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WELCOME ADDRESS

by

Maurice B. Rowe
Secretary of Commerce and Resources
State of Virginia

It is an honor to welcome such a distinguished group of visitors to Virginia and to our capital city, Richmond.

On behalf of Governor Dalton, I want to extend to you a warm greeting and a wish that your stay in our state will be most enjoyable and informative.

As a former Commissioner of Agriculture, I have had the pleasure of knowing and working with members of the peanut industry. I understand that your organization is an international society of more than 600 members who share a common interest in the welfare of the peanut industry, especially the research for improving the future of the industry. Your particular concerns therefore are in the areas of research and extension education.

I was surprised to learn that APRES includes members from 30 countries! It is difficult for the average person to realize the worldwide interest in the production and processing of the peanut.

Whenever visitors come to the Commonwealth, they are always told about the history and tradition for which Virginia is so famous. To put it succinctly, if you will permit me, this is where it all began. I believe that such statement is especially true for your organization since it was organized in July of 1968 down in Norfolk, Virginia.

In any event, your return to the state where you were organized is quite appropriate considering that we are beginning a new decade with great opportunities ahead. The challenges of your group to continue to improve the capacity of all segments of the peanut industry are increasing every day. The promotion of research and technology is a continuing process and it must receive adequate support in funding at both state and federal levels.

In Virginia, we have a special appreciation for the work of your organization and its support of the peanut industry. While cotton may have been king at one time or another, the peanut is still king in southeastern Virginia. Historians tell us that the peanut was introduced to this part of the world from Africa in colonial days, but it was not until after the War between the States that commercial production on a large scale developed. I understand that the first commercially produced peanuts were grown near Wakefield in Sussex County, Virginia.

The development of the peanut industry was a real boom to our antebellum economy. We can thank the boll weevil for the rapid expansion of peanut production, especially in the South's cotton belt. That insect was good for something, which proves that opportunities continue to exist.

Today, after more than a century, the peanut is still a major source of farm crop income in the United States. Virginia's Southampton County has ranked number one in peanut production through the years and still is one of the top-producers in the nation. Of the ten peanut producing states, the Old Dominion ranks fifth in production with more than eight percent of the total. That means that many of you and your states have come to the forefront.

Among our state's money crops, the noble legume is third in gross receipts with over $66 million. In value of production, it is fifth. I know you have similar success data.

We take pride in the fact that southeastern Virginia is the oldest commercial peanut-producing area in the U. S. Our growers with the same acreage have, in the last 25 years, nearly doubled the yield per acre. Of course, the soil and climate, as well as improved seed, should share a little of the credit.

As you know, the value of farmers' stock peanuts is only a portion of the total contribution of the industry to our state's and nation's economy. By using the usual economic multiplier factor of three, we find that southeastern

Virginia benefits from an almost $200 million boost for state-produced peanuts alone. This figure can be easily doubled if we add the peanuts coming from other sources for processing in our state. This means that the states you represent are important to your agricultural economy.

Since construction of some of the country's first cleaning and shelling plants in Norfolk in 1876, and the later establishment of other manufacturing and processing facilities in other locations in southeastern Virginia, our state's peanut industry has grown and prospered. Thanks to the vision and energy of men like Mr. Amedeo Obici, who founded Planters Peanut Company in his adopted state of Virginia, our city of Suffolk became the "Peanut Capital of the World." Here in Virginia, such revolutionary events as the development of the cellophane bag and vacuum-packed cans have helped establish worldwide markets for this delicious and nutritious commodity.

Because of the important role that the peanut industry plays in our state's economy, the State of Virginia has, through the years, worked diligently to provide this industry with support services and programs, as I know has occurred in the states you represent.

Whether it is peanut seed testing, grading and inspection of farmer stock peanuts, aflatoxin testing, developing new markets at home and abroad, promoting peanut consumer products, or a number of other related services, persons, like yourselves, are ready to provide assistance to the industry where it is needed. It is essential that your programs receive high priority among peanut programs.

I could elaborate on each state's efforts to develop new and expanded markets for peanuts abroad. As you know, each year American agriculture has provided our nation with larger trade surpluses to counterbalance the high cost of foreign oil. In Virginia, approximately 30 percent of the state's peanut crop is exported each year, and I know you have similar innovative programs.

Last year Governor Dalton led a trade mission to the Far East visiting Japan, the People's Republic of China, and Hong Kong. Mason Carbaugh, who was a member of the mission, tells me that general area of the world holds great promise as a market for Virginia agricultural products.

In closing, I would like to thank you for choosing Virginia for the location of your 12th annual meeting. I hope that you will get an opportunity to visit some of our historic and scenic areas while you are here and that you will come again.

Pressing Peanuts--Effects of Splits on Oil Removal. Joseph Pominski and J. J. Spadaro, Southern Regional Research Center New Orleans, La.; and J. R. Baxley, PERT Labs, Inc., Edenton, N.C.

ABSTRACT

Peanut-pressing tests were conducted with both laboratory and commercial cage presses to determine the effects of of split peanuts on oil removal. A batch of whole Jumbo Runner peanuts was obtained from a peanut lot that gave satisfactory oil removal in large commercial presses. One-half of the peanuts were split. Composition of the materials pressed were 75% wholes-25% splits, 50% wholes-50% splits, and 25% wholes-75% splits, and 0% wholes-100% splits. Two-hundred-pound (90.72 kg) portions were pressed in a commercial-scale press for 30 minutes at 1900 psig, and 1.32-pound (0.60 kg) portions were pressed in a laboratory press for 5 to 30 minutes at 250 to 2000 psig. For the commercial press, 53.8, 54.2, 50.1, and 43.8% oil, respectively, was removed. Peanuts with up to 50% splits had no effect on oil removal. Compared to 75% wholes, the 75% splits yielded 3.7% less oil removal, and 100% splits, 10% less. At a maximum pressure of 1160 psig, 51.6% oil was removed for peanuts containing 75% wholes. Pressing 100% splits at the lower pressure removed only 37.3% oil. Pressing tests show that although more oil is removed by the laboratory press under comparable conditions, effects of splits on oil removal can be demonstrated on a laboratory scale.

INTRODUCTION

Partially defatted peanuts and snack and diet bars that contain partially defatted peanuts are available in the food market today. Also, partially defatted peanuts of different roasts are milled into flours and used in food items. The demand for peanuts with a portion of the oil removed for these products makes it necessary to press peanuts the year round. However, removing the required amount of oil may not, at certain times, be possible, and sometimes it cannot be done under conditions that are commercially practical and profitable. One suspected but unproved cause for this adverse condition has been the amount of splits in peanuts before pressing. Previous work on pressing peanuts was conducted on whole peanuts (3, 4). This paper reports experimental work conducted to determine the effects of splits during pressing of peanuts for oil removal in both commercial and laboratory cage presses.

MATERIALS AND PROCEDURES

Commercially prepared spin-blanched Jumbo Runner peanuts with 5.1% moisture (1), 50.9% oil (2), and a peanut count of 638 per pound were used. Moisture was the average of 25 samples, each representing 200 lb (90.72 kg) of peanuts. The oil analysis was an average of five composite samples, each composite representing 1000 lb (453.6 kg) of peanuts. Five thousand pounds (2268 kg) of peanuts for the tests were removed from a lot of peanuts that gave satisfactory oil removal in large commercial presses. The peanuts were uniformly mixed and sampled for analyses; then one-half of the peanuts were split by a split-nut blancher. Two-hundred-pound portions that contained nominal values of 75% wholes-25% splits, 50% wholes-50% splits, 25% wholes-75% splits, and 100% splits were prepared.

One hundred percent wholes for the large-scale pressing tests were not

prepared because the whole peanuts had 24% splits and were used as 75% wholes. The 100% splits contained 2.6% wholes, and the other two mixtures contained the indicated proportions of peanuts. Small amounts of 100% wholes were hand separated for pressing in the laboratory press.

In the laboratory, peanuts placed in cheesecloth were pressed in a 12-ton Fred S. Carver[3/] laboratory cage press (3). A 3-1/2-inch-diameter slotted-mold cylinder was used in tests. Pressures ranged from 250 to 2000 psig (pounds per square inch gage on peanuts). In all laboratory tests, 600 g (1.32 lb) of peanuts was used except in those tests conducted to determine the effects of depth of peanuts on the amount of oil removed. In the latter evaluations, 200 g (0.44 lb) of peanuts was used. In a commercial plant, 200-lb portions of peanuts were pressed in a 600-ton Albright Nell cage press. Its slotted cage has a nominal inside diameter of 20 inches.

Removal of oil in both scales of pressing was determined by the difference in weights of peanuts before and after pressing. The percentage of oil removed was based on the oil content of the unpressed peanuts, which was determined by analyses. Tests were conducted at room temperatures of 75° F (±5°) and 65° F (±5°) for the laboratory and commercial tests, respectively. This difference in temperatures at which tests were conducted is not considered significant. For the laboratory pressings, application to a maximum pressure was within 1 minute except for tests in which the rate of application of pressure was evaluated; in the commercial press, application to a maximum pressure was within 15 minutes.

RESULTS AND DISCUSSION

Table I shows results of experiments conducted to determine a method for pressing peanuts in the laboratory press. Maximum differences occurred in the amounts of oil removed when pressing 75% wholes-25% splits as compared to 100% splits. Comparisons were made by pressing 200- and 600-g portions of these peanuts for 30 minutes at 1000 and 2000 psig. Although more oil is removed from 200-g samples, a maximum difference of about 4% oil removal is obtained by pressing 600-g samples of the 75% wholes-25% splits and 100% splits. Based on these results, pressing 600-g samples at 2000 psig for 30 minutes was used for comparing pressing evaluations in the small press to commercial pressings under comparable conditions. Six-hundred-gram samples were also used to evaluate oil removal from 75% wholes-25% splits and 100% splits at various pressures and times.

This work indicates that the final depth of the pressed peanut cakes in the laboratory mold cylinder is a factor in oil removal. For tests in which the peanuts were pressed at 2000 psig for 30 minutes, depths of the peanuts before and after pressing are respectively 6 and 2-3/8 inches for the 600-g samples and 2-3/8 and 3/4 inches for the 200-g samples. The furthest distance the oil has to travel horizontally is 1-3/4 inches from the center of the mold.

Pressing of peanuts with laboratory-scale equipment generally requires about 1 minute to attain the desired operating pressure as compared to about 15 minutes in commercial-size equipment. To relate laboratory-scale pressing data with a commercial-scale operation, laboratory pressing tests were conducted whereby both 1 minute and 15 minutes were used to attain the operating pressure (Table 2). With 15 minutes to attain operating pressures of 1000 and

2000 psig, 3.1 to 4.7% more oil was removed from both 75% whole peanuts and 100% split peanuts as compared with 1 minute to attain pressure.

Table 3 lists the amount of oil removed from various mixtures of whole and split peanuts. A maximum of 54.2% oil was removed by pressing in a commercial cage press. Mixtures containing up to 50% splits had no effect on oil removal. Compared to 75% wholes, the 75% splits yielded 3.7% less oil, and 100% splits, 10% less. Additional experiments in a commercial press (not included in Table 3) showed that peanuts containing 75% wholes could be pressed at a lower maximum pressure of 1160 psig to remove 51.6% oil. Pressing 100% splits at the lower pressure only removed 37.3% oil.

In the laboratory press, peanuts with up to 25% splits had no effect on oil removal, and 100% splits yielded 4% less oil than whole peanuts. For commercial pressing, splits reduced the amount of oil removal. In laboratory pressing, splits also reduced the amount of oil removed but to a lesser extent. Analyses of variance showed that for both commercial and laboratory pressing the effects of the splits in reducing oil removal were significant at the 99% level.

Figures 1 and 2 show effects of pressures ranging from 250-2000 psig and times from 5 to 30 minutes on oil removal for laboratory pressings of 75% wholes and 100% splits. At every level of pressure, less oil was removed from split peanuts than from the 75% wholes. Maximum oil removal for 30 minutes pressing at 250, 500, 750, 1000, and 2000 psig for 75% wholes was 32.8, 52.4, 55.9, 60.2, and 65.2%, respectively, and for 100% splits, 29.6, 46.3, 53.0, 56.4, and 61.2%, respectively. The data also show that, for pressing 75% wholes, over 55% oil can be removed in 30 minutes at 750 psig, 20 minutes at

1000 psig, and 15 minutes at 2000 psig. At 500 psig less than 55% oil was removed in 30 minutes. In pressing 100% splits, removal of over 55% oil was attained in 30 minutes at 1000 psig and in 20 minutes at 2000 psig. As expected, the higher the pressure the less the time required to remove 55% oil. From 750 to 1000 psig the amount of oil removed for the 75% whole peanuts increased an average of 1.7%/100 psig as compared to 1.4%/100 psig for 100% splits. When pressure was increased from 1000 to 2000 psig, the amount of increased oil removed averaged 0.5%/100 psig for both 75% whole peanuts and 100% splits.

Before the work reported here, industrial people believed that during pressing for oil removal a small percentage of splits may have been an important factor. The data reported here show that up to 50% splits in a commercial press had no significant effect on oil removal. Indications are that the smaller amounts of oil obtained with more than 50% split peanuts are probably caused by the spatial arrangement of the splits during pressing. A more dense mass of material is obtained, tightly closing passageways between peanuts, thus making it difficult for the oil to flow and be removed.

ACKNOWLEDGMENTS

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FOOTNOTES

1/ To be presented at 12th Annual APRES Meeting, July 16-18, 1980, Richmond, Virginia.

2/ One of the facilities of the Southern Region, Science and Education Administration, U.S. Department of Agriculture.

3/ Names of companies or commercial products are given solely for the purpose of providing specific information; their mention does not imply recommendation or endorsement by the U.S. Department of Agriculture over others not mentioned.

Table 1. Pressing Peanuts in Carver Press

Pressure PSIG2/	Oil Removed, %1/					
	600-g Sample			200-g Sample		
	75% Wholes	100% Splits	% Difference	75% Wholes	100% Splits	%Difference
1000	60.2	56.4	3.8	66.6	64.7	1.9
2000	65.2	61.2	4.0	73.3	72.3	1.0

1/ Average of 2 replicates.

2/ Pressure applied 30 minutes.

Table 2. Effects of Rate of Pressure Application on Peanuts

Pressure PSIG[2]	% Oil Removed[1]			
	75% Wholes		100% Splits	
	Fast[3]	Slow[4]	Fast[3]	Slow[4]
1000	60.2	64.3	56.4	59.8
2000	65.2	68.3	61.2	65.9

1/ Average of two replicates.

2/ Pressure applied a total time of 30 minutes.

3/ Maximum pressure reached in 1 minute.

4/ Maximum pressure reached in 15 minutes.

Table 3. Pressing Peanuts

Description % Wholes - % Splits	% Oil Removed	
	Press	
	Commercial[1/2]	Carver[3/4]
100 - 0	---	65.2
75 - 25	53.8	65.2
50 - 50	54.2	62.4
25 - 75	50.1	62.2
0 - 100	43.8	61.2

1/ 30 minutes pressing with maximum pressure of 1900 PSIG.

2/ Average value of 2 or 3 replicates.

3/ 30 minutes pressing with maximum pressure of 2000 PSIG.

4/ Average values of 2 replicates.

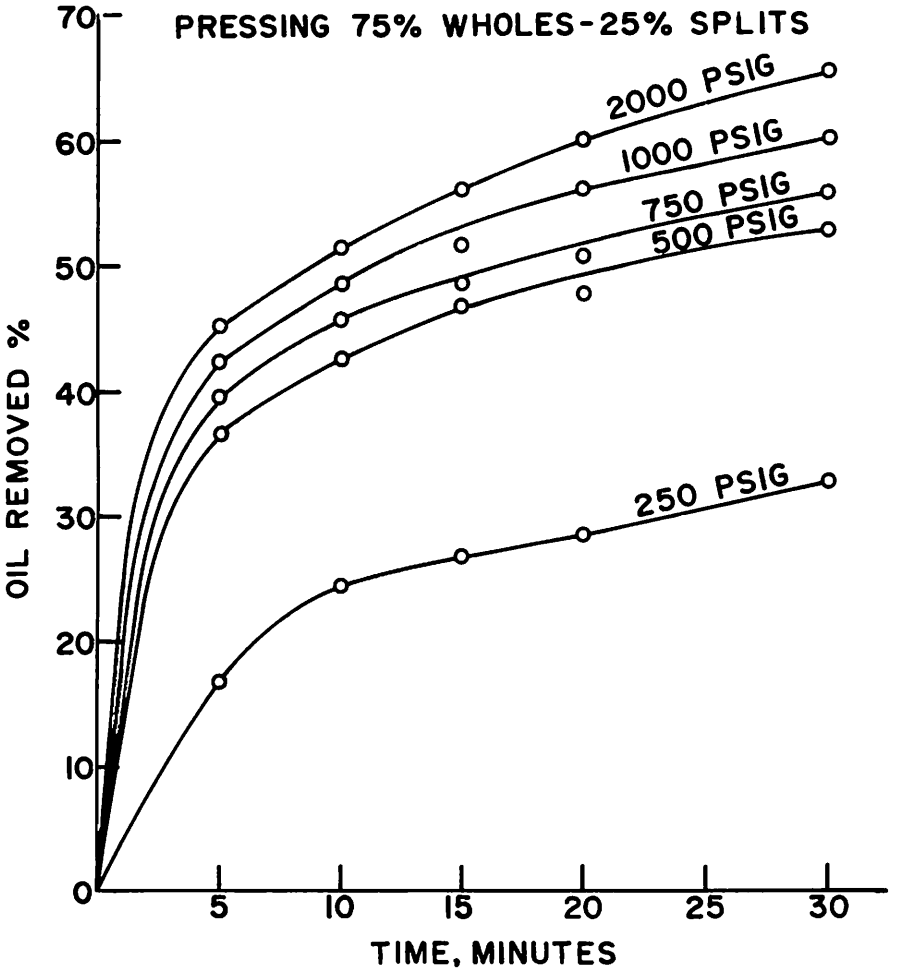

Fig. 1. Effects of time and pressure on removal of oil from 75% wholes-25% splits.

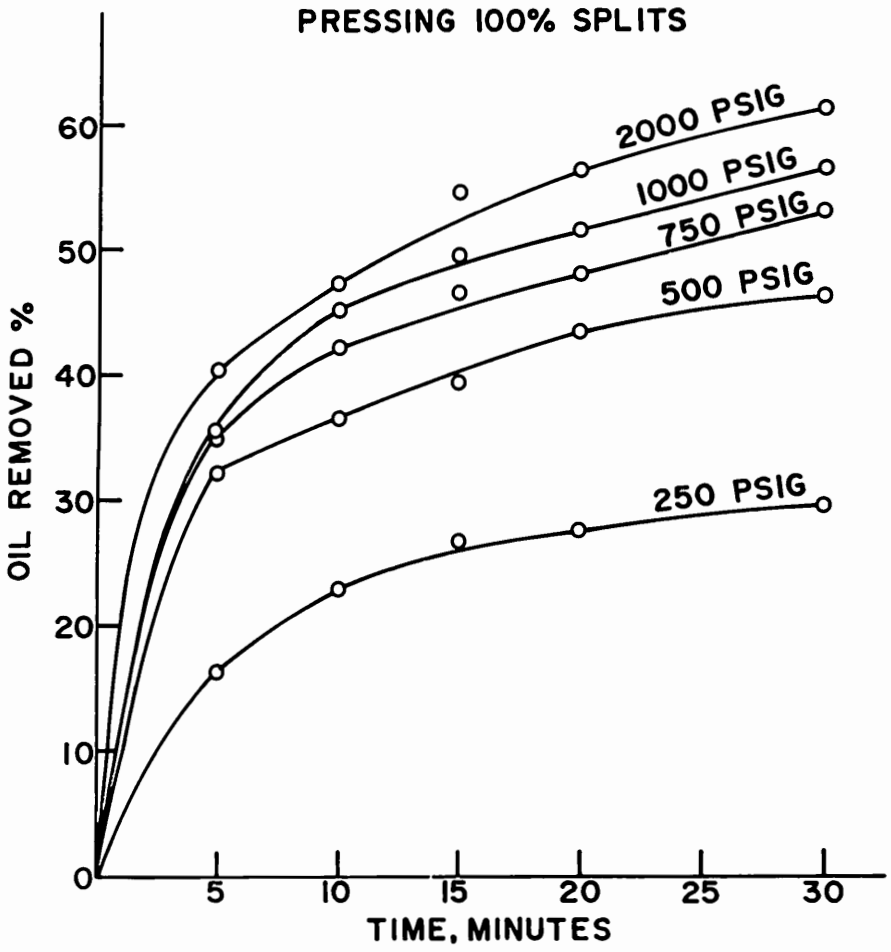

Fig. 2. Effects of time and pressure on removal of oil from 100% splits.

Oil, Total Protein, and Amino Acid Composition of 77 Peanut Lines and Cultivars. S.K. Pancholy, R. Sepulveda, and Shaik-M. M. Basha. Peanut Protein Lab., Florida A&M University, Tallahassee, FL 32307.

ABSTRACT

Seventy-seven peanut samples obtained from three different locations were analysed for oil, total protein, and the amino acid composition. Average oil content of the peanut samples was 49.2 percent and the average protein content was 25.17 percent. Amino acid composition averages (percent of total amino acids) were as follows: lysine (3.53 %), histidine (2.44%), ammonia (2.16%), arginine (9.19%), aspartic acid (10.81%), threonine (4.16%), serine (4.24%), glutamic acid (20.12%), proline (3.91%), glycine (5.13%), alanine (3.91%), valine (3.70%), methionine (0.79%), isoleucine (3.04%), leucine (5.92%), tyrosine (3.7%), phenylalanine (5.06%), and tryptophan (0.88%). Of all the lines, Jenkins Jumbo, 72X78-11-1-b3-B, and UF77318 were found to be high in methionine.

INTRODUCTION

Peanut seeds although high in protein, are deficient in some essential amino acids such as lysine, methionine, and tryptophan (4). However, methionine is of major concern because of its lower concentration compared to the other essential amino acids of peanut seed. Hence, identification of peanut lines with high methionine content is of great importance in studies aimed at improving the nutritional quality of peanut. Recently, Pancholy et al. (4) have examined several peanut cultivars and found some variations in their amino acid composition. Similarly, Young (5) also studied 31 peanut lines and cultivars grown at 10 different locations and found an average methionine content of 0.83% for the peanut samples under study. He also reported that the lines and cultivars NC-Fla 14, Argentine, VA72R, UF 439-16-6 and UF 70115 were high in methionine. In the continuing search for the identification of high-methionine lines, we have examined 77 peanut lines and cultivars and report the amino acid composition, protein, and oil content.

MATERIALS AND METHODS

Peanut samples (1977 crop) obtained from the breeding lines of the University of Florida (Marianna and Gainesville, FL) and Coastal Plain Research Station (Tifton, GA) were shelled, testae were removed and ground into a meal. The full-fat meals were stored at -20 C for further chemical analysis. Oil content of the meals was determined by recording the difference in weights of the samples before and after fat extraction with cold diethyl ether (1:20 ratio; 3 times). The protein content of the defatted peanut meal was analyzed by the micro-kjeldahl's method (1). The nitrogen value was multiplied with a factor of 5.46. The amino acid composition of peanut samples was obtained after hydrolyzing the defatted meal with 6N HCl at 110C for 18 hr, followed by analysis on a JEOL-6AH Automated Amino Acid Analyzer. Tryptophan was determined by the method of Basha and Roberts (2).

Table 1. Oil and Total Protein Content of Various Peanut Lines and Cultivars*.

Location Grown - Marianna, FL

Peanut Line or Cultivar	Sample No.	Percent Oil	Percent Total Protein
72X39A-2-2-b2-B	1	55.2	22.60
72X47B-3-1-b3-B	2	53.0	22.94
487A-B4 (UF 77318)	3	51.6	22.52
Florumner	4	51.4	22.13
72X68-11-2-b3-B	5	51.0	24.54
72X84B-2-1-b2-B	6	50.8	23.90
546B-1-3-B	7	50.8	27.22
72X78-11-1-b3-B	8	50.8	26.28
PI262090	9	50.4	27.89
Early Bunch	10	50.0	25.92
72X62-8-2-b3	11	50.0	25.50
72X70-5-2-b3-B	12	48.8	25.80
72X112-1-2-b3-B	13	48.8	25.20
72X45-8-1-b3-B	14	48.6	23.55
72X38-13-b4-13	15	48.4	26.05
72X72-9-1-b4-B	16	47.8	26.32
72X39B-3-2-B	17	47.6	24.78
72X70-4-1-b3-B	18	46.0	26.21
72X39A-8-4-b3-B	19	46.0	27.89
72X39B-14-1-b3-B	20	45.4	28.34
72X78-2-b2-B	21	45.4	27.92
UF75102	22	45.4	25.61
72X39A-14-1-b3-B	23	45.2	27.80
72X63-9-4-62-B	24	44.6	25.58
GK3	25	43.8	27.56
GKIA	26	43.2	30.00
72X68-5-1-62-B	27	42.6	26.08

* Values are percent of whole peanuts (oven-dry basis).

Table 2. Oil and Total Protein Content of Various Peanut Lines and Cultivars*.

Location Grown - Tifton, GA

Peanut Line or Cultivar	Sample No.	Percent Oil	Percent Total Protein
Hullaga 771012	28	51.4	25.92
NC-Fla 14	29	51.4	25.85
GK-19	30	51.0	22.69
Makula Red 771005	31	50.4	24.73
Shulamith PI 335915	32	49.8	24.42
Virginia Bunch	33	49.2	25.72
GK-3	34	49.2	25.41
PI 268689	35	49.0	25.96
NM Valencia A 772508	36	48.6	25.99
Tifton 8 771008	37	47.8	24.92
NC-17	38	47.6	26.70
Altika	39	47.4	24.59
Early Bunch	40	47.0	27.29
Florigiant	41	46.4	27.62
Jenkins Jumbo 771409	42	45.6	25.53

* Values are percent of whole peanuts (oven-dry basis).

Table 4. Total Amino Acid Composition of Various Peanut Lines and Cultivars*.

Amino Acid	Sample # 1	2	3	4	5	6	7	8
Lys	3.79	3.58	3.22	3.72	3.74	3.66	3.48	3.23
His	2.26	2.10	2.27	2.42	2.72	2.50	2.88	2.37
NH_4	1.73	1.96	2.06	2.10	1.82	2.10	2.32	1.39
Arg	9.66	11.31	9.67	12.50	11.37	11.04	10.85	11.87
Asp	12.64	12.20	12.91	12.72	11.22	12.42	11.90	12.60
Thr	4.59	3.90	4.60	4.26	3.78	4.76	4.18	4.41
Ser	5.53	4.29	4.74	4.92	4.45	5.28	4.64	4.82
Glu	20.95	19.48	21.85	19.05	18.60	19.40	19.54	20.00
Pro	4.01	4.55	4.49	4.80	5.14	4.88	4.78	4.41
Gly	6.05	6.10	5.42	6.70	6.13	6.72	6.34	6.20
Ala	4.09	4.08	4.32	4.90	4.05	4.00	4.40	4.24
Val	4.15	4.74	4.10	4.86	5.38	5.00	4.44	4.02
Met	0.85	0.60	0.70	0.72	0.64	0.83	0.75	0.95
Iso	3.18	4.81	3.20	3.20	4.15	3.98	3.20	3.36
Leu	6.18	6.19	5.82	6.40	5.97	5.25	5.90	6.62
Tyr	3.82	3.77	3.86	3.95	3.88	3.26	3.33	3.54
Phe	5.31	5.20	5.15	4.80	5.16	4.80	5.16	5.12
Tryp	0.74	0.78	0.79	0.80	0.79	0.85	0.75	0.88

Amino Acid	Sample # 9	10	11	12	13	14	15	16
Lys	3.35	3.60	3.50	3.49	3.46	3.18	3.38	3.40
His	2.60	2.50	2.33	2.43	2.19	2.80	2.80	2.24
NH_4	1.86	2.17	1.78	1.72	2.23	2.05	2.18	2.29
Arg	11.30	12.36	10.80	12.31	10.65	11.70	12.83	11.43
Asp	12.21	12.05	11.36	11.43	12.88	12.00	11.38	12.82
Thr	3.47	4.33	4.50	4.49	4.10	4.58	4.60	4.98
Ser	4.77	4.80	4.82	4.98	4.46	4.97	5.30	5.04
Glu	20.22	18.10	20.16	18.90	20.24	19.67	19.98	18.36
Pro	4.44	5.20	4.37	4.08	4.36	3.75	3.56	4.06
Gly	6.09	6.10	6.18	5.62	5.35	6.00	5.84	6.34
Ala	4.32	4.37	4.27	4.08	4.44	4.05	4.20	4.80
Val	4.20	4.22	4.15	4.18	4.94	4.40	4.14	4.30
Met	0.90	0.78	0.68	0.80	0.75	0.60	0.82	0.85
Iso	3.67	3.25	3.70	3.38	3.64	4.15	3.16	3.24
Leu	5.07	6.25	5.95	5.78	6.89	6.10	5.38	5.65
Tyr	3.98	4.00	4.05	4.08	3.77	3.90	3.28	3.28
Phe	5.25	5.10	5.30	5.20	5.05	5.10	5.44	4.88
Tryp	0.79	0.81	0.77	0.73	0.87	1.00	0.88	0.86

Table 3. Oil and Total Protein Content of Various Peanut Lines and Cultivars*.

Location Grown - Gainesville, FL

Peanut Line or Cultivar	Sample No.	Percent Oil	Percent Total Protein
UF77504	43	53.4	24.99
UF77303	44	52.6	23.61
UF77609	45	52.4	23.10
UF77518	46	50.4	23.77
UF77301	47	50.0	25.48
UF77318	48	49.8	22.57
UF77311	49	49.6	24.14
UF77114	50	49.6	23.57
UF77113	51	49.2	23.96
UF77117	52	49.2	22.58
UF77313	53	49.2	24.61
NC-Fla 14	54	49.2	26.75
Dixie Runner	55	49.0	24.19
UF77713	56	49.0	24.36
Early Bunch	57	48.8	23.23
UF439-16-63	58	48.8	25.33
UF77315	59	48.8	22.94
UF77602	60	48.8	24.42
UF77605	61	48.6	24.71
UF77705	62	48.0	25.22
Florunner	63	47.8	25.34
UF77112	64	47.6	26.28
UF77412	65	47.4	25.17
UF77317	66	47.2	25.91
UF77607	67	47.0	25.28
UF77608	68	47.0	25.33
UF77710	69	47.0	25.74
UF77403	70	46.4	26.13
UF77312	71	46.0	28.22
UF77514	72	45.6	27.45
UF77714	73	44.4	24.85
UF773135	74	42.8	26.14
UF773137	75	42.4	26.13
UF77409	76	42.2	26.83
UF773131	77	42.0	25.00

*Values are percent of whole peanuts (oven-dry basis).

Amino Acid	Sample # 17	18	19	20	21	22	23	24
Lys	3.80	3.85	3.10	3.32	3.30	3.72	3.76	3.64
His	2.90	2.90	2.25	2.13	2.40	2.25	2.87	2.41
NH_4	2.66	2.02	1.84	1.88	1.92	1.93	2.14	2.08
Arg	11.32	12.10	11.40	11.99	11.44	10.04	11.16	12.56
Asp	11.10	11.75	12.66	11.58	11.24	11.65	12.71	11.86
Thr	4.20	3.97	4.05	4.50	4.18	4.18	4.07	4.18
Ser	4.68	4.22	4.86	4.78	4.24	5.10	4.15	4.42
Glu	19.21	18.18	20.82	19.85	19.78	18.96	19.06	19.42
Pro	3.95	4.51	4.90	4.03	4.00	4.80	4.92	4.88
Gly	5.70	5.87	5.98	5.78	6.34	6.77	5.56	5.63
Ala	3.92	3.56	4.00	4.04	5.02	3.49	3.57	3.80
Val	4.60	4.32	4.17	4.35	6.04	4.36	4.19	4.56
Met	0.75	0.66	0.78	0.73	0.68	0.68	0.75	0.90
Iso	4.81	4.38	3.40	3.94	3.14	3.82	4.60	3.75
Leu	5.95	6.03	5.90	5.19	6.12	6.36	6.05	6.23
Tyr	3.88	3.24	3.80	3.10	3.88	4.59	3.82	3.25
Phe	5.65	4.70	5.30	5.69	4.66	6.40	4.96	5.19
Tryp	0.90	0.80	0.71	0.88	0.83	0.90	0.82	0.83

Amino Acid	Sample # 25	26	27	28	29	30	31	32
Lys	3.22	3.91	3.86	3.93	3.58	3.32	3.99	3.53
His	2.71	2.43	2.64	2.33	2.48	2.38	2.48	2.56
NH_4	1.99	2.13	1.74	1.76	2.34	2.02	2.25	2.49
Arg	13.50	10.41	11.55	12.24	12.03	11.80	12.20	12.09
Asp	12.05	12.27	11.67	11.52	12.15	11.96	11.54	13.18
Thr	4.06	4.69	4.08	4.47	4.38	4.10	4.55	4.94
Ser	5.10	5.18	4.52	5.05	4.85	4.76	4.75	4.17
Glu	18.17	19.77	19.19	19.13	19.09	20.05	19.57	20.54
Pro	3.88	4.80	4.47	4.49	4.58	4.20	4.30	3.04
Gly	5.86	6.67	6.16	5.85	5.41	5.63	6.28	5.09
Ala	3.95	3.22	3.30	3.76	4.53	3.86	3.81	3.33
Val	4.30	4.08	4.47	4.30	4.63	4.38	4.24	3.45
Met	0.72	0.35	0.79	1.03	0.85	0.96	1.07	0.47
Iso	4.10	3.63	3.75	3.09	3.29	3.64	3.45	3.41
Leu	6.12	5.68	5.90	7.15	6.41	5.85	6.14	5.94
Tyr	3.82	3.34	3.07	3.90	3.92	3.92	3.51	3.84
Phe	5.19	5.31	5.86	4.95	5.43	5.20	4.92	4.16
Tryp	0.82	0.82	0.86	0.72	0.80	0.82	0.83	1.03

Table 4 (Continued)

Amino Acid	33	34	35	36	37	38	39	40
Lys	4.00	3.28	3.77	2.40	3.83	3.38	3.76	3.23
His	2.32	2.61	2.19	2.06	2.23	2.23	1.90	2.11
NH_4	2.29	2.00	2.28	1.37	2.20	1.99	2.49	2.56
Arg	12.38	14.50	12.73	11.85	11.93	12.39	11.28	12.14
Asp	11.55	11.98	11.68	12.07	11.76	12.66	11.63	12.25
Thr	4.49	4.47	4.28	4.53	4.55	4.60	4.54	4.14
Ser	5.11	5.01	5.15	5.31	4.75	5.03	5.01	4.70
Glu	19.38	16.65	19.48	21.07	19.43	19.89	19.45	19.59
Pro	4.32	3.76	4.27	4.73	4.52	3.86	4.05	4.40
Gly	5.72	5.85	6.45	5.46	6.39	5.39	5.57	5.81
Ala	3.60	4.00	3.94	3.71	4.13	3.76	3.85	3.84
Val	4.12	4.25	3.99	4.42	4.33	4.00	4.40	4.34
Met	0.75	0.59	0.71	0.71	0.46	0.33	0.97	0.73
Iso	3.49	4.05	3.31	3.12	3.07	3.16	3.23	3.28
Leu	6.55	6.06	6.10	6.99	6.53	5.97	5.85	6.09
Tyr	3.54	3.70	3.53	3.40	3.60	3.60	3.68	3.53
Phe	4.95	5.18	4.97	5.00	5.11	5.05	5.12	5.15
Tryp	0.86	0.90	0.78	0.83	0.89	0.88	0.80	0.91

Amino Acid	41	42	43	44	45	46	47	48
Lys	3.15	3.42	3.66	3.71	3.45	3.76	3.52	3.47
His	2.05	2.19	1.94	2.07	2.50	1.76	2.00	2.04
NH_4	1.97	2.24	2.92	2.17	2.75	2.78	2.17	2.18
Arg	12.00	12.52	10.28	12.01	10.13	11.30	12.52	12.12
Asp	12.12	12.54	10.31	11.57	11.37	10.72	14.85	11.87
Thr	4.05	4.12	3.96	4.13	3.44	3.14	3.90	4.45
Ser	5.10	5.23	4.38	5.14	4.14	4.48	4.98	4.68
Glu	20.03	20.05	18.38	19.01	20.94	19.83	18.51	19.00
Pro	4.10	4.23	4.60	5.41	3.70	4.86	5.53	4.03
Gly	5.98	5.77	5.05	5.99	4.23	5.20	6.02	5.15
Ala	3.69	4.03	3.10	3.29	3.39	3.20	3.69	3.99
Val	4.20	4.32	3.80	3.66	3.28	3.45	3.62	4.32
Met	0.85	1.07	0.88	0.75	0.75	0.38	0.67	1.68
Iso	3.38	3.33	3.10	2.93	3.32	3.16	2.77	3.29
Leu	5.89	6.67	5.90	6.11	5.20	5.32	5.97	6.33
Tyr	3.60	3.61	4.24	4.35	3.16	4.08	3.62	4.17
Phe	5.00	5.00	5.10	5.69	4.58	5.20	4.92	4.82
Tryp	0.92	0.79	0.87	0.95	0.96	0.84	1.00	1.10

Table 4 (Continued)

Amino Acid	49	50	51	52	53	54	55	56	57
Lys	3.78	3.04	3.63	3.86	3.00	3.40	3.93	3.12	3.49
His	2.02	2.23	2.57	2.47	1.94	2.42	2.49	2.16	2.46
NH_4	2.23	2.17	2.31	2.20	2.44	2.16	2.81	2.11	2.27
Arg	11.65	12.04	12.63	11.73	11.12	12.11	12.06	10.98	12.29
Asp	12.23	13.55	12.22	12.43	11.30	12.20	11.36	11.65	11.98
Thr	4.39	4.22	4.12	4.44	4.21	4.37	4.33	3.86	4.33
Ser	5.19	4.39	4.58	5.20	5.16	4.70	4.73	4.68	4.81
Glu	19.80	20.50	19.04	19.65	21.98	19.36	18.67	19.16	18.79
Pro	5.27	4.37	4.95	5.47	4.68	4.52	3.92	3.69	5.16
Gly	5.94	4.91	5.73	5.87	5.28	5.49	5.36	5.00	6.00
Ala	3.43	4.43	4.54	3.53	3.78	4.50	3.64	3.98	4.62
Val	3.81	4.21	4.18	3.83	4.23	4.70	4.19	3.73	4.21
Met	0.51	0.53	0.71	0.66	0.85	0.87	1.04	0.68	0.74
Iso	3.08	3.84	3.21	3.10	3.13	3.30	3.76	3.61	3.18
Leu	6.43	5.68	6.17	6.46	6.50	6.18	5.71	5.26	6.38
Tyr	3.69	3.06	3.65	3.90	4.04	3.96	3.53	3.25	3.90
Phe	5.29	4.86	5.26	5.14	5.22	5.45	4.83	4.60	5.19
Tryp	1.01	0.86	1.02	1.12	0.93	0.82	0.86	0.98	0.93

Amino Acid	58	59	60	61	62	63	64	65	66
Lys	3.84	3.17	3.22	3.32	3.48	3.78	3.66	3.18	3.24
His	2.22	1.95	2.58	2.64	2.38	2.37	2.33	1.93	2.06
NH_4	2.30	2.16	1.82	2.07	2.86	2.29	2.51	2.49	1.93
Arg	11.34	10.66	10.15	10.58	10.27	12.63	12.27	10.31	10.62
Asp	12.12	11.15	13.51	12.87	11.53	12.22	12.24	10.75	12.60
Thr	4.40	4.21	3.98	3.35	3.23	4.19	4.06	4.07	4.05
Ser	5.10	5.49	3.90	3.68	4.54	4.89	4.67	5.25	4.96
Glu	19.70	22.06	21.26	22.70	20.30	19.26	19.73	21.17	19.00
Pro	4.94	4.70	4.61	4.01	3.55	4.72	5.04	4.43	5.10
Gly	6.64	5.54	4.85	5.15	4.51	6.62	5.97	5.24	6.17
Ala	4.40	3.57	4.42	3.29	3.56	3.58	3.80	3.41	4.40
Val	4.00	4.01	4.36	4.35	3.79	4.02	4.33	4.40	4.26
Met	0.89	0.98	0.79	0.89	0.82	0.67	0.61	0.86	0.97
Iso	3.06	3.01	3.38	3.85	3.28	3.19	3.28	3.26	3.19
Leu	6.48	6.58	5.71	5.20	5.64	6.42	6.35	6.59	6.10
Tyr	3.74	3.85	3.39	3.29	3.62	3.90	3.66	4.52	3.96
Phe	4.92	5.35	4.64	4.05	4.46	4.98	5.12	5.79	5.20
Tryp	0.79	0.94	0.85	0.90	0.92	0.83	0.81	0.87	0.88

Table 4 (Continued)

Amino Acid	67	68	69	70	71	72	73	74	75
Lys	3.57	3.93	3.69	3.56	3.51	3.90	3.17	3.42	3.60
His	2.67	2.59	2.12	2.27	1.97	1.74	2.30	2.37	2.26
NH_4	2.91	3.01	2.28	2.19	2.02	2.98	2.05	2.30	2.17
Arg	10.33	10.46	11.00	12.62	11.59	11.70	11.13	11.25	11.33
Asp	13.54	12.91	12.44	10.37	12.15	11.30	12.10	11.90	12.50
Thr	3.18	4.09	3.51	3.75	4.33	3.06	3.74	4.10	3.69
Ser	4.00	4.45	4.17	4.18	5.26	4.30	4.12	4.38	4.16
Glu	21.31	20.85	20.37	16.79	19.78	18.96	19.10	19.33	19.80
Pro	3.22	3.63	3.39	3.93	5.20	4.64	3.72	4.05	3.88
Gly	4.57	4.36	4.60	5.15	6.52	5.15	4.96	5.15	5.20
Ala	3.55	3.82	3.40	3.56	3.42	3.17	4.10	4.22	4.20
Val	4.13	3.63	3.51	3.24	3.55	3.76	4.15	3.96	4.00
Met	0.89	0.83	0.65	1.27	0.66	1.00	0.73	0.72	0.76
Iso	3.01	3.02	3.31	2.68	3.14	3.19	3.58	3.26	3.40
Leu	5.80	5.00	5.24	5.52	6.42	5.95	5.65	6.10	5.42
Tyr	3.46	3.17	3.05	4.53	3.86	4.24	3.46	3.82	3.38
Phe	4.04	4.26	4.74	5.08	5.16	5.24	4.25	5.20	5.10
Tryp	0.92	0.91	0.91	0.93	1.00	0.88	0.91	1.00	1.06

Amino Acid	76	77	$\bar{X}$(77 samples)
Lys	4.09	3.50	3.53
His	2.17	2.59	2.44
NH_4	2.02	2.19	2.16
Arg	10.02	11.06	9.19
Asp	11.33	12.12	10.81
Thr	4.26	4.00	4.16
Ser	4.93	4.37	4.24
Glu	18.80	20.30	20.12
Pro	4.20	3.44	3.91
Gly	5.17	5.17	5.13
Ala	3.66	4.15	3.91
Val	3.38	4.17	3.70
Met	1.55	0.59	0.79
Iso	2.73	3.70	3.04
Leu	6.02	5.48	5.92
Tyr	3.46	3.55	3.70
Phe	4.98	4.98	5.06
Tryp	0.91	0.95	0.88

* Values expressed as g amino acid/100 g of amino acids.

RESULTS AND DISCUSSION

The results of oil and total protein analysis are shown in Tables 1, 2, and 3. Peanut lines 72X39A-2-2-b2-B (55.2%), Huallaga (51.4%) and UF 77504 (53.4%) had high oil content, followed by NC-Fla 14, GK-19, 72X-47B-3-1-b3-B, UF 77303, and UF 77609. The average oil content for all 77 samples was 49.2 percent. Earlier, Pancholy et al. (4) have examined 27 peanut cultivars and found an oil content of 46 to 52 percent.

In general, the protein content of the cultivars ranged between 22.13 and 30 percent. The cultivar GKIA had the highest (30%) protein content, followed by 72X78-2-b2-B, Early Bunch, Florigiant, and UF 77514 (Tables 1, 2, and 3). A definite negative correlation was observed between oil and total protein content in peanut samples analysed during this study. The protein values found in this study are in agreement with the previous reports (4).

The results of amino acid analysis for 77 peanut lines and cultivars are reported in Table 4. Average methionine content of the samples was 0.79 percent. High methionine content was observed in the peanut line UF-77318, 72X78-11-1-b3-B and Jenkins Jumbo. The following lines and cultivars also contained relatively higher amounts of methionine: Huallaga, Makula Red, Dixie Runner, UF 77403, UF 77409, and UF 77514.

The average amino acid values are consistent with the findings of Pancholy et al. (4), Young (5), and Heinis (3). However, a number of peanut lines included in this study did contain high amounts of methionine and should be of potential interest to peanut breeders in developing high-methionine lines. Other essential amino acids, lysine and threonine are present in peanuts at concentrations close to the ideal amino acid composition and therefore, their deficiency is not as severe as that of methionine. Because of partial destruction of tryptophan during hydrolysis, low values are obtained for various peanut samples.

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Partial Morphogenesis in Peanut (Arachis hypogaea L.) Callus Cultures.

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ABSTRACT

The cotyledonary tissue of the peanut plant (Arachis hypogaea L.) was induced to produce callus tissue by growing in modified Murashige and Skoog's (MS) medium containing various concentrations of 2,4-D, NAA, kinetin and picloram. Callus tissue maintained on MS medium containing 2 mg/l each of 2,4-D, NAA and kinetin often developed roots within 6 weeks. The addition of mannitol (30 g/l) greatly enhanced root production. Histological examination of peanut callus cultures revealed numerous meristem formations and development of a few possible proembryos or embryoids in callus transferred to either low-auxin or auxin-less MS medium. None of the growth conditions tested induced the formation of shoots or mature embryos.

INTRODUCTION

The regeneration of complete plants form generally unorganized cell systems is necessary for the application of cell and tissue culture methods to plant breeding and germ plasma selection experiments done in vitro. Several methods have now been described for the recovery of complete plants from both cell and tissue culture. Organogenesis events producing shoots and roots have been described for many years (2,9,10,17). More recently, some of the factors necessary for the regeneration of viable plantlets derived from embryos formed de novo in both callus cultures (14,16) and liquid suspension cultures (7,9) have been elucidated. The role of phytohormones, especially auxins (11,15,20) has been implicated as playing a major role in control of morphogenesis for several leguminous plants (1,17, 18,19,21).

In this study, attempts were made to induce organogenesis and embryogenesis in callus cultures of three cultivars of the peanut, (Arachis hypogaea L.) by manipulating some components of the tissue culture medium. Factors such as medium osmolarity (13) and the use of auxin analouges (3,15, 17,18) have been shown to affect morphogenesis. Adjustments in medium osmolarity by the addition of the sugar mannitol, along with the addition of various phytohormones including the powerful auxin analouge, 4-amino-3,5,6-trichloropicolinic acid (picloram) were employed. The responses to these culture manipulations were evaluated by histological examination.

MATERIALS AND METHODS

Callus cultures of peanut were grown from the cotyledon tissues of three commercial cultivars "Early Bunch" (EB), 'NC-Fla 14' (NC), and 'Florunner' (FR). Callus growth was initiated by removing the plumule end of the seed and placing sterile cotyledonary fragments on modified commercially prepared Murashige and Skoog (MS) medium (Flow Labs) containing 0.8% agar. Standard tissue culturing methodology was employed as previously described (8). The MS medium was modified by the addition of 710 mg/l $CaCl_2.2H_2O$, 1.0 g/l NZ-Amine (Humko-Sheffield Chem.), 0.5 g/l xylose, 28 mg/l sequestrene (Ciba-Geigy) and several different concentrations of the phytohormones 2,4-dichlorophenoxyacetic acid (2,4-D), naphthalene acetic acid (NAA), and 6-furfurylamino purine (kinetin). In some cases the auxin analouge 4-amino-

3,5,6-trichloropicolinic acid (picloram) was substituted for 2,4-D. Osmotic variations of the MS medium were effected by the addition of sugar mannitol. Callus cultures were grown on modified MS medium containing 2mg/l each of 2,4-D, NAA and kinetin (designated as MS2:2:) for 3-6 weeks and then transferred to medium containing various concentrations of theses phytohormones (0:0:0, 1:1:1, 2:2:2, 4:1:1, 4:0.5:0.5, 1:1:4, 0:0:2). Histological examination of callus tissues was accomplished by fixing small pieces of callus in 4% gluteraldehyde for 24 hours and passing fixed tissues through a ethanol dehydration series (5). Dehydrated tissues were embedded in Paraplast Plus (Sherwood Medical) and serially sectioned at 10 u. Sections were mounted on glass slides and stained with safranin and counterstained with fast green (6).

RESULTS AND DISCUSSION

Earlier studies in this laboratory have shown that 2 mg/l each of 2, 4-D, NAA and kinetin in modified MS medium (MS2:2:2) provided the fastest fresh weight increase of peanut callus tissue (8). Callus growth was usually evident one week after cotyledonary fragments were placed on medium and callus growth was robust for all three cultivars (EB, NC and FR) on MS2:2:2 medium. Three to six weeks after transfer to the experimental medium listed previously roots emerged from a small number of those calli transferred to fresh MS2:2:2 medium. Roots appeared on approximately 20% of EB calli, less than 8% of NC calli and none of the FR calli. Root growth appeared only rarely on any other experimental medium. The addition of the metabolically inert sugar, mannitol (30 g/l) to MS2:2:2 medium greatly enhanced root generation to more than 75% for EB calli, nearly 50% on NC calli and 46% for FR calli. This effect was presumably due to osmotic stress placed on callus tissues grown in the presence of both sucrose and mannitol. These results differ from those obtained by Kimball *et al.* (13) who reported an increase in soybean callus growth rates, but demostrated no enhancement of differentiation by osmotic manipulation. In virtually all cases regenerated roots appeared morphologically normal developing root hairs, a root cap, and demonstrating distinct geotaxis (Fig. 1). Roots which grew down into the high auxin medium (MS2:2:2) rapidly produced more callus tissue. Rooted callus transferred to low auxin (MS1:1:1 or 1:1:4) or auxinless medium (MS0:0:0 or 0:0:2) demonstrated fewer secondary callus formations. Further experimentation with mannitol was not carried out since root formation seemed to be a "terminal" event in organogenesis (12). That is, once roots formed on any callus, no further differentiation was ever observed.

Callus growth for all cultivars was virtually identical whether 2 mg/l, 2,4-D or 0.2 mg/l picloram was used, although root formation was somewhat reduced when picoloram was substituted for 2,4-D. Auxins have been implicated in the suppression of both shoot meristem formation and *de novo* embryogenesis in callus cultures (4,12,16,22). Transfer of healthy callus cultures from the MS initiating medium, MS2:2:2, to low auxin or auxin-less medium was performed in an attempt to encourage one or both of these events. In no instance under any of the previously described growth conditions was the emergence of shoots observed from the callus tissues of any cultivar. Further, the regular examination of callus tissues utilizing a dissecting microscope yielded no visible evidence of embryo formation.

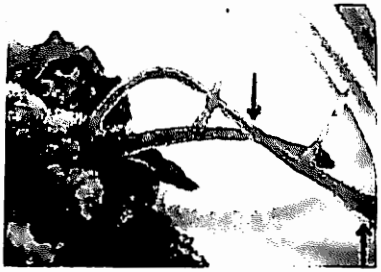

Fig. 1. Regenerated roots from Arachis callus (arrowed).

Fig. 2. Callus emerging from the epithelium (arrowed) of a cotyledon from the cultivar 'Florunner' x 80.

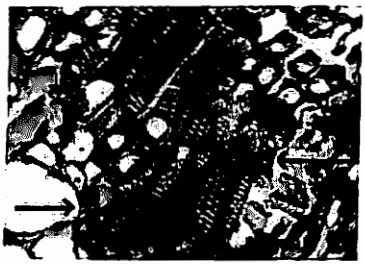

Fig. 3. Xylem and phloem transport elements (arrowed) growing rather randomly in vacuolated parenchyma cells. x 200.

Fig. 4. Active growth region (meristem) showing densely staining cells (arrowed) with prominent nuclei. x 200.

Fig. 5. Multiple meristematic complex obtained by growth on MS 2:2: 2 with mannitol (30 g/l). x 200.

Fig. 6. Meristematic region (arrowed) demonstrating cell separation from the remaining callus tissue. x 80.

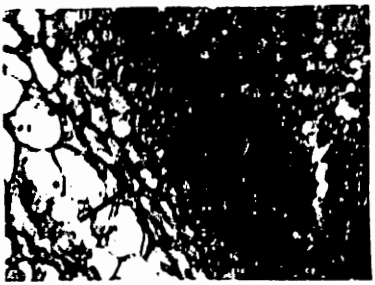

Fig. 7. Possible embryoid showing bilateral symmetry and possible leaf and root primordia (arrowed). x 200.

Histological examination of callus cultures grown under these various conditions did, however, lead to a number of interesting observations. Callus tissues derived from peanut cotyledonary fragments placed on MS2:2:2 medium consisted primarily of highly vacuolated parenchyma cells (Fig. 2) which later became randomly interspersed with xylem and phloem transport elements (Fig. 3). These transport elements were rarely associated with any of the active growth centers of the tissue. Many densely stained areas of meristematic growth centers consisted of darkly-stained, nucleated foci surrounded by what appeared to be an insulating layer of primarily senescent parenchyma-type tissue. These growth centers were predominately spherical in shape unlike the columnar shaped meristematic regions described as having developed in grape callus cultures (14). Meristematic foci developed almost exclusively on the outer periphery of the peanut callus mass, that is, in the regions most distal to the area where the callus contracted the medium.

Similarly, roots nearly always emerged from the uppermost position of the callus. A possible implication was that meristematic regions needed considerable insulation from the direct effect of phytohormones in the medium in order to undergo morphogenesis. In the cases where mannitol was added to the growth medium, callus cells seemed generally smaller and large areas consisting of many meristematic foci were often observed (Fig. 5). No other differences in histological organization were observed when mannitol was present in the medium.

Callus tissues sectioned three weeks or more after transfer to auxin-less MS medium demonstrated an overall appearance similar to that observed for auxin-containing medium. Auxin-less medium did maintain callus, however, it seemed to produce meristematic growth regions containing more tightly packed and generally darker staining foci than those formed in the presence of auxin.

The meristematic region shown in Figure 6 may be a late globular staged proembryo. Distinct isolation of the active growth region from the callus mass may have occured by the lysis of surrounding cells. Occasionally, bilaterally symetrical structures such as that seen in Figure 7 were observed in callus grown without auxin. Such a structure may have been an embryonic with rudimentary leaf and forming root primordia. The presumed embryoid was surrounded by enlarged, senescent parenchyma which was apparently beginning to undergo a cell separation event resulting from lysis of surrounding cells. Cell separation leading to isolation of a globular proembryo appears to be a necessary prerequisite for embryo maturation in the callus tissues of several plant types (9,14,16). No embryoid structures with development more advanced than that shown in Figure 7 were observed.

It seems that manipulation of medium osmolality or of auxin and cytokinin concentrations alone does not promote the development of shoot meristems or viable embryos from peanut callus cultures. Auxin concentration does, however, seem to have an important effect on the morphology of meristems fromed in callus culture and does possibly suppressing maturation and emergence of proembryo and embryoid structures. The further study of many factors including vitamins, chelating agents and amino acid composition of the growth medium will be needed before complete peanut plants are obtained from peanut tissue cultures.

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Control of Cercospora arachidicola and Cercosporidium personatum on Early Bunch and Florunner Peanuts in North Florida. F. M. Shokes, L. F. Jackson, and D. W. Gorbet, University of Florida, Institute of Food and Agricultural Sciences, Agricultural Research and Education Center, Quincy, Department of Plant Pathology, Gainesville, and Agricultural Research Center, Marianna.

Fungicides recommended for peanut leafspot control in North Florida (chlorothalonil, triphenyltin hydroxide & flowable sulfur, cupric hydroxide & sulfur, and mancozeb & flowable sulfur) were tested for efficacy against Cercopsora arachidicola and Cercopsoridium personatum on Early Bunch and Florunner peanuts (Arachis hypogaea L.). Counts of early and late leafspot lesions at five intervals during the growing season indicated the presence of C. personatum as early as 50 days and a predominance of this fungus from 70 days to harvest. At 90 days and thereafter the number of late leafspot lesions was the same or higher on Early Bunch than on Florunner for all treatments. Only chlorothalonil gave adquate control of both leafspots and prevented heavy defoliation by maturity. A treated check (chlorothalonil, 1.5X rate, and flowable sulfur) allowed only 21.4% defoliation at maturity compared to 99.9% for the untreated check. Late leafspot counts and defoliation observations indicate that Early Bunch may be slightly more susceptible to late leafspot than Florunner. All treatment yields were significantly higher than untreated controls with the treated check and chlorothalonil alone, yielding the highest (5604 kg/ha and 4753 kg/ha, respectively).

Influence of Peanut Cultivar and Stage of Shoot Symptom Development on the Production of Microsclerotia by Cylindrocladium crotalariae. John D. Taylor, G. J. Griffin, and K. H. Garren, VPI & SU, Blacksburg and USDA, SEA, Suffolk.

The production of microsclerotia by Cylindrocladium crotalariae in roots and pods of eight peanut cultivars, varying in susceptibility to Cylindrocladium black rot, was monitored in three field tests conducted from 1975 to 1977. Plants were grown in naturally infested field soils, and the root-pod zones of each cultivar were sampled with a post-hole digger at harvest. For each cultivar, shoots of plants were classified as dead, chlorotic and/or wilting, or asymptomatic previous to sampling. In 1975 and 1976, plants in all three symptom classes for every cultivar supported a build-up of microsclerotia in soils. In general, C. crotalariae produced the largest microsclerotium populations in susceptible cultivars, although appreciable populations were often produced in resistant plants. In 1975, higher microsclerotium populations were frequently produced in plants with asymptomatic shoots than in chlorotic and/or wilting plants, and the reverse was found in 1976. High populations were typically found for dead plants, but relatively low populations were sometimes associated with dead plants. The production of microsclerotia in plants within the three classes of shoot symptoms appeared to be affected greatly by the environmental conditions that prevailed within and between each growing season.

Effect of soil pH and the presence of remoistened peanut leaves on germination of Sclerotinia minor sclerotia. F. C. Hau, M. K. Beute, and D. M. Porter. North Carolina State University, Raleigh, and USDA, SEA, SR, Suffolk, Virginia.

Germination of S. minor sclerotia embedded in field soil at pH 5.0, 5.5, 6.0, 6.5, and 7.0 in 6-cm-diameter petri plates was studied in the presence of volatile stimulants from remoistened peanut leaves (0.007, 0.125, 0.250, 0.5, 1.0 and 2.5 g). Studies were conducted in 24-cm-diameter (9.9 L) enclosed dessicators. Field soil was collected from Clayton, N. C. and adjusted to the desired pH using either calcium hydroxide solution or 0.8% sulfuric acid. In the absence of peanut leaves, average percent germination of sclerotia was 1.7, 1.7, 5.0, 13 and 8.3 in soil at pH of 5.0, 5.5, 6.0, 6.5, and 7.0, respectively. Germination of sclerotia invariably increased in the presence of remoistened peanut leaves. Optimum amount of stimulant evolved from 0.25 to 0.50 g of dried peanut leaves and excessive peanut tissue ($\geq$ 1 g) tended to be inhibitory to germination. Average percent germination of sclerotia in soil with 0.25 - 0.50 g leaves was 7.5, 20, 27.5, 57.5, and 12.5 at pH of 5.0, 5.5, 6.0, 6.5, and 7.0, respectively. This study implies several epidemiologically important phenomena, i.e. 1) soil pH influences percent germination of sclerotia and 2) germination of sclerotia can be stimulated by remoistened peanut leaves, and 3) an interaction occurs between the conditioning effect of soil pH on germination of S. minor sclerotia and sensitivity to germination stimulants.

The Effect of Fungicides on Peanut-Field Soil Microflora. R. K. Lankow, D. M. Porter, J. R. Gouert, Diamond Shamrock Research Center, Painesville, Ohio and USDA, SEA, AR, Suffolk, VA.

The effects of 4 fungicides on microflora of peanut-field soils were monitored for 2 seasons. Soil bacterial populations were not affected by fungicide treatments but responded rapidly to soil moisture changes. Metabolic activity monitored by soil dehydrogenase was not affected by treatment. Trichoderma populations were monitored through the use of a selective medium. There were significant differences in Trichoderma populations with the highest populations occurring in plots treated with BRAVO and Difolatan. The lowest levels occurred in plots treated with DPX-4424. Benlate-treated and control plots has intermediate populations of Trichoderma. Trichoderma populations were highly correlated with Sclerotinia populations and with the incidence of Sclerotinia blight. It is suggested that fungicides may influence Trichoderma populations primarily by their effect on Sclerotinia, which in turn, serves as a food base for Trichoderma. The results indicate that the increased Sclerotinia blight levels observed following use of BRAVO and Difolatan are not due to direct inhibition of Trichoderma by the fungicides.

Peanut Pod Rot and Soil Calcium. A. S. Csinos and M. E. Walker, Departments of Plant Pathology and Agronomy, respectively, Univ. of Georgia, Coastal Plain Experiment Station, Tifton, Ga. 31794.

Five cultivars of peanut (Arachis hypogaea L.), Florunner, Tifrun, Florigiant, Ga. 194 Va. and Early Bunch, were grown for three years (1977-79) at Tifton, Ga. on a soil low in calcium (356 kg/ha) and at Plains, Ga. on a soil higher in calcium (752 kg/ha). Plots were top dressed with 0, 560, 1120, or 1680 kg/ha gypsum. Pod rot, commonly caused by Pythium myriotylum, Rhizoctonia solani and Fusarium solani, did not occur at the Plains location, however, significant ($P = 0.05$) differences among cultivars were detected for yield, % sound mature kernel (%SMK), % extra large kernels (%ELK) and value/ha. Severe pod rot occurred at the Tifton location for plots receiving 0 kg/ha gypsum, but pod rot decreased significantly in severity for all cultivars as the rate of gypsum applied increased. Significant differences in yield, %SMK, %ELK, pod rot, and value/ha occurred among cultivars at different gypsum rates. Florunner appears to be the best suited, of the cultivars tested, for south Georgia. These data support previous work which indicated suppression of pod rot and increase in yield with high soil calcium and demonstrates the dependancy of some cultivars on high soil calcium.

The Effect of Early Infection With Leaf Spot on Root Mass of Peanut Plants. H. A. Melouk, USDA, SEA, AR, Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078

One-month-old peanut plants of the cultivars Comet, Florunner and Tamnut 74 were inoculated twice, eighteen days apart with Cercospora arachidicola. Inoculations were accomplished by misting the plants with a conidial suspension (3×10^4 conidia/ml) of C. arachidicola that contained 1 ml of Amway surfactant per liter of inoculum. Inoculated and non-inoculated control plants were placed in a clear polyethylene chamber at 30 $\pm$ 2 C during day and 20 $\pm$ 2 C at night. Relative humidity was maintained between 90-95%. All plants were kept under these conditions for the duration of the experiment. The inoculations resulted in severe leaf spot infection that caused leaf defoliation of 40 percent or more. Degree of leaf defoliation was determined at 21 days after each of the inoculations. Aerial parts and roots were separated when plants were 90 days old. Roots were dried for 15 min in a microwave oven at maximum power. Reduction in root mass in peanut plants infected with C. arachidicola, as compared with non-inoculated controls, were 50, 56 and 60% for Tamnut 74, Comet and Florunner, respectively.

The Role of a Predictive Nematode Assay Program in Defining Nematode Problems on Peanut in Virginia. Joseph A. Fox and Patrick M. Phipps, VPI and SU, Blacksburg, Virginia and Tidewater Res. and Cont. Educ. Ctr., Suffolk, Virginia.

A predictive nematode assay program designed to detect potential nematode problems in fields to be planted with peanut in 1980 was conducted as a pilot project in the fall of 1979. After recommendations for nematode control were made to growers, the data from 340 samples processed between 11/1/79 and 12/15/79 were summarized in order to establish priorities for research and extension in 1980. Although it is estimated that 95% of the Virginia peanut acreage is treated annually, the data indicated 45% of the fields did not need nematicide treatment. Rotation effects on nematicide recommendations were indicated by the 11, 29, and 49% of the 1980 peanut fields without potential nematode problems following the 1979 culture of peanut, soybean and corn, respectively. The data also indicated ring nematode to be a problem in 33% of the fields, whereas root-knot nematode was a problem in 13% of the fields. Sting, lesion, stubby root and lance nematodes were considered problems in 13% of the fields with potential nematode problems. The culture of peanut resulted in higher populations of root-knot and ring nematodes than the culture of soybean or corn; the culture of corn resulted in higher populations of lance nematode; and soybean resulted in higher populations of sting and stubby root nematode. Two priorities set for 1980 were (1) to evaluate control measures for ring nematode and (2) to emphasize the treatment of fields with known nematode problems rather than encouraging indiscriminate use of nematicides.

The Interaction Between Fungicide Rate, Application Equipment and Adjuvant Use on Leafspot Control in Virginia Bunch Peanuts. Keith J. Middleton, J. Bjelke-Petersen Field Station, Dept. Primary Industries, Kingaroy, Qlk. Australia.

Chlorothalonil at 720 g and 360 g a.i. per hectare was applied to Virginia Bunch peanuts in Queensland, for control of leafspot (predominantly Cercosporidium personatum). The fungicide was applied with and without Amway All Purpose Spray Adjuvant by both conventional and spinning disc ("Controlled Droplet Application", or C.D.A.) equipment. Disease incidence and crop value were assessed at the optimum harvest date for each treatment. Plots treated with the higher rate of fungicide had significantly less disease than those treated with the lower rate ($P < 0.01$). From the factorial analysis of crop value, the second order interaction between equipment type, fungicide rate and adjuvant usage was significant ($P < 0.01$). Irrespective of adjuvant use, 360 g of fungicide applied through C.D.A. equipment produced crop of equal value to the higher rate applied through conventional equipment. The higher rate of fungicide applied through C.D.A. equipment without adjuvant depressed crop value, although this effect was not observed if the adjuvant was added.

Effect of Screening and Screen Openings on the Market Value and Quality of Farmers' Stock Peanuts. J. W. Dickens, USDA, SEA, AR, N. C. State University, P. O. Box 5906, Raleigh, N. C. 27650

Three 50-pound samples of Virginia-type farmers' stock peanuts collected at each of three locations in North Carolina during the 1979 market season were sized over rollers spaced 3/16, 4/16, 5/16, 6/16, 7/16 and 8/16-inch apart. The amounts of foreign material, loose shelled kernels (LSK) and pods which passed and which rode each spacing were determined. The kernels shelled from each segregation of pods and the kernels in each segregation of LSK were graded to determine the size distribution, the amount of splits, the count per pound, the amount of damage and the amount of minor defects. The value of the peanuts that rode each of the roller spacings and sold as farmers' stock quota plus the market value of the corresponding fall-through sold as farmers' stock additional was computed. The potential market value and quality of shelled peanuts produced from the farmers' stock peanuts that rode each roller spacing was also determined. The effects of screening farmers' stock peanuts on the disposition of LSK and the various types of foreign material are discussed in relation to the quality of shelled peanuts for edible purposes.

Nutrient Effects on Mineral Concentrations and Germinability of Peanut Seed. D. L. Hallock. VPI & SU, Tidewater Research and Continuing Education Center, Suffolk, VA 23437.

The effects of soil and/or foliar applied lime, N, P, K, Ca, Mg, Mn, Zn, Cu, B, S, or Fe on the elemental composition and germinability of peanut (*Arachis hypogaea* L.) seed were studied on two Aquic Hapludults. All treatments that contained considerable Ca increased Ca concentrations in seed except pulverized dolomitic lime. Concentrations of K in seed were increased by K soil treatments when no landplaster was applied. Foliar applied Zn decreased seed K levels and a combination of Zn + Mn spray treatment decreased seed Mg concentrations. None of the treatments decreased Fe, Cu, P, Mn, or Zn concentrations in the seed.

Germination varied from 39 to 82% and was highest where landplaster was applied alone. Application of 1,120 kg/ha of K_2SO_4 or KCl, or 224 kg/ha N as urea or NH_4NO_3 decreased germinability. Percentage germination was correlated positively with seed Ca and negatively with seed K concentrations. Fertilization practices which increase Ca uptake by the seed relative to K, particularly, should enhance peanut seed germinability.

Seasonal Patterns in Nitrogen Fixation of Peanut Cultivars. S. T. Ball, J. C. Wynne, G. H. Elkan, and T. J. Schneeweis, North Carolina State University, Raleigh.

Peanut production is dependent on symbiotic nitrogen fixation which is in turn affected by the strains of Rhizobium, the host genotype and environmental factors. In order to effectively manipulate the nitrogen-fixing potential of the host plant, basic information on the seasonal pattern of nitrogen fixation of peanut cultivars is needed. In two separate field studies conducted over 2 years, nodulation, nitrogen fixed (C_2H_2), biological yield, and fruit yield were determined for nine cultivars throughout the growing season.

Nodulation increased for each cultivar until just prior to harvest but nitrogen fixed (C_2H_2) peaked at early fruit fill. The pattern of biological yield also peaked during fruit fill while fruit weight continued to increase during the growing season. Virginia cultivars were superior to Spanish cultivars for all traits but interactions with harvest date were observed.

Cone Penetrometer with Digital Data Acquisition. F. S. Wright and J. L. Steele, USDA SEA, AR, Tidewater Research and Continuing Education Center, Suffolk, VA 23437.

A cone penetrometer was constructed to measure soil characteristics as affected by various tillage treatments. The device was tractor mounted on three-point hitch and powered with a DC motor. The cone can be moved horizontally for 100 cm and driven to a depth of 60 cm. The force (resistance of cone) with displacement was sensed with a Statham strain-gage load cell and recorded on an analog recorder. The analog signal to the recorder was digitized through a microprocessor and acquired on paper-tape by teletype. The paper-tape was read into a computer and analyzed as a cone index value (pressure of cone penetration with soil depth).

Twospotted Spider Mite Control Procedures on Large-Seeded Virginia-Type Peanuts. John C. Smith and R. W. Mozingo, VPI & SU, Tidewater Research and Continuing Education Center, Suffolk, VA 23437.

Field experiments were conducted from 1974-1977 in which the efficacy of various soil-applied systemic insecticides was compared with acaracidal and non-acaracidal foliar sprays. Severe infestations resulted at the treatment sites in 1975 and 1977. Moderate and late infestations were recorded in 1974 and 1976. The highest populations of mites developed in plots receiving foliar sprays of carbaryl (Sevin®). Disulfoton (Disyston®) and carbofuran (Furadan®) allowed heavy infestations. Preplant band and in-furrow treatments of aldicarb (Temik®) gave excellent suppression of populations. A split application of aldicarb gave excellent control and was equivalent to 3 foliar sprays of monocrotophos (Azodrin®) and slightly numerically inferior to 3 applications of dicofol (Kelthane®). No differences were noted between mite infestations developing on plots receiving scheduled fungicide applications of Du-Ter®, Benlate® + Manzate® or Difolatan® without insecticides. Yield and value factors were positively related to time of infestation and infestation level.

Solar Curing Peanuts in a Module. Joel E. Curtis and T. D. Hall, Gold Kist Inc., Anadarko, Oklahoma and Ft. Cobb, Oklahoma.

A 4 year study has indicated that peanuts can be successfully dried in Oklahoma, Texas, Virginia and North Carolina utilizing natural curing conditions in the field under various weather situations in Sol-Air Modules. The modules consist of a series of wire mesh barrels equally spaced and situated horizontally in a wire mesh container that allows natural air to diffuse through peanuts and dry without the aid of artificially induced air and/or heat to meet marketing moistures. The modules are designed to be filled directly in the field from combines, eliminating sack labor for the curing of seed and conserving fuel to dry peanuts artificially for commercial markets. A pilot program was initiated during the last season of the 4 year study in 1979 with 18 Oklahoma peanut growers and buyers purchasing 114 modules that successfully cured over 2,000 tons of peanuts on a commercial basis. The overall economic impact of converting to solar cured peanuts from the modules would be an approximate annual savings of $20,000,000 to the peanut industry in the southwest alone or a return of $60.00 for every ton generated in Texas and Oklahoma each season, conserving enough energy to supply 6,000 homes or 20,000 people each year.

Peanut Drying Energy Consumption-Simulation Analysis. J. M. Troeger, USDA, SEA, AR, Coastal Plain Experiment Station, Tifton, Georgia.

A deep bed peanut drying simulation model was used to examine energy consumption and drying time. The model was validated using actual drying test results. Estimates of drying time and energy consumption, based on initial moisture, ambient conditions and drying control settings, are presented in the form of regression equations and graphs.

Dichlorvos Aerosol as a Space Treatment for Peanut Shelling Plants. L. M. Redlinger, J. I. Davidson, Jr., H. B. Gillenwater, and R. A. Simonaitis, USDA, SEA, AR, Stored-Product Insects Research and Development Laboratory, Savannah, Ga., and National Peanut Research Laboratory, Dawson, Ga.

Details are presented on the performance of an automatic system for dispensing dichlorvos to control insects in peanut-shelling plants. Dichlorvos was dispensed at daily intervals from pressurized cylinders at the rate of 17.7 mg/m^3 (0.5 g a.i./1,000 cu. ft.). Distribution and efficacy were determined by residue analyses and bioassays. Dichlorvos residues were determined on the first 56.7-kg (125-lb) bag of peanuts from seven shelling fractions through the shelling plant and on the last bag of the day for each fraction. In addition, residues were determined on bagged lots of shelled peanuts stored in the shelling plant for 1 to 5 days. Test results showed good aerosol distribution and biological efficacy. Dichlorvos residues were found in some of the peanut fractions from the first bag shelled for the day. However, all residues were within the tolerance of 2 p.p.m., and no residues were found in any of the shelling fractions from the last bag of the day. Low levels of dichlorvos were found in split peanuts after the third day and remained below tolerance even after the fifth day. Low level residues occurred in jumbo and medium sized peanuts on the fifth day. All dichlorvos residues declined rapidly within 3 days after treatment was discontinued.

Effect of Dinitramine and Dinoseb on Cylindrocladium Black Rot (CBR) of Peanut. J. A. Barron and P. M. Phipps. VPI & SU, Blacksburg, VA and Tidewater Research & Cont. Educ. Ctr., Suffolk, VA.

Soils with high (2.0%) and low (1.1%) organic matter content (OMC) from two peanut fields were infested with Cylindrocladium crotalariae microsclerotia (ms) to a density of 30 ms/g soil, placed in 11.5-cm pots and maintained at 25C with soil temperature tanks in a greenhouse. Dinoseb and dinitramine were incorporated in the upper 2.5-cm soil just before planting Florigiant peanut seed. Plants grown for 8 wk in either OMC soil treated with dinitramine at 0.56 kg/ha exhibited symptoms of CBR that were significantly (P=.05) more severe than symptoms in untreated, infested soils. Dinitramine applied at 0.84 kg/ha to low-OMC soil did not significantly increase disease. Treatments with dinoseb at 1.72 and 3.36 kg/ha resulted in a significant (P=.05) increase in CBR in high-OMC soil, whereas dinoseb applied at 1.72, 3.36 and 6.72 kg/ha to low-OMC soil had no effect on disease severity. In a field test with high-OMC soil, microplots (77 cm-dia.) were infested to a density of 15 ms/g soil. Dinitramine and dinoseb were applied and incorporated at planting as in greenhouse tests. CBR was increased significantly (P=.05) in soil treated with dinitramine at 0.56 kg/ha, but not at 0.84 kg/ha. Dinoseb at 1.72, 3.36 and 6.72 kg/ha had no significant effect on disease severity. Although the mechanism is not clear, these results indicate that applications of these herbicides to certain soils can increase significantly the severity of CBR.

Control of Meloidogyne hapla, Belonolaimus longicaudatus and Macropostonia ornata on Peanut. P. M. Phipps and J. A. Fox, Tidewater Res. & Cont. Educ. Ctr., Suffolk, Virginia and VPI and SU, Blacksburg, Virginia.

Rates of non-fumigant and fumigant nematicides, as listed in the 1979 Va. Peanut Production Guide, were tested on a loamy fine sand to determine effects on nematode populations and on yield and quality of Florigiant peanut. Average pretreatment nematode populations per 250 cc soil were: Meloidogyne hapla (MH), 42; Belonolaimus longicaudatus, 22; and Macropostonia ornata (MO), 172. Non-fumigant nematicides were applied in a 30-cm band over the row and incorporated with a tilrovator. Fumigant nematicides were injected 20-cm deep with one chisel 5 cm from the seed furrow. All treatments were replicated 5 times and applied at planting time to the center two rows of 4 row plots (12.2-m long). Nematode populations were determined 80 and 140 days after treatment. Root knot gall ratings and pod injury ratings were made at harvest (140 days after treatment). A significant (P=0.05) negative correlation was found between yield and MH (r=-0.23) and MO (r=-0.24) populations at 80 days after treatment. Nematicides which reduced significantly populations of these nematodes as compared to the check increased crop value/A by 39%, whereas the nematicides which did not reduce significantly these populations increased crop value/A by 31%. Root and pod ratings as well as quality determinations indicated that no treatment provided complete nematode control.

Relationship Between Cercosporidium Personatum and Cercospora Arachidicola Leafspots on Florunner Peanut in Southern Georgia. Robert H. Littrell, Plant Pathology Department, University of Georgia, College of Agriculture, Agricultural Experiment Stations, Coastal Plain Station, Tifton, Georgia.

Cercosporidium personatum, the cause of late leafspot is the dominant foliar pathogen of peanut in the latter part of the growing season and has started earlier and been more widespread since 1976. Prior to 1976, Cercospora arachidicola was the major foliar pathogen. The comparative severity of the two leafspots was evaluated by counting lesions produced by each pathogen from July 5 through September 18. Four central stems were removed from plots at two-week intervals and lesions per leaflet recorded. Late leafspot was first detected on July 19 and within six weeks became dominant. Ratio of early to late leafspot lesions on Aug. 18 from control plants was 0.766/4.47 and by Sept. 18 was 0/11.74. Plants receiving foliar sprays of chlorothalonil (1.23 kg/ha), fentin hydroxide (0.26 kg/ha) or captafol (1.68 kg/ha) had leafspot ratios of 0.08/3.39, 0.10/14.31 and 0.19/13.51, respectively. Late leafspot increased regardless of fungicide treatment. C. personatum appeared to be more difficult to suppress with recommended fungicides for peanuts than C. arachidicola and was the main cause of defoliation during the last of the season. In addition to being less affected by fungicides, C. personatum apparently has other factors giving it a competitive advantage over C. arachidicola in late season.

Utilization of a Peanut Leafspot Forecasting Model in Virginia. Norris L. Powell, D. Morris Porter, and Roberta L. Dow, Department of Agronomy, VPI&SU, Blacksburg, VA; USDA, SEA, AR, Tidewater Research and Continuing Education Center, Suffolk, VA and Department of Plant Pathology and Physiology, VPI&SU, Blacksburg, VA.

An automated environmental monitoring system was employed to determine conditions conducive for Cercospora leafspot caused by Cercospora arachidicola and C. personata. Field plots in several Virginia counties were sprayed with Cercospora leafspot fungicide on a 14 day schedule or sprayed as needed according to a weather based forecasting model. In 1978, field plots sprayed according to need required three fungicide applications, while five were required on the 14 day schedule. There was no significant difference in yield between the two treatments. In 1979, four applications were made based on need, compared to six or seven on the 14 day interval. Sites at three western counties required only two spray applications, according to the model, while six to seven were required on the 14 day schedule. There was no significant difference in yield between the two spray schedules at eight out of nine sites studied in the two seasons.

Evaluation of Fungicides for Pythium Pod Rot Control. T. E. Boswell and W. J. Grichar, Texas Agricultural Experiment Station, Texas A&M University System, Yoakum, Texas

Several compounds were evaluated during 1978 and 1979 for the control of pythium pod rot, caused by Pythium myriotylium, in two South Texas peanut fields with histories of severe disease incidence. Metalaxyl at 1.12kg ai/ha as a planting or pegging treatment was most effective for Pythium pod rot control in both years. The pod disease rating (0 = no disease; 10 = completely diseased) of 0.8 for metalaxyl was significantly lower than the check at 6.9 in 1978. The yield increase with metalaxyl was not significant, but the gross dollar value of $1,710/ha was significantly higher. In 1978, SN 66752 at 4.48kg ai/ha applied at planting or pegging did not affect the pod disease rating. Copper ammonium carbonate at 2.24kg ai/ha applied at pegging had a disease rating of 4.8. In 1979, metalaxyl at 0.84kg/ha resulted in a significantly lower % DK (0.4) and pod disease (1.2) as compared to the check (2.0 and 4.3), respectively. In 1979, SN 66752 liquid and granules were compared at planting plus pegging at 4.48kg ai/ha resulting in lower % DK (0.3 and 0.7) and pod disease ratings (1.7 and 1.6), respectively. Also, copper ammonium carbonate at 2.24kg ai/ha at planting or pegging reduced % DK (1.6 and 1.0) and disease ratings (2.6 and 3.4), respectively.

Application of Metham Through Sprinkler Irrigation for the Control of Soilborne Pathogens of Peanuts. J. Krikun, G. C. Papavizas and Z. Frank. USDA, SEA-AR, Beltsville, Maryland 20705 and the Volcani Center, Bet Dagan, Israel.

Laboratory studies with soil columns indicated that to obtain an even distribution throughout the soil profile of methylisothiocyanate (MIT), the active ingredient of sodium methyldithiocarbamate (metham, Vapam^{R}), the fumigant should be applied continuously into the irrigation system during the entire duration of a preplant irrigation period. This method was used in field tests to control Verticillium wilt and a peanut pod rot caused by a Pythium-Rhizoctonia complex. Verticillium wilt was controlled with 600 liters/ha and the pod rot with 250-500 liters/ha applied to 25 and 50 cm depth, respectively. In Israel, yields of export grade peanuts were increased by 500% by controlling pod rot. In preliminary tests with soil columns, we found that metham solutions of 25 µg active ingredient (a.i.)/ml gave partial control of Sclerotium rolfsii and Sclerotinia minor. Solutions of 50 µg a.i./ml gave complete control. The antagonist Trichoderma harzianum survived these rates. Studies are underway to determine whether sublethal rates of metham predispose sclerotia of S. rolfsii and S. minor to enhanced biocontrol by T. harzianum.

Testae of Wild and Cultivated Peanuts: Surface Morphology and Fungal Penetration. Ruth A. Taber, Maria Olszak, Charles E. Simpson, Robert E. Pettit, and Olin D. Smith, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas, 77843; Institute of Pomology, Skierniewice, Poland; Stephenville, Texas, 76401 and College Station, Texas, 77843.

Peanut testae were examined by scanning electron microscopy in order to relate surface morphology with resistance to fungal penetration. Sixteen wild species, six plant introductions, three breeding lines, and six cultivated varieties were studied. Common characteristics included the presence of Malpighian cells with phalanges in various patterns, areolae, and cutin deposits. Those testae exhibiting small areolae included three wild, three PI's, two breeding lines, and two cultivated. Those having large areolae were all wild species; all others were intermediate. Areolae varied from almost non-existent with overlapping phalanges in Arachis rigonii to large and open with abortive phalanges in Arachis paraguariensis. Phalanges were obvious in some testae; in others their morphology was obscured. Impressions of cutin deposits varied with the cultivar. Penetration of Aspergillus flavus and other fungi into the testae was observed.

Detection of Mold and Mycotoxin Damaged Peanut Kernels with Helium-Neon Laser Reflected Energies. Robert E. Pettit and Andrew K. Chan, Department of Plant Sciences and Electrical Engineering Department, Texas A&M University, College Station, Texas 77843.

An improved nondestructive technique for accurately detecting the extent to which peanut kernels are damaged by molds and mycotoxins (eg., aflatoxin) has been under study. A helium-neon laser emitting light at 6550 A° wavelength with horizontal and vertical polarized components was first standardized on a known background target. The laser was then directed on the peanut kernel surface and the back scattering amplitude of both polarizations recorded along with a computer calculated ratio of the amplitudes. Preliminary results indicate that the amplitudes detected for pickout kernels are 30 to 40% below the amplitude recorded for sound mature healthy kernels. The amplitudes for Aspergillus flavus inoculated kernels were 15 to 20% below those recorded for the sound mature kernels. The polarization ratio for sound mature healthy peanut kernels was found to deviate only slightly from unity. With mold damaged kernels examined along the long axis the horizontal wave component decreased so that the polarization ratio ranged from 0.60 to 0.80. Evidence indicates that the amplitude of the reflected laser beam correlates with the surface features of the kernels while the polarization ratio provides information on the internal composition of the kernels.

Effects of a Lime Slurry on Soil pH, Exchangeable Calcium, and Peanut Yields.
Fred Adams and Dallas Hartzog, Auburn University, Wiregrass Substation, Headland, AL 36345.

The effectiveness of a low rate of lime slurry for peanut (Arachis hypogaea L.) production was evaluated on four Coastal Plain soils of southeastern Alabama. The four experimental sites were selected on farmers' fields because of their low soil pH and low exchangeable Ca. Lime was applied just prior to planting at a 560-kg/ha rate and at the recommended rate; lime sources included a slurry, an equally-fine dry limestone, and an agricultural-grade limestone. Soil pH and exchangeable Ca of the Ap horizon were measured by depth increments when crop was harvested. Lime slurry and dry lime at equivalent rates had identical effects on soil pH and peanut yields. The 560-kg/ha rate was inadequate for maximum peanut yields on Ca-deficient soils. The recommended rate of agricultural-grade limestone was more reactive than the low rate of lime slurry, and it also produced higher peanut yields.

Optimizing Storage for Farmers' Stock Peanuts--A Multidiscipline Team Approach.
J. S. Smith, Jr., J. I. Davidson, Jr., T. H. Sanders, R. J. Cole, and J. A. Lansden, National Peanut Research Laboratory, Dawson, GA 31742

Prior peanut storage research has been primarily confined to limited discipline and applied research that was based primarily on grain storage concepts. Research being undertaken here involves a multidiscipline team approach incorporating a balance of basic and applied research. Prevention of A. flavus mold growth and the production of aflatoxin will be the main emphasis in maintaining quality. Maintaining other edible quality parameters and milling quality will also be important consideration in this study. This is the initial report that will describe the overall research plan for this study. It will set the stage for two following papers that will provide data and results from the first phase. This paper will also provide the research plan for current studies on improvements in warehouse design and construction, ventilating and aerating systems, insect control methods and application equipment, warehouse loading and unloading, reducing effects of foreign material, temperature and humidity monitoring, reducing effects of meteorological conditions, and use of mathematical modeling concepts.

Some Properties of Peanuts and Foreign Material as Related to Farmers' Stock Storage. J. I. Davidson, Jr., J. S. Smith, Jr., R. J. Cole, T. H. Sanders, and P. D. Blankenship, National Peanut Research Laboratory, Dawson, GA 31742

Samples were taken from several commercial peanut warehouses to determine moisture contents, segregational characteristics and other properties of foreign material that may result in undesirable storage environments. High moisture foreign material included wild cucumbers, bullnettle berries, raisins, sticks, vines, and dirt. Segregation of the foreign materials appears to result from heavy and small materials (such as dirt, rocks, LSK, raisins, and small bullnettle berries) sifting down through the peanuts during the loading and unloading of the warehouse. Whole gherkins and large bullnettle berries tended to roll down the pile and segregate near the floor, walls, and valleys between the piles. Laboratory studies of "soldiers" showed that they are generally formed by high moisture conditions produced by sources such as condensation, leaks, improper insecticide applications, etc. The presence of high moisture foreign materials in storage result in significant quality problems because they are point sources for mold growth and they place an additional moisture load on the aeration and ventilation systems. Segregation of foreign material and LSK magnify storage problems because LSK are more susceptible to mold, insects and rancidity, and because dirt, LSK and other foreign material restrict air circulation and the gravity flow of peanuts.

Peanut Quality Changes Associated with Deficient Warehouse Storage. Timothy H. Sanders, John S. Smith, Jr., John A. Lansden, James I. Davidson, and Richard J. Cole, USDA, SEA, AR, National Peanut Research Laboratory, Dawson, GA.

Six peanut warehouses with various storage deficiencies were identified. Two 20 kg samples were bagged from each warehouse and one sample was analyzed immediately; the other remained in the warehouse and was recovered and analyzed when the warehouse was unloaded. SMK + SS, LSK, OK and damaged seed from official grade subsamples from selected locations as well as soldiers and around soldiers were analyzed for free fatty acids and total carbonyls. Official grade and chemical data indicate that some quality deterioration occurred during storage and suggest that largest changes occurred soon after storage while ambient air temperatures were high. Peanuts in soldiers were generally of inferior quality when compared to peanuts from around the soldiers.

Rainfall Control Plot Facility at National Peanut Research Laboratory. Paul D. Blankenship, Richard J. Cole, and Timothy H. Sanders, National Peanut Research Laboratory, Dawson

Six 18 ft X 40 ft plots with automatic mechanized roof systems for rainfall control have been constructed. The 6-ft-deep artificial soil profiles in the plots are positively drained and protected from lateral soil moisture movement. Soil physical property data are measured and collected automatically. The facility is designed to provide absolute moisture control so that factors and relationships affecting Aspergillus flavus invasion of peanuts in the field may be studied.

Effects of Low-Oxygen Atmosphere Processing and Storage on Field Performance of Florunner Seed. Whit O. Slay, National Peanut Research Laboratory, Dawson

Conventionally stored and processed Florunner seed peanuts were planted in a split plot design with peanuts from the same seed lots that were processed and stored using low-oxygen atmosphere methods. Peanuts in the low oxygen atmospheres lost approximately 0.2 of a percentage point in moisture during storage, and conventionally stored peanuts lost almost 1.5 percent. Yields appeared to be influenced more by seed quality than by the processing and storage methods. Significant differences in seed lots were indicated in 11 out of 14 of the grade factor responses. In treatments significant differences were found in only two grade factor responses. Interaction between treatments and seed lots was indicated in only one grade factor response.

Microprocessor Controlled Peanut Dryer - A Progress Report. J. L. Steele, USDA SEA, AR, Tidewater Research and Continuing Education Center, Suffolk, VA 23437.

A single board microprocessor, an analog/digital converter, multiplexer, control circuitry and software were assembled and successfully controlled a peanut dryer in 1979. A detailed description of the above system and its operation was provided. The control principles included in the software for first year operation were upper temperature limit, lower temperature limit, maximum drying air potential and time based fan cycling. Typical control performance data were presented. Future plans for optimizing a conventional peanut drying operation were discussed.

On-Farm Solar Assist Peanut Curers. A. J. Lambert, Agricultural Engineering Department, VPI&SU, Blacksburg, VA.

In cooperation with two farmers in Greensville County, Virginia, two integrated shed solar collectors for peanut curing have been designed, constructed, and performance tested during the falls of 1977-79. Preliminary investigation of reuse of drying air to lower energy consumption was conducted at one location in 1979. About 36 percent of the fuel energy was saved by the solar collectors as indicated by data collected. Additional on-farm solar collectors are being constructed in 1980.

Use of the Pedigree to Develop Multiline Peanut Varieties. A. J. Norden. Agronomy Department, University of Florida, Gainesville, Fla.

The principle methods of breeding self-pollinated crops were reviewed briefly prior to demonstrating the use of hybridization followed by a modified pedigree selection procedure for the development of improved peanut varieties. The advantages and disadvantages of compositing early generation lines into new peanut varieties were illustrated. The advantages of multiline peanut varieties are: (1) productive in a greater range of environmental conditions, (2) produce more stable yields when seasonal conditions vary, and (3) offer broader protection against disease. The disadvantages are: (1) less uniform than pure line varieties, (2) more difficult to maintain seed stock and identify in seed certification programs, and (3) generally lower yielding in a given year or location than the best line within it.

Selection indices, data collection and methods, and a system of recording the manipulations of hybrid populations in successive generations in the process of developing multiline peanut varieties were also presented.

Use of Single Seed Descent and Population Improvement Methods. J. C. Wynne and T. G. Isleib, North Carolina State University, Raleigh.

Peanut improvement programs have traditionally employed conservative breeding procedures such as the pedigree and bulk methods. Current breeding philosophy places more emphasis on population improvement methods that maximize recombination among selected genes. These methods include various forms of recurrent selection, such as phenotypic recurrent selection and the diallel selective mating system. A modification of Compton's recurrent selection procedure is being used with apparent success in two populations in peanuts. Single seed descent is being used to streamline this procedure to allow testing of F_4 progenies each two years. In addition to the recurrent selection procedures, convergent and composite crosses are being evaluated as breeding procedure for peanuts.

Single seed descent, or modified pedigree selection, may be used as a breeding method per se. The major advantages of the method are that it avoids selection in early segregating generations and allows for a rapid approach to homozygosity in the population.

Convergent Crossing for Peanuts. W. D. Branch, Dept. of Agron., Univ. of Georgia, Coastal Plain Expt. Stn., Tifton, Ga.

Several alternatives are available for crossing peanuts (*Arachis hypogaea* L.). One of these, convergent hybridization, offers opportunities for combining several sources of germplasm relatively quickly. The initial step involves carefully chosen, single cross combinations. This is followed by converging and crossing F_1's in a pyramid fashion. Advantages and disadvantages of this crossing method can be given. However, only after thorough testing can its potential be adequately evaluated for peanut breeding.

Methodology and Success in Breeding for Early Maturity. J. S. Kirby and D. J. Banks, Oklahoma State University and USDA-SEA-AR, Stillwater, Oklahoma.

In May 1980, 'Pronto', an early maturing Spanish peanut cultivar, was released jointly by the Oklahoma and Georgia Agricultural Experiment Stations and the U. S. Dept. of Agriculture. This cultivar was developed specifically for earliness utilizing 'Chico' (P.I. 268661), a very early but small-podded and small-seeded Spanish genotype from Russia as the female parent. The male parent was the Spanish cultivar 'Comet'. Pronto traces to one of several single plant selections made in F_3 at the Caddo Research Station, Ft. Cobb, Oklahoma in 1973. Criteria used in its selection, besides earliness, were apparent high pod yield, and favorable plant, pod, and seed characteristics.

Based on observations made in the development of Pronto and other early, high-yielding genotypes, we present the following ideas. A successful program aimed at breeding for earliness depends on (1) parents that combine well to give early maturing, agronomically desirable segregates; (2) rigorous selection for earliness by limiting the growing season; (3) selection of desirable plants in the F_2 - F_4 generations; (4) rapid generation advance; and (5) extensive field testing. The early maturing genotypes developed under our conditions appear to exhibit their greatest advantage over typical Spanish varieties when grown under dryland conditions and a short growing season.

Cytogenetics of Arachis. H. T. Stalker, North Carolina State University, Raleigh.

Arachis hypogaea L. and its wild peanut relatives comprise a large group of diploid and tetraploid species. Polyploidy probably evolved as two independent events in the genus. Aneuploid A. hypogaea plants have been documented in the literature; however, aneuploidy occurs frequently after colchicine treating interspecific hybrids. Reports of chromosome morphology in A. hypogaea are limited to a small chromosome pair, several types of secondary constrictions, and oversimplified observations of centromere position. The diploid species A. batizocoi, A. cardenasii, A. duranensis, A. chacoense and A. stenosperma have unique karyotypes, while the karyotypes of A. spegazzinii, A. villosa and A. correntina are indistinguishable from each other. Meiosis of diploid Arachis species is regular with 10 bivalents. The tetraploids A. hypogaea and A. monticola behave cytologically like diploids, but some intraspecific A. hypogaea hybrids have a higher frequency of univalents than parental types. Chromosome associations in A. hypogaea x diploid sect. Arachis species varies with the parents used in the hybrids. Arachis hypogaea x A. cardenasii F_2C_1 hybrids have up to 20 univalents and a few quadrivalents per pollen mother cell. Interspecific hybrids among diploid species of sect. Arachis are meiotically normal except when A. batizocoi is used as a parent. Amphidiploids of this section range in fertility and cytological behavior, with frequent multivalents. Chromosome pairing among species of intersectional hybrids has also been observed.

Response Of Labidura Riparia To Pesticide Residues On Peanuts. Nancy Aquilera de Rivero, University of Florida, Gainesville, Florida, and Sidney L. Poe, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

When individual earwigs, Labidura riparia (Pallas), were exposed to peanut foliage sprayed 1, 4 and 8 days earlier at recommended rates in north-central Florida peanut fields, the pesticides which resulted in the greatest mortality were methomyl, toxaphene, carbaryl and monocrotophos. Toxaphene and methomyl kept their residual toxicity until the end of the experiments (48 hours). The fungicides benomyl + maneb and chlorothanonil apparently had no effect on L. riparia when exposed to sprayed peanut foliage.

To determine if host larvae killed by pesticides and consumed by earwigs affected predator mortality, seven-day old larvae of fall armyworm, Spodoptera frugiperda (J. E. Smith), were sprayed with pesticides and fed to earwigs. Results of poisoned larvae on earwigs showed that monocrotophos and carbaryl-killed larvae were significantly more toxic to the earwigs than those killed by other pesticides. Monocrotophos was most toxic at 24 hours post-treatment. At 48 hours larvae killed by monocrotophos and consumed by the predators resulted in almost 100% mortality. Although the mortality caused by chlorothanonil and bentazon treated larvae was not as great as that of monocrotophos and carbaryl treated larvae, 38.3% and 31.6% of the individuals were affected by these materials respectively.

Cultural Control of the Twospotted Spider Mite on Peanuts. W. V. Campbell, North Carolina State University, Raleigh.

The twospotted spider mite (Tetranychus urticae Koch) is a destructive pest of peanuts that may cause reduction in yield as high as 65% in North Carolina. Mite population and mite damage are influenced by weather and pesticides. If no pesticides are used on peanuts, spider mite outbreaks will not occur. This information was used to develop a cultural method for mite management. Mite damage is prevented or delayed and reduced by the use of a buffer strip of untreated peanuts completely surrounding the main crop that receives a standard pesticide schedule. When peanuts are surrounded by an untreated buffer strip, the infestation pattern is typically isolated "hot spots" of mites rather than a general infestation pattern from the field border.

A Survey of Early Season Populations of Leafhoppers in Peanut Fields. L. W. Morgan, E. T. Hibbs and J. W. Todd, Coastal Plain Experiment Station, Tifton and Georgia Southern College, Statesboro.

A recent sampling of leafhopper species and numbers in peanut fields has indicated that, in addition to the potato leafhopper Empoasca fabae (Harris), 11 other species of leafhoppers were present at least during a portion of the growing season.

A survey, beginning at planting has been initiated to determine the sequence in which the different species appear in peanut fields. This study also encompasses alternate host plant relationships and observations on biology.

Herbicide Component Performance in the Control of Problem Weeds in Peanuts. O. E. Rud, Tidewater Research and Cont. Educ. Ctr., Holland Station, Suffolk, Virginia.

Several herbicides were evaluated for control of selected weeds in a natural field infestation in peanuts in 1977 and 1978. A strip test experimental design enabled evaluation in all possible combinations and each herbicide alone. Weed control ratings recorded on selected species were related to the herbicide or combination of herbicides. Bentazon was more efficacious on (Sida spinosa L.) than acifluorfen, but acifluorfen gave better control of (Ipomoea sp.) and (Amaranthus retroflexus L.) than did bentazon. There appeared to be less selectivity between weed species controlled with dinoseb than with bentazon, acifluorfen and 2,4-DB.

New Approaches to Weed Control in Peanuts. Howard Greer, Don Murray and John Soteres, Oklahoma State University, Department of Agronomy, Stillwater, Oklahoma 74078.

Peanuts grow slowly and do not shade the soil quickly, therefore early applied herbicides often do not provide full season weed control. Directed sprays cannot be used in the prostrate growing crops like they can in upright growing crops. With this limitation on herbicide selection for difficult-to-control weeds such as copperleaf and teaweed in peanuts, new methods of achieving herbicide selectivity is a very important phase of peanut weed control research. Postemergence herbicide applications may provide one method of weed control. Several herbicides that cause severe injury if applied to peanuts in sprayable formulations are showing promise when applied as granular formulations. The rope-wick is another method that has shown good promise as a selective placement of certain herbicides for tall growing escape weeds. Perennial weeds such as Johnsongrass, have been almost impossible to control in the past because of seeds from escape plants. Selective placement of herbicides can help eliminate seed production from late germinating weeds. Low growing perennial weeds such as horsenettle and silverleaf nightshade are serious problems in peanut production. Methods of using available herbicides to control these low growing weeds look promising in peanuts.

Promising New Herbicides for Weed Control in Peanuts. W. J. Grichar, T. E. Boswell, and M. G. Merkle, Texas Agricultural Experiment Station, Texas A&M University System, Yoakum, Texas, and College Station, Texas

Field experiments were conducted in various peanut growing areas of Texas during the past three years to determine the effectiveness of new compounds for weed control in peanuts. Several new herbicides (Dual, Dowco 295, and Uniroyal S-734) have shown promise for control of nutsedge and grassy weed species; however, they are generally less effective for controlling broadleaf weeds. Dual, at 1.4 to 2.8kg ai/ha gave control ranging from 65 to 99% for yellow nutsedge. Control of carpetweed was above 90% in early season ratings, but in some experiments control was less than 50% at harvest time. Crabgrass control remained above 90% for the 2.8kg ai/ha rate, but control with the lower rate was inconsistent. Dowco 295 at rates ranging from 0.56 to 3.36kg ai/ha has shown promise as a control for some broadleaf and grass weeds. However, in 1977 the control obtained for yellow nutsedge varied from 35 to 88%. In 1979, nutsedge control at harvest time was 91 and 87% with 2.24 and 2.8kg rates, respectively. Uniroyal S-734 gave excellent late season nutsedge control at rates of 0.28 to 1.68kg/ha. Early season control in 1979 was 73-82%, while the late season control was 93-99%. Control of purslane and carpetweed at harvest time varied from 0 to 50% in 1978 and 1979. Generally control of crabgrass was above 90% with the 1.12 and 1.68kg rates but the 0.56kg and 0.28kg rates did not give satisfactory control.

Breeding Peanuts for Resistance to Colonization by *Aspergillus* Species. A. C. Mixon. Cooperative University of Georgia Coastal Plain Station and USDA-SEA-AR, Tifton, Ga.

Evidence of the potential for developing peanut cultivars (*Arachis hypogaea* L.) with favorable agronomic characteristics and resistance to aflatoxin-producing strains of *Aspergillus* species is presented. Results of selection within successive generations following cross breeding has produced several lines with promising performance. Yield, value and seed quality data for six advanced lines derived by using pedigree selection from crosses revealed that two of the lines have yield and other characteristics comparable to the commercial Florunner variety.

Disease Resistance Breeding at ICRISAT. R. W. Gibbons, S. N. Nigam, J. P. Moss, D. J. Nevill, and S. L. Dwivedi. ICRISAT, India.

Disease resistance breeding is a major goal of the ICRISAT peanut improvement program as fungicides and spraying equipment are often beyond the means of the small farmer of the semi-arid tropics.

Of the foliar diseases, rust and leafspots are receiving the highest priorities. Resistance to the late leafspot, Cercosporidium personatum, and rust, Puccinia arachidis, has been found in cultivars from the germplasm collection. Some cultivars are resistant to both pathegerms. These cultivars have been used extensively in hybridization programs.

Diploid wild Arachis species, which are resistant to Cercospora arachidicola and C. personatum, are also being utilized in the breeding program. Interspecific hybrids at the hexaploid level are rated for leafspot resistance and are backcrossed to A. hypogoen in order to produce near tetraploid breeding lines.

Other programs include breeding for resistance to Aspergillus flavus and other pathogens affecting roots and fruits. The germplasm collection is also being screened for sources of resistance to peanut mottle virus (PMV) and tomato spotted wilt vines (TSWV).

Breeding for Resistance to Cylindrocladium Black Rot and Sclerotinia Blight. T. A. Coffelt, D. M. Porter and K. H. Garren, USDA, SEA, AR, Suffolk, VA.

Cylindrocladium black rot (CBR) caused by Calonectria crotalariae (Loos) Bell & Sobers (Cylindrocladium crotalariae (Loos) Bell & Sobers) and Sclerotinia blight (SB) caused by Sclerotinia minor Jagger are two of the most serious diseases of peanuts (Arachis hypogaea L.) in Virginia. Breeding for resistance to CBR started in 1973 and to SB in 1977. Over 200 genotypes have been screened for resistance to CBR. Most Spanish cultivars and no current Virginia cultivars are resistant to CBR. Some Virginia-type breeding lines have been identified with resistance to CBR. Differential reactions of pods and roots on the same plant to CBR indicate separate genetic mechanisms may control resistance of these plant parts. Differential reactions of genotypes among locations and significant differences between locations indicate that different strains or races of the fungus, environmental factors and/or innoculum levels influence CBR resistance. F_4 and F_5 lines are being evaluated for resistance to CBR and agronomic characteristics. Over 50 genotypes have been screened for resistance to SB. Two genotypes (Chico and VA 71-347) are significantly more resistant to SB than current cultivars. Cytoplasmic factors are indicated in the SB resistance of Chico, while morphological factors are indicated in the SB resistance of VA 71-347. Advanced lines are being evaluated for resistance to SB and agronomic characteristics.

Breeding for Resistance to Pod Rot and Lesion Nematodes. O. D. Smith and T. E. Boswell, Texas Agricultural Experiment Station, Texas A & M University, College Station and Yoakum, Texas.

Adapted cultivars were crossed and backcrossed with Plant Introductions 341885 and 365553 for pod rot resistance, and 295233 and 290606 for lesion nematode resistance. Segregating populations were screened in field tests where pod rot or lesion nematodes were expected based on site history. Repeated evaluations were necessary because of mis-classifications resulting from escape and micro-environmental variability. Pod rot and nematode evaluations on a plant progeny basis were most effective but within family selections were made where variability in disease incidence was pronounced. Moderately pod rot resistant Spanish x PI 341885 F_8 and F_9 lines yielded equal to the commercial Spanish and Runner checks. In lesion nematode infested areas, the lesion nematode resistance of PI 365553, which has a higher level of pod rot resistance than PI 341885, was equal to that of PI 295233 and PI 290606. Multiple resistance in PI 365553 should increase its potential usefulness as a parent. F_6 lines derived from PI 365553 are now in yield tests.

Breeding Peanuts for Disease Resistance: Rust and Leafspot.
Ray O. Hammons, USDA-SEA-AR, Southeast Area and Dep. Agronomy, Univ. Georgia Coastal Plain Station, Tifton, GA.

Rust and the leafspot diseases are the most important foliar pathogens of peanuts. Breeding programs to produce resistant cultivars must start with resistance-conferring genotypes. This paper documents sources of resistance to these diseases that have been isolated by screening portions of the world peanut gene pool in U. S. Department of Agriculture research cooperative with the University of Georgia College of Agriculture Coastal Plain Station, the International Crops Research Institute for the Semi-Arid Tropics, and other agencies. Progress in a program of breeding for leafspot resistance is described.

Rust Research in Guangdong Province, People's Republic of China. L. G. Zhou, C. B. Huo, J. M. Liu, and Z. Y. Liu. Institute of Plant Protection, Guangdong Academy of Agricultural Sciences, Guangzhou, Guangdong.

Peanut rust (Puccinia arachidis Speg.) was first found in Guangdong in 1956, and has become epiphytotic since 1970, causing 25-59% in yield losses. The rust fungi infect leaflets, petioles, stipules, pegs, and hulls, producing typical pustules. Only uredospores have been observed. The amount of rainfall and retention of dew period play an important role in the disease development, as the temperature is favorable for the rust fungi during the growing season. Volunteer rusted plants, infected crop debris, diseased hulls are the primary sources of inoculum, the first mentioned source being the most important. About 1000 varieties of peanuts have been screened for resistance, none shows high resistance, but susceptibility differs greatly among the varieties tested. Early planting in the spring, late planting in the autumn, using resistant varieties, spraying at 8-10 day intervals for 3-4 times during the period of disease onset, may significantly reduce the incidence of the disease and increase yields. Daconil is the most effective fungicide of all the chemicals tested.

Effect of Pretreatments on Peanut Hull Saccharification. John A. Lansden, Timothy H. Sanders, and James L. Butler. USDA, SEA, AR, National Peanut Research Laboratory, Dawson, Georgia, and USDA, SEA, Southern Agricultural Energy Center, Tifton, Georgia.

The effect of various pretreatments on the saccharification potential of peanut hulls was studied. The pretreatments were divided into four categories, base swelling, acid swelling, oxidative and physical. All pretreatments were able to raise the saccharification potential with the exception of dry heat. The saccharification potentials were measured by the production of glucose by extracellular Trichoderma reesei cellulase acting on the cellulosic substrates.

Quality of Cooked Ground Beef Extended With Defatted Peanut Meal. E. M. Ahmed and R. L. West, Food Science and Human Nutrition and Animal Science Departments, University of Florida, Gainesville, Florida

Chuck and plate cuts obtained from US utility grade carcass were mixed and ground to pass 0.318 cm plate. The ground meat was extended with extruded and non-extruded defatted peanut meal. Hydrated defatted meal was added at the rate of 20 and 30 parts to 80 and 70 parts of the ground meat, respectively. All treatments were formulated to contain 20% fat in the final patty and loaf products. Extruded and non-extruded meat products were stored at -18°C for periods up to 6 weeks. All quality evaluations were conducted on the cooked meat products.

Ground meat patties and loaves extended with non-extruded peanut meal exhibited smaller cooking loss than those either extended with extruded peanut meal or non-extruded product. Control meat products stored for 4 weeks or longer required larger forces to shear than the non-stored patties. Freezing storage of the extended meat products did not result in a change of the shearing forces. These forces were similar to the shearing force exhibited by the freshly prepared products. Expert sensory panel evaluations indicated that the extended meat patties were more tender and less cohesive than the non-extended patties. However, sensory acceptability test indicated similar acceptability ratings for the extended and non-extended meat patties and loaves.

Isolation and Characterization of Methionine-Rich Polypeptides From Peanut Seed. Mahaboob B. Shaik-M and Sunil K. Pancholy, Peanut Protein Lab, Florida A&M University, Tallahassee, FL 32307

Protein from the defatted peanut meal was extracted with 2 M NaCl, 10 mM Tris-HCl (pH 8.2) and resolved into 10 peaks by gel filtration on a Sephacryl S-300 column. Amino acid analysis of the peaks showed the presence of 0.39% and 2.7% methionine in peaks I and VI, respectively. In addition to methionine, peak VI was also rich in cystine (4.15%). Upon 1-D PAGE, peak I showed 3 slow migrating bands while peak VI contained at least two closely moving bands. However, 2-D PAGE showed the presence of 25 major and 20 minor polypeptides in peak I and 8 polypeptides in peak VI. The methionine-rich polypeptides of peak VI, had pI's between 5.0 and 5.8 and MW's between 17,000 and 25,000. High methionine content of these peaks was further confirmed by labeling the proteins with ^{35}S-methionine, eight weeks after planting. The ^{35}S-methionine incorporation data was consistent with the methionine content of the peaks where peak VI showed the highest methionine content. Autoradiography of the 2-D polypetide gels prepared from ^{35}S-methionine labeled material also indicated the distribution of radioactivity mainly into the polypeptide components of peak VI. Studies on the ^{35}S-methionine incorporation capacity of the maturing peanut seed showed that the immature seeds had a four fold higher ^{35}S-methionine incorporation capacity than the mature seeds. Further, the methionine incorporation capacity of the maturing seeds drastically decreased between the Low-Intermediate and High-Intermediate stages. Supported by a USDA-SEA/CR grant.

SUBJECT MATTER CHOICE

1. Peanut Utilization

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MAIL ADDRESS

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904/392-1991

Evaluation of Raw Peanuts from Volatile Profiles. N. V. Lovegren, C. H. Vinnett, and A. J. St. Angelo, USDA, SEA, Southern Regional Research Center, New Orleans, LA and R. W. Mozingo, Virginia Polytechnic Institute and State University, Suffolk, VA.

Minor modifications of the direct gas chromatographic procedure for analysis of volatiles were used to evaluate raw Virginia peanuts. The volatiles were adsorbed onto a cold Tenax-MPE column, and then, after the peanut sample was removed, the column was temperature programmed for the analysis. Some compounds seem to affect flavor scores more than others. Peanuts stored at 40°F with a moisture content of 8 to 8-1/2% had a greater volatile profile in the area beyond hexanal than did peanuts with a moisture content of 6 to 7%. In peanuts with a moisture content of 6-1/2%, the methanol, acetaldehyde, ethanol, and the acetone group (pentane, 2-propanol, propanal, and acetone) usually comprised up to 80% of the total volatiles. Volatile profiles of the smaller peanuts are slightly different than those of the large normal-size Virginia peanuts. Sensory data and their correlation with volatile profiles will be reported.

Effects of Various Herbicide and Disulfoton Applications on Proximate and Amino Acid Composition of Shelled Peanuts. Sam R. Cecil and Ellis W. Hauser; UGA, Georgia Station, Experiment, and USDA, SEA, Coastal Plain Station, Tifton.

Samples of hand-picked SMK's, from field plots previously treated with intensive sequences of registered herbicides (RH) and/or the insecticide disulfoton, were assayed to determine whether pesticide treatments were related to changes in proximate and amino acid composition. Samples selected were from treatments (nine applications including six herbicides) which had caused various reductions in milling and processing yields, each paired with a high-yield check. As compared to the checks, oil of RH was lower in 1975 Early Bunch and 1976 GK-3, Tifrun and GK-19, but was higher in 1976 Tamnut. Protein (N x 5.46) of RH was lower in 1975 GK-148 (used 1975 only), 1975-76 GK-3, and 1977 Early Bunch with disulfoton, higher in 1975 Early Bunch and Tamnut and 1977 Tamnut with disulfoton. Florunner varied only in lower oil and higher protein with disulfoton. While 25% of comparisons in whole kernel composition of GK-3, Florunner and GK-19 had lower values for various amino acids in RH samples, and 43% of Early Bunch, Florunner and GK-19 had higher values in disulfoton samples, differences were about equally distributed when estimated on the basis of protein contents. Thus, as also shown by correlations with yield and processing variables, most of the apparent influence of herbicide and disulfoton treatments was on proximate composition, not on amino acid composition of the protein.

Pressing Peanuts--Effects of Splits on Oil Removal. Joseph Pominski and J. J. Spadaro, Southern Regional Research Center, SEA, USDA, New Orleans, LA; and J. R. Baxley, PERT Labs, Inc., Edenton, N.C.

Peanut pressing tests were conducted with both laboratory and commercial cage presses to determine effects of different amounts of split peanuts on oil removal. A batch of whole Jumbo Runner peanuts was obtained from a lot of peanuts that gave satisfactory oil removal in large commercial presses. One-half of the peanuts were split. Composition of the materials pressed were 75% wholes-25% splits, 50% wholes-50% splits, and 25% wholes-75% splits, and 0% wholes-100% splits. Two-hundred-pound (90.72 kilograms) portions were pressed in a commercial-scale press for 30 minutes at 1900 psi and 1.32 pound (0.60 kilogram) portions in a laboratory press for 5 to 30 minutes at 250 to 2000 psi. In the commercial press results showed removal of 53.8, 54.2, 50.1, and 43.8%, oil respectively. Peanuts with up to 50% splits had no effect on oil removal. Compared to 75% wholes, the 75% splits yielded 3.7% less oil removal and 100% splits, 10% less. Experiments at a lower maximum pressure of 1160 psi showed an oil removal of 51.6% for peanuts containing 75% wholes. Pressing 100% splits at the lower pressure only removed 37.3% oil. Pressing tests show that while more oil is removed under comparable conditions, effects of splits on oil removal can be shown on a laboratory scale.

Effect of Foliar and Soil Application of Urea on Peanut Yield and Seed Quality. Sunil K. Pancholy, M. B. Shaik-M., and Arthur L. Guy. Florida A & M University, Tallahassee, Fla., and D. W. Gorbet, Agr. Res. Center, IFAS-University of Florida, Marianna, Fla.

The effect of urea application on the yield and biochemical composition of peanut seed was studied. Urea was applied to the foliage of three peanut cultivars (Early Bunch, NC-Fla 14, and Florunner) or to the soil at 85 and 118 days after planting at 0, 3, 6, and 9 kg N/ha. Ten days after application, one to two plants were harvested from each treatment and the pods stored at -20C. The crop was dug at 130 days after planting, yield determined, and seed, along with those from previously collected samples, lyophilized. The lyophilized seeds were ground into meal and analyzed for oil, total protein, soluble carbohydrates, and free amino acids. The application of urea had no effect on the yield of the Early Bunch variety. In contrast, NC-Fla 14 and Florunner showed higher yields with increasing foliar urea dosage. Soil application, however, caused a reduction in the yield of Florunner and the oil content in all three cultivars generally declined. At both samplings, the total protein and soluble carbohydrates were higher due to N application. Free amino acids increased with the increasing rate of urea. Early Bunch and NC-Fla 14 showed higher methionine concentrations at both samplings when N was applied.

Oil, Total Protein, and Amino Acid Composition of 80 Peanut Lines and Cultivars.
Roida Sepulveda and Sunil K. Pancholy, Florida A&M University, Tallahassee,FL

In continuing search for high methionine peanut lines, peanut samples were obtained from plant breeders (Gainesville, Marianna, and Tifton) and stored at -20 C prior to sample preparation and analysis. The peanuts were shelled and the seeds were lyophilized. Then, the cotyledons were ground into meals and analysed for oil (ether extraction), total protein (Nitrogen by micro-Kjeldahl's x5.46) and amino acid composition using a JEOL-6AH Amino Acid Analyzer.

Oil content of the 80 peanut samples varied from 42.20 to 55.20 percent and the average oil content was 49.42 percent. The total protein content ranged from 22.13 to 30.00 percent and averaged 24.72 percent. A definite negative correlation was observed between the oil content and the amount of total protein for all peanut samples. Amino acid averages (expressed as g amino acid/100 g total amino acids) were as follows: Lysine(3.36), Histidine(2.12), NH_4 (2.10), Arginine (12.26), Aspartic acid (12.13), Threonine (4.65), Serine (5.17), Glutamic acid(20.16),Proline (4.30), Glycine(5.97), Alanine (3.87), Cystine(Trace), Valine (4.27), Methionine (0.80), Isoleucine (3.38), Leucine (6.05), Tyrosine(3.72), Phenylalanine(5.13), and Tryptophan (0.83). Higher methionine concentrations were observed in peanut lines UF 77318 (1.68), UF 77403 (1.27), and UF 77409 (1.55) and in cultivars Jenkins Jumbo (1.07), Makula Red (1.07), Dixie Runner (1.04) and Huallaga (1.03).

Peanut Disease Loss in the United States. J. C. Wells.

Seven major peanut diseases continue to cause tremendous losses in the United States. These losses are experienced by growers in spite of the many chemical and production practices available for use in reducing losses. The seven major diseases and any percent loss in the United States in 1979 were as follows: Cercospora leafspot 6.0, CBR 1.5, Pythium myriotylum 1.5, Rhezortonia solani 2.5, Sclerotium rolfsii 6.5, Nematodes 5.2, and Sclerotinia minor 2.5. However, new breakthroughs in chemical formulations, new methods of application, better understanding of the disease organisms and its needs such as pH and climate conditions hold promise for the grower to reduce these losses in 1980. The role of crop rotation and many other culture practices will also help in many of the above disease situations. The development of resistant cultivars will be a major factor in reducing many of these problems. Consequently, continued research and educational efforts by Land Grant Universities, supported fully by the Peanut Grower Associations and Commissions, will be necessary for a sound disease program on peanuts in the future.

EFFECT OF CHANGING VARIETIES ON DISEASE AND NEMATODE CONTROL RECOMMENDATIONS.
Thomas A. Lee, Jr., Texas Agricultural Extension Service, Texas A & M Univ. System, Stephenville, Texas.

Recommendations for disease and nematode control in Texas peanuts are based on long years of experience with Spanish peanuts. As more and more acres are planted each year to the florunner variety, recommendations for control of the various nematode and disease problems must be re-evaluated. Spanish and runner types do not react the same to all seed treatment chemicals and nematicides. Nematodes, southern blight (sclerotium rolfsii) and pythium (Pythium myriotylum) appear to cause more damage on florunners. Web blotch is a much more serious problem on Spanish than on florunner as is leafspot, at least the early cercospora type. All of these things necessitate changing control recommendations.

Screening Chemicals for Efficacy in Control of Sclerotinia Blight of Peanut.
P. M. Phipps and D. M. Porter, Tidewater Res. and Cont. Educ. Ctr., Suffolk, Virginia.

A two-phase program involving laboratory and subsequent field tests was developed to accelerate the search for chemicals to control Sclerotinia blight of peanut. More than 30 chemicals with reported fungicidal properties have been tested in the laboratory by spraying 3-day-old, soil plate (5% corn meal) cultures of Sclerotinia minor. Each soil plate received 1 ml of spray containing a chemical in sterile, distilled water. Growth by S. minor on the surface of the medium was prevented only by DPX 4424 50W, BAS 352 50W, RP26019 50W, Botran 75W, and Terraclor 75W. Although no chemical prevented growth below the surface, numbers of sclerotia formed in the soil medium after 2 wk were suppressed greatest by DPX 4424 50W at 2.24 kg ai/ha. Field tests were designed primarily to evaluate promising fungicides when applied to peanut at or just prior to infection by S. minor. DPX 4424 50W at 0.56 to 2.24 kg ai/ha was the only chemical that resulted in significant (P=.05) control of Sclerotinia blight. BAS 352 50W and RP26019 50W at 0.56 to 2.24 kg ai/ha, Botran 75W at 4.2 to 8.4 kg ai/ha, and Terraclor at 11.22 kg ai/ha resulted in only partial control.

Field Evaluations of Fungicides for White Mold (Sclerotium rolfsii) Control on Peanuts in South Carolina in 1979. C. E. Drye, Fred H. Smith, and J. P. Krausz. Plant Pathology and Physiology Department, Clemson University, Clemson, South Carolina and L. S. Livingston, Sumter Area Agricultural Development, Project and Cooperative Extension Service.

Different rates and application procedures were tested in replicated - demonstration plots at two sites. Vitavax 3F was used at one site in Aiken County with Vitavax 3F, Vitavax 4G, and PCNB - Dasanit (10-3)G were tested in Sumter County. Results in Aiken County showed no significant differences among Vitavax 3F (3.41 l/ha at early pegging);(1.71 l/ha at early pegging + 1.71 l/ha as needed); (3.41 l/ha as needed); or check(water only). Results of tests with PCNB - Dasanit (10-5)G (54.48 kg/ha at pegging + as needed); PCNB - Dasanit (10-5)G (108.96 kg/ha as needed); PCNB 10G (54.48 kg/ha at pegging + as needed); Vitavax 3F (3.41 l/ha as needed); Vitavax 4G (27.24 kg/ha at pegging); Vitavax 3F (3.41 l/ha at pegging); Vitavax 4G (27.24 kg/ha as needed); Vitavax 3F (1.71 l/ha at pegging + as needed); Vitavax 4G (13.62 kg/ha at pegging + as needed); and the non-treated check, demonstrated that split applications of PCNB - Dasanit (10-3)G gave highest yield increases (626.52 kg/ha) over the check. However, this was not significantly better than any other treatment with PCNB - Dasanit or PCNB alone or the check. Vitavax 3F at full rate and as needed and Vitavax 4G at pegging were not significantly better than the check or treatments with PCNB - Dasanit or PCNB alone. Split applications of Vitavax were inferior to single treatments.

Control of Root-Knot Nematodes in Peanuts: The Post-DBCP Situation. R. Rodriguez-Kabana, Auburn University, Auburn, AL 36830.

Nematode control on peanuts prior to 1978 depended primarily on the use of DBCP. The removal of this fumigant from agricultural use resulted in its rapid replacement by formulations of ethylene dibromide (EDB), principally, Soilbrom 90 EC. Soilbrom 90 EC or Terr-O-Cide 72-27 (72% EDB + 27% chloropicrin) can be applied at planting time at rates as high as 37 L/ha without significant phytotoxicity to peanuts. Soilbrom 90 EC at rates of 14-19 L/ha is as effective as equivalent rates of DBCP. Use of systemic and contact nematicides is still limited by their higher cost when compared to that of nematicides containing EDB.

Peanut Pod Rot Diseases in Oklahoma. R. V. Sturgeon, Jr., Extension Plant Pathologist, Oklahoma State University.

Pod rot disease continued to cause heavy losses in Oklahoma with losses of 50% in certain fields in 1979. Several pathogenic soil borne fungi can cause rotting of peanut pods, however, species of Rhizoctonia, Fusarium, and Pythium are most often found with this specific Pod rot disease complex. Disease severity is seemingly related to predisposition of the peanut by environmental factors, fertility imbalances, certain pests and chemical practices. Preplant fumigation increased yield but did not significantly reduce Pod rot. Podox-L and Kocide 101 applied prior to planting did not significantly reduce the disease, however, at certain locations these copper fungicides applied by overhead irrigation mid to late season in combination with gypsum applied early in the season in the pegging zone showed yield increases and less Pod rot. Terraclor Super-X applied at planting in the covering soil significantly reduced incidence of Pod rot. Gypsum at early pegging and Terraclor 2EC by overhead irrigation during the season proved to be more effective in reducing disease incidence. Demosan-Benlate, Captan-Difolatan, CBA 64250-Ridomil combinations and SN 667521 in combination with certain fungicides showed great promise in control of Pod rot. The number of pathogens, parasites, and other factors involved in the Pod rot disease complex make it extremely difficult to control. Hence, presently recommended control practices only reduce disease losses and do not fully control the problem.

The Effect of Kylar on Plant, Pod and Seed Characters of Valencia Peanuts. David C. H. Hsi, New Mexico State University, Middle Rio Grande Experiment Station, Los Lunas, NM, and James I. Davidson, Jr., National Peanut Research Laboratory, Dawson, GA.

Kylar tests were conducted at three locations in New Mexico in 1979. Two locations in eastern New Mexico were planted with the New Mexico Valencia A peanut variety. The third location was in the central part of the state where the Advanced Strain Trial consisting of 12 entries was located. Kylar-85 was applied in three split applications. First application of 1/2 pound per acre rate was made when peanut plants were eight to ten inches tall or during mid-July. The two additional 1/4 pound per acre applications were made at successive 14-day intervals. Considerable reductions in plant height and internode length were obtained at all three locations. Average yield was lowered at two locations but was increased at the third. Proportion of 4-seeded pods decreased whereas that of the 3-seeded pods increased in Kylar-treated peanuts. Refined measurements indicated that Kylar-treated peanuts had shorter pods, thicker hulls, and higher proportions of small and flat-shaped seed than the non-treated check. Some treatment and variety interactions were noted but nothing significant. Kylar-treated plants showed considerable reduction of blackhulled peanut pods caused by *Thielaviopsis basicola* in field where a high disease incidence occurred.

Stage of Development Descriptions for Peanut (Arachis hypogaea L.). K. J. Boote, University of Florida, Gainesville.

Uniform growth stage descriptions were developed for peanuts based on visually observable vegetative (V) and reproductive (R) events. The V stages apply to the number of full-expanded leaf (nodes) on the main stem. The respective R stages for peanuts are R1 (beginning bloom), R2 (beginning peg), R3 (beginning pod), R4 (first full-sized pod), R5 (beginning seed), R6 (first full-sized seed), R7 (first mature pod), R8 (harvest maturity), and R9 (first overmature pod). These V and R stages were patterned after those developed for soybean by Fehr et al. except that R2 was re-defined as "beginning peg" and R9 stage "first overmature pod", was added. The stages are best used for populations, to express when 50% of the plants display a desired visual event. The R1 through R7 stages, respectively, are achieved when 50% of the plants have or have had one open flower (R1), one elongated peg (R2), one peg with turned swollen ovary (R3), one fully expanded pod (R4), one pod in which seed cotyledon growth is visible (R5), one pod with cavity apparently filled by the seed (R6), or one pod showing visible natural inner coloration of the pericarp or testa (R7). R8, harvest maturity, is when 2/3 to 3/4 of the total pods have testa or pericarp coloration, depending on cultivar. An R9 stage, first overmature pod, is based on orange-tan coloration of the testa which is closely associated with loss of physiological integrity (weak peg attachments or dropped pods).

Salt Sources and Concentrations of Potassium: Effects in the Solution Culture of Peanuts. J. S. Calahan, Jr., Tarleton State University and Texas Agricultural Experiment Station, Stephenville, Texas.

A greenhouse experiment was performed to determine the nutrient solution sufficiency level of potassium for the culture of peanuts. In addition, different potassium salts were used to investigate possible differences in efficiency of the source salts in supplying the potassium needs of the plants. Modified Hoagland's nutrient solutions with treatment levels of potassium chloride, potassium sulfate and potassium polyphosphate were used to irrigate peanut plants grown in eight liter containers of silica sand. Treatment levels of the three salts were 0.0, 0.01, 0.1, 1.0, and 4 meq./l. of potassium. No significant differences were found in yield due to source of potassium. The sufficiency level was found to be between 0.1 and 1 meq./l. Significant differences in tissue levels of potassium were found with treatment salt source. In general, potassium accumulated in the greatest amounts when potassium polyphosphate was used and in the least amounts when potassium chloride was used.

Ethylene Production and Leaflet Abscission of Peanut Genotypes Inoculated with Cercospora arachidicola. D. L. Ketring and H. A. Melouk, USDA-SEA, Agronomy and Plant Pathology Dept., respectively, Oklahoma State University, Stillwater, OK 74078

Several investigations have shown that fungal invasion of plant tissues resulted in production of large amounts of ethylene. Leaves of Tamnut 74 and PI 109839 were inoculated with Cercospora arachidicola as previously described (Peanut Sci. 5:112-114, 1979). Ethylene production by control and inoculated leaves was measured at 0.25, 2, 4, 7, 14 and 21 days after inoculation. Ethylene was detected at 0.25 days and it was produced in higher amounts by inoculated leaves. No differences in ethylene production were found at 2, 4 and 7 days after inoculation. However, ethylene was produced in large amounts by inoculated leaves at 14 and 21 days. This rise in ethylene production coincided with the appearance of lesions and defoliation of both genotypes. PI 109839 defoliated at a more rapid rate than Tamnut 74. Sprays of $AgNO_3$, an anti-ethylene action agent, increased leaf retention of Tamnut 74 infected plants.

Adaptability of the Arginine Maturity Index Method to Virginia Type Peanuts. Patricia G. Fincher, Clyde T. Young, Johnny C. Wynne, and Astor Perry, Food Science Department and Crop Science Department, N. C. State University, Raleigh.

The Arginine Maturity Index (AMI) method for estimation of optimum maturity and highest quality of peanuts was evaluated in a two-year research station study (1977 and 1978) of large-seeded peanuts grown in North Carolina. A one year study was conducted on farms in seven North Carolina counties in 1978. Samples were collected weekly from both the research station and farms and analyzed for arginine by the modified Sakaguchi reaction. Maximum yield corresponded to minimum AMI values for each cultivar in 1977 and for all except NC 2 in 1978 in the research farm study. Prediction curves were derived from each cultivar for each year using a quadratic polynomial equation. Large differences existed between 1977 and 1978 and between cultivars in 1978 at early harvest dates. Near minimum AMI values, however, all six curves appear to be similar. AMI and yield data obtained from individual county farms fluctuated throughout the growing season. Generally, higher AMI values were observed for Virginia than have been reported for Spanish peanuts. Using the prediction curve derived in Georgia, and subtracting one week, predicted digging dates were within 4 days of the date of maximum dollar return per ha in 5 of the 6 counties. Based on previous experience, the county farm data (with the exception of Nash) was used to derive a tentative optimum harvest prediction equation for North Carolina.

Improvement of Peanut Seed Germination With Hot Water and Acetone Treatments. M. A. Abdel Rehim, R. Rodriguez-Kabana, P. A. Backman and M. A. Crawford. Alexandria University, Alexandria, Egypt, and Auburn University, Auburn, AL 36830.

The effect of soaking Florunner peanut seeds in hot water (50 C for 15-20 min.) or in aqueous acetone solutions (2.5-20%, v/v) on germination was compared with germination of dry seeds and that of seeds soaked for 20 min. in 25 C water. Hot water and acetone treatment improved significantly seed germination and seedling vigor compared with those of dry seeds or of seeds soaked in 25 C water. Treatment of seeds in hot water or acetone followed by drying at 40 C did not affect the stimulatory effect of the treatment and reduced fungal growth on germinating seeds.

Effects of Peanut Seed Treatments on Rhizobium. P. A. Backman, M. A. Abdel Rehim, and R. Rodriguez-Kabana. Auburn University, Dept. of Botany, Plant Pathology, and Microbiology, Auburn, AL 36830, and Alexandria University, Alexandria, Egypt (second author).

Application of Rhizobium inoculants to peanut seed indicates that survival on stored seed at effective levels may only last for 3-4 weeks. When inoculants are added to seed treated with fungicides, survival was reduced to as little as 1 day or as long as 14 days. Thiram was the most toxic fungicide, followed in decreasing severity by carboxin, captan, and PCNB. Strains of Rhizobium showed differing sensitivities to the same fungicide. Survival on glass beads was longer than on peanut seed. Preliminary tests indicate that there is a water soluble component in peanut seed that is toxic to Rhizobium. Peanut seed extracted with hot water (50 C for 20 min.) had better Rhizobium survival and nodulated better after germination than nonextracted seed.

Interaction Among Sclerotium rolfsii, Nematodes and Chemical Controls. S. S. Thompson, N. A. Minton, and D. K. Bell. University of Georgia and SEA, USDA, Tifton, Georgia.

Two field and one laboratory tests were conducted. In one test, PCNB and fensulfothion applied postplant were evaluated for control of white mold and lesion nematodes. PCNB had no effect on lesion nematodes, but increased yield only one year out of three. PCNB plus fensulfothion increased yield and controlled white mold every year. In the laboratory, PCNB plus fensulfothion was more toxic to S. rolfsii than PCNB alone, indicating a possible synergism. In the second test, we investigated the effects of DBCP, ethoprop and phenamiphos applied preplant and ethoprop, phenamiphos, PCNB and PCNB + ethoprop and PCNB + phenamiphos applied postplant on root-knot nematodes and white mold. White mold was not reduced by preplant treatments only, but was reduced by all postplant treatments not receiving preplant treatments. White mold loci in plots with both pre- and postplant treatments did not differ significantly from those in plots that received only postplant treatments. Root-knot indices were reduced by DBCP and phenamiphos applied preplant and by ethoprop, phenamiphos and PCNB plus phenamiphos applied postplant. Yields were significantly increased by phenamiphos applied preplant and all postplant treatments except PCNB that did not receive preplant treatments. All postplant treatments except ethoprop significantly increased yields in plots that received ethoprop preplant.

Overwintering of Cylindrocladium crotalariae microsclerotia in peanut field soils. G. J. Griffin, J. D. Taylor, P. J. Graham, D. A. Roth, N. L. Powell, and K. H. Garren. Virginia Polytechnic Institute and State University and USDA, SEA, Suffolk, Virginia.

The influence of low soil temperatures on the survival of Cylindrocladium crotalariae microsclerotia in naturally infested peanut field soils was studied in the laboratory and in the field from 1974 to 1980. Incubation of soil at temperatures below 6C adversely affected the survival of microsclerotia but subsequent incubation at higher temperature (26C) partially reversed the low-temperature effect. Soil temperatures below 0C were most detrimental to survival, but some microsclerotia survived exposure to -10C for 1 month if soils were subsequently incubated at 26C for 1 month. Microsclerotium survival in the field over the winter months was related to minimum soil temperature, and appeared to play a significant role in Cylindrocladium black rot (CBR) incidence during subsequent growing seasons. The greatest decline in nicrosclerotium populations occurred during the winter of 1976-77, and was followed by a decline in CBR incidence in the 1977 growing season.

Forecasting Techniques for Peanut Leafspot Control. Panel Discussion: R. D. Berger, D. H. Smith, and N. L. Powell.

Jensen and Boyle described a system to forecast infection periods of Cercospora leafspot (likely C. arachidicola only) on peanut about 15 years ago. The system is receiving renewed interest in Virginia. Despite the accuracy of the forecasts, grower acceptance is minimal. Some of the problems of forecasting are: (1) the individual systems are for one disease only, systems for the major diseases need to be developed and merged to avoid the chance build-up of one component in the disease complex; (2) systems based on weather parameters need accurate weather forecasts to predict hazard periods in advance; (3) the weather instrumentations (primarily humidity sensors) are not reliable or require frequent calibration to maintain accuracy; (4) localized weather almost demands weather monitoring on a field-to-field basis; (5) grower practices (previous crops, varieties, soil moisture, etc.) need to be inputted; (6) if the forecast systems were widely followed, there would be a shortage of application equipment on those days at the onset of disease favorable weather.

Spore trapping may be an advised technique to develop the forecasting parameters, but it is a time-consuming practice on which to base routine forecasts. Rapid disease build-up can be expected on crops unprotected with fungicide. A possible safeguard against this build-up would be to have a basic minimum spray program and the grower can use the forecast systems to pinpoint high hazard periods for the application of sprays. The use of systemic fungicides with considerable back-actions has a real position in a disease control program built around a forecast system.

TO: Extension-Industry Peanut Disease Workers

RE: Minutes of July 17, 1980 Symposium
Richmond, Virginia

DATE: July 31, 1980

The Extension-Industry Peanut Disease Workers Symposium was opened by H. V. Morton, Vice President and Program Chairman for the Extension-Industry Peanut Disease Workers. R. V. Sturgeon, Jr., President, reviewed the history of how the Extension-Industry Peanut Disease Workers developed and presented plaques of appreciation to Dr.'s J. C. Wells, Luther L. Farrar, and W. Wyatt Osborne for their years of service as Extension Plant Pathologists and many contributions to the peanut industry. Each of these recipients has retired from the University Extension Service. They will be joining the industry members of our group as private consultants.

The meeting continued as scheduled and was well attended. Dr. Sturgeon presided over the business meeting. Under new business, it was recommended that the nematology committee prepare guidelines for standardized evaluation of nematicides on peanuts using guidelines established by the Society of Nematology. Concern was expressed over the presentation of research-type papers in Extension-Industry session. It was requested that future meetings consist of practical teaching, Extension-type presentations. It was suggested that Industry be given more time and not be placed last on the program. This was put into motion by Dr. Chip Lee, seconded by Ray Smith; motion carried. Motion made by J. C. Wells that next year the Extension-Industry hold an all day session the day preceding the regular APRES program meeting. Seconded by Chip Lee and others; motion carried. W. W. Osborne was asked to prepare a history of the Extension-Industry Workers Council and distribute copies of the history and operation to members. Committee reports included disease loss by J. C. Wells, publicity and publications by Osborne, and nominations by Reid Faulkner.

The following persons were nominated and elected to office for the coming year 1980-81. H. V. Morton, President; Chip Lee, Vice President & Program Chairman; Alice Farmer, Secretary; and Luther Farrar, Treasurer. The executive council will consist of the above officers and past President, R. V. Sturgeon, and permanent committee chairmen. The following members were recommended for chairmen of the permanent committees:

Disease Loss:	R. V. Sturgeon, Jr.
Publicity & Publications:	W. W. Osborne
Awards:	H. V. Morton
Soilborne Diseases:	Pat Phipps
Foliar Diseases:	Sam Thompson
Nematodes:	R. A. Dunn

The presidential gavel was passed to the new President, H. V. Morton, and the meeting was closed. (A. Farmer)

Peanut Photosynthesis Inhibited by Ethylene. J. E. Pallas, Jr., USDA-SEA, Watkinsville, GA 30677 and S. J. Kays, University of Georgia, Athens, GA 30602.

A pronounced effect of the plant hormone, ethylene, on photosynthesis of the cultivated peanut, Arachis hypogaea L. has been found. Apparent photosynthesis was inhibited up to 39% by concentrations normally considered hormonally significant (0.25 to 1.0 $\mu l\ l^{-1}$). The response occurred 2 to 2.5 hours after exposure, although the length of exposure to ethylene could be as brief as 30 minutes. The effect on photosynthesis was reversible and not induced by propylene, an ethylene analog, at 100 times the concentration required for maximum inhibition by ethylene. The percent inhibition of photosynthesis remained relatively constant at all light intensity levels tested (180, 340, 570, 920, 1150 and 1140 $\mu Em^{-2}sec^{-1}$ PAR). Inhibition of photosynthesis could not be accounted for by light or dark respiration increases nor does the response appear to be controlled at the stomatal level. One μl ethylene l^{-1} air resulted in a 22% increase in the photosynthetic CO_2 compensation level.

Foliar Fungicides and Peanut Seed Quality. D. K. Bell and R. H. Littrell, Plant Pathology Department, University of Georgia Coastal Plain Experiment Station, Tifton, Ga. 31794.

"Tifspan" peanuts were treated with foliar fungicides every 14 days from onset of Cercospora leafspot until 2 weeks before digging. Treatments and rates were: control, benomyl 0.14 + mancozeb 1.34, chlorothalonil 1.13 and fentin hydroxide 0.20 kg a.i./ha, applied at 344740 kPa in 93 l/ha of water, replicated 4X in a randomized complete block. Pods were collected at digging, dried to 12% moisture and hand shelled. Seed for microfloral assay were soaked 3 min in 0.53% w/v NaOCl. Seed for germination were treated with 1.87 g a.i. captafol + 0.63 g a.i. DCNA/kg. Microflora were assayed by plating 200 seeds/replicate on an agar medium and incubating 10 days at 26°C. Normal germination was determined by incubating 200 seeds/replicate, radicle downward in dark at 30°C-16 hr and 20°C-8 hr for 14 days. Both assays were conducted 1 and 7 months after harvest. After 1 month seed from benomyl + mancozeb, chlorothalonil and fentin hydroxide averaged 48, 48 and 65%, respectively, and after 7 months 103, 129 and 149% as many total microfloral colonies as the control. Normal germination of seed from benomyl + mancozeb, chlorothalonil, fentin hydroxide and control treatments after 1 month averaged 73, 75, 83 and 85%, respectively, and after 7 months 88, 86, 84 and 93%. The foliar fungicides caused ca a 50% temporary reduction in seed-borne microflora and some reduction in normal germination.

Nitrogen Balance Studies in Peanuts. P. R. Reddy, I. V. Subbarap, and L. M. Rao. A. P. Agricultural University, Rajendranagar, Hyderabad-30 India.
Subbar

Nodulation, nitrogen concentration (N) of eight genotypes at physiological stages viz., flowering, pegging and pod formation were studied. Nodulation and N concentration in main and lateral branches decreased from the time of flowering in all the genotypes. The rate of decline in N observed earlier has been controlled remarkably by deflowering. Nitrogen concentration was higher at flowering in the individual leaves estimated from top to bottom and showed a progressive decline after flowering. Even in the same branch the N concentration was higher in the top leaves and lower in the bottom leaves. From the time of flowering to maturity N from each leaf decreased 43 to 48%. This apparent loss of N may have been utilized either for growth of the plant in general or translocated to the developing pod. The N concentrations in the kernel increased during pod development. The stem's contribution to the pods is comparatively negligible. Among the genotypes, Virginia runner showed higher nodulation and Spanish were the least. Not much variation was noticed in the N concentration among genotypes. However, the decrease in nodulation and N concentration apparently occurred at much higher rate in the Spanish than in the other genotypes studied.

Screening Peanuts (Arachis hypogaea L.) for Resistance to Sclerotinia Blight. T. A. Coffelt and D. M. Porter, USDA, SEA, AR, Tidewater Research and Continuing Education Center, Suffolk, Virginia.

Sclerotinia blight (SB), caused by Sclerotinia minor, results in annual crop losses of 4-6% in Virginia. Chico, PI 371521 and VA 71-347 exhibited significantly fewer SB symptoms in 1977 field screening than Starr, NC 17, Florigiant and four breeding lines. Chico, NC 3033, VA 71-347 and VGP 1 exhibited significantly fewer SB symptoms in 1978 field screening than GK 3, Early Bunch, NC 6, Florigiant and 12 breeding lines. Under severe disease pressure VA 71-347 had the highest value/A, significantly higher than GK 3, Early Bunch and Florigiant. Three field tests were conducted in 1979. In the 1st test, Chico, NC 3033, VA 71-347 and VGP 1 exhibited significantly fewer SB symptoms than 20 other entries including Florigiant, Tifrun, NC 7 and Early Bunch. VA 71-347 significantly outyielded all entries. In the 2nd test, Chico and VA 71-347 were significantly less susceptible to SB than five breeding lines, Florigiant, GK 3 and NC 6 even under Cercospora leafspot fungicide spray regimes known to enhance the severity of SB. SB was significantly greater in chlorothalonil-treated plots than in benomyl-treated plots of all entries, except Chico. Benomyl treated plots had a significantly higher yield and value/A than chlorothalonil-treated plots, but under both leafspot spray regimes VA 71-347 had significantly higher yields and value/A than all entries, except NC 6. In the 3rd test, VA 71-347 had significantly less SB and significantly higher yield and value/A than Florigiant in four seeding patterns.

Cytophotometric Determination of the Amount of DNA in Arachis L. Sect. Arachis. P. M. Resslar, J. M. Stucky, J. P. Miksche, North Carolina State University, Raleigh, NC

Cytophotometric techniques were used to determine the 2C amounts of DNA for 12 taxa of the sect. Arachis nom. nud. sensu Gregory et al. The diploid taxa ranged from 4.92 to 5.98 pg of DNA per cell. The species of the diploid series Annuae Krap. et Greg. nom. nud. averaged ca. 1 pg less DNA per cell than the taxa of the diploid series Perennes Krap. et Greg. nom. nud. No significant differences were found between taxa within the two series. The tetraploid taxa ranged from 10.36 to 11.35 pg of DNA per cell. Within the tetraploid series Amphiploides Krap. et Greg. nom. nud. differences were found between A. monticola Krap. et Rig. and A. hypogaea L. The two 2C amounts of DNA for the two subspecies of A. hypogaea, ssp. hypogaea and ssp. fastigiata Waldron, were found to differ significantly. These data support the taxonomic system proposed by Gregory et al.

Second Gene for the Flop Trait in Peanuts. W. D. Branch and Ray O. Hammons, Dept. of Agron., Univ. of Georgia, Coastal Plain Expt. Stn. and AR, SEA, USDA, Southeast Area, Tifton, GA.

The Flop phenotype in peanuts (Arachis hypogaea L.) consists of large revolute leaflets, coarse stems, and reduced fruit set. Inheritance of the Flop characteristic was investigated among reciprocal infraspecific cross populations. F_2 segregation data supported a 15:1 digenic model with the Flop phenotype being governed by duplicate recessive alleles. Gene symbols, fl_1 fl_1 fl_2 fl_2, are proposed for the Flop genotype in our study.

An F_2 Yield Trial in Peanuts. Ray O. Hammons and W. D. Branch, USDA-SEA-AR, Southeast Area and Agronomy Dept., Univ. Georgia Coastal Plain Station, Tifton, GA.

An F_2 yield trial was conducted in 1978 to evaluate progenies from sixteen intrasubspecific crosses in peanut (Arachis hypogaea L.) involving component lines of two high-yielding U. S. cultivars, 'Florunner' and 'Florigiant,' and two unadapted introductions, 'Makulu Red' and '486 GKP.' Progeny vs. parental performances were used to investigate early generation testing. Significant differences occurred among entries for the eight characteristics evaluated: yield, fancy pods, meat content, total sound mature kernels, other kernels, extra large kernels, damaged kernels, and 100 seed weight. Adapted U. S. parental lines ranked at the top for yield as expected. Performance index values differentiated cross combinations with regard to certain characters. These results indicate that an F_2 yield trial would be useful to identify superior hybrid populations among intrasubspecific peanut crosses early in breeding programs.

Comparison of Peanut Pure Line and Multiline Cultivars Across 16 Environments. T. T. Schilling, R. W. Mozingo, J. C. Wynne and J. L. Steele, North Carolina State University, Raleigh; Tidewater Research & Continuing Education Center, Suffolk; Virginia; North Carolina State University, Raleigh; and USDA-SEA, Suffolk, Virginia.

In peanuts, multiline cultivars such as Florunner and Florigiant have been grown extensively in the Southeast with outstanding yield results. However, these cultivars differ from the traditional multilines in that their components are derived from the same cross. This study was conducted to determine if such multilines produce greater yields and are more stable over different environments than their pure line components.

The yield and stability of two multilines composed of four homozygous sibling lines were compared with the yield and stability of their pure line components over 16 environments in North Carolina and Virginia. Stability was estimated as the deviations from the regression of the yield of a line in different environments on an environmental index, and adaptability was estimated as a function of the regression coefficient, b.

Mean yields over 16 environments indicated that the two multilines did not outperform the better pure lines or pure line means. The stability of the pure lines was not significantly different than the stability of the multilines for yield. Multilines were adapted to all environments ($b = 1$) whereas only some pure lines were equally as adaptable. The results suggest that selected pure lines may be as stable and equal in performance to multiline peanut cultivars.

Peanut Plant Phenology and Damage From Insect Pests. J. W. Smith, Jr., Entomology Department, Texas A&M University, College Station, 77843.

Peanut plant growth and development associated with the growing season environment predispose the plant to insect damage only during certain "damage windows." Given a steady state of pest population the plant's sensitivity to pest damage will change with plant growth and maturity. Plant growth and maturity are also associated with climate especially available moisture. In this regard it is imperative that studies of insect damage to plants and any resulting yield loss be related to plant phenology. An excellent example of this relationship can be seen between defoliating Lepidoptera larvae, plant age at time of defoliation, degree of defoliation and pod yield. The plant phenological age may also affect the defoliating insects' growth and development.

Effect of Planting Date on Insect Damage and Yield of Peanuts. R. E. Lynch and J. W. Garner. Southern Grain Insects Lab, USDA, SEA, AR, Tifton, GA.

Florunner, Early Bunch, and Tamnut 74 peanuts were planted on April 5, April 20, May 5, May 20, and June 5 to assess the influence of planting date on insect damage and yield. Plots were rated for thrips, leafhopper, and Heliothis damage, and check plots were treated to minimize insect damage. Heliothis defoliation was greatest on the spanish peanut and on peanuts planted on the later dates.

Calibration of Florida Peanut Insect Scouting Procedures. H. Michael Linker, ICI Americas Inc., Goldsboro, N. C.

During 1979, the shake cloth (ground cloth) and sweep net method of estimating fall armyworm, Spodoptera frugiperda (J.E. Smith) and corn earworm, Heliothis zea (Boddie) densities were compared to absolute density estimates. For 13 weeks shake cloth and sweep net samples were taken at the same sample site as an absolute density estimate. At the end of the season, the absolute sampler was calibrated by linear regression using known numbers of laboratory reared larvae. Results of the calibration were used to adjust absolute estimates. Sample allocation within a field was examined by comparing two uniform and the standard "random" method to a random, uniform allocation procedure.

Interaction of Pesticides and Cultivars in a Peanut Pest Management Program. L. W. Morgan. Coastal Plain Experiment Station, University of Georgia, Tifton, GA.

This experiment was designed to determine the minimum amounts of insecticides necessary for maximum yields of high quality peanuts. The study included applications of pesticides on an automatic schedule, only as needed and an untreated check. A representative cultivar of each market type (spanish, runner and Va. bunch) was included.

Results indicated no significant differences among treatments and check for spanish peanuts. All treatments, including insecticides alone, fungicides alone and combinations of insecticides-fungicides gave significant yield increases above the check for runner peanuts. Significant yield increases were obtained for Va. bunch peanuts with combinations of insecticides and fungicides, and by each alone. The insecticide-only treatment, while significantly higher than the checks, was significantly lower than the pesticide combination and fungicide only treatment.

Assessment and Systems Control of Peanut Leafspot Control in Florida. Tom Kucharek, Plant Pathology Department, University of Florida, Gainesville, FL 32601

Peanut leafspot, caused by Cercospora aracidicola Hori and Cercosporidium personatum (Berk. & Curt) Deighton, continues to cost growers more money than other plant diseases in peanuts in Florida. The following variables influence leafspot control in Florida: Fungicide, fungicide formulation, crop rotation, variety, yield potential, time of planting, time of spray program initiation, spreader-stickers, spray pressure, water dilution of spray, nozzle placement and nearness to inoculum source. Other variables such as spray interval are important.

The grower or a field scout can monitor leafspot severity over time and relate specific counts in his field to yield loss. This is accomplished by couting leafspots per 50 randomly selected leaves located midway between the soil surface and the uppermost leaves in the row center. The count is cross referenced in a two way graph to plant age to attain the level of disease control in relation to yield. This leafspot assessment method was developed by utilizing leafspot counts made sequentially for routine fugicide trials. Designated points on the graph are two year averages of disease progress curves for Bravo (good control), Duter & sulfur (average control - 23% loss, Manzate 200 (poor control - 45% loss). The control plots were not graphed as the average yield loss was 80% and few growers if any incur such losses to leafspot in modern times in Florida. These relationships are supported by high negative correlations between leafspot numbers and yield.

History and Objectives of Peanut Pest Management in Alabama. John C. French, J. Ronald Weeks, Alabama Cooperative Extension Service, Auburn University, Auburn, Alabama.

A three-year pilot peanut pest management program was begun in Alabama in 1975. This program was federally funded as a part of a tri-state multi-crop multi-disciplinary project. The basic objective of this project was to educate peanut, soybean, and corn growers as to the latest techniques of managing pests in these crops and motivate them to incorporate these practices into their scheme of production. This project was begun in Houston County with 10 growers in 1975, expanded to include 12 growers in 1976 and made available to all peanut producing counties in 1977. Since the end of the three-year pilot phase, this project has been continued in the peanut producing area of the state.

Accomplishments of Peanut Pest Management Program in Alabama. J. Ronald Weeks, John C. French, Alabama Cooperative Extension Service, Auburn University, Auburn, Alabama.

Since the inception of the pilot project in 1975, the Crop Pest Management efforts in Southeastern Alabama, known as the Wiregrass, have been primarily directed at peanuts. Income from peanuts contribute a substantial portion of income from field crops production in the Wiregrass.

In Alabama IPM efforts on peanuts have increased from ten producers with 949 acres in the pilot project in 1975 to approximately 35,000 acres in 1979 under pest management supervision of private consultants, cooperative organized scouting programs or individual producers.

Each season has shown advantages for IPM practices as conducted by peanut producers in organized IPM programs compared to growers not utilizing any form of IPM. Over the five growing seasons from 1975-1979 cooperating IPM peanut producers have averaged from $5.00 per acre to $45.00 per acre more net profit than peanut producers not utilizing IPM technology.

Expression of Heterosis in Testcrosses of Exotic Peanut (Arachis hypogaea L.) Genotypes. T. G. Isleib and J. C. Wynne, North Carolina State University, Raleigh.

Heterosis, an indicator of nonadditive gene action, can be caused by dominance or epistasis. In the latter case, expression of heterosis in crosses of adapted and exotic peanut cultivars could help breeders to identify desirable sources of exotic germplasm for inclusion in improvement programs.

Testcrosses of 28 exotic peanut lines with an elite Virginia breeding line were grown in the F_1 and F_2 generations at two locations. Included in the parental sample were genotypes from the five secondary South American centers of diversity, Africa and China, as well as A. monticola. Positive heterosis for pod yield was observed for all but five crosses. Fastigiate parents generally produced greater heterotic responses than did parents from subspecies hypogaea. Maximum responses were achieved for fastigiate genotypes from the Peruvian center of diversity. High levels of heterosis (>50% more than the adapted parent) were observed for pod number while pod size exhibited somewhat lesser responses. Deviation from the additive-dominance model was found in only one cross for yield but was commonly observed for pod size.

The Effect of Genotype x Environment Interactions on Varietal Development in North Carolina and Virginia. J. C. Wynne and T. A. Coffelt, North Carolina State University, Raleigh and USDA, SEA, Suffolk, Virginia.

The peanut breeding programs in North Carolina and Virginia are developing varieties for a single production area consisting of northeastern North Carolina and southeastern Virginia. Data from a single location within each state are used to identify lines for regional testing. With little or no genotype x environment interaction, similar crosses and lines within crosses would be selected by both breeders.

Yield, sound mature and extra large kernels were determined for 2 years at the two selection sites for nine crosses represented by eight lines per cross in F_4 and F_5 generations. Cross populations and lines within crosses were significantly different for all traits. Cross populations interacted with the environment for all traits while lines within crosses interacted with the environment for all traits except yield. In spite of the significant cross x environment interaction, the same cross populations were identified as being high yielding at both locations. However, individual lines within cross populations selected for regional testing were different for the two programs.

Shell and Seed Size Relationships in Peanuts. Ignacio J. de Godoy and A. J. Norden. Agronomy Department, University of Florida, Gainesville, FL.

Three crosses and their reciprocals between peanut genotypes differing in pod and seed sizes were made during the Spring of 1977 to investigate relationships between pericarp (shell) and the seed. The genetic constitution of the seed is one generation ahead of that of the shell which is maternal tissue. F_1 seeds were increased in the greenhouse during the Fall of 1977, and the F_2 generation along with plants from the parental lines were grown in the field during the 1978 growing season. The weight, width and volume of dried fruits and seeds were obtained from samples of 30 visually mature pods from each plant. The density of fruits and seeds as well as internal pericarp color and shelling percentage were also recorded.

Width and weight of the F_1 seeds tended to be similar to the selfed seeds from the same plants, suggesting possible maternal influence. The wide distribution in weight and volume obtained among F_2 plants is indicative of quantitative inheritance. In most cases, however, the curves were skewed toward the smaller parent suggesting partial dominance of small pod and seed size. Estimates of phenotypic correlations for fruit and seed volume were high and positive in most cases. However, fruit density and fruit volume were negatively correlated in 10 of the 12 populations suggesting that seeds grown inside pods with genetically smaller cavities may be compacted by the shell.

Effects of Cultivars, Row Patterns and Plant Populations on the Yield, Value and Grade of Virginia Type Peanuts. R. W. Mozingo and T. A. Coffelt. VPI & SU and USDA, SEA, Tidewater Research and Continuing Education Center, Suffolk, Va.

The cultivars Florigiant (runner growth habit) and Va. 71-347 (bunch growth habit) were grown during 1977, 1978 and 1979 to evaluate the effect of single-row and double-row patterns and two plant populations on peanut productivity. Va. 71-347 had a significantly higher percentage of extra large kernels, sound mature kernels, total meat and price per unit weight which resulted in higher crop value per hectare than Florigiant although yields of the two cultivars were not significantly different. Row patterns significantly affected only the percentage of fancy pods which was higher for the single-row pattern. Peanuts planted at the high plant population of 215,274 plants per hectare produced significantly higher percentage of sound mature kernels, yield and value per hectare than the low plant population of 143,516 plants per hectare. The highest yield and value per hectare occurred where Va. 71-347 was planted at the high population in either the single or double-row pattern.

Resistance to Both Rust and Late Leafspot in Some Cultivars of Arachis hypogaea. P. Subrahmanyam, D. McDonald, R. W. Gibbons, and S. N. Nigam. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), P. O. Patancheru, 502324, A.P., India.

Rust resistant cultivars were assessed for their reaction to late leafspot, Cercosporidium personatum, both in field and screenhouse tests. For leafspot estimates entries were scored in the field on a 1-9 severity scale and in the screenhouse measurements were made on the amount of defoliation, the area of remaining leaflets covered by lesions and the degree of sporulation which occurred. Results show that several cultivars with high levels of resistance to rust were also promising sources of resistance to the late leafspot. Other rust resistant lines showed leafspot ratings ranging from tolerant to susceptible.

Integrated Pest Management on Peanuts in Georgia. Herbert Womack, University of Georgia, Tifton 31794.

Insects and their damage are serious problems in peanut production. Prior to the early 1970's insecticides were routinely applied to peanuts in combination with the fungicide used for leafspot control. The severity of insect infestations on peanuts varies from year to year, or even in the same growing season. Research and demonstrations (Morgan and French) showed that no insecticide was necessary to protect peanuts during some growing seasons.

In order to take advantage of yearly and seasonal insect fluctuations it is necessary to closely monitor insect infestations. A pilot program of monitoring insect infestations involving 2442 acres in 1974 further demonstrated the value of peanut insect management. Beginning in 1975 peanut scouting was offered to peanut growers across the state. This program has steadily increased each year and in 1979 peanut insect management programs were ongoing in 37 counties on more than 130,000 acres, or approximately twenty-five percent of the peanut acreage in Georgia.

In 1978 and 1979 weed and disease infestations were monitored as the scouts checked the peanut fields for insects. Present plans are for more utilization of the scouts in these areas as well as soil sampling for fertility and nematode assay.

Integrated Pest Management of Peanuts in Texas. Clifford E. Hoelscher and David S. Moore, Texas A&M University System, College Station, TX 77843.

A multi-discipline pest management program for peanut production has operated in Comanche County, TX since 1973. Field scouting operations have involved from 2,500 to 5,500 acres of both irrigated or dryland peanuts each production year. Major academic disciplines represented in the program include plant pathology, agronomy, weed control, irrigation and entomology. Sampling procedures have been developed to monitor the following major pests: leaf spot, lesion and rootknot nematode, nutsedge, lesser cornstalk borer, leaf feeding insect and major soil fertility needs. Program results have demonstrated that crop rotation of peanuts with other crops must be practiced to reduce population pressure of most pest problems. Total dependence on agriculture chemical for all pest problems will not be economically feasible. Field scouting procedures can determine action levels for suggesting chemical treatments for major pest problems. Proper management of the farming operation is a key factor in keeping the peanut producer in a competitive economic position. Increasing production costs and the stable market price for farmers stock peanuts demands that all pesticides be applied on a need basis. The need for chemical treatment must be established by field scout inspection.

Relations of Nematode Populations to Cylindrocladium Black Rot (CBR) in Peanut Fields. Marvin K. Beute, North Carolina State University, Raleigh.

Sequential inoculation with nematodes and C. crotalariae increased CBR severity on both CBR-susceptible (Florigiant) and CBR-resistant (NC 3033) peanuts in greenhouse tests. The ED_{50} values (microsclerotia/cm^3 soil to give 50% diseased plants) for Florigiant and NC 3033 were decreased from 0.35 and 17.5, respectively, in fungus-only soil to 0.05 and 1.6, respectively, in soil containing Meloidogyne hapla (Northern root knot nematode). Two populations of the peanut root knot nematode M. Arenaria (Race 2) which do not reproduce on peanut, also enhanced CBR on NC 3033 in greenhouse tests. Correlations between populations of M. hapla and C. crotalariae with CBR severity were significant in field tests conducted from 1976 to 1978. In greenhouse tests the ED_{50} values for Florigiant were decreased from 0.42 in fungus-alone soil to 0.05 in soil containing Macroposthonia ornata (ring nematode). M. ornata reproduced on NC 3033 in similar tests but did not enhance CBR severity on NC 3033. In microplot tests in fhe field where M. ornata was used in combination with C. crotalariae on both cultivars, more diseased plants occurred with M. ornata + C. crotalariae than with either pathogen alone on Florigiant but not on NC 3033, although the nematode reproduction factor was higher on NC 3033 than on Florigiant.

Predictive Value of Soil Analyses in Forecasting Cylindrocladium Black Rot (CBR) in Peanut Fields. P. M. Phipps and M. K. Beute, Tidewater Research and Continuing Education Center, Suffolk, Va. and North Carolina State University, Raleigh, N. C.

The predictive value of soil analyses in forecasting Cylindrocladium black rot (CBR) was assessed in three counties of North Carolina by sampling soil in 26 fields to be planted to peanuts in 1977. Each soil sample consisted of 25 vertical soil cores (2 cm x 20 cm), collected in a systematic manner in February, from areas ca. 1 ha in size. Soil samples were assayed for Cylindrocladium crotalariae microsclerotia (ms) by the elutriation method. Viable ms were detected in 27 of the 101 soil samples. Densities ranged from 0.1 to 1 ms/g soil in 18 samples and 1.1 to 3 ms/g soil in 9 samples. Systematic surveys for CBR in the 64 sample areas planted to peanuts were conducted in September. CBR was confirmed in 35 of 52 sample areas where soil assays failed to detect ms, but disease incidence was less than 1% in 29 of these sample areas and between 1 and 5% in the remaining 6 sample areas. Twelve of the sample areas with ms densities between 0.1 and 1/g soil were planted to peanuts. One showed no CBR, two showed less than 1% CBR incidence, and nine showed from 1 to 5% CBR incidence. No sample areas with greater than 1 ms/g soil were planted to peanuts.

Peanut Weed Control: the IPM Perspective. Harold D. Coble, North Carolina State University, Raleigh, NC

Peanuts, perhaps more than any other agronomic crop, require a very high degree of weed control for a relatively long growing season. Since peanuts form a relatively shallow crop canopy, they are not as competitive late in the season as crops like corn or soybeans. Therefore, more emphasis has been placed on chemical and mechanical means of achieving the needed level of control. Due to disease problems associated with cultivation, herbicides have become the principal means of control for most growers. Most herbicides used in peanuts are applied either preplant or preemergence to the crop and weeds. Although these herbicides are necessary, some of the most basic IPM principals cannot be followed with their use, eg. economic thresholds. Some of the newly developed chemical technology will allow use of economic thresholds. These chemicals, postemergence grass control herbicides, may completely change the concepts of weed management in peanuts.

APRES BOARD OF DIRECTORS MEETING

Richmond Hyatt House, Richmond, Virginia

15 July 1980

The meeting was called to order at 7:50 P.M. by President J. S. Kirby. The following board members were present: A. H. Allison, D. H. Smith, A. J. Norden, Ron Henning, Robert Ory, L. L. Hodges, W. H. Birdsong, and Perry Russ. Others in attendance were E. B. Browne, Dan Hallock, D. Hsi, J. L. Butler, H. E. Pattee, Ray Hammons, and Joe Sugg.

The APRES tax status summary report was given by Harold Pattee. Robert Ory moved that the report be accepted. Seconded by A. J. Norden. This report is published elsewhere in this volume.

Dan Hallock, Chairman of the Ad Hoc Committee on Revision of "Peanuts-Culture and Uses" presented a report on the current status of the new book (Peanut Science and Technology). W. H. Birdsong moved that the report and the recommendations of the committee be accepted. Seconded by Robert Ory. Motion passed. The complete report is published in this volume.

J. L. Butler and D. C. H. Hsi presented the report of the Site Selection Committee. Robert Ory moved that the 1981 annual meeting be held at the Savannah Hyatt from 21 to 24 July 1981 and that the 1982 meeting be held at the Albuquerque Hilton from 13 to 16 July 1982. A. H. Allison moved that the recommendations of the site selection committee be accepted. Seconded by W. H. Birdsong.

A. H. Allison moved that the Awards Committee be changed to the Bailey Award Committee and that a Golden Peanut Award Advisory Committee be established. Seconded by A. J. Norden. Motion passed.

The report of the Publications and Editorial Committee was presented by Joe Sugg, Ray Hammons, and Harold Pattee. Robert Ory moved that the report of the committee be accepted. Seconded by Ron Henning. Motion passed. The complete report is published in this volume.

R. O. Hammons, liaison representative to the American Society of Agronomy, presented the annual report. A. J. Norden recommended that the report be accepted. Seconded by Robert Ory. Motion passed. The complete report is published in this volume.

A. J. Norden presented the report of the Nominating Committee. A. J. Norden moved that the report be accepted. Seconded by Robert Ory. Motion passed. The report is published in this volume.

The meeting was adjourned at 10:25 P.M.

APRES BOARD OF DIRECTORS MEETING

Richmond Hyatt House, Richmond, Virginia

17 July 1980

The meeting was called to order at 7:35 P.M. by President James S. Kirby: The following board members were present: J. S. Kirby, A. H. Allison, R. Henning, Robert Ory, Perry Russ, W. H. Birdsong, L. L. Hodges, D. H. Smith, A. J. Norden, and Wilbur Parker. Others present were: E. B. Browne, C. A. Dunn, R. O. Hammons, Joe Sugg, Harold Pattee, Olin D. Smith, Robert Pettit, Rufus Keel, D. M. Porter, David Hsi, and Leland Tripp.

The report of the Peanut Quality Committee was given by Wilbur Parker. Ron Henning moved that the report and recommendations be accepted. Seconded by L. L. Hodges. Motion passed. The report is published in this volume.

C. A. Dunn presented the report of the APRES Finance Committee. Wilbur Parker moved that recommendations 1, 4, 5, and 6 be approved. Seconded by A. J. Norden. Motion passed.

L. L. Hodges moved that recommendations 2 and 3 be approved. Seconded by A. J. Norden. Motion passed.

The report of the Finance Committee is published in this volume.

A. H. Allison moved that the proposed members of the PEANUT SCIENCE Editorial Board be approved. Seconded by W. H. Birdsong. Motion passed.

Robert Ory moved that the date and sites of the 1981 and 1982 meetings be approved and that J. L. Butler and D. C. H. Hsi be authorized to consummate agreements with the Savannah Hyatt House and the Hilton Inn of Albuquerque, New Mexico, respectively, for the 1981 and 1982 meetings, respectively. Seconded by Wilbur Parker. Motion passed.

A. J. Norden moved that A. H. Allison write a letter to the National Peanut Council suggesting initiation of a second annual award for individuals involved in education. Seconded by Wilbur Parker. Motion passed.

Wilbur Parker moved that the APRES Awards Committee establish guidelines for selection of APRES Fellows. Seconded by Robert Ory. Motion passed.

D. H. Smith presented the report of the Executive Secretary-Treasurer. Ron Henning moved that the report be accepted. Seconded by Robert Ory. Motion passed.

The meeting was adjourned at 9:45 P.M.

Minutes of the Regular Business Meeting of the

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Richmond Hyatt House, Richmond, Virginia, July 18, 1980

The meeting was called to order by President James S. Kirby at 7:35 A.M.

Dan Hallock gave the invocation.

President Kirby presented his report, and the complete report is published in this volume of APRES PROCEEDINGS.

President J. S. Kirby presented the Bailey Award. The award winning paper was: "A Non-Destructive Method of Peanut Pod Maturity Classification" by J. S. Drexler and E. J. Williams.

Russell Schools moved that the minutes of the Regular Business Meeting of the American Peanut Research and Education Association in Tulsa, Oklahoma on July 13, 1979 be approved as published on pages 69 - 72 of APRES PROCEEDINGS (Volume 11). Seconded by Olin Smith. Motion passed.

Charles A. Dunn presented the report of the APRES Finance Committee and moved that the report and recommendations be accepted. Seconded by Clyde Young. Motion passed. The complete report is published in this volume.

Wilbur Parker presented the report of the Peanut Quality Committee. Sam Ahmed moved that the report be accepted. Seconded by Robert Ory. Motion passed. The complete report is published in this volume.

Joe Sugg presented the report of the Publications and Editorial Committee. Ray Hammons reported on PEANUT RESEARCH and Harold Pattee reported on PEANUT SCIENCE. C. T. Young moved that the report be accepted. Bill Mills seconded the motion. Motion passed. The complete report is published in this volume.

Rufus Keel presented the report of the Public Relations Committee. Olin Smith moved that the report be accepted. Seconded by Ray Hammons. Motion passed. The complete report is published in this volume.

D. L. Hallock, Chairman of the Ad Hoc Committee on Revision of PEANUTS-CULTURE AND USES, presented the report and moved that it be accepted. Seconded by Joe Sugg. Motion passed. The complete report is published in this volume.

Jim Butler, Chairman of the APRES Site Selection Committee reported that the 1981 APRES meeting will be held at the Savannah Hyatt House from 21 to 24 July and that the 1982 meeting will be held at the Hilton Inn of Albuquerque, New Mexico from 13 to 16 July.

The Nominating Committee report was presented by A. J. Norden. Joe Sugg moved that the report be accepted by acclamation. Seconded by Terry Coffelt. Motion passed.

President J. S. Kirby introduced A. H. Allison as the President of APRES for 1980-1981.

The meeting was adjourned at 9:35 A.M.

PRESIDENT'S REPORT

James S. Kirby

It has been a real privilege for me to serve as your President this year. I have heard several comments this week to the effect that our organization has "come of age" and that it is a "first-class" organization. I agree with these comments and I can tell you why we have a first-class organization. It is because of the interest, dedication, and enthusiasm all of you have for what you are doing, for the respective position or role you have in the peanut industry.

We have experienced a name change this year. We are now a Society rather than an Association. Some of us like the change. Some of us don't like the change. Some of us really feel that it makes little difference what our "name" is as long as the goals and objectives of our organization are those which we believe in and can support. Our basic purposes have not changed. We share a common interest in the welfare of the peanut industry. We are interested in research of all facets of the peanut industry. We have an equal interest in the education activities or the extension of the research information to the entire peanut industry and to all of the interested public.

Certainly the name change we experienced this year must be minor and almost insignificant to that which occurred twelve years ago this fall. I was not involved in peanuts at that time but many of you were. I am sure there must have been mixed feelings in the Fall of 1968 when the PIWG or Peanut Improvement Working Group made the decision to change their "group" to the American Peanut Research and Education Association. This change was made to allow additional members, or we could say it was made to meet the needs of those interested in the peanut industry. I would hope that our organization will continue to be receptive and responsive to the needs and desires of our people as long as they are consistent with the goals and objectives and in the best interest of the Society. I joined the peanut industry in January of 1969 and my first national peanut meeting to attend was the first annual meeting of the APREA. Fortunately, I have been able to attend and have enjoyed all 12 of our annual meetings since that time. I have observed at least some of the workings of the organization and I have enjoyed the people in our organization. This is why I count it an honor to have served as your President.

Our keynote speaker in the opening session Wednesday morning, the Honorable Maurice Rowe, paid tribute to American Agriculture and recognized the important contribution of the "peanut" and the peanut industry to agriculture and to our country. I think all of us take pride in being in agriculture but I believe we also need to all share in the responsibility of telling Agriculture's story. We hear that we are in a minority and that certainly often appears to be the case. However, as reminded by the Agriculture Council of America, agriculture is the "heartbeat" of America. It is the nation's #1 Industry, the nation's #1 Employer, the nation's #1 Exporter, and the nation's #1 Inflation Fighter. This is a record of which we can all be justifiably proud, but, as we are also aware, we cannot "rest on our laurels". All of us can see need for continued improvement.

I would liken our American Peanut Research and Education Society to this. You have been successful. You have made many contributions through the years of which you can be proud. But we cannot rest on our laurels. A few years ago, we heard a note of caution that our organization might be ready for a "downhill" trend. I personally see no evidence for this. Our membership has grown to a record of 630+ with a total of 30 countries represented in our membership. We had a record attendance of 275 at this meeting. We had 66 technical papers presented in 9 paper sessions plus 3 discipline-related symposia were held.

I can also say that, from what I have observed this week, the "committee system" is "alive and well" in APRES. For a number of years, your Board of Directors has stressed the importance of "continuity" of membership on our committees. This year, I have tried to get a system of rotation established for all of our standing committees where this is feasible. However, I would like to stress a point in our By-Laws that all committee meetings are open to APRES members and we encourage you to attend those of your interest.

In my opinion, APRES is in "good condition". However, when we see something that could be improved upon, as we all do at one time or another, let it be known. As varied as our industry is, it may not be possible to resolve all problems or differences, but I am optimistic enough that I will continue to believe that we share a common interest in the welfare of the peanut industry and that we will all continue to work toward that end.

May I again express my appreciation to all of you for your support this year and for allowing me the honor of having served as President of the American Peanut Research and Education Society.

PROGRAM COMMITTEE REPORT

The printed program for the twelfth Annual Meeting (first under the APRES designation), which was held in Richmond, Virginia, July 15-18, 1980, is complete as given below, except the Board of Directors' meeting held on Thursday night is not listed, including sponsors, patrons, and exhibitors who contributed to the overall enjoyment of the conference. Special recognition should go to the following:

Dr. Morris Porter, chairman, Technical Program Committee, and its members

Dr. Ken Garren, chairman, Local Arrangements Committee, and its members

Mr. Delbert O'Meara, chairman, Transportation, Visual Aids, Room Arrangements Committee, and its members

Mrs. Lena Garren, Mrs. Betty Allison, co-chairmen, Spouses' Hospitality Committee, and its members

Mr. Herbert Jones, Exhibit Committee, and members

Mr. Russell Schools and Mrs. Mariam Francis, Bookkeeping and Finances

Mr. Larry Hodges and Uniroyal Company, Bar-B-Que

Mr. Gerald Harrison and Diamond Shamrock, Reception

Mr. Dave Hogg and U. S. Gypsum Company, Wine Cellar

Mr. Charles T. Lichy and Mr. Dave McCormick and Dow USA, Ice Cream Parlor

Mr. Astor Perry and Mr. Hoover Thomas, Golf Tournament

Mr. C. B. Robertson and Halfe-Sink Golf Course, grounds for Bar-B-Que

Also, all companies having Hospitality Suites: Elanco Products, Dow, duPont, Olin, Nitragin, Monsanto, Union Carbide.

The following organizations contributed financial support for coffee breaks, bus transportation, and other incidental expenses for this year's APRES meeting. We are most grateful to them for all they do for our industry throughout the year and for their special help in making the Twelfth Annual Meeting of APRES a success:

Sponsors with Exhibits:

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FMC Corporation

Gustafson, Incorporated

J & S Plant Consultants, Skippers, Virginia

Mobay Chemical Corporation

Mobil Chemical Company

Monsanto Agricultural Products Company
North American Plant Breeders
Stauffer Chemical Company
Union Carbide Corporation

Sponsors without Exhibits

Agricultural Division, Olin
Diamond Shamrock Corporation
Southern States Cooperative
Waverly Farm Credit Association

Patrons

Birdsong Peanuts
The Columbian Peanut Company
Gilliam Brothers Peanut Shellers, Incorporated
Gold Kist Peanuts
Hancock Peanut Company
Harrington Manufacturing Company, Incorporated
National Peanut Corporation
Parker Peanut Company
Peanut Processors, Incorporated
Pond Brothers Peanut Company
Virginia Peanut Growers Association, Incorporated

Sixty-six technical papers and three symposia were presented. To the authors, speakers, and session chairmen, we express our appreciation for the professional way in which each was handled and especially the quality of the papers presented.

PROGRAM
for the
Twelfth Annual Meeting
of the
American Peanut Research and Education Society

Tuesday, July 15

1:00-8:00 APRES Registration - Celebrities Foyer

COMMITTEE MEETINGS

1:00 Ad Hoc - Peanut Book - Potomac Room

4:00 Publications and Editorial (Peanut Science) - Potomac Room

4:00 Awards - Monroe Room

4:00 Site - Tyler Room

7:30 Board of Directors - Tidewater Room

7:45 Finance - Taylor Room

7:45 Public Relations - Monroe Room

7:45 Quality - Tyler Room

Wednesday, July 16

8:00-5:00 APRES Registration - Celebrities Foyer

8:00-5:00 Exhibits - Monticello Room

8:00-5:00 Spouses' Hospitality Room - Suite 315

GENERAL SESSION - J. S. Kirby, presiding - Ballroom A-B

8:30 Invocation, J. E. Wrenn

8:35 Grower Welcome and Introduction of Guest Speaker, J. H. Barlow

8:45 Welcome to Virginia, Honorable Maurice Rowe, Secretary of Commerce and Resources

9:15 Announcements
K. H. Garren, Local Arrangements Committee
D. M. Porter, Program Committee

9:30 BREAK

10:00 TWO CONCURRENT SESSIONS
1. Session A - Plant Pathology - Ballroom A
2. Session B - Production Technology - Ballroom C

SESSION A PLANT PATHOLOGY - Ruth Taber, presiding

10:00 Control of *Cercospora arachidicola* and *Cercosporidium personatum* on Early Bunch and Florunner Peanuts in North Florida. F. M. Shokes, L. F. Jackson, and D. W. Gorbet

10:15 Influence of Peanut Cultivar and Stage of Shoot Symptom Development on the Production of Microsclerotia by *Cylindrocladium crotalariae*. J. D. Taylor, G. J. Griffin, and K. H. Garren

10:30 Effect of Soil pH and the Presence of Remoistened Peanut Leaves on Germination of Sclerotinia minor Sclerotia. F. C. Hau, M. K. Beute, and D. M. Porter

10:45 The Effect of Fungicides on Peanut-Field Soil Microflora. R. K. Lankow, D. M. Porter, and J. R. Gouert

11:00 Peanut Pod Rot and Soil Calcium. A. S. Csinos and M. E. Walker

11:15 The Effect of Early Infection with Leaf Spot on Root Mass of Peanut Plants. H. A. Melouk

11:30 The Role of a Predictive Nematode Assay Program in Defining Nematode Problems on Peanut in Virginia. J. A. Fox and P. M. Phipps

11:45 The Interaction Between Fungicide Rate, Application Equipment and Adjuvant Use on Leafspot Control in Virginia Bunch Peanuts. K. J. Middleton

SESSION B PRODUCTION TECHNOLOGY - Dallas Hartzog, presiding

10:00 Effect of Screening and Screen Openings on the Market Value and Quality of Farmers' Stock Peanuts. J. W. Dickens

10:15 Nutrient Effects on Mineral Concentrations and Germinability of Peanut Seed. D. L. Hallock

10:30 Seasonal Patterns in Nitrogen Fixation of Peanut Cultivars. S. T. Ball, J. C. Wynne, G. H. Elkan, and T. J. Schneeweis

10:45 Cone Penetrometer with Digital Data Acquisition. F. W. Wright and J. L. Steele

11:00 Twospotted Spider Mite Control Procedures on Large-Seeded Virginia-type Peanuts. J. C. Smith and R. W. Mozingo.

11:15 Solar Curing Peanuts in a Module. J. E. Curtis and T. D. Hall

11:30 Peanut Drying Energy Consumption - Simulation Analysis. J. M. Troeger

11:45 Dichlorvos Aerosol as a Space Treatment for Peanut Shelling Plants. L. M. Redlinger, J. I. Davidson, Jr., H. B. Gillenwater, and R. A. Simonaitis

12:00 LUNCH

1:00 THREE CONCURRENT SESSIONS
1. Session A - Plant Pathology - Ballroom A
2. Session B - Peanut Harvesting and Curing - Ballroom B
3. Session C - Peanut Breeding Symposium - Ballroom C

SESSION A PLANT PATHOLOGY - Durham Bell, presiding

1:00 Effect of Dinitramine and Dinoseb on Cylincrocladium Black Rot (CBR) of Peanut. J. A. Barron and P. M. Phipps

1:15 Control of Meloidogyne hapla, Belonolaimus longicaudatus and Macropostonia ornata on Peanut. P. M. Phipps and J. A. Fox

1:30 Relationship Between Cercosporidium Personatum and Cercospora Arachidicola Leafspots on Florunner Peanut in Southern Georgia. R. H. Littrell

1:45	Utilization of a Peanut Leafspot Forecasting Model in Virginia. N. L. Powell, D. M. Porter, and R. Dow.
2:00	Evaluation of Fungicides for Pythium Pod Rot Control. T. E. Boswell and W. J. Grichar
2:15	Application of Metham Through Sprinkler Irrigation for the Control of Soilborne Pathogens of Peanuts. J. Krikun, G. A. Papavizas and Z. Frank
2:30	Testae of Wild and Cultivated Peanuts: Surface Morphology and Fungal Penetration. R. A. Taber, M. Olszak, C. E. Simpson, R. E. Pettit, and O. D. Smith
2:45	Detection of Mold and Mycotoxin Damaged Peanut Kernels with Helium-Neon Laser Reflected Energies. R. E. Pettit and A. K. Chan
SESSION B	PEANUT HARVESTING AND CURING - B. L. Clary, presiding
1:00	Effects of a Lime Slurry on Soil pH, Exchangeable Calcium, and Peanut Yields. F. Adams and D. Hartzog
1:15	Optimizing Storage for Farmers' Stock Peanuts--A Multidiscipline Team Approach. J. S. Smith, Jr., J. I. Davidson, Jr., T. H. Sanders, R. J. Cole, J. A. Lansden, and L. M. Redlinger
1:30	Some Properties of Peanut and Foreign Material as Related to Farmers' Stock Storage. J. I. Davidson, Jr., J. S. Smith, Jr., R. J. Cole, T. H. Sanders, and P. D. Blankenship
1:45	Peanut Quality Changes Associated with Deficient Warehouse Storage. T. H. Sanders, J. S. Smith, Jr., J. A. Lansden, J. I. Davidson, Jr., and R. J. Cole
2:00	Rainfall Control Plot Facility at National Peanut Research Laboratory. P. D. Blankenship, R. J. Cole, and T. H. Sanders
2:15	Effects of Low-Oxygen Atmosphere Processing and Storage on Field Performance of Florunner Seed. W. O. Slay
2:30	Microprocessor Controlled Peanut Dryer - A Progress Report. J. L. Steele
2:45	On-Farm Solar Assist Peanut Curers. A. J. Lambert
SESSION C	PEANUT BREEDING SYMPOSIUM I.: Breeding Methods - T. A. Coffelt, presiding
1:00	Use of the Pedigree to Develop Multiline Peanut Varieties. A. J. Norden
1:20	Use of Single Seed Descent and Population Improvement Methods. J. C. Wynne and T. G. Isleib
1:35	Convergent Crossing for Peanuts. W. D. Branch
1:45	Methods of Breeding for Early Maturity. J. S. Kirby and D. J. Banks
1:55	Cytogenetics of Arachis. H. T. Stalker
2:20	Discussion
3:00	BREAK

3:15	TWO CONCURRENT SESSIONS 1. Session A - Entomology and Weed Science - Ballroom A 2. Session C - Peanut Breeding Symposium (continued) - Ballroom C
SESSION A	ENTOMOLOGY AND WEED SCIENCE - Tom Larsen, presiding
3:15	Response of Labidura Riparia to Pesticide Residues on Peanuts. N. A. de Rivero and S. L. Poe
3:30	Cultural Control of the Twospotted Spider Mite on Peanuts. W. V. Campbell
3:45	A Survey of Early Season Populations of Leafhoppers in Peanut Fields. L. W. Morgan, E. T. Hibbs, and J. W. Todd
4:00	Herbicide Component Performance in the Control of Problem Weeds in Peanuts. O. E. Rud
4:15	New Approaches to Weed Control in Peanuts. H. Greer, D. Murray and J. Soteres
4:30	Promising New Herbicides for Weed Control in Peanuts. W. J. Grichar, T. E. Boswell, and M. G. Merkle
SESSION C	PEANUT BREEDING SYMPOSIUM II.: Breeding for Resistance - J. C. Wynne, presiding
3:15	Resistance to Aflatoxin. A. C. Mixon
3:35	Disease Resistance Breeding at ICRISAT. R. W. Gibbons
3:50	Cylindrocladium Black Rot and Sclerotinia Blight. T. A. Coffelt, D. M. Porter, and K. H. Garren
4:00	Pod Rot and Lesion Nematode. O. D. Smith and T. E. Boswell
4:10	Rust and Leafspot. R. O. Hammons
4:20	Rust Research in People's Republic of China. C. Liang Gao
6:00	BARBECUE AT HALFE-SINK GOLF COURSE - UNIROYAL

Thursday, July 17

8:00	TWO CONCURRENT SESSIONS 1. Session A - Processing - Ballroom C 2. Session B - Extension-Industry Plant Disease Symposium - Ballroom A
SESSION A	PROCESSING - L. Khatri, presiding
8:00	Effect of Pretreatments on Peanut Hull Saccharification. J. A. Lansden and T. H. Sanders
8:15	Quality of Cooked Ground Beef Extended with Defatted Peanut Meal. E. M. Ahmed and R. L. West
8:30	Isolation and Characterization of Methionine-Rich Polypeptides from Peanut Seed. M. B. Shaik-M and S. K. Pancholy
8:45	Evaluation of Raw Peanuts from Volatile Profiles. N. V. Lovegren, C. H. Vinnett, A. J. St. Angelo, and R. W. Mozingo

9:00	Effect of Various Herbicide and Insecticide Field Applications on Proximate and Amino Acid Composition of Shelled Peanuts. S. R. Cecil and E. W. Hauser
9:15	Pressing Peanuts--Effects of Splits on Oil Removal. J. Pominski, J. J. Spadaro, and J. R. Baxley
9:30	Effect of Foliar and Soil Application of Urea on Peanut Yield and Seed Quality. S. K. Pancholy, M. B. Shaik-M, A. L. Guy, and D. W. Gorbet
9:45	Oil, Total Protein, and Amino Acid Composition of 80 Peanut Lines and Cultivars. R. Sepulveda and S. K. Pancholy
SESSION B	EXTENSION-INDUSTRY PLANT DISEASE SYMPOSIUM - H. V. Morton, presiding
8:00	Welcome - R. V. Sturgeon, Jr.
8:10	Peanut Disease Losses in the United States. J. C. Wells
8:45	Effect of Changing Varieties on Disease and Nematode Control Recommendations. T. A. Lee, Jr.
9:00	Screening Chemicals for Efficacy in Control of Sclerotinia Blight of Peanut. P. M. Phipps and D. M. Porter
9:15	Field Evaluations of Fungicides for White Mold (Sclerotium Rolfsii) Control on Peanut in South Carolina. C. E. Drye, F. H. Smith, J. P. Krausz, and L. S. Livingston
9:30	Control of Root-Knot Nematodes in Peanuts: The Post-DBCP Situation. R. Rodriguez-Kabana
9:45	Peanut Pod Rot in Oklahoma. R. V. Sturgeon, Jr.
10:00	BREAK
10:15	TWO CONCURRENT SESSIONS 1. Session A - Physiology - Ballroom C 2. Session B - Extension-Industry Peanut Disease Symposium (continued) - Ballroom A
SESSION A	PHYSIOLOGY - A. B. Rodgerson, presiding
10:15	The Effect of Kylar on Plant, Pod and Seed Characters of Valencia Peanuts. D. C. H. Hsi and J. I. Davidson, Jr.
10:30	State of Development Descriptions for Peanut (Arachis Hypogaea L.). K. J. Boote
10:45	Salt Sources and Concentrations of Potassium: Effects in the Solution Culture of Peanuts. J. S. Calahan, Jr.
11:00	Ethylene Production and Leaflet Abscission of Peanut Genotypes Inoculated with Cercospora Arachidicola. D. L. Ketring and H. A. Melouk
11:15	Adaptability of the Arginine Maturity Index Method to Virginia Type Peanuts. P. G. Fincher, C. T. Young, J. C. Wynne, and A. Perry
11:30	Improvement of Peanut Seed Germination with Hot Water and Acetone Treatments. M. A. Abdel Rehim, R. Rodriguez-Kabana, P. A. Backman, and M. A. Crawford

11:45	Effects of Peanut Seed Treatments on Rhizobium. P. A. Backman, M. A. Abdel Rehim, and R. Rodriguez-Kabana
SESSION B	EXTENSION-INDUSTRY PEANUT DISEASE SYMPOSIUM - H. V. Morton, presiding
10:15	Interactions Between Sclerotium Rolfsii Nematodes and Control Practices. S. S. Thompson
10:30	Overwintering of Cylindrocladium crotalariae Microsclerotia in Peanut Field Soils. G. J. Griffin, J. D. Taylor, P. J. Graham, D. A. Roth, N. L. Powell, and K. H. Garren
10:45	Forecasting Techniques for Peanut Leafspot Control. Panel Discussion - R. D. Berger, H. D. Smith, and N. L. Powell
11:15	New Developments in Industry. H. V. Morton
11:45	Business Meeting. H. V. Morton
12:00	LUNCH
1:00	TWO CONCURRENT SESSIONS 1. Session A - Physiology and Breeding - Ballroom C 2. Session B - Integrated Pest Management Symposium - Ballroom A
SESSION A	PHYSIOLOGY AND BREEDING - A. C. Mixon, presiding
1:00	Peanut Photosynthesis Inhibited by Ethylene. J. E. Pallas, Jr. and S. J. Kays
1:15	Foliar Fungicides and Peanut Seed Quality. D. K. Bell and R. H. Littrell
1:30	Nitrogen Balance Studies in Peanuts. P. R. Reddy, I. V. Subbarap, and L. M. Rao
1:45	Screening Peanuts (Arachis hypogaea L.) for Resistance to Sclerotinia Blight. T. A. Coffelt and D. M. Porter
2:00	Cytophotometric Determination of the Amount of DNA in Arachis L. Sect. Arachis. P. M. Resslar, J. M. Stucky, and J. P. Miksche
2:15	Second Gene for the Flop Trait in Peanuts. W. D. Branch and R. O. Hammons
2:30	An F_2 Yield Trial in Peanuts. R. O. Hammons and W. D. Branch
2:45	Comparison of Peanut Pure Line and Multiline Cultivars Across 16 Environments. T. T. Schilling, R. W. Mozingo, J. C. Wynne, and J. L. Steele
SESSION B	INTEGRATED PEST MANAGEMENT SYMPOSIUM - W. V. Campbell, presiding
1:00	Peanut Plant Phenology and Damage from Insect Pests. J. W. Smith
1:20	Effect of Planting Date on Insect Damage and Yield. R. E. Lynch and J. W. Garner
1:35	Calibration of Florida Insect Scouting Procedures. H. M. Linker

1:50	Interaction of Pesticides and Cultivars in a Peanut Pest Management Program. L. W. Morgan
2:05	Assessment of Systems Control of Peanut Leafspot Control. T. A. Kucharek
2:25	History and Objectives of Peanut Pest Management in Alabama. J. C. French and J. R. Weeks
2:45	Accomplishments of Peanut Pest Management Program in Alabama. J. R. Weeks and J. C. French
3:00	BREAK
3:15	TWO CONCURRENT SESSIONS 1. Session A - Breeding - Ballroom C 2. Session B - Integrated Pest Management Symposium (continued) - Ballroom A
SESSION A	BREEDING - E. Harvey, presiding
3:15	Expression of Heterosis in Testcrosses of Exotic Peanut (Arachis hypogaea L.) Genotypes. T. G. Isleib and J. C. Wynne
3:30	The Effect of Genotype X Environment Interactions on Varietal Development in North Carolina and Virginia. J. C. Wynne and T. A. Coffelt
3:45	Shell and Seed Size Relationships in Peanuts. I. J. de Godoy and A. J. Norden
4:00	Effects of Cultivars, Row Patterns, and Plant Populations on the Yield, Value, and Grade of Virginia Type Peanuts. R. W. Mozingo and T. A. Coffelt
4:15	Resistance to Both Rust and Late Leafspot in Some Cultivars of Arachis hypogaea. P. Subrahmanyam, D. McDonald, R. W. Gibbons, and S. N. Nigam
SESSION B	INTEGRATED PEST MANAGEMENT SYMPOSIUM - W. V. Campbell, presiding
3:15	Integrated Pest Management in Peanuts in Georgia. H. Womack
3:35	Integrated Pest Management in Peanuts in Texas. C. E. Hoelscher and D. S. Moore
3:55	Relations of Nematode Population to Cylindrocladium Black Rot (CBR) in Peanut Fields. M. K. Beute
4:10	Predictive Value of Soil Analysis in Forecasting Cylindrocladium Black Rot (CBR) in Peanut Fields. P. M. Phipps and M. K. Beute
4:25	Peanut Weed Control: The IPM Perspective. H. D. Coble
4:45	Discussion
6:00	RECEPTION - DIAMOND SHAMROCK - Regency Room

Friday, July 18

7:30	BREAKFAST - Ballrooms A and B
8:30	President's Address and Business Meeting - Ballrooms A and B - J. Kirby, presiding
10:30	ADJOURN
8:00-12:00	Exhibit Removal - Monticello Room

FINANCE COMMITTEE REPORT

Charles A. Dunn, Chairman
Robert Pettit, Vice-Chairman
Scott Wright
Darold Ketring
Lional Felts

The Finance Committee met at 7:45 p.m. on July 15, 1980 and at 8:30 p.m. on July 16, 1980. A limited audit of the financial statements submitted by the Secretary-Treasurer and Peanut Science Editor was conducted and found to be in order.

The committee responded to several requests and submit the following recommendations to the Board of Directors:

1. That the assistant to the Secretary-Treasurer be paid $2,000 for work done for APRES during the fiscal year July 1, 1980 to June 30, 1981.

2. That the Editorial Assistant be paid $1,700 for work done for Peanut Science during the fiscal year July 1, 1980 to June 30, 1981.

3. That the request for travel funds to help defray the cost of the Editor of Peanut Science to attend the annual meeting not be funded in view of the financial status and in the best interests of the society.

4. That the Assistant to the Secretary-Treasurer be authorized to submit an itemized list of actual expenses not covered by other funding sources to attend the annual meeting of APRES and assist in registration and completion of annual committee reports.

5. That the financial statements submitted by the Secretary-Treasurer and Peanut Science Editor be accepted.

6. That the request from the Peanut Quality Committee for $1,000.00 to cover the initial costs of handling and printing 300 copies of Peanut Methodology be accepted.

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Proposed Budget - July 1, 1980 to June 30, 1981

I.	Assets (July 1, 1980)	
	A. Certificates of Deposits	
	1. Yoakum Federal Savings & Loan, Yoakum, Texas	$15,285.99
	2. Cuero Federal Savings & Loan, Cuero, Texas	12,610.26
II.	Income	
	A. Balance Carried Forward (July 1, 1980)	6,968.11
	B. Membership and Registration	12,000.00
	C. Proceedings and Reprint Charges	400.00
	D. Peanut Science Page and Reprint Charges	10,800.00
	E. Differential Postage Assessment - Foreign Members	650.00
	F. Institutional Membership	960.00
		$31,778.11

III.	Liabilities & Expenditures	
	A. Peanut Research	$1,250.00
	B. Proceedings, Printing, Etc.	4,500.00
	C. Annual Meeting	1,750.00
	D. Secretary-Treasurer	
	1. Secretarial Services	2,000.00
	a. Travel and Meeting Expenses to Attend Annual APRES Meeting	1,000.00
	E. Postage	1,000.00
	F. Office Supplies	2,000.00
	G. Peanut Quality Committee	1,000.00
	H. Travel	
	1. President	600.00
	2. Secretary-Treasurer	600.00
	I. Registration (State of Georgia)	5.00
	J. Peanut Science	12,150.00
	K. Miscellaneous	500.00
		$28,355.00

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Financial Statement

July 1, 1979 to June 30, 1980

ASSETS AND INCOME

I

Item		
A.	Balance - July 1, 1979	$ 7,761.59
B.	Membership & Registration (Annual Meeting)	12,886.00
C.	Proceedings & Reprint Sales	391.55
D.	Special Contributions	-
E.	The Peanut	604.06
F.	Peanut Science Page Charges & Reprints	9,508.60
G.	Institutional Membership	840.00
H.	Differential Postage Assessment - foreign members	909.70
	Total	$32,901.50

LIABILITIES AND EXPENDITURES

II

Item		
1.	Proceedings - Printing & Reprints	$ 3,259.97
2.	Annual Meeting - Printing, Catering & Misc.	833.37
3.	Secretarial	1,800.00
4.	Postage	739.45
5.	Office Supplies	2,192.06
6.	Postition Bond for $5,000 (Exec. Sec. Treas)	-
7.	Travel - President	-
8.	Travel - Executive Sec. Sec. Treas)	-
9.	Registration - State of Georgia	5.00
10.	Miscellaneous	267.92
11.	Peanut Science	10,500.00
12.	The Peanut	128.61
13.	Bank Charges	2.85
14.	Peanut Research	1,065.63
15.	Certificate of Deposit	4,000.00
16.	Membership	14.00
17.	Secretary-Self Employment Tax	140.00
18.	Legal Fees	984.53
	Total	$25,933.39

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Financial Statement

July 1, 1979 to June 30, 1980

I. Income

A. Balance - July 1, 1979	$ 7,761.59
B, C, D, E, F, G, H Income July 1, 1979 to June 30, 1980	25,139.91
	$32,901.50
Expenses - July 1, 1979 to June 30, 1980	25,933.39
	$ 6,968.11

SAVING ACCOUNT

	Date	Interest	Disbursed	Balance
Yoakum National Bank Wallace K. Bailey Fund	6-30-80	$11.63	-	$894.36

CERTIFICATES OF DEPOSIT

	Date	Balance
Yoakum Federal Savings & Loan Association	6-30-80	$15,285.99
Cuero Federal Savings & Loan Association	6-30-80	$12,610.26

REPORT OF THE PUBLICATIONS AND EDITORIAL COMMITTEE

by

Joe S. Sugg, Chairman

The Publications and Editorial Committee is responsible for two continuing functions. One is the publication of PEANUT RESEARCH and this report will be made at this time by Ray Hammons, on behalf of Ray Hammons and J. E. Cheek, Editors. Mr. Hammons' report is as follows:

"Four quarterly issues of APRES PEANUT RESEARCH (Volume 17, Issues 71-74, totalling 29 pages) were compiled, edited, published, and mailed to the membership during the year.

"Circulation was to about 590 individual members or institutions in the U. S. and abroad. The Newsletter is sent to Libraries of Land-grant institutions in the southern United States, to USDA-SEA National Agricultural Library, to various abstracting services and to several agricultural periodicals.

"PEANUT RESEARCH reported updates on people and research grants, along with several interpretive summaries.

"Two new features were added. In January, ten editorial consultants were appointed to one-year terms to broaden geographical coverage in the States, laboratories or centers they represent. Members are encouraged to report newsworthy events to their editorial representative.

"The new FOCUS ON RESEARCH section reviewed ongoing research and extension activities in the Food Science Dept., Georgia Station, Experiment, GA.; the Plant Disease Research Station, TAMU, Yoakum, TX.; and the Tidewater Research and Continuing Education Center, Suffolk, VA.

"One hundred sixty-two selected references and twenty-nine theses and dissertations were documented.

"All information issuances from APRES officers were published."

The other continuing publication is PEANUT SCIENCE, Harold Pattee, Editor, and this morning Dr. Pattee will report on PEANUT SCIENCE:

"Gentlemen, Fellow Members, and Guests:

"This has been a most successful year for PEANUT SCIENCE, and I wish to commend the authors, the Publications and Editorial Committee, the President, the Secretary and the Treasurer, and others who have cooperated in making this a successful and profitable year.

"The manuscript submission level has increased nearly 25%. The publication of the SIX-YEAR Index was a monumental but successfully handled task for the Editorial Board. The status of the journal is as follows:

Manuscripts submitted July 1, 1979-June 30, 1980..36
July-December 1979 Issue: 15 articles - 57 pages printed
Index - 9 pages printed
January-June 1980 Issue : 13 articles - 60 pages printed
Total: 28 articles -126 pages printed
Number of articles accepted or in review.....20
Printing cost per page: $44.55
Average length of articles: 4.2 pages
Total cost per page : $70.25

Printing Cost Breakdown:

Total pages	Printed pages	
136	133	$ 4,345.50
Reprints supplied		$ 1,435.60
Journal cover		$ 346.40
Taxes		$ 270.03
Shipping charges		$ 98.75
Galley error corrections		$ 15.00
Index		$ 608.80

"In addition to these figures, I feel that the financial statement will be of interest to the membership, which I shall at this time hurriedly present:

Financial Statement
July 1, 1979 to June 30, 1980

Balance - July 1, 1979		$ 1,068.13
Received from APRES		10,500.00
Expenditures:		
Printing		7,120.08
Postage	Domestic	655.57
	Foreign	556.39
Office Expenses	Photocopy	54.98
	Supplies	172.18
	Mileage	52.00
	Bank Serv. Chg.	1.60
P. O. Box and Bulk Mailing Permit		96.00
Salary, Editorial Assistant		1,500.00
	Social Security	78.52
	Total	$ 10,287.42
Balance on Hand		$ 1,280.81

Estimated Expenses: $11,875.00

Income from Peanut Science	$ 4,303.10
Outstanding Invoice Charges	4,505.30
Sale of Back Issues	
APRES Member Subscription (530 x $2.00)	1,060.00
Library Subscription (74)	888.00
Foreign Mailing Credit	513.29
	$ 11,269.69

Estimated Income: $11,090.00

Proposed Budget 1980-1981

Number of Issues 2 (July-December 1980, January-June 1981)
Estimates: Pages -------- 140
Cost per page- $50.00

Expenditures:		
Printing Costs		$ 7,000.00
Reprint Costs		1,600.00
Editorial Assistant		1,800.00
Editor-Travel Expenses		300.00
Office Supplies		750.00
Postage	Domestic	450.00
	Foreign	650.00
	Total-	$ 12,550.00
Income:		
Page Charges		$ 9,100.00
Peprint Charges		1,700.00
Foreign Mailing		650.00
APRES Member Subscription (540 x $2.00)		1,080.00
Library Subscription (80)		960.00
	Total-	$ 13,490.00

"In addition to these statistics, I think you should know that there have been nominated Associate Editors, who will succeed themselves or fill unexpired-term positions. They are as follows, and they have been approved by the Board of Directors:

Kenneth J. Boote
Bobby Clary
Fred R. Cox
Ray O. Hammons
D. Morris Porter
Edith J. Conkerton
William V. Campbell

"Another small accomplishment, which I am sure will meet with the approval of you, the Secretaries, and our printers, is the elimination of the degree mark in quoting celsius. Also, tables will be typed on bond paper to facilitate better reproduction. The authors will be notified of this.

"There were other points concerning PEANUT SCIENCE, which will be reported by the Chairman of the Publications and Editorial Committee.

"Again, let me thank you for your cooperation and before this assembled group express sincere appreciation to each editorial Board member for a job well done, and for the support of every APRES member."

Thank you, Harold, and at this point I should report that the Publications and Editorial Committee during the year reviewed several questions concerning PEANUT SCIENCE and they are as follows:

1. The question concerning advertising in PEANUT SCIENCE was approved by the Publications and Editorial Committee and presented to the Board of Directors who tabled the plan for further consideration next year.

2. Any paper or portion of a paper printed in the PROCEEDINGS would be considered as prior publication should the same paper or part of this paper be offered for publication in PEANUT SCIENCE.

3. Special effort will be made on the part of the Editors of PEANUT SCIENCE to make sure that all potential authors are aware of publication dates, procedures, etc., in order that no author having publishable material might be overlooked.

4. Encourage corporation or commercial researchers to publish when their company policy will permit, and encourage these scientists to appear on the program when it is known that they have something to report that will be of interest to the membership at the annual meeting.

5. Endeavor to get more libraries to subscribe to PEANUT SCIENCE, and to accomplish this, Broadus Brown agreed to write to his counterpart in all land-grant universities, who are not now subscribing, sending to them a copy of PEANUT SCIENCE, with the request that they encourage their libraries to subscribe.

The Peanut Quality Committee Chairman, William Parker, appeared before the Publications and Editorial Committee and stated that there are a number of methodology procedures used in the different disciplines which need to be catalogued and published and made available to interested scientists from APRES. He reported that he and his committee had screened and reviewed 23 and another 20 were in the process, and felt that there would be 40 to 50 that could be published in the near future. His estimate was that a maximum of $1,000.00 would be needed to publish on a self-liquidating basis. This proposal was presented to the Board of Directors, who adopted this proposal with the understanding that it would be published as soon as practical and the members would be informed when it is available and at what price.

The Publications and Editorial Committee appreciates the cooperation of the officers, other committees, and the entire membership in its endeavors during the past year.

REPORT OF THE 1980-81 APRES QUALITY MEETING

The Quality Committee met at 7:45 P.M. on July 15, 1980 during the twelfth annual meeting.

The total attendance at the meeting was one of the best on record, with twenty members and non-committee members attending. Present were: Wilbur A. Parker, Pert Lab, Edenton, N. C.; John Troega, USDA-SEA, Coastal Plain Exp. Sta., Tifton, Ga.; Paul D. Blankenship, National Peanut Research Lab, Dawson, Ga.; Jim Davidson, National Peanut Research Lab, Dawson, Ga.; Ted Marolla, M&M/ Mars, Albany, Ga.; Tim Sanders, USDA, SCA, NPRL, Dawson, Ga.; Doyle Welch, Delson Peanut Company, Delson, Texas; John Smith, National Peanut Research Lab, Dawson, Ga.; E. Jay Williams, USDA, SEA, Coastal Plain Exp. Sta., Tifton, Ga.; D. M. Hogg, P. O. Box 10811, Raleigh, N. C.; Shaik-M. M. Basha, Box 29, FAMU, Tallahassee, Fla.; W. O. Slay, National Peanut Research Lab, Dawson, Ga.; E. M. Ahmed, Food Science and Human Nutrition, U. of Fla., Gainesville, Fla.; S. K. Pancholy, Box 29, FAMU, Tallahassee, Fla.; Sam Cecil, Ga. Station, Experiment, Ga.; Lakho Khatri, Swift and Company, R & D Center, Oak Brook, Illinois; Ruth Ann Taber, Texas A & M University, College Station, Texas; Clyde Young, NCSU, Raleigh, N. C.; Terry Coffelt, P. O. Box 7099, Holland Station, Suffolk, Va.; and Walton Mozingo, Tidewater Research Center, Suffolk, Va.

A review was made of the analytical methods that have been drafted in the APRES format.

Twenty-three methods have been prepared and reviewed by two different laboratories. These methods are now ready for publication as Proposed Method.

After reviewing the goals and work of the two previous committees, the following recommendations were made and adopted:

--Publish the methods that have been prepared and reviewed as proposed methods in loose-leaf form, using standard hard-type binders containing APRES logo.

--Publish proposed methods on 8 x 11 size inexpensive paper and make recommendation at 1981 meeting on cost and quality for type paper to be used for official methods.

--The number of copies to be published is to be 300 for each method, and cost of handling and printing is not to exceed a total of $1,000.00.

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Discussed mechanics of handling and cost of subscription which should include the first 50 copies published. Suggestion made that the Publication Committee be contacted to advise on procedures for printing the initial copies and assist in establishing the subscription cost for first 50 copies for each subscriber.

Also should consult with the Publication Committee on how to proceed when existing methods, viz. AOCS and AOAC have been modified to be specific for peanuts.

Discussed need to review existing USDA grading procedures with proper personnel and to advise Board of Directors of the need to have better measurement of critical factors that have important impact on quality. These factors include, but are not limited to, roast quality, freeze injury, mechanical injury and foreign materials.

Respectfully submitted,

W. A. Parker

REPORT OF THE 1979-80 NOMINATING COMMITTEE

The nominating committee consisting of J. L. Steele, C. H. Warnken, Jr. and A. J. Norden, Chairman nominate the following APRES members to fill the positions described:

President-Elect ---------- James L. Butler

Executive Secretary-Treasurer ---------- Don H. Smith

Board of Directors (manufactured products representative - 3 year term) ---------- Gerry Zekert

The willingness of the nominees to accept the responsibility of the position, if elected, has been ascertained.

Presentation of the Sixth Annual
Bailey Award

Twelfth Annual Meeting of the
American Peanut Research and Education Society
Richmond Hyatt House, Richmond, Virginia
July 15-18, 1980
by

James S. Kirby - President, APRES
Business Meeting - July 18, 1980

The Bailey Award was established in honor of WALLACE K. BAILEY, an eminent peanut scientist and long-time leader of Peanut Investigations in the U.S.D.A. Agricultural Research Service. Wallace Bailey was one of the small group of people who formed the Peanut Improvement Working Group which later became the American Peanut Research and Education Association and which is now known as the American Peanut Research and Education Society.

The BAILEY AWARD is presented each year to that scientist or scientists presenting the best paper at the previous year's annual meeting as determined by the Bailey Award Committee.

Each paper presented at the 1979 annual meeting in Tulsa, Oklahoma was considered. They were judged for merit, originality, clarity and contribution to peanut scientific knowledge. Manuscripts, based on oral presentations, were obtained from the authors for evaluation by the award committee. This committee has a difficult assignment, and, on behalf of the Society, I want to thank the committee for their conscientious efforts. Members of this year's Bailey Award Committee were:

Morris Porter, Chairman (1980)	Milton E. Walker (1981)
Johnny Wynne, Vice-Chairman (1981)	Kay McWatters (1982)
Olin Smith (1981)	Paul Blankenship (1983)

Appreciation is also extended to Don Banks and Fred Cox, substitutes for Olin Smith and Johnny Wynne, who had papers being considered for the award.

It is now my privilege as President of APRES to present the Bailey Award to Mr. J.S. Drexler and Mr. E. Jay Williams for their paper entitled, "A Non-destructive Method of Peanut Pod Maturity Classification". This handsome set of gold peanut bookends is presented to Stan as the senior author and Bailey Award certificates are presented to both Stan and Jay in recognition of, and appreciation for, their outstanding paper. Both Stan and Jay are located at the Coastal Plain Experiment Station, Tifton, Georgia. Stan is a state agronomist and Jay is a U.S.D.A. agricultural engineer.

AD HOC COMMITTEE REPORT

Revision of Peanuts, Culture and Uses
July 18, 1980

Pursuant to decisions made by this Society one year ago, the newly selected editors of our new book about peanuts, Drs. Harold Pattee and Clyde Young, were given a very tight schedule for producing that book. We are happy to report that progress to-date is very satisfactory in that about 1/3 of the 21 chapters is in the editors' hands already. Both the editors and the authors deserve our deep gratitude for the many, many hours they have spent, and will spend, to get this book in your hands.

Input from many members was solicited regarding the name of this book. No name will satisfy everyone here. The name we recommended to the Board of Directors Tuesday evening is "Peanut Science and Technology". After considerable discussion, they accepted this recommendation.

Last year there was some comment that the book contain one comprehensive listing of all literature cited in the various chapters. However, after many urgent requests from the authors in our meeting Tuesday, this committee recommends that each chapter be followed by its own literature cited section.

Now let's consider probable publication and circulation costs. After considerable checking, the editors report that this Society can save considerable money by utilizing a smaller publishing company and doing our own sales promotion. For instance, under present day prices, the printers of "Peanut Science" say they could print 2,500 copies for about $13 per copy. Shipping charges would probably add $2 to $3 to that cost. Let me make it clear that no agreement with any company has been consummated to-date. If any of you know of some printing company which is capable of giving us a quality job on this book at a reasonable price, please forward this information to the editors promptly so they can check them.

The approximate cost mentioned above was without color prints. However, it was the consensus of this committee and most of the authors that certain information needs to be presented in color for proper emphasis and clarity. To eliminate color entirely would seriously detract from the book. Therefore, we recommend that the editors be empowered to authorize presentation of certain subjects in color up to a maximum additional cost of $7,500 or $3 per copy. If in the opinion of the editors and this committee, any authors request excessive color printing, they will have to arrange for payment of such printing. The Board of Directors concurred with this latter recommendation.

Thus, if we consider the cost of each book as $18, 2,500 copies could be printed and distributed for about $45,000. It appears that our original estimate of a maximum price per copy of $30 can be met. However, special effort on the part of many of us will be necessary so that the printing of this book is not delayed. Delays could easily increase the price of this book and reduce returns to this Society via increased finance charges and reduced sales.

I wish to thank especially the members of this committee and others who have helped in the above endeavors.

Dr. Ronald Henning
Dr. Thomas Whitaker
Dr. Donald Smith
Dr. Gale Buchanan
Dr. Donald Banks
Daniel L. Hallock, Chairman

REPORT OF THE PUBLIC RELATIONS COMMITTEE

The committee was composed of the following persons: Rufus Keel, Vice-Chairman; J. W. Dickens; D. M. Carter; H. Ray Smith and G. M. Grice with C. E. Simpson, Chairman.

The committee tried to get an early start on notices of the Richmond meeting (as suggested by last year's committee). On January 28, 1980, a news release was mailed to seventeen possible sources of release. On February 5, 1980, each committee member was requested to advise other sources in their area. Several other sources were contacted.

A few copies of "History Purposes Goals of APRES" were distributed. There are approximately 2,000 more copies of this brochure available. This committee recommends that next year's committee make better use of these attractive brochures.

Resolutions of necrology and services were duly submitted.

RESOLUTION

WHEREAS: Since the last meeting of the American Peanut Research and Education Society, God in His infinite wisdom, did take from our midst, B. C. Langley, Superintendent (Retired), West Cross Timbers Experiment Station, Stephenville, Texas, and

WHEREAS: Byron served the peanut industry for many years, was a charter member of APREA and of the PIWG, and served many capacities in these organizations, and

WHEREAS: Byron was instrumental in developing Certified Peanut Seed in Texas, did develop and release the 'Starr' Spanish peanut, did much of the early work on peanut irrigation and control of weeds with herbicides, and was awarded the Golden Peanut Research Award in 1965.

THEREFORE: Be it resolved that the membership of APRES here assembled recognize the passing of Byron C. Langley as a profound loss to us all and further that this resolution be made a part of the permanent record of APRES and that copies be sent to Mrs. B. C. Langley and to Robert B. Langley.

Adopted this 18th day of July 1980.

RESOLUTION

Be it resolved, that the tragic death of Mr. Ronnie D. Sell, Vice-President of the Lee County Peanut Company, Inc., Giddings, Texas, be recognized by the American Peanut Research and Education Society with utmost regret. Ronnie was very active in the peanut industry, being a member of the Southwest Peanut Shellers Association and an advisor to the Texas Peanut Producers Board. Ronnie's contribution to the peanut industry and fellowship with his many friends will be greatly missed.

We, therefore, recommend that this Resolution be included in the permanent records of the 1980 APRES meetings and that a copy of it be forwarded to Mrs. R. D. (Jo Ann) Sell.

RESOLUTION

Be it resolved, that the death of Mr. Ellis Lee Ganey, President of Ganey Peanut Company, Abilene, Texas, be recognized by the American Peanut Research and Education Society with utmost regret. Mr. Ganey was very active in the Southwest Board of Directors up until his death. Mr. Ganey's contribution to the peanut industry and fellowship with his many friends will be greatly missed.

We, therefore, recommend that this Resolution be included in the permanent records of the 1980 APRES meetings and that a copy of it be forwarded to his wife, Mrs. E. L. (Madge) Ganey.

REPORT OF SITE SELECTION COMMITTEE

BY

J. L. Butler, Chairman
David C. H. Hsi, Vice Chairman
Ken Garren
Al Allison
Bill Branch
Ross Wilson

The success of our organization is evidenced by the fact that up to three concurrent sessions are now required. This requirement for more meeting room space eliminates many of the motels which could perhaps handle our organization for sleeping room space, but not for meeting room space. This, and the growing trend of organizations to plan meeting sites for three years in advance, resulted in the committee being charged to select sites for both 1981 and 1982.

Following established procedures, Georgia will be the location for the 1981 meeting. For 1982, tradition has been changed, with New Mexico being designated as the state to host that meeting. This will be the first time APREAS has met in New Mexico.

For 1981, the committee selected the Hyatt Regency Savannah, Savannah, GA, to be the meeting site. This hotel is located on the riverfront adjacent to the restored historic section of Savannah. The rates for this meeting are $49 for singles and $64 for doubles, plus sales tax. The dates for the meeting are July 21-24, 1981.

For the 1982 meeting, the Albuquerque Hilton, in Albuquerque, New Mexico, was selected. The dates for the 1982 meeting are July 13-16, 1982.

Respectfully submitted,

J. L. Butler, Chairman

REPORT BY RAY O. HAMMONS

Liaison Representative between the American Peanut Research and Education Society, Inc., and the American Society of Agronomy.

As Liaison Representative, I attended the 71st Annual Meeting of the ASA and the affiliated CSSA and SSSA at Colorado State University, Fort Collins, CO, August 5-10, 1979.

Members of APRES organized, and I had the privilege of chairing, the first technical paper session on peanuts ever held by the ASA or its affiliates. Eight presentations were made in CSSA Division C-1 on Peanut Breeding and Cytological Investigations and abstracted in Agronomy Abstracts. Three other papers were given by APRES members in other program sessions.

A tour of the USDA-SEA National Seed Storage Laboratory was a feature of the meetings. APRES peanut breeders and seed specialists observed storage conditions and computerization of records for the peanut cultivars and P.I. genotypes in the germplasm bank.

The Liaison Representative met with ASA officers and served as communicator between the two societies.

In addition, I participated in the annual meeting of the CSSA Crop Registration Committee where I serve as chairman of the Peanut subcommittee.

The next annual meeting of the ASA is scheduled for November 30-December 5, 1980 in Detroit, Michigan.

1980 AWARDS COMMITTEE REPORT

The 1979 Bailey Award candidate has been selected. The selection process was as follows:

1. On June 18, 1979 the 10 session moderators for the 1979 APRES Meeting at Tulsa, OK, were notified of their responsibility for selecting a nominee for the Bailey Award from their respective sessions.

2. The nominees from all sessions were obtained from the session moderators at the Tulsa meeting.

3. On July 20, 1979 all nominees for the Bailey Award were informed of their selection by certified mail. Instructions on manuscript preparation were provided. Submission deadline was December 15, 1979.

4. Eight manuscripts were in hand December 20, 1979. For various reasons, two nominees chose not to submit manuscripts.

5. On January 4, 1980 the members of the AWARDS COMMITTEE were sent a packet containing eight manuscripts. Instructions were provided on criteria for use in judging the merits of each manuscript. Date to be returned--February 29, 1980.

6. On March 10, 1980 President Jim Kirby, President-Elect Al Allison and Executive Secretary Don Smith were notified that the Bailey Award candidate had been selected.

7. On March 10, 1980 members of the AWARDS COMMITTEE were notified that a candidate for the 1979 Bailey Award had been chosen. Manuscripts submitted to committee members for judging should either be returned to the committee chairman or destroyed.

8. On June 20, 1980 session moderators for the 1980 APRES Meeting in Richmond, VA, were notified to select nominees for the 1980 Bailey Award.

AWARDS COMMITTEE:

Johnny Wynne
Milton Walker
Olin Smith
Kay McWatters
Paul Blankenship
Morris Porter, Chairman

BY-LAWS
of
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC.

ARTICLE I. NAME

Section 1. The name of this organization shall be "AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC."

ARTICLE II. PURPOSE

Section 1. The purpose of the Society shall be to instruct and educate the public on the properties, production, and use of the peanut through the organization and promotion of public discussion groups, forums, lectures, and other programs or presentations to the interested public and to promote scientific research on the properties, production, and use of the peanut by providing forums, treatises, magazines, and other forms of educational material for the publication of scientific information and research papers on the peanut and the dissemination of such information to the interested public.

ARTICLE III. MEMBERSHIP

Section 1. The several classes of membership which shall be recognized are as follows:

a. Individual memberships: Individuals who pay dues at the full rate as fixed by the Board of Directors.

b. Institutional memberships: Libraries of industrial and educational groups or institutions and others that pay dues as fixed by the Board of Directors to receive the publications of the Society. Institutional members are not granted individual member rights.

c. Organizational memberships: Industrial or education groups that pay dues as fixed by the Board of Directors. Organizational members may designate one representative who shall have individual member rights.

d. Sustaining memberships: Industrial organizations and others that pay dues as fixed by the Board of Directors. Sustaining members are those who wish to support this Society financially to an extent beyond minimum requirements as set forth in Section 1c, Article III. Sustaining members may designate one representative who shall have individual member rights. Also, any organization may hold sustaining memberships for any or all of its divisions or sections with individual member rights accorded each sustaining membership.

e. Student memberships: Full-time students who pay dues at a special rate as fixed by the Board of Directors. Persons presently enrolled as full-time students at any recognized college, university, or technical school are eligible for student membership. Post-doctoral students, employed persons taking refresher courses or special employee training programs are not eligible for student memberships.

Section 2. Any member, participant, or representative duly serving on the Board of Directors or a Committee of this Society and who is unable to attend any meeting of the Board of such Committee may be temporarily replaced by an alternate selected by the agency or party served by such member, participant, or representative upon appropriate written notice filed with the president or Committee chairman evidencing such designation or selection.

Section 3. All classes of membership may attend all meetings and participate in discussions. Only individual members or those with individual membership rights may vote and hold office. Members of all classes shall receive notification and purposes of meetings, and shall receive minutes of all Proceedings of the American Peanut Research and Education Society.

ARTICLE IV. DUES AND FEES

Section 1. The annual dues shall be determined by the Board of Directors with the advice of the Finance Committee subject to approval by the members at the annual meeting. Minimum annual dues for the five classes of membership shall be:

a.	Individual memberships :	$ 10.00
b.	Institutional memberships :	$ 12.00
c.	Organizational memberships:	$ 25.00
d.	Sustaining memberships :	$100.00
e.	Student memberships :	$ 4.00

Section 2. Dues are receivable on or before July 1 of the year for which the membership is held. Members in arrears on July 31 for dues for the current year shall be dropped from the rolls of this Society provided prior notification of such delinquency was given. Membership shall be reinstated for the current year upon payment of dues.

Section 3. A $15.00 registration fee will be assessed at all regular meetings of the Society. The amount of this fee may be changed upon recommendation of the Finance Committee subject to approval by the Board of Directors.

ARTICLE V. MEETINGS

Section 1. Annual meetings of the Society shall be held for the presentation of papers and/or discussions, and for the transaction of business. At least one general business session will be held during regular annual meetings at which reports from the executive secretary-treasurer and all standing committees will be given, and at which attention will be given to such other matters as the Board of Directors may designate. Also, opportunity shall be provided for discussion of these and other matters that members may wish to have brought before the Board of Directors and/or general membership.

Section 2. Additional meetings may be called by the Board of Directors, either on its own motion or upon request of one-fourth of the members. In either event, the time and place shall be fixed by the Board of Directors.

Section 3. Any member may submit only one paper as senior author for consideration by the program chairman of each annual meeting of the Society. Except for certain papers specifically invited by the Society president or program chairman with the approval of the president, at least one author of any paper presented shall be a member of this Society.

Section 4. Special meetings or projects by a portion of the Society membership, either alone or jointly with other groups, must be approved by the Board of Directors. Any request for the Society to underwrite obligations in connection with a proposed special meeting or project shall be submitted to the Board of Directors, who may obligate the Society to the extent they deem desirable.

Section 5. The executive secretary-treasurer shall give all members written notice of all meetings not less than 60 days in advance of annual meetings and 30 days in advance of all other special project meetings.

ARTICLE VI. QUORUM

Section 1. Until such time as the membership reaches 200 voting members, 20% of the voting members of this Society shall constitute a quorum for the transaction of business. When the membership exceeds 200, a quorum shall consist of 40 voting members.

Section 2. For meetings of the Board of Directors and all committees, a majority of the members duly assigned to such board or committee shall constitute a quorum for the transaction of business.

ARTICLE VII. OFFICERS

Section 1. The officers of this organization shall be:

a. President
b. President-elect
c. Executive Secretary-Treasurer

Section 2. The president and president-elect shall serve from the close of the annual general meeting of this Society to the close of the next annual general meeting. The president-elect shall automatically succeed to the presidency at the close of the annual general meeting. If the president-elect should succeed to the presidency to complete an unexpired term, he shall then also serve as president for the following full term. In the event the president or president-elect, or both, should resign or become unable or unavailable to serve during their terms of office, the Board of Directors shall appoint a president, or both president-elect and president, to complete the unexpired terms until the next annual general meeting when one or both offices, if necessary, will be filled by normal elective procedure. The most recent available past president shall serve as president until the Board of Directors can make such appointment. The president shall serve without monetary compensation.

Section 3. The officers and directors shall be elected by the members in attendance at the annual general meeting from nominees selected by the Nominating Committee or members nominated for this office from the floor. The president-elect shall serve without monetary compensation.

Section 4. The executive secretary-treasurer may serve consecutive yearly terms subject to re-election by the membership at the annual meeting. The tenure of the executive secretary may be discontinued by a two-thirds majority vote of the Board of Directors, who then shall appoint a temporary executive secretary to fill the unexpired term.

Section 5. The president shall arrange and preside at all general meetings of the Board of Directors and with the advice, counsel, and assistance of the president-elect and secretary-treasurer, and subject to consultation with the Board of Directors, shall carry on, transact, and supervise the interim affairs of the Society and provide leadership in the promotion of the objectives of this Society.

Section 6. The president-elect shall be program chairman, responsible for development and coordination of the overall program of the educational phase of the annual meetings.

Section 7. (a) The executive secretary-treasurer shall countersign all deeds, leases, and conveyances executed by the Society and affix the seal of the Society thereto and to such other papers as shall be required or directed to be sealed. (b) The executive secretary-treasurer shall keep a record of the deliberations of the Board of Directors, and keep safely and systematically all books, papers, records, and documents belonging to the Society, or in any wise pertaining to the business thereof. (c) The executive secretary-treasurer shall keep account for all monies, credits, debts, and property, of any and every nature, of this Society, which shall come into his hands or be disbursed and shall render such accounts, statements, and inventories of monies, debts, and property, as shall be required by the Board of Directors. (d) The executive secretary-treasurer shall prepare and distribute all notices and reports as directed in these By-Laws, and other information deemed necessary by the Board of Directors to keep the membership well informed of the Society activities.

ARTICLE VIII. BOARD OF DIRECTORS

Section 1. The Board of Directors shall consist of the following:

a. The president

b. The most immediate past president able to serve

c. The president-elect (elected annually)

d. State employees' representative - this director is one whose employment is state sponsored and whose relation to peanuts principally concerns research, and/or educational, and/or regulatory pursuits.

e. United States Department of Agriculture representative - this director is one whose employment is directly sponsored by the USDA or one of its agencies and whose relation to peanuts principally concerns research, and/or educational, and/or regulatory pursuits.

f. Three Private Peanut Industry representatives - these directors are those whose employment is privately sponsored and whose principal activity with peanuts concerns: (1) the production of farmers' stock peanuts; (2) the

shelling, marketing, and storage of raw peanuts; (3) the production or preparation of consumer food-stuffs or manufactured products containing whole or parts of peanuts.

g. A person oriented toward research - to be named by the chairman of the Board of Directors of the National Peanut Council.

h. The executive secretary-treasurer - non-voting member of the Board of Directors who may be compensated for his services on a part of full-time salary stipulated by the Board of Directors in consultation with the Finance Committee.

i. The president of the National Peanut Council - a non-voting member.

Section 2. The Board of Directors shall determine the time and place of regular and special meetings and may authorize or direct the president to call special meetings whenever the functions, programs, and operations of the Society shall require special attention. All members of the Board of Directors shall be given at least 10 days advance notice of all meetings; except that in emergency cases, three days advance notice shall be sufficient.

Section 3. The Board of Directors will act as the legal representative of the Society when necessary and, as such, shall administer Society property and affairs. The Board of Directors shall be the final authority on these affairs in conformity with the By-Laws.

Section 4. The Board of Directors shall make and submit to this Society such recommendations, suggestions, functions, operations, and programs as may appear necessary, advisable, or worthwhile.

Section 5. Contingencies not provided for elsewhere in these By-Laws shall be handled by the Board of Directors in a manner they deem desirable.

ARTICLE IX. COMMITTEES

Section 1. Members of the committees of the Society shall be appointed by the president and shall serve 2-year terms unless otherwise stipulated. The president shall appoint a chairman of each committee from among the incumbent committeemen. The Board of Directors may, by a two-thirds vote, reject committee appointments. Appointments made to fill unexpected vacancies by incapacity of any committee member shall be only for the unexpired term of the incapacitated committeeman. Unless otherwise specified in these By-Laws, any committee member may be reappointed to succeed himself, and may serve on two or more committees concurrently but shall not hold concurrent chairmanships. Initially, one-half of the members, or the nearest (smaller) part thereto, of each committee will serve one-year terms as designated by the president.

a. Finance Committee: This committee shall include at least four members, one each representing State-, and USDA-, and two from Private Business - segments of the peanut industry. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendations as they deem necessary or as requested or directed by the Board of Directors. The term of the chairman shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given on the work of the Finance Committee under his chairmanship, whichever is later.

b. Nominating Committee: This committee shall consist of at least three members appointed to one-year terms, one each representing State-, USDA-, and Private Business - segments of the peanut industry. This committee shall nominate individual members to fill the positions as described and in the manner set forth in Articles VII and VIII of these By-Laws and shall convey their nominations to the president of this Society on or before the date of the annual meeting. The committee shall, insofar as possible, make nominations for the president-elect that will provide a balance among the various segments of the industry and a rotation among federal, state, and industry members. The willingness of any nominee to accept the responsibility of the position shall

be ascertained by the committee (or members making nominations at general meetings) prior to the election. No person may succeed himself as a member of this committee.

c. Publications and Editorial Committee: This committee shall consist of at least three members appointed for indeterminate terms, one each representing State-, USDA-, and Private Business - segments of the peanut industry. This committee shall be responsible for the publication of the proceedings of all general meetings and such other Society sponsored publications as directed by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

d. Peanut Quality Committee: This committee shall include at least seven members, one each actively involved in research in peanuts - (1) varietal development-, (2) production and marketing practices related to quality-, and (3) physical and chemical properties related to quality, and one each representing the Grower-, Sheller-, Manufacturer-, and Services- (Pesticides and Harvesting Machinery, in particular) - segments of the peanut industry. This committee shall actively seek improvement in the quality of raw and processed peanuts and peanut products through promotion of mechanisms for the elucidation and solution of major problems and deficiencies.

e. Public Relations Committee: This committee shall include at least six members, one each representing the State-, USDA-, Grower-, Sheller-, Manufacturer-, and Services-, segments of the peanut industry. This committee shall provide leadership and direction for the Society in the following areas:

(1) Membership: development and implementation of mechanisms to create interest in the Society and increase its membership.

(2) Cooperation: advise the Board of Directors relative to the extent and type of cooperation and/or affiliation this Society should pursue and/or support with other organizations.

(3) Necrology: proper recognition of decreased members.

(4) Resolutions: proper recognition of special services provided by members and friends of the Society.

ARTICLE X. DIVISIONS

Section 1. A Divisions within the Society may be created upon recommendation of the Board of Directors, or members may petition the Board of Directors for such status, by a two-thirds vote of the general membership. Likewise, in a similar manner, a Division may be dissolved.

Section 2. Divisions may establish or dissolve Subdivisions upon the approval of the Board of Directors.

Section 3. Divisions may make By-Laws for their own government, provided they are consistent with the rules and regulations of the Society, but no dues may be assessed. Divisions and Subdivisions may elect officers (chairman, vice-chairman to succeed to the chairmanship, and a secretary) and appoint committees, provided that the efforts thereof do not overlap or conflict with those of the officers and committees of the main body of the Society.

ARTICLE XI. AMENDMENTS

Section 1. These By-Laws may be amended consistent with the provisions of the Articles of Incorporation by a two-thirds vote of all the eligible voting members present at any regular business meeting, provided such amendments shall be submitted in writing to each member of the Board of Directors at least thirty days before the meeting at which the action is to be taken.

Section 2. A By-Law or amendment to a By-Law shall take effect immediately upon its adoption, except that the Board of Directors may establish a transition

schedule when it considers that the change may best be effected over a period of time. The amendment and transition schedule, if any, shall be published in the "Proceedings of APRES".

Amended at the Annual Business Meeting of the American Peanut Research and Education Society, Inc., July 13, 1979, Tulsa, Oklahoma.

LIST OF APRES MEMBERS WITH ADDRESSES
SEPARATED BY MEMBERSHIP TYPES

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