Partners in Progress
PEANUTS

Peanut Research at OSU 2001

Supported by the

Oklahoma Peanut Commission
National Peanut Board

Oklahoma State University
Division of Agricultural Sciences and Natural Resources
Oklahoma Agricultural Experiment Station
Oklahoma Cooperative Extension Service

In cooperation with
U.S. Department of Agriculture - Agricultural Research Service

P-990

Partners in Progress
PEANUTS

Partners in Progress PEANUTS

Peanut Research at OSU 2001

Supported by the

Oklahoma Peanut Commission
National Peanut Board

Oklahoma State University
Division of Agricultural Sciences and Natural Resources
Oklahoma Agricultural Experiment Station
Oklahoma Cooperative Extension Service

In cooperation with
U.S. Department of Agriculture - Agricultural Research Service

P-990


Printed on recycled paper using soy-based ink.

This report of the Oklahoma Agricultural Experiment Station is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of $2313.16 for 500 copies. #3006 0402 JS.

Partners in Progress PEANUTS

Table of Contents

Foreword ____ 1

Producers support expanded "partnership" for progress ____ 2

Development of integrated strategies for management of soil-borne peanut diseases ____ 3

Management of insect and disease incidence in peanuts ____ 8

Peanut breeding ____ 15

Management of Sclerotina blight and Verticillium wilt in peanuts ____ 20

Results of applied research on peanuts — 2001 ____ 23

Field studies for the control of peanut diseases ____ 32

Weed Control Research ____ 45

Foreword

This publication is the seventh in a series of annual reports from the OSU Division of Agricultural Sciences and Natural Resources summarizing work supported by the Oklahoma Peanut Commission.

In his opening comments, Oklahoma Peanut Commission Executive Secretary Mike Kubicek describes the partnerships used to keep Oklahoma peanut producers viable in an ever changing market place. With the addition of the National Peanut Board, growers can rest assured that researchers are working to keep them competitive.

Our *Partners in Progress* series is intended to highlight the most recent significant research and extension activities. With all the work accomplished, it is important to keep in mind that additional research and educational activity needs to come in the future if progress is to continue.

In partnership with the Oklahoma Peanut Commission, we strive to conduct research that is directed toward the needs of the state's producers. This report is just one way in which we communicate results to producers as rapidly as possible.

D.C. Coston, Associate Director
Oklahoma Agricultural Experiment Station
Division of Agricultural Sciences and Natural Resources
Oklahoma State University

Oklahoma State University Division of Agricultural Sciences and Natural Resources Mission Statement

The Mission of the Oklahoma State University Division of Agricultural Sciences and Natural Resources is to discover, develop, disseminate, and preserve knowledge needed to enhance the productivity, profitability, and sustainability of agriculture; conserve and improve natural resources; improve the health and well-being of all segments of our society; and to instill in its students the intellectual curiosity, discernment, knowledge, and skills needed for their individual development and contribution to society.

Producers support expanded "partnership" for progress

Mike Kubicek, Executive Secretary
Oklahoma Peanut Commission

Borne out of necessity, the partnership between peanut producers and Oklahoma State University for aggressive peanut research began with the creation of the Oklahoma Peanut Commission in 1965. The state's first 'commodity check-off' program provided for farmer funded education, promotion, and research activities directed by a six-member farmer board nominated by their peers and appointed by the Governor.

A 'blue-print' for other commodities, the Peanut Commission has always recognized research as the priority venue to accomplish their mission…"of enhancing the viability of Oklahoma peanut producers." A major strategic goal of the Commission is "to assemble a creative, producer-driven, and visionary program of work for peanut research."

For the past 37 years, the Commission has set the pace for other state peanut check-off boards by investing a substantial portion of its farmer dollars to research. With millions of dollars invested, the research partnership with OSU has evolved into a team effort of multi-disciplined scientists and the Commission, mutually determined to keep Oklahoma peanut producers viable in an ever-demanding economic environment.

Time has now come to expand this "partnership" for progress. Via contractual arrangements with the National Peanut Board, the Oklahoma Peanut Commission has identified, prioritized, and funded additional research grants to meet the state's producer needs. In fact, during the 2001 crop year, $85,900 of a two-year $171,800 NPB grant was added to the Commission's research portfolio for "Enhancing Profitability of Peanut Production in Oklahoma."

The NPB has adopted a policy of providing up to 20 percent of national assessments collected from each state to be made available to the respective state's check-off board for investment in production research priorities. The Oklahoma Peanut Commission welcomes the National Peanut Board as a member of our Partnership For Progress. The additional resources available to the OPC for investment on our producers behalf is needed now more than ever as our research team addresses our greatest challenge… keeping our producers competitive.

The Oklahoma Peanut Commission, on behalf of the peanut producers they represent, welcomes the NPB to the team; and salutes the scientists, educators, and administrators cited in this issue of the "Partners In Progress" report for their dedicated commitment to improving our industry.

Development of integrated strategies for management of soil-borne peanut diseases*

Ken E. Jackson,
Hassan A. Melouk (USDA-ARS),
and John P. Damicone
Department of Entomology and Plant Pathology

2001 progress made possible through OPC support

- OLin and Tamrun OL 01 cultivars with high O/L ratios and an acceptable level of resistance to Sclerotinia blight are being considered for release.
- Tamrun OL 01 had similar yields as Tamrun 96, lower grades than Georgia Green and the standard cultivar, and more Sclerotinia blight than Tamrun 96, but less than Georgia Green and the standard cultivar.
- OLin, a Spanish-type, has a seed size that approximates that of Tamspan 90.
- Tamrun OL 01, a runner-type, has a seed size 15 percent larger than that of Okrun.
- About fifty new peanut germ plasm lines had zero incidence of Sclerotinia blight.

Yield and grade of peanuts are adversely affected by several fungal pathogens, which cause several diseases in Oklahoma and other peanut producing states. These diseases are caused by pathogens that have a broad host range and are able to survive under adverse conditions for extended periods, sometimes for several years, by producing resistant structures. Continuous cropping favors the build-up of populations of soil pathogens to a level that can cause severe epidemics on an annual basis. In Oklahoma, the most economically important soil-borne diseases include Sclerotinia blight, Southern blight, pod rot, and diseases caused by root-knot nematodes. Chemical management of these diseases is often necessary and contributes to increased peanut production cost. Therefore, the ultimate goal of this research is to develop a management system for peanut production with minimum inputs (reducing number of fungicide and/or nematicide applications) for sustaining profitability under future farm commodity programs.

*Two Ph.D. students are assisting in these investigations.

Disease resistance research

Peanut disease investigations have been conducted since 1982, to identify acceptable disease resistance in the peanut germ plasm and breeding lines for the Sclerotinia blight fungus and other soil-borne pathogens. This year, the incidence of Sclerotinia blight in many of the Caddo research plots was moderately high at the end of the season. These readings will be helpful in assessing useful levels of resistance in the future.

Several advanced runner peanut lines, some with enhanced oleic acid content, from the breeding program at Texas A&M University and Oklahoma State University are being evaluated annually for resistance to Sclerotinia blight in field plots at multiple locations in Oklahoma and Texas. Several of these lines have exhibited a good level of resistance to Sclerotinia at the Caddo Research Station near Ft. Cobb and in Stillwater during 2001. Most of the Spanish and runner-type peanut lines have high O/L ratios. Performances (Sclerotinia disease incidence, yield, grade, and seed size) of a selected number of breeding lines (Spanish and runner-type) are presented in Tables 1-5.

OLin, a Spanish-type cultivar (tested as TX 962120), and Tamrun OL 01, a runner-type cultivar (tested as TX 977006), both with high O/L ratios and acceptable level of resistance to Sclerotinia blight are being considered for release by Texas A&M, Oklahoma State University, and the USDA-ARS. The seed size for OLin approximates that of Tamspan 90, a popular Sclerotinia-resistant Spanish cultivar. The seed size for Tamrun OL 01 is about 15 percent larger than that of Okrun and Florunner, two popular runner-type cultivars. These new lines have acceptable yield and grade. Table 6 compares Tamrun OL 01 to Tamrun 96, Georgia Green, and a standard cultivar (either Florunner or Okrun). These results indicated that Tamrun OL 01 had similar yields as Tamrun 96, lower grades than Georgia Green and the standard cultivar, and more Sclerotinia blight than Tamrun 96, but less than Georgia Green and the standard cultivar.

Germ plasm evaluation to Sclerotinia blight

Small field plots at the Caddo Research Station near Ft. Cobb were planted to 372 peanut germ plasm entries, obtained from

Table 1. Field performance of a selected runner-type peanut lines at the Caddo Research Station (study 01) in 2001.

Entry	Sclerotinia (%)	Yield (lb/A)	Grade	100 Seed wt (g)
Okrun	23	3098	71	55
SW Runner	5	3896	67	46
Tamrun 96	13	4296	67	55
GA Green	19	3642	71	51
Tamrun 98	19	3267	64	51
TX 977006	18	4126	67	69
TX 977053	20	3824	67	58
GA 942007	8	3497	71	80
TX 961507 tan	14	3570	68	58
U. S. 224	11	1392	56	59

Dr. Roy Pittman, USDA-ARS, and the Curator of the National Peanut Germ Plasm Collection, Griffin, Georgia. These entries were introduced from Peru and Ecuador, and represent the cultivated peanut botanical types. Because of the small amounts of seed available in 2001, only single non-replicated plots were established. Sixteen plots of Okrun (a Sclerotinia-susceptible cultivar) were dispersed among the 372 plot entries in a W arrangement to ensure uniformity of Sclerotinia incidence throughout the plots, and provide confidence from data obtained from the non-replicated plots. About 50 germ plasm entries had zero incidence of Sclerotinia, and about 40 entries had 3 percent Sclerotinia disease incidence, while all the Okrun plots exhibited Sclerotinia with an average incidence of 77 percent. A summary of these data is presented in Table 7. These selections are currently being tested for Sclerotinia reaction under greenhouse conditions.

Table 2. Field performance of selected runner-type peanut breeding lines at the Caddo Research Station (study 02) in 2001.

Entry	Sclerotinia (%)	Yield (lb/A)	Grade	100 seed wt (g)
TX 977006	26	3884	72	72
TX 977053	40	3473	70	62
TX 971783	23	3134	71	59
So. Runner	62	1779	64	60
TX 994371	23	4126	65	52
Flav. Runner 458	45	2444	68	48
GA Green	30	3086	73	49
Florunner	39	2747	72	55
Tamrun 96	18	3473	68	55

Table 3. Field performance of selected runner-type peanut breeding lines at the Caddo Research Station (study 03) in 2001.

Entry	Sclerotinia (%)	Yield (lb/A)	Grade	100 seed wt (g)
TX 994396	37	3469	69	54
TX 994374	44	3501	65	63
TX 994305	42	2791	67	58
TX 994395	37	3840	68	50
TX 977006	63	3162	69	68
GA Green	82	2130	70	48
Florunner	77	2049	71	53
Tamrun 96	39	3630	69	56

Table 4. Field performance of selected Spanish peanut breeding lines at the Caddo Research Station (study 04) in 2001.

Entry	Sclerotinia (%)	Yield (lb/A)	Grade	100 seed wt (g)
TX 991983	10	2795	68	48
TX 991921	1	2795	65	49
TX 991980	0	2698	65	52
TX 991915	1	2589	66	47
TX 991951	10	2735	65	48
TX 962120	4	2638	68	41
Tamspan 90	3	2565	68	39
Spanco	6	2868	70	44

Table 5. Field performance of selected Spanish peanut breeding lines at the Caddo Research Station (study 05) in 2001.

Entry	Sclerotinia (%)	Yield (lb/A)	Grade	100 seed wt (g)
TX 008006	9	2335	70	43
TX 996695	3	2856	66	43
TX 996518	3	2735	70	40
TX 996670	2	2565	71	45
TX 996750	2	2045	69	43
TX 996601	2	2263	65	44
TX 996618	11	2638	62	40
TX 996643	3	2069	65	46
TX 962120	8	2299	68	40
Tamspan 90	2	2178	67	38
Spanco	6	2916	70	43

Table 6. Summary of 2001 results from several trials that compare Tamrun OL 01 to selected standard cultivars.

Test Parameter and Test Number	Tamrun OL 01	Tamrun 96	GA Green	Standard Variety[1]
Sclerotinia (%) Test 1	36	23	44	46
Sclerotinia (%) Test 2	62	46	70	76
Sclerotinia (%) Test 3	20	14	20	40
Sclerotinia (%) Test 4	0	0	0	0
Yield (Lb/A) Test 1	3724	3800	2953	2631
Yield (Lb/A) Test 2	3893	4147	3648	2623
Yield (Lb/A) Test 3	5282	5019	4646	4238
Yield (Lb/A) Test 4	4471	4522	4153	3841
Grade Test 1	68	66	72	70
Grade Test 2	71	68	74	70
Grade Test 3	70	69	72	70
Grade Test 4	69	68	71	71

[1] Standard variety was either Okrun or Florunner.
Test 1 = Average of three breeding lines field performance trials at Caddo Research Station.
Test 2 = Means from 2001 Variety by Fungicide Trial without Omega.
Test 3 = Means from 2001 Variety by Fungicide Trail with Omega.
Test 4 = Average from Sclerotinia free fields located in Bryan, Grady, and Love counties.

Table 7. Reaction of peanut germ plasm from Peru and Ecuador to Sclerotinia blight at the Caddo Research Station, 2001.

	Number of plots in each hit category								
No. of plot entries	0	1	2	3-5	6-10	11-15	16-20	21-25	26-30
Okrun (16)	0	0	0	0	1	1	0	5	9
Germ plasm (372)	51	40	56	118	66	20	9	8	3

Management of insect and disease incidence in peanuts

Phillip G. Mulder, Ken E. Jackson, and Kelly Seuhs
Department of Entomology and Plant Pathology

2001 progress made possible through OPC support

- In 2001, extremely low populations of thrips and subsequent infection in peanuts with TSWV suggested that harsh winter conditions are probably a major factor limiting the spread of this plant disease and/or its vector in Oklahoma.
- Even with equal or higher insect (thrips) populations, a variety of peanut resistant to TSWV (Tamrun 96) had a lower incidence and severity rating for the disease than a susceptible variety (Tamrun 98). This result was consistent over two years of study (1999 and 2000).
- In three years of study, insecticides targeted at controlling thrips had no effect on incidence or severity of TSWV.
- No consistent differences in populations of thrips, among the various treatments, at three locations were observed. Overall, populations of thrips were down in three separate trials located in Burneyville, Ft. Cobb, and Martha, Oklahoma.
- For the third year in a row, Tamrun 96 provided significantly greater peanut yields than did Tamrun 98.
- A study conducted on Spanish peanuts to assess the various miticides, used alone or in combination with user-friendly enhancement products, found a significant advantage to use of Kelthane over Comite or Capture. The addition of Naturalis-L contributed further to control and yield differences obtained with Kelthane.

Thrips management and Tomato Spotted Wilt Virus

Since the introduction of Tomato Spotted Wilt Virus (TSWV) into Oklahoma in 1989, we have begun the task of evaluating how the use of insecticides and plants resistant to disease can be manipulated to curb the encroachment of TSWV into the state. If managing the vector (thrips) by using insecticides can help in holding down the disease incidence then these products may ultimately help in controlling the onslaught of this disease.

Results of the 2001 TSWV trial at the Noble Foundation Red River Farm in Burneyville, OK, are presented in Tables 1-5. In addition, a summary of the results from 1999, 2000, and 2001 on variety performance and insecticide efficacy are presented in

Tables 2 and 4, respectively. In the 2001 trials, runner type peanuts of two varieties were planted in 36-inch rows on June 6 at the Red River Research Farm. In-furrow insecticides were applied after planting using a hand-powered Precision Granular Applicator in a 7-inch band, calibrated to deliver the prescribed amount of insecticide over the open furrow. The furrow was then covered by hand, using a garden hoe. The Orthene hopperbox treatment was premeasured according to seeding rate and applied with the seed using a precision cone planter. The post-emergent application of Orthene was applied after 90 percent emergence on June 21 using a CO_2 wheelbarrow plot sprayer.

Tables 1 and 2 present the results of the analysis conducted across the two varieties. These varieties were chosen on the basis of their resistance. Tamrun 96 is resistant to TSWV, while Tamrun 98 is considered susceptible to the disease. Thrips populations were not significantly different between the two varieties throughout the test (Table 1). These results varied somewhat from previous years, with only slightly higher thrips populations in the Tamrun 96 plants in 1999 and 2000. In the first two years, while the thrips populations were sometimes higher in Tamrun 96 than in Tamrun 98, the incidence and severity of TSWV was consistently and significantly higher in Tamrun 98 (Table 2). No TSWV

Table 1. Effect of variety selection on thrips populations, Noble Foundation Red River Farm, Burneyville, OK, 2001.

	Thrips Population[1]							
	4 DAT[2]		7 DAT		14 DAT		21 DAT	
Variety	Adults	Larvae	Adults	Larvae	Adults	Larvae	Adults	Larvae
Tamrun 96	3.3 a[3]	12.7 a	1.2 a	6.1 a	1.7 a	5.1 a	2.1 a	1.3 a
Tamrun 98	2.6 a	14.1 a	1.4 a	11.2 a	2.6 a	5.3 a	1.4 a	1.1 a

[1] Thrips population based on a sample of 5 leaves/plot.
[2] DAT = Days after treatment.
[3] Means, within column, followed by the same letter are not significantly different (P=0.05, LSD).

Table 2. Effect of variety selection on incidence and severity of TSWV (1999 and 2000) and peanut yield, Burneyville, OK, 1999, 2000, 2001.[1]

Variety	TSWV % Incidence[2]		TSWV % Severity[3]		Yield (lbs/A)		
	1999	2000	1999	2000	1999	2000	2001
Tamrun 96	9.8a	3.7a	0.7a	0.0a	2476 a	3723 a	3957 a
Tamrun 98	30.5b	31.0b	6.1b	2.1b	1612 b	3162 b	3423 b

[1] Means, within column, followed by the same letter are not significantly different (P=0.05, LSD).
[2] %TSWV incidence = Percent of plants showing TSWV symptoms.
[3] %TSWV severity = Percent of plants showing stunting and wilting caused by TSWV infection.

was discovered in this area in 2001, likely attributable to the harsh winter weather. In all three years, yields were significantly greater for Tamrun 96 (Table 2).

Tables 3 and 4 present the results of the analysis conducted across the various insecticide treatments for 2001. Initially, no differences in thrips populations were detected between treated and untreated peanuts (Table 3). Some minor differences appeared 7 days after the post emergence treatment, but these are certainly not alarming since overall thrips populations were extremely low. In 1999 and 2000, none of the peanuts receiving an insecticide experienced lower incidence or severity of TSWV (Table 4). Likewise, in the three years, all of the peanuts treated with insecticide had yields similar to the untreated plants (Table 4). Peanut grade and value per acre are reflected in Table 5. Little value

Table 3. Effect of insecticides on thrips populations, Noble Foundation Red River Farm, Burneyville, OK, 2001.[1]

	Thrips Population[2]							
	4 DAT[3]		7 DAT		14 DAT		21 DAT	
Treatment/Rate (a.i./A)[4]	Adults	Larvae	Adults	Larvae	Adults	Larvae	Adults	Larvae
Temik 15G/1.0 lb	1.6 a	5.9 a	0.4 a	0.5 a	1.5 a	1.5 a	0.9 a	2.4 a
Orthene HB/0.19 lb	4.5 a	1.4 a	1.4 abc	1.1 a	1.6 a	4.6 a	2.6 a	0.2 a
Thimet 20G/1.0 lb	2.6 a	9.0 a	1.6 bc	7.9 ab	3.0 a	1.3 a	1.8 a	0.8 a
Orthene 75S/0.5 lb	2.3 a	10.8 a	0.8 ab	15.8 b	2.8 a	1.3 a	1.1 a	1.8 a
Untreated	3.8 a	25.4 a	2.1 c	17.8 b	2.3 a	6.5 a	2.4 a	0.9 a

1 Means, within columns, followed by the same letter are not significantly different (P=0.05; LSD).
2 Thrips populations based on a sample of 5 leaves/plot.
3 DAT = Days after treatment.
4 Temik and Thimet were used at plant, in furrow. Orthene HB was used at plant, in the hopperbox and Orthene 75S was used as a postemergence spray.

Table 4. Effect of insecticides on incidence/severity of TSWV (1999, 2000) and peanut yields (1999, 2000, and 2001), Burneyville, OK.[1]

	TSWV % Incidence[2]		TSWV % Severity[3]		Yield (lbs/A)		
Treatment/Rate (a.i./A)[4]	1999	2000	1999	2000	1999	2000	2001
Temik 15G/1.0 lb	18.9a	22.0a	3.7a	1.0a	2142a	3680a	3920 a
Orthene HB/0.19 lb	—	20.4a	—	0.9a	—	3521a	3689 a
Thimet 20G/1.0 lb	19.2a	13.3a	3.1a	1.0a	2173a	3544a	3635 a
Orthene 75S/0.5 lb	22.8a	18.3a	4.2a	0.9a	1969a	3086a	3712 a
Untreated	18.9a	12.6a	3.7a	1.5a	1978a	3380a	3494 a

1 Means, within columns, followed by the same letter are not significantly different (P=0.05, LSD).
2 % Incidence = percent of plants showing TSWV symptoms.
3 % Severity = percent of plants showing stunting and wilting caused by TSWV infection.
4 Temik and Thimet were used at plant, in furrow. Orthene HB was used at plant, in the hopperbox and Orthene 75S was used as a postemergence spray.

was obtained from the use of insecticides and in fact, untreated peanuts had the highest overall grade.

Based on three years of study, it appears that the incidence of TSWV in Oklahoma remains relatively low and occurs later in the season, making expression of the disease on the plant less severe. In addition, it appears that harsh winter weather may have a profound effect on the incidence of TSWV or survivability of the thrips vector. Based on the two years when TSWV was prevalent, the use of an at-plant, hopperbox or post-emergent insecticide to control thrips was ineffective at reducing disease incidence or increasing yields (Tables 3 and 4). Higher yields obtained from Tamrun 98 (Table 2) are, in part, due to resistance to TSWV, but may also be a product of its superior agronomic qualities that appear consistently in many tests conducted across the state. All of these relationships may have changed had the populations of thrips been greater or the disease incidence been sooner and greater.

Thrips management in areas unaffected by TSWV

Tables 6 through 9 present results of insecticide management of thrips in two areas of Oklahoma not affected by TSWV. Tests conducted on the Caddo Research Station at Ft. Cobb, Oklahoma, using conventional insecticides often chosen by growers, showed few differences in levels of thrips control (Table 6). In addition, only one insecticide treatment (F0570) provided significantly greater yields than any other treatment (Orthene hopperbox), otherwise no differences in yields were obtained (Table 6). In Martha, Oklahoma, similar results were obtained with few differences in thrips populations between treated and untreated peanuts (Table 8). A comparison of the grades and values for these treatments showed slightly higher grades in treated peanuts than in untreated peanuts in Ft. Cobb (Table 7); however, these higher grades were not evident in Martha (Table 9). Based on yield analysis results of these treatments and comparing the economic

Table 5. Effect of insecticides applied for thrips control on peanut grade and value per acre, TSWV study, Noble Foundation Red River Farm, Burneyville, 2001.

	2001 Grade (SMK + SS)			Dollar Value per Acre		
Treatment/Rate (a.i./A)[1]	Tamrun 96	Tamrun 98	Average	Tamrun 96	Tamrun 98	Average
Temik 15G/1.0 lb	63	63	63	1154	993	1074
Orthene HB/0.19 lb	63	61	62	1077	925	1001
Thimet 20G/1.0 lb	63	63	63	1068	936	1002
Orthene 75S/0.5 lb	62	63	63	1021	1004	1012
Untreated	65	64	65	1130	838	984
Average	63	63		1090	939	

[1] Temik and Thimet were used at plant, in furrow. Orthene HB was used at plant, in the hopperbox and Orthene 75S was used as a postemergence spray.

returns after adjusting for grade, value, and cost of control, none of these treatments represent a reasonable investment risk (Tables 7 and 9). In fact, in trials conducted in Martha, untreated peanuts provided the highest yield (nonsignficant) and values over any of the treated plants. This is indicative of many studies conducted on thrips management in Oklahoma. The inconsistencies associated with many at-plant and/or prophylactic treatments for thrips control, cast an unreliable shadow on the yearly benefits often given these products.

Table 6. Effect of insecticides on thrips populations and peanut yields, Ft. Cobb, OK, 2001.

	Thrips Populations[1]				
Treatment/Rate (a.i./A)[2]	3 DAT	7 DAT	14 DAT	21 DAT	Yield (lbs/A)
Temik (1.0 lb)	0.3 a[3]	0.5 a	0.8 a	2.0 a	3734.4 ab
Temik (0.6 lb)	3.5 a	0.5 a	5.3 bc	1.0 a	3752.5 ab
Thimet (1.0 lb)	4.8 a	3.0 b	7.3 b	1.3 a	3856.9 ab
Orthene HB (0.19 lb)	1.5 a	1.0 a	3.8 abc	2.8 a	3580.0 b
F0570 (0.007 lb)	1.0 a	0.5 a	2.8 ac	1.5 a	4002.1 a
Orthene 75S (0.5 lb)	2.3 a	1.0 a	3.6 abc	3.0 a	3679.9 ab
F0570 (0.010 lb)	1.3 a	1.0 a	2.5 ac	3.5 a	3906.6 ab
Untreated	8.8 b	4.0 b	4.8 abc	2.3 a	3693.4 ab

[1] Thrips populations based on a sample of 5 leaves/plot.
[2] Temik, Thimet, and Orthene HB were at-plant treatments placed in furrow. Orthene 75S and F0570 were postemergence treatments made on 6-8-01.
[3] Means, within columns, followed by the same letter are not significantly different (P=0.05; LSD).

Table 7. Effect of thrips insecticides on peanut yield, grade, and value, Ft. Cobb, OK, 2001.

Treatment/Rate (a.i./A)[1]	Mean Yield	Mean Grade (% TSMK)	Mean Value ($/A)	Cost ($/A)[2]	Return ($/A)[3]
Temik (1.0 lb)	3734.4 ab[4]	69	1093.36	24	1069.36
Temik (0.6 lb)	3752.5 ab	67.5	1073.84	14	1059.84
Thimet (1.0 lb)	3856.9 ab	69.5	1139.78	11	1128.78
Orthene HB (0.19 lb)	3580.0 b	68.5	1040.31	3	1037.31
F0570 (0.007 lb)	4002.1 a	68.5	1162.71	—	—
Orthene 75S (0.5 lb)	3679.9 ab	69	1079.71	10	1069.71
F0570 (0.010 lb)	3906.6 ab	68.5	1137.56	—	—
Untreated	3693.4 ab	66.5	1046.11	0	1046.11

[1] Temik, Thimet, and Orthene HB were at-plant treatments placed in furrow. Orthene 75S and F0570 were postemergence treatments made on 6-8-01.
[2] Treatment costs = cost of insecticide only for at-plant applications (Temik, Thimet, Orthene HB, Orthene I); for Orthene postemergence application, cost = insecticide cost ($7.00) + application cost($3.00).
[3] Partial return = (crop value) - (treatment costs).
[4] Means, within columns, followed by the same letter are not significantly different (P=0.05; LSD).

Miticide evaluation studies

Table 10 summarizes the results of an efficacy trial conducted to evaluate performance of various miticide products in Spanish peanuts. A field of Spanish peanuts was planted at the Perkins Research Station on May 10. Plots were four rows, 36 inches apart, 25 feet long, and replicated four times. After peanuts are established and pod set was initiated, the plants received water every other week and a soil insecticide (Lorsban 15G) was applied once. Also, two additional applications of insecticides (Orthene 75S and Asana XL) were made, all in an effort to increase mite populations. By mid-August, mite populations were clearly noticeable throughout the treatment area and were relatively uniform in their distribution. Products evaluated in this trial included material that growers presently use and other materials that are considered possible alternatives and/or enhancers. Application was made using a CO_2 wheelbarrow plot sprayer calibrated to deliver 20 gallons per acre. Evaluations were conducted 3, 7, and 14 days after treatment by randomly selecting 5 leaves per plot and examining an area of 2.5 cm^2 under a 10X hand lens.

Results from this trial showed the best levels of control with Kelthane and Kelthane + Naturalis-L (Table 10). This was particularly evident 7 and 14 days after treatment. In addition, these differences in efficacy carried over to greater yields in two of the three treatments containing Kelthane (Table 10). Comite, Capture, Naturalis-L, and Stirrup-M are presently labeled for use on peanuts while Kelthane is not. With the exception of the Kelthane + Naturalis-L combination, the addition of the "enhancers" (Naturalis-L, Stirrup-M) did not appear to increase the efficacy of any of the products evaluated in this trial (Table 10).

Naturalis-L is a fungal biopesticide that should show some promise in controlling mites. Stirrup-M is a behavior-modifying chemical that is supposed to increase mite searching capacity. The hope for this latter material lies in the tank-mix combination with a more toxic component. In light of the type of conditions these materials were evaluated under, it would be unfair to suggest that they may not have a place in further trials or in management of other organisms in peanuts.

Table 8. Effect of insecticides on thrips populations and peanut yields, Martha, OK, 2001.

Treatment/Rate (a.i./A)[1]	3 DAT	7 DAT	14 DAT	21 DAT	Yield (lbs/A)
Temik (1.0 lb)	8.3 a[2]	0.5 a	0.3 a	1.0 a	4319.5 a
Thimet (1.0 lb)	20.3 bc	1.5 a	0.8 a	2.8 a	4483.0 a
Orthene 75S-HB (0.19 lb)	14.3 ac	0.3 a	0.8 a	1.3 a	4283.4 a
Orthene 75S-I (0.33 lb)	25.8 c	1.0 a	0.8 a	1.3 a	4564.7 a
Orthene 75S-P (0.5 lb)	13.3 ac	2.0 a	0.5 a	0.8 a	4355.9 a
Untreated	17.3 abc	5.8 b	3.0 a	2.5 a	4567.0 a

[1] Temik, Thimet, and Orthene 75S-HB were at-plant treatments placed in furrow. Orthene75S-I was an at-plant treatment injected into the furrow and Orthene 75S-P was a postemergence treatment made on 5-28-01.

[2] Means, within columns, followed by the same letter are not significantly different (P=0.05; LSD).

Table 9. Effect of thrips insecticides on peanut yield, grade, and value, Martha, OK, 2001.

Treatment/Rate (a.i./A)[1]	Mean Yield	Mean Grade (% TSMK)	Mean Value ($/A)	Cost ($/A)[2]	Return ($/A)[3]
Temik (1.0 lb)	4319.5 a[4]	69	1267.01	24	1243.01
Thimet (1.0 lb)	4483.0 a	70.5	1351.35	11	1340.35
Orthene 75S-HB (0.19 lb)	4283.4 a	72	1311.28	3	1308.28
Orthene 75S-I (0.33 lb)	4564.7 a	70	1361.18	4.62	1356.56
Orthene 75S-P (0.5 lb)	4355.9 a	71	1316.54	10	1306.54
Untreated	4567.0 a	71	1381.79	0	1381.79

[1] Temik, Thimet, and Orthene 75S-HB were at-plant treatments placed in furrow. Orthene75S-I was an at-plant treatment injected into the furrow and Orthene 75S-P was a postemergence treatment made on 5-28-01.
[2] Treatment costs = cost of insecticide only for at-plant applications (Temik, Thimet, Orthene HB, Orthene I); for Orthene postemergence application, cost = insecticide cost ($7.00) + application ($3.00).
[3] Partial return = (crop value) - (treatment costs).
[4] Means, within columns, followed by the same letter are not significantly different (P=0.05; LSD).

Table 10. Effect of miticides on mite populations (2.5 cm^2) in runner peanuts, Perkins, OK, 2001.

	Mean No. Mites/2.5 cm^2			
Treatment (Rate-actual chemical/A)	3 DAT	7 DAT	14 DAT	Yield (lbs/A)
Capture 2E (5.12 oz.)	15.5 a[1]	19.8 ab	14.3 abc	1611.7 cd
Comite (2.0 pts)	8.3 a	14.5 b	11.5 abc	1865.8 bc
Kelthane MF (1.5 pts)	2.5 a	3.3 b	3.5 c	1923.9 ab
Capture 2E (5.12 oz.) + Naturalis-L (10 oz.)	10.8 a	18.0 ab	9.8 abc	1691.6 bcd
Comite (2.0 pts) + Naturalis-L (10 oz.)	13.0 a	11.8 b	13.8 abc	1495.6 d
Kelthane MF (1.5 pts) + Naturalis-L (10 oz.)	6.3 a	3.5 b	4.8 bc	2185.3 a
Capture 2E (5.12 oz.) + Stirrup-M (2 oz.)	10.8 a	20.5 ab	17.5 a	1691.6 bcd
Comite (2.0 pts) + Stirrup-M (2 oz.)	7.0 a	16.8 ab	16.8 ab	1807.7 bc
Kelthane MF (1.5 pts) + Stirrup-M (2 oz.)	5.5 a	18.0 ab	11.3 abc	1669.8 bcd
Untreated	16.5 a	36.5 a	20.5 a	1822.3 bc

[1] Means, within columns, followed by the same letter are not significantly different (P=0.05, LSD).

Peanut Breeding

Kenton Dashiell, Niels Maness, Tom Stevens, and Bruce Greenhagen
OSU Department of Plant and Soil Sciences

2001 progress made possible through OPC support

- Southwest High Oleic Peanut Program (SWHOPP) proposed one Spanish and one runner breeding line for release.
- Several high yielding breeding lines with the high oleic acid trait were identified.

The major objectives of the peanut breeding project are to develop high yielding, early maturing peanut cultivars with resistance to Sclerotinia blight and improved post harvest quality characteristics for Oklahoma. Emphasis is on the development of runner and Spanish market types.

During the 2001 growing season, several peanut breeding trials were conducted at the Caddo Research Station near Ft. Cobb, Oklahoma, and a summary of these experiments is presented in this report.

The Uniform Peanut Performance Test (UPPT) had 13 breeding lines and 5 varieties developed by the major peanut breeding projects in the USA. The results of the best breeding lines and check varieties are presented in Table X. The recently released Virginia market type variety, Jupiter, gave the highest gross return and the next two highest were runner breeding lines TX 977006 and TX 977053. These two breeding lines were developed and evaluated by a program titled Southwest High Oleic Peanut Program (SWHOPP) that is funded by the Texas Peanut Producers Board and the Oklahoma Peanut Commission. The organizations that conduct the research for SWHOPP are the Texas Agricultural Experiment Station (TAES), Oklahoma Agricultural Experiment Station (OAES), and United States Department of Agriculture, Agricultural Research Service (USDA-ARS). During 2001, the release of TX 977006 was proposed and seed should be available for production in Oklahoma for the 2003 crop. If this breeding line is approved for release the proposed name is Tamrun OL 01. TX 977053 will be proposed for release during 2002.

An improved characteristic that TX 977006 and TX977053 have is called “high oleic.” This trait gives roasted peanut products a much longer shelf life and also has some additional health benefits for consumers when compared to peanuts that do not have the high oleic trait. There are indications from the peanut processing industry that they prefer high oleic peanuts for most of their products and in a few years they may only purchase peanuts with the high oleic trait. If all peanut farmers in Oklahoma and Texas grow high oleic peanuts this should benefit the entire peanut industry in the Southwest because we will be producing a higher quality peanut and thus improved peanut products.

In Table 1 and other tables the column with the heading O/L Ratio refers to the ratio of oleic acid to linoleic acid. Higher values

indicate that the peanut breeding line or variety has more oleic acid and thus a longer shelf life and more health benefits for consumers. Incorporating this high oleic trait into breeding lines that will be considered for release in Oklahoma is a high priority of the peanut breeding project. In addition to TX 977006 and TX 977053 the only other entry that combined a high gross return and high oleic acid was UF 98511.

The top five entries for gross return in this trial were all developed in Oklahoma or Texas. This reinforces the need for Texas and Oklahoma peanut breeding projects to work together for the benefit of peanut producers in the Southwest. There were also some relatively good entries from Georgia (GA 962569 and GA 962533) and Florida (UF 98511), which indicates that efforts to exchange breeding lines with these peanut breeding projects could benefit Oklahoma.

The Advanced Runner Peanut Performance Test (ARPPT) had 15 breeding lines and 5 varieties that had high gross returns in trials conducted at Ft. Cobb during 1999 and 2000. Any breeding line that continued to perform well in this trial should be considered for release and subjected to extensive testing during 2002. Results for three of the varieties and the seven breeding lines with the highest gross return are presented in Table 2. Three of the breeding lines 8-4-003, NC 7 X VGB 9 94-2, and UF 98511 had higher gross returns than any of the check varieties. Four of the best breeding lines UF 98511, TX 966151, TX 977053, and TX 977006 have high oleic acid as indicated by the O/L ratio.

Six of the breeding lines performed well in both the UPPT and the ARPPT. The gross return per acre for each these six breeding lines and the three varieties, when

Table 1. Uniform Peanut Performance Test – Caddo County, 2001.

Entry	Yield (lb/A)	Grade (% TSMK)	O/L Ratio[1]	Seed Weight g/100 seed	Gross Return $/acre	State[2]
Jupiter	4906	65.4	1.5	80.4	1373	OK
TX 977006	4739	67.4	15.1	66.1	1369	TX & OK
TX 977053	4533	64.2	19.2	59.0	1251	TX & OK
Tamrun 96	4280	67.9	1.5	54.8	1247	TX
NC 7 X VGP 9 94-4	4104	69.2	0.8	53.9	1216	OK
GA 962569	4427	63.7	1.3	68.2	1208	GA
8-4-010	3983	70.2	1.3	55.1	1200	OK
GA 962533	4134	67.0	1.8	58.2	1187	GA
UF 97102	4275	63.1	1.3	57.3	1160	FL
NC 7 X VGP 9 94-2	3907	68.9	0.7	55.9	1153	OK
8-4-003	3857	68.3	1.4	57.5	1131	OK
UF 98511	3711	70.4	22.2	57.7	1121	FL
Okrun	3847	66.6	1.3	55.1	1099	OK
Florunner	3716	63.1	1.6	55.2	1007	FL
NC 7	3524	63.8	1.1	78.2	963	NC
LSD 0.05	565	4.3		4.3		

[1] Ratio of oleic acid to linoleic acid.
[2] State where the entry was developed.

averaged over their performance in the UPPT and the ARPPT was :

TX 977006	$1036
NC 7 X VGP 9 94-2	$980
TX 977053	$979
8-4-003	$972
UF 98511	$946
Okrun	$922
8-4-010	$913
Tamrun 96	$903
Florunner	$829

The University of Florida has a peanut breeding project at their North Florida Research and Education Center and they have been working to develop high yielding, early maturing runner peanuts with the high oleic acid trait for at least 15 years. The peanut breeder sent us 18 of his best breeding lines and they were evaluated in the Florida Peanut Performance Test with seven check varieties (Table 3). Two of the breeding lines from Florida, UF 00627 and UF 99621, looked very good for all the characters evaluated and will be in several trials during 2002.

One of the activities of the SWHOPP during 2001 was to evaluate the performance of some of the best breeding lines that are being developed by the peanut breeding team in Texas. The testing of peanut breeding lines that were developed in Texas at an Oklahoma location is beneficial to peanut producers in both states because the breeding lines can be tested in a more diverse set of locations and environments in less time. This will help the SWHOPP to quickly identify the best breeding lines for the peanut producers in the Southwest US.

Four Peanut Performance Tests were conducted that included seeds from peanut breeding lines sent from Texas. The four trials were the Texas Advanced Lines, Texas Runner O/L, Texas Spanish O/L #1 and Texas Spanish O/L #2. Each of these trials had some excellent breeding lines that will be tested again in 2002. For example, in the Texas Spanish O/L #2 trial there were 18 breeding lines and two check varieties. Table 4 shows the results for the six best breeding lines and the two check varieties. Results for O/L ratio are not

Table 2. Advanced Runner Peanut Performance Test – Caddo County, 2001.

Entry	Yield lb/acre	Grade % TSMK	O/L Ratio[1]	Seed Weight g/100 seed	Gross Return $/acre	State[2]
8-4-003	2839	66.5	1.4	51.3	813	OK
NC 7 X VGP 9 94-2	2702	69.6	0.7	53.7	807	OK
UF 98511	2597	69.1	22.2	55.6	770	FL
Okrun	2607	66.3	1.3	53.0	744	OK
TX 966151	2534	67.4	14.1	52.3	734	TX & OK
TX 977053	2566	64.0	19.2	56.3	707	TX & OK
TX 977006	2455	66.7	15.1	62.1	703	TX & OK
Florunner	2289	66.2	1.6	57.4	651	FL
8-4-010	2244	64.8	1.3	50.1	625	OK
Tamrun 96	2002	62.8	1.5	50.8	532	TX
LSD 0.05	494	3.8		5.4		

[1] Ratio of oleic acid to linoleic acid.
[2] State where the entry was developed.

presented in the Table 4, but all of the breeding lines have high oleic acid and the two check varieties have low oleic acid. During 2001, the release of TX 962120 was proposed and seed should be available for production in Oklahoma for the 2003 crop. If this breeding line is approved for release the proposed name is OLin. There were three breeding lines that had higher gross returns than the check varieties, Spanco, Tamspan 90, and TX 962120 and they will be tested again in 2002. TX 996621 also performed very well in a trial conducted by the USDA Peanut Pathologist at Ft. Cobb. If it continues to perform well we may propose it for release during 2003.

There were seven Preliminary Peanut Performance Trials. The breeding lines in these trials were being tested in replicated trials for yield, grade, O/L ratio, seed weight, and gross return the first time. There were a total of 113 breeding lines evaluated and 17 of them performed very well and will be tested in Intermediate Peanut Performance Trials in 2002.

Three other Peanut Performance Trials were conducted during 2001. They were titled Intermediate Runner, Intermediate Spanish, and Advanced Virginia. Only the best few breeding lines from each of these trials will be retained for further testing in 2002 and the others will be discarded.

Segregating populations in the F2 through F6 generations were evaluated and large percentages of plants were discarded because of their poor plant vigor, poor pod production, small pod size, or pod rot. Only plants with good plant vigor and good pod production were retained.

In summary, the 2001 growing season was a productive one for the peanut breeding project. Several breeding lines have been identified that have superior performance for gross return and post harvest quality characteristics when compared to varieties that are presently grown by peanut producers in Oklahoma. However, as is expected, the vast majority of the breeding lines tested in replicated trials and individual plants observed in segregated populations had some weakness and were discarded.

With the strong support that the peanut breeding project receives from OSU, USDA, agronomy, pathology, entomology, oilseed chemistry, human nutrition, and biochemistry; along with the strong collaborative programs with Texas and Florida there is a great optimism that we will be releasing on average one new peanut variety a year for the Oklahoma peanut producers.

Table 3. Florida peanut performance test – Caddo County, 2001.

Entry	Yield lb/acre	Grade % TSMK	O/L Ratio[1]	Seed Weight g/100 seed	Gross Return $/acre
UF 00627	2612	73.3	29.5	56.3	822
UF 99621	2561	74.4	22.8	59.7	816
UF 98604	2279	72.5	20.6	62.4	708
Spanco	2228	71.2	1.2	51.0	677
UF 00618	2017	72.0	22.9	60.2	623
Sunoleic	2097	69.1	12.6	55.8	623
UF 97611	1976	71.7	18.0	59.5	608
Southwest Runner	1906	63.9	1.1	47.8	524
Tamrun 96	1744	65.9	1.5	59.5	494
Okrun	1734	70.3	1.3	56.4	524
LSD 0.05	412	6.6[2]		4.7	

[1] Ratio of oleic acid to linoleic acid.
[2] Probability of a greater F was 0.06.

Table 4. Texas Spanish O/L #2 peanut performance test – Caddo County, 2001.

Entry	Yield lb/acre	Grade % TSMK	Seed Weight g/100 seed	Gross Return $/acre
TX 996612	2360	61.6	46.3	620
TX 991959	2095	65.5	49.8	586
TX 996784	2095	65.4	49.2	585
TX 008006	1928	65.9	46.0	544
TX 008003	1807	65.4	43.8	505
TX 962120	1838	64.1	42.8	503
Spanco 1686	64.1	47.2	464	
Tamspan 90	1066	64.8	41.2	296
LSD 0.05	622	8.1	3.9	

Management of Sclerotinia blight and Verticillium wilt in peanuts

H. A. Melouk, USDA-ARS and
K. E. Jackson, Entomology and Plant Pathology

2001 progress made possible through OPC support

- Tamrun 96 and SW Runner had the least incidence of limb rot disease at the Weger and Noble Red River farms.
- Peanut lines TX 977006, TX 977053, and Tamrun 96 at Arthur Kell Farm near Chickasha yielded above two tons per acre.
- Peanut lines TX 977006, TX977053, and Tamrun 96 had comparable yields and were consistently near the top of each trial.
- Peanut line GA 942007 had the highest yield at Gary Weger Farm and had yields comparable to GA Green.
- Peanut line GA 942007 had the least incidence of Tomato Spotted Wilt Virus (TSWV).
- Peanut lines TX 977006, TX 977053, GA Green, and Tamrun 96 exhibited moderate resistance to TSWV.

Some of the objectives of this research are to study the biology of economically important peanut pathogens including Tomato Spotted Wilt Virus (TSWV), and to determine the role of disease resistance in managing soil-borne peanut pathogens, particularly Sclerotinia blight, Verticillium wilt, and Southern blight. In 2001, several studies were conducted to evaluate the performance of peanut lines, including the Sclerotinia-resistant advanced breeding lines (some with high O/L ratios), and fungal soil-borne pathogens under field conditions at three Oklahoma locations. Also, a study that was established in a field near Pearsall, Texas to evaluate the reaction of advanced breeding lines to TSWV.

Performance of advanced peanut breeding lines was evulated in field plots at Chickasha, Durant, and Burneyville in 2001:

Field plots were planted at Kell's farm near Chickasha in Grady County, Weger's farm near Durant in Bryan County, and the Noble Research Foundation Red River Farm near Burneyville in Love County on May 15, May 17, and June 6, 2001, respectively. The plots were harvested at Red River, Kell's,

and Weger's on October 18, October 23, and October 26, 2001, respectively. Eight peanut cultivars and breeding lines were used at each location. Each plot consisted of two 20-foot rows, 3-feet apart, with four replications. Plots at the Burneyville and Durant locations received Bravo/Folicur block treatment for management of early leaf spot and southern blight.

The incidence of foliar and soil-borne diseases at Kell's during the growing season was very low for meaningful evaluation, and therefore disease readings were not taken. Yield and grade at Kell's farm are presented in Table 1. Southern blight, limb rot, yield, and grade numbers at Weger and the Noble Red River Farm are presented in Tables 2 and 3, respectively.

Reaction of peanut lines to TSWV in field plots near Pearsall, Texas in 2001:

Field plots were planted near Pearsall, Texas on June 26, 2001. Eight peanut cultivars and breeding lines were included in this study. Each plot consisted of two 20-foot rows, 3-feet apart, with four replications. ELISA (an immunological diagnostic test for the presence of viruses) sampled leaves from the peanuts on July 30 to verify the presence of TSWV. Incidence of TSWV was recorded through the growing season. Table 4 shows TSWV incidence data in Pearsall, TX.

Table 1. Yield and grade of peanut lines, Arthur Kell Farm, Grady County, 2001.

Entry	Yield (lb/A)	Grade
GA Green	3775	71
Okrun	4011	72
Tamrun 96	4673	69
GA 942007	3684	67
TX 977006	4183	69
Tamrun 98	4029	68
TX 977053	4183	69
SW Runner	3847	65

Table 2. Performance of peanut lines, Gary Weger Farm, Bryan County, 2001.

Entry	Southern blight (%)	Limb Rot(%)	Yield (lb/A)	Grade
GA Green	11.9	4.1	5000	74
Okrun	7.5	5.3	4319	71
Tamrun 96	2.2	0.0	4818	68
GA 942007	2.5	3.4	5082	70
TX 977006	2.2	7.8	5018	69
Tamrun 98	1.6	1.0	4483	69
TX 977053	1.3	8.8	4601	66
SW Runner	0.3	0.0	4029	60

Table 3. Performance of peanut lines at the Noble Foundation farm, Burneyville, Love County, 2001.

Entry	Southern blight (%)	Limb Rot (%)	Yield (lb/A)	Grade
GA Green	5.0	28.4	3684	71
Okrun	3.1	15.3	3194	66
Tamrun 96	1.3	4.7	4075	62
GA 942007	0.3	19.7	3821	70
TX 977006	1.6	12.8	4211	65
Tamrun 98	3.1	11.9	2968	58
TX 977053	2.5	15.3	3884	63
SW Runner	0.3	2.5	3149	58

Table 4. Incidence of Tomato Spotted Wilt Virus on peanut lines at Pearsall, Texas, 2001.

Entry	Incidence of TSWV on			
	8-14-01	8-27-01	9-19-01	10-4-01
Okrun	2.0 ab[1]	6.8 b	15.8 a	39.3 abc
SW Runner	2.3 ab	4.8 bc	17.0 a	47.3 a
Tamrun 96	2.8 ab	7.3 b	6.5 a	25.5 cd
GA Green	2.0 ab	4.3 c	9.5 b	25.5 cd
Tamrun 98	1.0 b	7.0 b	15.0 a	44.5 ab
TX 977006	4.3 a	9.8 a	17.3 a	28.8 cd
TX 977053	2.0 ab	7.3 b	17.5 a	31.0 cd
GA 942007	1.8 ab	4.3 c	9.3 b	19.8 d

[1] Means, within column, followed by the same letter are not significantly different (P=0.05, LSD).

Results of applied research on peanuts – 2001

Ron Sholar and Jerald Nickels
Department of Plant and Soil Sciences

2001 progress made possible through OPC support

- In 6 variety tests conducted during 2001, runner peanut varieties averaged 873 lb/A and 4 percent Total Sound Mature Kernels higher than Spanish varieties. Tamrun 96 was the highest yielding variety tested for the sixth consecutive year.
- In Oklahoma peanut fields, Strongarm, a new broadleaf, soil applied herbicide, demonstrated excellent activity on a broad spectrum of troublesome weeds. Valor, another new soil applied herbicide, was also effective in controlling a broad spectrum of weeds and showed good crop safety in these tests.
- The long drought and low disease incidence masked benefits from both rotation and disease control. The highest yielding rotation in both Spanco and Okrun was one-year rotations of corn and peanuts.
- Inoculation tests showed that new inoculants consistently produced higher numerical yields, but rarely are the differences statistically significant. Grades were not affected by the treatments.
- A seeding rate test demonstrated that there is no difference in yields from varying seeding rates as long as an adequate amount of seed is planted.

Background:

The Oklahoma and US peanut continues to undergo changes. Rising production costs, disease problems, etc. have continued to result in a shift of peanuts from eastern Oklahoma to southwest Oklahoma. Five southwestern counties now account for 25 percent of Oklahoma's 80,000 acre peanut crop. Oklahoma's peanut acreage has dropped from 125,000 acres in 1980 to 85,000 acres in 2001 (Table 1). However, peanuts remain one of the few farm commodities offering acceptable potential for a positive return to growers. Profit margins are very narrow as costs of production have risen and prices paid to producers have remained as established by the 1996 Farm Bill. Growers must adopt innovative management strategies to remain competitive in the peanut industry. The following applied research was conducted to assist growers in remaining competitive in the peanut industry. The applied research in peanuts conducted by the Department of Plant and Soil Sciences focuses on the introduction and demonstration of new and appropriate technology for Oklahoma conditions. The objective is to assist growers in developing management strategies that will result in more economical production. The importance that the peanut industry has placed on delivery of a high quality product is also a focal point.

Weather was very unfavorable for much of the summer, until mid-August, the weather was much like the hot and dry conditions of 2000. As of August 1, very few pods had been set and prospects were poor. However, a break in the weather occurred around August 10 and the majority of the pods were set after that date. A long, warm fall allowed the crop to mature and the yields were much better than in 2000. Yields in 2001 averaged more than 2200 lb/A compared to only 1800 lb/A in 2000.

1. Variety testing

The purposes of the variety testing program are to evaluate the performance of new varieties and to compare that performance to varieties currently available. In 2001, variety tests were conducted in Caddo, Love, Hughes, Grady, Bryan, and Jackson counties (Tables 2 and 3). Sclerotinia blight was not a major problem at any of the locations in 2001.

Yields were good at all locations and were exceptionally high in Jackson, Bryan, and Caddo counties. Yields at other locations were about average. The Jackson County location has a short history of peanut production. This no doubt contributed to the extremely high yields. In this test, Tamrun 96 yielded 5608 lb/A.

Grades reflect the fact that the crop was set late and grades were lower than in some years. The highest grade obtained was 77 percent TSMK for OK 8-4-3 and OK 8-4-10, two experimental lines planted at the Grady County location.

The following varieties have demonstrated the best potential for being planted in Oklahoma.

Tamrun 96 – This variety was developed by Texas A&M University and was released in 1996. It continues to be the top performing variety in Oklahoma tests. It has resistance to Tomato Spotted Wilt Virus (TSWV), a disease that to date has resulted in relatively small problems in Oklahoma. However this disease is causing severe losses in the southeastern US and in some areas of Texas.

In 2000, this variety averaged 4010 lb/A at six locations and in 2001 it averaged 4260 lb/A at six locations. This variety tends to grade 1-2 percent lower than Okrun. It has consistently been the highest yielding variety in statewide tests conducted from 1997-2001. Tamrun 96 also has demonstrated some Sclerotinia blight resistance. As an example, in the 1998 test in Bryan County under Sclerotinia blight pressure, Tamrun 96 yielded 3872 lb/A compared to 2105 lb/A for Okrun.

Table 1. Peanut acreage, yield, and value.

Year	Acres Planted	Yield (lb/A)	Total Value (Millions $)
2001	85,000	2200	50
2000	84,800	1800	50
1999	85,400	2271	55
1998	89,200	2326	60.6
1997	94,200	2352	63
1996	98,400	2355	67.7
1995	103,400	2334	69.7

Georgia Green – It was released by the University of Georgia in 1998 and was first tested in the Oklahoma variety tests that year. The performance of this variety was good at all locations in 1998 and 1999. Georgia Green tends to mature a little earlier and grade a little higher than Tamrun 96. In 6 tests in 2000, Georgia Green averaged 3860 lb/A while Tamrun 96 averaged 4010 lb/A. In the same tests, Georgia Green averaged 71 percent TSMK and Tamrun 96 averaged 69 percent TSMK. In 6 tests in 2001, Georgia Green averaged 4125 lb/A while Tamrun 96 averaged 4260 lb/A. In the same tests, Georgia Green averaged 72 percent TSMK and Tamrun 96 averaged 69 percent TSMK.

Table 2. Peanut variety tests – 2001.

Average of Six Tests[1]

Variety	Market Type	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
Spanco	Sp	3449	66	982
Tamspan 90	Sp	3079	68	895
Okrun	Ru	3986	71	1220
Florunner	Ru	3845	70	1162
AT – 120	Ru	3767	71	1146
Tamrun 96	Ru	4511	69	1340
Georgia Green	Ru	4383	73	1372
Tamrun OL 01[2]	Ru	4448	71	1357
Tamrun 98	Ru	4019	70	1220

[1] Average of Six Counties (18 obs.) – Bryan, Caddo, Grady, Hughes, Jackson, and Love counties.
[2] Tamrun OL 01 was planted at 5 locations only. It was not planted in Caddo County due to seed shortage.

Table 3. Peanut variety tests – 2000 and 2001.

Average of Six Tests[1]

Variety	Market Type	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
Spanco	Sp	3314	67	965
Tamspan 90	Sp	2981	68	871
Okrun	Ru	3984	70	1223
Florunner	Ru	3869	70	1181
AT – 120	Ru	3611	69	1092
Tamrun 96	Ru	4260	69	1279
Georgia Green	Ru	4125	72	1287
Tamrun 98	Ru	3888	70	1186

[1] Average of Six Counties (18 obs.) – Bryan, Caddo, Grady, Hughes, Jackson, and Love counties.

2. Peanut Rotation Study – (Joint project with the Noble Foundation)

Peanuts are susceptible to a wide range of foliar and soil-borne diseases. Peanut fields rotated with other crops are generally less susceptible to foliar and soil-borne diseases, weed problems, and soil insects. Higher yields, grades, and gross returns are usually achieved if a rotation plan is followed. In 1991, a cooperative project was started with the Noble Foundation to demonstrate the benefits of rotating peanuts with corn, grain sorghum, and cotton compared to continuous peanuts. This project will be continued for several years.

General Results – A long-term rotation study was established in 1990 on land that had not been planted to peanuts in the previous 14 years. In 1990, plots were planted to either cotton, grain sorghum, corn, or peanuts. In the following years, they were planted with one of these crops according to a long-term crop rotation plan. In 2001, all systems were planted to peanuts.

Spanco Summary

Because of the dry weather of 2001, disease incidence was low and there was a small response to Folicur (Table 4). Further, after 12 years, yields in the continuous peanut plots were only slightly lower than the yields in the rotation treatments. It may be that in the absence of severe disease problems, rotation is not producing significant advantage over continuous peanuts.

Yields in Folicur treated plots averaged 269 lb/A (3714 vs. 3445) more than the average for Bravo alone treatments.

The highest yielding rotation was one-year rotations of corn and peanuts. Yields in this rotation treatment (with Folicur) was 3871 lb/A compared to 3674 lb/A for the continuous peanut treatment (with Folicur). This was a difference of 197 lb/A. Two years of corn followed by peanuts was only slightly better than continuous peanuts. Rotating with cotton had no advantage over continuous peanuts.

When rotation and Folicur were used in combination, the yield increase was 467 lb/A (3871 vs. 3404) compared to continuous peanuts and Bravo alone.

Okrun Summary

Because of the dry weather of 2001, disease incidence was low and there was a small response to Folicur (Table 5). Further, after 12 years, yields in the continuous peanut plots were only slightly lower than the yields in the rotation treatments. It may be that in the absence of severe disease problems, rotation is not producing significant advantage over continuous peanuts.

Yields in Folicur treated plots averaged 386 lb/A (3412 vs. 3026) more than the average for Bravo alone treatments.

The highest yielding rotation was one-year rotations of corn and peanuts. Yields in this rotation treatment (with Folicur) was 3610 lb/A compared to 3356 lb/A for the continuous peanut treatment (with Folicur). This was a difference of 254 lb/A. A rotation of two years of corn followed by peanuts was only slightly better than continuous peanuts. Rotating with cotton had no advantage over continuous peanuts.

When rotation and Folicur were used in combination, the yield increase was 449 lb/A (3610 vs. 3161) compared to continuous peanuts and Bravo alone.

Table 4. Peanut rotation test – 2001, Red River Farm, Burneyville, OK.

Yields for Spanco Test

Rotation System	Bravo Alone (lb/A)	Bravo + Folicur (lb/A)	Advantage of Bravo +Folicur over Bravo Alone (lb/A)
(1)P-P-P-P-P-P-P-P-P-P-P-P[1]	3404	3674	+270
(2)M-P-M-P-M-P-M-P-M-P-M-P	3541	3871	+330
(3)M-M-P-M-M-P-M-M-P-M-M-P	3351	3521	+170
(4)P-M-P-P-M-P-P-M-P-P-M-P	3619	3844	+225
(5)C-P-C-P-C-P-C-P-C-P-C-P	3353	3680	+327
(6)C-C-P-C-C-P-C-C-P-C-C-P	3403	3694	+291
Average	3445	3714 + 269(compared to Bravo Alone)	

[1] Test started in 1990. This code shows the crops that have been grown the 12 years of the test.
P = Peanuts M = Maize (Corn) C = Cotton S = Grain Sorghum

Soil Type - Minco fine sandy loam
Planted - June 5, 2001, 36 inch rows
Seeding Rate - 90 lb/A
Harvested - October 19, 2001

Table 5. Peanut rotation test – 2001, Red River Farm, Burneyville, OK.

Yields for Okrun Test

Rotation System	Bravo Alone (lb/A)	Bravo + Folicur (lb/A)	Advantage of Bravo +Folicur over Bravo Alone (lb/A)
(1)P-P-P-P-P-P-P-P-P-P-P-P[1]	3161	3356	195
(2)M-P-M-P-M-P-M-P-M-P-M-P	3147	3610	463
(3)M-M-P-M-M-P-M-M-P-M-M-P	2726	3464	738
(4)P-M-P-P-M-P-P-M-P-P-M-P	3093	3478	385
(5)C-P-C-P-C-P-C-P-C-P-C-P	2825	3150	325
(6)C-C-P-C-C-P-C-C-P-C-C-P	3203	3416	213
Average	3026	3412 + 386(compared to Bravo Alone)	

[1] Test started in 1990. This code shows the crops that have been grown the 12 years of the test.
P = Peanuts M = Maize (Corn) C = Cotton S = Grain Sorghum

Soil Type - Minco fine sandy loam
Planted - June 5, 2001, 36 inch rows
Seeding Rate - 90 lb/A
Harvested - October 19, 2001

3. Variety X herbicide test

Three herbicides were tested on four varieties at three locations in 2000 and 2001. The herbicides are listed in Table 6. The varieties were Okrun, Tamrun 96, AT 120, and Tamspan 90. The purpose of the test was to determine if the varieties would respond differentially to the herbicides.

It was determined all varieties tested had good tolerance to these herbicides. There were no differences in the way the varieties responded to the different herbicides and there would be no reason for growers to take extra precautions when using these herbicides.

Table 6. Variety X herbicide summary – 2000-2001.

Average of Three Tests

Herbicide	Observations	Yield (lb/A)	Grade (% TSMK)
Strongarm 84 WG 0.45 oz/A	72	4437	70
Valor 50 WP 3 oz/A	72	4492	70
Cadre 70 DF 1.44 oz/A	72	4445	70
Weed Free Hand Weeded	72	4478	70

Tests were conducted at:
Caddo Research Station, Caddo County
Matt Muller Farm, Jackson County
Gary Weger Farm, Bryan County

4. Peanut inoculation tests

The peanut tests were conducted on old peanut land and were irrigated (Tables 7, 8, and 9). Just as in 2000, beginning in June, we suffered through a summer-long drought and only irrigated crops produced any yields in the southwest during 2001. The Caddo County test at Ft. Cobb was irrigated with a side roll irrigation system, and the Jackson and Hughes counties tests were irrigated with center pivot systems.

Yields in Jackson and Caddo counties were good given the weather for the growing season.Yields were not statistically different for the inoculation treatments; however, in all but one case, yields for inoculation treatments were numerically higher than the untreated check. Grades were not affected by the treatments.

Table 7. Peanut inoculation test – 2001.
Caddo Research Station
Caddo County

Treatment	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
Untreated Control	4007	70	1203
Urbana-Rhizoflo/Granular Infurrow (5.5#/A)	4370	68	1283
Urbana-Mega Prep Seed Trt. 4/4 oz/100 lb seed	4528	67	1302
LSD 0.05	NS	NS	NS

[1] % TSMK = Percent Total Sound Mature Kernels

Planting Date – May 14, 2001
Variety – Tamrun 96
Digging Date – October 12, 2001
Growing Season – 151 Days

Table 8. Peanut inoculation test – 2001.
Matt Muller Farm
Jackson County

Treatment	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
Untreated Control	4969	72	1537
Urbana-Rhizoflo/Granular Infurrow (5.5#/A)	5406	72	1665
Urbana-Mega Prep Seed Trt. 4/4 oz/100 lb seed	4651	71	1421
LSD 0.05	NS	NS	NS

[1] % TSMK = Percent Total Sound Mature Kernels

Planting Date – May 8, 2001
Variety – Tamrun 96
Digging Date – November 26, 2001
Growing Season – 202 Days, Digging was delayed by dry weather, soil was too dry to dig

Table 9. Peanut inoculation test – 2001.
James Stafford Farm
Hughes County

Treatment	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
Untreated Control	2167	69	642
Urbana-Rhizoflo/Granular Infurrow (5.5#/A)	2345	69	697
Urbana-Mega Prep Seed Trt. 4/4 oz/100 lb seed	2394	68	704
LSD 0.05	NS	NS	NS

[1] % TSMK = Percent Total Sound Mature Kernels

Planting Date – May 24, 2001
Variety – Tamrun 96
Digging Date – October 31, 2001
Growing Season – 160 Days

5. Seeding rate test

Growers frequently plant excessive seed in an attempt to increase peanut yields. A seeding rate demonstration was conducted to demonstrate that there is little or no difference in yield results from varying seeding rates as long as an adequate amount of seed is planted (Tables 10 and 11). Previous research has indicated that seeding rates of 80-90 lbs/A will produce yields equal to yields from 100 lb/A or more. The results of this applied research confirmed what had been previously determined.

Table 10. Seeding rate test – 2000 and 2001.
Matt Muller Farm
Jackson County

Treatment	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
80 lb/A	5215	72	1620
90 lb/A	5571	73	1736
100 lb/A	5329	73	1670
LSD 0.05	NS	NS	NS

[1] % TSMK = Percent Total Sound Mature Kernels

Planting Date – April 27, 2000
Variety – Tamrun 96
Digging Date – October 5, 2000
Growing Season – 161 Days
Average Yield – 5434 lb/A

Table 11. Seeding rate test – 2001.
Matt Muller Farm
Jackson County

Treatment	Yield (lb/A)	Grade (%TSMK)[1]	Gross Return ($/A)
80 lb/A	5425	72	1560
90 lb/A	5633	72	1737
100 lb/A	5268	73	1646
LSD 0.05	NS	NS	NS

[1] % TSMK = Percent Total Sound Mature Kernels

Planting Date – May 8, 2001
Variety – Tamrun 96
Digging Date – November 26, 2001
Growing Season – 202 Days
Average Yield – 5309 lb/A

Appreciation is expressed for the cooperation and tremendous assistance from

OSU
Otis Bales
Zac Blumer
Caddo Research Station
Bobby Weidenmaier, Agriculturist
Mike Branties, Field Foreman
Jerry Howell, Field Assistant
Noble Foundation
Jim Johnson
Jerry Baker
Arthur Kell, Grady County
Matt Muller, Jackson County
Gary Weger, Bryan County
James Stafford, Hughes County

Field studies for the control of peanut diseases

John P. Damicone and Ken E. Jackson
Department of Entomology and Plant Pathology

2001 progress made possible through OPC support

- Tamspan 90 and the runner varieties Tamrun 96 and TX-006 produced the highest yields where Sclerotinia blight was severe.
- Omega, a new fungicide registered in 2001 for control of Sclerotinia blight, increased yields and partial returns ($/A) on all varieties except Tamspan 90.
- BAS 510, a new experimental fungicide that may be registered in 2003, provided good control of Sclerotinia blight and early leaf spot, but not Southern blight.
- New potential sources of resistance to Sclerotinia blight, which had little or no disease under heavy disease pressure, were identified among 745 germ plasm lines of the USDA "core collection" screened for the first time in 2001.
- Headline (formerly BAS 500), provided excellent control of early leaf spot on both 14- and 21-day schedules, and was effective against Southern blight.
- Stratego, a fungicide registered for use on peanuts in 2000, provided good control of early leaf spot, but was not effective against Southern blight.
- In southwestern Oklahoma where disease pressure was low, fungicide programs were not profitable, but the disease-resistant variety Tamrun 96 produced the highest yields.

Eighteen field trials were completed in 2001 that addressed the major peanut diseases faced by growers. Management strategies that were evaluated included chemical control, disease resistant varieties, biological control, and tillage. Efforts were made to develop and demonstrate a range of input levels for the disease management programs. Diseases studied included early leaf spot, pepper spot, Southern blight, Sclerotinia blight, limb rot, and pod rot. Excellent cooperation in these studies was provided by Ron Sholar and Jerald Nickels, Department of Plant and Soil Sciences; Phil Mulder, Department of Entomology and Plant Pathology; and Hassan Melouk, USDA/ARS in Stillwater. Appreciation is expressed to Gary Weger (Bryan County), and James Stafford (Hughes County), and Matt Meuller (Jackson County). These growers provided time and resources as on-farm cooperators for some of the trials. Also, the Samuel Roberts Noble Foundation is acknowledged for their cooperation and resources provided at the Red River Farm.

The studies on disease management in 2001 served several purposes. The first was to identify new and better ways of managing diseases. The second was to use the trial sites as demonstrations to show growers firsthand the benefits of disease management in peanut production. Trial sites in Bryan, Caddo, Jackson, and Hughes counties were showcased during annual fall field tours. Results are summarized in this report. In interpreting the results, small differences in treatment values should not be overemphasized. Least significant differences (LSD) values are shown at the bottom of most tables. Unless two values differ by at least the LSD value shown, little confidence can be placed in the superiority of one treatment or variety over another.

In 2001, weather generally did not favor disease development until temperatures cooled and rainfall was received in mid-August. Most of the state did not receive appreciable amounts of rain in July and early August. Foliar disease was minimal except in east central Oklahoma where severe disease development in some fields and trial sites was observed. Southern blight became a problem statewide in late August and September. Sclerotinia blight was first found in mid-August and increased with the cool temperatures that prevailed during September and October. Severe disease pressure occurred in several of the trials reported; thus valid comparisons could be made between treatments.

Sclerotinia blight

Sclerotinia blight remains a destructive disease in Oklahoma. It is prevalent in all areas of the state except in far southwestern Oklahoma. Trials focused on evaluating fungicides and disease resistant varieties, determining the response of specific varieties to fungicide programs, and screening peanut germ plasm to identify new sources of resistance.

At the Caddo Research Station, fungicide treatments applied to the susceptible variety Okrun were compared to untreated runner varieties and Tamspan 90, a resistant Spanish variety. Runner varieties included Tamrun 96 and Tamrun 98, which have shown moderate resistance and improved yields where Sclerotinia blight is a problem. Fungicide treatments included the registered fungicides Rovral, Omega, and Botran, which had been approved for use through Section 18 for several years prior to 2001.

Disease pressure was moderately severe in this trial (Table 1). Of the fungicide treatments, Omega applied twice at 1.0 or 1.5 pt/A were the only fungicide treatments that reduced Sclerotinia blight compared to the check (untreated Okrun) treatment. Among the varieties not treated with fungicide, Tamspan 90 showed excellent disease resistance while Tamrun 98 had an unusually high level of disease. Yield was increased above the Okrun check for all Omega treatments, and for the varieties Tamspan 90 and Tamrun 96. Yield increases using Omega and the resistant varieties exceeded 1000 lb/A compared to the Okrun check. Yield was not increased for the Rovral and Botran treatments or the Tamrun 98 variety. Because of the high costs for the fungicide treatments, return ($/A) was highest for Tamspan 90. Returns of more than $250/A above the Okrun check were achieved for Tamrun 96 and the Omega treatments. Results from this trial differed from previous years in that Omega was less effective than in previous trials and Tamspan 90 performed better in comparison to Tamrun 96 and Tamrun 98.

BAS 510 is an experimental fungicide that has been tested at the Caddo Research Station since 1998 for control of Sclerotinia blight under a secrecy agreement with its manufacturer. In previous trials, its performance has been similar to that of Omega. However, disease pressure in two of the three previous years has been low. In 2001, the effectiveness of BAS 510 for control of Sclerotinia blight was evaluated at the Caddo Research Station.

Pressure from Sclerotinia blight was severe in this trial as infection was near 100 percent and yields were below 2000 lb/A for the untreated check (Table 2). All fungicide programs reduced levels of disease compared to the control. BAS 510 applied 4 times, BAS 510 alternated with Omega, or Omega applied three times provided the best disease control. All treatments increased yield compared to the check. Yield increases ranged from 1300 lb/A for the BAS 510 applied twice to over 2300 lb/A for three-application Omega treatment. Treatments with Omega returned from $400/A to over $600/A over the cost of treatments. While yield responses for BAS 510 did not equal the high rate of Omega, the fungicide provided a similar level of disease control. BAS 510 may be registered for use on peanuts as soon as 2003. Foliar disease development was not a factor in this trial because plots were oversprayed with Tilt/Bravo. However, results from a foliar disease trial (Table 2) indicate that BAS 510 also controls early leaf spot. In addition, results from Virginia have shown that BAS 510 provides control of web blotch.

At the Caddo Research Station in 2001, promising runner varieties were grown with and without fungicide treatment for Sclerotinia blight. Varieties included Tamrun 96, Tamrun 98, Georgia Green, and TX-006. Tamrun 98 has previously shown the best resistance of the runner varieties, while Tamrun 96 is moderately resistant. Georgia Green has also shown moderate resistance. TX-006 is a new high-oleic breeding line from Texas A&M reported by the USDA-ARS Peanut Program in Stillwater to have resistance to Sclerotinia blight. These were compared to Okrun, a susceptible runner variety, and Tamspan 90, a resistant Spanish variety. Plots of each entry were left untreated, received a single application of Omega at 2 pt/A made on demand, or a preventive program consisting of two applications of Omega at 1.5 pt/A.

Levels of Sclerotinia blight were moderately severe in this trial (Table 3). Levels of disease in untreated check plots ranged from only 4 percent for Tamspan 90 to 76 percent for Okrun. Levels of disease on the runner varieties with moderate resistance to Sclerotinia blight were higher than previously observed. Tamrun 96 showed the best resistance having 40 percent less disease than Okrun. Tamrun 98 had an unexpectedly high level of disease. TX-006 was similar in disease reaction to Tamrun 98, while Georgia Green appeared similar to Okrun. However, increases in yield for check plots above the Okrun check ranged from 553 lb/A for Tamrun 98 to 1524 lb/A for Tamrun 96. Generally, Omega programs reduced disease on all varieties except Tamrun 98. It should be noted that disease levels were so low on Tamspan 90 that the significant reduction observed with Omega on this variety was not meaningful.

Spray programs with Omega increased yield for all varieties except Tamspan 90. Yield responses to Omega for the runner varieties ranged from about 800 lb/A for Tamrun 96 to 1450 lb/A for Okrun. Yields of more than 5000 lb/A were observed for TX-006 and Tamrun 96 following Omega treatment. Yield responses within any

Table 1. Control of Sclerotinia blight with fungicides or resistant varieties at the Caddo Research Station in 2000.

Variety-Treatment & rate/A (no. applications)	Sclerotinia blight (%)	Yield (lb/A)	Value ($/A)	Cost ($/A)[1]	Return ($/A)[2]
Okrun-Botran 75W 4 lb (2)	70	3042	903	94	809
Okrun-Rovral 4F 1 qt (3)	62	2890	860	160	700
Okrun-Omega 4F 1 pt (1)	37	3404 *	1038	48	990
Okrun-Omega 4F 1 pt (2)	29 *	3404 *	1091	96	995
Okrun-Omega 4F 1 pt (3)	34	3514 *	1119	144	975
Okrun-Omega 4F 1.5 pt (2)	21 *	3674 *	1137	141	996
Okrun-check	62	2360	723	0	723
Tamspan 90-check	4 *	3710 *	1099	0	1099
Tamrun 96-check	38	3369 *	998	0	998
Tamrun 98-check	61	2635	791	0	791
LSD (P=0.05)[3]	31	754			

[1] Treatment cost = cost of fungicides for Sclerotinia blight (Rovral=$50/qt, Botran=11.00/lb, Omega=$45/pt) + $3/A for application costs.
[2] Partial return = (crop value base don grade) - (treatment cost).
[3] Least significant difference.
* Values are significantly different from the untreated Okrun check at P=0.05.

Table 2. Control of Sclerotinia blight on Okrun peanuts with fungicides at the Caddo Research Station, 2001.

Treatment & rate/A (no. applications)	Sclerotinia blight (%)	Yield (lb/A)	Value ($/A)	Cost ($/A)[1]	Return ($/A)[2]
BAS 510 70WG 9 oz (2)	37 *	3057 *	931	?	?
BAS 510 70WG 9 oz (4)	21 *	3434 *	1043	?	?
Omega 4F 1 pt (2) plus BAS 510 70WG 9 oz (2)	20 *	3645 *	1099	?	?
Omega 4F 1 pt (2)	62 *	3347 *	1013	96	917
Omega 4F 1 pt (3)	10 *	4058 *	1271	144	1127
Rovral 4F 1 qt (3)	55 *	2650 *	803	160	643
check	92	1721	489	0	489
LSD (P=0.05)[3]	18	461			

[1] Treatment cost = cost of fungicides for Sclerotinia blight (Rovral=$50/qt, Omega=$45/pt) + $3/A for application costs.
[2] Partial return = (crop value based on grade) - (treatment cost).
[3] Least significant difference.
* Values are significantly different from the untreated check at P=0.05.
? Unknown at this time.

Table 3. Responses of peanut varieties to fungicide programs for control of Sclerotinia blight at the Caddo Research Station, 2001.

Treatment & Rate/A (no. applications)[1]	Okrun	Tamspan 90	Georgia Green	Tamrun 96	Tamrun 98	TX-006
			Disease incidence (%)			
Omega 4F 2 pt (1)	37 *	0 *	26 *	17 *	35	23 *
Omega 4F 1.5 pt (2)	40 *	1 *	20 *	14 *	27	20 *
check	76	4	70	46	62	62
LSD (P=0.05)[2]	17	2	17	12	NS	18
			Yield (lb/A)			
Omega 4F 2 pt (1)	4102 *	3984	4265	4964 *	4156 *	5127 *
Omega 4F 1.5 pt (2)	4238 *	3694	4646 *	5019 *	4492 *	5282 *
check	2623	3821	3648	4147	3176	3893
LSD (P=0.05)	628	NS	627	356	817	464
			Return ($/A) [3]			
Omega 4F 2 pt (1)	1168	1121	1236	1382	1158	1465
Omega 4F 1.5 pt (2)	1113	955	1307	1345	1202	1443
check	789	1123	1151	1211	908	1188

[1] Omega was applied once at 2 pt/A on demand (when symptoms first appeared) on August 27, and in a different treatment at 1.5 pt/A on July 26 and August 27.
[2] Least significant difference at P=0.05.
[3] Partial return = (crop value based on grade)-(treatment cost). Treatment cost was based on the cost of Omega ($45/pt) and $3/A application cost.
* Values are significantly different from the untreated check at P=0.05.

variety did not differ between the one and two application programs of Omega. For untreated plots, returns ($/A) were improved over Okrun for all varieties. All varieties except Tamrun 98 that were left untreated returned at least $300/A more than Okrun. Omega programs were profitable on all varieties except Tamspan 90. Increases in returns compared to check plots ranged from $134/A for Tamrun 96 to over $379/A for Okrun. Returns for two applications of Omega were never better than the single application, suggesting the added expense of an additional application was not needed. Results demonstrated the importance of planting improved varieties where Sclerotinia blight is a problem. The benefits of Omega treatment offer an improvement over varietal selection alone.

Hoping to identify new sources of resistance to Sclerotinia blight, the core collection, a subset of the USDA peanut germ plasm collection comprising 745 entries, was obtained from Corley Holbrook, USDA-ARS Tifton, GA. They were then planted at the Caddo Research Station in a field with a history of severe Sclerotinia blight. The core collection had not been screened previously for resistance to this disease. Conditions became favorable for Sclerotinia blight in mid-August and the disease increased to severe levels by harvest. Considerable variability in disease reaction was observed (Table 4). Some susceptible entries had over 90 percent disease. Among the 398 entries with an upright vine type in the early and mid-early maturity classifications (maturity groups 1 and 2), 24 had no disease and were retained for

Table 4. Reaction of the USDA peanut core collection to Sclerotinia blight at the Caddo Research Station, 2001.

Maturity group[1]	Disease reaction[2]					
	H Res (0%)	Res (<10%)	M Res (10<25%)	M Sus (25<50%)	Sus (50<75%)	H Sus (>75-100%)
1	5	5	7	5	0	0
2	51 (24)[3]	85 (11)	149 (1)	68	18	5
3	23 (16)	40 (15)	68 (3)	59	53 (1)	15 (1)
4	2 (2)	7 (5)	20 (1)	26 (1)	15	13
6	0	0	3	1	2	0
Total	81 (42)	137 (31)	247 (5)	159 (1)	88 (1)	33 (1)

[1] Group 1 = earliest maturity, maturity group 6 = latest maturity.
[2] Number of lines in the following reaction classes: H Res = highly resistant, Res = resistant, M Res = moderately resistant, M Sus = moderately susceptible, Sus = Susceptible, H Sus = highly susceptible.
[3] Numbers in parenthesis represent lines retained for further evaluation.

further evaluation. Among the 348 entries with a mostly prostrate (runner) vine type (maturity groups 3 and 4), 38 had either 0 percent disease or less than 10 percent disease and were retained for further evaluation. A total of 81 lines were retained and will be evaluated in replicated plots in 2002. In addition, each entry in the core collection is a representative of a larger group of related entries in the USDA peanut germ plasm collection. Therefore, additional potential sources of resistance to Sclerotinia blight will be obtained and evaluated.

Biological fungicides were evaluated on the susceptible variety Okrun at the Caddo Research Station in 2001. In one trial, Contans, a product containing a fungus reported to parasitize and kill sclerotia of Sclerotinia minor in soil, was incorporated into the soil during March in the same plots for a second consecutive year. The Contans treatments were left untreated or were supplemented with 2 applications of Omega at 1 pt/A. Contans treatments were compared to a spray program with the fungicide Omega and an untreated check. Disease pressure was low (20-30 percent) compared to other trials at this site and differences between treatments were not evident. Further evaluation of Contans is needed before its effectiveness can be determined.

In a second study, a bacterial formulation (QRD 131), which has shown activity against Sclerotinia minor in culture, was tested on the variety Okrun in comparison to various spray programs with the fungicide Omega. QRD 131 was applied on 10-day intervals, beginning with detection of the disease on July 15, either by foliar sprays or by a soil drench to simulate chemigation. Disease pressure was severe (78 percent) in check plots, which yielded less than 2000 lb/A. The biological treatments did not provide adequate disease control or yield (2000-2200 lb/A). Depending on timing and rate of application, spray programs with Omega ranged from moderately to highly effective. When

two or three applications at 1 pt/A were made before August 31, when disease became established, yields increased 3700 to 4300 lb/A. However, single application made on August 31 at 1, 1.5, and 2 pt/A was less effective and increased yields only 2800 to 3200 lb/A.

Southern blight

Southern blight is another damaging soilborne disease that is a problem statewide. Effective management of Southern blight relies on the use of fungicides because varieties with resistance are not locally adapted and long crop rotations often are not feasible. Folicur, Abound, and Moncut have provided good to excellent disease control in fields with a history of Southern blight. Folicur and Abound also are effective against foliar diseases. Moncut must be tank-mixed with another fungicide to provide control of foliar diseases. In 2001, three trials focused on comparing the performance and profitability of spray programs using registered fungicides, and evaluation of new fungicides under development. While all of the spray programs were scheduled to control foliar diseases as well as Southern blight, foliar diseases did not reach damaging levels in any of the plots including the untreated checks.

In one trial, standard spray programs were compared to experimental fungicides under development. Headline (BAS 500), which has provided superior control of early leaf spot and may be registered for use in 2002, was evaluated as a block of four sprays or in alternation with Folicur. BAS 510, an experimental fungicide, which has shown good control of Sclerotinia blight, was applied in a four-spray block program. Four-spray block programs with AMS 21619, an new experimental fungicide, and Stratego, a fungicide (Tilt + Flint) already registered for use on peanuts to control foliar diseases, were also evaluated.

Southern blight pressure was severe in the trial (Table 5). All fungicide programs reduced disease compared to the untreated check. However, only Folicur, Abound, Moncut, Headline, AMS 21619, and Headline/Folicur reduced Southern blight compared to the Bravo check. Folicur, Moncut, and Headline/Folicur programs provided the best disease control. Yields were variable, and yield rankings were not always associated with levels of disease. The Folicur and Headline/Folicur programs increased yields compared to the Bravo check. Where costs of the spray programs were known, the Folicur program provided the greatest return. Results showed that Headline will provide adequate control of Southern blight at the rate tested. AMS 21619 was also promising while BAS 510 and Stratego did not provide adequate control of Southern blight.

In a second trial, spray programs with Moncut at various rates and application timings were evaluated in comparison to Folicur and Abound programs, Bravo only, and an untreated check. Disease pressure was moderately severe in the trial. All fungicide programs except the Bravo check reduced levels of Southern blight compared to the untreated check, which had 30 percent infection. The best control (<10 percent infection) was achieved with two applications of Moncut at 1.4 lb/A and with a four-spray block program of Folicur alternated with Moncut at 0.7 lb/A. Most spray programs except the Bravo check increased yield compared to the untreated check. The standard Folicur block program and the four-spray Moncut/Folicur alternation program had the highest yields, over 500 lb/A above the Bravo check.

Table 5. Evaluation of fungicides for control of Southern blight on Okrun peanuts in Bryan County 2001.

Treatment & Rate/A (timing[1])	Southern blight (%)	Yield (lb/A)	Value ($/A)[2]	Cost ($/A)[3]	Return ($/A)[4]
Bravo 720 1.5 pt (1-6)	31*	3122	887	72	815
Bravo 720 1.5 pt (1,6) Folicur 3.6F 7.2 fl oz (2-5)	8**	4167**	1194	123	1071
Bravo 720 1.5 pt (1,3,5,6) Abound 2.1F 18 fl oz (2,4)	19**	3238	978	126	852
Bravo 720 1.5 pt (1-6) Moncut 70DF 1.0 lb (2,4)	7**	3318	1020	128	892
Bravo 720 1.5 pt (1,6) Stratego 2.1E 14 fl oz (2-5)	29*	2984	868	72	796
Bravo 720 1.5 pt (5,6) Headline 2.1E 12 fl oz (1-4)	14**	3623*	1134	?	?
Headline 2.1E 12 fl oz (1,3,5) Folicur 3.6F 7.2 fl oz (2,4) Bravo 720 1.5 pt (6)	8**	4087**	1185	?	?
Bravo 720 1.5 pt (5,6) BAS 510 70WG 9 oz (1-4)	21*	3420*	1004	?	?
Bravo 720 1.5 pt (1,6) AMS 21619 5 fl oz (2-5)	12**	3550*	1027	?	?
check	44	2586	770	0	770
LSD (P=0.05)[5]	12	754			

[1] Six sprays were applied on 14-day intervals beginning 45 days after planting. Spray numbers (1- 6) correspond to the spray dates of July 5, July 24, August 8, August 21, September 5, and September 27.
[2] Values based on grade, which averaged 68.
[3] Cost based on $5.98/pt for Bravo, $3.01/fl oz for Folicur, $1.95/fl oz for Abound, $26/lb for Moncut, and $3.00/spray application cost.
[4] Partial return = (crop value based on grade) - (treatment cost).
[5] Least significant difference.
* Means are significantly different from the untreated check.
** Means are different from the check and the Bravo alone treatment.
? Unknown at this time.

In a third trial, various spray programs with Abound were compared to standard programs with Moncut and Folicur. Some of the Abound programs also included in-furrow applications at 7.6 oz/A. Disease pressure was low in this trial and none of the spray programs increased yields compared to the untreated check.

Limb Rot

The soil-borne fungus *Rhizoctonia* causes limb rot. The fungus also causes peg and pod rot. This disease is most important on sandy soils where runner varieties are grown under a high level of management.

The disease often is not apparent until after the peanuts are dug. At the Noble Foundation Red River Farm, limb rot has become an increasingly important problem. Aside from avoiding rotations with cotton, which aggravates the disease, crop rotation is not very effective in controlling this disease because the fungus has a wide host range. Fungicides that control Southern blight such as Folicur, Moncut, and Abound are effective against limb rot. However, the responses of specific varieties to the disease and to fungicide programs are not well defined.

Spray programs consisted of two- and four-spray block programs with Folicur, a four-spray block program with Bravo/Moncut, and two sprays of Abound at 60 and 90 days after planting at 12.3 and 18.5 fl oz/A. The check treatment was a full-season Bravo program for leaf spot. Varieties included Tamrun 96 and Tamspan 90, which have been moderately resistant to limb rot in previous trials; and Okrun, Georgia Green, and Tamrun 98, which have been susceptible. Georgia Hi-O/L is a new runner variety included in 2001 because ViruGard seed was not available.

In 2001, limb rot pressure reached moderately severe levels. In check plots that received only Bravo, limb rot was lowest for Tamspan 90 (11 percent); intermediate for Tamrun 96 (38 percent) and Okrun (40 percent), and highest for Tamrun 98 (48 percent), Georgia Green (51 percent), and Georgia Hi-O/L (58 percent). Varieties responded similarly to the fungicide treatments (Table 6). All fungicide treatments reduced limb rot compared to the Bravo check. Abound provided the highest level of control, nearly eliminating the disease. The four-spray Folicur program and Moncut also provided good control. The two-spray Folicur program was the least effective spray program. However, much of the disease developed on the foliage and outer limbs late in the season. As a result, yields did not differ among spray programs. Yields did differ among varieties, although yield rankings were not highly associated with levels of disease. Tamrun 96 and Georgia Hi-O/L were the highest yielding varieties while Tamspan 90, Tamrun 98, and Okrun were the lowest yielding varieties. Because of the lack of yield responses to the fungicide programs, fungicide use for limb rot in this trial was not profitable.

Foliar Diseases

Foliar diseases are widespread across all production areas of Oklahoma and can be damaging when severe. Where early leaf spot is not controlled, yield losses have averaged from 500 to 700 lb/A. However, losses exceeding 1000 lb/A are possible in years when weather patterns favor severe disease development. Pepper spot is a foliar disease that has increased in prevalence recently, particularly on runner varieties. However, the damage potential of this disease and effective treatments for its control have not been identified. Evaluation of new fungicides for control of foliar diseases has been difficult in recent years due to drought conditions and resulting low disease pressure.

Fungicides were compared for control of early leaf spot on Tamspan 90 at the Agronomy Research Farm in Perkins. New fungicides evaluated included Headline, which has provided superior control of early leaf spot in previous trials; BAS 510, an experimental fungicide with good activity against Sclerotinia blight; Stratego, a newly registered fungicide for foliar disease control; and QRD 137, a biological fungicide. Except for Headline, which was applied on 14- and 21-day intervals, all fungicide programs consisted of full-season, 14-day application schedules. New fungicides

Table 6. Response of peanut varieties to fungicides for control of limb rot at the Noble Foundation Red River Farm, 2001.

Treatment & Rate/A (timing[1])	Limb rot (%)	Yield (lb/A)[2]	Variety	Limb rot (%)	Yield (lb/A)[2]
Bravo 720 1.5 pt (1-6)	41	3350 a	Tamspan 90	5	3320 cd
Bravo 720 1.5 pt (1,2,5,6) Folicur 3.6F 7.2 fl oz (3,4)	30 *	3242 a	Okrun	17	3153 d
Bravo 720 1.5 pt (1,6) Folicur 3.6F 7.2 fl oz (2-5)	13 *	3430 a	Tamrun 96	13	3818 a
Bravo 720 1.5 pt (1-6) Moncut 70DF 0.4 lb (2-5)	12 *	3564 a	Tamrun 98	18	3379 c
Bravo 720 1.5 pt (1,3,5,6) Abound 2.1F 112.3 fl oz (2,4)	2 *	3576 a	Georgia Green	23	3469 bc
Bravo 720 1.5 pt (1,3,5,6) Abound 2.1F 112.3 fl oz (2,4)	2 *	3642 a	Georgia Hi-O/L	24	3666 ab
LSD (P=0.05)[3]	10	NS		4	208

[1] Spray numbers 1-6 represent the spray dates of 1=July 11, 2=July 25, 3=August 8, 4=August 22, 5=September 6, and 7=September 19.
[2] Values in a column followed by the same letter are not significantly different at P=0.05.
[3] Least significant difference (LSD).
NS = treatment effect not significant at P=0.05.
* Means are significantly different from the Bravo alone.

were compared to standard fungicide programs and an untreated check.

While dry weather delayed disease development, early leaf spot reached severe levels in the trial by harvest (Table 7). The untreated control had 100 percent infection and 60 percent defoliation. The full-season Bravo program provided excellent disease control. Standard spray programs with Folicur and Abound also provided good disease control. Headline provided superior disease control on a 14-day schedule, and good disease control on a 21-day schedule. Stratego and BAS 510 provided adequate disease control, while the biological fungicide was not effective. The level of disease observed in this trial was sufficient, but only to moderately reduce yield. Stratego and the Headline spray programs increased yields compared to the untreated check. Because yield effects were moderate, only the Stratego program increased returns ($/A) compared to the untreated check.

A second trial comparing registered fungicides with Headline for control of early leaf spot on Tamspan 90 was conducted in Hughes County. Levels of early leaf spot were similar to those observed at Perkins. Spray programs with Bravo, Folicur, Abound, Stratego, Headline, and Tilt/Bravo all provided good disease control. Abound, Stratego, Headline, and Tilt/Bravo were superior to Bravo. However, yields were very low (below 2000 lb/A) and did not differ among treatments.
Fungicide programs were compared for

control of pepper spot on Tamspan 90 at the Caddo Research Station in 2001. This trial had included ViruGard, a highly susceptible variety in the past, but seeds were not available in 2001. Pepper spot pressure was light in this trial and levels of disease (10-25 percent) did not differ among treatments. As a result of the low disease pressure, yields did not differ among treatments and fungicide use for pepper spot control was not profitable.

Pod Rot

Pod rot is a serious problem in isolated fields in Oklahoma each year. *Pythium* and *Rhicoctonia* are two fungi that cause pod rot. Both fungi are usually involved when pod rot is severe. In 2001, two trials were conducted using the susceptible variety AT-120 at the Noble Foundation Red River Farm in Burneyville in an area of the farm with a history of pod rot. The fungicides

Table 7. Control of early leaf spot on Tamspan 90 at the OSU Agronomy Research Farm in Perkins, 2001.

Treatment and Rate/A (timing[1])	Leaf spot (%)	Defoliation (%)	Yield (lb/A)	Cost ($/A)[2]	Return ($/A)[3]
Bravo 720 1.5 pt (1-6)	10 *	0 *	3063	72	756
Bravo 720 1.5 pt (1,6) Folicur 3.6F 7.2 fl oz (2-5)	20 *	4 *	2875	123	634
Bravo WS 6F 1.5 pt (1,3,5,6) Abound 2.1F 18.5 fl oz (2,4)	19 *	2 *	3260	126	756
Stratego 2.1E 7 fl oz (1-6)	34 *	4 *	3724 *	72	871
Bravo 720 1.5 pt (1) Headline 250E 9 fl oz (21-d)	15 *	0 *	3979 *	?	?
Bravo 720 1.5 pt (1,6) Headline 250E 6 fl oz (2-5)	2 *	0 *	3674 *	?	?
Bravo 720 1.5 pt (1,6) BAS 510 70WG 9.1 oz (2-5)	25 *	2	3165	?	?
QRD 137 W 4.0 lb (1-6)	99	64	2933	?	?
check	100	61	2890	0	771
LSD (P=0.05) [4]	11	7	583		

[1] Spray numbers 1 - 6 correspond to six sprays applied on a 14-day schedule beginning July 2. Spray dates for the 21-day program were July 27, August 17, and September 10.
[2] Cost based on $5.98/pt for Bravo, $3.01/fl oz for Folicur, $1.95/fl oz for Abound, and $9.00/7 fl oz Stratego, and $3.00/spray application cost.
[3] Partial return = (crop value) - (treatment cost). Crop value was based on grade, which averaged 62.
[4] Least significant difference.
* Means are differ from the untreated check at P=0.05.
? Unknown at this time.

Headline, Abound, Folicur, and Ridomil were evaluated in one trial. Sources of calcium (gypsum and calcium chloride) and phosphorous acid (Phostrol), reported to induce resistance to diseases caused by *Pythium* and related fungi, were evaluated in a second trial.

Limb rot was the primary disease in the fungicide trial. Pod rot severity was low, but appeared to be caused by *Rhizoctonia*, which is also the cause of limb rot. This was evident because pod rot levels were highest in the plots receiving only Bravo and Bravo with Ridomil. Spray programs with Headline, Folicur, and Abound had very low levels of both limb rot and pod rot. However, disease pressure was not sufficient to influence yields. In the second trial, gypsum was banded over the row while calcium chloride and Phostrol were applied as a row drench. Limb rot again was the primary disease in this trial, but levels of pod rot were very low (less than 1 percent). None of the treatments reduced limb rot and yield did not differ among treatments. The calcium chloride treatment did produce wilt, leaf scorch, and leaf drop typical of salt injury. However, plants recovered and yield was not reduced. Further evaluation of these fungicide and nutrient sources is needed where *Pythium* pod rot is present.

Disease management in southwestern Oklahoma

Peanut production is increasing in far southwestern Oklahoma. Growers in this part of the state have not experienced severe losses to disease because of low rainfall and humidity, and soils that do not have a long history of peanut production. However, foliar diseases, Southern blight, limb rot, and pod rot have been identified as potentially damaging diseases in this new peanut area.

In 2001, a trial was repeated for a second year in Jackson County. Because high disease pressure was not anticipated, reduced-input spray programs were evaluated on the three most commonly grown varieties in the area. They included Tamrun 96, which has moderate resistance to several soil-borne diseases, plus AT-120 and Okrun, which are susceptible to most soil-borne diseases. Fungicide programs consisted of one or two applications, targeted at either foliar disease (Bravo, Tilt/Bravo), soil-borne disease (Moncut), or both (Abound, Folicur, Headline).

Disease pressure was very low at this site. Leaf spot did not develop and obvious symptoms of soil-borne diseases were not evident prior to digging. Limb rot may have been a problem, but harvest was delayed by a late-season drought. Freeze damage occurred before digging when limb rot could be assessed. As a result of the low disease pressure, none of the spray programs increased yield compared to the untreated check. However, yields differed significantly among varieties. Yields of Tamrun 96 were 1500 lb/A higher than Okrun. Yields of AT-120 were low, probably due to loss of pods from over maturity of this early-season runner variety, which performed well at this location in 2000. Grades ranged from 72 to 75 at this location. Because of the low disease pressure, spray programs were not beneficial at this site. The higher yields for Tamrun 96 compared to Okrun and AT-120 were likely due to the ability of Tamrun 96 to better withstand adverse harvest conditions rather than its disease resistance.

Table 8. Effect of spray programs on yield and value of peanut varieties in Jackson County, 2001.

Treatment and Rate/A (timing[1])	AT-120	Okrun	T-96	mean[2]
	Yield (lb/A)			
Bravo WS 6F 1.5 pt (1,2)	2586	3322	4946	3618 a
Folicur 3.6F 7.2 fl oz (1-2)	2577	3567	4683	3609 a
Headline 2.1E 9.2 fl oz (1,2)	3349	4238	4937	4187 a
Moncut 50W 1.2 lb (1-2)	2233	3067	4764	3355 a
Abound 2.1F 18.5 fl oz (1)	3049	3276	5227	3851 a
Abound 2.1F 18.5 fl oz (1,2)	2922	3821	4991	3911 a
Tilt/Bravo 18 fl oz (adv)	2668	3576	4937	3727 a
check	2686	3176	4991	3618 a
mean[3]	2759 c	3505 b	4939 a	
	Value ($/A)[4]			
Bravo WS 6F 1.5 pt (1,2)	822	1116	1490	1143
Folicur 3.6F 7.2 fl oz (1-2)	811	1132	1473	1139
Headline 2.1E 9.2 fl oz (1,2)	1035	1352	1567	1318
Moncut 50W 1.2 lb (1-2)	691	956	1502	1050
Abound 2.1F 18.5 fl oz (1)	939	1068	1621	1209
Abound 2.1F 18.5 fl oz (1,2)	906	1256	1516	1226
Tilt/Bravo 18 fl oz (adv)	818	1163	1543	1175
check	830	1013	1540	1128
mean	857	1132	1532	

[1] Spray numbers 1 to 2 correspond to the spray dates of 1 = July 31 and 2 = August 28. Adv. = two sprays applied according to the MESONET early leaf spot advisory program on August 21 and September 6.
[2] Mean values over varieties followed by the same letter are not significantly different at P=0.05.
[3] Mean values over treatments followed by the same letter are not significantly different at P=0.05.
[4] Values based on grade, which averaged 73 for AT-120, 75 for Okrun, and 72 for Tamrun 96.

Weed Control Research

Don S. Murray and Dave L. Nofziger,
Plant and Soil Sciences
Shea W. Murdock, Program Specialist
R. Brent Westerman, Senior Research Specialist

2001 progress made possible through OPC support

- PEET the Computer Assisted Decision Support System for weed control in peanuts is ready for Internet access.

PEET–A computer assisted decision support system

Financial support for this project from the Oklahoma Peanut Commission was not available in 2001; however, the project continued and has been completed. By the time this publication is released, the program should be on the Internet. This "decision aid" is very user friendly and suggestions and warnings are provided very quickly. Several inputs are required by the user such as weed species, weed density, weed size (postemergence only), field size, soil type, expected peanut yield, expected selling price, and some environmental conditions. In return the user obtains information about the losses caused by these weeds if they are not controlled, which control options offer the greatest economic return, and which herbicides may pose potential ground water hazards. Suggestions for preplant incorporated (PPI), preemergence (PRE), and postemergence (POST) herbicides are provided.

Experiments were conducted at both Ft. Cobb and Perkins to evaluate a twice-modified version of a Computer Decision Support System originally developed by North Carolina State University (Herbicide Application Decision Support System-HADSS). In 1999, only half of the site was treated with Sonalan and it was apparent that a preplant incorporated herbicide treatment is essential for effective weed control. In 2000, the entire site was treated with Treflan. Additionally, one-half of the site was treated with Strongarm while the other half was treated with Valor. Various postemergence herbicides were then used as recommended by either human sources or the Computer Decision Support System. Morning glories and crownbeard were the two most uniform and dense weeds; however, Texas panicum was also present. Both Strongarm and Valor controlled the crownbeard. Follow-up postemergence treatments suggested by both human sources and the computer program performed equally well in controlling the morning glories and Texas panicum. Peanut yields from plots treated with herbicides recommended by the computer program were equal to the yields from plots treated with herbicides recommended by humans, indicating that the Computer Decision Support System was operating properly. This program is one step closer to being released to the public through Internet access. If the validation in 2001 is success-

fully completed, the Oklahoma version of the program plus recommendations for preplant incorporated and preemergence herbicides will be made available through the internet.

Peanut-crownbeard competition experiment

A peanut-crownbeard competition experiment was conducted on a farmer's field, which had a high, natural infestation of crownbeard. Plots were maintained weed-free for the entire season or weeds were removed every two weeks beginning four weeks after emergence. Crownbeard is the fourth most common and the third most troublesome weed in Oklahoma peanuts and it is toxic to sheep, cattle, and swine. If the crownbeard were allowed to remain in the peanuts for the entire season, a yield reduction of over 40 percent would have occurred. This field had a high, natural infestation of crownbeard and each week that the crownbeard was allowed to remain with the peanuts there was a 2.6 percent yield reduction.


OSU
OKLAHOMA AGRICULTURAL
EXPERIMENT STATION