8. Ivyleaf morningglory control following reduced rates of Cadre or Pursuit plus other herbicides at Mark Boardman's farm near Lamesa, TX.

Treatment	Rate (lb/A)	Rate (prod./A)	Peanut Injury (%)			Ivyleaf morningglory control (%)			Yield (lb/A)
			Jun 10	Jul 22	Oct 11	Jun 10	Jul 22	Oct 11	
Untreated	---	---	0	0	0	0	0	0	3635
Cadre + COC	0.063	1.44 oz	2	0	5	83	94	84	4623
Cadre + 2,4-DB + COC	0.063 + 0.25	1.44 oz + 1 pt	4	0	5	100	96	83	5009
Cadre + Storm + COC	0.063 + 0.75	1.44 oz + 1.5 pt	0	3	7	92	97	87	4351
Cadre + Ultra Blazer + COC	0.063 + 0.375	1.44 oz + 1.5 pt	4	7	6	90	95	87	3706
Cadre + COC	0.032	0.72 oz	0	0	4	80	86	69	4093
Cadre + 2,4-DB + COC	0.032 + 0.25	0.72 oz + 1 pt	4	0	3	100	97	77	4150
Cadre + Storm + COC	0.032 + 0.75	0.72 oz + 1.5 pt	0	3	0	88	88	92	5209
Cadre + Ultra Blazer + COC	0.032 + 0.375	0.72 + 1.5 pt	0	0	2	73	78	85	4794
Pursuit + COC + AMS	0.063	1.44 oz	0	0	0	87	82	91	4952
Pursuit + 2,4-DB + COC + AMS	0.063 + 0.25	1.44 oz + 1 pt	3	0	0	100	87	89	4680
Pursuit + Storm + COC + AMS	0.063 + 0.75	1.44 oz + 1.5 pt	0	0	3	82	53	81	4193
Pursuit + Ultra Blazer + COC + AMS	0.063 + 0.375	1.44 oz + 1.5 pt	1	0	3	85	65	81	4251
Pursuit + COC + AMS	0.032	0.72 oz	0	0	0	72	78	73	4136
Pursuit + 2,4-DB + COC + AMS	0.032 + 0.25	0.72 oz + 1 pt	3	0	0	100	79	75	4164
Pursuit + Storm + COC + AMS	0.032 + 0.75	0.72 oz + 1.5 pt	0	2	3	87	53	67	3535
Pursuit + Ultra Blazer + COC + AMS	0.032 + 0.375	0.72 + 1.5 pt	0	2	0	82	58	72	3735
2,4-DB + COC	0.25	1 pt	3	0	8	100	62	50	4007
Storm + COC	0.75	1.5 pt	0	0	12	58	18	62	3735
Ultra Blazer + COC	0.375	1.5 pt	0	0	10	66	18	63	3706
CV									
$LSD_{(0.05)}$			2	2	5	8	14	10	NS

Table 9. Yellow nutsedge control following reduced rate combinations of Cadre or Pursuit plus Dual Magnum or Strongarm at Shelby Elam's farm near Seminole, TX.

Treatment	Rate (lb ai/A)	Rate (prod./ A)	Peanut Injury (%)			Yellow Nutsedge Control (%)			Yield (lb/A)
			Jun 7	Jun 21	Sep 20	Jun 7	Jun 21	Sep 20	
Non-treated	---	---	0	0	0	0	0	0	5014
Cadre 70DG + Strongarm 84WG + COC	0.0315 + 0.0188 + 1% v/v	0.72 oz +	9	3	7	47	80	80	4636
Cadre 70DG + Strongarm 84WG + COC	0.0315 + 0.024 + 1% v/v	0.72 oz +	12	3	8	50	82	85	4041
Cadre 70DG + Dual Magnum 7.64 EC + COC	0.0315 + 0.633 + 1% v/v	0.72 oz +	12	5	3	55	86	94	4259
Cadre 70DG + Dual Magnum 7.64 EC + COC	0.0315 + 0.0078 + 1% v/v	0.72 oz +	12	5	5	60	89	98	3997
Pursuit 70DG + Strongarm 84WG + COC	0.0315 + 0.0188 + 1% v/v	0.72 oz +	7	5	11	52	73	68	3968
Pursuit 70DG + Strongarm 84WG + COC	0.0315 + 0.024 + 1% v/v	0.72 oz +	7	2	9	72	81	79	4113
Pursuit 70DG + Dual Magnum 7.64 EC + COC	0.0315 + 0.633 + 1% v/v	0.72 oz +	5	0	6	50	69	78	4157
Pursuit 70DG + Dual Magnum 7.64 EC + COC	0.0315 + 0.0078 + 1% v/v	0.72 oz +	5	0	4	48	73	83	3895
Cadre 70DG + COC	0.063 + 1% v/v	1.44 oz +	12	7	9	63	87	95	4607
Pursuit 70DG + COC	0.063 + 1% v/v	1.44 oz +	5	2	4	65	76	77	4346
$LSD_{(0.05)}$			4	4	4	11	5	7	NS

Table 10. Yellow nutsedge control following Pursuit plus Outlook in peanuts grown on Shelby Elam's farm near Seminole, TX.

Treatment	Rate (lb ai/A)	Applic. Timing[a]	Peanut Injury (%)			Y. Nutsedge Control (%)			Yield (lb/A)
			Jun 7	Jun 21	Sep 20	Jun 7	Jun 21	Sep 20	
Non-treated	---	---	0	0	0	0	0	0	4175
Pursuit 70DG + Fertilizer + COC + Outlook 6EC	0.063 + 1% + 1% + 0.75	EP fb LP	0	2	5	70	79	83	4131
Pursuit 70DG + Fertilizer + COC + Outlook 6EC	0.063 + 1% + 1% + 0.75	MP fb LP	0	8	5	NA	65	88	4394
Pursuit 70DG + Fertilizer + COC + Outlook 6EC	0.063 + 1% + 1% + 0.75	LP fb LP	0	0	5	NA	NA	83	4117
$LSD_{(0.05)}$			--	5	2	--	--	6	NS

[a]EP = early postemergence; MP = mid-postemergence; LP = late-postemergence

Table 11. Weed control using Cadre and Pursuit in combination with 2,4-DB, Storm, and Ultra Blazer.

Herbicide treatment [1]	Rate Product/A	Weed control (%)		
		Smellmelon	Horse purslane	Palmer amaranth
Cadre	0.72 oz	88	73	83
Cadre + 2,4-DB	0.72 oz + 1.2 pt	91	49	95
Cadre + Storm	0.72 oz + 1.5 pt	65	60	98
Cadre + Ultra Blazer	0.72 oz + 1.5 pt	93	70	98
Cadre	1.44 oz	97	81	87
Cadre + 2,4-DB	1.44 oz + 1.2 pt	98	81	100
Cadre + Storm	1.44 oz + 1.5 pt	97	89	98
Cadre + Ultra Blazer	1.44 oz + 1.5 pt	100	95	99
Pursuit	0.72 oz	45	43	88
Pursuit + 2,4-DB	0.72 oz + 1.2 pt	23	73	97
Pursuit + Storm	0.72 oz + 1.5 pt	51	55	96
Pursuit + Ultra Blazer	0.72 oz + 1.5 pt	92	79	94
Pursuit	1.44 oz	51	54	84
Pursuit + 2,4-DB	1.44 oz + 1.2 pt	80	73	100
Pursuit + Storm	1.44 oz + 1.5 pt	33	48	100
Pursuit + Ultra Blazer	1.44 oz + 1.5 pt	55	49	98
2,4-DB	1.2 pt	59	70	88
Storm	1.5 pt	40	83	94
Ultra Blazer	1.5 pt	59	50	98
LSD (0.05)		30	42	8

[1] Agridex at 1.0 qt/A added to all herbicide treatments.

Table 12. Late-season smellmelon, horse purslane, and Palmer amaranth control in peanut with POST herbicides.

Herbicide[1]	Rate Product/A	Application timing[2]	Control (%)		
			Smellmelon	Horse purslane	Palmer amaranth
Strongarm	0.45 oz	EP	93	62	92
		LP	33	10	52
2,4-DB	1.2 pt	EP	43	27	50
		LP	40	17	69
Pursuit	1.44 oz	EP	68	13	96
		LP	83	7	71
Cadre	1.44 oz	EP	80	33	97
		LP	92	7	80
Ultra Blazer	2.0 pt	EP	40	50	67
		LP	63	43	17
Cobra	0.8 pt	EP	78	93	93
		LP	53	40	45
Basagran	2.0 pt	EP	53	30	63
		LP	53	13	60
LSD (0.05)			27	26	17

[1]Strongarm, 2,4-DB, Ultra Blazer, Cobra, and Basagran included Agridex at 1 qt/A. Cadre and Pursuit included X-77 at 0.25% v/v.
[2]EP, early postemergence, weeds no greater than 4 inch tall; LP, late postemergence, weeds 8 to 10 inch tall.

Table 13. Late-season smellmelon, horse purslane and Palmer amaranth control in peanut with soil-applied herbicides.

Herbicide[1]	Rate Product/A	Application timing[2]	Control (%)		
			Smellmelon	H. purslane	P. amaranth
Check	-	-	0	0	0
Prowl	2.4 pt	PPI	60	37	20
Valor	2.0 oz	PRE	93	64	43
Valor	3.0 oz	PRE	70	43	80
Prowl	2.4 pt	PPI	83	77	83
+ Valor	3.0 oz	PRE			
Pursuit	1.44 oz	PRE	87	40	100
Prowl	2.4 pt	PPI	93	90	100
+ Pursuit	1.44 oz	PRE			
Prowl	2.4 pt	PPI	87	86	81
+ Strongarm	0.45 oz				
Dual Magnum	1.3 pt	PRE	58	32	80
Outlook	1.4 pt	PRE	37	40	53
Prowl	2.4 pt	PPI	36	87	90
+ Dual Magnum	1.3 pt	PRE			
Prowl	2.4 pt	PPI	52	85	92
+ Outlook	1.4 pt	PRE			
Prowl	2.4 pt	PPI	75	63	67
+ 2,4-DB	1.2 pt	POST			
Prowl	2.4 pt	PPI	62	57	90
+ Pursuit	1.44 oz	POST			
Prowl	2.4 pt	PPI	95	65	98
+ Cadre					
Prowl	2.4 pt	PPI	100	70	98
+ Cadre	0.72 oz	POST			
+ Cadre	0.72 oz	+ 3 WK			
Prowl	2.4 pt	PPI	92	50	92
+ Ultra Blazer	1.5 pt	POST			
Prowl	2.4 pt	PPI	52	47	67
+ Basagran	2.0 pt	POST			
Prowl	2.4 pt	PPI	89	89	99
+ Cobra	0.8 pt	POST			
Prowl	2.4 pt	PPI	67	78	86
+ Strongarm	0.3 oz	POST			
LSD (0.05)			38	43	26

[1]POST applications of 2,4-DB, Ultra Blazer, Basagran, and Cobra included Agridex at 1.0 qt/A; Cadre and Pursuit included X-77 and Strongarm included Kinetic at 0.25% v/v.
[2]Abbreviations: PPI, preplant incorporated; PRE, preemergence; POST, postemergence.

Table 14. Comparison of Prowl H_20 and Prowl EC for weed control in peanut.

		TX panicum control (%)		Yield	Grade (%)
Herbicide[1]	Rate (Product/A)	4 WAT[2]	8 WAT	(Lbs/A)	
Prowl 3.3 EC	1.8 pt	98	95	2610	71.4
	2.4 pt	94	89	2283	72.0
	3.0 pt	98	96	2320	70.9
Prowl H_20	1.6 pt	98	97	2272	70.8
	2.2 pt	99	97	2516	71.1
	2.6 pt	98	96	2418	72.1
LSD (0.05)		NS	NS	NS	NS

[1]Prowl H_20 is formulated as 3.8 lb/gal.
[2]Abbreviation: WAT, weeks after herbicide treatment.

Table 15. Controlling volunteer peanuts in cotton with herbicides.

			Peanut control (%)		
Herbicide treatment[1]	Rate (Product/A)	Application[2]	1 WAT[2]	2 WAT	4 WAT
Check	-	-	0	0	0
MSMA	24 fl oz	3 WAP	4	44	98
Roundup Ultra	12 fl oz	3 WAP	29	51	70
Roundup Ultra	24 fl oz	3 WAP	50	79	87
Roundup Ultra	36 fl oz	3 WAP	71	100	100
Roundup Ultra	24 fl oz	3+5WAP	66	78	98
Roundup + Valor	24 fl oz +1.0 oz	3 WAP	66	90	94
Ignite	32 fl oz	3 WAP	96	100	98
Ignite	40 fl oz	3 WAP	96	100	99
Caparol	32 fl oz	3 WAP	58	60	87
Cotoran	32 fl oz	3 WAP	51	52	45
Direx	32 fl oz	3 WAP	66	99	100
Linex	32 fl oz	3 WAP	57	73	89
Envoke	0.1 oz	3 WAP	24	86	99
Envoke	0.15 oz	3 WAP	23	87	100
Supprend	1.25 lb	3 WAP	69	100	100
Supprend	1.50 lb	3 WAP	53	100	99
Buctril	16 fl oz	3 WAP	16	54	43
Bucril	24 fl oz	3 WAP	26	52	46
Cotoran + MSMA	32 + 24 fl oz	3 WAP	40	73	80
Direx + MSMA	32 + 24 fl oz	3 WAP	55	100	99
LSD (0.05)			8	10	9

[1] POST applications of MSMA, Caparol, Cotoran, Direx, Linex, Supprend, and Buctril included
Agridex at 1.0 qt/A while Envoke included Induce at 0.25% v/v.
[2] Abbreviations: WAT,weeks after initial herbicide application; WAP, weeks after planting.

Table 16. Comparison of split-rate applications of Cadre, Stongarm, and Pursuit with full rates applied one time.

Herbicide[1]	Rate Product/A	Application timing[2]	% Control		
			Smellmelon	Tall waterhemp	Ivyleaf MG
Pursuit	1.44 oz	EP	53	86	63
Pursuit	1.44 oz	LP	43	70	92
Pursuit	0.72/0.72 oz	EP+LP	71	91	66
Cadre	1.44 oz	EP	92	97	75
Cadre	1.44 oz	LP	78	83	88
Cadre	0.72/0.72 oz	EP+LP	95	94	86
Strongarm	0.30 oz	EP	43	68	69
Strongarm	0.30 oz	LP	63	44	75
Strongarm	0.15/0.15 oz	EP+LP	36	71	91
LSD (0.05)			25	23	25

[1]Herbicide treatments included Induce at 0.25% v/v.
[2]Abbreviations: EP, Early postemergence; LP, late postemergence.

Table 17. Weed control, peanut injury and yield when using Aim and ET herbicides.

Herbicide[2]	Rate Product/A	Application timing[3]	Control (%)[1] Tall waterhemp	Control (%)[1] Broadleaf signalgrass	Peanut injury(%)[4]	Yield Lbs/A
Check	-	-	0	0	0	941
Aim	0.5 oz	Crack	83	0	7	2190
Aim	1.0 oz	Crack	93	0	7	2117
Aim	1.5 oz	Crack	93	10	6	2747
Aim	2.0 oz	Crack	86	0	5	2420
ET	0.5 oz	Crack	88	0	4	1667
ET	1.0oz	Crack	88	0	4	2154
ET	1.5 oz	Crack	93	0	3	2468
ET	2.0 oz	Crack	87	3	6	2892
Gramoxone	1.0 pt	Crack	93	0	3	2166
Aim	0.5 oz	28 DAC	100	0	16	2553
Aim	1.0 oz	28 DAC	100	0	15	3485
Aim	1.5 oz	28 DAC	100	0	16	2964
Aim	2.0 oz	28 DAC	100	0	17	2601
ET	0.5 oz	28 DAC	98	0	12	3037
ET	1.0 oz	28 DAC	100	0	14	2904
ET	1.5 oz	28DAC	100	0	13	2420
ET	2.0 oz	28 DAC	100	0	13	2795
Gramoxone	1.0 pt	28 DAC	100	30	18	2698
Aim	0.5 oz	56 DAC	87	0	12	2057

Aim	1.0 oz	56 DAC	94	3	11
2105					
Aim	1.5 oz	56 DAC	88	3	18
1924					
Aim	2.0 oz	56 DAC	90	0	15
1803					
ET	0.5 oz	56 DAC	83	3	5
1960					
ET	1.0 oz	56 DAC	82	13	10
3025					
ET	1.5 oz	56 DAC	82	3	12
2493					
ET	2.0 oz	56 DAC	88	3	12
2626					
2,4-DB	1.6 pt	56 DAC	100	0	0
1754					
LSD (0.05)			16	9	4
880					

[1] Weed ratings taken approximately 4 wk after herbicide application.
[2] Aim, ET, and 2,4-DB applications included Agridex at 1.0 qt/A. Gramoxone treatments included Basagran at 0.5 pt/A plus Kinetic at 0.25% v/v.
[3] Abbreviations: CRACK, at peanut cracking approximately 7 to 10 days after planting; DAC, days after peanut cracking.
[4] Peanut injury ratings taken approximately 7 days after herbicide application.

Table 18. Weed control, peanut injury and yield when using Aim and ET herbicides.

Herbicide[1]	Rate Product/A	Application timing[2]	Peanut injury(%)[3]	Yield Lbs/A
Check	-	-	0	941
Aim	1.5 oz	28 DAC	15	2714
Aim	2.0 oz	28 DAC	16	2459
ET	1.5 oz	28 DAC	14	2432
ET	2.0 oz	28 DAC	19	2178
Gramoxone	1.0 pt	28 DAC	20	2768
Aim	1.5 oz	90 DAC	7	2559
Aim	2.0 oz	90 DAC	8	2523
ET	1.5 oz	90 DAC	8	2432
ET	2.0 oz	90 DAC	4	2986
2,4-DB	1.6 pt	90 DAC	0	2432
LSD (0.05)			4	752

[1] Aim, ET, and 2,4-DB applications included Agridex at 1.0 qt/A. Gramoxone treatments included Basagran at 0.5 pt/A plus Kinetic at 0.25% v/v.
[2] Abbreviations: CRACK, at peanut cracking approximately 7 to 10 days after planting; DAC, days after peanut cracking.
[3] Peanut injury ratings taken approximately 7 days after herbicide application.

Peanut Management Systems

Todd A. Baughman, Agronomist, TCE & TAES – Vernon R&E Center
W. James Grichar, Research Scientist, TAES – Beeville
Calvin Trostle, Agronomist, TCE – Lubbock R&E Center

Summary

Sixteen variety trials were conducted this past year to assess new and existing commercial cultivars. This included evaluation of runner, Virginia, Spanish, and Valencia market-types. When averaged across nine locations one half of all runner varieties yielded greater than 4000 lb/A. Tamrun 96, DP-1, and Carver all yielded greater than 4500 lb/A. However, Tamrun 96 (5 sites) and DP-1 (2) were not included at all trial locations. NC 12C (averaged over 2 locations) was the only Virginia variety to yield over 5000 lb/A. It also had the highest percentage of extra large kernels. Tamspan 90 was the highest yielding Spanish variety at 1 of 3 locations. There were no differences in peanut yield between any of the Valencia varieties. In an evaluation of market-types Flavorrunner 458 yielded as high as or higher than any other variety or market-type at three locations. Twin-row patterns out yielded single-row patterns with both runner and Spanish market-type. Seed planting rate did not affect yield or grade. There was no difference in yield, grade, digger or harvest loss, or peanut flavor between sandwich and conventional digging of peanut. Peanut yields were reduced with defoliation (to simulate hail damage) of 99% of the canopy at beginning bloom and 66 and 99% at full bloom. Applications of Chaperone at two locations did not affect peanut yield or grade.

Introduction

Growers are faced with numerous production issues each year. New varieties, herbicides, and other products must be continually evaluated to determine their contribution to overall profitability. The Extension Agronomy Peanut Team continues to try to address many of these issues and provide answers to grower's questions. In addition, educational efforts were conducted throughout the state at several events. Several new varieties were tested again this past year to determine their overall feasibility and adaptability in Texas. The results of many of the agronomic studies will be discussed in this report while the weed management projects are presented in a separate weed control report.

Discussion

Variety trials were conducted in Atascosa, Cochrane, Collingsworth, Frio, Haskell, Dawson (Ag-Cares Farm), Frio, Gaines (Western Peanut Growers), Hockley, Lamb, Terry, Wilbarger, and Yoakum Counties. Variety trials investigated Spanish, runner, Valencia, and Virginia market-types. Yields in this year's variety trial were affected by

seed quality and stand establishment in many cases. A high number of splits occurred with the seed sample of Tamrun OL 02 and most likely affected the performance of this cultivar. Flavorrunner 458, ANorden, AT127 (2 trials), and Tamrun 96 all yielded over 4000 lb/A when averaged over 4 Southern High Plains locations. Carver, Andru II, Tamrun 96 and Tamrun OL 01 all yielded over 5400 lb/A at 2 South Texas locations. Tamrun 96 (2 trials), Carver, and Tamrun OL 01 all yielded over 4500 lb/A at 3 Rolling Plains locations. Averaged across locations AT215 (2 sites), Virugard (2), and Flavorrunner 458 (7) had grades of greater than 76, while Andru II (9), AT127 (2), Tamrun 96 (5), Georgia 03L (5), and DP-1 (2) all had grades less than 75. NC 12C was the only Virginia variety that yielded over 5000 lb/A when averaged over 2 locations. In addition it had the highest percentage of extra large kernels. There were no differences in yield between Spanish varieties at 2 locations. Tamspan 90 outyielded OLin and 9899-14 (previously none as AT9899-14, and currently being marketed by Golden as a high O/L small-seeded runner for the Spanish market). Tamspan 90 also had as high or higher grade than any variety at all three locations. There were no differences in peanut yield between any of the Valencia varieties at either of two locations.

Market-type trials were conducted at 3 locations to evaluate the performance of the various market-types under the same growing conditions. Unfortunately, unseasonable weather during harvest most likely impacted the results of these trials. Flavorrunner 458 was the only market-type to yield over 5000 lb/A and grade over 80 at the Ag-Cares farm. It was also the only variety to yield over 4000 lb/A and grade over 78 at the Western Peanut Growers farm. There were no differences in market-types at Sudan however; this trial had a high degree of variability due to delayed digging and harvesting.

A study was conducted to evaluate twin versus single rows and seeding rate. Spanish yields were almost 750 lb/A higher and runner yields were over 1300 lb/A higher with the twin-row compared to the single row pattern. There were no differences in yield or grade between 4, 6, and 8 seed/row foot seeding rates.

A study was conducted to compare sandwich digging to conventional digging on peanut yield and quality. No differences in peanut yield, grade, digger loss, harvest loss, peanut value, or peanut flavor were observed. Foreign material, moisture, and sound mature kernels were higher with the sandwich digger, while loose shelled kernels, sound splits and skin slippage was higher with the conventional digger. This differences between a sandwich digger and conventional digger needs to be evaluated over a series of years since it is most likely this years results were influenced by the climate and delays that occurred during harvest.

A study was conducted to evaluate the effects of simulated hail on peanut yield and grade. Peanut plants were defoliated at levels of 33, 66, and 99% at beginning and full bloom. Yields were reduced by 99% defoliation at beginning bloom and by 66 and 99% defoliation at full bloom. Grades were reduced with all defoliation levels except 33 and 66% defoliation at full bloom.

Two trials were conducted to evaluate the potential use of Chaperone in peanut. Chaperone is a reputed protein transport enhancer that increases the uptake of proteins that are necessary for plant growth resulting in increased yield. The active ingredients include 0.03 lbs sodium p-nitrophenolate, 0.02 lbs sodium o-nitrophenolate, and 0.01 lbs sodium 5-nitroguaiacolate per gallon. The product is currently labeled for use in cotton. Chaperone was applied 5 and 10 oz/A at the beginning of bloom and at 10 oz/A beginning of bloom followed by 10 oz/A at 3 to 4 weeks later. Chaperone did not affect yield or grade at either of the two locations.

Acknowledgements

Appreciation is extended to the Texas Peanut Producers Board for assistance in funding this research and the Extension Peanut Agronomy Program. I would also like to thank each of the producers: Larry Beseda, Jimmy Burson, Michael and Kim Franke, Dan & Rex Henard, Gary Jackson, Devin Kieshnick, Chuck and Quentin Marsh, Glen Martin, Haldon Messamore, Greg Tschirhart, Jet Wilmeth, Clint and Dan White, who devoted land, time, and equipment for these studies. In addition the support of the Western Peanut Growers Farm near Denver City and the Ag-Cares Farm near Lamesa are appreciated. Without their assistance and interest none of this research would be possible. I would like to thank J Leek Associates and Southwestern Peanut Shellers Association for support with the digging project. Finally a big thanks to Jim Reed; Trey Carter; Jason Baker; Chip Lee and crew; Peter Dotray, Wayne Keeling, and the weed science crew, and Mike Schubert and crew at Lubbock; the crews at Ag-Cares and Western Peanut Growers, and James Grichar and the South Texas crew for technical assistance.

Texas A&M Research & Extension Center - Vernon

Runner Peanut Variety Trials

Project Code……: PACF04-01
Cooperator……..: Ag-Cares Farm
Location……..: Lamesa, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-40" rows x 75'
Planting Date……: 4/26/2004
Digging Date……: 10/19/2004
Harvest Date……: 11/8/2004
Days from Planting to Digging…..: 176
Comments: There were no yield differences between any of the varieties. Carver, GP-1, Georgia 02C, and ANorden all yielded over 4000 lbs/A. Grade was 80 or greater with Georgia 02C, AT 215, and Flavorruner 458.

Project Code……: PAT04-01
Cooperator……..: Chuck & Quentin Marsh
Location……..: Charlotte, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-36" rows x 60'
Planting Date……: 6/8/2004
Digging Date……: 10/22/2004
Harvest Date……: 10/28/2004
Days from Planting to Digging…..: 142
Comments: Tamrun OL 01, Carver, Tamrun 96, and Andru II all yielded greater than 5000 lbs/A. Georgia 02C and 01R, Carver, and C99-4 all had a grade of greater than 75.

Project Code……: PCO04-01
Cooperator……..: Larry Beseda
Location……..: Whiteface, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-40" rows x 40'
Planting Date……: 5/5/2004
Digging Date……: 10/26/2004
Harvest Date……: 11/10-11/2004
Days from Planting to Digging…..: 174
Comments: Georgia 03L, Flavorrunner 458, and Tamrun OL 01 all yielded greater than 5500 lbs/A. Peanut grade was less than 72 with all varieties.

Texas A&M Research & Extension Center - Vernon

Runner Peanut Variety Trials

Project Code……: PCW04-01
Cooperator……..: Dan & Rex Henard
Location……..: Quail, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-40" rows x 50'
Planting Date……: 5/5/2004
Digging Date……: 10/2/2004
Harvest Date……: 10/17/2004
Days from Planting to Digging…..: 150
Comments: Carver, Tamrun OL 01, ANorden, and Flavorrunner 458 all yielded over 5000 lbs/A. Grade was 75 or greater with all varieties except Andru II, Carver, and Georgia 03L.

Project Code……: PFR04-01
Cooperator……..: Greg Tschirhart
Location……..: Pearsall, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-36" rows x 55'
Planting Date……: 6/21/2004
Digging Date……: 10/18/2004
Harvest Date……: 10/25/2004
Days from Planting to Digging…..: 119
Comments: Yield was greater than 6000 lbs/A with Carver. Grade was 75 or greater with all varieties except Andru II and DP-1.

Project Code……: PHK04-01
Cooperator……..: Jimmy Burson
Location……..: Rochestor, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-40" rows x 75'
Planting Date……: 5/7/2004
Digging Date……: 10/4/2004
Harvest Date……: 11/8/2004
Days from Planting to Digging…..: 150
Comments: Tamrun OL 01 and Carver both yielded over 3500 lbs/A. Anorden and Flavorrunner 458 each had a grade of 78.

Texas A&M Research & Extension Center - Vernon

Runner Peanut Variety Trials

Project Code……: PTY04-01
Cooperator……..: Glen Martin
Location……..: Brownfield, TX
Experimental Design……: Randomized Complete Block
Number of Reps/Plot Size……..: 4/2-40" rows x 75'
Planting Date……: 4/28/2004
Digging Date……: 10/13/2000
Harvest Date……: 10/29/2004
Days from Planting to Digging…..: 168
Comments: Flavorunner 458, Anorden, Tamrun OL 02, and Tamrun 96 all yielded over 3000 lbs/A. Anorden and Flavorrunner 458 each had a grade of 78 or higher. Peanut yields in this trial were affected by erratic plant stands.

Project Code……: PWB04-01
Cooperator……..: Clint White
Location……..: Fargo, TX
Experimental Design……: Randomized Complete Block
Number of Reps/Plot Size……..: 4/2-40" rows x 75'
Planting Date……: 5/3/2004
Digging Date……: 10/14/2004
Harvest Date……: 10/25/2004
Days from Planting to Digging…..: 164
Comments: Carver, Tamrun OL 01, and Flavorrunner 458 yielded over 4000 lbs/A. There was no difference in grade between varieties.

Project Code……: PWPG04-01
Cooperator……..: Western Peanut Growers Farm
Location……..: Denver City, TX
Experimental Design……: RCB
Number of Reps/Plot Size……..: 4/2-36" rows x 75'
Planting Date……: 4/27/2004
Digging Date……: 10/12/2004
Harvest Date……: 10/19/2004
Days from Planting to Digging…..: 168
Comments: There were no yield differences between any of the varieties. AT127 yielded over 4000 lbs/A. ANorden, AT215, and Georgia 02C all had a grade of 80 or higher.

**Yields of Tamrun OL 02 in these trials were most likely influenced by the erratic stands due to a higher number of splits that occurred with the seed sample.

Texas A & M Research & Extension Center - Vernon

Runner Peanut Variety Trial

Location: Lamesa, TX Cooperator: Ag-Cares

Variety	Yield	Grade	SMK	SS	OK	DK
	lb/A	----------	----------	(%)	----------	----------
Carver	4437	78	70	8	1	1
GP-1	4433	78	63	15	1	0
Georgia 02C	4394	80	70	10	1	0
ANorden	4337	79	63	15	1	1
AT 1-1	3938	77	67	11	1	1
AT215	3903	81	68	13	1	0
AT127	3890	73	62	11	1	1
Flavorrunner 458	3786	80	67	13	1	0
Tamrun OL 01	3782	78	67	11	1	1
Georgia 03L	3743	76	63	13	1	0
Andru II	3734	78	61	18	1	1
Tamrun OL 02	3135	77	68	9	1	0
LSD (P=.10)	NS	1	4	4	NS	NS
Standard Deviation	675	1	3	3	0	0
CV	17	1	4	21	45	98
Test Mean	3959	78	66	12	1	1

Runner Peanut Variety Trial

Location: Charlotte, TX Cooperator: Chuck & Quentin Marsh

Variety	Yield	Grade	SMK	SS	OK	DIS	DIS
	lb/A	----------	----------	(%)	----------	%	#
Tamrun OL 01	5355	75	69	6	4	7	4
Carver	5264	76	72	4	3	13	6
Tarmrun 96	5264	75	70	5	3	4	2
Andru II	5097	73	62	10	5	6	3
Georgia 02C	4991	77	70	6	3	8	4
C-99R	4765	76	72	4	3	9	5
GP-1	4765	75	69	6	5	6	3
ANorden	4674	75	68	7	5	12	6
DP-1	4281	72	69	3	5	5	3
Hull	3782	75	68	6	3	0	0
Tamrun OL 02	3615	74	69	5	4	5	3
Georgia 01R	3524	76	67	8	4	2	1
LSD (P=.10)	439	2	2	2	1	5	2
Standard Deviation	366	1	2	2	1	4	2
CV	8	2	3	28	22	64	64
Test Mean	4615	75	69	6	4	6	3

Texas A & M Research & Extension Center - Vernon

Runner Peanut Variety Trial

Location: Whiteface, TX Cooperator: Larry Beseda

Variety	Yield	Grade	SMK	SS	DK	PDL	PDR	PL/A
	lb/A	----------	(%)	----------		-- rating --		x1000
Georgia 03L	5836	67	64	3	4	1	2	39
Flavorrunner 458	5713	70	70	1	7	1	1	36
Tamrun OL 01	5672	70	69	1	4	1	2	37
Tamrun OL 02	5227	66	65	1	3	1	2	38
GP-1	5137	71	70	2	7	0	1	50
Tamrun 96	5137	68	67	1	4	1	1	18
Andru II	4945	64	62	2	12	1	1	47
ANorden	4807	64	63	1	13	1	2	42
Georgia 02C	4749	62	58	3	9	1	3	26
Carver	4525	68	67	1	4	1	1	44
LSD (P=.10)	384	3						
Standard Deviation	553	3						
CV	11	5						
Test Mean	5175	67	66	2	7	1	2	38

Runner Peanut Variety Trial

Location: Quail, TX Cooperator: Dan & Rex Henard

Variety	Yield	Grade	SMK	SS	OK	DK
	lb/A	----------	(%)	----------		
Carver	5449	74	65	10	2	1
Tamrun OL 01	5383	76	70	6	2	1
ANorden	5316	75	58	17	2	1
Flavorrunner 458	5051	77	66	12	2	1
Tarmrun 96	4918	75	68	8	2	1
Tamrun OL 02	4884	77	67	10	1	1
GP-1	4884	76	62	14	2	1
Andru II	4718	74	61	14	2	1
Virugard	4486	78	67	11	1	0
AT 1-1	4320	76	68	9	1	1
Georgia 02C	4187	79	68	10	1	1
Georgia 03L	3688	74	59	15	2	1
LSD (P=.10)	556	2	4	4	NS	1
Standard Deviation	463	1	3	3	1	0
CV	10	2	4	24	35	49
Test Mean	4774	76	65	11	2	1

Texas A & M Research & Extension Center - Vernon

Runner Peanut Variety Trial

Location: Pearsal, TX Cooperator: Greg Tschirhart

Variety	Yield	Grade	SMK	SS	OK	TSW	DIS	DIS
	lb/A	----------	(%)	----------		%	%	#
Carver	6122	77	72	6	3	8	10	5
Andru II	5940	74	59	16	4	5	19	9
Anorden	5792	78	64	14	3	7	16	8
Tamrun 96	5577	75	65	10	3	16	17	9
Tamrun OL 01	5462	76	68	8	3	26	31	15
Georgia 02C	5429	79	66	13	2	5	8	4
GP-1	5066	78	61	17	4	17	29	14
DP-1	4884	73	70	3	6	4	3	1
Tamrun OL 02	4604	75	68	7	3	22	25	13
Hull	4538	76	63	13	3	7	7	4
C-99R	4389	76	69	7	3	6	14	7
Georgia 01R	3878	77	66	11	3	4	6	3
LSD (P=.10)	496	2	4	3	1	3	7	4
Standard Deviation	413	1	3	3	1	3	6	3
CV	8	2	5	27	31	25	40	40
Test Mean	5140	76	66	10	3	10	15	8

Runner Peanut Variety Trial

Location: Rochestor, TX Cooperator: Jimmy Burson

Variety	Yield	Grade	SMK	SS	OK	DK
	lb/A	----------	(%)	----------		
Tamrun OL 01	3529	75	64	11	2	0
Carver	3520	74	61	14	3	1
Andru II	3250	76	57	19	1	1
ANorden	3207	78	61	16	1	1
Flavorrunner 458	3094	78	62	16	2	1
Tamrun OL 02	3002	76	63	13	2	0
AT 1-1	2759	76	62	14	1	1
Georgia 02C	2739	77	59	18	1	1
Georgia 01R	2691	76	58	18	2	1
Hull	2602	75	52	24	2	1
GP-1	2589	77	59	18	2	1
C99R	2067	75	63	12	2	1
LSD (P=.10)	422	2	4	4	NS	NS
Standard Deviation	352	1	3	3	1	0
CV	12	2	5	18	37	68
Test Mean	2921	76	60	16	2	1

Texas A & M Research & Extension Center - Vernon

Runner Peanut Variety Trial

Location: Brownfield, TX Cooperator: Glen Martin

Variety	Yield	Grade	SMK	SS	OK	DK
	lb/A			(%)		
Flavorrunner 458	3566	79	71	8	1	1
ANorden	3212	78	68	10	2	1
Tamrun OL 02	3119	76	69	7	1	1
Tamrun 96	3021	74	66	8	2	1
Georgia 02C	2910	76	68	8	1	1
Andru II	2853	75	65	10	1	1
AT 1-1	2537	74	68	6	1	0
Carver	2198	74	69	5	3	1
Tamrun OL 01	2166	76	71	5	1	0
Virugard	1913	77	71	7	1	0
GP-1	1883	74	69	5	2	1
Georgia 03L	1556	74	65	9	1	0
LSD (P=.10)	582	2	4	NS	NS	NS
Standard Deviation	485	2	3	2	1	1
CV	19	2	4	32	41	87
Test Mean	2578	76	68	7	1	1

Runner Peanut Variety Trial

Location: Fargo, TX Cooperator: Clint White

Variety	Yield	Grade	SMK	SS	OK	DK
	lb/A			(%)		
Carver	5089	77	68	9	1	1
Tamrun OL 01	4713	77	69	8	1	1
Flavorrunner 458	4197	78	67	11	2	1
Georgia 02C	3986	76	68	9	2	1
Andru II	3916	77	69	9	1	1
ANorden	3846	78	66	12	1	1
AT 1-1	3799	78	68	10	1	1
Hull	3048	78	65	13	1	1
GP-1	2978	75	65	11	2	1
Georgia 01R	2931	77	70	7	1	0
Tamrun OL 02	2837	78	67	11	2	1
C99R	2814	77	67	11	1	1
LSD (P=.10)	724	NS	NS	NS	NS	NS
Standard Deviation	603	1	2	3	1	0
CV	16	2	4	27	37	47
Test Mean	3680	77	67	10	1	1

Texas A & M Research & Extension Center - Vernon

Runner Peanut Variety Trial

Location: Denver City, TX Cooperator: Western Peanut Growers

Variety	Yield	Grade	SMK	SS	OK	DK
	lb/A	----------	----------	(%)	----------	----------
AT127	4268	75	67	8	1	1
ANorden	3982	80	61	19	1	1
Carver	3919	79	68	11	1	1
Georgia 03L	3829	74	66	8	1	1
Andru II	3753	79	60	19	1	1
Flavorrunner 458	3710	79	66	14	1	1
Georgia 02C	3681	81	68	13	1	1
AT215	3523	80	65	15	1	1
Tamrun OL 01	3412	77	67	10	2	1
Tamrun OL 02	3362	77	67	10	2	1
AT 1-1	3341	76	66	10	1	1
GP-1	3327	79	65	14	1	0
LSD (P=.10)	NS	2	4	5	NS	NS
Standard Deviation	548	1	3	3	0	0
CV	15	2	5	27	35	53
Test Mean	3676	78	66	13	1	1

LSD = least significant difference, CV = coefficient of variation, NS = not significant
SMK = sound mature kernel, SS = sound splits, OK = other kernel, DK = damaged kernel,
DIS = disease infection sites, TSW = tomato spotted wilt virus
PDL = pod loss rating (0 = none, 1 = few, 2 = some, 3 = fair)
PDR = pod rot rating (0 = none, 1 = 1-2%, 2 = 3-10%, 3 = >10%
PL/A = plants per acre x 1000
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas A&M Research & Extension Center - Vernon

Virginia Peanut Variety Trials

Project Code……: PWPG04-02
Cooperator……: Western Peanut Growers Farm
Location……: Denver City, TX
Experimental Design……: RCB
Number of Reps/Plot Size……: 4/2-36" rows x 75'
Planting Date……: 4/27/2004
Digging Date……: 10/12/2004
Harvest Date……: 10/19/2004
Days from Planting to Digging…..: 168
Comments: NC12C was the only variety to yield over 3500 lbs/A and have a grade greater than 75. NC 12C, Gregory, Jupiter, NC00009 HiOL all had more than 40% extra large kernels.

Project Code……: PYK04-01
Cooperator……: Jet Wilmeth
Location……: Plains, TX
Experimental Design……: RCB
Number of Reps/Plot Size……: 4/2-40" rows x 36'
Planting Date……: 4/29/2004
Digging Date……: 10/11/2004
Harvest Date……: 10/28/2004
Days from Planting to Digging…..: 165
Comments: NC 12C, Perry, and Gregory all yielded greater than 6000 lbs/A. There were no difference in grade, with NC 12C having greater than 60% extra large kernels.

Texas A & M Research & Extension Center - Vernon

Virginia Peanut Variety Trial

Location: Denver City, TX Cooperator: Western Peanut Growers

Variety	Yield	Grade	SMK	SS	OK	DK	JK	ELK
	lb/A	----------	----------	----------	(%)	----------	----------	----------
NC 12C	3745	76	70	6	1	1	44	54
Gregory	3434	75	71	5	1	1	46	51
Perry	3342	75	67	9	1	1	20	32
VC2	3229	75	68	7	1	0	32	25
NC 7	2987	74	66	9	1	1	14	22
Jupiter	2863	75	67	9	1	1	42	42
NC00009 HiOL	2101	75	66	9	1	1	45	53
LSD (P=.10)	511	NS	4	3	NS	1	9	5
Standard Deviation	408	1	2	2	0	0	6	4
CV	13	2	4	28	25	39	19	9
Test Mean	3117	75	67	8	1	1	32	39

Virginia Peanut Variety Trial

Location: Plains, TX Cooperator: Jet Wilmeth

Variety	Yield	Grade	ELK	JK	PV 5/13	PDL 10/22	PDR 10/22	PL/A x1000
	lb/A	----------	(%)	----------				
NC 12C	6378	73	62		3	1	1	41
Perry	6080	73	54		3	1	1	43
Gregory	6067	71	58		3	1	1	41
NC-7	5985	68	34		4	1	2	47
VC-2-P	5853	71	60		3	1	1	42
VC-2	5597	72	41		3	2	1	37
Jupiter	5405	71	56		3	1	1	43
LSD (P=.10)	396	NS	6					
Standard Deviation	420	3	11					
CV	7	4	21					
Test Mean	5909	71	50		3	1	1	42

LSD = least significant difference, CV = coefficient of variation; NS = not significant
SMK = sound mature kernel, SS = sound splits, OK = other kernel, DK = damaged kernel,
JK = jumbo kernel, ELK = extra large kernel
PV = plant vigor rating (0 = none, 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent)
PDL = pod loss rating (0 = none, 1 = few, 2 = some, 3 = fair)
PDR = pod rot rating (0 = none, 1 = 1-2%, 2 = 3-10%, 3 = >10%
PL/A = plants per acre x 1000
P next to variety designates planted from producers seed supply
Vigor Rating: 0 = none, 1 = poor, 5 = high; Pod Rot/Loss Rating: 0 = none, 2 = fair, 3 = high
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas A&M Research & Extension Center - Vernon

Spanish & Valencia Peanut Variety Trials

Project Code……: PHO04-01
Cooperator/Location……..…. : Jerry Myatt/Earth, TX
Design/Rep#/PlotSize……..: : RCB/6/4-40" rows x 40'
Planting/Digging/Harvest Date….. : 5-8-04/10-14-04/11-1-04
Days from Planting to Digging….. : 159
Comments: There were no differences in yield between Tamspan 90 and OLin, while grade was higher with Tamspan 90.

Project Code……: PLB04-02
Cooperator/Location……..…. : Brad Heffington/Littlefield, TX
Design/Rep#/PlotSize……..: : RCB/4/4-40" rows x 35'
Planting/Digging/Harvest Date….. : 5-15-04/10-22-04/11-16-04
Days from Planting to Digging….. : 160
Comments: There were no differences in varieties at location. However, there was a high degree of variability with this trial due to excessive moisture and iron chlorosis. Therefore, conclusions should not be drawn from this trial.

Project Code……: PTY04-06
Cooperator/Location……..…. : Buster Adair/Wellman, TX
Design/Rep#/PlotSize……..: : RCB/4-40" twin-rows x 36'
Planting/Digging/Harvest Date….. : 5-13-04/9-29-04/10-10-04
Days from Planting to Digging….. : 134
Comments: Tamspan 90 out yielded both OLin and 9899-14. There were two samples of 9899-14.

Project Code……: PYK04-02
Cooperator/Location……..…. : Robbie Guetersloh/Plains, TX
Design/Rep#/PlotSize……..: : RCB/4/4-40" rows x 36'
Planting/Digging/Harvest Date….. : 5-3-04/9-13-04/10-13-04
Days from Planting to Digging….. : 133
Comments: There were no differences yield differences between any of the Valencia varieties.

Project Code……: PLB04-03
Cooperator/Location……..…. : John Chester/Earth, TX
Design/Rep#/PlotSize……..: : RCB/6/2-30" rows x 40'
Planting/Digging/Harvest Date….. : 5-24-04/10-14-04/10-21-04
Days from Planting to Digging….. : 143
Comments: There were no differences in yield between any of the Valencia varieties.

Texas A & M Research & Extension Center - Vernon

Spanish Peanut Variety Trial

	Hockley			Lamb			Terry		
Variety	Yield	Grade	PL/A	Yield	Grade	PL/A	Yield	Grade	PL/A
	lb/A	- (%) -	x1000	lb/A	- (%) -	x1000	lb/A	- (%) -	x1000
Tamspan 90	1754	73	49	1154	72	81	5269	73	54
OLin	1609	69	62	694	72	36	4897	74	43
9899-14 (1)							4614	68	59
9899-14 (2)				821	69	50	4745	68	51
LSD (P=.10)	NS	2	13	NS	1	5	232	2	5
Std Dev	177	3	11	337	2	20	302	3	7
CV	11	4	20	38	3	36	6	5	14
Test Mean	1682	71	55	890	71	55	4881	71	52

9899-14(1) = higher germ (77%); 9899-14 (2) = lower germ (63%)

Valencia Peanut Variety Trial

	Yoakum			Lamb		
Variety	Yield	PL/A	Grade	Yield	PL/A	Grade
	lb/A	x1000	%	lb/A	x1000	%
Valencia A	4297	63	68	2870	50	68
Valencia C	4458	66	69	3241	60	67
Gentex 101	4449	66	67	3005	47	68
Gentex 102	4556	62	69	2746	49	67
Gentex 136	4190	52	67	2729	40	63
Valencia A-P	4251	59	70			
NMPR-3	4175	86	66			
S-3685	4380	78	66			
Gentex 136-P				2718	40	66
Sunland X-6				2859	63	67
LSD (P=.10)	NS	7	NS	NS	6	2
Std Dev	228	12	2	421	10	3
CV	5	18	3	15	20	4
Test Mean	4345	66	68	2881	50	67

LSD = least significant difference, CV = coefficient of variation; NS = not significant
PL/A = plants per acre x 1000
P next to variety designates planted from producers seed supply
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas A&M Research & Extension Center - Vernon

Market-Type Trials

Project Code…… : PACF04-02
Cooperator/Location…….. : Ag-Cares Farm/Lamesa, TX
Design/Rep#/Plot Size…… : RCB/4/4-40" rows x 50'
Planting Date……. : 4-26-04
Digging Date/Harvest Date…… : Spanish & Valencia - 9-21-04/10-13-04
Runner & Virginia - 10-19-04/10-28-04
Days from Planting to Digging…… : Spanish & Valencia - 148
Runner & Virginia -176

Comments: Flavorrunner 458 had a yield of over 5000 lbs/A. Tamrun OL02, NC7, and NC12C all yielded more than 4000 lbs/A. All Spanish and Valencia varieties yielded less than 4000 lbs/A. Flavorrunner 458 (81) and Tamrun OL02 (79) graded higher than all of the other varieties and market-types.

Project Code…… : PWPG04-04
Cooperator/Location…….. : Western Peanut Growers/Denver City, TX
Design/Rep#/Plot Size…… : RCB/4/4-36" rows x 50'
Planting Date……. : 4-27-04
Digging Date/Harvest Date…… : Spanish & Valencia - 9-21-04/10-12-04
Runner & Virginia - 10-12-04/10-19-04
Days from Planting to Digging…… : Spanish & Valencia - 147
Runner & Virginia -171

Comments: Flavorrunner 458 was the only variety that yielded over 4000 lbs/A and had a grade greater than 78.

Project Code…… : PLB04-01
Cooperator/Location…….. : Haldon Messamore/Sudan, TX
Design/Rep#/Plot Size…… : RCB/4/4-40" rows x 50'
Planting Date……. : 5-4-04
Digging Date/Harvest Date…… : 10-19-04/11-11-04
Days from Planting to Digging…… : 168

Comments: There were no differences in yielded and grade with any of the market-types. Due to problems with digging and harvesting yields were highly variable at this trial. Therefore, no conclusions should be drawn from these results.

**Delays and digging mostly likely had an effect on the results of all trials.

Texas A & M Research & Extension Center - Vernon

Market-Type Trial

Location: Lamesa, TX Cooperator: Ag-Cares

Variety	Yield	Grade	SMK	SS	OK	DK
	-(lbs/A)-			(%)		
Flavorrunner 458	5018	81	65	17	1	0
Tamrun OL02	4562	79	69	11	1	0
NC 7	4543	75	68	7	2	1
NC 12C	4330	76	70	7	1	0
OLin	3030	76	63	13	1	1
Tamspan 90	2925	75	64	11	1	1
Valencia A	2309	72	65	8	2	1
Genetex 136	1923	70	64	7	1	1
LSD (P=.10)	749	3	NS	NS	NS	1
Standard Deviation	615	2	5	5	0	0
CV (%)	17	3	7	52	29	73

Market-Type Trial

Location: Denver City, TX Cooperator: Western Peanut Growers

Variety	Yield	Grade	SMK	SS	OK	DK
	-(lbs/A)-			(%)		
Flavorrunner 458	4238	79	67	12	2	0
NC 7	3685	72	65	8	2	1
NC 12C	3570	75	69	7	1	0
Tamrun OL 02	3462	76	66	10	2	1
Tamspan 90	2168	77	61	16	1	1
OLin	2112	77	64	13	1	1
Valencia A	1772	74	64	10	2	1
Genetex 136	1143	71	65	6	3	1
LSD (P=.10)	519	2	3	3	1	0
Standard Deviation	426	1	3	3	1	0
CV (%)	15	2	4	25	39	58

Texas A & M Research & Extension Center - Vernon

Market-Type Trial

Location: Sudan, TX Cooperator: Haldon Messamore

Variety	Yield	Grade	SMK	SS	OK	DK
	-(lbs/A)-	----------	----------	(%)	----------	----------
NC 7	3604	76	66	9	1	1
Flavorrunner 458	3272	79	65	14	1	1
NC 12C	3074	76	60	16	2	1
OLin	2835	75	63	12	1	1
Tamrun OL02	2316	75	67	8	1	1
Tamspan 90	2290	76	62	14	2	1
Genetex 136	2179	76	65	12	1	1
Valencia A	1971	76	57	20	1	1
LSD (P=.10)	NS	NS	6	NS	NS	NS
Standard Deviation	1292	3	4	5	1	0
CV (%)	48	3	6	39	52	38

LSD = least significant difference, CV = coefficient of variation, NS = not significant
SMK = sound mature kernel, SS = sound splits, OK = other kernel, DK = damaged kernel,
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas A & M Research & Extension Center - Vernon

Evaluation of Row Pattern in Spanish & Runner Peanut

Project Code…… : PTY04-02 & 03
Cooperator/Location……..: Michael Franke/Brownfield, TX
Design/Rep#/Plot Size…… : RCB/4-40" rows x 50'
Planting Date…… : 4-28-04 - Tamspan 90 & Flavorruner 458
Digging Date/Harvest Date…… : Tamspan 90, 9-21-04/10-15-04
Flavorruner 458, 10-15-04/10-29-04
Days from Planting to Digging…… : Tamspan 90 = 146
Flavorruner 458 = 170

Comments: Trial was established to determine the effects of row pattern and seeding rate on yields of Spanish (Tamspan 90) and Runner (Flavorruner 458) peanut. Yields were higher with the twin row pattern with both the Spanish and Runner market-types. Grades were not affected by row pattern. Yields were not affected by planting rate.

Evaluation of Row Pattern in Spanish & Runner Peanut

	Spanish Peanut		Runner Peanut	
Treatment	Yield	Grade	Yield	Grade
	lb/plot	%	lb/plot	%
Single Row	2655	77	3617	78
Twin Row	3401	77	4969	78
LSD (P=.10)	404	NS	944	NS
4 seed/ft	3136	77	4327	78
6 seed/ft	3095	77	4153	78
8 seed/ft	2853	77	4399	79
LSD (P=.10)	NS	NS	NS	NS
Standard Deviation	564	1	1319	2
CV	19	2	31	2

LSD = least significant difference, CV = coefficient of variation, NS = not significant
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas A&M Research & Extension Center - Vernon

Evaluation of a Conventional vs. Sandwich Digger

Project Code . . . . . : PGN04-01
Cooperator . . . . . : Gary Jackson
Location . . . . . : Seminole, TX
Experimental Design . . . . . : RCB
Number of Reps/Plot Size . . . . . : 4/18'x2500'
Row Width/#Per Plot . . . . . : 36"/6
Planting Date . . . . . : NA
Digging Date . . . . . : 10/15/2004
Harvest Date . . . . . : 10/29/2004
Crop/Variety . . . . . : Peanut/Flavorrunner 458
Days from Planting to Digging. . . . : NA

Comments: Trial was established to evaluate the differences between a conventional and sandwich digger on yield, grade, value, harvest loss, and overall flavor. There were no differences between the two diggers in yield, total sound mature kernels, other and damaged kernels, peanut value, or overall value. Digging loss was evaluated both under the windrow and outside the windrow along with total loss (under the windrow + outside the windrow). Peanuts were harvested with a six-row peanut thresher. Harvest loss was evaluated both directly behind the combine (under the windrow), outside the windrow, and total. There was no difference in digging or harvest loss. Foreign material and moisture was higher with the sandwich digger compared to the conventional digger. Loose shelled kernels and sound splits were higher with the conventional digger, while sound mature kernels were higher with the sandwich digger. There was no difference in peanut flavor, off-flavor, or total peanut blanchability. There was a higher percentage of bald kernels with the conventinal digger.

Texas A & M Research & Extension Center - Vernon

Evaluation of a Conventional vs. Sandwich Digger

Location: Seminole, TX Cooperator: Gary Jackson

Digging Method	Yield	FM	Moist	LSK	SMK	SS	TSMK	OK	DK
	lbs/A	(%)							
Conventional Digger	7874	1.5	9	3	75	7	82	1	0
Sandwich Digger	8081	2.3	10	2	78	4	82	1	0
LSD (P=.10)	NS	0.6	1	1	3	2	NS	NS	NS
Standard Deviation	495	0	0	1	2	1	1	1	0
CV (%)	6	19	4	29	2	25	1	46	0

Digging Method	Value	Value	DigLoss OWR	DigLoss IWR	DigLoss Total	HarLoss OWR	HarLoss IWR	HarLoss Total
	cent/lb	$/A	(lb/A)					
Conventional Digger	0	1524	276	204	480	470	210	680
Sandwich Digger	0	1590	245	135	380	352	237	589
LSD (P=.10)	NS	NS	NS	NS	NS	NS	NS	NS
Standard Deviation	0	94	69	91	91	80	68	135
CV (%)	1	6	26	53	21	19	30	21

Digging Method	Roasted Peanut Flavor	Off-Flavor Intensity	Aflatox ppb	Skins Slip	Unblan Wholes	Unblan Splits	Rnose Wholes	Rnose Splits	Blan Wholes	Blan Splits
				(%)						
Sandwich	5.1	0	0	7	2.1	0.7	3.8	0.2	81.8	11.4
Conventional	4.8	1	0	15.3	3.8	0.7	8.3	0.7	75.7	11.1
LSD (P=0.05)	NS	NS	NS	4.3	NS	NS	NS	NS	NS	NS
Standard Deviation	0.2	0.8	0	4.9	2	0.9	4.2	0.9	5.5	4.6
CV (%)	5	165	0	17	61	174	84	246	7	26

FM = foreign material, Moist = moisture, LSK = loose shelled kernel, SMK = sound mature kernel, SS = sound splits,
TSMK = total sound mature kernel, OK = other kernel, DK = damaged kernel, LSD = least significant difference, CV = coefficient of variation,
NS = not significant, DigLoss = digger loss, OWR = outside windrow, IWR = inside windrow, HarLoss = harvest loss, Aflatox = aflatoxin
Slip = slippage, Unblan = unblanched, Rnose = rednose, Blan - blanched
Means within a column which differ by more than the LSD are statistically different (P=0.10 or 0.05).

Texas A & M Research & Extension Center - Vernon

Evaluation of Simulated Hail Damage on Peanut Yields

Project Code……: PWB04-02
Cooperator……: Devin Kieschnick
Location……: Lockett, TX
Experimental Design……: RCB
Number of Reps/Plot Size……: 4/4-40" rows x 50'
Planting Date……: 5/4/04 - (TAMRUN OL 02)
Digging Date……: 10/16/2005
Harvest Date……: 11/1/2004
Days from Planting to Digging……: 165
Comments: Simulated hail damage was conducted on 6//03 (Beginning Bloom) and 7//03 (Full Bloom). Peanuts were defoliated at a level of 33%, 66%, or 99%. Peanut yields were reduced with 99% defoliation at both defoliation timings and with 66% defoliation at the full bloom growth stage. Peanut grades were reduced with all defoliation levels and timings except the 33% and 66% at the full bloom growth stage. Sound mature kernels (SMK) was reduced with the 66% and 100% defoliation irregardless of timing. Sound splits (SS) was increased with 99% defoliation at beginning bloom and 66% defoliation at full bloom. Damaged kernels (DK) increased with 99% defoliation at full bloom. The number of other kernels (OK) was increased with the full bloom timing (irregardless of defoliation level) and 66% and 100% defoliation (irregardless of defoliation timing).

			Peanut			
Treatment	Yield	Grade	SMK	SS	OK	DK
	lb/plot	%	%	%	%	%
Beginning Bloom - 33% Defoliation	5995	75	63	12	1	1
Beginning Bloom - 66% Defoliation	5482	75	65	10	1	1
Beginning Bloom - 99% Defoliation	3583	74	60	14	2	1
Full Bloom - 33% Defoliation	6018	76	66	10	1	1
Full Bloom - 66% Defoliation	4222	76	61	15	2	1
Full Bloom - 99% Defoliation	1901	68	59	9	3	2
Untreated	6071	77	67	10	1	1
LSD (P=.10)	830	2	4	3	1	0
Standard Deviation	677	2	3	2	1	0
CV	14	2	5	17	40	26

LSD = least significant difference, CV = coefficient of variation, NS = not significant
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas A&M Research & Extension Center - Vernon

Evaluation of Chaperone in Peanut

Project Code.	: PCW04-03		PWB04-03	
Cooperator	: D. & R. Henard		Devin Kieschnick	
Location	: Quail, TX		Lockett, TX	
Experimental Design	: RCB		RCB	
Number of Reps/Plot Size	: 4/13.3'x50'		4/13.3'x70'	
Row Width/#Per Plot	: 40"/4		40"/4	
Soil Type	: Loamy Sand		Loamy Sand	
Sand/Silt/Clay [%]	: 87/8/4		87/9/4	
pH/OM/CEC.	: 8.0/0.2		7.4/0.1	
Planting Date	: 5/5/2004		5/4/2004	
Harvest Date	: 10/17/2004		11/1/2004	
Crop/Variety.	: Peanut/Flavorrunner 458		Peanut/Tamrun OL 02	
Application Timing	: POST1	POST2	POST1	POST2
Application Date	: 6/16/2004	7/12/2004	7/2/2004	7/23/2004
Application Method	: BC	BC	BC	BC
Time of Day	: 1:00-1:10	10:15-10:20	2:30-2:40	9:20-9:25
Air/Soil Temperature [F]	: 82/78	87/80	96/81	84/78
Relative Humidity [%]	: 70	39	45	55
Wind [mph/direction]	: 4.0/SE	3.0/SSW	4.0/SE	3.0/W
Cloud Cover [%]	: 95	5%	20%	40
Soil/Leaf Moisture	: Med/Dry	Low/Dry	Low/Dry	Med/Dry
Crop Stage/Ht or Diam	: 10->25lf/4-11"	Bloom/12-24"	>25lf/8-14"	Bloom/20-36"
Sprayer Type/mph	: BPK/3	BPK/3	BPK/3	BPK/3
Nozzle Type/Size	: FF 11002 XR	FF 11002 XR	FF 11002 XR	FF 11002 XR
Boom Ht/# Noz/Spacing [in]	: 16"/4/20"	16"/4/20"	16"/4/20"	16"/4/20"
GPA/PSI	: 12/28	12/28	12/29	12/27

Comments: Yield and grade were not affected by any of the Chaperone treatments at either of the two locations.

	Collingsworth Peanut		Wilbarger Peanut	
Treatment	Yield	Grade	Yield	Grade
	- (lbs/A) -	---- (%) ----	- (lbs/A) -	---- (%) ----
Untreated	5141	77	5593	76
Chaperone - 5 oz/A - POST 1	4595	77	5390	76
Chaperone - 10 oz/A - POST 1	4242	77	5632	74
Chaperone - 10 oz/A - POST 1 Chaperone - 10 oz/A - POST 2	4949	77	5691	76
LSD (P=.10)	NS	NS	NS	NS
Standard Deviation	531	1	183	1
CV (%)	11	1	3	2

LSD = least significant difference, CV = coefficient of variation, NS = not significant
Means within a column which differ by more than the LSD are statistically different (P=0.10).

Texas Cooperative EXTENSION
The Texas A&M University System

Does Peanut Seeding Depth Have an Effect on *Rhizobium* Nodulation and Peanut Yield? 2003-2004

Calvin Trostle & Kyle Long, Extension Agronomy, Texas A&M—Lubbock
(806) 746-6101, ctrostle@ag.tamu.edu

In highly sandy soils used in peanut production in the Texas South Plains, drying conditions around the seed are common due to temperature, wind, sandy soils, and planting depths often only 1" deep. Shallow seeding depths are sometimes used to hasten emergence and hopefully gain 1-3 days of maturity. Furthermore, some producers plant into dry soils then water frequently in an effort to keep the seed zone moist and get peanuts to emerge quickly.

Objective: Determine the effect of seeding depth on *Rhizobium* nodulation and peanut yield at Western Peanut Growers Research Farm, Gaines Co., Texas.

How this study was conducted:

2003—Flavor Runner 458 was seeded May 5 into wet soil at replicated (four) seeding depths of 1", 2", and 3". Standard 1X rates of granular Nitragin 'Soil Implant' and liquid Nitragin 'Lift' *Rhizobium* inoculants were used. No pre-plant nitrogen was applied, but the trial was fertilized through the pivot in July and August for a total of 50 lbs. N/acre. Thus potential yield differences due to inoculant or seeding depth were tempered by possible response to fertilizer N. Nodule counts were taken June 25 and August 8, eight plants per plot.

2004—Similar to 2003 FR 458 was seeded into moist soil on April 29th and irrigated twice in 6 days. The seeding rate was accidentally set on 'LO' range hence only about 1/3 of the target seeding rate (6 seeds/ft.) was dropped, and stands were thin. Nodule samples were collected June 15 and August 10. No nitrogen was added. Yields were measured (each of nine treatments replicated four times).

Results:

Tables 1 & 2 demonstrate the significant impact that both seeding depth and inoculant type may have on the survival of *Rhizobium* inoculant in dry conditions. **In both years, the shallow depth of seeding, in spite of moist conditions, resulted in significant reduction in nodulation especially for liquid inoculant on peanut seeded at 1" depth.**

The data suggest that producers should minimize planting either into dry soil and shallow planting. When adverse conditions are expected then granular inoculant might be a better choice than liquid due to the buffering of temperature and moisture that granular inoculant may provide.

Table 1. 2003 *Rhizobium* inoculant and seeding depth trial. Planted May 5th, Gaines Co., Texas, and threshed October 18th. Trial was planted into moist soil and irrigated 54 hours later. Pivot applied nitrogen, 50 lbs. N/A, occurred in July & August thus masking effects of inoculant and seeding depth on yields.

2003 WPG Trial Inoculant	Seeding Depth (inches)	6/25/04 Avg. Nodules per plant	8/8/04 Avg. Nodules per plant		Average Yield (lbs./A)
None	All	2.2 d	4.8 d		4610 c
Liquid Lift	1"	**1.2 d**	**5.4 d**		4792 c
Liquid Lift	2"	15.8 a	37.0 z		5799 a
Liquid Lift	3"	15.3 ab	33.5 z		5418 ab
Gran. Soil Implant	1"	6.1 c	12.7 c		4905 c
Gran. Soil Implant	2"	10.3 b	18.0 b		5028 bc
Gran. Soil Implant	3"	13.2 b	19.3 b		4715 c

P-Value (All)	0.0002	<0.0001		0.0615
Fisher's Least Signif. Diff. (0.10)	3.0	4.1		394

Table 2. 2004 *Rhizobium* inoculant and seeding depth trial. Planted April 29th, Gaines Co., Texas, and threshed November 16th. Trial was planted into moist soil and irrigated twice in 6 days. No mid-season N was applied. Incorrect settings on planter led to seeding about 1/3 of target seeding rate (~2 seeds/ft. of row).

2004 WPG Trial Inoculant	Seeding Depth (inches)	6/15/04 Avg. Nodules per plant	8/10/04 Avg. Nodules per plant	10/15/04 Average Chlorophyll	Average Yield (lbs./A)
None	1"	0.5 e	3.5 g	21.9 e	1700 de
None	2"	0.7 e	6.7 ef	22.8 e	1660 e
None	3"	1.5 e	24.9 de	25.0 de	1722 de
Liquid Lift	1"	**5.1 d**	**16.9 ef**	22.4 e	2033 d
Liquid Lift	2"	17.4 a	59.3 ab	34.3 ab	3706 a
Liquid Lift	3"	16.6 a	60.8 a	36.5 a	3469 a
Gran. Soil Implant	1"	10.0 c	34.0 cd	26.5 d	2407 c
Gran. Soil Implant	2"	11.0 bc	40.1 c	30.4 c	2815 b
Gran. Soil Implant	3"	13.4 b	45.0 bc	32.0 bc	3002 b

P-Value (Inoculant)	<0.0001	0.0005	<0.0001	<0.0001
P-Value (Depth)	<0.0085	0.0063	0.0002	0.0046
P-Value (Inoculant X Depth)	0.0246	0.1360	0.0411	0.0030
Fisher's Least Signif. Diff. (0.10)	2.7	12.8	2.5	357
Coefficient of Variation, CV (%)	78.3	72.9	20.6	33.6

Texas Cooperative EXTENSION
The Texas A&M University System

Rhizobium Product & Rate and Nitrogen Fertilization Trials for Peanut, Texas South Plains 2004

Calvin Trostle, Extension Agronomy, Texas A&M—Lubbock
(806) 746-6101, ctrostle@ag.tamu.edu

in collaboration with

Jamie Easterling, TCE Extension IPM agent, Atascosa-Frio Cos.
Bob Whitney, TCE Ag. Extension Agent, Comanche Co.
Bob Farley, Helena Chemical, Deleon
Leonard Haynes, TCE Ag. Extension Agent, Donley Co.
Saunna Blacksher, TCE Program Assistant, Collingsworth Co.
Kenny Brdecko, TCE Ag. Extension Agent, Wheeler Co.

And cooperating producers

The attached table compiles selected results from the statewide survey of *Rhizobium* nodulation in Texas peanut. Thanks to the many cooperators who helped identify fields and provided information. About 15 more farmers remain to be contacted regarding field observations and field history.

Since 2000 an active education and research program for *Rhizobium* product and rate evaluation, effectiveness of *Rhizobium* application, and farmer education has been conducted in the Texas South Plains. This component of Texas Peanut Producer Board work seeks to investigate *Rhizobium* inoculation and nodulation in other areas of Texas. Could some of what we have learned in the past five cropping seasons in the High Plains be useful to producers in other areas of Texas?

Objectives: 1) Determine the degree of *Rhizobium* nodulation in Texas peanut fields in areas other than the Texas South Plains.

2) Relate observed *Rhizobium* nodulation in these other Texas peanut fields to inoculant use, years since the field was in peanut, and N fertilizer use.

How this study was conducted:

With the assistance of the above cooperators, 36 peanut fields off the High Plains were visited in Summer 2004. General nodulation and field conditions were observed as well as other measures such as weed problems or plant disease. Each site was recorded by GPS. A minimum of eight plants were take randomly within one area of the field, and nodule number per plant was recorded. In addition, numerous nodules were examined for N fixation activity (pink or red

inside) as well as a general location of the nodules on the plant (e.g., masses on the taproot, evidence of applied *Rhizobium* inoculant; Or nodulation mostly on the lateral roots, indicative of background or native *Rhizobium*).

The following was the survey timing and number of fields:

Atascosa-Frio Counties, July 13, 9 fields (several fields were little more than 1 month since planting)
Haskell County, August 19th, 5 fields
Comanche-Erath Counties, August 30th, 8 fields
Southeast Panhandle/Northwest Rolling Plains (6 counties), September 21st, 14 fields

Results:

In general little *Rhizobium* nodulation was very high on the majority of field and inoculant use was low. The majority of fields appear to have had inoculant at some point in the past, but most not recently. Most fields did not have masses of nodulation on the taproot indicating that nodulation was from background soil *Rhizobium*, however, often the nodules had no color development inside which means they are not fixing N for the peanut plant. Several producers indicated that "they tried inoculant before" but couldn't tell the difference. Furthermore, many if not most of the producers were applying high rates of N, as much as 240 lbs. N/A when they tried the inoculant hence the likelihood of response was low.

Regional Observations:

Atascosa-Frio Counties—Among the nine fields sampled nodulation ranged from 370 nodules per plant (most not active) to 9 nodules per plant (planted five weeks earlier). Among peanuts that had been planted at least two months, nodulation averaged 205 per plant. No fields to date reported inoculant use. Most nodules were on the laterals, and many were not active.

Haskell County—Five fields, none with inoculant use, demonstrated nodulation ranging from 108 to almost 700 nodules per plant (average 320). Almost all nodules were on lateral roots. Two fields had a high proportion of active nodules. Nitrogen use ranged from little to high.

Comanche-Erath Counties—Among the eight fields sampled, most had received *Rhizobium* inoculant in the past though much of it was seedbox powder, which may not perform well based on observations in West Texas. We did find one field, however, that had been out of peanuts for 12 years which had an increase in nodulation from 20 per plant for uninoculated to 64 with seedbox powder. The range of nodulation observed was from 20 to almost 800 per plant (average 376). Few nodules were observed on the taproot though this was the case for the inoculated field where seedbox powder was used. Several fields, observed on August 30th, had few nodules were currently or ever had been active.

Southeast Panhandle/Northwest Rolling Plains—A wide variety of production fields were evaluated. Half of fourteen fields showed evidence of *Rhizobium* inoculant use due to

masses of nodules on the taproot, and this generally was consistent with inoculant use among producers. Among fields that demonstrated taproot nodulation there was an average of 195 nodules per plant, but **without** taproot nodulation the average was 89. Farmer interest in inoculation was high in Donley Co., producers who are relatively new to peanut production. In contrast, one Collingsworth producer was aware of nodulation and its importance, and he used a seedbox powder on a field that had been in irrigated wheat for 15 years, but he achieved only 3 nodules per plant (6 of 8 plants had none). He had noticed nodulation on plants and thought he had good results as did his buying point.

2004-2005 Extension Education

The development of these observations included discussion with over 20 farmers, five Extension employees, and four industry farm supply dealers regarding the objectives, the basis, and the outcome of this program. Also, initial results were shared with approximately 45 producers at the Comanche Co. peanut workshop in Feb., 2005.

Where Do We Go From Here?—2005 Follow-up

The survey will be repeated in 2005 on a similar number of fields. Through visits with producers several individuals were identified that are interested in applying *Rhizobium* granular inoculant (one with liquid in-furrow application) to further evaluate potential nodulation due to inoculation. We will attempt to have at least one and hopefully two sites in each region where a comparison can be made of inoculated and uninoculated trials. Yields will not be measured in 2005 unless local cooperators can arrange it. A second year of results—we've learned in West Texas that nodulation is not always consistent from one year to the next, will help evaluate the right response for producers in subsequent years.

For more information about effective *Rhizobium* nutrition and product application in West Texas consult Calvin Trostle or visit the Texas A&M website at http://lubbock.tamu.edu/peanuts

Texas Peanut Rhizobium Nodulation Survey, 2004

Calvin Trostle, Extension Agronomy, Texas A&M--Lubbock, 806.746.6101, ctrostle@ag.tamu.edu

Texas Cooperative EXTENSION
The Texas A&M University System

Sample Date 9/21	County	Irri-gated?	Inoculant Type & Product	Plants per sample site										Avg. Nod-ules per Plant	Taproot Nod-ules?	Nodules On Laterals?	Years Since Peanuts
				1	2	3	4	5	6	7	8	9	10				
1	Donley	Yes	Yes	400	250	300	275	300	250	225	285			286	Two-thirds	yes	
2	Donley	Yes	Yes	175	200	250	100	125	75	300	150			172	Over half	yes	
3	Donley	Yes	Yes	150	175	200	175	250	300	300	175			216	Two-thirds	some	First Time
4	Wheeler	Yes		375	30	85	175	18	200	275	285			180	few	yes	
5	Collingsworth	Yes	Seedbox	10	10	0	0	0	0	2	0			3	none	yes	16+
6	Collingsworth	Yes		245	95	175	180	300	300	250	275	300	285	241	Two-thirds	yes	
7	Collingsworth	Yes		400	450	300	250	275	300	325	200			313	Three-fourths	some	
8	Collingsworth	Yes		100	125	75	240	250	175	100	195			166	few	yes	
9	Collingsworth	No	Granular	25	50	40	25	35	30	20	45			34	Two-thirds	yes	
10	Collingsworth	Row?		150	200	175	225	200	150	100	75			159	none	yes	
11	Childress	Yes	None	50	45	30	45	20	15	75	100			48	few	yes	
12	Hall	Yes		60	100	105	115	95	70	165	120			104	50%	yes	
13	Motley	Yes	None	60	80	45	90	80	55	50	25			61	few	yes	
14	Motley	Yes	None	0	0	0	0	0	0	25	12			5	none	yes	
													Average (tap)	**195**	**Range, 34 to 313**		
													Average (no tap)	**89**	**Range, 3 to 180**		
8/30																	
1	Erath	Pivot	None	400	**350**	**90**	**250**	450	**900**	**575**	200			402		yes	2
2	Erath	Sideroll	None	550	600	800	650	150	375	800	900			603		yes	
3	Comanche	Pivot		*130*	*160*	*1000*	600	**300**	100	150	300	350		343		yes	
4A	Comanche	Dryland	None	*30*	18	20	20	10	18	6	**20**	40		20		yes	12
4B	Comanche	Dryland	Seedbox, 2X	***90***	**80**	20	15	40	**80**	**30**	**170**	**50**		64	Half	some	12
5	Comanche	Dryland	Seedbox, 2X	110	700	450	500	*800*	800	300	325	500		498		yes	1
6	Comanche			200	275	120	220	500	140	250	500	600		312		yes	
7	Comanche		None	600	600	500	**350**	300	175	**350**	**225**	200		367		yes	2
8	Comanche	Pivot		*1000*	*550*	**1200**	**600**	500	**800**	**1200**	**600**			779		yes	
													Average	**376**			
8/19																	
1	Haskell	Pivot	None	200	240	160	170	190	90	210	150			176	No	yes	
2	Haskell	Pivot	None	105	77	47	118	130	60	200	125			108	No	yes	
3	Haskell	Pivot	None	185	255	500	725	450	190	220	275			350	No	yes	
4	Haskell	Pivot	None	500	600	525	730	750	800	775	825			688	No	yes	
5	Haskell	Sideroll	None	175	220	185	550	185	130	375	420			280	No	No	
													Average	**320**			

Texas Cooperative EXTENSION
The Texas A&M University System

Rhizobium Product & Rate and Nitrogen Fertilization Trials for Peanut, Texas South Plains 2004

Calvin Trostle & Kyle Long, Extension Agronomy, Texas A&M—Lubbock
(806) 746-6101, ctrostle@ag.tamu.edu

The attached data compiles the most recent data from the 2004 *Rhizobium* product rate and nitrogen fertilization trials at Western Peanut Growers Farm, Gaines Co.

Objectives: 1) Determine the effect of *Rhizobium* nodulation and peanut yield due to product and inoculant rate.

2) Determine the effect of nitrogen fertilization rate and timing on peanut yield.

How this study was conducted:

Similar to previous years, FR 458 was seeded into moist soil on May 3rd. At-plant N fertilizer of 20 lbs. N/A was standard on most plots, and was broadcast applied in front of the pivot. Essentially all commercially available liquid and granular inoculants were tested, some at a 2X rate. Nodule samples were collected June 18 and August 10, eight plants per plot. Mid-season N applications were applied either as one 80 lbs. N/A rate, or divided into four 20-lb. increments ending July 30th.

Results:

The accompanying table summarizes nodulation and yields. Among first-time products tested UAP liquid and granular (manufactured by Becker Underwood) performed well. No significant differences were observed among different liquid inoculant products, and when mid-season N was applied on liquid *Rhizobium* inoculant, no significant increase in yield was observed. Liquid inoculation essentially doubled yields over uninoculated plots, whereas N fertilization on uninoculated plots increased yields ~60%. With increasing costs for N fertilizer, effective *Rhizobium* inoculation continues to be the most cost effective means of supplying N to peanut.

Failures in the trial included, for the third year in a row, any seedbox inoculant. No increases in nodulation were observed. Any remaining producers in West Texas are advised to find other means of inoculating their peanuts, and the potential benefits of peanut inoculation, even with granular inoculants, well justifies hiring peanut planting or leasing a planter that can apply either liquid or granular inoculant. Poor performance was observed for Becker Underwood's RhizoFlo granular inoculant (formerly Urbana Laboratories).

For more information about effective *Rhizobium* nutrition and product application in West Texas consult Calvin Trostle or visit the Texas A&M website at http://lubbock.tamu.edu/peanuts

Western Peanut Growers Assn. Research Farm Rhizobium X Nitrogen Trial, 2004

Calvin Trostle, Extension Agronomy, Texas A&M--Lubbock, 806.746.6101, ctrostle@ag.tamu.edu

Planted May 3, 2004; Harvested Nov. 18, 2004.

Treat-ment	Rhizobium Inoculant & Nitrogen Treatment	At-plant N rate (lbs. N/A)	Mid-season (lbs. N/A)	*Rhizobium* inoc. rate (lbs./A)	6/18/04 Average Nodules Plant	8/10/04 Average Nodules Plant	**Yield (lbs./A)**
1	None	0	0	0X	0.5	3.3	1871
2	None	20	0	0X	0.5	3.8	2249
3	None	20	80	0X	1.2	3.3	3570
4	None	20	4x20**	0X	0.6	2.0	3376
5	None	100	0	0X	0.3	8.9	3625
6	B/U* Rhizo-Flo^ granular	20	0	1X	3.8	20.5	2178
7	B/U Rhizo-Flo granular	20	80	1X	5.4	31.3	3553
8	B/U Rhizo-Flo granular	20	0	2X	8.7	22.7	2033
9	B/U Rhizo-Flo granular	20	80	2X	6.7	13.1	3692
10	Nitragin Lift liquid	0	0	1X	6.3	25.8	3727
11	Nitragin Lift liquid	20	0	1X	6.1	24.4	4093
12	Nitragin Lift liquid	20	80	1X	10.4	48.1	4713
13	Nitragin Lift liquid	20	4x20	1X	8.2	52.1	4252
14	Nitragin Lift liquid	100	0	1X	5.0	68.8	4019
15	Nitragin Lift liquid	20	0	2X	8.1	M	4710
16	Nitragin Lift liquid	20	80	2X	6.4	39.8	4410
17	Nitragin Lift liquid	20	4x20	2X	8.6	38.7	4568
18	Nitragin Lift liquid	100	0	2X	7.3	42.9	4789
19	Nitragin Soil Implant granular	20	0	1X	7.0	33.5	4081
20	Nitragin Soil Implant granular	20	0	2X	10.6	39.3	4191
23	B/U HiStick L liquid	20	0	1X	7.6	59.8	4183
24	B/U HiStick L liquid	20	0	2X	6.4	51.9	4265
25	B/U HiStick L + Subtilex liquid	20	0	1X	7.4	91.3	4247
26	B/U HiStick L + Subtilex liquid	20	0	2X	8.6	82.6	4278
27	UAP DynaStart liquid	20	0	1X	8.5	94.7	4446
28	UAP DynaStart granular	20	0	1X	6.3	47.2	3616
29	INTX Microbials N-TAKE liquid	20	0	1X	10.9	57.5	4188
30	INTX Microbials N-TAKE liquid	20	0	2X	10.9	81.3	3916
31	INTX Microbials Exptl. liquid	20	0	1X	5.3	63.1	4133
32	INTX Microbials N-ROW gran.	20	0	1X	3.4	22.5	3668
33	INTX Microbials N-ROW gran.	20	0	2X	6.0	41.9	3912
34	Liquid Lift + granular Rhizo-Flo	20	0	1X/1X	11.3	50.6	3556
35A	Nitragin Peanut Special powder	20	0	2X	0.7	3.9	2343
35B	B/U HiStick N/T powder	20	0	2X	0.7	4.5	2277

*Becker Underwood

^Formerly Urbana Rhizo-Flo

**Four 20-lb. increments, approx. mid-June, July 1, mid-July, Aug. 1

Actual, Fert 1, June 18; Fert 2, July 2; Fert 3, July 16; Fert 4, July 30

Average	**3697**
P-Value (Rhizobium)	<0.0001
P-Value (Block)	0.0007
PLSD, Rhizobium (0.10)	490
Standard Deviation	899
Coefficient of Variation (CV)	24.3%

PROGRESS REPORT

SUBJECT AREAS
Improved flavor potential in West Texas peanuts resulting in improved market economics.

Improved crop management and handling improvements based on peanut physiological responses to West Texas environments during production and field curing.

TITLE
West Texas Crop Management and Handling Practices to Improve Market Quality and Competitive Position of Peanuts in Texas

PERSONNEL AND AGENCY
Dr. A. M. (Mike) Schubert
Texas Agricultural Experiment Station
TAMU Ag. Res. & Ext. Center
Lubbock, TX

Timothy H. Sanders
USDA, ARS, Market Quality and Handling Research Unit
Raleigh, North Carolina

Diane L. Rowland
USDA, ARS National Peanut Research Laboratory
Dawson, GA

Christopher L. Butts
USDA, ARS National Peanut Research Laboratory
Dawson, GA

Contact
Dr. A. M. (Mike) Schubert
Texas Agricultural Experiment Station
TAMU Ag. Res. & Ext. Center
Rt. 3 Box 219
Lubbock, TX 79403-9803
Phone: 806-746-6101 ext 4027
Fax: 806-746-6528
Mobile: 806-778-2353
E-mail: a-schubert@tamu.edu

or
Dr. Tim Sanders
3127 Ligon Street, Box 7631
NC Sate University
Raleigh, NC 27695-7624
919 515 6312
919 856-4598 FAX
Email: tim_sanders@ncsu.edu

STATEMENT OF PROBLEM AND NEED

Problem

According to all major peanut product manufacturers, peanuts produced in West Texas have considerably higher incidence of fruity fermented off-flavor than other production regions and this condition impacts markets for West Texas peanuts. As long as supply and demand are equal, this may not be an issue, but with the level of off-flavor in 2003, many manufacturers sought sources of peanuts other than West Texas.

Need

To significantly reduce the incidence of this problem, research must be continued to define the role of parameters of environment, such as cool night temperature, and resulting plant physiology that affect sugar content and maturity level during production. The relationship of these factors to various windrow and artificial curing conditions, which are known to contribute to off-flavor development, must be determined. Without an understanding of the factors related to maturation of peanuts and the incidence of fruity fermented off-flavor, the focused development of methods to reduce the problem can not be accomplished. The solution might be the absolute need for an early maturing variety or it could entail production and cultural practice changes. For example, studies last year demonstrated the reduction in fruity fermented off flavor by use of sandwich windrows and Surround spray. Simply put, if the causes are not defined, the problem will continue for lack of a focused plan for solution.

PLAN OF ACTION

This proposal is a continuation of research initiated last year.

All objectives listed below will be accomplished through field studies located in West Texas.

Objectives

1) Further evaluate the role of soil temperature in development of high sugar content in peanuts produced in West Texas. This will be accomplished by determining the effect of a minimum soil temperature on sugar concentration in peanuts grown in West Texas. Soil temperature in a plot will be controlled above a certain minimum (20 C) with heating cables to determine if high sugar content is related to cool soil temperatures. Sugar concentration and other metabolites, such as starch, and maturity patterns will be determined in the heated plot and in a non-heated plot during the growing season. Peanuts from these plots will be used to determine if high sugar is responsible for higher incidence of off-flavor (next objective).

2) Determine the effect of various curing temperatures on off-flavor development in normal West Texas peanut sugar levels from non-heated plots and lower sugar peanuts from heated plots as defined in the first objective.

3) Continue to evaluate seasonal fluctuations in soil temperature, soil moisture, and ambient temperature and correlate these environmental conditions with seed chemistry and ultimately with flavor/off-flavor. This information will provide a platform for further investigation into specific chemical mechanisms responsible for flavor and identify environmental factors that might respond to variations in cultural practices. This would allow for production and curing strategies that enhance maturation, ameliorate sugar production and optimize West Texas peanut flavor.

4) Determine the effect of spray treatments of Surround WP (a wettable powder of white kaolin clay), sandwich windrows, and tented windrows (plants leaning against each other with peanuts on the bottom) on peanut pod temperatures in windrows. High temperatures in windrows were definitely responsible for fruity fermented off-flavor in 2003. Studies last year demonstrated lower temperature and a slower rate of temperature rise in sandwich windrows and lower levels of fruity fermented off flavor.

PROGRESS

The soil heating equipment was again installed in spring 2004 at the Grissom farm near Seminole and a repeat of the soil temperature modification was conducted through the growing season. Soil, water application, and ambient conditions were continuously monitored and compiled on an hourly basis. Plant chemical analysis samples were collected throughout the season and maturity samples were collected twice during late season to monitor the development of the crop. Plots were harvested, cured, and analyzed for yield, quality, and flavor.

Based on the results of 2003 and 2004, two primary environmental factors appear to be affecting crop maturity and the eventual development of fruity fermented off-flavors. While soil heating did lead to decreased fruity fermented off-flavors, the differences in pod sugar levels between heated plot and control plot samples was not large enough to have been solely responsible for the observed differences in flavor. In addition, average soil temperatures were lower in 2004 than in 2003 but the crop from 2004 had improved flavor characteristics. When comparing environmental conditions between 2003 and 2004, soil moisture levels, ambient air temperature and relative humidity, as well as crop stress reflected through canopy surface temperature showed that the crop suffered much more water stress in 2003, which correlated with higher fruity fermented off-flavors. We conclude that adequate soil moisture is likely just as important as soil temperature in the prevention of off-flavors and we are proposing to continue this work by developing irrigation scheduling support systems for the region.

Curing temperature affected the development of fruity fermented as has been previously shown. Mature peanuts from the windrow studies developed fruity fermented off flavor when cured at 120 F.

Windrow studies proved once again that sandwich type windrows helped control temperature of peanut pods during curing. Tent type windrows were similar to sandwich windrows in temperature control. Surround helped control pod temperatures relative to untreated windrows. These studies have conclusively shown that sandwich windrows help control pod temperatures during windrow curing and in certain environmental conditions are effective in reducing fruity fermented off flavor.

Accelerating Development of Peanut Varieties through Molecular Markers

Mark D. Burow[1,2] , Yolanda López[1], Arun M. Jesubatham[3], and Charles E. Simpson[4]
[1] Texas Agricultural Experiment Station, Texas A&M University, Lubbock, Texas 79403
[2] Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas 79409
[3] Department of Computer Science, Texas Tech University, Lubbock, Texas 79409
[4] Texas Agricultural Experiment Station, Texas A&M University, Stephenville, Texas 76401

Problem and Need

Enhanced resistance to disease, early maturity, water-use efficiency, and oleic:linoleic ratios are important peanut traits requiring improvement in Texas. Breeding for these traits is difficult because of our lack of understanding of the genetics of these traits, and the variability in field conditions which means that the needed weather or pathogens are not present in some years. In all cases, research is needed to identify the genes controlling these traits and to develop molecular markers to accelerate varietal development for Texas producers.

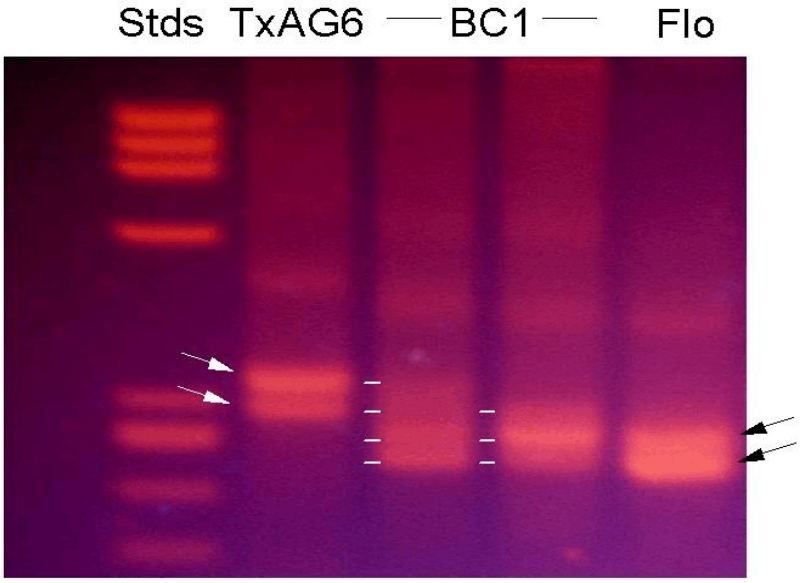
Objectives

The proposed research aims to develop markers for cultivated × cultivated crosses to complement the peanut breeding programs in Texas. The applications expected to benefit the soonest are early maturity, disease resistance, and high O/L content.

Results

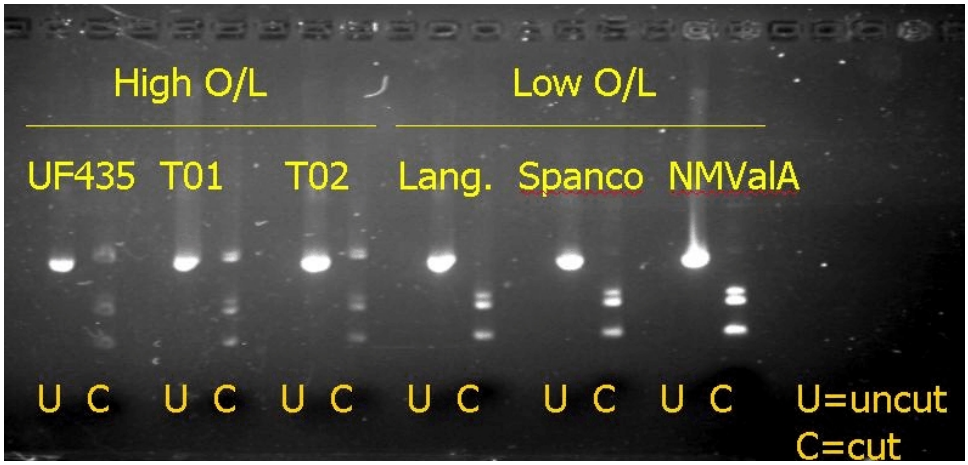
(1) Test microsatellite primers for detection of polymorphism in cultivated peanut and begin mapping of markers on a peanut population. Approximately 110 microsatellites that have been reported to reveal differences among cultivated peanut have been synthesized commercially. We have been able to identify differences among the BC1 progeny of the Florunner x TxAG-6 mapping population. We will use this cross for mapping microsatellite markers on the RFLP map of peanut.

Many of these markers will also be useful for breeding work in cultivated peanut, with the potential to be associated with diverse traits including early maturity, nematode, leafspot, TSWV, and Sclerotinia resistance.

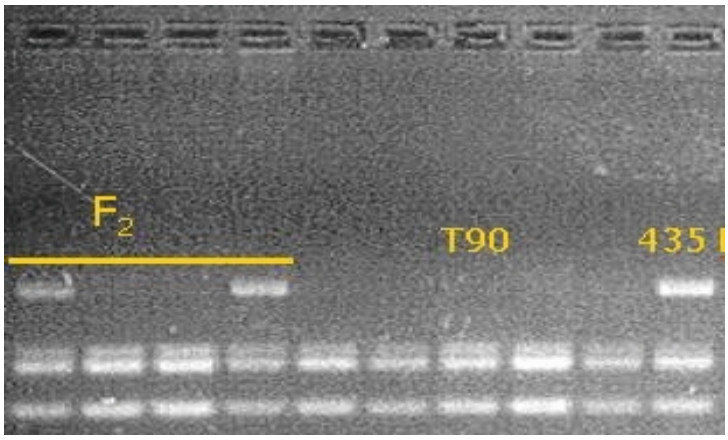


(2) Development of markers for the high-O/L trait. The high-oleic trait has known to be controlled by 2 recessive genes, but there is evidence that more genes are involved. This means additional complexity in breeding for this trait. We are in the process of developing markers that can be used for this trait. Also, success for this trait will signify that this approach is workable in peanut.

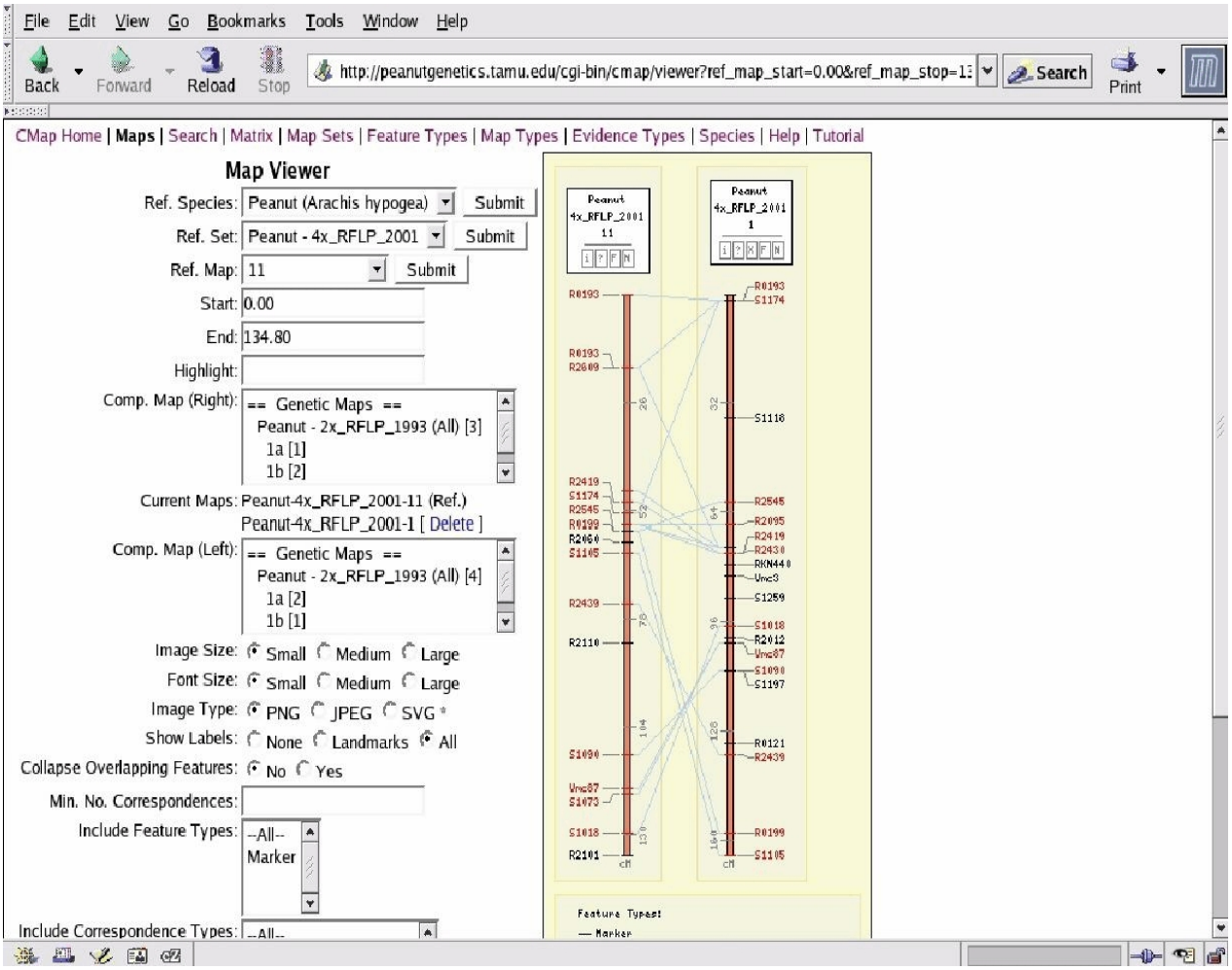
We have used differences in the sequences of the normal (low oleic) and mutant (high oleic) genes to design DNA primers for CAPS (cleaved amplified polymorphic sequence) markers. These markers can distinguish both high-O/L and low-O/L varieties (see figure below).



To test whether these work in a breeding population, we have made F2 crosses between high-O/L and low-O/L varieties, and are now testing the markers on DNA from this population. This can be seen in the following figure:



(3) Development of a marker database and installation of DNA analysis software**.** We have published an online graphic-oriented database of DNA marker maps using the open source CMAP software. This is the only marker database for peanut, and data will be made available in the Legume Information System (LIS) database for comparison of peanut and other legumes. The benefit of this database is that it will allow easy access to peanut marker data for breeding and genetics work.



We have added both marker maps of peanut (Halward *et al*., 1993; Burow *et al*., 2001). The database is publicly available on the internet at http://peanutgenetics.tamu.edu/cmap. The database shows the markers mapped on peanut, and places them on schematic drawings of peanut chromosomes.

ACKNOWLEDGMENTS

We express our sincere appreciation to the National Peanut Board and the Texas Peanut Producers Board for assisting our program in 2004. The work reported here would not have been possible without their generous support.

Title: **Breeding for Early-Maturing Peanuts**

Personnel: M. D. Burow[1], C. E. Simpson[2], M. R. Baring[3], Y. López[1], and J. Ayers[1]
Agencies: [1] Texas Agricultural Expt. Station, Texas A&M Univ., Lubbock, TX 79403.
[2] Texas Agricultural Expt. Station, Texas A&M Univ., Stephenville, TX 76401.
[3] Dept. of Soil and Crop Sciences, Texas A&M Univ., College Station, TX 77843.

Problem and Need

Edible seed quality is a major need for West Texas. Problems of off-flavor are associated with immaturity and high drying temperatures. Additional benefits of reducing the days to maturity are greater flexibility in planting and harvesting as well as cost savings from fewer irrigations, fungicide applications for disease control, and fewer days for weeds to grow.

Objective.

The ultimate goal is release of new varieties that are early-maturing and high-oleic. Our emphasis currently is on developing runner and Spanish varieties.

Current Results

(a) Evaluation of F2:6 populations for yield and maturity. These lines were developed from Spanish x runner high-O/L crosses, and are segregating runner, bunch, and Spanish plant types. We evaluated these populations at the Western Peanut Growers Research Farm at Denver City, and on Doug Sims farm at Earth. Additional sites (Wellington, Stephenville, and Pearsall) were planted using funds from the Texas Peanut Producers Board and these results are presented in that report.

Among the runners, several lines with promising combinations of yield and maturity were identified. An example is Line 21, with a yield equal to Florunner, but significantly earlier. Lines 9 and 12 are similar, except with lower shelling rates. These lines are segregating for pod shape and O/L ratio. We will select the best-shaped pods and seeds with high-O/L for increase and crossing to high-O/L runner varieties. We will also repeat the evaluation of the best lines in 2005 to gather additional data on yield and disease resistance.

F2:6 Runner Test - Denver City

Entry	ValAc	LbPodAc	PctBlkBr	G100SMK	PctTSMK
NC7	868 a	4677 a	68.00 c-e	76.19 a	71.38 a-d
Florunner	796 ab	4329 ab	46.67 f g	56.56 f-l	74.79 a
21	772 a-c	4402 a	69.33 c-e	63.65 b-g	71.38 a-d
TX966205	755 a-d	4270 a-c	30.67 h i	58.65 e-k	72.85 a-c
TX972505	737 a-d	4133 a-c	19.33 i	54.76 h-l	73.20 ab
9	688 b-e	4165 a-c	70.00 c-e	64.45 b-f	67.23 a-f
10	648 b-f	4172 a-c	45.33 f-h	59.17 e-k	62.13 d-f
TX977235	635 c-g	4001 a-d	20.44 i	54.36 i-l	62.19 d-f
12	626 c-h	3856 a-e	81.10 a-d	63.90 b-g	66.26 a-f
7	609 d-h	3797 a-e	64.69 e	42.84 mn	62.46 d-f
17	603 d-h	3564 c-g	36.00 g h	62.51 b-h	67.30 a-f
13	577 e-i	3637 b-f	66.67 d e	69.36 a-c	67.12 a-f
20	562 e-j	3564 c-g	67.33 d e	60.70 d-j	63.01 c-f
8	548 e-k	3730 a-f	76.15 a-e	42.22 mn	54.78 f
25	544 e-k	3669 b-f	62.67 e	56.21 g-l	59.82 e f
18	537 e-k	3190 e-i	73.33 b-e	55.23 h-l	68.94 a-e
31	515 f-k	3198 e-i	40.33 g h	69.42 ab	66.39 a-f
24	510 f-l	3205 e-i	82.67 a-c	53.47 j-l	64.60 b-f
23	504 f-l	3318 d-i	37.33 g h	58.57 e-k	62.33 d-f
11	486 g-m	3416 d-h	69.33 c-e	64.59 b-e	59.32 e f
19	474 h-m	3027 f-j	94.58 a	41.37 n	60.37 e f
14	429 i-m	2963 f-j	74.67 b-e	64.47 b-e	64.89 a-f
15	419 j-m	2705 h-j	59.95 e f	58.34 e-k	63.38 b-f
27	404 k-m	2636 i j	73.33 b-e	57.91 e-k	65.84 a-f
28	385 k-m	2653 i j	64.48 e	61.44 d-i	66.17 a-f
26	376 k-m	2672 f-j	44.42 f-h	68.03 a-d	64.36 a-f
30	364 k-m	2460 j k	65.33 e	63.96 b-g	68.08 a-f
16	332 k-n	2881 f-j	33.33 g-i	69.63 ab	55.79 f
22	201 n	1762 k l	64.29 e	51.97 k-m	55.31 f
BSS56	189 n	1323 l	88.00 ab	49.87 l m	64.70 b-f
LSD =	156	713	14.86	7.89	9.93
CV =	17.7%	12.9%	15.5%	8.1%	9.3%

At Earth, the experiment was very immature - even BSS56, which is more mature than Tamspan90, was only 50% mature. Entries 12, and 21 which had good combinations of yield and maturity at Denver City were in the top statistical class for maturity at Earth even though they were very immature compared to Denver City. The CV for maturity was high because of the low mean. There were several other entries (19, 24, 27, and 28) that were more mature and did have acceptable seed size, but had lower yields. These entries were also the most-mature at Denver City. We will select the best lines from these (and other) sites for further testing and crossing. Because of the immaturity of all materials at this location, the test is useful for identifying the most-mature lines, but may not be as useful for selecting varieties that can be grown in a climate conducive to development of runner varieties.

F2:6 Runner Test - Earth 2004

Entry	ValAc	LbPodAc	PctBlkBr	G100SMK	PctELK	PctTSMK
NC7	933.20 a	5077 a	18.67 b-d	82.23 a	40.91 a	70.54 b-g
Florunner	832.66 ab	4561 ab	0.51 d	60.47 d-f	24.16 b-e	74.34 a-c
31	827.37 ab	4398 a-c	0.59 d	59.67 d-g	26.17 bc	76.40 a-d
32	741.34 a-c	4010 a-f	0.00 d	54.73 fg	20.20 b-i	74.91 ab
7	738.09 a-c	4268 a-d	12.90 cd	42.37 h	0.39 m	68.27 d-j
20	733.12 a-c	4302 a-d	14.00 cd	64.77 b-e	18.02 c-j	68.74 c-j
4	730.37 a-c	4238 a-e	0.67 d	57.17 e-g	9.03 j-m	69.39 b-h
18	723.88 a-d	4082 a-e	14.67 cd	56.63 e-g	12.55 h-l	69.99 b-g
6	722.31 a-e	4124 a-e	8.00 d	54.70 fg	15.86 e-k	70.50 b-g
12	706.14 b-f	4266 a-d	32.37 a-c	62.47 c-f	24.16 b-e	67.69 d-l
24	701.23 b-f	3888 b-h	37.59 ab	58.30 d-g	21.90 b-g	72.74 a-d
27	691.73 b-g	3967 a-g	37.33 ab	58.97 d-g	11.73 i-l	71.97 a-f
17	680.70 b-h	3922 a-g	1.33 d	64.53 b-e	15.41 e-k	70.99 a-g
16	672.56 b-h	4313 a-d	0.00 d	64.77 b-e	14.70 f-l	62.07 lm
14	672.03 b-h	3948 a-g	8.67 d	64.77 b-e	9.17 j-m	68.92 c-i
28	658.13 b-h	3724 b-h	26.59 b-d	57.53 e-g	12.76 h-l	71.75 a-f
5	648.41 b-h	3875 b-h	1.33 d	58.17 d-g	16.46 d-k	68.71 c-j
9	634.88 b-h	3831 b-h	5.99 d	68.93 bc	26.30 bc	67.90 d-k
21	628.11 b-h	3913 a-h	28.98 a-d	63.64 b-f	23.60 b-f	68.95 b-i
23	577.66 c-h	3671 b-h	2.98 d	59.13 d-g	13.06 g-l	63.23 i-m
25	564.52 c-h	3231 c-h	19.59 b-d	56.69 d-g	13.41 f-l	70.96 a-g
29	524.16 d-h	3108 e-h	12.86 d	71.91 b	24.16 b-d	68.83 d-i
19	523.91 c-h	3715 b-h	58.98 a	54.80 fg	9.80 j-l	64.04 h-m
22	517.22 c-h	3088 e-h	8.51 d	55.17 fg	6.06 lm	66.41 f-m
30	501.80 d-h	2853 f-h	8.00 d	58.80 d-g	21.46 b-h	72.21 a-e
10	496.67 e-h	3297 c-h	7.90 d	65.87 b-d	21.66 b-h	61.02 m
11	492.31 f-h	3658 b-h	9.51 d	71.47 b-e	23.52 b-f	62.31 k-m
13	491.48 f-h	3165 d-h	21.33 b-d	71.30 b-f	28.95 b-d	66.98 e-l
BSS56	470.43 gh	2734 h	56.00 a	51.50 g	7.75 k-m	71.02 a-g
15	460.28 h	2806 gh	22.67 b-d	64.77 b-e	17.93 c-j	65.68 g-m
LSD =	226.20	1170	19.10	8.21	9.13	5.74
CV =	21.6%	18.9%	74.3%	8.2%	31.3%	5.1%

Among the bunch types, there are also a few outstanding lines for further development. Among these are Entries 10 and 13. The former has a yield equal to Florunner, but is earlier and has larger seeds. Line 13 yields a little less, but is also early. The earliest entries (6 -8) has seed sizes similar to Spanish lines and are not useful. Lines 13 and 20 are also among the earlier lines at Earth, and 10 is similar in yield to Florunner.

F2:6 Bunch Trial at the WPGRF (Denver City) 2004

Entry	Valac	LbPodAc	PctBlkBr	G100SMK	PctELK	PctTSMK
Florunner	743 a	4220 a	31.33 d-f	56.23 d	11.30 e-g	70.91 a
10	681 ab	4022 ab	57.33 bc	66.13 bc	34.37 b	69.86 a
Ts90	607 a-c	3902 a-c	71.67 ab	41.83 fg	0.95 h	58.71 a-c
NC7	579 b-d	3654 a-c	43.33 cd	90.87 a	46.04 a	68.84 a
13	524 b-e	3271 c-e	61.81 bc	37.06 gh	0.06 h	62.22 a-c
Spanco	516 c-e	3513 b-d	84.00 a	45.73 ef	4.47 h	67.45 ab
20	501 c-f	2805 e-g	38.67 de	49.80 e	3.03 h	71.43 a
17	460 c-f	3039 d-f	34.67 d-f	61.37 cd	13.40 ef	66.51 a-c
18	452 d-f	2872 ef	31.33 d-f	69.50 b	21.22 cd	69.61 a
19	412 e-g	2417 fg	44.67 cd	69.80 b	22.79 c	72.55 a
6	385 e-g	2315 fg	83.33 a	38.23 gh	0.93 h	68.52 a
9	357 e-g	2405 e-g	67.81 ab	47.66 ef	4.34 f-h	67.63 ab
16	354 e-g	3296 b-e	67.12 a-c	69.79 b	19.51 c-e	58.53 a-d
12	317 f-h	2269 fg	24.67 ef	64.63 bc	17.03 c-e	66.67 a-c
8	291 gh	2139 gh	75.33 ab	34.83 h	0.28 h	62.69 a-c
15	291 f-i	2183 f-h	53.12 b-d	68.79 bc	13.49 d-f	61.19 a-c
14	286 g-i	2197 g	20.00 fg	42.60 fg	1.46 h	56.58 b-d
7	269 g-j	2235 g	82.00 a	34.00 h	0.09 h	57.06 b-d
BSS56	220 h-j	1497 hi	81.33 a	46.63 ef	3.49 h	64.24 a-c
21	156 ij	1342 i	10.80 g	41.94 fg	1.25 h	45.51 d
LSD =	152	609	16.89	5.34	6.26	10.15
CV =	23.0%	13.9%	21.2%	6.2%	38.2%	9.8%

F2:6 Bunch Test - Earth 2004

Entry	ValAc	LbPodAc	PctBlkBr	G100MK	PctELK	PctTSMK
NC7	1000 a	5539 a	18.28 de	75.58 b	34.91 b	68.90 d
Florunner	948 ab	5075 ab	0.00 e	57.77 cd	23.58 c	76.01 a
Spanco	894 a-c	4930 ab	64.96 a	46.97 de	4.20 d	74.40 ab
19	877 a-d	5088 ab	4.67 e	68.70 bc	22.60 c	69.25 cd
18	847 a-d	4921 ab	4.67 e	73.23 b	26.80 bc	67.34 de
Ts90	832 a-e	4620 a-c	56.67 ab	46.80 de	2.97 d	73.88 a-c
12	819 a-e	4607 a-c	8.67 e	70.47 bc	21.81 c	69.49 b-d
10	765 b-e	4409 b-d	16.00 de	65.37 bc	30.07 bc	68.77 d
20	747 b-f	4313 b-d	31.33 cd	51.87 de	4.68 d	68.25 d
14	679 c-f	4048 b-e	12.01 de	46.90 de	1.19 d	62.54 ef
NC12	664 d-f	3752 c-e	9.83 e	89.00 a	46.85 a	68.66 d
BSS56	606 ef	3451 de	59.26 ab	47.63 de	5.30 d	72.01 a-d
13	596 ef	3730 c-e	20.00 de	50.33 de	8.51 d	55.33 g
7	546 f	3624 c-e	52.00 a-c	43.40 e	4.66 d	60.40 f
6	545 f	3171 e	57.70 ab	41.00 e	2.07 d	67.11 de
8	531 f	3363 de	42.67 bc	38.90 e	3.00 d	62.78 ef
LSD =	217	1121	21.01	13.14	9.63	4.99
CV =	17.4%	15.7%	44.3%	13.7%	37.0%	4.4%

We also evaluated Spanish lines at both locations, but no entry was superior in yield or maturity to the parents, so data are not presented here.

(b) Evaluate F_2 single plants from new crosses, to begin the process of developing new varieties for the future. We planted 10 populations of space-planted F2 single plants at the Texas Tech Farm in Lubbock. Each population consisted of 300 F2 plants, plus parents. We took extensive notes on flowering, pegging, and plant size during the year, with the intent of determining the relationship between dates of first flowering, pegging, and maturity. We are in the process of measuring yield, maturity, and seed weight for each plant. Selections from several populations will be grown as space-planted rows in 2005. We expect that the better of these crosses will be used extensively in future years.

(c) Backcross selected early-maturing progeny by selected varieties. We crossed early-maturing, high-yielding selections evaluated in previous years by high-oleic lines to introduce the high-oleic trait into these populations. We will begin field testing of progeny in 2005.

In addition, we have evaluated a backcross progeny derived from Valencia x Spanish high O/L crosses. The goal is to develop early-maturing, high-oleic Spanish and/or Valencia varieties. The 2004 results are part of the thesis work of Amade Muitia, who is expected to graduate this spring. Selections were grown at 3 locations in 2004, and the following data are from the TAES Etter Experiment Station, chosen to put severe stress for maturity on this material.

Valencia x Spanish Population - Etter 2004

Entry	LbPodAc	PcTBlkBr	G100SMK	PctTSMK	Pct3&4Sd
Spanco	2153 a	59.33 a-e	47.56 bc	67.47 a-c	3.33 hi
1	2016 ab	71.33 a-c	41.13 e-k	67.08 a-d	48.00 a-d
Tamspan90	1997 a-c	54.00 b-f	45.30 b-e	68.81 ab	13.33 g-i
23	1820 a-d	62.00 a-d	41.33 e-j	68.29 a-c	46.66 a-d
13	1754 b-e	64.66 a-d	38.56 h-k	62.85 c-i	13.33 g-i
11	1749 b-e	66.66 a-d	45.30 b-e	66.66 a-e	24.66 e-g
8	1649 b-e	47.33 def	41.33 e-j	58.40 hi	33.33 c-f
12	1643 c-e	52.66 c-f	39.73 g-k	64.62 a-g	18.66 f-h
7	1619 d-f	53.33 b-f	45.30 b-e	66.00 a-f	48.00 a-d
25	1613 d-f	74.00 ab	42.66 e-h	66.43 a-e	60.66 a
22	1592 d-f	57.33 a-f	39.93 g-k	60.71 f-i	31.33 d-f
16	1564 d-f	66.41 a-d	42.23 e-i	58.33 hi	3.28 hi
19	1540 d-f	51.33 c-f	47.13 b-d	63.78 a-h	40.00 b-e
NMValC	1521 d-g	72.88 a-c	44.63 b-e	69.05 a	52.64 a-c
24	1506 d-g	52.00 c-f	54.50 a	63.68 a-h	6.66 hi
18	1483 d-g	60.00 a-d	48.03 b	65.11 a-g	47.33 a-d
5	1478 d-g	61.33 a-d	42.83 e-h	67.71 a-c	55.33 ab
21	1472 d-g	64.00 a-d	43.00 d-g	60.05 g-i	45.33 a-d
14	1472 d-g	62.00 a-d	43.63 c-g	64.13 a-g	8.00 g-i
OLin	1451 e-h	18.00 g	43.36 c-g	66.06 a-f	0.00 i
6	1449 e-h	38.66 e-g	41.16 e-k	57.98 i	16.00 f-i
3	1446 e-h	57.33 a-f	42.33 e-h	63.27 b-i	53.33 ab
17	1440 e-h	76.00 a	44.33 b-f	61.14 e-i	34.66 c-f
X-101	1385 e-h	62.66 a-d	43.33 c-g	66.77 a-d	59.33 a
2	1374 e-h	62.65 a-d	41.60 e-i	64.18 a-g	15.87 f-i
9	1263 f-h	62.00 a-d	38.00 i-k	61.83 d-i	2.66 hi
10	1252 f-h	65.33 a-d	40.33 f-k	59.59 g-i	13.33 g-i
4	1169 gh	76.66 a	36.90 k	67.83 a-c	12.66 g-i
15	1154 gh	58.66 a-f	39.63 g-k	64.64 a-g	47.33 a-d
20	1086 h	38.00 fg	37.10 jk	64.83 a-g	10.00 g-i
LSD	368	20.68	4.27	5.54	17.5
CV (%)	14.62	21.51	6.12	5.27	37.24

ACKNOWLEDGMENTS

We express our sincere appreciation to the National Peanut Board, the Texas Peanut Producers Board, and United States Aid for International Development (through INTSORMIL for the Valencia x Spanish experiment) for assisting our program again in 2004. A large part of the work reported here would not have been possible without this generous support.

We also acknowledge the support of Members of the Western Peanut Growers Research Farm, the TAES Etter Experiment Station, Texas Tech University, and Doug Sims (Earth).

March 1, 2005

Subject: Peanut Breeding

Title: Heritability Estimates for High Yield Traits Transferred from Wild Species Hybrids to a Conventional Peanut.

Researchers: M.R. Baring, C.E. Simpson, and M.D. Burow

Final Report for 2004:

The crossing program to transfer high yield potential from wild species derived hybrids to conventional peanuts began in the spring greenhouse of 2004. Approximately 275 pollinations were made with positive results on 70% of the attempts. The resulting F_1 populations were planted in the College Station nursery in June of 2004. There were 191 F_1's planted in the nursery with the pedigrees listed in the following table.

#F_1's	Pedigree		#F_1's	Pedigree
5	Tamrun OL 01 X TP301-81		4	01F5404 XTP301-81
4	Tamrun OL 01 X TP301-95		10	01F5404 X TP301-209
10	Tamrun OL 01 X TP301-33		10	01F5404 X TP301-112
12	Tamrun OL 01 X TP301-112		2	TP301-112 X 01F5404
10	Tamrun OL 01 X TP301-81		7	01F5404 X TP301-95
6	TP 301-89 X Tamrun OL 01		16	01F6212 X TP301-112
12	TP301-89 X Tamrun OL 01		4	02F3813 X TP301-95
4	TP301-112 X Tamrun OL 01		3	02F3813 X TP301-112
4	Tamrun OL 01 X TP301-209		1	02F3846 X TP301-112
1	Tamrun OL 02 X TP301-33		1	02F3820 X TP301-89
4	Tamrun OL 02 X TP301-81		2	02F3820 X TP301-95
14	Tamrun OL 02 X TP301-112		3	01F5415 X TP301-95
8	Tamrun OL 02 X TP301-209		2	01F5415 X TP301-209
6	Tamrun OL 02 X TP301-95		6	TP301-89 X 01F5415
6	TP301-112 X Tamrun OL 02		2	01F5415 X TP301-112
7	TP301-112 X 03T4204		3	TP301-89 X 03T4202

The F_1 yields and seeds are being evaluated and a select number of F_2 populations will be grown out for the purpose of estimating the heritability of high yield traits as compared to parent 1, parent 2, and the F_1 progeny. This will give a preliminary idea as to whether or not the study should progress and lines should be carried out to the fifth or sixth generation for a generation means analysis. Crosses will be made in the 2005 spring greenhouse to make duplicate F_1's from last years crosses so that the individual F_2 population variances can be measured against both the F_1 and Parental variances.

Final report to the
National Peanut Board
Funding year 2004

Title of Project:

Peanut quality evaluations of Texas Peanut Breeding lines (in developing new Varieties with Early Maturity and/or Resistance to Root-knot Nematode, Sclerotinia blight, Southern blight, Leafspot, and Tomato Spotted Wild Virus and with High O/L.)

Researchers: Charles E. Simpson[1], Mark D. Burow[2], and Michael R. Baring[3]

Agencies: [1]Texas Agricultural Experiment Station, Soil and Crop Sciences Dept. Texas A&M University, P.O. Box 292, Stephenville, Texas 76401. Phone: (254) 968-4144, FAX: (254) 965-3759, <c-simpson@tamu.edu>.
[2]Texas Agricultural Experiment Station, Texas A&M University, Texas Tech University, Rt. 3 Box 219, Lubbock, TX 79403, <m-burow@tamu.edu>
[3]Soil and Crop Sciences Department, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas 77843. <m-baring@tamu.edu>.

The objective of our project is to conduct quality analyses on breeding materials in earlier generations so we are able to eliminate undesirable materials at an earlier stage, thus conserving resources to concentrate on those lines which are truly more promising to become released varieties that will serve the peanut industry, and ultimately the consumers, better.

We conducted analyses on three sets of samples in 2004. The first of these analyses was run on samples from the Advanced Lines Runner tests conducted at the Otis Johnson farm in south Gaines County. These data are shown in Table 1, below. These data are not normalized (adjusted) for moisture content, so the percent fat and the percent sugar is slightly lower than the figures shown. As expected, Tamrun OL01 had a sugar content much higher than all but one of the breeding lines. We can say that Breeding lines 7 and 16 are candidates to be discarded from further testing, with sugar contents at 5 and 6.1%, respectively. Generally, a flavor ranking above 5 is desired, but Southwest peanuts are not always that high. Five of the breeding lines in these analyses scored 5 or more in flavor.

Because these samples all originated in West Texas, it was surprising that four of the samples showed some presence of aflatoxin. These four included Flavor Runner 458. We are at a loss to explain this occurrence.

Table 1. Quality analyses for 2004, South Gaines County tests.

Line Identification	Aflatoxin	Flavor rk	% Fat	% H2O	% Sugar
Breeding line 1	0	4.8	45.6	4.5	4.2
Breeding line 2	0	4.8	45.9	5.2	4.9
Flavor Runner 458	0.6	5.0	45.7	4.9	4.5
Breeding line 3	0	5.0	46.6	5.0	4.7
Breeding line 4	0.1	5.0	46.3	4.8	4.2
Breeding line 5	0	4.8	45.8	5.0	4.9
Florunner	0	5.0	46.5	4.7	4.3
Breeding line 6	0	5.5	47.1	4.5	4.5
Breeding line 7	0	5.0	46.8	5.7	5.0
Breeding line 8	0	4.8	48.0	5.2	4.6
Breeding line 9	0	4.5	48.2	4.6	4.9
Breeding line 10	1.8	4.0	47.2	4.7	4.4
Tamrun 96	0	4.5	46.2	5.1	4.8
Tamrun OL01	0	4.5	46.2	5.7	5.5
Tamrun OL02	0	5.0	47.9	4.9	4.8
Breeding line 11	0.3	5.3	45.8	4.9	4.6
Breeding line 12	0	4.8	48.2	5.0	4.6
Breeding line 13	0	4.8	49.4	4.0	3.9
Breeding line 14	0	4.8	47.0	4.7	4.6
Breeding line 15	0	4.8	49.9	3.7	3.5
Breeding line 16	0	4.5	46.5	6.2	6.1

The Second group of samples was put together from two locations and consisted of both runner and Spanish lines. The data are shown in Table 2 below. In these analyses, again the only line that was higher than Tamrun OL02 in sugar content was Breeding line 16. Numerous of these breeding lines were 5 or higher in flavor score, but six of the 5-and-above were Spanish lines, which usually rate higher in flavor score because of maturity. Again, Flavor Runner 458 showed the presence of aflatoxin, so the toxin was present in both locations tested from Gaines County in this variety.

Table 2. Quality analyses for 2004, North Gaines County tests.

		Afla-	Fat	H2O	Sugar	Roast	Peanut	N	N	N
Line Identification	Type	toxin	%	%	%	peanut	Off-flv.	Fat	H20	Sugar
Breeding line 20	S	0	46.4	5.6	4.8	5.0	NONE	45.7	7	4.7
Breeding line 21	S	0	46.7	5.3	4.7	5.2	NONE	45.9	7	4.6
Breeding line 11	R	0	48.2	5.0	4.9	5.2	NONE	47.2	7	4.8
Breeding line 22	S	0	45.8	5.6	4.8	5.0	NONE	45.1	7	4.7
Breeding line 23	S	0	45.6	5.7	4.7	5.0	NONE	45.0	7	4.6
Breeding line 24	S	0	47.5	5.6	4.8	5.2	NONE	46.8	7	4.7
OLin	S	0	47.4	5.2	4.4	5.0	NONE	46.5	7	4.3
Tamspan 90	S	0	46.2	5.2	4.4	4.6	NONE	45.3	7	4.3
Breeding line 25	S	0	47.1	5.7	4.8	5.0	NONE	46.5	7	4.7
Breeding line 26	S	0	46.7	5.8	4.7	4.8	NONE	46.1	7	4.6
Breeding line 27	S	0	46.9	5.1	4.7	5.0	NONE	46.0	7	4.6
Breeding line 28	S	0	46.1	5.3	4.8	4.8	NONE	45.3	7	4.7
Breeding line 29	S	0	46.2	5.7	4.7	5.0	NONE	45.6	7	4.6
Breeding line 30	S	0	46.5	5.7	4.8	5.0	NONE	45.9	7	4.7
Breeding line 31	S	0	46.2	5.3	4.8	5.2	NONE	45.4	7	4.7
Breeding line 32	S	0	46.0	5.5	4.8	5.3	NONE	45.3	7	4.7
OLin	S	0	47.4	5.5	4.4	5.3	NONE	46.6	7	4.3
Tamrun OL01	R	0	45.5	6.1	5.4	4.8	NONE	45.1	7	5.3
Tamrun OL02	R	0	46.9	5.5	4.8	5.0	NONE	46.2	7	4.7
Flavor Runner 458	R	0.4	47.2	5.4	4.7	5.3	NONE	46.4	7	4.6
Florunner	R	0	46.5	5.7	4.7	5.0	NONE	45.9	7	4.6
Breeding line 15	R	0	47.5	5.0	3.9	4.6	NONE	46.5	7	3.8
Breeding line 13	R	0	48.1	4.8	3.9	4.8	NONE	47.0	7	3.8
Breeding line 3	R	0	47.0	5.2	4.9	5.0	NONE	46.1	7	4.8
Breeding line 33	R	0	46.3	5.3	4.7	4.8	NONE	45.5	7	4.6
Breeding line 16	R	0	45.7	6.2	5.9	4.8	NONE	45.3	7	5.8
Breeding line 10	R	0	47.4	5.5	4.6	5.0	NONE	46.6	7	4.5
Breeding line 1	R	0	45.8	5.1	4.4	5.2	NONE	44.9	7	4.3
Breeding line 4	R	0	46.8	4.9	4.5	5.0	NONE	45.8	7	4.4
Breeding line 6	R	0	47.1	5.3	4.8	5.0	NONE	46.3	7	4.7
Breeding line 17	R	0	45.9	5.4	4.8	5.3	NONE	45.1	7	4.7
Breeding line 18	R	0	46.1	5.2	4.8	5.3	NONE	45.2	7	4.7
Breeding line 19	R	0	46.9	5.4	4.9	5.0	NONE	46.1	7	4.8
Breeding line 12	R	0	47.9	4.6	4.7	5.0	NONE	46.7	7	4.6
Breeding line 2	R	0	46.8	5.4	4.9	4.8	NONE	46.0	7	4.8

The purpose of a third set of data was to conduct an experiment to have quality analyses performed on a subset of a population that was evaluated for yield and maturity over multiple years and locations. The subset analyzed was limited by funds, but consisted of 4 varieties, 2 locations, and 3 digging dates. The varieties selected were Langley (early-maturing runner released in 1985), Tamrun 96, Flavor Runner 458, and Tamrun OL01. The locations were the Western Peanut Growers Research Farm at Denver City, TX, and the Helms Farm at the Texas Agricultural Experiment Station at Halfway. The latter location was chosen because of its cooler climate and was expected to result in a high degree of immaturity of pods. Three target harvest dates were selected – 135, 150, and 165 days after planting (DAP). Materials at Denver City were planted on May 12, 2003, with digging dates of 9/17/03 (139 DAP), 9/30/03 (152 DAP), and 10/18/03 (170 DAP). Materials at Halfway were planted later (June 6th, 2003) with digging dates of 10/31/03 (143 DAP), 11/11/03 (154 DAP), and 11/21/03 (164 DAP) as we were forced to select this site at a late date by unexpected circumstances. Weather conditions at WPGRF on the digging dates was generally warm and dry, with average daily temperatures in the middle to lower seventies, and humidity levels below 50 percent. Weather conditions at Halfway were cooler than WPGRF because of the later digging dates. Daily average temperatures were in the upper 50's to lower 60's and humidity levels were between 50 and 60 percent. Irrigation at Denver City was by spray nozzle on a center pivot, but at Halfway it was by surface drip. The expected results were that Tamrun OL01 would show the greatest degree of off-flavors, because of its late maturity, relative to other entries, and that Langley would have the least off-flavors. We expected, also, that the relative immaturity of materials grown at Halfway would result in more off-flavors from that location.

Statistical data are presented below, using the four varieties for which quality data are available. There was no difference in yield (LbPodAc) or maturity (PctBlkBr) (See Table 3) among the four varieties, although yield and maturity were greater at WPGRF than at Halfway, as was expected. These measures were greater in the third digging date than in the first. Similar differences were observed for shelling percentages.

Quality data fell into two categories. Firstly, for chemical composition, there were significant differences between varieties and location for fat, moisture, and sugar (Table 3). Sugar was higher at Halfway, where maturity was less. There were also differences among varieties, with Tamrun OL01 having a sugar content of 5.7%. Somewhat surprisingly, sugar content increased with later digging dates, even though maturity also increased. Secondly, for flavor itself, the only significant difference was for the fruity-fermented trait, with the greater off-flavor at the Denver City site. This was surprising, as there were almost no mature pods at the Halfway site (Table 3). No significant differences were observed between varieties, although the reduction expected for Langley relative to Tamrun OL01 did not occur, contrary to expectation.

Acknowledgement

We wish to express our sincere appreciation to the National Peanut Board, The Texas Peanut Producers Board, the Western Peanut Growers Association, and our several cooperators who assisted us in many different ways to get these analyses conducted. We express appreciation to Dr. Michael Franke and the J. Leek Company for their willingness to work with us on these quality parameters.

Table 3. Statistical Analyses of the Quality Data Location X Digging Date X Variety.

Source	df	Flavor	Fruity	Earthy	Fat	H2O	Sugar	LbPodAc	%BlkBr	%SMK
Location	1	2.71 ns	12.47*	0.04 ns	8.38 ns	64.47 **	245.04***	14.57**	56.13**	4.27*
Dig date	2	0.39 ns	1.79 ns	1.55 ns	0.96 ns	0.75 ns	6.91 **	3.52 *	11.73 **	8.92 **
Genotype	3	1.63 ns	2.28 ns	1.92 ns	8.84 **	23.19 **	123.12***	0.77 ns	0.89 ns	7.91 **
Loc X Geno	3	1.49 ns	1.97 ns	0.23 ns	0.47 ns	0.10 ns	1.20 ns	0.42 ns	1.01 ns	2.63 ns
error	36									
Means		4.453	0.531	0.305	47.92	3.73	5.04	4020	22.8%	70.8%
Denver City		4.38 nsd	0.947 a	0.284 ns	48.51 a	3.24 b	4.68 b	4489 a	40.5 a	71.9% a
Halfway		4.52	0.115 b	0.327 ns	47.32 b	4.22 a	5.40 a	3552 b	5.18 b	69.6% b
Dig 1		4.42 nsd	0.26 nsd	0.56 nsd	47.92 nsd	3.82 nsd	4.94 b	3679 b	7.68 b	68.4 b
Dig 2		4.51	0.54	0.26	47.56	3.71	5.04 ab	3934 ab	26.7 a	70.1 b
Dig 3		4.43	0.79	0.10	48.27	3.65	5.14 a	4448 a	34.1 a	73.9 a
Flav.Ru. 458		4.57 nsd	0.17 nsd	0.12 nsd	49.05 a	3.57 b	5.03 b	4299 nsd	24.4 nsd	73.2 a
Langley		4.41	0.89	0.00	48.90 a	3.03 c	4.92 d	3819	26.8	70.8 a
Tamrun 96		4.32	0.30	0.43	46.81 b	3.88 b	4.90 c	3920	16.4	66.3 b
Tamrun OL01		4.52	0.76	0.67	46.90 b	4.43 a	5.74 a	4043	23.6	72.8 a

National Peanut Board –Annual Report for 2004

Date: 15 March 2005

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

PIs: James L. Starr, Dept Plant pathology and Microbiology, Texas Agricultural Experiment Station, College Station; and Charles E. Simpson, Texas Agricultural Experiment Station, Stepheville

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 haveing 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 advance 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:

We thank the Texas Peanut Producers Board for their continued support of this effort through the National Peanut Board funds. We also thank Dr. M Black for his assistance in the evaluation of resistance to tomato spotted wilt virus resistance and to Mr. J. Seay for allowing us to plant our tests on his farm.

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	
					----------%---------						---------	------		
Florunner	1316.7	a	6872	a	81.1	ab	77.7	ab	0.6	c-d	2.8	cd	51.4	b-e
14	1253.9	ab	6502.1	a-c	81.6	a	78.2	a	0.4	c-d	3.0	cd	48.7	d-f
13	1218.7	a-c	6468.6	a-c	80.5	a-c	76.0	a-c	0.4	c-d	4.1	bc	51.5	b-e
TamrunO/L02	1218.3	a-c	6593.1	ab	78.2	e-h	74.8	c-e	0.3	cd	3.2	cd	53.7	bc
Tamrun96	1207.0	a-c	6535.9	a-c	78.2	e-h	75.0	c-e	0.5	c-d	2.7	cd	49.4	d-f
NemaTAM	1206.0	a-c	6430	a-c	80.3	a-c	75.8	a-c	0.6	c-d	3.9	cd	48.9	d-f
15	1199.3	b-c	6418.8	a-c	79.9	b-d	75.4	b-d	0.4	c-d	4.1	bc	51.0	c-d
5*	1183.1	b-d	6380.5	a-c	78.5	e-g	75.4	b-d	0.6	c-d	2.5	d	53.5	bc
11	1170.8	b-e	6098.5	bc	81.0	ab	77.8	ab	0.3	cd	2.9	cd	50.0	de
3*	1139.3	c-e	6402.2	a-c	76.6	i	71.8	gh	0.5	c-d	4.3	bc	44.3	gh
1*	1136.2	c-e	6259	bc	77.1	hi	73.5	c-g	0.5	c-d	3.1	cd	54.9	b
12	1134.4	c-e	6146.3	bc	79.2	c-e	74.5	c-e	0.6	c-d	4.1	bc	46.2	fg
4*	1134.1	c-e	6288.5	bc	77.0	hi	72.7	e-h	0.3	c-d	4.0	cd	48.5	ef
7*	1132.9	c-e	6273.9	bc	77.2	f-i	72.7	e-h	0.2	cd	4.2	bc	43.7	g-i
9*	1111.0	c-e	6046.9	c	78.6	e-f	74.4	c-f	0.9	b	3.3	cd	52.0	b-d
10*	1082.6	de	6052.4	bc	77.9	e-h	73.2	d-g	1.8	a	2.9	cd	60.8	a
6*	1082.5	de	6029.6	c	77.9	e-h	71.9	f-h	0.3	c-d	5.7	ab	50.7	c-e
2*	1078.1	de	6100.4	bc	77.2	hi	70.6	h	0.4	c-d	6.2	a	40.3	i
8*	1067.3	e	6035.6	c	77.5	f-i	70.4	h	0.1	d	7.0	a	42.3	hi
COAN	938.3	f	5103.2	d	78.8	de	74.6	c-e	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.

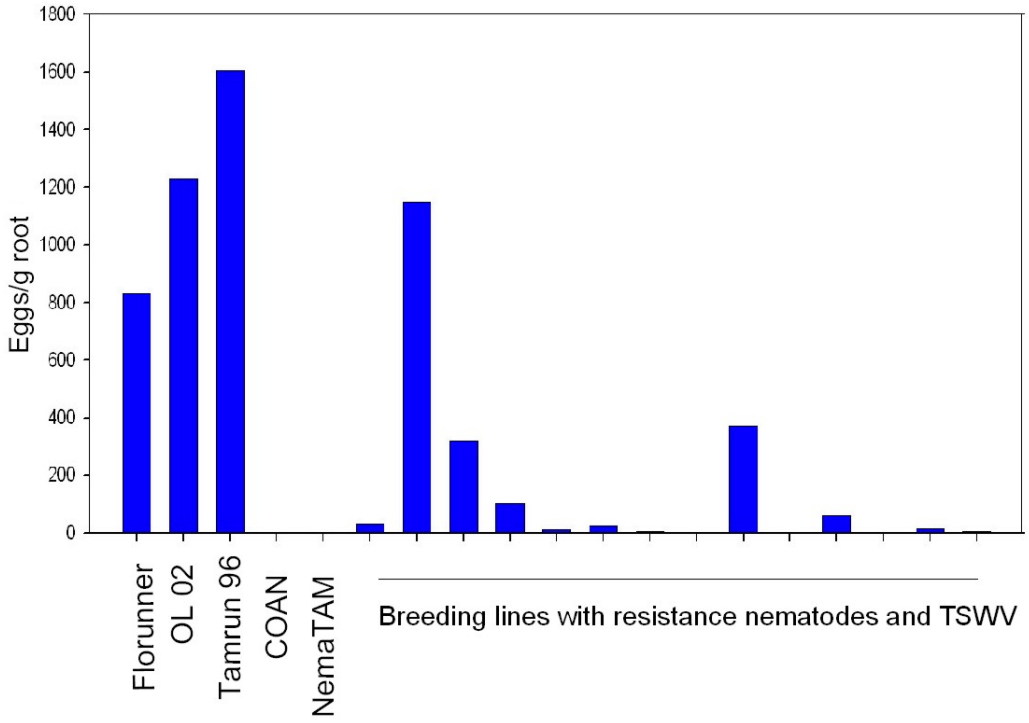
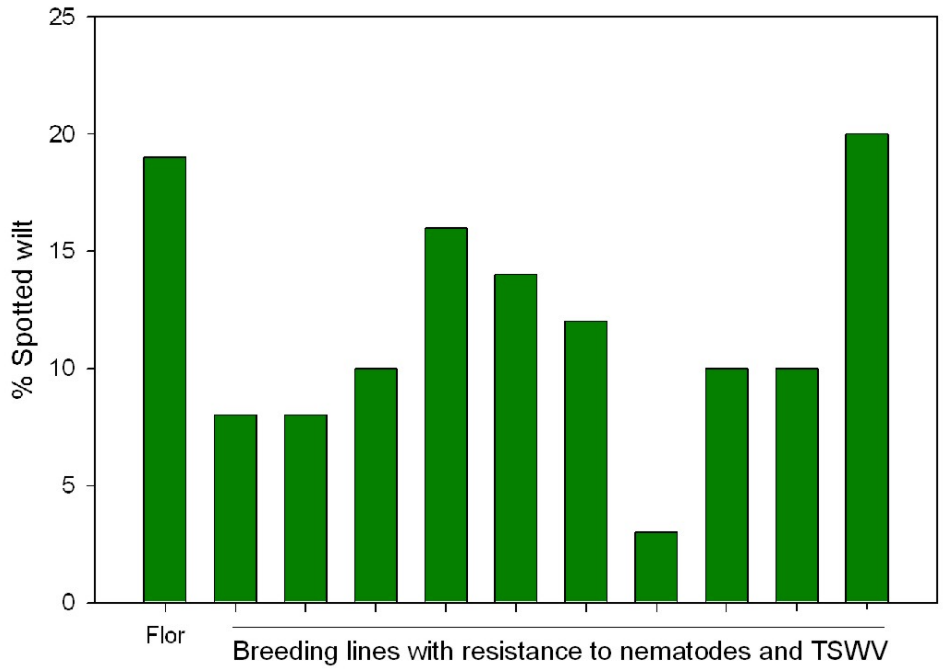


Figure 2 . Incidence of Tomato Spotted Wilt Virus infection on breeding lines with resistance to root-knot nematodes.



TITLE: Spotted Wilt Related to Runner Peanut Canopy Characteristics

PERSONNEL: : Mark C. Black, Noel N. Troxclair, Michael R. Baring, Texas Cooperative Extension, Uvalde and Texas Agricultural Experiment Station, College Station, Texas A&M University.

SUMMARY: We continued to gather evidence that peanut variety reactions to TSWV involve at least two mechanisms: a) reactions on the cellular or systemic level in the plant (2002 mechanical inoculation) and b) thrips behavior related to plant canopy characteristics (2003, 2004 canopy modification, vegetative plant mapping).

Four peanut varieties pruned to modify the canopy shape. Spotted wilt was moderate-to-severe in this 2004 test. Our working hypotheses were 1) 'tall' canopy would have more thrips (TSWV vectors) and more spotted wilt than 'check', and that 'short' would have fewest thrips and the least spotted wilt; 2) main terminals would have more thrips than side terminals; and 3) Tamrun 88 would have more thrips than other varieties. Data in 2004 supported in part hypotheses 2) and 3). Hypothesis #1 was supported in part by thrips data, but not disease data. These treatments would probably have had more pronounced effects if initiated 2-3 wk after planting instead of at 7 wk.

Variety vegetative plant mapping. Large plant size [height (main stem); width (secondary branches 1,2,3,4)] was always positively correlated with increased spotted wilt. All significant correlations of disease with tertiary branch lengths for S3, S4, and S5 were negative. Significant correlations were all negative between disease and length of branches that fill in the canopy between main stem and near-horizontal secondary branches (secondary branches 6 to 11). More growth in this 'middle' part of the canopy would result in less exposed main stems, supporting our hypothesis that non-prominent main stems reduce spotted wilt risk. Thirty-nine of 44 significant correlations between spotted wilt and calculated variables were positive, also supporting our hypothesis of large plants and prominent main stems compared to secondary stems 1 to 4 contributing to TSWV field susceptibility.

Regression analysis of stem with three spotted wilt ratings explained significant portions of total variation in spotted wilt disease. Six of nine significant models had positive terms for secondary stems (range: 1 to 4) lengths, and only one significant model had a negative effect for these secondary stems. For the last sampling date, models for all three disease ratings included a negative term for secondary stem 6 length.

We are gaining an understanding of plant types that are highly vulnerable during spotted wilt epidemics and this can be used to some extent in years with little spotted wilt pressure. However, we have not yet identified one or two easily measured traits in the seedling stage that breeders could use for early screening in the greenhouse or winter nursery. The traits related to spotted wilt variety ratings explored in this report do not fit the classical definition of disease resistance, although some entries do have partial true 'resistance' (2002 report). Rather, these canopy traits fall in the category of 'field resistance.' This type of 'field resistance' should be stable and additive with 'true resistance.'

INTRODUCTION:

Tomato spotted wilt virus (TSWV) suddenly became the biggest threat to peanut production in Southwest Texas in the early 1980s. A few years later this also happened in Central Texas, Alabama, Georgia and Florida. Every peanut producing state reported problems with spotted wilt by 1990 and problems still occur in Southwest Texas. Several growers had severe losses in late planted 2004 fields. State and USDA breeding programs in Texas, Georgia, Florida, North Carolina and one private company have developed and released cultivars that perform better than old standard varieties under TSWV pressure. Some cultivars that hold up well have been rapidly accepted in high risk growing areas and breeding work seeks to improve this resistance. The partial resistance appears to be stable but resistance mechanisms are not well understood. Some varieties have premature vine death following heat and

drought with symptoms somewhat similar to late-season spotted wilt symptoms. New varieties for Texas should have both virus and stress resistance/tolerance. Variety development proceeds slowly with labor-intensive field selection for disease and stress resistance.

In our 2002 work, some level of 'true' resistance to *Tomato spotted wilt virus* (TSWV) was confirmed in growth chamber tests, in agreement with work done in Georgia. Inoculations of peanut seedlings with TSWV usually identified the most susceptible and most resistant entries, but usually did not rank intermediate varieties consistent with rankings from field data. Field observations and greenhouse work suggested that plant canopy shape may contribute to variety reaction during spotted wilt epidemics. Selecting breeding lines with certain canopy characteristics may be a useful trait for breeders to use when selecting early generation breeding lines for use in regions with spotted wilt and southern blight disease problems. Thrips behavior may be affected by plant canopy shape or other canopy characteristics. The benefits of twin-rows during spotted wilt epidemics may also be due in part to altered thrips behavior related to wider row canopy and less difference in canopy surface between main stems and row-middles.

Advantages of traditional plant breeding with field evaluation include increased probability of selecting stable multiple-component resistance and opportunities to select for resistance to multiple diseases, environmental stress, pod traits, and yield. Disadvantages of field evaluations for almost all breeding lines generations and the release of new varieties are the slow pace (8-10+ years), uncertainty of disease occurring in plots a given year, and the expense of multiple year field tests for large numbers of lines. Discovery of peanut plant traits in the seedling stage related to spotted wilt resistance would help us discard many susceptible lines earlier and save time and expenses in the field. Knowledge of TSWV resistance mechanisms will also provide a knowledge base for long term stable use of resistance mechanisms.

The objective was to identify peanut resistance/tolerance mechanisms to thrips-vectored TSWV that will predict field performance of varieties and breeding lines. Partial funding did not permit us to explore thrips vector efficiency or stress reactions in 2004.

MATERIALS and METHODS:

Four peanut varieties pruned to modify the canopy shape. This split-plot experiment with four replications was planted 20May04 at Phillips Farm in Frio County, TX. Main plot effect was canopy shape (check, tall, short); sub-plot effect was variety (Tamrun88, Tamrun96, ViruGard, GeorgiaGreen). Non-check plots were pruned 9Jul, 28Jul, and 27Aug based on ratio of average main stem height to half the average canopy width in check treatments, by variety, on each pruning date. Pruned canopy width by variety for the tall treatment was check ratio plus 0.2. Pruned canopy height by variety for the short treatment was check ratio minus 0.2. Spotted wilt disease was evaluated on 22Jul, 17Aug, 15Sep and 6Oct.

Thrips populations were estimated from terminal samples (main stem/top of canopy, secondary stem/side of canopy) collected at approximately the same times in the morning on 9Jul (before pruning) from all four varieties, and on 28Jul, 27Aug from only two varieties (Georgia Green, Tamrun88). Five terminals from the canopy peak (top) and five from the canopy side (widest point) were immediately placed in large vials of 70% ethanol. Thrips were decanted after agitation and concentrated with partial vacuum filtration onto grided filter paper for counting.

Variety vegetative plant mapping. Nine peanut varieties and two breeding lines (11 entries) were mapped for vegetative stem growth. The experimental design with two-row 15 ft plots was a randomized complete block with four replications. Plots were inverted 7Oct and threshed 13Oct (three of four replications) for yield and value estimates. Whole plants were destructively sampled on 29Jun,

28Jul, and 7Sep by removing a minimum of three plants in 1 row-ft from each of the two rows per plot (minimum six plants per plot). The resulting gaps were measured after each sampling date to estimate stand (plants per row ft). Total number plants sampled and all branch lengths on the six largest plants were recorded (primary, secondary, tertiary, quaternary, quinary). Spotted wilt was rated 22Jul, 17Aug, and 6Oct. Plot averages (six plants) for each stem and several other variables were calculated. Data were compared using analysis of variance (PC-SAS Proc ANOVA), Pearson correlation (Proc CORR), and stepwise regression (Proc REG; model selection also based on minimum C(p) statistic).

RESULTS AND DISCUSSION:

Four peanut varieties pruned to modify the canopy shape. Disease. Spotted wilt was moderate-to-high in this test in 2004. Only main plot and sub-plot averages are presented (Table 1) because interactions were not significant. Tamrun88, the susceptible check, had significantly more spotted wilt than other entries on all rating dates, as expected. Canopy treatment was similar on the first three dates and 'short' and 'check' treatments had significantly more spotted wilt than 'tall' treatment on the last date.

Thrips. Only main plot, sub-plot, and sample site averages are presented (Table 1) because only one significant interaction (not presented). There were significant differences among (first date) or between (second, third date) varieties for two of the three terminal sampling dates, among canopy treatments for two of three dates, and between terminal sample locations on two of three dates (Table 2). On 9Jul Virugard had significantly more male tobacco thrips than Georgia Green, Tamrun 88, and Tamrun 96. On 9Jul side terminals had significantly more male tobacco thrips and total tobacco thrips than main terminals. This terminal location effect early in the season (middles not completely lapped) may result from the putative preference of migrating insects for peanut terminals contrasted against bare soil.

On 28Jul 'tall' canopy treatment had significantly more male tobacco thrips and total thrips than 'short' or 'check' canopies. Prominent exposed main stems may have more thrips due to attraction or passive impact. On 27Aug Tamrun 88 had significantly more second stage larvae, all immature stages, and total thrips than did Georgia Green, consistent with final disease ratings (Table 1); 'check' and 'tall' canopies had significantly more second stage larvae than the 'short' treatment; and main terminals had significantly more total immatures and total thrips than side terminals (Table 2). Taller plants and upper terminals may have attracted or were impacted more often by thrips migrating late in the season.

The numbers of thrips collected by our technique were never high on the dates of sampling. Some of these data are consistent with our hypothesis of main stem (canopy) characteristics affecting spotted wilt disease. This is probably due to thrips behavior responses to developing canopy.

The test site was inaccessible during June04 due to farm road construction and several weeks of rain, delaying our imposing of canopy treatments compared to the 2003 test. These treatments would probably have had more pronounced effects if initiated 2-3 wk rather than 7 wk after planting.

Variety vegetative plant mapping. Spotted wilt was moderate-to-severe in this test, and variety rank on all three dates was about as we expected (Table 3). Yield and value/A estimates were high (Table 4) proably due to overcorrection for row length based on gaps after plant sampling, and because of compensation for light and moisture near gaps. A new measurement in '04 was plant size expressed as row-ft (distance down the row) covered by single plants (Table 3). The standout was Tamrun 88, which covered an average of 2.76 ft per plant. Once a viruliferous thrips inoculated a terminal anywhere on the plant and the infection quickly progressed to systemic, first stage larvae feeding on terminals up to 2.76 ft away would be acquiring TSWV. With several potential cycles of these events per season compared to other varieties, this may partly explain why Tamrun88 is highly susceptible.

Highly TSWV-susceptible varieties tended to have taller main stems early in the season (Table 5). However, TSWV-resistant ViruGard, the only virginia bunch plant type in the test, was also tall early. TSWV-susceptible varieties also had tall main stems at mid and late season. Similar trends were true for secondary stem 1 (Table 5) and secondary stem 2 (not shown).

Tamrun96, TamrunOL01, and TamrunOL02 generally had low total stem numbers (Table 5). This uncluttered zone at the crown may contribute to lower southern blight ratings in previous years and in other tests. Tamrun96, TamrunOL01, and TamrunOL02 ranked lowest for total stem length on 7Sep (Table 5) even though growers in Southwest Texas perceive these varieties as large, "stemmy," and tough to combine. Reduced branching contributed to low total stem lengths. The three Texas varieties ranked lower than Florunner on 7Sep for main stem and secondary stem 1 lengths, so Florunner stems must be considerably more flexible at digging. Stem strengths may help explain variety tolerance to various environmental stresses observed in previous years.

Numerous correlations of stem traits with all three spotted wilt disease ratings were significant (Table 6). The main branch lengths, [height (main stem) and width (secondary branches 1,2,3,4)] were always positively correlated with increased spotted wilt. Significant correlations of spotted wilt with higher order branches (tertiary, quaternary) were sometimes positive and sometimes negative. However, twenty-one significant correlations of disease with tertiary branch lengths for S3, S4, and S5 were all negative.

Significant correlations between disease and lengths of six adjacent secondary branches of the middle-canopy that fill in the canopy between main stem and near-horizontal secondary branches (Table 6, S6–S11) were all negative. More growth in this part of the canopy would result in less exposed main stems, supporting our hypothesis that non-prominent main stems reduce spotted wilt risk.

Thirty-nine of 44 significant correlations between spotted wilt and calculated variables (Table 6, rows TtStemL through RMSTS) were positive, supporting our hypothesis of higher risk of large plants and prominent main stems compared to secondary stems 1 to 4. Plant population (stand) correlations were significant only for the 22Jul disease ratings, indicating that vegetative compensation for slight differences in stand were more important early in the season (Table 6) before compensation occurred.

Regression of all variety stem characteristics and several calculated variables with spotted wilt ratings on three dates explained significant portions of total variation in spotted wilt disease (Table 7). Six of nine significant models had positive terms for secondary stem lengths 1 to 4, and only one significant model had a negative effect (last row). For the last sampling date, models for all three disease ratings included a negative term for secondary stem 6 length.

An unrelated production practice that modifies canopy shape in peanut fields also reduces spotted wilt, *i.e.*, twin vs. single rows. Main stems are less prominent, and bare soil is covered earlier in the season with twin rows. Fungicides with potential for plant growth regulating (PGR) effects should perhaps be tested for similar responses.

Vegetative plant mapping was very labor intensive and many additional statistical analyses could be done with these data. The 11 entries chosen for this test represent very diverse genetic backgrounds, and more consistent variables in regression equations would be expected for plant mapping of breeding lines from similar backgrounds.

Significant differences for spotted wilt reactions occur in almost all collections of peanut breeding lines. The exception has been with field tests of closely related sister lines (e.g. lines generated

by repeated backcrosses to Tamrun 96).

There is apparently not one or two easily measured traits related to spotted wilt reaction in the seedling stage that breeders could use for early screening in the greenhouse or winter nursery. However, we are gaining an understanding of plant types that are highly vulnerable and this can be used in years with little spotted wilt pressure. Other possibilities we hope to explore in 2005 are non-destructive objective and subjective canopy shape/contour descriptors for use in the field, canopy density at junction with bare-soil (bare soil visible within the canopy perimeter), and leaf/canopy color.

The traits related to spotted wilt variety ratings explored in this report do not fit the classical definition of disease resistance, although some entries do have partial 'true resistance.' Rather, these canopy traits fall in the category of 'field resistance' (some varieties/breeding lines have less disease in the field than expected based on laboratory tests). Fortunately, this type of 'field resistance' should be stable, and even when epidemics occur, there should always be a similar rank of known susceptible and known resistant entries. The Georgia and Florida university breeding programs are clearly using different genetics in breeding for spotted wilt resistance, apparently relying more on 'true resistance' than the Texas program and a dense canopy. Genetics developed by Texas breeders appears to have other advantages including potential for tolerance/resistance to southern blight, Sclerotinia blight, and summer stress.

Therefore, field testing and screening breeding lines at locations with risk of spotted wilt should continue. Work will continue on defining traits for use in field selections when disease intensity if low or absent.

ACKNOWLEDGMENTS: Texas Peanut Producers Board provided partial funding through National Peanut Board funds. We thank Alfred Sanchez, James 'Bud' Davis, and Sindy Ortiz for technical assistance; Maggie Gunn for secretarial service; and Murray Phillips, Brad Easterling, and Jaime Lopez for support and help with the field plots.

Table 1. Spotted wilt in peanut plots pruned three times to modify the canopy shape at Phillips Farm, Frio County, TX, 2004.

	Spotted wilt, % row ft.			
Entry	**22Jul**	**17Aug**	**15Sep**	**6Oct**
Tamrun88	10.1 a[z]	35.3 a	51.8 a	78.9 a
Tamrun96	5.3 b	9.2 b	10.8 b	17.2 b
Ga.Green	2.0 b	6.0 b	11.8 b	21.1 b
ViruGard	4.7 b	7.5 b	12.3 b	15.1 b
Canopy				
Tall	4.7	12.5	19.6	27.2 b
Short	7.3	16.6	20.8	35.2 a
Check	4.5	14.3	24.7	36.8 a
Test average	**5.6**	**14.1**	**20.8**	**32.0**
C.V., %[y]	**93**	**46**	**27**	**22**

[z]Mean separation at P=0.05 with least squares means because of missing plots due to planting errors in three plots.
[y]Low C.V. (Coefficient of Variation) indicates more consistent data.

Table 3. Spotted wilt and plant size down the row in peanut plots of eleven varieties and breeding lines for destructive sampling and plant mapping at Phillips Farm in Frio County, TX, 2004.

	Spotted wilt, % row ft				Plant size (row-ft)
Entry	**22Jul**	**17Aug**	**6Oct**	**Entry**	**7Sep**
Tamrun 88	12.9	30.7	89.7	Tamrun 88	2.76
FlavorRunner458	9.2	26.4	73.3	Tamrun96	2.37
Florunner	10.1	21.5	63.4	C11-2-39	2.34
TamrunOL01	12.1	21.5	63.4	Florunner	2.32
US 224	6.5	18.0	44.4	TamrunOL02	2.27
Southern Runner	8.2	18.4	44.2	Virugard	2.24
Ga. Green	5.5	8.1	39.0	Southern Runner	2.18
TamrunOL02	3.8	9.6	35.1	TamrunOL01	2.17
Tamrun96	4.6	8.1	23.5	FlavorRunner458	2.16
Virugard	4.6	6.0	19.6	Ga. Green	2.07
C11-2-39	0.0	3.1	5.8	US 224	2.02
Average	**7.0**	**15.6**	**45.6**	**Average**	**2.26**
LSD 0.05*	**5.8**	**11.4**	**22.7**	**LSD 0.05***	**0.26**
CV, %**	**57**	**51**	**34**	**CV, %****	**8**

* Least significant difference at *P*=0.05

**Low C.V. (Coefficient of Variation) indicates more consistent data.

Table 4. Yield and value estimates in peanut plots of eleven varieties and breeding lines for destructive sampling and plant mapping at Phillips Farm in Frio County, TX, 2004.

Entry	Yield, lb/A	Value, $/A
Ga. Green	8110	1454
Tamrun 96	8126	1448
C11-2-39	7700	1415
Virugard	7933	1345
So Runner	7266	1257
Tamrun OL 02	6864	1181
Florunner	6088	1072
Tamrun 88	5955	1021
Tamrun OL 01	6042	1019
Flavor 458	4940	858
US 224	3189	494
Average	**6565**	**1142**
LSD 0.05*	**1336**	**250**
CV, %**	**12**	**13**

*Least significant difference among any two averages at *P*=0.05.

**Low C.V. (Coefficient of Variation) indicates more consistent data.

Table 5. Selected peanut stem measurements for eleven varieties or breeding lines, Phillips Farm, Frio County, TX, 2004.

	Number of main stem leaves			Main stem length, cm			Secondary stem 1 length, cm		
Entry	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**
Tamrun88	12.9	18.7	24.5	27.3	49.4	57.5	35.7	68.0	80.0
FlvRn458	12.0	18.4	21.5	24.8	43.2	51.5	30.5	62.1	70.3
Florunne	11.6	18.3	21.9	25.1	46.2	55.8	30.3	62.1	71.9
TmrnOL01	12.2	17.0	20.3	22.8	37.1	38.8	32.4	57.2	65.7
US___224	11.3	17.5	21.3	15.2	25.9	30.5	18.7	38.6	49.2
SoRunner	11.8	18.2	22.0	23.5	37.3	41.3	28.7	59.4	67.1
GeoGreen	11.9	18.8	21.6	20.2	35.5	38.1	27.3	50.3	57.5
TmrnOL02	11.7	17.9	21.3	22.9	35.0	35.8	26.9	53.7	58.7
Tamrun96	11.8	17.4	20.5	24.0	40.8	42.2	29.7	59.2	63.4
Virugard	12.8	18.5	21.5	26.9	46.8	49.8	30.5	55.8	65.2
C11239	12.1	18.3	22.5	21.1	33.5	38.2	27.3	52.8	67.3
Average	**12.0**	**18.1**	**21.7**	**23.1**	**39.1**	**43.6**	**28.9**	**56.3**	**65.1**
LSD 0.05*	**0.5**	**NS**	**1.5**	**2.3**	**4.8**	**6.7**	**2.1**	**5.8**	**7.1**
CV, %**	**3**	**5**	**5**	**7**	**9**	**11**	**5**	**7**	**8**

Table 5 continued…

	Number of stems, total			Total stem length, cm			Secondary stem 9 length, cm		
Entry	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**
Tamrun88	18.8	36.4	43.5	267	776	1017	0.3	9.0	13.1
FlvRn458	23.3	44.8	41.0	278	941	980	0.7	17.7	12.0
Florunne	18.2	43.4	37.8	240	938	957	0.4	11.5	12.2
TmrnOL01	14.3	21.0	24.3	249	561	670	0.0	5.7	9.9
US___224	15.8	51.9	81.2	140	575	1143	0.3	6.3	15.3
SoRunner	15.2	37.9	42.8	218	758	1000	0.6	11.1	16.8
GeoGreen	21.3	45.4	41.8	261	842	910	1.0	12.1	12.1
TmrnOL02	14.6	39.6	40.1	176	760	883	0.3	12.0	13.4
Tamrun96	15.4	24.8	32.3	227	587	762	0.3	5.2	8.3
Virugard	25.0	44.7	47.8	330	923	1145	2.4	13.0	16.7
C11239	19.3	40.6	46.3	210	803	1184	1.8	21.5	25.9
Average	**18.3**	**39.1**	**43.5**	**236**	**769**	**968**	**0.7**	**11.4**	**14.1**
LSD 0.05	**2.9**	**8.1**	**11.3**	**34**	**138**	**223**	**0.7**	**5.6**	**6.1**
CV, %	**11**	**14**	**18**	**10**	**12**	**16**	**64**	**34**	**30**

*Averages followed by the same letter are not significantly different at *P*=0.05 by Least Significant Difference (LSD). Differences were not significant if averages have no letters.
**Low C.V. (Coefficient of Variation) indicates more consistent data.

Table 6. Significant ($P \leq 0.05$) Pearson correlation coefficients (N=44) for three spotted wilt disease ratings with selected peanut stem characteristics from three sampling dates for eleven varieties or breeding lines at Phillips Farm in Frio County, TX, 2004.

	Spotted wilt, % row ft								
Disease rating date	**22Jul**			**17Aug**			**6Oct**		
Plant sample date	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**
A. Stem length[z]									
MS (main stem)						+.35*[y]		+.32*	+.40**[y]
S1	+.41**			+.31*			+.42**	+.38*	+.37*
S1T1Q1									-.35*
S1T2	+.33*					-.31*			-.30*
S1T2Q1									-.35*
S1T2Q2			-.33*						-.36*
S1T9Q2									+.33*
S1T10									+.32*
S1T11						+.35*			+.38*
S1T12									+.37*
S1T13									+.34*
S2	+.37*	+.35*			+.32*		+.33*	+.44**	
S2T1			-.36*						
S2T2	+.32*								
S2T1Q1						-.35*			-.30*
S2T1Q2									-.35*
S2T1Q3									-.30*
S2T2Q1			-.30*			-.39**			-.45**
S2T5Q1		+.32*			+.35*				
S2T5Q2		+.33*			+.36*			+.30*	
S2T5Q4									+.32*
S2T6							+.35*		
S2T6Q2									+.30*
S2T6Q3									+.37*
S2T6Q4									+.34*
S2T7							+.32*		
S2T8							+.34*		
S2T12									+.35*
S3	+.39**						+.32*	+.39**	+.37*
S3T1			-.40**			-.40**			-.30*
S3T2			-.42**			-.45**			-.42**
S3T3			-.31*			-.32*			-.31*
S3T4						-.30*			-.32*
S4	+.41**	+.32*		+.30*	+.32*		+.39**	+.40**	
S4T1		-.32*							
S4T2			-.40**			-.42**			-.37*
S4T3			-.35*			-.39**			
S5	+.33*								
S5T1			-.31*	-.34*			-.31*		-.33*
S6			-.43**			-.58***[y]			-.53***
S7			-.32*			-.33*			
S8						-.33*	-.34*		
S8T2								+.34*	

Table 6 is continued on next page

Table 6, continued….

	Spotted wilt, % row ft								
Disease rating date	**22Jul**			**17Aug**			**6Oct**		
Plant sample date	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**	**29Jun**	**28Jul**	**7Sep**
S9			-.38*	-.32*		-.42**	-.38*		-.36*
S10			-.39**			-.36*			-.37*
S11			-.47**			-.42**			-.39**
S13T1						+.30*			
S17					+.47**			+.38*	
B. Calculated variables----------									
TtStemL			-.30*						
TtSStemL	+.38*								
TtTStemL			-.34*						
StemL	+.39**								
SStemL	+.44**						+.33*		
TStemL	+.31*								
S12L	+.39**						+.38*	+.42**	+.32*
S34L	+.41**						+.36*	+.40**	+.32*
S1234L	+.42**						+.38*	+.42**	+.32*
SmMSS1_4	+.39**						+.36*	+.41**	+.35*
MSxxS1_4	+.37*					+.35*	+.34*	+.42**	+.42**
MSnodeL						+.33*			+.34*
RMSSS1							-.30*		
RMSSS2						+.33*			+.34*
RMSSS1_2						+.31*			
RMSSS1_4	-.33*					+.33*			+.30*
RMSSS	-.30*								
MSSS			+.45**			+.39**			+.49***
RMSTS			+.41**			+.51***			+.49***
Plant population 7Sep	+.39**	+.39**	+.39**						

[z]Stem length was an average of six plants per plot. Calculated variables were based on averages of previous variables for each plot. There were four replications, N=44. MS=main stem; S= and SS=secondary stem; T= and TS=tertiary stem; Q= quaternary stem; Tt=total; R=ratio (of stems described); 1_2=1 and 2; 1_4=1, 2, 3, and 4. Plant population 7Sep was estimated from number of plants actually sampled and resulting skips on that date.

[y]Asterisks (one, two, or three) indicate significance at $P \leq 0.05$, $P \leq 0.01$, and $P \leq 0.001$, respectively.

Table 7. Regression analysis of plant mapping data (three dates, destructive sampling) for 11 varieties/breeding lines and spotted wilt disease ratings at Phillips Farm in Frio County, TX, 2004.

Sample date	Disease rating date	Best regression equation[z]	Model P > F	R^2
29Jun	22Jul	SW = –6.27 + 0.76SStmL	0.003	0.19
	17Aug	SW = –9.53 + 0.92S1 – 1.36TtQStmL	0.022	0.17
	6Oct	SW = 19.91 + 4.15S1 + 6.58S4 – 2.03TtSStmL – 4.61TtQStmL + 0.37TtTStmL	<0.001	0.43
28Jul	22Jul	SW = –7.95 – 0.71MS + 0.70S2 + 0.80S4 + 0.33TtNoTSt - 0.13TtSStmL	<0.001	0.47
	17Aug	SW = 53.41 + 2.11S4 + 0.41TtNoStm – 0.28TtSStmL – 94.71RMSSS12	<0.001	0.41
	6Oct	SW = 333.72 + 2.15TtNoTSt – 0.62TtSStmL – 374.24RMSSS1_4 + 0.07MSxxS1_4	<0.001	0.57
7Sep	22Jul	SW = 5.20 – 0.27S6 + 8.14MSSS	<0.001	0.31
	17Aug	SW = 27.78 + 0.61S3 – 0.85S6 – 0.86TStmL	<0.001	0.49
	6Oct	SW = 94.15 – 1.34S2 + 3.03S3 – 2.37S6 – 1.83SStmL	<0.001	0.59

[z]Equations were estimated by PC-SAS Proc Regression using Stepwise option and minimum C(p) statistic. Six whole plants were collected from each plot on each date. Stem descriptions are

SW = spotted wilt (% row ft with noteworthy symptoms)
MS = average length of main (primary) stem 1 (cm)
S1 = average length of secondary stem 1 (cm)
S2 = average length of secondary stem 2 (cm)
S3 = average length of secondary stem 3 (cm)
S4 = average length of secondary stem 4 (cm)
S6 = average length of secondary stem 6 (cm)
SStmL = average total/plant secondary [arising from main(primary)] stem length (cm)
TStmL = average total/plant tertiary stem length
TtSStmL = average total/plant secondary stem lengths (cm)
TtTStmL = average total/plant tertiary (from secondary stems) stem lengths (cm)
TtQStmL = average total/plant quaternary (from tertiary stems) stem lengths (cm)
TtNoStm = average total number all stems/plant (cm)
TtNoTSt = average total number tertiary stems/plant (cm)
RMSSS12 = average ratio of main stem length to average of secondary stems 1 and 2
RMSSS1 = average ratio of main stem length to secondary stem 1 length
MSxxS1_4 = product of main stem length and the average length of secondary stems 1-4
MSSS = ratio of average main stem length/plot to average secondary stem length /plot.

Table 2. Thrips counts (composite of five terminals) in peanut plots pruned three times to modify the canopy shape at Phillips Farm in Frio County, TX, 2004.

-----A. 9July samples----------

	Male*		Female		Immature			All			
Entry	**TT****	**WFT****	**TT**	**WFT**	**1Lar**	**2Lar**	**3Lar**	**TT**	**WFT**	**Imm**	**Thrips**
GeoGreen	0.21 b	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Tamrun88	0.21 b										
Virugard	0.64 a										
Tamrun96	0.21 b										
Canopy											
Check	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Tall											
Short											
Terminal											
Main	0.49 b	NS	NS	NS	NS	NS	NS	0.78 b	NS	NS	NS
Side	0.91 a							1.75 a			

-----B. 28Jul samples----------

	Male		Female		Immature			All			
Entry	**TT**	**WFT**	**TT**	**WFT**	**1Lar**	**2Lar**	**3Lar**	**TT**	**WFT**	**Imm**	**Thrips**
GeoGreen	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Tamrun88											
Canopy											
Check	0.21 b	NS	NS	NS	NS	NS	NS	NS	NS	NS	3.74 b
Tall	0.43 a										5.77 a
Short	0.16 b										3.81 b
Terminal											
Main	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Side											

Table 2 is continued on next page

Table 2, continued…

-----C. 27August samples----------

	Male		Female		Immature			All			
Entry	**TT**	**WFT**	**TT**	**WFT**	**1Lar**	**2Lar**	**3Lar**	**TT**	**WFT**	**Imm**	**Thrips**
GeoGreen	NS	NS	NS	NS	NS	1.81 b	NS	NS	NS	3.32 b	3.71 b
Tamrun88						2.58 a				4.59 a	5.10 a
Canopy											
Check	NS	NS	NS	NS	NS	1.44 a	NS	NS	NS	NS	NS
Tall						1.42 a					
Short						0.78 b					
Terminal											
Main	NS	NS	NS	NS	NS	NS	NS	NS	NS	4.56 a	5.81 a
Side										3.29 b	4.23 b

*Averages (de-transformed means) followed by the same letter are not significantly different at *P*=0.05 by LSD (least significant difference). NS indicates was not significant. Data were transformed using $(y+0.5)^{-2}$ to improve normality before statistical analysis. Averages (means) reported in this table were de-transformed by $(\text{transformed mean})^2$ - 0.5 + unconverted error mean square.

**TT=tobacco thrips; WFT=western flower thrips.

NATIONAL PEANUT BOARD
Progress Report
March 2005
Plant Pathology

1. Subject Area:

   Plant Pathology

2. Title:

   Peanut Defoliation as Related to Salt Scorch and Temperature Extremes

3. Personnel and Agency:

Thomas A. Lee, Jr.
Extension Plant Pathologist
Texas Cooperative Extension
1229 North U. S. Hwy. 281
Stephenville, Texas 76401
Phone: 254-968-4144
Fax: 254-965-3759
E-mail: t-lee@tamu.edu

4. Introduction:

   Defoliation of West Texas Peanut produced with high salt water is a problem in most years. Plants appear normal until about mid August. At that time many fields display marginal leaf death while others display varying degrees of yellow canopy. The first moisture event following these symptoms results in significant defoliation due to various fungal organisms which colonize these necrotic or weakened leaves. Both excessive heat and/or excessive early fall cool temperatures appear to enhance the problem. This premature defoliation shuts down photosynthesis resulting in less pod maturity and more pod loss prior to harvest.

5. Summary:

   As the accompanying data sheets will show, numerous fungicides and fungicide combinations were tested in 2004. The summer of 2004 was one that in two locations did not lend itself to significant foliage problems. Most treatments displayed some positive yield responses.

6. Materials and Methods:

Plots were established in Collingsworth, Dawson and Erath Counties. All plots were replicated three times and each plot was 2 rows X 100 feet. All chemicals were hand sprayed with a CO_2 backpack sprayer. Spray timing varied with plant age and location.

7. Results and Discussion:

See accompanying data for specific results on specific farms. The 2004 treatments displayed yield increases in all except the Dawson County location. The Erath County location displayed the largest return. This is probably due to the fact that fall conditions were wetter here and thus more disease developed. As in 2003 the 2004 returns to leafspot treatments above the "caprock" were practically non existent on these runner type peanuts. These two years data leads me to question whether a grower should spray runner peanuts for leafspot above the "cap". Spanish and Valencia types will be more prone to leafspot. The Collingsworth location although practically void of leafspot in 2004 had significant leafspot in 2003. In 2004 this location displayed significant color differences among treatments with the experimental treatment USF 2010 showing up considerable darker green. There apparently are effects of this chemical other than disease (at least leafspot) control. This color enhancing effect is worth your attention if and when this product is labeled.

Quail Leafspot
Collingsworth County

Treatment	Chemical	Rate/acre	Days After Planting
1	Echo 720	1.5 pts	45, 60, 75, 90, 105, 120, 135
2	Echo 825	22 oz	45, 60, 75, 90, 105, 120, 135
3	USF 2010	3.5 oz	45, 60, 75, 90, 105, 120, 135
4	Stratego	7 oz	45, 60, 75, 90, 105, 120, 135
5	USF 2010 Induce	3.5 oz .1	45, 60, 75, 90, 105, 120, 135 45, 60, 75, 90, 105, 120, 135
6	Untreated Check		
7	Headline Bravo	9 oz 1.5 pts	45, 75, 105, 135 60, 90, 120
8	Endura	9 oz	45, 60, 75, 90, 105, 120, 135
9	Echo 720 Folicur Induce	1.5 pts 7.2 oz .06	45, 60, 135 75, 90, 105, 120 75, 90, 105, 120
10	Headline Bravo	9oz 1.5 pts	75, 120 105

45 Day Spray = June 21, 2004

Harvest Date = October 22, 2004
Type = Runner
Soil = Sandy Loam

Quail Leafspot
Collingsworth County

Treatment	Color rating	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
	6	5175	78%	1%	1%	983	
1	5	5116	79%	1%	0%	980	992
	5	5293	79%	1%	0%	1014	
	6	4999	78%	2%	0%	946	
2	5	5175	78%	2%	0%	979	968
	4	5234	77%	2%	0%	978	
	3	5058	77%	2%	0%	936	
3	2	5587	78%	2%	0%	1048	1025
	2	5763	78%	1%	0%	1090	
	2	5763	79%	1%	0%	1104	
4	4	4881	78%	1%	0%	923	1027
	2	5705	75%	2%	0%	1055	
	1	5705	78%	2%	0%	1070	
5	1	5763	78%	2%	0%	1081	1096
	1	5940	79%	1%	0%	1138	
	7	4705	76%	2%	0%	859	
6	5	4176	77%	2%	0%	773	827
	6	4646	76%	2%	0%	849	
	4	5116	75%	2%	0%	922	
7	1	5116	76%	2%	0%	934	970
	2	5646	77%	1%	0%	1054	
	5	5234	79%	1%	0%	1003	
8	5	5411	78%	2%	0%	1015	1032
	4	5705	78%	1%	0%	1079	
	4	5352	75%	2%	0%	965	
9	5	5234	80%	1%	0%	1016	1013
	6	5646	78%	2%	0%	1058	
	3	4999	78%	1%	0%	946	
10	4	5293	77%	2%	0%	980	943
	3	4881	77%	2%	0%	903	

Color rating: 1 – darkest green foliage
10 - yellow

Color differences were easily detectable and were not due to leafspot.

Leafspot in rateable levels was not present in any plot.

All values are based on a loan value of $356.06/ton with quality parameters.

Lamesa Leafspot
Dawson County

Treatment	Chemical	Rate/acre	Days After Planting
1	Echo 720	1.5 pts	60, 75, 90, 105, 120, 135
2	Echo 825	22 oz	60, 75, 90, 105, 120, 135
3	USF 2010	3.5 oz	60, 75, 90, 105, 120, 135
4	Stratego	7 oz	60, 75, 90, 105, 120, 135
5	USF 2010 Induce	3.5 oz .1	60, 75, 90, 105, 120, 135 60, 75, 90, 105, 120, 135
6	Untreated Check		
7	Headline Bravo	9 oz 1.5 pts	75, 105, 135 60, 90, 120
8	Endura	9 oz	60, 75, 90, 105, 120, 135
9	Echo 720 Folicur Induce	1.5 pts 7.2 oz .06	60, 135 75, 90, 105, 120 75, 90, 105, 120
10	Headline Bravo	9 oz 1.5 pts	75, 120 105

Spray began on the 60 day = June 22, 2004
75 day = July 5, 2004
90 day = July 20, 2004
105 day = August 2, 2004
120 day = August 17, 2004
135 day = August 28, 2004

Harvest Date = October 22, 2004

Leafspot of any type was not detectable in this location

Lamesa Leafspot
Dawson County

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
1	1	5148	74%	0%	1%	928	1011
	2	5676	75%	0%	0%	1033	
	3	5742	77%	1%	0%	1072	
2	1	5280	75%	1%	0%	960	998
	2	5544	77%	0%	0%	1035	
	3	5412	76%	1%	0%	998	
3	1	5478	75%	1%	0%	997	1001
	2	5610	75%	1%	0%	1021	
	3	5346	76%	0%	0%	985	
4	1	5610	74%	1%	0%	1007	1004
	2	5874	75%	1%	0%	1069	
	3	5214	74%	1%	0%	936	
5	1	5148	76%	0%	0%	949	957
	2	5148	76%	1%	0%	961	
	3	5214	77%	0%	0%	961	
6	1	5346	76%	1%	0%	998	1018
	2	5742	77%	1%	0%	1072	
	3	5412	75%	1%	0%	984	
7	1	5610	75%	1%	0%	1021	997
	2	5214	76%	1%	0%	961	
	3	5478	76%	0%	0%	1010	
8	1	5478	77%	0%	0%	1023	998
	2	5544	76%	1%	0%	1022	
	3	5214	75%	0%	0%	948	
9	1	5280	75%	1%	0%	960	973
	2	5214	75%	0%	0%	961	
	3	5346	76%	0%	0%	998	
10	1	5214	77%	0%	0%	961	952
	2	5346	75%	1%	0%	972	
	3	5082	75%	0%	0%	924	

All values are based on a loan value $356.06/ton with quality parameters.

Stephenville Leafspot
Erath County

Treatment	Chemical	Rate/acre	Days After Planting
1	Echo 720	1.5 pts	45, 60, 75, 90, 105, 120, 135
2	Echo 825	22 oz	45, 60, 75, 90, 105, 120, 135
3	USF 2010	3.5 oz	45, 60, 75, 90, 105, 120, 135
4	Stratego	7 oz	45, 60, 75, 90, 105, 120, 135
5	USF 2010 Induce	3.5 oz .1	45, 60, 75, 90, 105, 120, 135 45, 60, 75, 90, 105, 120, 135
6	Untreated check		
7	Headline Bravo	9 oz 1.5 pts	45, 75, 105, 135 60, 90, 120
8	Endura	9 oz	45, 60, 75, 90, 105, 120, 135
9	Echo 720 Folicur Induce	1.5 pts 7.2 oz .06	45, 60, 135 75, 90, 105, 120 75, 90, 105, 120

Double rate of herbicide (Treflan) prior to planting.
45 day spray moved to 50 days due to size of peanuts = June, 24, 2004
60 day = July 9, 2004
75 day = July 23, 2004
90 day = August 5, 2004
105 day = August 23, 2004
120 day = September 2, 2004
135 day = September 14, 2004

At digging all untreated checks were dead due to leafspot. On a scale of 1-10 they were given a 10. All other treatments and reps received either a 2 or 3 rating.

Harvest Date = October 15, 2004

Stephenville Leafspot
Erath County

Treatment	Rep	Yield #/acre	Grade	% Damaged	% Immature	Value/ $ acre	Avg
1	1	1162	71%	1%	4%	203	238
	2	1162	70%	1%	4%	200	
	3	1742	73%	0%	2%	311	
2	1	1307	74%	1%	3%	237	254
	2	1742	70%	0%	4%	262	
	3	1452	74%	0%	2%	263	
3	1	2033	68%	2%	5%	339	329
	2	1597	75%	1%	2%	293	
	3	2033	71%	1%	4%	356	
4	1	1888	71%	2%	3%	326	307
	2	2323	73%	0%	3%	416	
	3	1016	70%	1%	3%	175	
5	1	2033	72%	1%	2%	358	298
	2	1307	72%	1%	2%	230	
	3	1742	72%	0%	3%	307	
6	1	1016	70%	1%	3%	175	171
	2	1307	70%	1%	5%	226	
	3	871	70%	0%	6%	152	
	4	726	72%	1%	4%	129	
7	1	1162	70%	1%	4%	201	273
	2	1597	73%	0%	2%	285	
	3	1888	72%	1%	3%	334	
8	1	1742	70%	1%	3%	299	311
	2	2178	70%	0%	5%	377	
	3	1452	72%	0%	2%	256	
9	1	1888	70%	2%	3%	325	265
	2	1307	70%	0%	3%	225	
	3	1452	68%	0%	5%	245	

All values are based on a loan value of $356.06/ton with quality parameters.

Grower Application of AU-Pnut Fungicide Spray Advisory on Peanut in South Texas

A. J. Jaks and W. J. Grichar

SUMMARY

Early and late leaf spot disease pressure was epidemic in the test. The grower applied six sprays by advisory plus one extra spray at the third application early in the season for a total of seven sprays. Rainfall and favorable meteorological conditions throughout the growing season resulted in more advised sprays and the epidemic leaf spot infection. Five sprays were applied as part of a normal comparison program. The grower by following the AU-Pnut advisory achieved significantly better foliar disease control and numerically higher yield and dollar value per acre over the comparison five-spray program. The grower wisely used different fungicides in the advisory disease control program. In this particular years testing, the AU-Pnut advisory resulted in more timely fungicide applications in a year favorable for foliar disease.

INTRODUCTION

At present there is no peanut fungicide advisory program in use in Texas, although advisories are used effectively in other peanut production areas of the country. Growers in south Texas do not normally apply seven fungicide sprays on a calendar schedule as is common on some other regions. Fungicide use in south Texas may vary from two to five sprays in a normal season. Periods of high humidity with leaf wetness caused by dew, rainfall or irrigation under favorable temperatures can result in foliar disease infection of leaf spot and rust. Conversely, hot, dry weather with minimal leaf wetness and lower humidity does not favor foliar infections. Under favorable periods of infection weather, using and advisory will result in timely use of fungicides. Fungicide spray advisories will not be issued under poor infection weather periods. Timing of fungicide sprays is critical and especially when fewer sprays are applied, as is the case in south Texas. Use of an advisory on an "as needed" basis can result in savings for producers in fungicide and application costs. For example, based on one south Texas producer's production costs, using Folicur 3.6F plus ground application cost per acre would be $20.00/ acre x 200 acres = $4000.00. Fungicide application by airplane would be greater. Use of the AU-Pnut fungicide advisory program may offer producers, consultants and farm managers with a useful tool in determining when to apply costly fungicides. Basic use of this program is not cost inhibitive. It involves use of a rain gauge and maintaining a record of field rainfall and irrigation date amounts and recording dates of sprays applied.

MATERIALS AND METHODS

The test was conducted in an Atascosa County, south Texas grower field. Test plots were arranged in a randomized complete block with four replications including unsprayed, five spray comparison and the growers AU-Pnut advisory plots. Test plots were two rows, each 20 feet long spaced 36-inches apart. Grower treatments were applied with a tractor mounted sprayer except for the initial spray, which was applied by airplane. Comparison five-spray treatments were applied with a small plot CO_2 pressurized sprayer. The grower applied seven fungicide sprays. Bravo 720 (1.5 pt.) was applied by airplane 34 days after planting and again at 118 days after planting applied

broadcast. Stratego (7.0 fl. oz./A) was applied at 46 and 75 days after planting. Headline (6.0 fl. oz./A) was applied at 54 days after planting. Folicur (7.2 and 7.0 fl. oz./A respectively) were applied at 89 and 105 days after planting. The five spray comparison fungicides were: Bravo 720 (1.5 pt./A) by airplane 34 days after planting and Echo 720 (1.5 pt./A broadcast) at 116 days after planting. Folicur (7.2 fl. oz.) was applied at 54,75, and 97 days after planting. The grower for land preparation, fertility and weed control followed standard grower practices. Circle pivot irrigation provided supplemental water during the growing season when needed. Assessment of leaf spot disease was made visually using the Florida leaf spot scale where 1= no disease, 10= plants dead, completely defoliated from leaf spot. Soilborne disease from southern blight or Rhizoctonia was not a problem at this field location. Plots were dug at 154 days after planting, inverted, dried in the field and combined with a small plot thresher. Plot samples were then force air dried to 10% moisture, cleaned of debris and weighed to determine yield per acre. Pod samples of a known weight were then were then removed from plot samples to determine grade and economic value. Disease ratings, yield, grade and economic value were analyzed statistically.

RESULTS AND DISCUSSION

Early and late leaf spot in equal observed quantities were epidemic at the test location with untreated plots averaging a 9.1 rating out of a possible 10 for severity. Using the AU-Pnut advisory and observing weather conditions, the grower applied a total of seven fungicide applications. As a result, leaf spot pressure while evident (4.8 rating) was less than the five spray plots (7.4 rating). Yield and dollar value per acre was also numerically higher than those of the five-spray program. No significance was noted from the analyzed data for grade or dollar per ton values from any of the programs including the untreated peanuts. While the AU-Pnut advisory program can and has saved a fungicide spray or two in a normal year, this may not be the case in a year with more rainfall and leaf wetness from the rain, dew or irrigation under favorable temperatures. In this instance, sprays will be advised because they are needed as timed applications. Continuation of this research is needed in Texas to test these programs in order to provide data that can be used to make sound decisions. Data from the study is presented in Table 1.

ACKNOWLEDGEMENTS

The researchers extend special thanks to the Texas Peanut Producers Board and the National Peanut Board for interest and funding for this research. Special appreciation is extended to Mr. Jimmy Seay, producer and TPPB member from Atascosa County, Texas for interest and cooperative participation in this research. Appreciation is extended to Bill Klesel, Kevin Brewer and Dwayne Drozd for research support.

Table 1. Fungicide Advisory Data from Atascosa County, Texas, 2003.

Treatment/Program/Application Type	Timing[2] DAP	Leaf spot[3] 22 Sep	Target sites[4] 6 Oct	Yield lb/A	Grade	$/Acre[5]
Untreated Control…….	------	8.6 a[1]	7.8 c	2591 b	77 a	468.99 b
4 SPRAY COMPARE						
Echo 720 1.5 pt. (Band)……..	48	4.8 d	4.5 d	3925 a	77 a	713.00 a
Folicur 3.6F 7.2 fl. oz. (Broadcast)	70,90					
Echo 720 1.5 pt. (Broadcast)	105					
AU-Pnut 3 SPRAY/GROWER						
Bravo WS 1.5 pt. (Band)……..	54	6.5 b	10.0 b	3607 a	77 a	658.38 a
Folicur 3.6 F 7.2 fl. oz. (Band)	90,111					
4 SPRAY GROWER						
Bravo WS 1.5 pt. (Band)……..	54	5.8 c	12.0 a	3635 a	78 a	663.53 a
Folicur 3.6 F 7.2 fl. oz.(Band)	83,92,109					

[1] Means in a column followed by the same letter indicates Duncan's Multiple Range groupings of treatments, which do not differ significantly ($P \leq 0.05$).
[2] Timing = Days after planting (DAP)
[3] Leaf spot disease rating based on Florida leaf spot assessment scale (1 = no disease, 10 = plants dead, completely defoliated from leaf spot).
[4] Soilborne disease target sites based on the number of Southern blight infection sites less than or equal to 1.0 ft. of damaged pods/stems in 40.0 ft. of row.
[5] Dollar per Acre values based on loan rate values for peanut grading values.

Tolerance of Spanish Peanut to Soil Applied Cotton Herbicides after Crop Failure and Control of Volunteer Spanish Peanut in Cotton

Peter A. Dotray[1], J. Wayne Keeling[2], John D. Everitt[2], Todd A. Baughman[3]

SUMMARY

Regardless of tillage after cotton failure, initial peanut injury was greatest following Staple and Caparol + Staple treated plots. Injury was also observed in the Dual Magnum-treated plots. Injury following these treatments was observed all season including at the end of the season. Within the "no tillage after cotton failure" system, no treatment reduced peanut yield relative to the non-treated control. However, within the "tillage after cotton failure" system, yield loss was observed in the Staple and Staple + Caparol treated plots. In the cotton replant system, cotton injury following Prowl and Caparol never exceeded 9% and 2% regardless of tillage. In the Dual Magnum no-tilled plots, cotton was injured up to 25% during the season. In the Staple and Caparol + Staple "no tillage after cotton failure" treated plots, cotton was injured up to 25 to 33%. Dual Magnum induced injury was less in the tilled plots compared to no tillage plots at all observation dates. Staple and Caparol + Staple treated plots injured cotton as much as 22% and injury from these treatments in tillage plots was often less than the injury caused by these treatments in no tillage plots. Within tillage system, no herbicide treatment reduced cotton yield relative to the non-treated control. Roundup WeatherMax (glyphosate) was most effective treatment at controlling volunteer 'Tamspan 90' Spanish peanut. At 2 weeks after treatment (WAT), Roundup WeatherMax at 32 ounces controlled peanut 91%. At approximately 16 WAT, Roundup WeatherMax at 32 ounces applied early controlled peanut 88%. No other treatment controlled peanut over 77% at the end of the season.

---

[1]Professor and Extension Weed Specialist, Texas Tech University, Texas Agricultural Experiment Station, and Texas Cooperative Extension, Lubbock; [2] Professor and Research Associate, Texas Agricultural Experiment Station, Lubbock; [3] Associate Professor and Extension Agronomist, Vernon.

INTRODUCTION

In 2001-02, an average of 2.8 million acres were planted to cotton in the Southern High Plains 1-S district. Over this period, an average of 67% of the planted acres were harvested while the other 33% were lost to unpredictable environmental conditions such as wind, hail, and rainfall extremes. In 2003, we lost well over 1 million acres of cotton. Plant back options following cotton failure include sorghum, soybeans, guar, and peanuts, but crop tolerance to many of the soil applied cotton herbicides is unknown. In 2002, numerous questions were raised regarding the tolerance of Spanish peanut to several cotton herbicides following cotton failure. In 2003, we started to investigate the tolerance of Spanish peanut following cotton failure. Previous research dated back as far as 1950 indicates that Spanish peanuts are often more sensitive to soil applied herbicides such as Treflan and Prowl. In 2003, we observed injury to Olin peanut in plots treated with Dual magnum, Staple, and Staple + Caparol. Injury was first apparent in the Dual Magnum plots (up to 5%), but was more apparent in the Staple-treated plots 4 and 8 weeks after planting. There was no difference in peanut injury in plots tilled (bed reformed) after crop failure compared to plots not tilled (peanuts planted directly into stale seedbeds).

MATERIALS AND METHODS

Field experiments were established using traditional small plot techniques. Plot sizes ranged from 2 rows by 30 or 50 feet. Herbicides were applied with a CO_2 backpack sprayer using a carrier volume of 10 gallons of water per acre. Visual weed control and peanut and cotton injury ratings were made at various intervals during the growing season on a scale of 0 = crop injury to 100 = complete crop death.

RESULTS AND DISCUSSION

Peanut recrop. Cotton was planted on May 11 and the following herbicides were applied at planting: Prowl, Staple, Dual Magnum, Caparol, and Caparol plus Staple. The cotton was terminated using paraquat on June 3. The Spanish variety Olin was planted on June 5 to beds that were either reworked or peanut seed was planted directly into stale seedbeds. Regardless of tillage, initial peanut injury was greatest following Staple (17 to 33%) and Caparol + Staple plots (10 to 37%) (Table 1). Injury was also observed in the Dual Magnum-treated plots (12 to 13%). Observations on July 5 and August 6 indicated a similar trend. On October 6, Staple-treated plots injured peanut 45 to 48%, whereas the Staple + Caparol-treated plots injured peanut 38 to 42%. We believe that the majority of the injury from the Staple + Caparol plots was due to the Staple and not the Caparol. Dual Magnum injury was also apparent at the end of season, but injury at less than 10%. Peanut injury from the Prowl and Caparol was less than 8% at all observations. Plots were harvested on October 20. Within the “no tillage after crop destruct” system, no treatment reduced peanut yield relative to the non-treated control. However, within the

"tillage after crop destruct" system, yield loss was observed in the Staple and Staple + Caparol plots. This study will be conducted one more year, and an economic analysis will be conducted for replant peanut and cotton systems (Table 1).

Cotton recrop. Similar to the study described above, cotton was planted on May 11 and the following herbicides were applied at planting: Prowl, Staple, Dual Magnum, Caparol, and Caparol plus Staple. The cotton was terminated using paraquat on June 3. Cotton was replanted on June 5 to beds that were either reworked or cotton seed was planted directly into stale seedbeds. Regardless of tillage, cotton injury following Prowl and Caparol never exceeded 9% and 2%, respectively (Table 2). In the Dual Magnum/ no tilled plots, cotton was injured 17% on June 21, 25 to 22% on July 5 and August 2, and 8% at the end of the season (October 13). In the Staple and Caparol + Staple/no tilled plots, cotton was injured was much as 33% and 25%, respectively. Dual Magnum induced injury was less in the tilled plots compared to no tillage plots at all observation dates. Staple and Caparol + Staple treated plots injured cotton as much as 22% and 13%, respectively, and injury from these treatments in tillage plots was often less than the injury caused by these treatments in no tillage plots. Within tillage system, no herbicide treatment reduced cotton yield relative to the non-treated control; however, a yield loss trend was apparent where significant visual cotton injury was observed. This study will be conducted one more year, and an economic analysis will be conducted for replant cotton and peanut systems (Table 2).

Volunteer peanut control. Volunteer peanut control in cotton can be a problem in some years. Preplant tillage and in-season cultivation are effective, but are not options if conservation tillage systems (reduced or no-till) are used. The objective of this study was to examine of efficacy of herbicides that may be used postemergence in cotton. Roundup WeatherMax (glyphosate) was most effective treatment at controlling 'Tamspan 90' Spanish peanut. At 2 weeks after treatment (WAT), Roundup WeatherMax at 32 ounces controlled peanut 91%, which was better than all other treatments (Table 3). At approximately 6 WAT, Roundup WeatherMax at 21 and 32 ounces controlled peanut 80 and 91%, respectively. This control was greater than the control achieved by Ignite at 40 ounces (67%). At approximately 16 WAT, Roundup WeatherMax at 32 ounces applied early controlled peanut 88%. No other treatment controlled peanut over 77%. This data suggests that Roundup WeatherMax applied early was more effective than Roundup WeatherMax treatments applied later in the season. This data also suggests that Roundup WeatherMax was more effective than Ignite at controlling volunteer Spanish peanut. Cultivation two or more weeks after any of these herbicide treatments would probably improve control over the herbicide treatment without cultivation. Sequential applications of any treatment would probably improve peanut control over single applications. Sequential applications will be studied in 2005 (Table 3).

Table 1. Peanut recrop tolerance and yield following cotton herbicides applied preemergence before crop failure at the Western Peanut Growers Research Farm near Denver City, TX.

Treatment	Tillage after crop destruct	Rate (lb/A)	Rate (prod./A)	Peanut Injury (%)				Yield (lb/A)
				Jun 21	Jul 5	Aug 6	Oct 6	
Untreated	none	---	---	0	0	0	0	2932
Prowl 3.3EC	none	0.5	1.2 pt	0	0	1	0	4171
Staple 85WP	none	0.063	1.2 oz	17	20	47	48	2004
Dual Magnum 7.62EC	none	1.0	1 pt	12	2	5	7	3649
Caparol 4L	none	0.8	1.6 pt	0	3	8	5	4122
Caparol + Staple	none	0.8 + 0.063	1.6 pt + 1.2 oz	10	17	47	38	2085
Untreated	yes	---	---	0	0	0	0	3095
Prowl 3.3EC	yes	0.5	1.2 pt	0	2	3	2	3324
Staple 85WP	yes	0.063	1.2 oz	33	38	55	45	**1824**
Dual Magnum 7.62EC	yes	1.0	1 pt	13	8	12	7	3356
Caparol 4L	yes	0.8	1.6 pt	3	2	7	2	2802
Caparol + Staple	yes	0.8 + 0.063	1.6 pt + 1.2 oz	37	33	42	42	**1802**
$LSD_{(0.05)}$				19	14	14	10	1121

Table 2. Cotton recrop tolerance and yield following herbicides applied preemergence before crop failure at the Western Peanut Growers Research Farm near Denver City, TX.

Treatment	Tillage after crop destruct	Rate (lb/A)	Rate (prod./A)	Cotton Injury (%)				Yield (lb/A)
				Jun 21	Jul 5	Aug 2	Oct 13	
Untreated	none	---	---	0	0	0	0	600
Prowl 3.3EC	none	0.5	1.2 pt	0	3	7	0	572
Staple 85WP	none	0.063	1.2 oz	12	30	33	17	356
Dual Magnum 7.62EC	none	1.0	1 pt	17	25	22	8	381
Caparol 4L	none	0.8	1.6 pt	0	2	2	0	529
Caparol + Staple	none	0.8 + 0.063	1.6 pt + 1.2 oz	10	25	8	3	393
Untreated	yes	---	---	0	0	0	0	700
Prowl 3.3EC	yes	0.5	1.2 pt	0	3	9	0	658
Staple 85WP	yes	0.063	1.2 oz	3	13	22	4	556
Dual Magnum 7.62EC	yes	1.0	1 pt	15	17	13	3	662
Caparol 4L	yes	0.8	1.6 pt	0	0	2	2	595
Caparol + Staple	yes	0.8 + 0.063	1.6 pt + 1.2 oz	0	3	13	8	464
$LSD_{(0.05)}$				7	8	12	5	267

Table 3. Control of volunteer Spanish peanut with cotton herbicides that may be applied preplant, postemergence in transgenic crops, or postemergence-directed at the Western Peanut Growers Research Farm near Denver City, TX.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Control (%)		
			Jun 09	Jul 05	Oct 13
Non-treated	---	---	0	0	0
MSMA 6L	2.0 early-season	1.33 qt	40	75	77
Roundup WeatherMax 4.5AS	0.75 ae early-season	21 oz	63	80	55
Roundup WeatherMax 4.5AS	1.125 ae early-season	32 oz	84	91	88
Roundup WeatherMax 4.5AS	0.75 ae mid-season	21 oz	NA	57	43
Roundup WeatherMax 4.5AS	1.125 ae mid-season	32 oz	NA	63	55
Liberty 1.67 EC	0.52 early-season	40 oz	68	67	53
$LSD_{(0.05)}$			13	14	24

1. Title: Effects of Calcium on Yield, Grade, and Hull Degradation with Virginia-Type Peanut

2. Project Investigators:

Dr. Todd A. Baughman, Associate Professor and Agronomist, Vernon, TX
Dr. Thomas A. Lee, Professor & Plant Pathologist, Stephenville, TX
Mr. W. James Grichar, Research Scientist, Yoakum, TX
Dr. Mark McFarland, Associate Professor and Soil Fertility Specialist, College Station, TX

3. Problem and Need:

Although Texas produces all four market-type of peanut, the Virginia-type seems to be one with a significant competitive advantage for some producers. This competitive advantage could possibly increase with the new farm bill. This market-type is produced on numerous farms across West Texas. However, this area could expand with the new farm bill. Calcium is a critical element for producing all market-types of peanut, and is especially critical with the Virginia-type peanut. This is due to its larger kernel size and the fact that it is most often sold as an in-shell peanut. Normally, in many areas of Texas calcium is not a limiting factor in peanut production. The soils (especially in West Texas) often are naturally calcareous in nature. Therefore, current fertility recommendations would indicate that calcium is not a limiting factor in most Virginia-type fields in Texas. However, there have been issues with peanut grade/quality and hull characteristics (including brightness and degradation) in recent years. This has lead to the recommendation of adding calcium in-season to increase quality for the in-shell market. While this has been a normal practice in the Virginia-Carolina region (most often in the form of gypsum), the soils in that region are more acidic (less calcareous). The objectives of this proposal are to evaluate the use of calcium on peanut yield, quality, and hull degradation, and possibly determine what factors are leading to hull degradation problems.

4. Plan of Action:

Field studies were established in Texas during the 2003 and 2004 growing seasons to evaluate the use of calcium on peanut yield and grade. Five studies were conducted on producers' field in Terry and Wilbarger County. Treatments included untreated (no calcium), one application of gypsum at 1500 lbs/A (750 lbs/A on 20" band), two applications of N-Cal at 12 gallons per acre each applied in a broadcast spray, and one or two applications N-Cal applied through the center pivot. The application of gypsum and first N-Cal spray were applied on June 26, 2003 and June 30, 2004 while the second N-Cal spray was applied on July 23, 2003 and July 22, 2004 at the Terry County locations. The first applications were applied on July 12, 2004 and the second application was made on July 26, 2004. Peanut were harvested to determine yield and grade.

Two studies were conducted at the Western Peanut Growers Farm near Denver City and the Yoakum Experiment Station near Yoakum. Treatments included untreated (no calcium), one application of gypsum at 1500 lbs/A (750 lbs/A on 20" band), and two applications of N-Cal at 12 gallons per acre each applied in a broadcast spray. The studies also include three Virginia varieties: Jupiter, NC7, and VC2. The application of gypsum and first N-Cal spray were applied on June 25, 2003 and June 30, 2004 (Western Peanut Growers) and August 12, 2003 and August 26, 2004 (Yoakum) while the second N-Cal spray was applied on July 23, 2003 and July 22, 2004 (Western Peanut Growers) and August 26, 2003 and September 9, 2004 (Yoakum).

5. Results:

Neither yields nor grades were affected by any of the calcium applications in the first study. Yield was not affected in 3 or 4 trials in the second study and grade was not affected in any of the trials. Yield was reduced by the N-Cal spray treatment in Trial 4 of the second study. This was most likely due to excessive leaf burn from the sprayed application of N-Cal. There were no differences in yield or grade between Virginia varieties in two trials. NC7 yielded high than VC2 or Jupiter in two of the trials. VC2 had a higher grade than NC7 and Jupiter in one trial and NC7 in another.

Table 1. The effects of calcium applications on Virginia peanut yield and grade in 2003 and 2004.

	Yield					Grade				
Variety	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
	---------- (lb/A) ----------					---------- (%) ----------				
Untreated	5200	5480	6410	4950	4940	72	73.	69	74	71
Gypsum	5060	5150	6500	5150	4330	72	73	71	73	71
N-Cal -Spray	4980	5710	5830	5490	4890	70	72	72	74	71
N-Cal – Center Pivot	4600	5520	5650	4470	4290	72	72	71	74	73
LSD (10%)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Standard Deviation			980	700	590			1	1	1
CV (%)	7	8	16	11	13	2	3	2	2	2

Trials conducted in Terry County on the Delwin Marrow Farm (Trial 1), the Monty Henson Farm (Trial 2), J.W. Hawkins Farm (Trial 3), Tommy Mason Farm (Trial 4), and Wilbarger County on the Clint White Farm (Trial 5).

Table 2. The effects of calcium applications on Virginia peanut yield and grade in 2003 and 2004.

Variety	Yield				Grade			
	Trial 1	Trial 2	Trial 3	Trial 4	Trial 1	Trial 2	Trial 3	Trial 4
	----------(lb/A)----------				----------(%)----------			
Untreated	2980	2150	3240	4430	72	68	74	72
Gypsum	3180	2120	3300	4380	72	70	74	71
N-Cal -Spray	2070	2100	3440	4070	73	70	74	71
LSD (10%)	NS	NS	NS	222	NS	NS	NS	NS
NC7	3310	2060	3760	4210	72	69	74	70
VC2	2950	2360	3380	4360	73	71	75	72
Jupiter	2970	1940	2850	4310	73	69	73	72
LSD (10%)	250	NS	320	NS	NS	NS	1	1
Standard Deviation	350	522	460	330	2	2	1	2
CV (%)	11	25	14	8	2	3	2	2

Trials conducted on the Western Peanut Grower Farm (Trial 1 and 3) and the Yoakum Experiment Station (Trial 2 and 4).

LSD = least significant difference, CV = coefficient of variation, NS = not significant
Means within a column which differ by more than the LSD are statistically different (P=0.10).

AgriPartners Peanut Irrigation and Production Summary, 2004

Leon New
Professor and Extension Agricultural Engineer-Irrigation
Texas Cooperative Extension Service
Amarillo, Texas

Six peanut irrigation and production demonstrations were conducted in 2004. Peanut row width was 30, 36, and 40 inches. Two were in Collingsworth, two in Donley, one in Hall and one in Wheeler County in cooperation with six growers. All irrigation was by center pivot. Production was on 437 acres.

Peanut production ranged from 4217 to 3000 pounds per acre and averaged 3491 pounds. Highest production was on 40 inch rows and lowest on 40 inch row spacing. It averaged 3579 pounds per acre on 40 inch rows and 3400 on 30 inch. Two on 36 inch rows averaged 3412 pounds per acre. All yields are by thrasher harvest. Six of six growers pre-watered. Pre-water ranged from 1.0 to 3.0 inch and averaged 1.67 inches.

Seasonal irrigation ranged from 14.60 to 5.40 inches per acre. Average was 11.91 inches per acre. Peanut production from each inch of irrigation water applied ranged from 630 to 211 pounds. It was highest for 40 inch rows and lowest for 40 inch. Average production was 293 pounds per inch of irrigation water.

Rainfall, irrigation, and additional water used from the top three feet of soil ranged from 32.39 to 23.01 inches. Average was 25.50 inches. Peanut production from each inch of irrigation, rainfall, and additional soil water measured ranged from 165 to 108 pounds. Average was 137 pounds.

Total irrigation, rainfall, and additional water removed from the soil measured ranged from 152 to 111 percent of that reported by the North Plains PET weather station network for fully irrigated Runner peanuts. Average was 121 percent when peanut production averaged 3491 pounds per acre from an average of 11.91 inches of irrigation and 25.50 inches of total rainfall, irrigation, and additional soil water. Some rainfall events were intense that did not allow full contribution to peanut production, especially in September when the crop was basically made. This caused greater than normal total water measured and percent of PET.

The value of irrigation water in producing peanuts priced at $425 per ton ranged from $132.22 to $44.37 per inch applied. Average was $61.57 from each inch. These values for irrigation water include rainfall and additional water removed from the soil by the crop as well as irrigation system application efficiency and management of resources.

A tabulated summary of the 2004 peanut irrigation and production demonstrations are listed in Table 1. Additional information is presented in the individual grower reports.

Thirty- four peanut irrigation and production demonstrations were conducted during ’98, ’99, ’00, ’01, ’02, ’03 and ’04 growing seasons. All were irrigation by center pivot systems. Irrigation averaged 17.96 inches and production 3872 pounds per acre. Production per inch of irrigation averaged 215 pounds per acre. Rainfall, irrigation, and additional soil water averaged 29.06 inches from which peanut production was 133 pounds per inch measured. Rainfall, irrigation, and soil water averaged 133 percent of that reported by the North Plains PET Network for fully irrigated Runner peanuts. The ’98, ’99, ’00, ’01, ’02, ‘03 and ’04 summary is included in Table 1.

Thanks to the peanut growers who cooperated in making the information presented available by providing personal facilities, management time, operating data and other information. Hopefully, the information reported will help you and other peanut growers.

Table 1. Peanut Irrigation and Production, Panhandle AgriPartners, 2004

		WATER-INCHES		PET		PRODUCTION		CROP VALUE @$425.00/TON- $	
						LB/ACRE/IN		ACRE INCH	
COUNTY	GROWER	IRRIGATION	RAIN/IRRIG/SOIL	% OF	LB/AC	IRRIGATION	RAIN/IRRIG/SOIL	IRRIGATION	RAIN/IRRIG/SOIL
Collingsworth	Dan & Rex Henard	12.87	25.62	120	4217	327.66	164.60	68.81	34.57
Collingsworth	Dan Langford	15.47	25.33	119	3624	234.26	143.07	49.19	30.04
Hall	Billy Neal Shannon	14.60	32.39	152	3506	240.14	108.24	50.43	22.73
Donley	Donnie Howard	5.40	23.46	110	3400	629.63	144.93	132.22	30.44
Donley	Eddie Helms	8.90	23.18	111	3200	359.55	138.05	75.51	28.99
Wheeler	Gary & Danny Hardcastle	14.20	23.01	111	3000	211.27	130.38	44.37	27.38
AVERAGE 2004	6	11.91	25.50	121	3491	293.21	136.92	61.57	28.75
AVG '98'99'00'01'02'03'04	34	17.96	29.06	133	3872	215.65	133.26	45.29	27.98

All irrigated with Center Pivot Systems

Texas Cooperative EXTENSION
The Texas A&M University System

Peanut Production Per Inch of Water

'98, '99, '00, '01, '02, '03, '04 AgriPartners

		WATER - INCHES		PET	PRODUCTION		
County	Year	Irrigation	Rain/Irrig/Soil	% of	LBS/Ac	LBS/Ac - In Irrigation	LBS/Ac - In Rain/Irrig/Soil
Collingsworth	'98	22.60	25.68	104	5208	230.44	202.80
Collingsworth	'98	20.15	27.54	111	5132	254.69	186.35
Collingsworth	'01	25.75	32.60	138	4837	187.84	148.37
Collingsworth	'02	15.65	25.30	123	4787	305.88	189.21
Collingsworth	'01	17.89	26.23	103	4726	264.17	180.18
Collingsworth	'98	22.65	29.35	118	4500	198.68	153.32
Collingsworth	'03	22.48	34.88	161	4411	196.22	126.46
Collingsworth	'02	22.09	35.44	169	4367	197.69	123.22
Collingsworth	'02	16.82	26.82	128	4254	252.91	158.61
Collingsworth	'04	12.87	25.62	120	4217	327.66	164.60
Collingsworth	'99	12.85	26.43	123	4200	326.85	158.91
Wheeler	'02	8.95	21.45	105	4009	447.93	186.90
Collingsworth	'99	22.70	37.80	175	3984	175.51	105.40
Collingsworth	'00	20.35	30.06	160	3900	191.65	129.74
Collingsworth	'99	20.65	33.70	156	3892	188.47	115.49
Collingsworth	'02	15.87	25.27	120	3879	244.42	153.50
Collingsworth	'01	18.51	25.54	108	3800	205.29	148.79
Collingsworth	'01	18.50	24.32	106	3750	202.70	154.19
Collingsworth	'03	13.20	25.30	113	3750	284.09	148.22
Collingsworth	'03	17.53	32.08	143	3750	213.92	116.90
Collingsworth	'00	24.07	37.87	177	3740	155.38	98.76
Collingsworth	'01	17.83	23.40	99	3658	205.16	156.32
Collingsworth	'04	15.47	25.33	119	3624	234.26	143.07
Hall	'04	14.60	32.39	152	3506	240.14	108.24
Collingsworth	'03	28.60	40.75	182	3427	119.83	84.10
Collingsworth	'00	26.61	39.96	186	3422	128.60	85.64
Collingsworth	'02	15.47	25.17	120	3400	219.78	135.08
Donley	'04	5.40	23.46	110	3400	629.63	144.93
Donley	'99	13.25	29.90	140	3240	244.53	108.36
Collingsworth	'00	19.43	32.33	151	3200	164.69	98.98
Donley	'04	8.90	23.18	111	3200	359.55	138.05
Wheeler	'03	9.30	18.98	88	3194	343.44	168.28
Wheeler	'04	14.20	23.01	111	3000	211.27	130.38
Donley	'00	29.35	40.86	188	2300	78.36	56.29
Average	34	17.96	29.06	133	3872	215.65	133.26

All irrigated by Center Pivot Systems

Prepared by: Leon New, Professor/Extension Agricultural Engineer - Irrigation, Texas A&M Research and Extension Center, Amarillo, Texas.

Texas Cooperative EXTENSION
The Texas A&M University System

IRRIGATED PEANUT PRODUCTION USING CENTER PIVOT
COLLINGSWORTH COUNTY - 2004

DAN & REX HENARD, ANDY HEFLEY, PRISCILLA GREEN AND LEON NEW

PROBLEM: High Plains growers need more field measurements and documented data on peanut production from selected or available irrigation and rainfall to make management decisions and conserve water.

OBJECTIVES: To determine peanut production from measured irrigation, rainfall, and soil moisture levels using center pivot irrigation and relating it to the North Plains PET Network report of fully irrigated peanuts to help growers predict yields.

SUMMARY:

Planted:	May 5	**Fertilizer:**	30-30-0
Variety:	Runner 458	**Fungicide:**	Bravo @ Aug. 15 & Sept. 15
Seeding Rate:	93 Pounds	**Herbicide:**	1.5 pts. Prowl, 7/26 Folicure for Leaf spot
Soil Type:	Miles Loamy Fine Sand	**Harvested:**	October 15
Row Width:	40 Inches	**No. Acres:**	60

RAINFALL

May- 0.00" June- 4.10" July- 2.25" August- 1.15" September- 1.65" Total: 9.15"

MATERIALS AND METHODS: Sixty acres irrigated by a center pivot nozzled at 600 gpm were planted to peanuts. The date, number, and amount of individual irrigations, as indicated by a water meter were recorded and operating pressure monitored. A rain gauge located at the site measured rainfall. Moisture sensors were installed at 1, 2 and 3 feet in the root zone to measure soil water levels. They were measured twice each week, recorded, and reported in a graph on the following page. Rainfall, irrigation, additional soil water, and water use reported by the North Plains PET Network for fully irrigated peanuts are reported on the same page.

2004 Demonstration Results						
IRRIGATION		**PET**	**PRODUCTION**		**CROP VALUE @ $425.00/ TON- $**	
Number	**Inches**	**% Of**	**Lb/Ac**	**Lb/Ac-In Irrigation**	**Per Acre**	**Acre-Inch of Irrigation**
16	**12.87**	**120***	**4217**	**328**	**$885.57**	**$68.81**

***Includes 3.60 inches of water removed from three feet of soil, rainfall, and irrigation.**

CONCLUSION: Soil water was good at 1, 2 and 3 feet until mid July, when it was mostly depleted for approximately ten days. Continuous irrigation plus good rainfall reestablished good soil water during early August. The crop depleted soil water from 2 and 3 feet again during September. Production was 328 pounds per inch of irrigation. Irrigation, rainfall and soil water totaled 25.62 inches. Production was 165 pounds per inch measured. Irrigation, rainfall, and net soil water was 120 percent of that reported by the North Plains PET Network for fully irrigated peanuts.

Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U. S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Texas Cooperative EXTENSION
The Texas A&M University System

IRRIGATED PEANUT PRODUCTION USING CENTER PIVOT
COLLINGSWORTH COUNTY - 2004

DAN LANGFORD, ANDY HEFLEY, PRISCILLA GREEN AND LEON NEW

PROBLEM: High Plains growers need more field measurements and documented data on peanut production from selected or available irrigation and rainfall to make management decisions and conserve water.

OBJECTIVES: To determine peanut production from measured irrigation, rainfall, and soil moisture levels using center pivot irrigation and relating it to the North Plains PET Network report of fully irrigated peanuts to help growers predict yields.

SUMMARY:

Planted:	May 3	**Fertilizer:**	40-50-0
Variety:	Runner 458	**Fungicide:**	Bravo
Seeding Rate:	85 Pounds	**Herbicide:**	Folicure
Soil Type:	Miles Loamy Fine Sand	**Harvested:**	October 15
Row Width:	36 Inches	**No. Acres:**	60

RAINFALL

May- 0.00" June- 4.55" July- 1.60" August- 0.65" September- 1.40" Total: 8.20"

MATERIALS AND METHODS: Sixty acres irrigated by a center pivot nozzled at 600 gpm were planted to peanuts. The date, number, and amount of individual irrigations, as indicated by a water meter were recorded and operating pressure monitored. A rain gauge located at the site measured rainfall. Moisture sensors were installed at 1, 2 and 3 feet in the root zone to measure soil water levels. They were measured twice each week, recorded, and reported in a graph on the following page. Rainfall, irrigation, additional soil water, and water use reported by the North Plains PET Network for fully irrigated peanuts are reported on the same page.

2004 Demonstration Results						
IRRIGATION		**PET**	**PRODUCTION**		**CROP VALUE @ $425.00/ TON- $**	
Number	**Inches**	**% Of**	**Lb/Ac**	**Lb/Ac-In Irrigation**	**Per Acre**	**Acre-Inch of Irrigation**
14	**15.47**	**119***	**3624**	**234**	**$761.04**	**$49.19**

***Includes 1.66 inches of water removed from three feet of soil, rainfall, and irrigation.**

CONCLUSION: Good soil water continuously available to the crop at 1, 2 and 3 feet. The crop used all water from 3 feet during late September, but it was good at 1 and 2 feet. Production was 234 pounds per inch of irrigation. Irrigation, rainfall and soil water totaled 25.33 inches. Production was 143 pounds per inch measured. Irrigation, rainfall, and net soil water was 119 percent of that reported by the North Plains PET Network for fully irrigated peanuts.

Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U. S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Texas Cooperative EXTENSION
The Texas A&M University System

IRRIGATED PEANUT PRODUCTION USING CENTER PIVOT
HALL COUNTY - 2004

BILLY NEAL SHANNON, JOSH BROOKS, PRISCILLA GREEN AND LEON NEW

PROBLEM: High Plains growers need more field measurements and documented data on peanut production from selected or available irrigation and rainfall to make management decisions and conserve water.

OBJECTIVES: To determine peanuts production from measured irrigation, rainfall, and soil moisture levels using center pivot irrigation and relating it to the North Plains PET Network report of fully irrigated peanuts to help growers predict yields.

SUMMARY:

Planted:	May 3	**Fertilizer:**	64-0-0
Variety:	Tam Run 96	**Insecticide:**	None
Seeding Rate:	80 Pounds	**Herbicide:**	1.5 pts. Prowl
Soil Type:	Miles Loamy Fine Sand	**Harvested:**	October 25
Row Width:	30 Inches	**No. Acres:**	17

RAINFALL

May- 0.20" June- 4.55" July- 5.50" August- 3.20" September- 0.00" October- 2.00"
Total: 15.45"

MATERIALS AND METHODS: Seventeen acres irrigated by center pivot nozzled at 170 gpm were planted to peanuts. The date, number, and amount of individual irrigations, as indicated by the precipitation chart, were recorded and operating pressure monitored. A rain gauge located at the site measured rainfall. Moisture sensors were installed at 1, 2 and 3 feet in the root zone to measure soil water levels. They were measured twice each week, recorded, and reported in a graph on the following page. Rainfall, irrigation, additional soil water, and water use reported by the North Plains PET Network for fully irrigated peanuts are reported on the same page.

2004 Demonstration Results						
IRRIGATION		**PET**	**PRODUCTION**		**CROP VALUE @ $425.00/ TON- $**	
Number	**Inches**	**% Of**	**Lb/Ac**	**Lb/Ac-In Irrigation**	**Per Acre**	**Acre-Inch of Irrigation**
10	**14.60**	**152***	**3506**	**240**	**$736.26**	**$50.43**

***Includes 2.34 inches of water removed from three feet of soil, rainfall, and irrigation.**

CONCLUSION: The crop had sufficient soil water during the growing season. It was half depleted at 2 feet during late July and early August while irrigating and rainfall was 1.5 inches. This shows how peanut uses significant water during pod development and seed fill growth stages. The graph also shows the crop used water in September when soil moisture was depleted at 2 and 3 feet. Production was 240 pounds per inch of irrigation. Irrigation, rainfall, and soil water totaled 32.39 inches. Production was 108 pounds per inch measured. Irrigation, rainfall, and net soil water was 152 percent of that reported by the North Plains PET Network for fully irrigated peanuts.

Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U. S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Texas Cooperative EXTENSION
The Texas A&M University System

IRRIGATED PEANUT PRODUCTION USING CENTER PIVOT
DONLEY COUNTY - 2004

DONNIE HOWARD, LEONARD HAYNES, PRISCILLA GREEN AND LEON NEW

PROBLEM: High Plains growers need more field measurements and documented data on peanut production from selected or available irrigation and rainfall to make management decisions and conserve water.

OBJECTIVES: To determine peanut production from measured irrigation, rainfall, and soil moisture levels using center pivot irrigation and relating it to the North Plains PET Network report of fully irrigated peanuts to help growers predict yields.

SUMMARY:

Planted:	April 28	**Fertilizer:**	34-34-34
Variety:	Runner 458	**Insecticide:**	Headline
Seeding Rate:	80 Pounds	**Herbicide:**	1.8 pts. Prowl/ Cadre
Soil Type:	Miles Fine Sandy Loam	**Harvested:**	October 15
Row Width:	40 Inches	**No. Acres:**	120

RAINFALL

May- 0.00" June- 5.10" July- 2.70" August- 4.00" September- 1.08" October- 2.35"
Total: 15.23"

MATERIALS AND METHODS: One hundred twenty acres irrigated by center pivot nozzled at 800 gpm were planted to peanuts. The date, number, and amount of individual irrigations, as indicated by the precipitation chart, were recorded and operating pressure monitored. A rain gauge located at the site measured rainfall. Moisture sensors were installed at 1, 2 and 3 feet in the root zone to measure soil water levels. They were measured twice each week, recorded, and reported in a graph on the following page. Rainfall, irrigation, additional soil water, and water use reported by the North Plains PET Network for fully irrigated peanuts are reported on the same page.

2004 Demonstration Results						
IRRIGATION		**PET**	**PRODUCTION**		**CROP VALUE @ $425.00/ TON- $**	
Number	**Inches**	**% Of**	**Lb/Ac**	**Lb/Ac-In Irrigation**	**Per Acre**	**Acre-Inch of Irrigation**
7	**5.40**	**110***	**3400**	**630**	**$714.00**	**$132.22**

***Includes 2.83 inches of water removed from three feet of soil, rainfall, and irrigation.**

CONCLUSION: The graph at the top of the following page shows soil water was good at 1, 2 and 3 feet thru June. It was mostly depleted in the first and second feet during early July. Soil water at 3 feet was good during the primary growing season. The crop used all water from one and two feet during September, plus one inch of rainfall. Production was 630 pounds per inch of irrigation. Irrigation, rainfall, and soil water totaled 23.46 inches. Production was 145 pounds per inch measured. Irrigation, rainfall, and net soil water was 110 percent of that reported by the North Plains PET Network for fully irrigated peanuts.

Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U. S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Texas Cooperative EXTENSION
The Texas A&M University System

IRRIGATED PEANUT PRODUCTION USING CENTER PIVOT
DONLEY COUNTY - 2004
EDDIE HELMS, LEONARD HAYNES, PRISCILLA GREEN AND LEON NEW

PROBLEM: High Plains growers need more field measurements and documented data on peanut production from selected or available irrigation and rainfall to make management decisions and conserve water.

OBJECTIVES: To determine peanut production from measured irrigation, rainfall, and soil moisture levels using center pivot irrigation and relating it to the North Plains PET Network report of fully irrigated peanuts to help growers predict yields.

SUMMARY:

Planted:	May 9	**Fertilizer:**	30-30-0
Variety:	Runner 458	**Insecticide:**	None
Seeding Rate:	85 Pounds	**Herbicide:**	Preplant 2 pts. Prowl/ Cadre
Soil Type:	Miles Loamy Fine Sand	**Harvested:**	October 15
Row Width:	36 Inches	**No. Acres:**	180

RAINFALL

May- 0.00" June- 4.50" July- 2.80" August- 3.00" September- 1.52" October- 2.34"
Total: 14.16"

MATERIALS AND METHODS: One hundred eighty acres irrigated by center pivot nozzled at 800 gpm were planted to peanuts. The date, number, and amount of individual irrigations, as indicated by the precipitation chart, were recorded and operating pressure monitored. A rain gauge located at the site measured rainfall. Moisture sensors were installed at 1, 2 and 3 feet in the root zone to measure soil water levels. They were measured twice each week, recorded, and reported in a graph on the following page. Rainfall, irrigation, additional soil water, and water use reported by the North Plains PET Network for fully irrigated peanuts are reported on the same page.

2004 Demonstration Results						
IRRIGATION		**PET**	**PRODUCTION**		**CROP VALUE @ $425.00/ TON- $**	
Number	**Inches**	**% Of**	**Lb/Ac**	**Lb/Ac-In Irrigation**	**Per Acre**	**Acre-Inch of Irrigation**
8	**8.90**	**111***	**3200**	**360**	**$672.00**	**$75.51**

***Includes 0.12 inches of water removed from three feet of soil, rainfall, and irrigation.**

CONCLUSION: Soil water was good at 1, 2 and 3 feet until late August when the crop depleted the first and second foot and half the third. Late September rainfall refilled all soil depths and finished the crop. Production was 360 pounds per inch of irrigation. Irrigation, rainfall, and soil water totaled 23.18 inches. Production was 138 pounds per inch measured. Irrigation, rainfall, and net soil water was 111 percent of that reported by the North Plains PET Network for fully irrigated peanuts.

Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U. S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Texas Cooperative EXTENSION
The Texas A&M University System

IRRIGATED PEANUT PRODUCTION USING CENTER PIVOT
WHEELER COUNTY - 2004

GARY & DANNY HARDCASTLE, KENNY BRDECKO, PRISCILLA GREEN AND LEON NEW

PROBLEM: High Plains growers need more field measurements and documented data on peanut production from selected or available irrigation and rainfall to make management decisions and conserve water.

OBJECTIVES: To determine peanut production from measured irrigation, rainfall, and soil moisture levels using center pivot irrigation and relating it to the North Plains PET Network report of fully irrigated peanuts to help growers predict yields.

SUMMARY:

Planted:	May 10	**Fertilizer:**	N.A.
Variety:	Runner 458	**Insecticide:**	None
Seeding Rate:	75 Pounds	**Herbicide:**	Prowl, Cadre, Buturac
Soil Type:	Devol Loamy Fine Sand	**Harvested:**	November 3
Row Width:	40 Inches	**No. Acres:**	60

RAINFALL

May- 0.00" June- 0.35" July- 0.60" August- 2.10" September- 1.46" October- 1.29"
Total: 5.80"

MATERIALS AND METHODS: Sixty acres irrigated by a center pivot nozzled at 600 gpm were planted to peanuts. The date, number, and amount of individual irrigations, as indicated by a water meter were recorded and operating pressure monitored. A rain gauge located at the site measured rainfall. Moisture sensors were installed at 1, 2 and 3 feet in the root zone to measure soil water levels. They were measured twice each week, recorded, and reported in a graph on the following page. Rainfall, irrigation, additional soil water, and water use reported by the North Plains PET Network for fully irrigated peanuts are reported on the same page.

2004 Demonstration Results						
IRRIGATION		**PET**	**PRODUCTION**		**CROP VALUE @ $425.00/ TON- $**	
Number	**Inches**	**% Of**	**Lb/Ac**	**Lb/Ac-In Irrigation**	**Per Acre**	**Acre-Inch of Irrigation**
13	**14.20**	**111***	**3000**	**211**	**$630.00**	**$44.37**

***Includes 3.01 inches of water removed from three feet of soil, rainfall, and irrigation.**

CONCLUSION: Soil water was good at 2 and 3 feet thru August. It was temporarily mostly used from one foot during mid July. The crop used all stored soil water plus approximately 1.5 inches of rainfall during September. Production was 211 pounds per inch of irrigation. Irrigation, rainfall and soil water totaled 23.01 inches. Production was 130 pounds per inch measured. Irrigation, rainfall, and net soil water was 111 percent of that reported by the North Plains PET Network for fully irrigated peanuts.

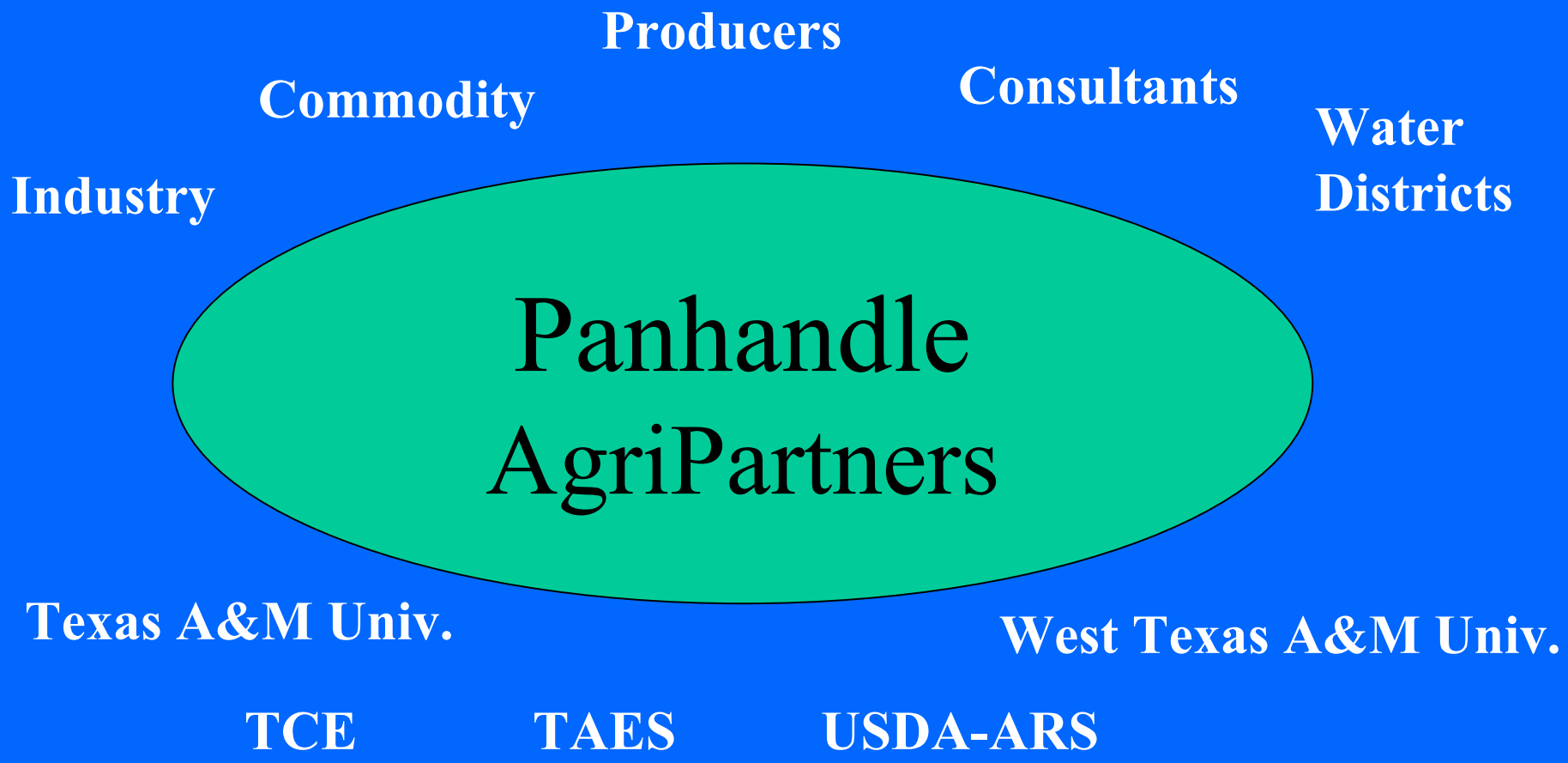
Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U. S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

2004 Texas Panhandle Peanut Demonstrations of Irrigation Technology, Water Management, and IPM

Leon New, Carl Patrick, Ordie R. Jones, Don Dusek, Thomas Marek, Bob Robinson, John Sweeten, TCE Ag Agents, TCE Demonstration Assistants, and 6 Cooperating Producers

Panhandle AgriPartners

Support Provided by The Texas Peanut Producers Board and The National Peanut Board


Producers
Commodity
Consultants
Water Districts
Industry
Panhandle AgriPartners
Texas A&M Univ.
West Texas A&M Univ.
TCE
TAES
USDA-ARS

COUNTY CLUSTER AND FDA LOCATIONS

Panhandle AgriPartners

Dallam 1	Sherman
Hartley	Moore ✗

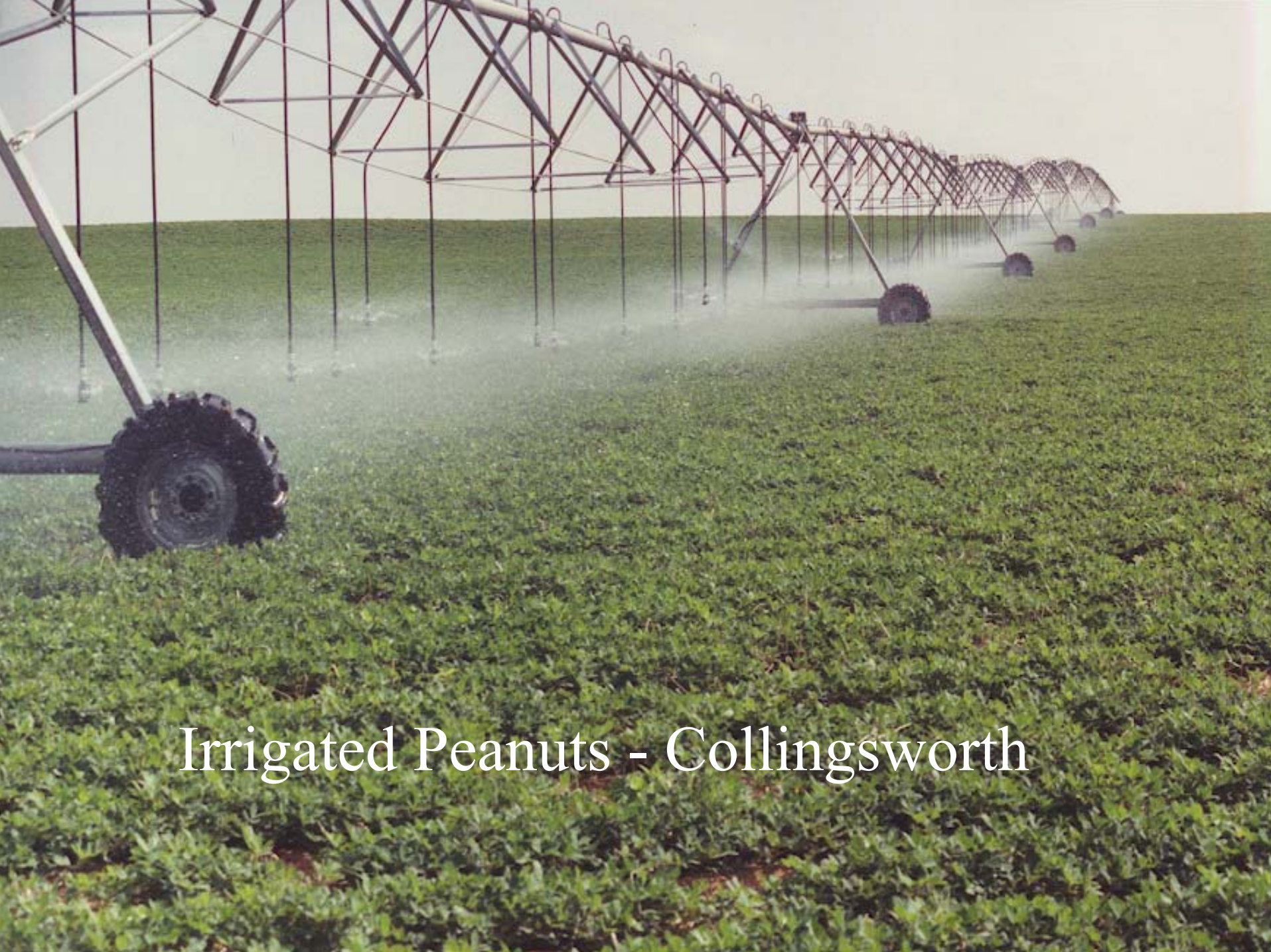
Hansford 2	Ochiltree ✗	Lipscomb
Hutchinson		Hemphill

Oldham 3	Potter
Deaf Smith	Randall ✗

	Roberts 4
Carson ✗	Gray
Armstrong	

	Wheeler
Donley 5	Collingsworth ✗
Briscoe	Hall

AgriPartner Priscilla Green and Extension Entomologist Carl Patrick


Irrigated Peanuts - Collingsworth

No-Till Irrigated Peanuts – Collingsworth County

OBJECTIVES

- Provide current information to producers & others
  - Water use by peanut
  - Plant development
  - Pests
- Conduct on-farm demonstrations of technology & IPM
- Provide accurate databases for model development

Peanut Production Per Inch of Water

'98, '99, '00, '01, '02, '03, '04 AgriPartners

		WATER - INCHES		PET	PRODUCTION		
County	Year	Irrigation	Rain/Irrig/Soil	% of	LBS/Ac	LBS/Ac - In Irrigation	LBS/Ac - In Rain/Irrig/Soil
Collingsworth	'98	22.60	25.68	104	5208	230.44	202.80
Collingsworth	'98	20.15	27.54	111	5132	254.69	186.35
Collingsworth	'01	25.75	32.60	138	4837	187.84	148.37
Collingsworth	'02	15.65	25.30	123	4787	305.88	189.21
Collingsworth	'01	17.89	26.23	103	4726	264.17	180.18
Collingsworth	'98	22.65	29.35	118	4500	198.68	153.32
Collingsworth	'03	22.48	34.88	161	4411	196.22	126.46
Collingsworth	'02	22.09	35.44	169	4367	197.69	123.22
Collingsworth	'02	16.82	26.82	128	4254	252.91	158.61
Collingsworth	'04	12.87	25.62	120	4217	327.66	164.60
Collingsworth	'99	12.85	26.43	123	4200	326.85	158.91
Wheeler	'02	8.95	21.45	105	4009	447.93	186.90
Collingsworth	'99	22.70	37.80	175	3984	175.51	105.40
Collingsworth	'00	20.35	30.06	160	3900	191.65	129.74
Collingsworth	'99	20.65	33.70	156	3892	188.47	115.49
Collingsworth	'02	15.87	25.27	120	3879	244.42	153.50
Collingsworth	'01	18.51	25.54	108	3800	205.29	148.79
Collingsworth	'01	18.50	24.32	106	3750	202.70	154.19
Collingsworth	'03	13.20	25.30	113	3750	284.09	148.22
Collingsworth	'03	17.53	32.08	143	3750	213.92	116.90
Individual demonstration data for the top 20 yielding demos are shown above. Averages for all 34 demos are shown below.							
Average	**34**	**17.96**	**29.06**	**133**	**3872**	**215.65**	**133.26**

All irrigated by Center Pivot Systems

Prepared by: Leon New , Professor/Extension Agricultural Engineer - Irrigation

2004 PEANUT INSECT AND DISEASE OBSERVATIONS

Coordinated by Dr. Carl Patrick, District Entomologist

- Scouted producer fields for pests with good results "Peanut has no major insect pests in the Texas Panhandle".
- Some fairly heavy disease pressure with late leaf spot and Sclerotinia blight.
- "AgriPartners Insect Report" assembled and faxed or emailed weekly to 43 mass media outlets
- "Panhandle Pest Report" newsletter prepared and mailed weekly to 300 producers and agribusinesses

Demonstration Site Visit – Data & Observations (Taken twice a week)

- Irrigation & rainfall amounts since last visit
- Soil moisture status to 3 ft depth (1-ft increments)
- Peanut growth stage & crop condition
- Other observations (pests, diseases, spraying, etc)

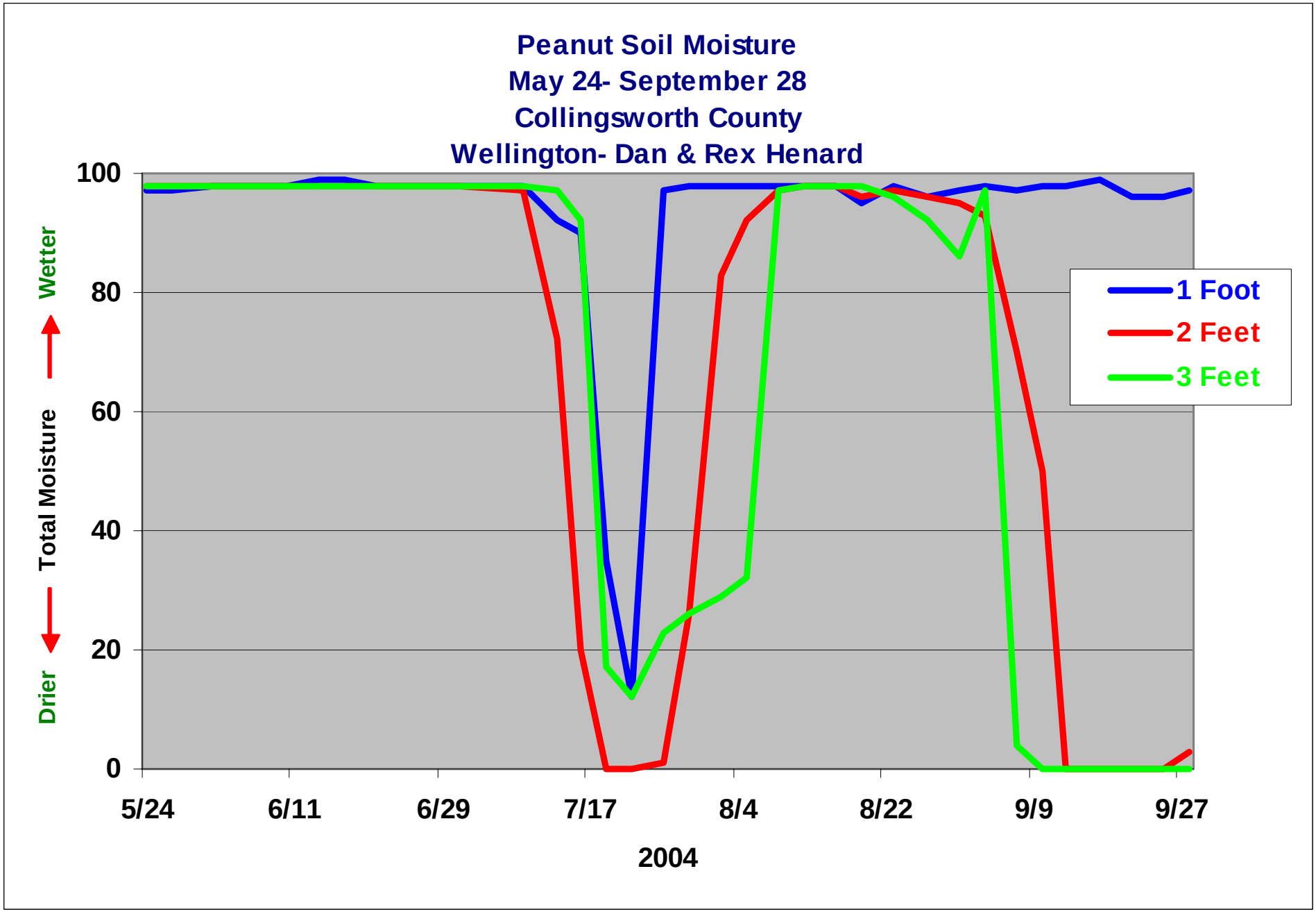
Irrigated Peanut Demonstration Summary 2004

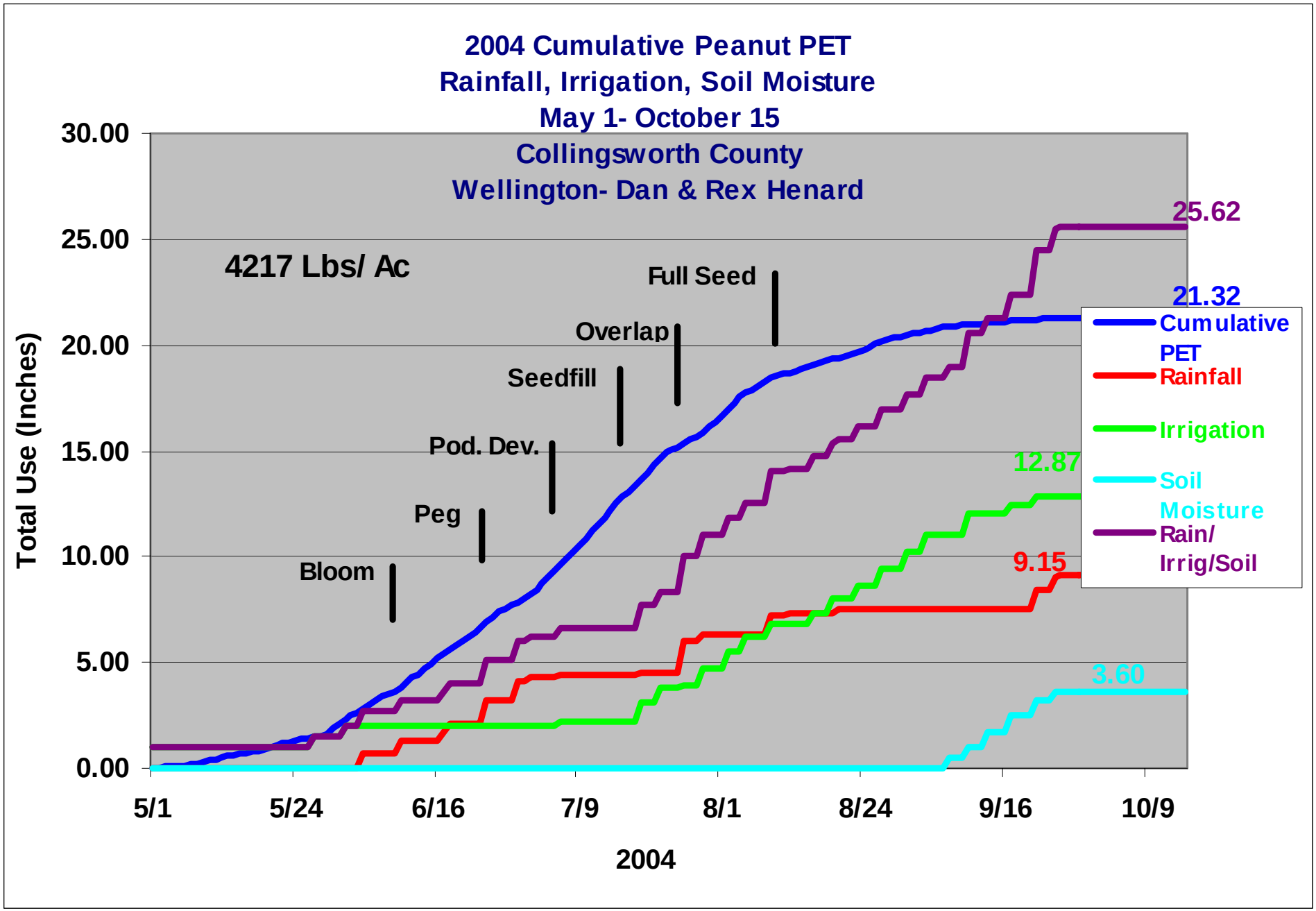
- Six center pivot irrigated peanut demonstrations were conducted on 437 acres in 2004.
- Two Demonstrations were in Collingsworth County, two in Donley, one in Wheeler, and one in Hall County.
- All demos were runner type.

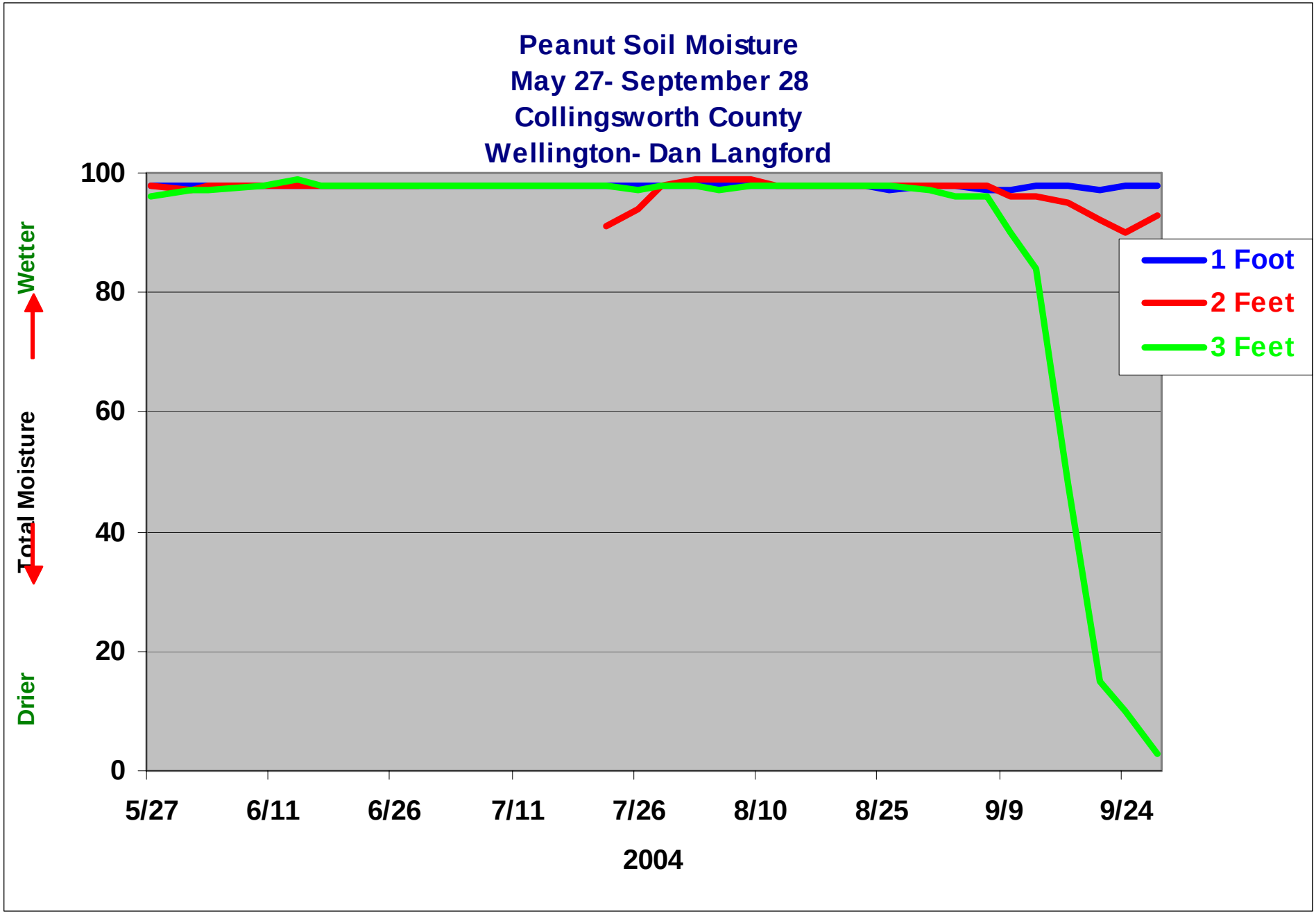
Table 1. Peanut Irrigation and Production, Panhandle AgriPartners, 2004							
		WATER-INCHES		PET		PRODUCTION	
						LB/ACRE/IN	
COUNTY	GROWER	IRRIGATION	RAIN/IRRIG/SOIL	% OF	LB/AC	IRRIGATION	RAIN/IRRIG/SOIL
Collingsworth	Dan & Rex Henard	12.87	25.62	120	4217	327.66	164.60
Collingsworth	Dan Langford	15.47	25.33	119	3624	234.26	143.07
Hall	Billy Neal Shannon	14.60	32.39	152	3506	240.14	108.24
Donley	Donnie Howard	5.40	23.46	110	3400	629.63	144.93
Donley	Eddie Helms	8.90	23.18	111	3200	359.55	138.05
Wheeler	Gary & Danny Hardcast	14.20	23.01	111	3000	211.27	130.38
AVERAGE 2004	6	11.91	25.50	121	3491	293.21	136.92
AVG '98'99'00'01'02'03'0	34	17.96	29.06	133	3872	215.65	133.26
All irrigated by Center Pivot Systems							

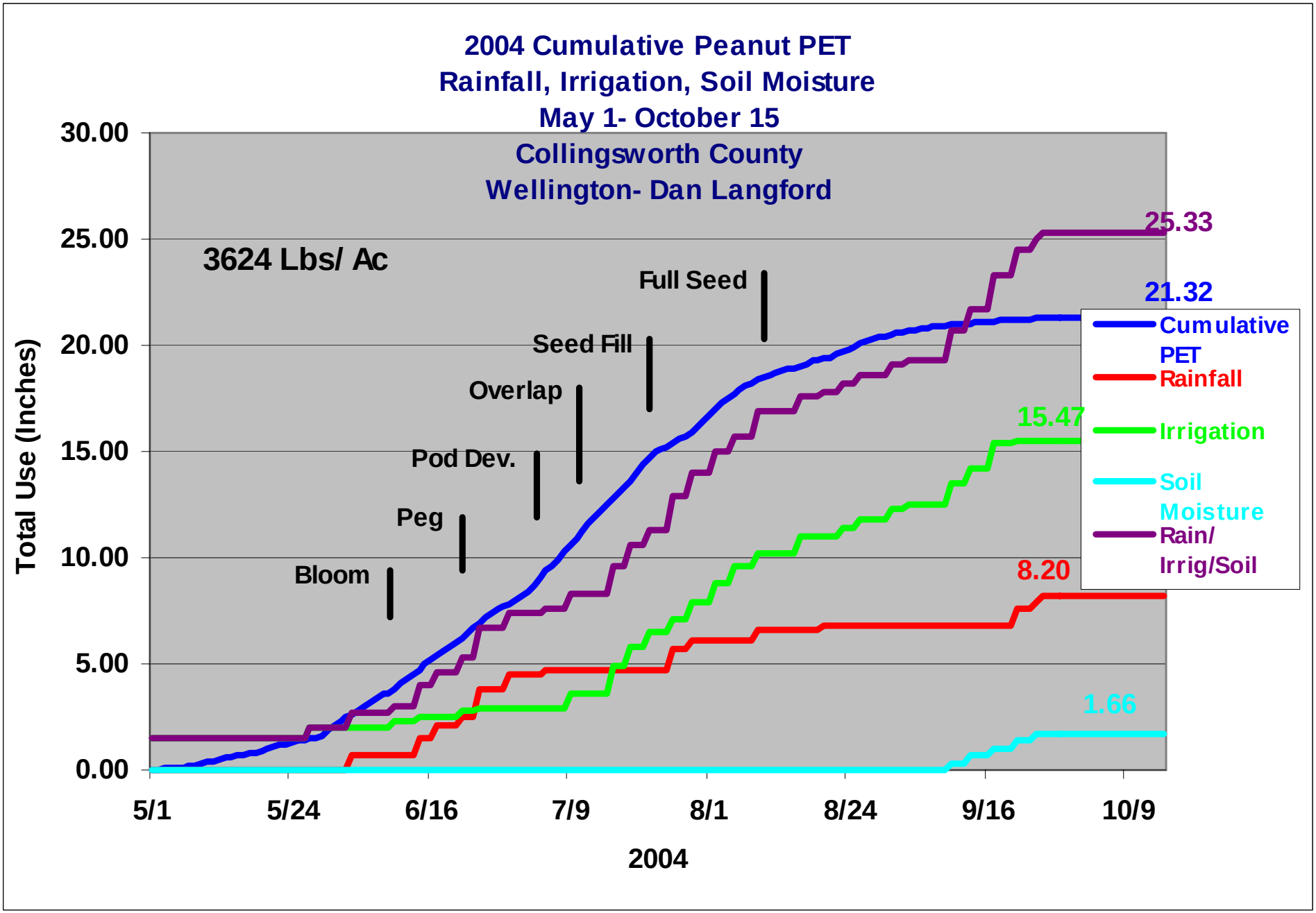
Individual Peanut Demonstration Graphs

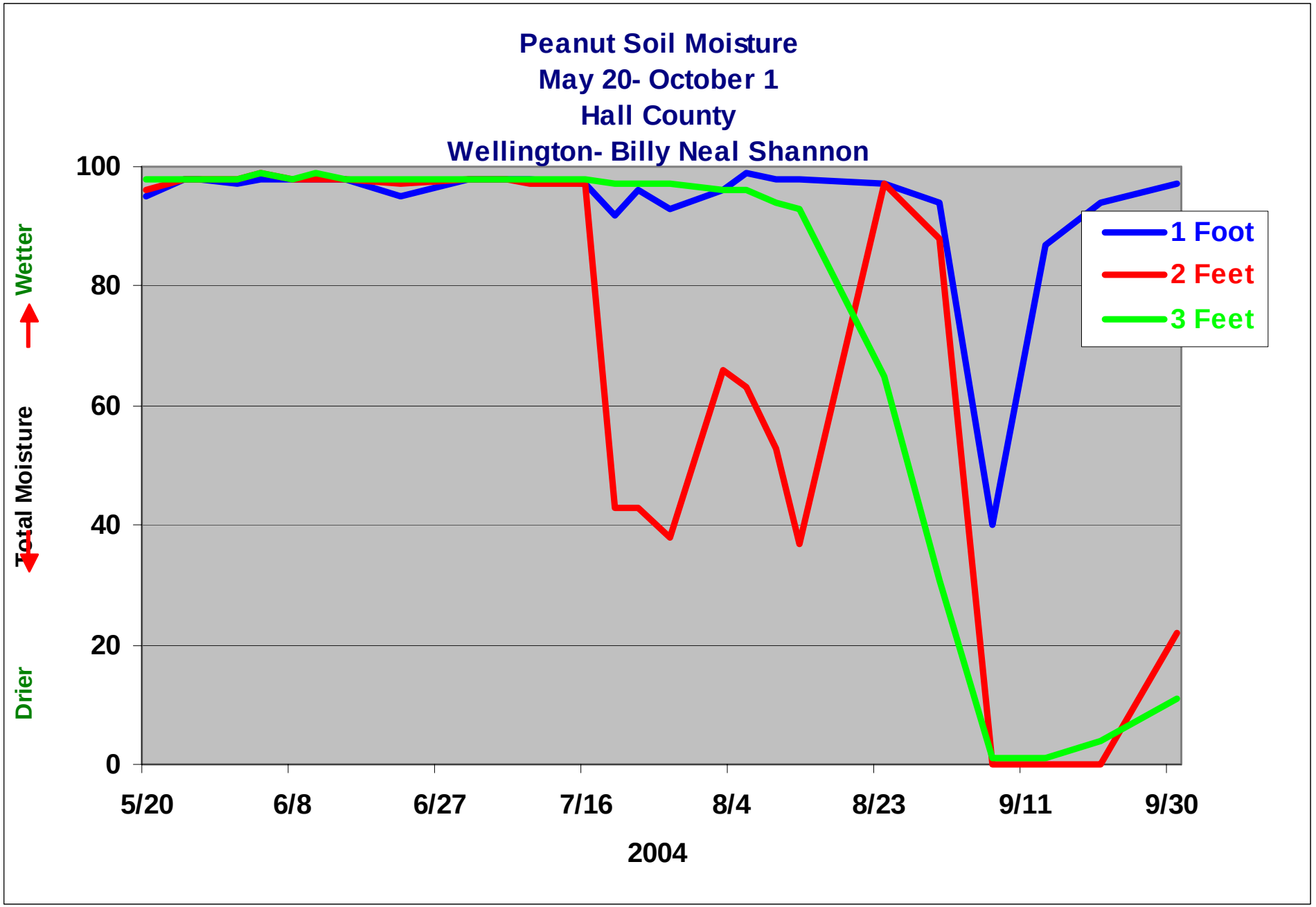
- Each Demonstration has two graphs:
  - Seasonal soil water content by 1-ft increments to a 3- ft depth.
  - Seasonal water use from rain, irrigation, and soil water are shown and compared to model-predicted water use (PET) from the nearest North Plains Evapotranspiration Network weather station. Peanut yield and growth stages are also shown.

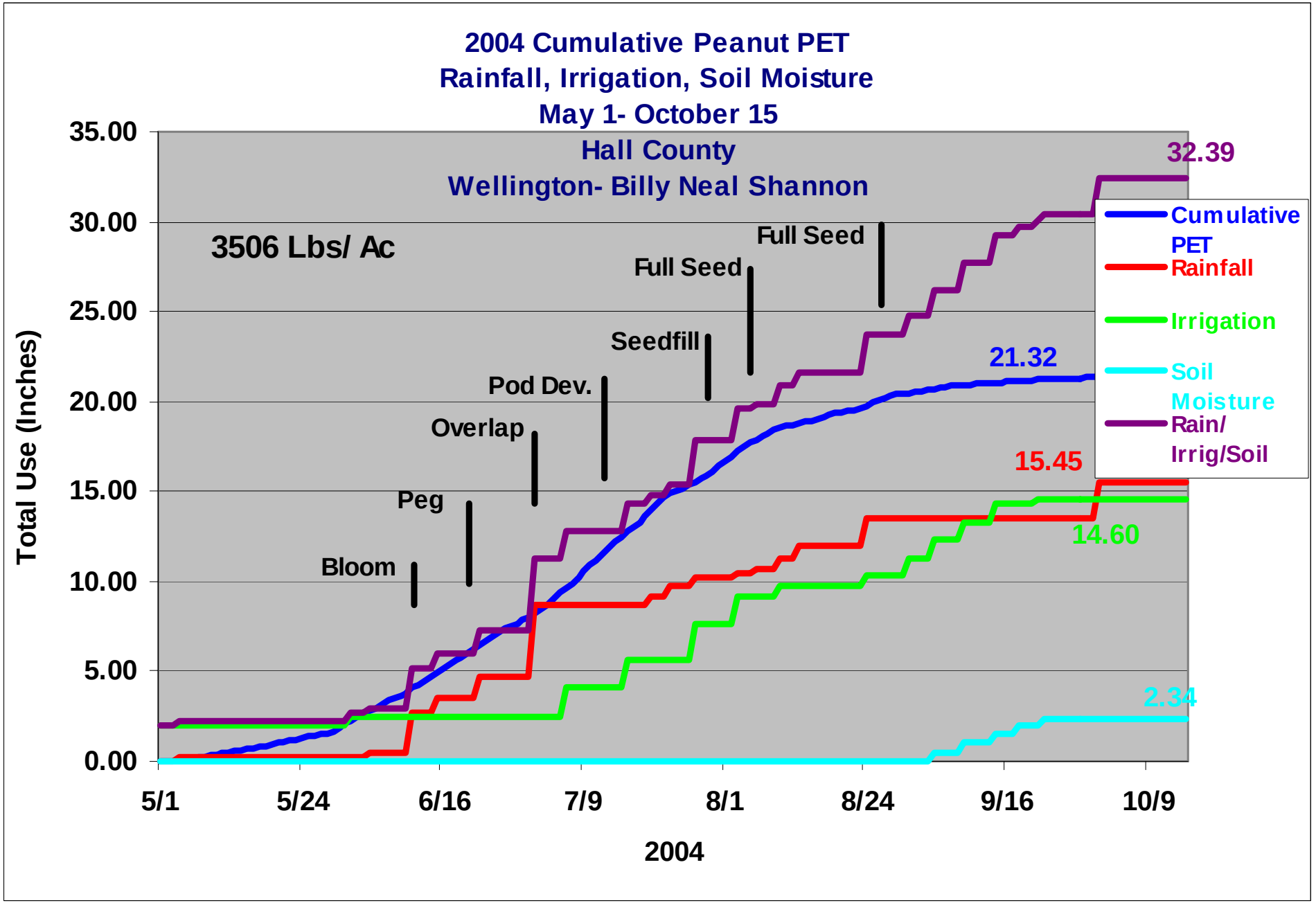

Peanut Soil Moisture
May 24- September 28
Collingsworth County
Wellington- Dan & Rex Henard
Wetter
Total Moisture
Drier
100
80
60
40
20
0
5/24
6/11
6/29
7/17
8/4
8/22
9/9
9/27
2004
1 Foot
2 Feet
3 Feet

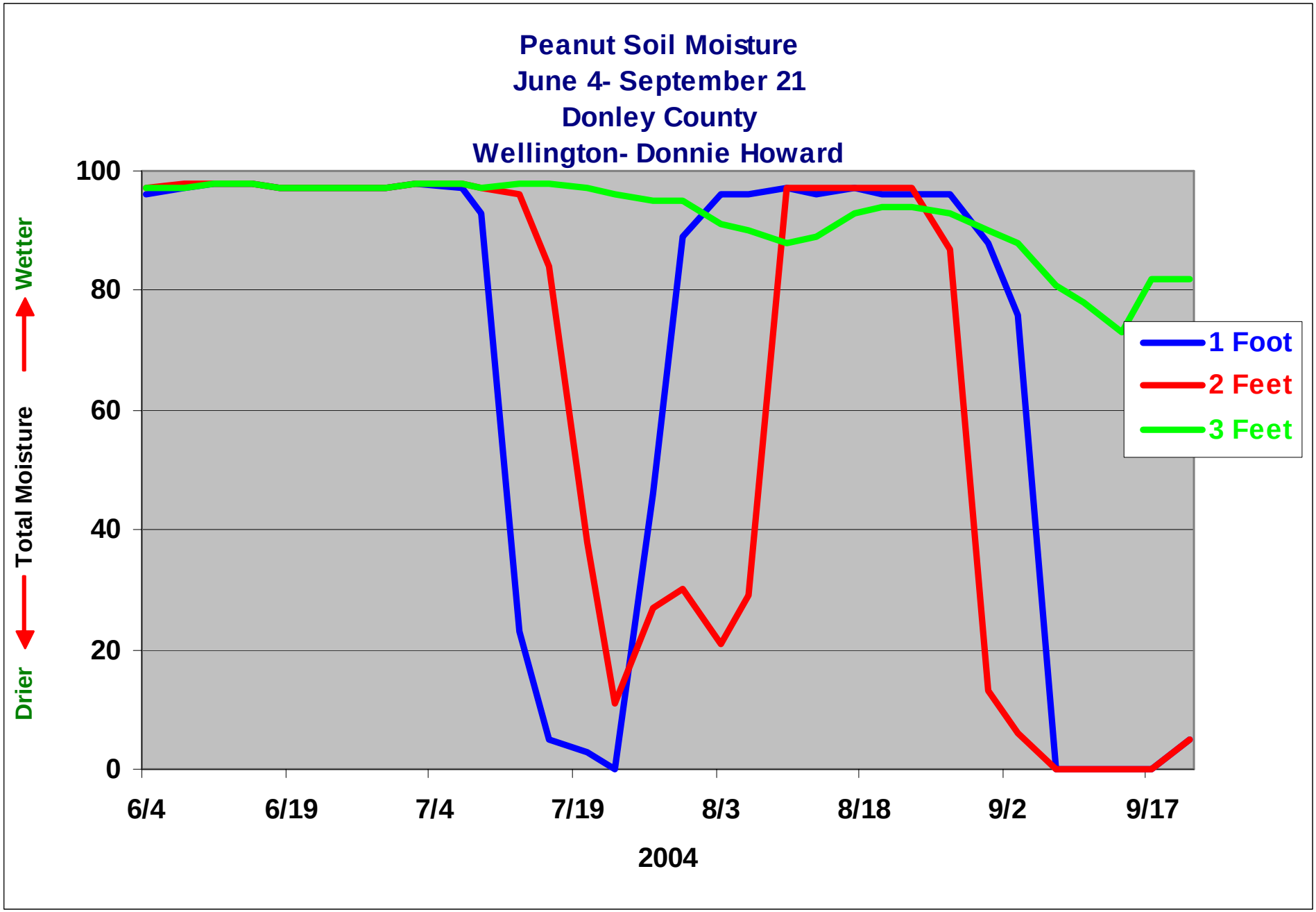

2004 Cumulative Peanut PET
Rainfall, Irrigation, Soil Moisture
May 1- October 15
Collingsworth County
Wellington- Dan & Rex Henard
4217 Lbs/ Ac
Full Seed
Overlap
Seedfill
Pod. Dev.
Peg
Bloom
25.62
21.32
12.87
9.15
3.60
Cumulative PET
Rainfall
Irrigation
Soil Moisture
Rain/ Irrig/Soil
Total Use (Inches)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
5/1
5/24
6/16
7/9
8/1
8/24
9/16
10/9
2004

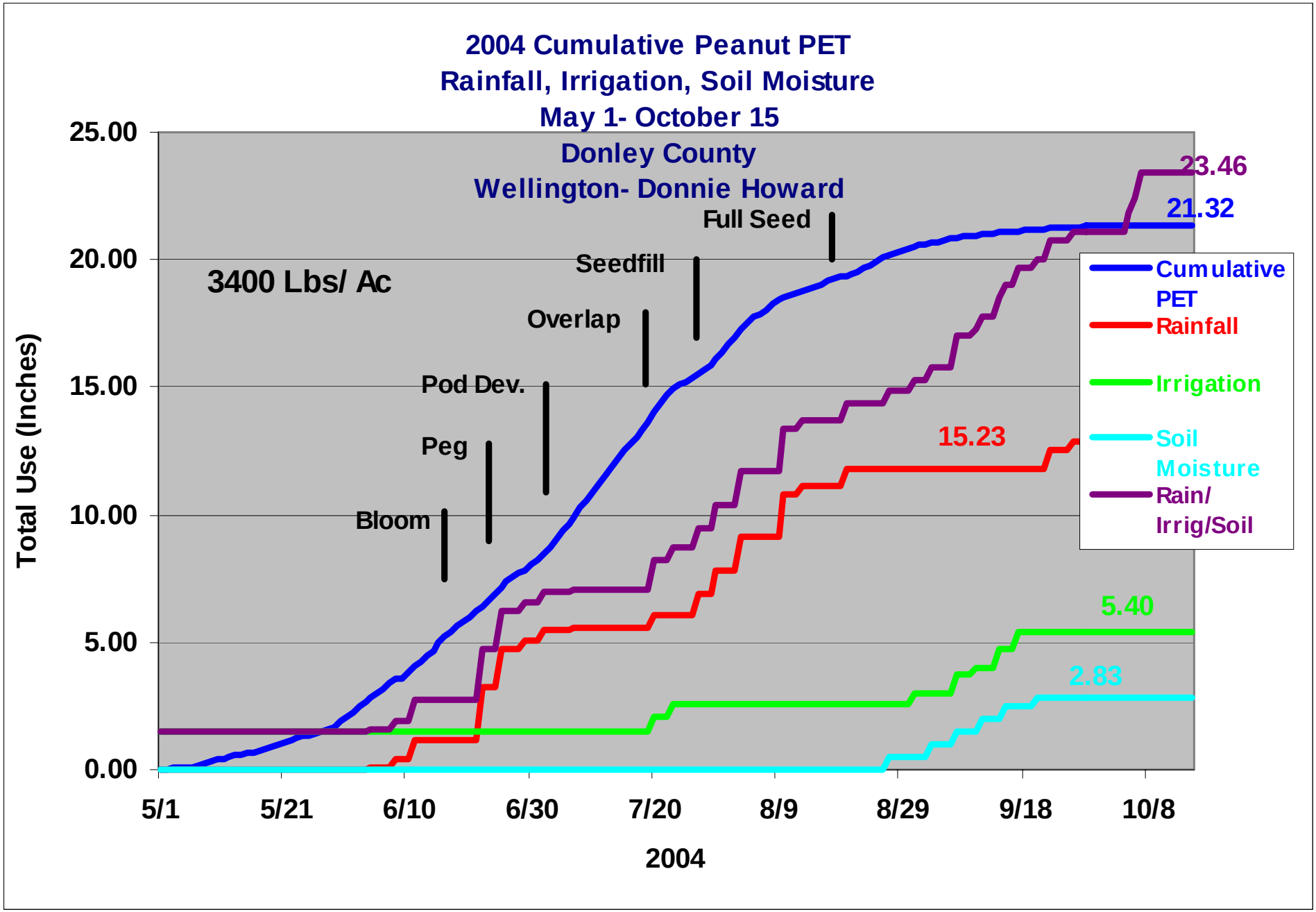

Peanut Soil Moisture
May 27- September 28
Collingsworth County
Wellington- Dan Langford
Wetter
Total Moisture
Drier
100
80
60
40
20
0
5/27
6/11
6/26
7/11
7/26
8/10
8/25
9/9
9/24
2004
1 Foot
2 Feet
3 Feet

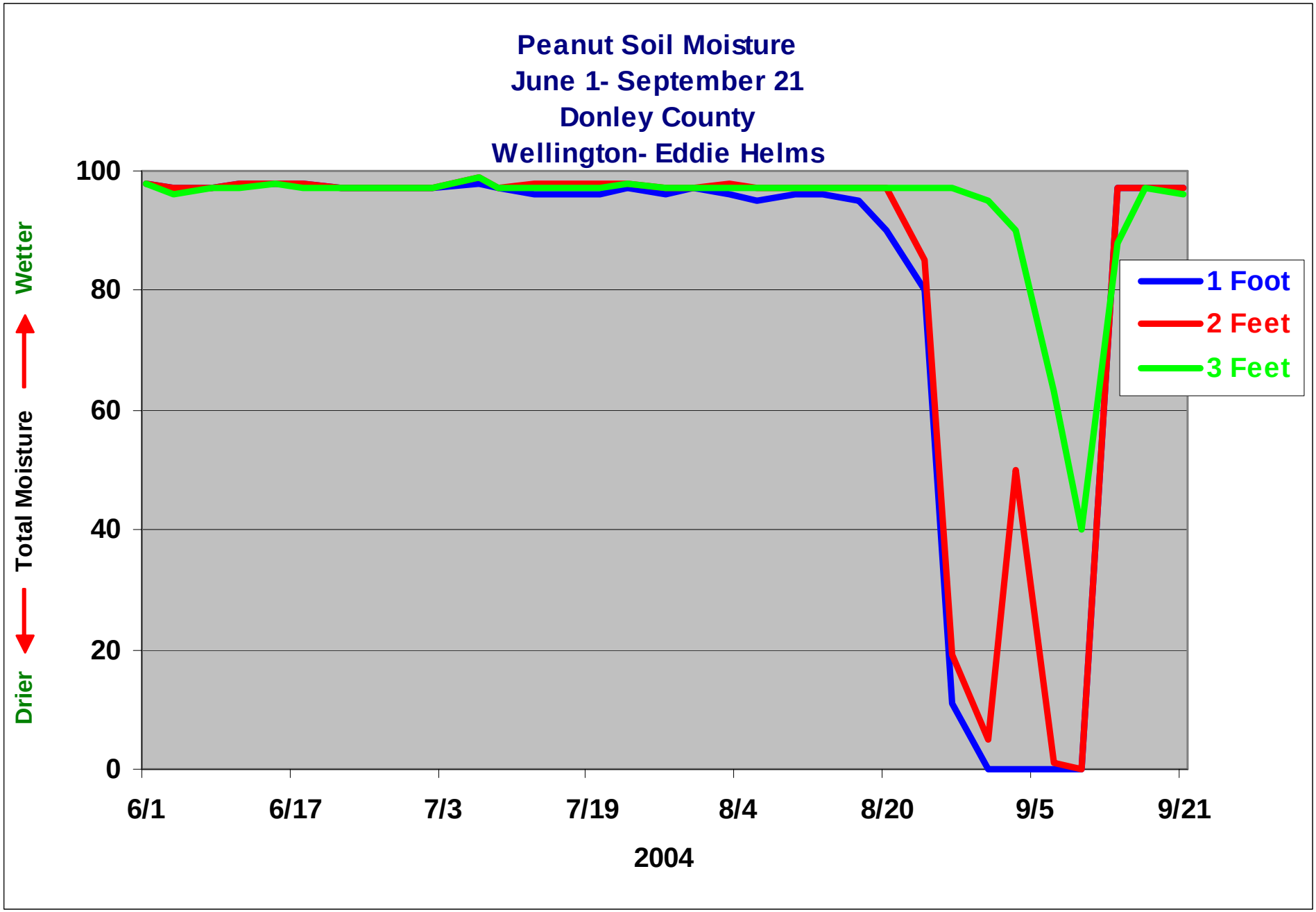

2004 Cumulative Peanut PET
Rainfall, Irrigation, Soil Moisture
May 1- October 15
Collingsworth County
Wellington- Dan Langford
3624 Lbs/ Ac
Full Seed
Seed Fill
Overlap
Pod Dev.
Peg
Bloom
25.33
21.32
15.47
8.20
1.66
Cumulative PET
Rainfall
Irrigation
Soil Moisture
Rain/ Irrig/Soil
Total Use (Inches)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
5/1
5/24
6/16
7/9
8/1
8/24
9/16
10/9
2004

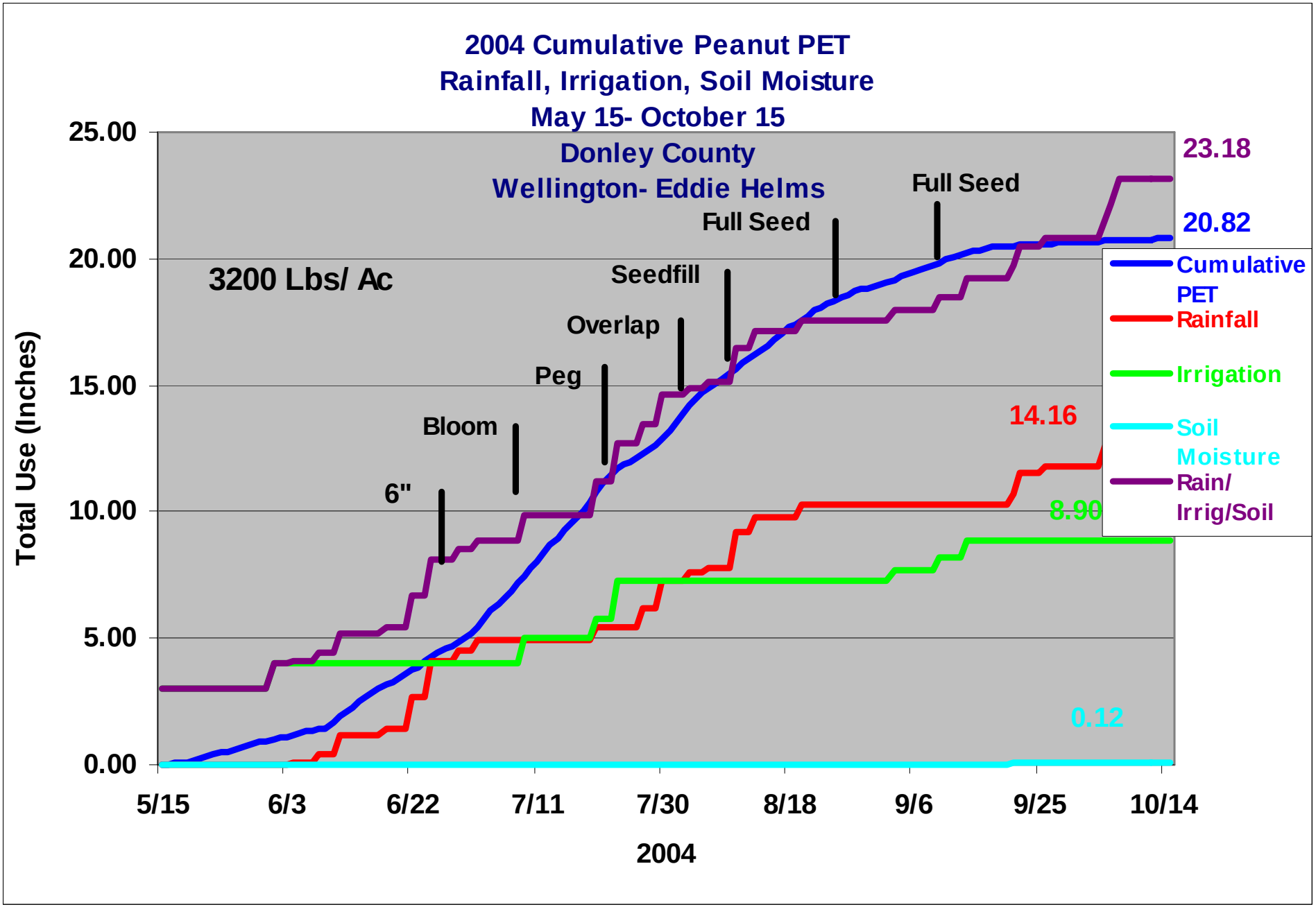

Peanut Soil Moisture
May 20- October 1
Hall County
Wellington- Billy Neal Shannon
Wetter
Total Moisture
Drier
100
80
60
40
20
0
5/20
6/8
6/27
7/16
8/4
8/23
9/11
9/30
2004
1 Foot
2 Feet
3 Feet

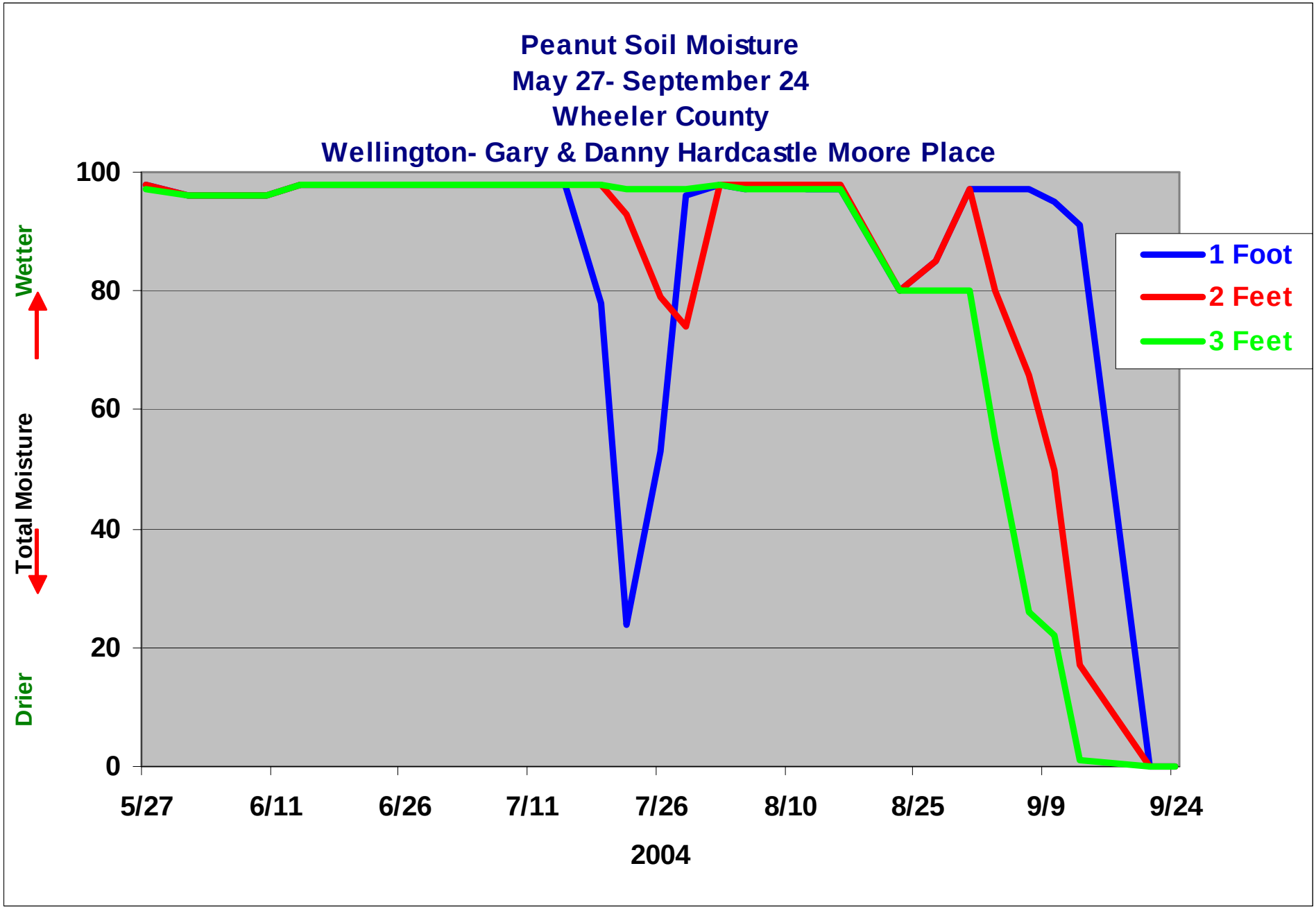

2004 Cumulative Peanut PET
Rainfall, Irrigation, Soil Moisture
May 1- October 15
Hall County
Wellington- Billy Neal Shannon
3506 Lbs/ Ac
Bloom
Peg
Overlap
Pod Dev.
Seedfill
Full Seed
Full Seed
32.39
21.32
15.45
14.60
2.34
Cumulative PET
Rainfall
Irrigation
Soil Moisture
Rain/ Irrig/Soil
Total Use (Inches)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
5/1
5/24
6/16
7/9
8/1
8/24
9/16
10/9
2004

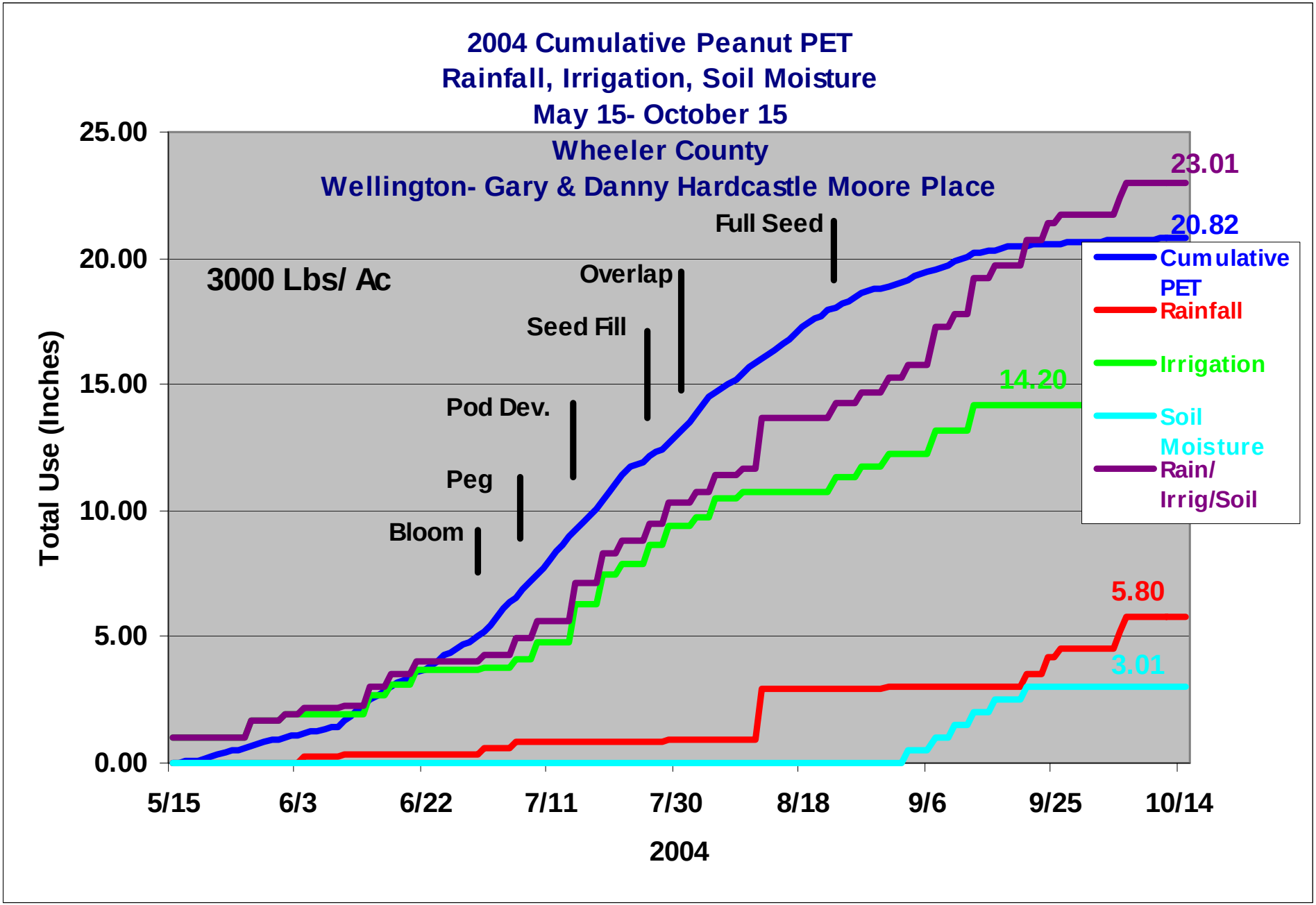

Peanut Soil Moisture
June 4- September 21
Donley County
Wellington- Donnie Howard
Wetter
Total Moisture
Drier
100
80
60
40
20
0
6/4
6/19
7/4
7/19
8/3
8/18
9/2
9/17
2004
1 Foot
2 Feet
3 Feet


2004 Cumulative Peanut PET
Rainfall, Irrigation, Soil Moisture
May 1- October 15
Donley County
Wellington- Donnie Howard
3400 Lbs/ Ac
Full Seed
Seedfill
Overlap
Pod Dev.
Peg
Bloom
23.46
21.32
15.23
5.40
2.83
Cumulative PET
Rainfall
Irrigation
Soil Moisture
Rain/ Irrig/Soil
Total Use (Inches)
25.00
20.00
15.00
10.00
5.00
0.00
5/1
5/21
6/10
6/30
7/20
8/9
8/29
9/18
10/8
2004


Peanut Soil Moisture
June 1- September 21
Donley County
Wellington- Eddie Helms
Wetter
Total Moisture
Drier
100
80
60
40
20
0
6/1
6/17
7/3
7/19
8/4
8/20
9/5
9/21
2004
1 Foot
2 Feet
3 Feet


2004 Cumulative Peanut PET
Rainfall, Irrigation, Soil Moisture
May 15- October 15
Donley County
Wellington- Eddie Helms
3200 Lbs/ Ac
6"
Bloom
Peg
Overlap
Seedfill
Full Seed
Full Seed
23.18
20.82
14.16
8.90
0.12
Cumulative PET
Rainfall
Irrigation
Soil Moisture
Rain/ Irrig/Soil
Total Use (Inches)
25.00
20.00
15.00
10.00
5.00
0.00
5/15
6/3
6/22
7/11
7/30
8/18
9/6
9/25
10/14
2004

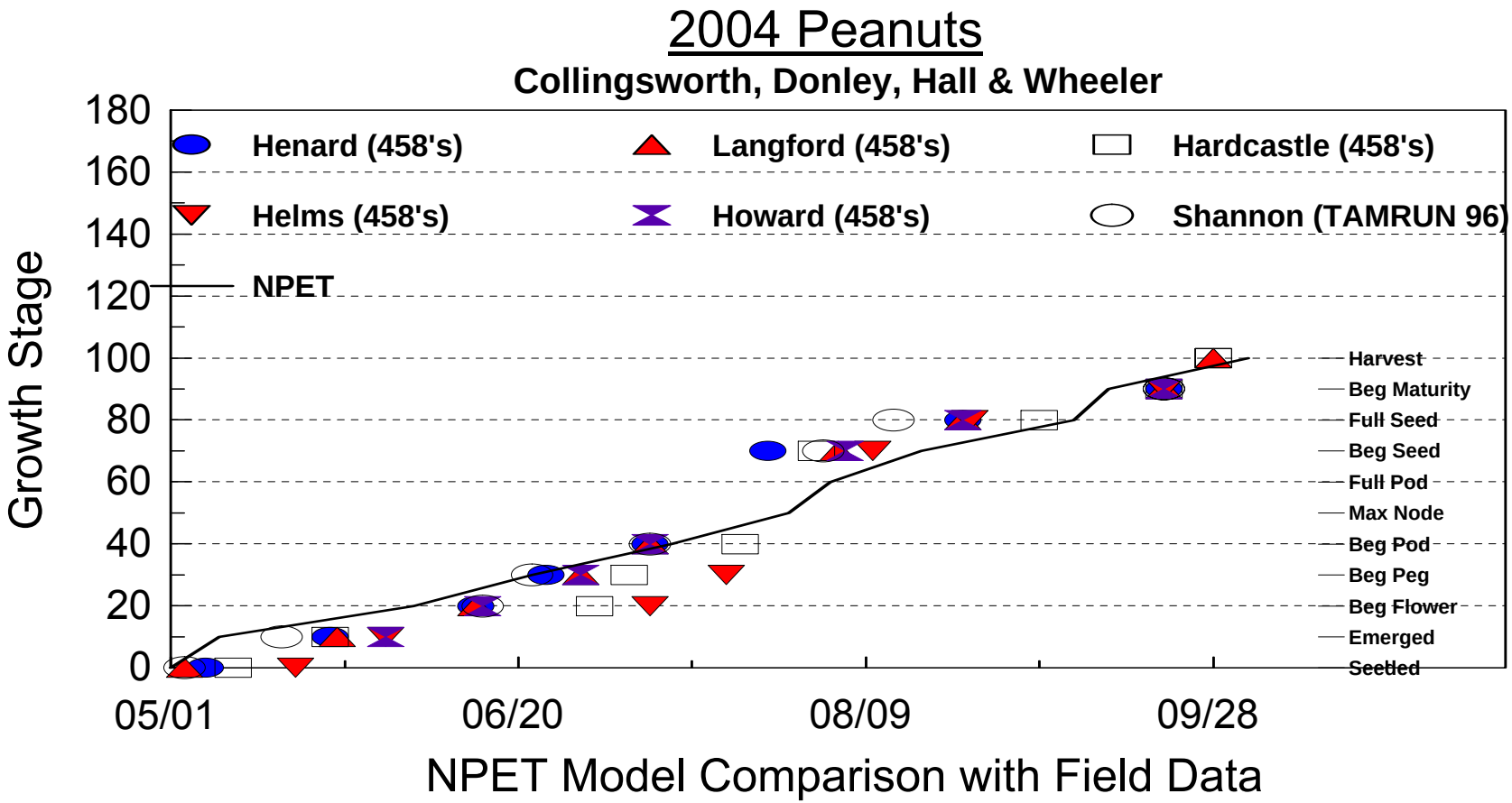

Peanut Soil Moisture
May 27- September 24
Wheeler County
Wellington- Gary & Danny Hardcastle Moore Place
Wetter
Total Moisture
Drier
100
80
60
40
20
0
5/27
6/11
6/26
7/11
7/26
8/10
8/25
9/9
9/24
2004
1 Foot
2 Feet
3 Feet


2004 Cumulative Peanut PET
Rainfall, Irrigation, Soil Moisture
May 15- October 15
Wheeler County
Wellington- Gary & Danny Hardcastle Moore Place
3000 Lbs/ Ac
Full Seed
Overlap
Seed Fill
Pod Dev.
Peg
Bloom
23.01
20.82
14.20
5.80
3.01
Cumulative PET
Rainfall
Irrigation
Soil Moisture
Rain/ Irrig/Soil
Total Use (Inches)
25.00
20.00
15.00
10.00
5.00
0.00
5/15
6/3
6/22
7/11
7/30
8/18
9/6
9/25
10/14
2004

Comparison of PET Predicted Seasonal Growth Stages with Actual Growth stages

- The North Plains Evapotranspiration Network operates 12 weather stations. NPET crop growth models are used to predict growth stages, based on heat units, as well as crop water use for specific periods.
- The following slide compares the predicted seasonal growth stage (NPET Wellington weather station) with actual field observations of peanut growth stages during the growing season.

NPET Growth Model Comparisons With Field 0bservations



AgriPartners - Future Plans 2005

- Provide current information to producers & others
  - Water use by peanut
  - Plant development
  - Pests
- Conduct on-farm demonstrations of improved technology & IPM
- Provide accurate databases for model development

THANKS TO THE NATIONAL PEANUT BOARD AND THE TEXAS PEANUT PRODUCERS BOARD FOR SUPPORT OF PANHANDLE AGRIPARTNERS

Texas Cooperative EXTENSION
The Texas A&M University System

Long-term P & K Fertility for West Texas Peanut-Cotton Cropping System
Gaines and Dawson County, Texas
Year 4—2004 & Four-Year Summary

Calvin Trostle, Extension Agronomy, Texas Cooperative Extension, Lubbock, 806-746-6101, c-trostle@tamu.edu
Kevin Bronson, Research Soil Fertility, Texas Ag. Experiment Station, Lubbock, 806 746-4013, k-bronson@tamu.edu

OBJECTIVE:

This report continues the project initiated in 2001. Response to P and K fertilizer in peanut is often difficult to measure. Soil tests in West Texas report high K, and P is often high as well. One- and two-year fertility projects addressing P and K in peanuts will not provide adequate results. A long-term fertility project was needed whereby peanut, as well as its rotational crop (cotton), is fertilized at a range of nutrient levels, each of which is retained on the same land area over time. Results will assist producers in examining the economic value of P and K for peanut and cotton in a three-year rotation.

The objective of this proposal is to continue the two long-term P&K fertility sites (AGCARES, Lamesa, TX; Western Peanut Growers facility, Gaines Co., TX) to gauge long-term impact and optimum levels of different P and K fertilizer regimes in a three-year peanut-cotton rotation.

METHODS AND PROCEDURES:

Peanuts

	Gaines County	Dawson County
Soil Type:	Brownfield loamy sand	Amarillo fine sandy loam
Peanut variety:	Flavor Runner 458	Flavor Runner 458
Planting:	April 28, 2004, on 36" rows	April 29, 2004 on 40" rows
Previous Crop:	Cotton (2 years)	Cotton (2 years)
Seeding Rate:	~5.5 seeds per row foot	~5.7 seeds per row foot
Plot Set-up:	RCBD, four reps for each of 6 treatments	Same
Harvest Area:	2 rows X 33'	4 rows X 33'
Inoculant:	Nitragin Lift liquid, 1X	Nitragin Soil Implant granular, 1X
N Fertilizer:	~50 lbs. N/A applied with pivot	~40 lbs. N/A
Herbicide:	Sonolan	Prowl
Insecticide:	None	None
Rainfall:	~14" during the growing season	15" during growing season
Irrigation level:	~14"	13"
Date Dug:	October 22, 2004	October 12, 2004
Date Harvested:	November 18, 2004	November 11, 2004

Cotton

	Gaines County	Dawson County
Soil Type:	Brownfield loamy sand	Amarillo fine sandy loam
Cotton variety:	Paymaster 2326 RR	Paymaster 2326RR/BG
Planting:	May 10, 2004, on 36" rows	May 6, 2004 on 40" rows
Previous Crop:	Set 1, cotton; set 2, peanuts	Set 1 (UNR), cotton; set 2, peanuts
Seeding Rate:	~16 lbs./A	North pie, 15 lbs./A South pie, 8 lbs./A
Plot Set-up:	RCBD, four reps for each of 6 treatments	Same
Harvest Area:	2 rows X 33' (stripper)	2 rows X 30' (stripper)
N Fertilizer:	60 lbs. N/A	~60 lbs. N/A
Herbicide:	Prowl, 1.5 pt./A	Treflan, 1.5 pt/A
Rainfall:	~14" during the growing season	15" during growing season
Irrigation level:	~12"	North pie, 13" South pie, dryland
Date Harvested:	November 27, 2004	November 10 (dryland) & 15, 2004

Each individual plot was marked and the position recorded with a GPS unit so we can come back on the same location in 2004. Soil samples were collected from 0-12" depth.

Texas A&M soil tests on the peanut ground indicated WPG indicated average 23 ppm P (moderate) and potassium, 270 ppm K (high); at AGCARES 26 ppm P (moderate), and potassium, 255 K (high). Slight trends were observed reflecting application (or lack thereof) of P and K in 2003.

Fertilizer application for P used 10-34-0 applied with rolling coulters leading a knife rig, banded 4" deep. Equivalent amounts of N were applied to each plot to ensure that all plots received the same amount of N. Potash application for K used 0-0-60, which also was incorporated into the surface.

Due to irrigation limitations, the south pie at AGCARES was not irrigated in 2004, but it received the same levels of fertility.

RESULTS AND DISCUSSION:

Peanut

There was no significant yield response to K or P at either location in this fourth year of fertilizer application. Yields at WPG were fair at ~4300 lbs./A. and 5,200 lbs./A at AGCARES. Although we believe that as this study continues for up to six years that crop response may begin to respond to residual fertility, we have not seen consistent evidence of it yet. It is possible that with soil K levels already high that addition of more K could interfere with calcium uptake. This information should be valuable in helping West Texas peanut and cotton farmers gauge the value of their particular approach to fertilizer use.

Although in Gaines Co. in 2003 we saw evidence of yield response to added P that was not evident in 2004. Earlier evidence suggested that cotton is responding to P applications the preceding year in peanut, but then again, yield response could be to long-term P applications whereas some treatments receive no P.

Table 1: Peanut yield response to P and K at Western Peanut Growers, 2004 (fourth year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Peanut Yield (lbs./A)^
1	0	0	4153
2	30	0	4477
3	60	0	4400
4	0	80	4451
5	30	80	4307
6	60	80	4345
Trial average			4355
P-Value:	0.9568	0.9243	
P-Value interaction (P2O5 X K2O): 0.7470			
Least significant difference (LSD), 0.10			**NS**
Trial coefficient of variation (CV)			12.5%

Table 2: Peanut yield response to P and K at AGCARES, 2004 (fourth year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Peanut Yield (lbs./A)^
1	0	0	5177
2	30	0	5549
3	60	0	5458
4	0	80	5215
5	30	80	5243
6	60	80	5138
Trial average			5297
P-Value:	0.7348	0.3561	
P-Value interaction (P2O5 X K2O): 0.7276			
Least significant difference (LSD), 0.10			**NS**
Trial coefficient of variation (CV)			8.9%

Cotton

We observed no yield response to K or P in 2004 for cotton at either location (Tables 3-4, WPG; Tables 5-6, AGCARES). A slight response to K in cotton after peanut had been observed at WPG in 2003. With high soil test levels of residual fertility for K this any response is not expected. Potassium response is often seen not in the crop the year it was applied but in the subsequent crop, but we have not observed this in this trial.

Table 3: Cotton yield response to P and K at Western Peanut Growers, 2004 (northwest pie, cotton after peanut after cotton, fourth year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	1201
2	30	0	1390
3	60	0	1403
4	0	80	1355
5	30	80	1308
6	60	80	1425
Trial average			1347
P-Value:	0.1077	0.5475	
P-Value interaction (P2O5 X K2O): 0.1980 Least significant difference (LSD), 0.10			**NS**
Trial coefficient of variation (CV)			9.8%

Table 4: Cotton yield response to P and K at Western Peanut Growers, 2004 (north pie, cotton after cotton after peanut, fourth year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	1036
2	30	0	1068
3	60	0	1115
4	0	80	1020
5	30	80	1077
6	60	80	1079
Trial average			1066
P-Value:	0.9132	0.9181	
P-Value interaction (P2O5 X K2O): 0.9921 Least significant difference (LSD), 0.10			**NS**
Trial coefficient of variation (CV)			25.1%

Table 5: Dryland cotton yield response to P and K at AGCARES, 2004 (south pie, cotton after peanut after cotton, fourth year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	674
2	30	0	644
3	60	0	626
4	0	80	623
5	30	80	623
6	60	80	647
Trial average			639
P-Value:	0.8110	0.4044	
P-Value interaction (P2O5 X K2O): 0.0.3542 Least significant difference (LSD), 0.10			**NS**
Trial coefficient of variation (CV)			7.3%

Table 6: Cotton yield response to P and K at AGCARES, 2004 (north pie, cotton after cotton after peanut, fourth year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	1203
2	30	0	1214
3	60	0	1198
4	0	80	1168
5	30	80	1216
6	60	80	1168
Trial average			1192
P-Value:	0.6346	0.4501	
P-Value interaction (P2O5 X K2O): 0.8744 Least significant difference (LSD), 0.10			**NS**
Trial coefficient of variation (CV)			5.4%

A four-year summary is included for field yield trial results for peanut and cotton treated with long-term P & K fertilizer (Table 7). After four years little effect has been observed for response to either nutrient.

Table 7. Summary of long-term P and K applications to peanut and cotton in a three-year rotation (Gaines and Dawson Counties, Texas, 2001-2004).

Nutrient	Location	2001	2002	2003	2004
Phosphorus	WPG--Peanut	NS	NS (T)	**	NS
	AGCARES--Peanut	NS	NS	NS	NS
	WPG--Cotton after peanut after cotton	NS	**	NS	NS (T)
	WPG--Cotton after cotton after peanut	NS	**	NS	NS
	AGCARES--Cotton after peanut after cotton	NS	NS (T)	NS	NS
	AGCARES--Cotton after cotton after peanut	NS	NS	NS	NS
Potassium	WPG-Peanut	NS	NS	NS	NS
	AGCARES-Peanut	NS	NS	NS	NS
	WPG--Cotton after peanut after cotton	NS	NS	*	NS
	WPG--Cotton after cotton after peanut	NS	NS	NS	NS
	AGCARES--Cotton after peanut after cotton	NS	NS	NS	NS
	AGCARES--Cotton after cotton after peanut	NS	NS	NS	NS

NS, not significant at α = 0.10
NS (T), not significant at α 0.10, though upward trend noted in crop response to nutrient
*, significant at α = 0.10
**, significant at α = 0.05