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ENTOMOLOGY

PRODUCTION TECHNOLOGY AND WEED SCIENCE

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EXTENSION AND INDUSTRY

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Occurrence of Peanut Mottle Virus on Peanut in Egypt. M. K. ABO-EL-DAHAB, E. H. WASFY, M. A. EL-GOORANI, H. M. EL-KASHEIR, E. E. WAGIH, and H. A. MELOUK*. Dept. of Plant Pathology, College of Agriculture, Univ. of Alexandria, Egypt and USDA/ARS, Dept. of Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078-0285.

ABSTRACT

Many virus-like symptoms commonly seen in peanut fields are not mechanically transmissible and are not considered to be caused by viruses. The most commonly observed symptom whose causal agent is shown to be peanut mottle virus (PMV) is mottling associated with upward leaf rolling. An isolate associated with this symptom has been obtained and termed Alex-isolate.

The virus gave characteristic symptoms on selected host range, and when physically characterized using the Topcrop bean variety as a local lesion assay host, it was found to have a dilution end point between 10^{-3} and 10^{-4}, a thermal inactivation point between 60 and 65 C and a longevity in vitro for 96h at 25 C. The virus was purified and the molecular weight of its coat protein subunit was estimated to be 35,500 d, using the SDS-discontinuous- polyacrylamide gel electrophoresis technique.

INTRODUCTION

Peanut mottle virus (PMV) infects peanut (Arachis hypogaea L.) plants causing mottling, associated in some genotypes with upward leaf rolling and depressions in the intervenial tissue (Kuhn, 1965). Several strains of the virus have been reported (Sun and Hebert, 1972; Paguio and Kuhn, 1973) with the mild mottle strain (Paguio and Kuhn, 1973) being the most widely distributed (Bock, 1973; Reddy et al, 1978). Since the virus was first reported in Georgia (Kuhn, 1965), several publications (Behncken, 1970; Bock, 1973; Reddy et al, 1978; Ahmed and Idris, 1981) have reported its existence in many parts of the world. However, PMV was not reported on peanut in Egypt. Recently, five different types of virus-like symptoms were observed on peanut plants growing in Alexandria, Egypt. These symptoms include leaf malformation, leaf tip and marginal chlorosis, vein banding, leaf chlorosis and mottling associated with upward leaf rolling. The objective of this study was, therefore, to study these symptoms, particularly those resembling PMV infection, and to characterize the virus(es) responsible for them.

MATERIAL AND METHODS

Plants and Growth Conditions

Giza 4 Peanut (Arachis hypogaea L.) as a test plant and Little Marvel peas

(Pisum sativum L.) as a propagating host for the virus were planted in large (120 x 100 x 40 cm) wooden boxes containing sandy clay (3:1) soil in the greenhouse at 25 ± 5°C. Topcrop bean was used (Phaseolus vulgaris L.) as a local lesion assay host. All plants used for the host range study were planted in small (10 cm d) earthen pots under the same conditions.

Mechanical Inoculation

Frozen leaves showing characteristic symptoms of virus infection were used as a source of inoculum in the mechanical inoculation experiments. Tissues were homogenized in a prechilled pestle and mortar using cooled 0.05 M potassium phosphate buffer, pH 7.0 (or 8.0) containing 0.1% sodium sulphite. Homogenization was carried out at 4 C using an extraction ratio of approximately 1:5 (w/v). Plants to be inoculated were first dusted with 600 mesh carborundum and then inoculated with the resultant homogenate and excess inocula were washed off with running tap water. At least two plants were mock inoculated with the K-phosphate buffer alone to serve as a control. Inoculated plants were kept in an insect-free environment in the laboratory at room temperature (25 C) for symptoms to develop.

Physical Characterization

Physical properties of PMV (Alex-isolate), dilution end point (DEP), thermal inactivation point (TIP) and longevity in vitro were determined in sap extracted from infected Giza 4 peanut leaves 15 days after inoculation using standard methods (Noordam, 1973). The extraction procedure was exactly the same as that used for mechanical inoculations and assays were performed on Topcrop bean (Phaseolus vulgaris L.). Three bean plants (6 primary leaves) were used for each treatment in each test. Local lesions developed on inoculated leaves were counted 3-4 days after inoculation and the average number of local lesions per leaf was calculated.

Purification Procedure

IV- Purification of PMV Alex-isolate:

The PMV, Alex-isolate obtained from infected Giza 4 cultivar plants was propagated in Pisum sativum, Little Marvel. Carborundum (600 mesh)-dusted plants were inoculated with an inoculum prepared by homogenizing infected leaves in 0.01 M potassium phosphate buffer (pH 7.2) containing 0.01 M diethyl-dithiocarbamate (1/2. w/v) as recommended by Sanburn (1983). Plants were kept under greenhouse conditions (25 C) until symptom appearance (10-15 days). Infected leaves were then harvested and deep frozen at -20 C.

The method of purification followed in this work was similar to that adopted by Sherwood (1984) with little modifications. Frozen leaves of Pisum sativum "Little Marvel" systemically infected with PMV, Alex-isolate were used for virus purification. Infected tissue was homogenized in 0.01 M potassium phosphate buffer, pH 8.0 containing 0.01 M Na-diethyl-dithiocarbamate at the ratio of 1:2 (g/ml) in a blender at 4 C. The homogenate was filtered through two layers of cheescloth and the filtrate was mixed with chloroform (15%, v/v). The mixture was gently stirred for 5 min and the resultant emulsion was broken by low-gravity centrifugation at 10,000 g for 10 min. in an MSE-high speed centrifuge. Polythylene glycol (PEG) (mol. wt. 6,000) and KCl were added to the supernatant to give a final concentration of 4% and 1.5% (w/v) respectively. The mixture was stirred for 30 min, let stand for 2 h, and subjected to low-g centrifugation as above to precipitate the virus. The resultant pellet from each 50 ml of centrifuged mixture was resuspended overnight in 5 ml of 0.01 M borate-phosphate buffer, pH 8.3 containing 0.2 M urea to prevent virus aggregation. The resuspended pellets were pooled, stirred gently with chloroform (15%, v/v) for 3 min, and the emulsion was then centrifuged at 10,000g for 10 min. PEG (4%) and KCl (1.5%) were added again as above and the mixture was stirred for 20 min, let stand for 2 h, and centrifuged at 10,000g for 10 min. The obtained pellets were resuspended overnight in 0.01 M borate-phosphate buffer, pH 8.3 containing 0.2 M urea. The resuspended pellets were pooled and given a spin at 3,000g for 5 min. The obtained virus preparation was further purified by density gradient centrifugation on columns of 10-40% sucrose gradient in 0.01 M K-phosphate buffer (pH 8.0) containing 0.01 M No-diethyldithiocarbamate. Centrifugation was carried out in a Beckman SW rotor at 20,000 rpm for 2 h. The apparently single band in each tube was collected manually using an ordinary syringe and the collected bands were diluted with an equal volume of the gradient buffer and the virus was pelleted by centrifugation at 160,000 g for 1.5 h. The obtained pellets were resuspended in 0.01 M K-phosphate buffer, pH 8.0 and given a final spin at 3,000g for 5 min. The resultant supernatant was considered a highly purified virus preparation and used for further studies.

Molecular weight determination of virus protein subunits

Molecular weight determination of PMV protein submit was carried out, using a single concentration (12%, w/v) of acrylamide, by the SDS-discontinuous polyacrylamide gel electrophoresis technique following a method derived from the

outline by Wagih et al (1983) and that of Sherwood (1984). A mixture of standard proteins was prepared in the laboratory using the following standard proteins at 50 Ug ml^{-1} each, Mr in brackets: bovine serum albumin (67,000 d), human gamma globulins, heavy and light chain (55,000 and 23,500 d), Ovalbumin (43,000 d), trypsin (24,000 d), lysozyme (14,300 d), and cytochrome C (12,384 d). The whole PMV, Alex-isolate virus particles and the standard proteins were separately heated at 95 C for 5 min in 0.0625 M Tris-HCl buffer (pH 6-8) with 2% SDS, 5% 2-merrcapteethanol, 0.5 M sucrose, and 0.002% bromophenol blue. Heated proteins were cooled to room temperature prior to electrophoresis. Aliquots (50 Ul/gel) of disrupted PMV or marker proteins were electrophoresed in 12% acrylamide gel (pH 8.8) with a 4% spacer gel (pH 6.8). Ten Ul of cytochrome C (60 Ug/ml) were loaded onto each gel to serve as an additional marker for later relative mobility (Rm) calculations. Running buffer was composed of 0.3% tris, 1.44% glycine and 0.1% SDS, pH 8.3, (Laemmli, 1970). Electrophoresis was carried out at 4 mA/gel until the bromophenol blue marker (BPBM) entered the resolving gel, thereafter increasing to 8 mA/gel until the BPBM has left the gels. After electrophoresis, gels were stained in 0.5% Coomassic blue in methanolacetic acid-water (5:1:5, v/v/v), destained in methanolacetic acid-water 50:7.5:42.5, v/v/v), and scanned at 280nm (Wagih and Coutts, 1981).

Precipitin Ring Interface Test

The Precipitin Ring Interface Test was carried out as outlined by Reddy et al (1969). A PMV-specific antiserum was used at 1:10 dilution and titrated against serial two fold dilutions of purified virus on clarified leaf extract from infected plants. A proper control for each test was used and the reaction was observed in a dark room using a box with a slit source of light.

RESULTS

Studies on virus-like symptoms commonly observed in peanut fields

Over 500 Giza 4 peanut (Arachis hypogaea L.) seeds were sown in large wooden boxes under greenhouse conditions. Plants were left to grow without taking any measure of insect control and were observed for the development of virus-like symptoms. Five different types of symptoms were noticed. These included comprised leaf malformation, leaf tip and marginal chlorosis, vein banding, leaf chlorosis and mottling associated with upward leaf rolling. Leaves showing each of these symptoms were collected and kept at -20 C for further work.

Mechanical transmissibility of the observed symptoms

Frozen leaves showing each of the previously mentioned symptoms were used as a source of inoculum in the mechanical inoculation experiments. Tissues were homogenized in a prechilled pestle and mortar using cooled 0.05 M potassium phosphate buffer, pH 7.0, containing 0.1% sodium sulphite. Homogenization was carried out at 4 C using an extraction ratio of approximately 1:5 (w/v). Five plants of Giza 4 cv. previously dusted with 600 mesh carborundum were inoculated with the resultant homogenate and excess inocula were washed off with running tap water. At least two plants were mock inoculated with the K-phosphate buffer alone to serve as a control. Inoculated plants were kept in an insect-free environment in the laboratory at room temperature (25 C). Plants were daily checked daily for symptom appearance. The results obtained are summarized in the following table:

It appears from Table 1 that the only mechanically transmissible symptom was the mottling associated with upward leaf rolling. Based on symptomatology (Kuhn, 1965) and mechanical transmissibility, this type of symptom is suspected to be caused by peanut mottle virus (PMV). This isolate of PMV was named Alex- isolate.

The inability to mechanically transmit the other types of symptoms along with the fact that they sometimes appear on plants without being associated with any other symptoms characteristic to the known peanut virus diseases rules out their virus etiology. These symptoms could represent nonpathogenic diseases of which mineral deficiency is highly suspected. However, the possible involvement of a pathogen(s) not mechanically transmissible cannot be completely ignored, but this needs further investigation.

Physical characterization of PMV, Alex-isolate

Tests of physical properties of PMV, Alex-isolate were conducted using sap extracted from infected Giza 4 peanut leaves 15 days after inoculation. The extraction procedure was that used for inoculum preparation, and assays were performed on Topcrop bean (Phaseolus vulgaris L.). Three bean plants (6 primary leaves) were used for each treatment in each test. Local lesions developed on inoculated leaves were counted 3-4 days after inoculation and the average number of local lesions per leaf was calculated.

a) Dilution end point (DEP)

The DEP of PMV, Alex-isolate was determined as described by Noordam (1973). Of the original buffered extract (10^{-1}) ten fold serial dilutions (10^{-2},

10^{-3}, 10^{-4} and 10^{-5}) were made and assayed on Topcrop bean primary leaves. Results are shown in the following table.

Results presented in Table 2 indicate that the DEP of PMV, Alex-isolate is between 10^{-3} and 10^{-4}. This result is identical to those reported by other investigators (Kuhn, 1965; Herold and Munz, 1969; Sun and Herbert, 1972).

b) Thermal inactivation point (TIP)

The TIP of PMV, Alex-isolate was determined using the original buffered extract (10^{-1}) as outlined by Noordam (1973). Extracts were subjected to different temperatures (25,40,50,55,60,65, and 70) for ten minutes and assayed on Topcrop bean. The results obtained are shown in Table 3.

The results presented in Table 3 reveal that the TIP of PMV Alex-isolate is between 60-65 C. This finding is consistent with those reported by Kuhn (1965) and Sun and Herbert (1972). However, lower values (55-60 C) were reported by Reddy et al (1978) and Ahmed and Idris (1981).

c) Longevity (Aging) in vitro

Longevity in vitro was determined for the PMV, Alex-isolate in the buffered extract (10^{-1}) as described by Noordam (1973). Sodium azide was added to the extract at a concentration of 0.02% to prevent microbial contamination. Samples were taken daily over a period of 6 days and inoculated on Topcrop bean leaves to check the presence of viable viruses.

After inoculation, leaves were thoroughly washed in tap water to remove excess inoculum and sodium azide. Results are recorded in Table 4.

As seen from data of Table 4, the longevity in vitro period of PMV, Alex-isolate is between 4 and 5 days at room temperature (25 C). This result is higher than the corresponding values estimated by many others (Kuhn, 1965; Herold and Munz, 1969; Sun and Herbert, 1972; Reddy et al, 1978). In contrast, Paguio and Kuhn (1973) have reported higher values (between 5-6 days). These controversial results may be due to the difference in the extracting medium (Kuhn, 1965), the storage temperature (Herold and Munz, 1969), and/or the existence of different strains (Paguio and Kuhn, 1973).

Virus yield and purity

The method of purification (Sherwood, 1984) used in this study has produced a considerable yield of highly purified virus, PMV, Alex-isolate, reaching in its best trials 12 mg/Kg infected Pisum sativum leaves when spectrophotometrically

assessed assuming an E260 (1mg/ml) = 3.0 (Rajeshwari et al, 1983).

When virus purity was assessed by determining the ratio of absorbance at 260 nm to that at 280 nm a value of 1.28 was obtained, and when the ratio of maximum absorbance (260 nm) to minimum absorbance (246 nm) was calculated the value 1.15 was calculated. It is important to mention here that all the above calculations were carried out using values noncorrected for light scattering. The obtained results are very similar to those reported by many others (Reddy et al, 1978; Tolin and Ford, 1983; Sherwood, 1984).

Molecular weight determination of PMV, Alex-isolate, protein subunit

Following the use of SDS-discontinuous polyacrylamide gel electrophoresis technique (Wagih et al, 1983; Sherwood, 1984), the molecular weight of the protein subunit was estimated, using a calibration curve relating the log molecular weight and relative mobility of the standard proteins previously mentioned, to be 35,500 dalton (Fig. 1). This value is much closer to the molecular weight (36,100 d) reported by Sherwood (1984) and more than that (34,000 d) calculated by Rajeshwari et al (1983). The differences observed could be due to differences in experimental conditions or to the use of different strains.

Serological Reaction

When either purified virus preparation or clarified crude extract from infected Giza 4 peanut plants was serologically tested for PMV using the precipitin ring interface test, a positive reaction was observed with PMV, Alex-isolate, but not with the corresponding control. This strongly suggests that the virus isolate (Alex-isolates) is a PMV.

LITERATURE CITED

Ahmed, A. H. & Idris, M. O. 1981. Peanut mottle virus in the Sudan. Plant Diseases 64:692-693.

Behncken, G. M, 1970. The occurrence of peanut mottle virus in Queensland. Aust. J. Agric. Res. 21:265-472.

Bock, K. R., 1973. Peanut mottle virus in East Africa. Ann. Appl. Biol 74:171-179.

Herold, F. and Munz, K. 1969. Peanut mottle virus. Phytopathology 56:663-666.

Kuhn, C. W. 1965. Symptomatology, host range, and effect on yield of a seed transmitted peanut virus. Phytopathology 55:880-884.

Laemmli, U. K. 1970. Cleavage of structural proteins during the assembly of the head bacteriophage T_4. Nature 227:680-685.

Noordam, D. 1973. Identification of plant viruses: Methods and experiments. Pudoc. Wageningen, Netherlands. 207 pp.

Paguio, O. R. and Kuhn, C. W. 1973. Strains of peanut mottle virus. Phytopathology 63:976-980.

Rajeshwari, R., Lizuka, N., Nolt, B. L. and Reddy, D.V.R., 1983. Purification, serology, and physico-chemical properties of a peanut mottle virus isolate from India. Plant Pathology 32:197-205.

Reddy, D. V. R., Haripradada, R. M., Padma, M. C. and Gopal, R. V., 1969. Haemagglutination test to detect tobacco mosaic virus antigens. Indian Journal of Experimental Biology 7:162-165.

Reddy, D. V. R., Lizuka, N., Ghanekar, A. M., Murthy, V. K., Kuhn, C. W., Gibbons, R. W., and Chohan, J. S. 1978. The occurrence of peanut mottle virus in India. Plant Dis. Report 62:978-982.

Sherwood, J. L., 1984. An efficient procedure for purification of an isolate of peanut mottle virus from wild peanut and determination of molecular weights of the viral components. Peanut Science 11:40-42.

Sun, M. K. C. and Herbert, T. T. 1972. Purification and properties of a severe strain of peanut mottle virus. Phytopathology 62:832-839.

Tolin, S. A., and Ford, R. H., 1983. Purification and Serology of peanut mottle virus. Phytopathology 73:899-903.

Wagih, E. E. and Coutts, R. H. A., 1981. Similarities in the soluble protein profiles of leaf tissue following either a hypersensitive reaction to virus infection or plasmolysis. Plant Science Letters 21:61-69.

Wagih, E. E., Raftopoulos, A. E., Archer, S. A. and Coutts, R. H. A., 1983. Characterization of an apparently novel soluble protein fraction found in pathogen and osmotically stressed cucumber cotyledons. Phytopathologyische Zeitschrift 107:233-243.

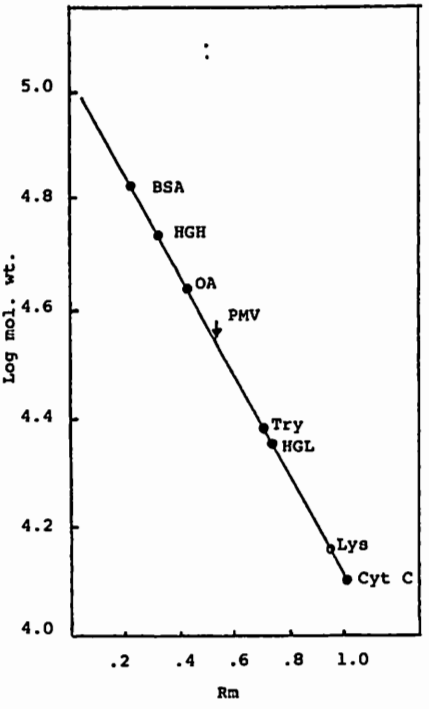

Figure 1. A calibration curve depicting the relationship between relative mobility (Rm) and log mol. wt. of standard proteins of known molecular weight. B.S.A., bovine serum albumin (67,000 d); H.G.H., human gamma globulin, heavy chain (55,000 d); O.A., ovalbumin (43,000 d); Try., trypsin (24,000 d); H.G.L., human gamma globulin, light chain (23,500 d); Lys., lysozyme (14,300 d); Cyt. C, cytochrome C (12,384 d). Rm is the relative mobility compared to Cyt. C on 12% SDS-polyacrylamide gel. P.M.V. is the protein subunit of peanut mottle virus, Alex-isolate.

Table 1. Types of symptoms observed on peanut Giza 4 cultivar and their transmissibility by mechanical inoculation of healthy peanut plants of the same cultivar.

Type of symptoms	Mechanical transmissibility
Leaf malformation	-
Leaf tip and marginal chlorosis	-
Vein banding	-
Leaf chlorosis	-
Mottling associated with upward rolling	+

Table 2. Dilution-end point of PMV, Alex-isolate:

Dilution[a]	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}
No. of LL/L	70.0	21.0	3.0	0.0	0.0

a = dilutions were made using 0.05 M potassium phosphate buffer. pH 7.5 containing 0.1% Na_2SO_3.

b = LL/L = Local lesions/leaf.

Table 3. Thermal inactivation point of PMV, Alex-isolate.

Temperature (C)	25	40	50	55	60	65	70
No. of LL/L*	70.0	40.0	10.0	6.6	2.0	0.0	0.0

* LL/L = Local lesions/leaf.

Table 4. Longevity *in vitro* of PMV, Alex-isolate at 25 C.

Time after extraction (days)	0	1	2	3	4	5	6
No. of LL/L*	70.0	50.0	20.0	5.0	1.0	0.0	0.0

*LL/L = Local lesions/leaf.

Peanut Disease Loss Estimates for Major Peanut Producing States in the United States for 1984 and 1985. R. V. Sturgeon, Jr., Department of Plant Pathology, Oklahoma State University.

PAPER

Disease continues to be a major factor in suppression of the yield potential of peanuts. Peanut disease loss estimates from ten states ranged from 5.25% reported by New Mexico in 1984 to 27.15% reported by Oklahoma in 1985 (Tables 1 and 2). Disease severity varies between infection sites, fields and states because the severity of disease is dependent on several environmental factors interacting with one another and affecting both pathogen and peanut plant simultaneously. How much of this multi-million dollar loss could have been prevented is unknown, yet much of this loss could have been reduced by properly using available disease control practices. Early and late peanut leafspots, caused by Cercospora arachidicola and Cercosporidium personatum, accounted for the greatest yield losses and was reported to be most severe in Florida. Losses to Southern blight, caused by Sclerotium rolfsii, were reported to be as great in many states as those caused by nematodes. The pod and root rot disease complex caused as much damage as in past years. Seedling diseases continue to be a problem, but it is difficult to correlate loss in stand with yield loss. Sclerotinia blight, caused by Sclerotinia sclerotium and S. minor, continued to be a serious problem in Virginia, North Carolina, Oklahoma and Texas. Pythium wilt reported by Virginia and Rhizoctonia peg, stem, and foliar damage reported by Oklahoma are diseases that should be recognized. Estimating disease losses is difficult because of the many factors that influence diseases and yields. However, loss estimates can be reliable when proper techniques are used such as field monitoring programs, disease control trials, crop reporting service and surveys. Accurate disease loss estimates alert agricultural scientists, stimulate needed research and make the public aware of existing problems.

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Cooperation of Plant Pathologists and Nematologists from those states reporting is greatly appreciated and acknowledged.

Table 1. ESTIMATED PERCENT LOSS OF PEANUT YIELD IN 1984 AS A RESULT OF DISEASE

DISEASE	PATHOGEN	AL	AR	FL	GA	NC	NM	OK	SC	TX	VA
Seedling blight	Penicillium spp., Pythium spp. Rhizoctonia solani, Fusarium spp., Rhizopus spp., and etc.	TR	2.1	0.5	--	0.75	0.25	1.0	0.5	2.0	TR
Crown rot	Aspergillus niger	TR	--	TR	--	--	--	0.75	0.5	1.0	TR
Southern blight	Sclerotium rolfsii	7.0	TR	2.0	9.0	2.5	0.25	3.25	3.5	4.0	0.5
Sclerotinia blight	Sclerotinia minor	--	--	--	--	0.15	1.0	2.25	--	TR	7.0
Pod and Root Rot	Pythium spp., Rhizoctonia solani, Fusarium spp.	0.2	4.0	2.0	6.0	3.5	1.25	3.5	5.0	3.3	2.5
Seg. 3	Aspergillus flavus flavus	1.0	--	TR	0.59	--	TR	1.0	--	0.75	TR
Black rot	Cylindrocladium crotalariae	0.5	--	TR	--	7.5	--	--	5.0	--	4.0
Verticillium wilt	Verticillium spp.	--	--	--	--	--	--	1.0	--	--	--
Early and Late Leafspot	Cercospora arachidicola Cercosporidium personatum	5.8	4.0	10	3.0	6.0	2.25	2.5	3.0	3.0	4.0
Web blotch	Phoma arachidicola	--	2.0	--	--	TR	.25	--	--	1.0	TR
Leaf rust	Puccinia arachidis	0.2	--	3.0	0.01	--	--	--	--	TR	--
Other Leaf Spot	Alternaria spp. Leptosphaerulina crassiasca	--	--	--	--	--	--	--	0.5	TR	TR
Botrytis blight	Botrytis cinerea	--	--	--	--	--	--	--	--	--	--
Virus		TR	--	--	1.0	TR	--	--	--	TR	TR
Rhizoctonia Limb and Peg	Rhizoctonia sp. (not R. solani)	--	--	--	--	--	--	0.75	--	--	--
Nematodes	All kinds	5.5	1.0	5.0	3.0	1.25	TR	3.25	3.0	5.0	3.0
N. Root Knot	Meloidogyne hapla	--	--	--	(0.3)	(0.25)	--	(2.5)	--	--	(2.5)
S. Root Knot	Meloidogne arenaria	(5.4)	(1.0)	(4.5)	(2.7)	--	--	--	--	(3.0)	--
Lesion	Pratylenchus spp.	(0.1)	--	(0.5)	--	--	--	(0.5)	--	(2.0)	(TR)
Sting	Belonolaimus spp.	--	--	--	--	(0.5)	--	(0.25)	--	--	(0.5)
Ring	Macroposthonia spp.	--	--	--	--	--	--	TR	--	--	(TR)
Total Percent Loss		20.2	13.1	22.5	22.6	21.65	5.25	19.25	21.0	20.05	21.0

Table 2. ESTIMATED PERCENT LOSS OF PEANUT YIELD IN 1985 AS A RESULT OF DISEASE

DISEASE	PATHOGEN	AL	AR	FL	GA	NC	NM	OK	SC	TX	VA
Seedling blight	Penicillium spp., Pythium spp. Rhizoctonia solani, Fusarium spp., Rhizopus spp., and etc.	TR	4.0	0.5	--	--	0.25	1.75	0.5	2.0	TR
Crown rot	Aspergillus niger	TR	1.0	TR	--	--	--	0.2	0.5	1.0	TR
Southern blight	Sclerotium rolfsii	7.5	TR	2.0	9.5	2.5	0.25	5.0	4.0	4.0	0.1
Sclerotinia blight	Sclerotinia minor	--	--	--	--	0.5	1.5	1.75	--	.25	7.0
Pod and Root Rot	Pythium spp.,Rhizoctonia solani, Fusarium spp.	TR	1.0	2.0	6.5	3.5	1.0	5.25	5.0	3.5	1.8
Seg. 3	Aspergillus flavus flavus	0.5	--	TR	.04	--	TR	.15	0.1	1.75	TR
Black rot	Cylindrocladium crotalariae	0.3	--	TR	--	4.0	TR	--	5.5	--	3.0
Verticillium wilt	Verticillium spp.	--	--	--	--	--	--	1.0	--	--	0.5
Early and Late Leafspot	Cercospora arachidicola Cercosporidium personatum	4.5	2.0	15	4.0	3.0	2.0	6.75	4.0	4.0	4.0
Web blotch	Phoma arachidicola	TR	1.0	TR	--	--	1.0	0.5	--	0.5	TR
Leaf rust	Puccinia arachidis	TR	--	TR	--	--	--	0.5	--	TR	TR
Other Leaf Spot	Alternaria spp. Leptosphaerulina crassiasca	--	--	TR	--	--	--	--	0.5	--	2.0
Botrytis blight	Botrytis cinerea	--	--	--	--	--	--	--	--	TR	TR
Virus		TR	TR	--	1.0	--	--	--	--	0.5	TR
Rhizoctonia Limb and Peg	Rhizoctonia sp. (not R. solani)	--	--	--	--	--	--	1.75	--	--	--
Nematodes	All kinds	5.5	2.0	6.5	3.0	5.58	TR	3.0	3.0	4.5	3.0
N. Root Knot	Meloidogyne hapla	--	--	--	(0.3)	(0.25)	--	(2.5)	--	--	(3.0)
S. Root Knot	Meloidogne arenaria	(5.4)	(2.0)	(6.0)	(2.7)	(4.7)	--	--	--	(4.5)	--
Lesion	Pratylenchus spp.	(0.1)	--	(0.5)	--	(0.25)	--	(0.25)	--	--	(TR)
Sting	Belonolaimus spp.	--	--	--	--	(0.38)	--	(0.25)	--	--	--
Ring	Macroposthonia spp.	--	--	--	--	--	--	TR	--	--	(TR)
Total Percent Loss		18.3	11.0	26.0	24.4	19.08	6.0	27.60	23.1	22.0	21.4

Breeding and Genetics

Evidence on the Evolution of Arachis hypogaea L. C. E. SIMPSON*, A. KRAPOVICKAS, J. R. PIETRARELLI, and R. O. VANNI, Texas Agric. Exp. Stn., Stephenville, Texas; IBONE, Corrientes, INTA, Manfredi, and IBONE, Corrientes, Argentina.

More than 800 lines of cultivated peanut (Arachis hypogaea L.) have been collected in Bolivia since 1954. These lines have been carefully evaluated over the years, receiving intense study since 1978. During 1985-86 the entire collection was planted at Manfredi, and subsequently evaluated at four stages of development; early season, mid-season, late season, and at harvest. Pod and seed samples of each line from previous years were available for study. Collection year, location and source were also used in the evaluation. The lines were classified into 5 basic plant-type groups, with 54 classes of pod type (shape, size, reticulation) and seed color within the plant groupings. The area of collection of what are considered to be the more primitive groups corresponded with the area of distribution of the nearest wild relatives of the peanut; Southern Bolivia/Northwest Argentina. Included in the primative characters were small seeds, prostrate plant type, and pods with deep constriction and distinct but reduced reticulation. The wild relatives considered as closest to A. hypogaea were A. monticola Krap. et Rig., A. batizocoi Krap. et Greg., and A. duranensis Krap. et Greg. (nom. nud.). As one proceeded north and west in Bolivia the more advanced types were found. There were certain areas of transition where two, or more, types of plants and/or pods were found. The gradation was essentially continuous from the ssp. hypogaea var. hypogaea into the ssp. fastigiata var. fastigiata. The intermediates between ssp. hypogaea and ssp. fastigiata were collected in Northwest Bolivia and South Central Peru. Types considered as intermediate included prostrate plants with flowers on the main axis, erect (bunch) types with no flowers on the main stem, and prostrate plants with pods reticulated like var. fastigata and/or with three or more seeds. The information from this study should be useful in choosing parents for selected crosses in the utilization of the germplasm.

Rescue of Arachis hypogaea L. Embryos by in vitro Culture. H. T. STALKER*, N. C. State Univ., Raleigh, NC 27695.

Ovules of nine Arachis hypogaea L. genotypes were cultured to investigate in vitro responses to different media and growth regulators. Approximately 70% of the 870 cultured ovules over the entire experiment swelled and turned green. However, only 14.9% expanded to a sufficient size (ca. 5 mm) for whole embryo excision. Three ovules produced roots and shoots after 60 days. Because of the low success rate with ovules, experiments were conducted to determine the effects of growth regulators on embryos at the heart or early cotyledonary stages. More than 1600 embryos were excised from the ovule and placed on Murashige and Skoog's (MS) media with the addition of the growth regulators indole-3-acetic acid (IAA), 6-benzyl-amino purine (BA), kinetin (Kn), or 1-naphthaleneacetic acid (NAA). Significant differences between cultivars were observed for shoot and root development when combinations of the growth regulators were used. Addition of BA enhanced shoot development, but restricted root growth. The results indicated that initially culturing embryos on a 1-mg/L Kn media for 3 weeks, followed by 0.5 mg/L BA for 2 weeks, and final transfer to a MS medium without growth regulators is a satisfactory sequence for regeneration of plants for a range of A. hypogaea cultivars. Up to 75% of the embryos cultured in vitro for cultivar NC 4 survived transfer to a soil medium in the greenhouse after an intermediate sand-mist system step to enhance root development.

Inheritance of Fatty Acid Content in Peanut. L. C. MERCER*, J. C. WYNNE and C. T. YOUNG, N. C. State Univ., Raleigh, NC 27695.
The stability or shelf-life of peanut (Arachis hypogaea L.) products is related to the fatty acid content of the oil, specifically to the ratio of oleic (18:1) to linoleic (18:2) acid. The inheritance of the eight major fatty acids in peanut oil was determined to develop information needed for cultivar development. Eight parents representing a range in fatty acid content were crossed in diallel. Individual F_1 seeds from the greenhouse and F_2 bulks from the field were analyzed for fatty acid cotnent. For the F_1 seeds, general combining ability (GCA) and maternal effects were significant for all eight fatty acids and the O(18:1)/L(18:2) ratio. Specific combining ability was also significant for four of the fatty acids and the O/L ratio. GCA was significant for six fatty acids and the O/L ratio for the F_2 bulks, whereas the only trait with significant SCA was steric (18:0). Maternal effects were not significant for the F_2 generation although significant reciprocal effects for six of the fatty acids and the O/L ratio were found. The data suggest that selection for specific fatty acid content should be possible among and within the crosses.

The Effect of Three Harvest Dates on Oil Quality, Yield and Grading Data of Five Peanut Genotypes Grown Without Leafspot Control. D. A. KNAUFT*, A. J. NORDEN, Dept. of Agronomy, Univ. of Florida, Gainesville 32611 and D. W. GORBET, Florida Agricultural Research and Education Center, Marianna, 32446.
Five peanut genotypes, 'Southern Runner', 'Dixie Runner', 'Florunner', 'UF82206' and 'UF714021', were grown for a three year period in Gainesville, Florida without fungicide applications. Three harvest dates, averaging 105 days after planting (DAP), 118 DAP and 132 DAP, were used each year. Genetic differences existed for all fatty acids analyzed and large year to year variations occurred. However the various times from planting to harvest used in this study did not affect the fatty acid proportions, nor did harvest date affect oil content or iodine value. Highest yields of Southern Runner and UF82206 occurred on both the second and third digging dates, while the other three genotypes produced their highest yields at the second digging date. Weight of 100 kernels, proportions of sound mature kernels and extra large kernels, and shelling percentages increased for all genotypes as digging dates were delayed, although the majority of the increase occurred from the first to the second digging date. If diseases are not controlled, this study suggests that early harvest of peanut genotypes does not affect oil quality. Yields of leafspot susceptible lines were higher at the 118 DAP digging date than at the earlier or later digging dates. Grading data generally improved from the first to the second digging date, but remained constant from the second to the third digging date.

Variability in Oil Quality Among Peanut Genotypes in the Florida Breeding Program. A. J. NORDEN*, D. W. GORBET, D. A. KNAUFT, and C. T. YOUNG. Dept. of Agronomy, Univ. of Florida, Gainesville, FL 32611; Florida Agric. Research and Education Center, Marianna, FL 32446; and Dept. of Food Science, North Carolina State University, Raleigh, NC 27695.

The improvement of peanut *(Arachis hypogaea* L.) oil quality (fatty acid composition), since it relates to nutritional quality and the shelf-life of manufactured products, has long been an objective of the Florida breeding program. Fatty acid composition of peanut genotypes (228 in 1984 and 298 in 1985) from the Gainesville and Marianna locations was determined by gas-liquid chromatography. A wider range in fatty acid composition was found among the genotypes than that reported previously in the literature for the cultivated peanut. Two closely related experimental lines (UF-851237 and UF-851241) had 80% oleic and 2% linoleic acid, with iodine values of 74. For the Florida breeding lines, iodine values of the oil ranged from 74 to 107 and the oleic/linoleic (O/L) ratios from 0.9 to 35. Florunner, by comparison, has an iodine value of 95 and an O/L ratio of slightly less than 2. The oleic acid content of the different experimental lines ranged from 37% to 80%, and the linoleic acid content from 2% to 43%. The magnitude of this variability permits the development of peanut cultivars with a range of oil composition for improved nutritional and industrial purposes.

Selection Among Early Generation Peanut Progeny for High and Low Acetylene Reduction and Plant Weight. S. ARRENDELL*, J. C. WYNNE, G. H. ELKAN, and T. J. SCHNEEWEIS, N. C. State Univ., Raleigh, NC 27695.

Selection of superior host genotypes in symbiosis with native Bradyrhizobium has been suggested as a means of increasing nitrogen fixation in peanut (Arachis hypogaea L.). Progeny from a cross of cultivars Florigiant and Florunner intermated twice and selected for yield formed the base population. For this study 44 selected $S_{0,1}$ families from the base population and the cultivars Florigiant and Florunner were evaluated at two sampling dates and two locations for traits indicative of nitrogen fixation. Based on means over dates and locations, five families were selected in each of four selection groups--high and low acetylene reduction and high and low plant weight. Selected families were retested in a second year and intermated. $S_{0,1}$ progeny within each selection group were bulked and evaluated for nitrogen-fixing characteristics at two sampling dates and two locations. Selection for acetylene reduction was effective. After intermating, the mean of the high acetylene reduction group, 62.9 µmoles C_2H_4/plant/hour, was significantly greater than the mean of the low acetylene reduction group, 52.5 µmoles C_2H_4/plant/hour, and of the midparent, 55.8 µmoles C_2H_4/plant/hour. Mean fruit weight of the high acetylene reduction group, 96.7 g/plant, was equivalent to that of the midparent, 98.7 g/plant. Selection for plant weight was ineffective. After intermating, the plant weight means of the two groups selected for high and low plant weight were not significantly different. The relative performance of inbred lines developed from the high and low acetylene reduction groups needs to be determined.

Effect of Bradyrhizobium Strain on Combining Ability of the Host Plant. T. D. PHILLIPS*, J. C. WYNNE, T. J. SCHNEEWEIS and G. H. ELKAN, N. C. State Univ., Raleigh, NC 27695.

Plant genotype x Bradyrhizobium strain interactions have been shown to be significant for nitrogen fixed for the peanut (Arachis hypogaea L.). In order to determine the effect of Bradyrhizobium strains on nitrogen fixed by host plants, an eight-parent diallel cross was evaluated for each of two Bradyrhizobium strains. For strain NC92, general combining ability (GCA) effects were significantly different for all traits measured, including nodule number and mass, plant top weight, nitrogenase activity, visual color rating and date of first flowering. Specific combining ability (SCA) was significant for plant weight and color rating. For strain NC123, significant GCA effects were observed for plant weight, nitrogenase activity, color ratings, and the first flowering date. Combined analysis over both strains of Bradyrhizobium revealed significant differences among genotypes for all traits except nitrogenase activity. Genotype x strain interactions were significant for nodulation number and mass. In addition, Bradyrhizobium strain performance differences were observed. Since there were significant genotype x strain interactions, breeders can select strains for specific genotypes. Parents with high combining ability can then be chosen to improve nitrogen fixation in peanuts.

Early Generation Identification of Crosses with Promise for Leafspot Resistance and Yield in Peanuts (Arachis hypogaea L.). R. N. IROUME* and D.A. KNAUFT, Dept. of Agronomy Univ. of Florida, Gainesville, FL 32611.

The primary purpose of this study was to investigate the identification of crosses to combine yield and disease resistance. Twelve crosses were chosen in the F_2 on the basis of yield and disease reaction. The F_3 was evaluated under natural disease infection for pod yield and leafspot severity. The leafspot severity was measured by leaf necrotic area and defoliation. Narrow sense heritabilities for all the traits were estimated by sib analysis and regression of F_3 family or plant mean on F_2 plant or family mean performance. Genetic correlations among traits and the relative efficiency of indirect selection for all the traits were also computed. Preliminary results suggested that selection of crosses for all the traits would be advantageous in the F_2 (h^2_f = 67-79%) as compared to individual plant selection (h^2 = 16-26%) or within family selection (h^2_w = 3-5%). Selection of genotypes within crosses would be the poorest strategy in early generations. Negative genetic correlations were noted between yield and leafspot severity. Indirect selection for yield or disease resistance appeared to be no better than direct selection for the trait itself. However, the expected progress in lowering susceptibility of peanut genotypes through selection for yield (30 to 40% of the response from direct selection for low susceptibility) indicated that selection for yield under disease pressure, may be a start towards developing high yielding, leafspot tolerant genotypes.

Inheritance of Late Leafspot Resistance and Agronomic Traits in Peanut (Arachis) hypogaea L.). S. JOGLOY, J. C. WYNNE*, M. K. BEUTE and J. O. RAWLINGS, N. C. State Univ., Raleigh, NC 27695.

Twenty F_2 crosses from five leafspot-resistant female parents with four adapted male parents in an M x N mating design were evaluated using detached leaf technique for resistance to late leafspot (Cercosporidium personatum) and agronomic characters. Additive gene effects measured by general combining ability (GCA) were highly significant for agronomic traits and for most parameters of disease resistance. Nonadditive genetic variance was also significant for pod length and seed size. NC 7 and NC 6 were the best combiners for agronomic traits and late leafspot resistance. Narrow sense heritability estimates from parent-offspring regression (F_2, F_3 generation) were low. Because of the low heritability, selection for leafspot resistance among F_2 plants would probably be ineffective suggesting that progeny testing will be required to select for resistance.

Origin, Inheritance, and Characteristics of a Yellow-Flowered Peanut from Bolivia. D. J. BANKS* and R. N. PITTMAN, USDA, ARS, Plant Science Research Laboratory, Stillwater, OK 74076.

A yellow-flowered peanut (Arachis hypogaea L.) genotype, isolated from PI 468295, originally from Bolivia, was used in a series of genetic studies. The genotype, named 'Yellowflower', is a large-seeded, late-maturing, virginia botanical type with distinctive lemon-colored flowers which contrast markedly with the orange flowers of most cultivated peanuts. The studies indicated that the yellow trait is inherited in a 11:5 ratio (yellow to orange). However, some yellow-flowered progeny exhibited variable orange-colored blotches along the edges of the standard petals, which is suggestive of the presence of transposable genes. In hand crosses, the hybrid success rate was higher when Yellowflower was the male rather than when it was the female parent. The yellow-flowered trait showed some linkage with normal (vs. krinkle) leaves. Honey bees caged over field plots preferred Yellowflower to orange-flowered genotypes. The bees increased the percentage of outcrossing of orange-flowered females by Yellowflower males. The yellow-flowered trait is an interesting and unusual genetic character that might be useful in developing future peanut cultivars and hybrids.

An Additional Recessive Gene for Red Testa Color. C. C. HOLBROOK* and W. D. BRANCH, USDA-ARS, and Dept. of Agronomy, Coastal Plain Exp. Stn., Tifton, GA 31793.

Two genes controlling red testa color in peanut (*Arachis hypogaea* L.) have been previously reported. One of these genes (R_1r_1) is dominant to tan or pink, whereas, the other gene (R_2r_2) must be homozygous and recessive for red testa color expression. In the present study F_2 families resulting from crosses involving six different pink parental lines were examined for testa color. Data for each family fit a 15 tan or pink to 1 red testa segregation ratio. Thus, in these families, red testa color is controlled by two complementary recessive genes. Since only one recessive red testa color gene has previously been identified, these results indicate the existence of at least one additional recessive gene for red testa color.

The Occurrence and Genetics of an Unusual White Peanut Testa Color. W. D. BRANCH, Dept. of Agronomy, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Numerous studies of white testa color in the cultivated peanut (*Arachis hypogaea* L.) have amply established genetic models with white being recessive to all solid-colored (tan, pink, red, and purple) testa. Two sets of duplicate genes ($F_1F_2D_1D_2$) are known to interact in testa color development, and only when either or both sets of duplicate genes are homozygously recessive ($f_1f_2D_1D_2$, $F_1F_2d_1d_2$, or $f_1f_2d_1d_2$) is a white testa color expressed. However in a previous natural outcrossing nursery, one cross combination between a white-seeded female by a tan-colored testa male resulted in a heterozygous F_1 hybrid plant with white testa-colored seed. Additional crosses were made with this same white parental genotype x tan ($F_1F_2D_1D_2r_1R_2$) and two other red ($F_1F_2D_1D_2r_1r_2$ and $F_1F_2D_1D_2R_1R_2$) testa-colored parents. All F_1's from each of these cross combinations were again white, and the F_2 segregation data suggested a single dominant gene was controlling this unusual white peanut testa color.

Harvesting, Storage and Handling

Impact of the Food Security Act of 1985 on Determination of National Peanut Poundage Quotas, R. H. MILLER, Commodity Analysis Division, ASCS, USDA, Washington, D. C. 20250.

For the 1982-85 peanut crops, decreasing annual quotas were set by the 1981 farm bill. The Food Security Act of 1985 provides a utilization formula for the Secretary of Agriculture to set the national poundage quota for the 1986 through 1990 crops. The national poundage quota must equal the quantity of peanuts estimated to be devoted to domestic edible, seed, and related uses in each marketing year. Method of determining the national poundage quota is analyzed. About five-sixths of the 1986 quota of 2,711 million pounds represents domestic edible use. The USDA Interagency Supply Estimates Committee is continuing to review the data used in calculating supply-utilization balances.

Volatile Profiles Measured by GC in Peanuts With Induced Freeze Damage
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A freshly dug peanut (Arachis hypogaea L.) sample was frozen, then dried to normal moisture content. GC volatile profiles were determined as the sample was aged at room temperature. The initial volatile profiles were normal. A very large ethanol peak was found after about 1-1/2 months of storage. Along with this large ethanol peak may appear excessive acetaldehyde, methylbutanol, and other volatiles. Another indicator of freeze damage was the appearance of 2,3-butanediol with hexanal as a double peak. This double peak serves as a good indicator of the bad off odor of freeze damaged peanuts. This double peak was found in only some of the peanuts and developed after about 4 months.

An Electronic Meter to Measure the Concentration of Alcohols and Aldehydes in Peanuts. J. W. DICKENS*, A. B. SLATE and H. E. PATTEE, U.S. Department of Agriculture, Agricultural Research Service, N. C. State University, Box 7625, Raleigh, NC 27695-7625.

An electronic meter has been developed to measure the concentration of alcohol and aldehydes in the headspace over samples of ground peanuts. The measurements are accomplished by the following 3 steps. (1) Comminute approximately 100 g of peanut kernels for 10 sec in a 0.95 ℓ blender container with a tight-fitting lid. (2) Open a port in the lid of the container and insert the meter probe. (3) After 45 sec record the meter reading. Approximately 30 samples/hour can be measured. The meter should be calibrated every 4 hours by measuring the headspace over a known concentration of ethyl alcohol in water. The sensor used in the meter probe is a commercially available n-type semiconductor of tin dioxide heated by a platinum wire. The resistance of the sensor varies according to the concentration of alcohols and aldehydes in the headspace over the comminuted peanuts. A thermistor is used in the meter circuit to compensate for the effects of temperature on the resistance of the sensor. Studies with peanuts which had off-flavors that resulted from curing at 50 C or from exposure to -1 C before curing demonstrated the ability of the meter to detect these types of off-flavors and showed that meter readings are not affected by the moisture content of the peanuts at the time they are tested.

Evaluation of Aspiration Systems for Peanut Cleaning. P. D. BLANKENSHIP* and J. I. DAVIDSON, JR., USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

The efficiency of aspiration systems in conventional peanut cleaners for separating various portions of material flow was evaluated along with proposed improvements for the systems. Additionally, air column separators currently being used for separating or cleaning other commodities were examined for potential use in making separations in peanuts. Findings of the study should facilitate the design of more efficient peanut cleaners whose use will provide a more desirable product in marketing channels.

Some Effects of Carbon Dioxide and Nitrogen Atmospheres in Peanuts. W. O. SLAY, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
Tests were conducted to determine vacuum levels and headspace gas composition in rigid- and flexible-type low-oxygen atmosphere containers of peanuts flushed with (1) CO_2 gas; (2) CO_2 gas in combination with N_2 gas; and (3) an initial vacuum with CO_2 gas backflush. The self-forming vacuum levels in rigid- and flexible-type low-oxygen containers flushed with CO_2 gas were 308 and 295 mm/hg, respectively, after 24 hours of storage. The vacuum-CO_2 gas backflush treatment produced about the same amount of vacuum but required less time to form. Vacuum levels in combination gas treatments were much lower and were not linearly correlated with the percent CO_2 gas in the treatment. CO_2 gas concentrations in all treatments showed considerable decay within 24 hours, but N_2 and O_2 concentration in the containers increased. The CO_2 gas adsorption capacity of the peanuts was less than has been reported but the increase in N_2 and O_2 levels in the containers was approximately the same ratio as in air. This appears to agree with the theory that the self-forming vacuum is created by the CO_2 gas displacing the air in the interstitial areas between the cell structure in peanuts or other products. The data suggest that an approximate level of vacuum can be produced in a container by selecting the appropriate percentage of N_2 gas to mix with the CO_2 gas.

Influence of External Environment Changes on Peanut Storage. J. S. SMITH, JR. USDA-ARS, National Peanut Research Laboratory, Dawson, GA 31742.
The affects of changes in the external environment (periods of high and low temperatures and periods of high and low relative humidities) on the environment within the peanut mass are discussed. These affects as related to a conventional mechanically ventilated peanut storage are compared to those from a model underground mechanically ventilated storage. Results from these studies will provide needed information to design and contruct better storages.

Effect of pod maturity and plant age on the seed size distribution of Florunner peanuts. E. J. WILLIAMS* and G. O. WARE, USDA-ARS, Crop Systems Research and the University of Georgia, Agricultural Experiment Stations.
Florunner peanut pods (Arachis hypogaea L.) were sampled at nine weekly intervals from 92 to 148 days after planting in crop year 1979. The fresh pods were divided into six maturity categories according to the color of the mesocarp. Individual pods and seed were sized over standard screens for each maturity class and date. The cumulative function for the logistic distribution (CDF) was used to quantify the cumulative percentage by weight of pods and seed which rode a designated screen. The parameters of the CDF for the logistic distribution were regressed separately by maturity class as functions of plant age. These relationships provide a mathematical approach for a better understanding of the influence of pod maturity and plant age on the distribution of pod and seed sizes.

Physiology, Processing and Utilization

Changes in the Seed Composition of Peanut Seed During Boiling. V. MURUGESU and S.M. BASHA*, Peanut Research Laboratory, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307

In most of the peanut growing countries boiled peanuts are consumed by both rural and urban populations. Little scientific information is available on the effect of boiling on the nutritional quality of the seed. For this purpose 150 g of green peanuts CV. Florunner, were boiled for various intervals between 10 and 120 min and in the presence of varying salt concentrations (0 to 5%, W/V). After boiling, the peanuts were shelled, seed coats removed and the cotyledons were freeze dried. The cotyledons were ground into a meal, defatted with hexane and the defatted meal was used for chemical analyses. The results showed that major compositional changes occured in the seed during the first 10 min of boiling. The soluble carbohydrates and soluble proteins decreased by more than 50% following boiling. In contrast total protein, total carbohydrates, oil and minerals remained relatively unchanged. Gel electrophoresis and HPLC profiles indicated disappearance of major proteins during the first 10 min of boiling. Duration of boiling and salt concentration had no significant effect on seed composition after the first 10 min of boiling, indicating that major changes occur during the initial 10 min of heat treatment.

Effect of Storage on the Chemical Composition and Quality of Packaged Roasted Peanuts. James S. L. HOW*[1] and Clyde T. YOUNG[2]
[1]Hershey Foods Corporation, Technical Center, Hershey, PA 17033
[2]North Carolina State University, Raleigh, NC 27650

Effects of storage time and modified atmosphere (using N_2, CO_2, vacuum and air) packaging on the chemical composition, headspace volatile profile and sensory scores of 4 varieties (i.e. market types: Virginia, Runner, Spanish, Valencia) of peanuts which were either dry roasted or oil cooked were investigated. Variety and storage time significantly ($P<.05$) affected residual gaseous composition in the packages, headspace volatile components, free sugars, total fatty acids, oleic-linoleic ratio (O/L) and sensory scores. Packaging affected ($P<.05$) only certain volatile peaks (8, 9, 10, 12, 14, 16), total volatiles, color and texture scores. Changes in free sugars, total fatty acids, volatile profile and sensory scores were variable for each variety during storage (initial through 12 months) indicating possible correlations between them. Runner peanuts were consistently higher in sensory scores and lowest in total volatiles. Percent oleic acid generally tended to decrease from initial to 8 months storage while % linoleic acid decreased markedly from 8 to 12 months.

Consumer Acceptance of Partially Defatted Peanut Flour Products in Thailand. P. CHOMPREEDA, C. OUPADISSAKOON*, and V. HARUTHAITANASAN. Dept. of Product Development, Kasetsart University, Bangkok, 10900, Thailand. Partially defatted peanut flours were made from two variety peanuts in Thailand, Tainan-9 and SK-38. The processes included sorting, dry blanching, Hydraulic pressing, and certrifugal milling with 0.75 mm screen. Raw, partially toasted, and toasted peanut flours were used to prepared products, Thai sausage, Sommanut, Kanom-Koh, Koa-Tu, cake type doughnuts, cakes, cookies, and infant supplementary food. Thai sausage prepared by using 25% peanut flour replacing ground pork showed no difference from control in sensory evaluation. Partially toasted and toasted defatted peanut flour was successfully used in making Sommanut, Kanom-Koh, Koa-Tu, and cookies. Flavor and nutritional qualities of these products were improved. Peanut flour (28%) mixed with rice, sesame, pumpkin meal, and sugar were processed into supplementary food for infant. The product was better in taste and nutritive value than rice alone. Cake type doughnuts and cakes can also be made from these partially defatted peanuts flours -wheat flour mixture. Consumer tests with Thai people showed high acceptability of these developing products.

Development of an Imitation Cheese Spread from Peanut Paste. A. V. A. RESURRECCION*, B. L. SANTOS, and P. E. KOEHLER. Department of Food Science, University of Georgia Experiment Station, Experiment, GA 30212 and Department of Food Science, University of Georgia, Athens, GA 30602. Studies in the development of model systems for the efficient utilization of peanuts in value-added consumer products have resulted in efforts toward an imitation cheese spread prepared from peanut paste. This study was conducted to: (1) determine sensory responses using magnitude estimation scaling, to imitation cheese spreads prepared from peanut paste with varying levels of color and flavor ingredients, and (2) measure relationships between instrumental color values and sensory responses of laboratory and consumer panels to 9 imitation cheese spread formulations. Results indicate the potential for the development of an acceptable imitation cheese product from peanut paste. Color intensity and preference scores by laboratory panelists were negatively correlated ($P < 0.01$) with objective color measures for lightness (L) and hue angle ($Theta^{-1}$ b/a). Color preference scores by the laboratory panel were highest for samples with 0.6% added annatto extract. Both consumer and laboratory panels preferred the sample with 1.0% level of flavor. No relationship was found between laboratory and consumer panel scores for flavor preference, overall acceptability and purchase intention. Sensory and purchase intention scores were generally lower in laboratory panel tests compared to scores of a consumer panel wherein persons representing the target market for the product were used. No statistically significant correlations were found between consumer panel scores and laboratory panel scores for any measures. Results indicate the importance of selecting appropriate consumer panelists in product development efforts in the U. S. that are targeted toward the export market.

Simulating the Growth and Yield of Florunner Peanut. K. J. BOOTE*, J. W. JONES, J. W. MISHOE, and G. G. WILKERSON. Univ. of Florida, Gainesville, FL 32611.

A peanut crop growth simulator (PNUTGRO) was developed patterned after our soybean crop growth simulator (SOYGRO). PNUTGRO is a physiologically-based crop model which responds dynamically to daily weather inputs, and considers crop carbon balance, N balance, and soil water balance. Processes associated with carbon balance include canopy photosynthesis, carbon allocation to different plant parts, growth and maintenance respiration, and tissue abscission. The N balance includes N input from N assimilation, internal re-mobilization to seeds, and loss in abscised parts. The water balance includes infiltration of rainfall or irrigation, root uptake of water, soil evaporation, and crop transpiration. Crop development is driven by heat unit accumulation.Relationships for the model were developed from the literature or specifically calibrated from a 1981 growth analysis on Florunner peanut. In addition to changing input files of crop- and cultivar-specific traits, the FORTRAN code had to be changed occasionally. Using the coefficients from the 1981 data set, the model was validated against several independent data sets on Florunner growth measured in other years and locations. Results of these validation tests will be discussed and interpreted. Release of an IBM-PC-compatible version of the model is anticipated.

Prediction of Peanut Root Penetration Probability Through A Compact Layer: A Simulation Study. Prem Singh* and J. H. Young, Biological and Agricultural Engineering Department, North Carolina State University, Raleigh, North Carolina 27695-7625.

A simulation procedure has been developed to predict the peanut root penetration probability as a function of mean moisture content of a compact layer e. g. a plowpan. Basically the procedure involves the probabilistic characterization of root growth pressure and plowpan mechanical impedance, measured as cone index (CI), in terms of their probability density functions (PDF). A function is developed for conversion of CI values to equivalent soil root impedance values. The complete process is simulated using Monte Carlo simulation procedure. The results from the procedure can be easily incorporated in growth simulation models. The simulation results for a Norfolk loam sand with a plowpan having 1.79 gm/cm^3 mean bulk density indicated that this plowpan will allow about 17 percent of the peanut roots to penetrate at a mean volumetric moisture content of 17 percent.

Effect of Early Leafspot Invasion on Growth Analysis of Spanish Peanuts. D. L. KETRING, USDA-ARS, P.O. Box 1029, and Agronomy Dept., Oklahoma State University, Stillwater, OK 74076.

Studies of growth and development of peanuts (Arachis hypogaea L.) by sequential sampling of vegetative and reproductive components have revealed how yield improvements have occurred through physiological differences among cultivars. Greater partitioning of assimilates to developing fruits is a major factor in recent improvements in genetic yield potential. However, yield potential is frequently modified by invasion of pests (diseases and insects). This study was conducted to compare the growth and development of three spanish peanuts (Pronto, and parents Comet and Chico). Pronto was selected from the Chico X Comet cross. The plots were invaded by early leafspot disease. Maximum shoot weight was attained at 91 days after planting (DAP), then declined due to leaf loss from leafspot disease. Comet was least and Chico the most affected. Number of pegs, pods, and pod weight followed a similar pattern, but after an initial decline Pronto recovered. Seed weight continued to increase until 119 and 133 DAP for Comet and Pronto, respectively, then remained constant. Final yields (kg pods/ha) compared to recent tests showed about 12 to 20% reduction for Comet and 7 to 8% for Pronto. Thus, the initial reduction in shoot weight due to leaf loss apparently had little direct effect on final yields.

Effects of Planting Pattern on the Light Interception, Yield, and Quality of Peanut Genotypes. Z. B. JAAFFAR* and F. P. GARDNER, Department of Agronomy, University of Florida, Gainesville, FL. 32611.

Compared to the conventional wide-row planting, alternative planting patterns of peanut can increase productivity. Studies were conducted to compare three row patterns: 91 cm, 46 cm, and twin rows (23-23)-68 cm: and seven genotypes for effects on crop growth rate, light interception, dry matter yield, pod yield, and seed yield and quality. The genotypes were 'Florunner', 'Tamnut', and five experimental lines: three erect-type ('84-503', '84-504', and '84-2345') and two runner-type ('84-516' and '84-518). All genotypes were seeded at the standard rate. 'Florunner' and 'Tamnut' were also seeded at double rate. Samplings were done at two-week intervals for complete growth analysis. The results on yield of pods and seeds showed that there was no significant interaction between genotypes and planting patterns, though 'Tamnut' and the other erect types produced more in the 46 cm rows than in 91 cm. The main effects, both genotypes and planting patterns, were significant. Quality was not affected by planting pattern.

Effect of Soil Water On Water Relations, Nitrogen Fixation, and Nitrogen Accumulation Of Peanut And Soybean. J.D. DEVRIES, J.M. BENNETT, K.J. BOOTE*, S.L. ALBRECHT, and C.E. MALIRO. Agronomy Dept., Univ. of Florida and USDA-ARS, Gainesville, FL 32611.

Peanut (Arachis hypogaea L.) and soybean [Glycine max (L.) Merr.] were grown in 1984 in well-irrigated and rainfed field plots to examine their response to water stress. The specific objective of the study was to compare the two species for the responses of leaf water relations, stomatal activity, root growth, nitrogen fixation, and nitrogen partitioning to limited soil water. During periods of moderate stress, peanut maintained higher leaf water potentials and leaf turgor potentials than soybean and supported higher rates of specific nitrogenase activity further into stress periods. However, both species showed reductions in nitrogenase activity before visible symptoms of water stress were observed. Although water stress limited nitrogen concentration and total nitrogen yield in both crops, peanut accumulated more total nitrogen under both well-watered and rainfed treatments. Results of this study suggest that resistance to drought in peanut confers a greater ability to fix and accumulate nitrogen during water stress when compared to soybean.

Effect of Drought and Temperature Stress on Peanut Seed Composition. M. MUSINGO and S.M. BASHA*, Peanut Research Laboratory, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307.

Invasion of peanut seed by taxigenic strains of Aspergillus spp. and consequent aflatoxin contamination has been found to be due to the exposure of peanut seed to temperature and drought stress during their development. In order to determine the effect of this stress on aflatoxin production 18 peanut seed samples (obtained from the National Peanut Laboratory, Dawson, GA) of different market catagories (Jumbo, Medium, #1) from six different plots subjected to varying soil temperatures (19.8 to 30.5 C) and moisture levels (1.29 bars to 60 bars). Seeds were freeze dried, ground into meals and defatted with hexane. The defatted meals were then analysed for composition. The results showed a slight decrease (5 to 10%) in oil and protein content with increased periods of stress. In contrast, the soluble and total carbohydrate content increased (15 to 20%) with stress treatment. The free amino acid and nitrogen contents remained relatively unchanged. Gel filatration studies on HPLC indicated gradual decrease in arachin proteins followed by increase in high molecular weight proteins. Gel electrophoresis data indicated alterations in the polypeptide ratios due to the stress treatment.

Sterol Biosynthesis Inhibitors As Plant Growth Regulators. C. S. KVIEN*, R. H. LITTRELL and A. S. CSINOS, Coastal Plain Exp. Stn., Univ. of Georgia, Tifton, GA 31793.

Although sterol biosynthesis inhibitors (SBI's) are most widely known for their fungicidal properties, many SBI's also have plant growth regulating (PGR) properties. Similar cytochrome (P-450) enzymes are found in the fungal sterol biosynthesis pathway and in the gibberellin biosynthesis pathway of plants. It is these P-450 enzymes which are believed to be the targets of many of the SBI's. Field studies comparing the plant growth regulating properties of the SBI diniconazole to daminozide were conducted during 1983-1985 with the cultivar Florunner. Granular and foliar applied wettable powder formulations demonstrated that diniconazole has PGR activity when absorbed by roots or foliage. Diniconazole is composed of several isomers, one of the isomers is believed to be responsible for PGR activity, a second for fungistatic activity. Diniconazole in current formulations is 12% PGR isomer. Our studies found that 0.67 kg ai ha^{-1} (0.08 kg PGR isomer ha^{-1}) of dinoconazole was as effective at controlling node formation and expansion as 1.41 kg ai ha^{-1} of daminozide. PGR carryover in the seed was monitored. Daminozide increased seed dormancy proportioned to the amount applied. No effect on seed dormancy was found for diniconazole at rates up to 1.12 kg ai ha^{-1} (0.13 kg PGR isomer ha^{-1}).

Entomology

Insect Damage and Yield Assessment on Groundnuts. Manochai KEERATI-KASIKORN*, and Preecha SINGHA. Department of Entomology, Khon Kaen Univ., Khon Kaen, Thailand.

A knowledge of yield-loss relationship between a crop and its insect pests is an important aspect of insect pest management. Therefore, tests were designed to determine the effect of insect management on yields during the rainy seasons of 1983-1985. Insecticides were applied during various stages of groundnut development. Counts were taken of the numbers of thrips, leafhopper, leafminer and Heliothis armigera. Information was also obtained on accumulative insect damage and yield at harvest. Thrips, leafhopper and leafminer were significantly reduced by complete seasonal control of the insect complex by timing the application of insecticide during the vegetative stage of the plant. Three applications of insecticide applied during 30-60 days after planting (DAP) significantly reduced insect damage while insecticide applied later did not reduce damage below the untreated check. In a farmer's field in 1985, untreated groundnuts yielded only 630 kg/ha while the best treatments yielded 1276 to 1800 kg/ha. There was an inverse relationship between H. armigera damage and leafminer damage in 1985 test. In general, insecticide applied before 45 DAP provided the best protection against thrips, leafhopper and leafminer. These data indicate that more precise timing of insecticide will provide better pest management and reduce the cost of pest control in Thailand groundnut production.

Evaluation of Chemicals for Managing Soil Insects in Florida Peanuts. M. E. GILREATH* and J. E. FUNDERBURK, Dept. of Entomol. and Nematol., Univ. of Fla., N. Fla. Res. and Educ. Ctr., Quincy, FL 32351; and D. W. GORBET, Dept. of Agron., Univ. of Fla., Agric. Res. and Educ. Ctr., Marianna, FL 32446.

A study was conducted in 1985 to evaluate the efficacy of insecticides for control of soil-inhabiting insects in peanuts and to determine effects of chemical treatments on peanut yield and seed quality. Insecticide treatments included were Dyfonate 10G (2# ai/A) and 15G (2# ai/A), Lorsban 15G (2# ai/A and 1# ai/A + 1# ai/A), Mocap 15G (2# ai/A and 3# ai/A), Furadan 10G (2# ai/A), and Dimilin 25WP (1 oz ai/A + 1 oz ai/A). Telone II soil fumigant/nematicide was also evaluated, both as a single treatment (5 gal (92% ai)/A) and in combination with some of the insecticides. Lesser cornstalk borer (LCB), Elasmopalpus lignosellus (Zeller), density was greater (based on adult emergence cages) in the control, Telone (only), and Dimilin + Telone combination than in other treatments. Lower densities occurred in the Dimilin and Lorsban split applications and in the Furadan treatment. No LCB adult emergence was detected in the remaining treatments. Yields were greater in all singular insecticide treatments and in all insecticide + Telone combinations, except Dimilin + Telone, than in the control or Telone (only) plots. There was no consistent yield response from Telone. However, nematodes were detected only at low levels in a pretreatment soil test; thus, the use of Telone was not warranted, and no yield response was expected. Peanut seed quality was very good (≥77% total sound mature kernels) in all treatments. The study is being continued in 1986, with sampling expanded to include wireworms (Elateridae), whitefringed beetles (Graphognathus spp.), and rootworms (Diabrotica spp.).

Abundance of Lesser Cornstalk Borer Eggs, Larvae, and Adults in Florunner Peanut Fields. T. P. MACK*, C. B. BACKMAN, and D. W. SPURGEON. Entomology Department, Alabama Agricultural Experiment Station, 331 Funchess Hall, Auburn University, AL 36849-4201.
Lesser cornstalk borer, Elasmopalpus lignosellus (Zeller), (Lepidoptera: Pyralidae) populations were monitored in conventionally planted Florunner peanuts at Headland, AL from 1982-1985. Sampling techniques employed included soil sieving for larvae and pupae; plant and soil sampling with subsequent flotation of eggs, larvae, and pupae; pheromone trapping of adult males; flushing adult males and females from plants from 0600-0830 h CST; and sampling adult emergence cages. Adult sex ratios and female age distributions were determined on a weekly basis in 1984 and 1985. Adult abundance varied according to the sampling technique employed. Generally, pheromone trap counts correlated with flush counts. Emergence cage adult abundance estimates were variable, but peak abundance dates from emergence cages corresponded to peaks observed by flushing. Egg abundance was variable from year to year, and correlated with adult abundance estimates from flush samples. More males than females were found at low densities; however, pheromone traps in the area may have skewed the sex ratios by attracting males to the fields where flush samples were taken. Approximately 70% of the adult females caught in 1984 had >50% mature oocytes with <30 eggs.

Efficacy of LARVIN® Brand Thiodicarb Insecticide For Control of Fall Armyworm (Spodoptera frugiperda) and Corn Earworm (Heliothis zea) on Peanuts. C. F. HARDEN, Union Carbide Agricultural Products Company, Inc., P. O. Box 12014, T. W. Alexander Drive, Research Triangle Park, NC 27709.
LARVIN® Brand thiodicarb insecticide, a new oxime carbamate insecticide, has demonstrated excellent performance against Lepidoptera pests on peanuts. Union Carbide Agricultural Products Company, Inc. has conducted several years of small plot testing on peanuts obtaining excellent control of fall armyworm at 0.25 pounds of active ingredient per acre (lb. ai/A) and corn earworm at 0.45 lb. ai/A. LARVIN® Brand thiodicarb insecticide has shown minimal impact on non-target organisms. A review of performance data will be presented and discussed in this paper.

Insecticidal Control of Granulate Cutworm Larvae Feltia subterranea (Fab) in peanuts. L. W. MORGAN*, H. WOMACK, Univ. of Ga., Coastal Plain Exp. Stn., and Coop. Ext. Svc., Tifton, Ga. 31793-0748

In 1984 and 1985 field studies using granular and spray formulations were conducted to evaluate the efficacy of several insecticides for control of granulate cutworm larvae infesting peanuts. All experiments were conducted on 2-row plots 7.7 m long replicated 4 times. Materials applied as granules were weighed for individual plots and applied by hand. Spray formulations were applied 95 l/ha at 40 psi. In 1984 & 85, PP993 @ 0.34 kg a.i./ha gave about 93% control. Control with Lorsban® @ 2.26 kg a.i./ha ranged from 60% to 80% in granular formulation, and as a spray at 1.13 kg a.i./ha. only 65% in both years. Orthene spray @ 1.13 kg a.i./ha ranged from 55% to 84% control. Cymbush® @ .11 kg a.i./ha. gave 93%-100% control when applied either as a spray or granular formulation. Baythroid® in spray formulation @ .014 a.i./ha. gave above 88% control in the 2 years of use. Granular Dyfonate® @ 2.26 kg a.i./ha. reduced the infestation 73% in 1984 and 47% in 1985. Mocap®,used only in 1985 in granular formulation, gave 94% control @ 3.39 kg a.i./ha. At harvest there were no significant differences among treatments for either SMK or yield.

Peanut Stripe Virus: Effect on Growth and Yield of Florunner Peanut in Relation to Stage of Peanut Development When Infection Was Initiated. ROBERT E. LYNCH*, J. W. DEMSKI, L. W. MORGAN, and W. D. BRANCH, Insect Biology and Population Management Res. Lab., USDA-ARS, Tifton, GA 31793; Dept. of Plant Pathology, Georgia Exp. Stn., Experiment, GA 30212; Dept. of Entomology, Coastal Plain Exp. Stn., Tifton, GA 31793; and Dept. of Agronomy, Coastal Plain Exp. Stn., Tifton, GA 31793.

Florunner peanuts (Arachis hypogaea L.) were artificially inoculated with peanut stripe virus (PStV) at emergence, 20-,40-, and 60-days post-emergence. All inoculated plants were grown under 6'x6'x12' saran-screened cages. Plants from each plot were analyzed each 20 days for presence of PStV using the ELISA immunoassay. Data were recorded on plant height, number of plants per plot, number of plants with white mold, fresh plant weight, fresh top weight per plant, fresh root weight per plant, fresh pod weight per plant, dry pod weight per plant, number of pods per plant, number of seed per plant, seed weight per plant, yield, and grade. Orthogonal comparisons showed significant differences between the caged control and the uncaged control in plant height, fresh root weight per plant, fresh pod weight per plant, dry pod weight per plant, number of pods per plant, number of seed per plant, seed weight per plant, and yield. There were no significant differences, with one exception, between the PStV treatments and the caged control.

Effect of No-Till and Double-Cropped Peanuts on Insect Population, Damage and Peanut Yield. W. V. CAMPBELL*, Dept. of Entomology, N.C. State Univ., Box 7613, Raleigh, N.C. 27695.

Tests were conducted in 1985 at the Peanut Belt Research Station to determine the effects of no-till (minimum tillage) peanut and peanuts double cropped after wheat (no-till) on insects and insect damage compared with conventionally-planted peanuts. Data were collected on plant stand, thrips numbers, thrips damage, leafhopper damage, corn earworm number and damage, southern corn rootworm pod damage and peanut yields. Plant stand was slightly better in no-till double-cropped peanuts and peanuts planted conventionally in June than for peanuts planted in May. No-till peanut had fewer thrips and lower thrips damage, less leafhopper damage, fewer corn earworm larvae and lower corn earworm damage than conventionally-planted peanuts. Pod damage from southern corn rootworm was higher on no-till 'NC 6' cultivar but the same on 'Florigiant' cultivar planted no-till or conventional. Cultivar differences were recorded for insect damage and yield. Yields of double cropped peanuts were equivalent to yields of peanuts planted at the normal time in May.

Southern Corn Rootworm Pheromone Trap Location in Relation to Trapping Success in Virginia-Type Peanuts. J. C. SMITH*, J. L. STEELE and W. V. CAMPBELL, VPI & SU, Tidewater Res. Ctr., Suffolk, VA; USDA-ARS, Tidewater Res. Ctr., Suffolk, VA and N. C. State Univ., Raleigh, NC, respectively.

A pheromone, specific for the adult males of the southern corn rootworm, Diabrotica undecimpunctata howardi Barber, was utilized in sticky-traps located in six sites in Virginia and four sites in North Carolina. Four traps per field were utilized in several configurations depending on field size and shape. Trap catches were determined daily at two sites in Virginia with other traps being inspected twice/wk. North Carolina traps were inspected weekly except for daily inspection at two sites for a one week period. Trap location in respect to prevailing winds, relationship to adjacent crops and position within the peanut field was studied. Trapping success appeared greatest from traps within a peanut field. Trapping success was decreased in traps located near other potential alternative host crops such as soybeans or corn. Seasonal trapping for ca. 90 days in VA and 113 days in NC resulted in total catches of ca. 2500-5500/site. Peak daily trapping success varied somewhat due to latitude of the site, but was generally between July 15-Aug 10 in VA with a distinct peak during the week July 31-Aug 6 at all four locations in NC.

Production Technology and Weed Science

Interactions Between Imazaquin and Fenamiphos in Peanuts. F. T. CORBIN, G. A. SULLIVAN*, and D. P. SCHMITT, Dept. of Crop Science and Plant Pathology, North Carolina State Univ., Raleigh, NC 27695-7620.

Imazaquin is a new herbicide under development for broadleaf weed control in soybean and is particularly effective for control of seedling sicklepod (Cassia obtusifolia) and common cocklebur (Xanthium pennsylvanicum). However, early season stunting of seedlings and yield reductions at harvest have been observed in peanut production, particularly with the use of higher rates of the herbicide. Cultivars 'NC 6' and 'Florigiant' were grown in experimental plots that had been treated with imazaquin alone at 0.22 kg/ha and 0.44 kg/ha or with the same rates of imazaquin in combination with fenamiphos at 2.24 kg/ha. Data were collected on fresh weights of peanut roots and shoots at 4, 6, and 8 weeks after planting and on peanut yields at harvest. Florigiant was more sensitive than NC 6 to the herbicide. Roots and shoots were stunted for all rates of imazaquin after 4 weeks. Shoot weights of both cultivars were reduced after 4, 6, and 8 weeks in plots which received applications of the herbicide alone. In contrast, a protective effect was observed when the herbicide was combined with fenamiphos. Weights of seedlings taken from plots which received imazaquin at 0.22 kg/ha or 0.44 kg/ha and fenamiphos at 2.24 kg/ha were significantly higher than seedlings which were treated with the herbicide alone. Peanut yields at harvest were reduced in plots which received applications of the herbicide alone, but complete recovery of plants was observed when plots were treated with combinations of imazaquin and fenamiphos (0.22 kg/ha + 2.24 kg/ha) and yields were equivalent to checks.

The Response of Peanuts to the Herbicides Imazaquin and Chlorimuron. G. SIMS, G. WEHTJE and J. W. WILCUT*. Dept. of Agronomy and Soils, Alabama Agric. Exp. Sta., Auburn Univ., Auburn, AL 36849.

The tolerance of Florunner peanuts to imazaquin and chlorimuron were evaluated over a 2-yr. period at Headland, Alabama. The experiment with imazaquin consisted of a factorial arrangement of five rates (0.06, 0.17, 0.28, 0.39 and 0.50 kg/ha) applied at four different timings; preplant incorporated, preemergence, ground cracking and postemergence. The experiment with chlorimuron was identical except rates evaluated were 17.5, 35.0, 52.5, 70.0 and 87.5 g/ha. The tolerance of peanuts to both of these herbicides was not as good as what has been observed with soybeans. All treatments with chlorimuron reduced yield relative to the untreated check. This yield reduction increased with increasing herbicide rate, and was generally greater with the later applications. Peanut grade was affected only by postemergence treatment at the highest rate. Imazaquin, when applied preemergence at the higher rates (0.39 and 0.50 kg/ha) reduced yields. Yields from all other imazaquin treatments were equivalent to the nontreated check, and no imazaquin treatment reduced peanut grade relative to the untreated check.

Early-Season Stress Effect Resulting from Herbicide Injury and Insect Damage on Florunner and Early Bunch Peanuts. B. J. BRECKE*, Univ. of Florida, AREC, Route 3, Box 575, Jay, FL 32565-9524 and D. H. TEEM, Auburn Univ., Auburn, AL 36849.

In field studies conducted during 1984 and 1985 at two locations in Florida, "at cracking" applications of the standard herbicide combination, alachlor + naptalam + dinoseb, resulted in less early season peanut injury than the same herbicide mixture applied 10 days after peanut emergence (11 vs 30%). When the herbicide Vernolate was applied preplant the injury rating for the "at cracking" treatment rose to 24% while that for the 10 day postemergence application increased to 43%. Less crop injury was observed when an insecticide was used to control the insect thrips (20 vs 36%) and peanuts recovered more rapidly from the herbicide damage. In general, the Early Bunch cultivar was more sensitive to early season stress than Florunner.

Reduced Cost Weed Control Systems for Sunbelt Runner Peanuts. J. CARDINA*, A. C. MIXON, and G. R. WEHTJE, USDA-ARS, Tifton, GA 31793, and Auburn University, Auburn, AL 36849.

We studied weed control in 'Sunbelt runner' peanuts planted in a twin row pattern in 1982-85 at Tifton, GA and 1982-84 at Headland, AL. The weed control treatments included a standard herbicide program and reduced input programs which substituted reduced herbicide rates and/or less expensive chemicals to decrease weed control costs. None of the herbicide programs, including the standard (benefin+vernolate, alachlor+naptalam+dinoseb, dinoseb) consistently resulted in the highest weed control, crop yield or quality. A 30-60% reduction in residual herbicide rates resulted in weed control and crop yield equivalent to the standard treatment except in 1984 at Tifton where weed densities were extremely high. In years and locations where weed populations were low there were no differences in weed control, crop yield or quality except in the weedy control. The lowest cost treatment, which included three applications of paraquat, caused reduced weed control at both locations in 1982 and reduced yield in 1982 and 1984. Yields averaged over years were lower for this treatment compared to the standard at both locations. Regression equations showed that grass weeds were more important in reducing peanut yield than were broadleaf weeds. Results indicate the potential for reducing herbicide inputs in twin-row peanuts without sacrificing yield or quality.

Efficiency and Economics of Peanut Weed Control with Herbicides and/or Cultivations. J. W. WILCUT*, G. R. WEHTJE, R. H. WALKER, and M. G. PATTERSON, Dept. of Agronomy and Soils, Agric. Exp. Stn., Auburn Univ., Auburn, AL 36849.

Two separate experiments were conducted for 1982-1984 and 1983-1984 at Headland, Alabama to investigate the effieciency and economics of herbicides and/or cultivations for weed control. In the first experiment (1982-1984), net returns (3-yr. average) generally increased with increasing numbers of cultivations regardless of the herbicides applied. The herbicide system of benefin applied preplant incorporated (PPI), plus alachlor and Dyanap (dinoseb + naptalam) applied at ground cracking (GC) with no cultivation provided a net return of $179/ha. The same herbicide system with 2 cultivations provided a net return of $275/ha. One to four timely cultivations (no herbicides applied) provided net returns of $131, $208, $136, and $275/ha, respectively. In the second experiment (1983-1984), the greatest 2-yr. average net returns ($150/ha) were provided by either 1) benefin (PPI) plus alachlor and dinoseb (GC) followed with two timely cultivations or by, 2) alachlor and dinoseb (GC) plus sethoxydim (30 cm band over drill) applied as an early postemergent application followed by one cultivation.

Control of Bermudagrass in Peanut with Postemergence Grass Herbicides. W. J. GRICHAR, Texas Agricultural Experiment Station, P. O. Box 755, Yoakum, Texas 77995

Various postemergence grass herbicides were evaluated for control of common bermudagrass (Cynadon dactylon (L.) Pers). Treatments were applied to bermudagrass at early post (EP) when grass was 3" tall and stolons were 6" long and/or late post (LP) when grass was 6" tall and stolons were 12" long. All treatments included a non-phytotoxic oil added at the rate of 1.0 qt/A. Verdict (haloxyfop-methyl) gave excellent season long control with rates as low as 0.125 lbs ai/A when applied at early post (EP). Later post treatments of Verdict required higher rates for control above 90%. Poast (sethoxydim) required 0.3 lbs ai/A for excellent control when one application was made. However, a split application of 0.2+0.2 lbs ai/A gave control of 92% at the last rating, 30 days prior to harvest. Fusilade 4E (fluazifop-butyl) gave 84 and 100% control prior to harvest with one or two applications, respectively, at the 0.25 lbs ai/A rate. Fusilade 2000 gave above 90% control when applied early post at rates as low as 0.125 lbs ai/A. SC 1084 provided excellent bermudagrass control at rates varying from 0.25 to 0.5 lbs ai/A when applied early or late post.

Cultivar and Planting Date Effects on Peanut Diseases and Plant Deterioration. R. W. MOZINGO*, D. M. PORTER and T. A. COFFELT. VPI & SU and USDA-ARS, Tidewater Research Center, Suffolk, VA 23437.

Peanut (Arachis hypogaea) cultivars Florigiant, NC 7, VA 81B and NC 9 were planted April 22, May 1, 10 and 20, 1985 at the Tidewater Research Center Farm in Suffolk, VA. Observations during the growing season indicated differences in levels of disease severity and plant deterioration (a condition of unknown cause characterized by rapid plant senescence resulting in severe defoliation and pod shedding) among cultivars and planting dates. Severity of leafspot, caused by Cercospora arachidicola, Sclerotinia blight caused by Sclerotinia minor, and plant deterioration (unknown cause) was directly related to plant age. On September 13, plants of the last planting date (May 20) exhibited fewer symptoms of leafspot and Sclerotinia blight than plants from earlier planting dates. The progression of both diseases was related to plant age with older plants the most susceptible. On September 13 differences in cultivar susceptibility to leafspot and Sclerotinia blight were also noted. Cultivars ranked in order of most to least susceptible to leafspot (disease index 1 to 5 with 5 being equal to 100% infection) were VA 81B, Florigiant, NC 9, and NC 7. Cultivars ranked in order of most to least susceptible to Sclerotinia blight (number of 30-cm sites/24.4 m row with disease) were NC 7, NC 9, Florigiant and VA 81B. Plant deterioration occurred throughout the peanut production area of Virginia in 1985 as plants approached maturity. Ratings showed that the earlier the planting date, the more susceptible plants were to this condition. The ratings from two rating dates also showed rapid deterioration with time. All cultivars were extremely susceptible with NC 9 being more susceptible than the other cultivars tested. These results in Virginia for 1985 show earlier plantings to be more susceptible to leafspot, Sclerotinia blight, and plant deterioration than later plantings.

Peanut Cultivar Response to Row Spacing and Plant Density. J. S. KIRBY* and C. KITBAMROONG. Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74078-0507 and Nakarn Sawan Field Crop Research Center, Takfa, Nakarn Sawan, Thailand 60190

Four peanut cultivars, Florunner, Pronto, Spanco, and Tamnut 74 were utilized to investigate the influence of four row spacings and three within-row plant densities on yield and grade. The study was conducted under irrigation at the Caddo Peanut Research Station in 1981 and 1982. The four replication split-plot design experiment utilized the four cultivars as main plot factors and the four row spacings and three within-row plant densities as sub-plot factors. The data were analyzed by years because large interactions of cultivar and year were obtained for all characters when the combined analyses were attempted. In both years, significant pod yield differences were produced with cultivars, row spacings, and plant densities. The row spacing by plant density interaction was also significant for yield in both years, however, the interactions of cultivar by row spacing, by plant density, and by row spacing and plant density were not significant in either year. Thus, the data indicated that pod yield for all cultivars generally improved when row spacing was narrowed from a wide spacing of 91.4 cm to an intermediate spacing of 45.7 cm and when within-row plant density was increased from a low density of 2 plants/30.5 cm to a medium density of 4 plants/30.5 cm. However, further narrowing of rows or increases in plant density per row resulted in either no additional increase in yield or in detrimental effects to yield and grade factors. The appropriate spatial arrangement for these four cultivars was 45.7 cm between rows and 4 plants/30.5 cm within the row at which plant population was anticipated to be 215,273 plants/ha. Overall cultivar performance varied considerably due to the differences in the two seasons studied. Florunner performed better in the long season of 1981 (179 days) while Pronto, Spanco, and Tamnut 74 performed better in the shorter season of 1982 (135 days).

Simulation of Planting Date, Irrigation Treatment, and Defoliation Effects on Peanut Yields Using PEANUT. J. H. Young* and L. J. Rainey, Biological and Agricultural Engineering Department, North Carolina State University, Raleigh, North Carolina 27695-7625.

The peanut growth simulation model, PEANUT, developed at North Carolina State University was used to simulate the effects of planting date, irrigation treatment, and defoliation on peanut yields. The model was developed for Florigiant peanuts over a period of years from 1974 through 1982. Subroutines for simulating soil moisture level and root growth were added in 1982 based on field tests at Lewiston, NC. Weather data for the years 1982 through 1985 were used with the simulation model to determine the predicted effect of planting date under both irrigated and nonirrigated conditions. In addition, the value added by individual irrigation treatments was estimated. Finally, the effects of the removal of 25, 50, 75 or 99% of the leaves at various intervals within the season were simulated. Trends of simulated yield data agreed with those of state and county yield averages but yields showed considerably more variation between years. This would be expected since weather conditions at a given location would show more variability than average conditions over a county or state.

Rainfall Plus Irrigation Patterns and Soil Temperature Under the Canopy as Indication of Florunner Peanut Yield and Quality. J. I. DAVIDSON, JR.*, P. D. BLANKENSHIP, T. H. SANDERS, R. J. COLE, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 31742; R.J. HENNING, Farmers Fertilizer & Milling Co., Colquitt, GA 31737; W. R. GUERKE, GA Seed Test. Laboratory, Atlanta, GA 30334.
Plot and field experiments were conducted on CY 1980-1985 Florunner peanuts. Each year several locations and soil types were evaluated. Soil temperature underneath the canopy and rainfall and irrigation patterns were highly correlated with plant stress, yields, aflatoxin and other quality factors. The correlations were dependent upon plant growth and fruiting stages. Optimum rainfall plus irrigation patterns consisted of about 13 cm (5") of total water for 0-50 days after planting, 20 cm (8") of total water for 40 day pod development period, and then 3.6 cm every 2 weeks until harvest. Certain periods of mild stress were beneficial in providing higher yields and quality. Daily optimum soil temperature underneath the canopy consisted of about 26.7° (80°F) - 27.8° (82°F) maximum and 21.7° (71°F) - 22.8 (73°F) minimum. Use of this and other information in developing a knowledge base for an expert systems peanut production management model is discussed.

Response of Peanuts to Phosphorus and Potassium Fertilization. Dallas L. Hartzog*, James F. Adams and Fred Adams, Alabama Cooperative Extension Service, Headland, AL 36345 and Agronomy and Soils Department, Auburn University, AL 36849.
Direct fertilization of peanuts (Arachis hypogaea L.) with P and K generally does not increase peanut yields which is probably due to crop rotational practices and/or high soil fertility levels. This has limited the information concerning critical soil test levels of P and K. Phosphorus and potassium fertilizer experiments for peanuts (Florunner) were conducted in farm fields from 1973 to 1985. Site selection was based on soil test data that indicated medium or lower levels of available P or K. Phosphorus and potassium were applied at rates of 20 and 74 kg/ha, respectively. There was no yield response to P and K fertilization even when double acid extractable P was as low as four kg/ha. Yield increases did occur with P and K fertilization when soil test K levels were low. This indicates that yield response was due to K and not P fertilization. Potassium increased yield in seven of the 37 experiments. This critical soil test K level for maximum relative yield was 51 kg/ha. Four out of the seven yield responses to K, followed corn as a previous crop. These yield responses occurred on deep sandy soils; thus, certain soil types should be tested for available K even when peanuts are grown in rotation. Only in one of three experiments was there a difference in percent SMK as well as yield.

Comparison of Soil and Foliar Applied Mn for Florunner Peanuts. M. E. WALKER*, T. P. GAINES and B. G. MULLINIX, JR., Univ. of Georgia. Coastal Plain Sta., Tifton, GA.

There is an increase in the number of acreages of peanuts being planted on Atlantic Coast Flatwood soils of Georgia. Many of these soils when limed have shown typical Mn deficiency, thereby creating a need for an economical rate and method of application of Mn fertilizer to correct this condition. Manganese treatments of 0, 1.68, and 6.72 kg ha^{-1} were split into 6 applications and applied to 'Florunner' peanuts, while 40 kg ha^{-1} of Mn was applied to the Pelham soil (arenic Paleaquults) at pH levels of 5.6, 7.0, and 7.3. Leaves were collected at 5, 6, 9, 11, and 14 weeks after planting. Deficiency symptoms occurred only at the high pH levels. All Mn treatments significantly increased the yield, SMK, and value of Florunner peanuts regardless of rate or method of application. From data obtained the most economical rate of Mn to correct Mn deficiency in Florunner peanuts is 1.68 kg ha^{-1} applied in 6 applications (0.28 kg ha^{-1}). The Mn fertilizer can be applied with fungicide materials used in controlling leaf spot disease without any additional cost.

Calcium Studies on Peanuts in Florida. E. B. Whitty*, D. W. Gorbet, G. Kidder and F. M. Shokes. 303 Newell Hall, University of Florida, Gainesville, FL 32611.

Five experiments were conducted to compare various sources of calcium for peanuts. Calcitic lime, dolomitic lime, powder gypsum, granular gypsum, and phosphogypsum were the calcium sources. Various rates, combination of sources, and time of application were also evaluated. Effects of enhanced soil potassium levels on calcium response were evaluated in one test. Florunner and Early Bunch were the varieties included in the trials. Soil calcium levels were relatively high at all locations. Consequently, no yield responses were obtained from the various treatments. Differences in peanut quality, pod rot, and other diseases were not striking nor consistent. Germination of seed produced with the various treatments appeared to be the most sensitive measure of shortages of calcium, expecially with the Early Bunch variety. Detrimental effects of excessive levels of potassium in the pegging zone were counteracted by application of gypsum.

Plant Pathology, Nematology and Mycotoxins

A Method for Assessing Severity of Peanut Leafspot and Relationship to Yield.

R. H. LITTRELL and BEN MULLINIX*. Plant Pathology Department, and Computer Center, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

Single leaves from the fourth, sixth and eighth nodes below the first fully expanded leaf were removed from three central stems from each replicate (82 m x 40 m). A standard area chart (1-20%) was used to estimate percent necrotic tissue resulting from Cercosporidium personatum just prior to first digging, when pod maturity was judged to be optimum, and two weeks later at second digging. A fungicide screening (FS) test (29 treatments) and a Copper/Bravo (CB) test (9 treatments) were evaluated for percent necrosis and yield. The FS test had a curvilinear relation to yield and percent necrosis and the CB had a linear relation. A model was constructed for each test to predict pod yield from percent necrotic tissue. The slope of the line was steeper with the second digging date. The method described in this paper is effective in determining differences between fungicide treatments and is less time-consuming than determining the percent defoliation and percent infection method.

Effect of Fungicides on Rate of Disease Progress of Early Leaf Spot of Peanut.

K. E. JACKSON* and H. A. MELOUK, Dept. of Plant Pathology and USDA-ARS, Oklahoma State Univ., Stillwater, OK 74078-0285.

The efficacy of copper sulfate, BAY HWG 1608, chlorothalonil, propiconazole, and benomyl to control Cercospora arachidicola Hori on peanut cv. 'Spanco' was investigated. Seeds were planted on May 16, 1985 at the Plant Pathology Farm, Stillwater, Oklahoma, in plots (3.65 x 9.14 m) with rows spaced at 0.91 m. Treatments were replicated 4 times in a randomized complete block design. Fungicide applications began on July 2 and continued on a 14-day schedule until harvest. Amount of leaf spot and defoliation were estimated every week from July 30 until harvest. Total disease (Y) was calculated by the formula: Y = [(100-defoliation)·(percent leaf spot)] + defoliation. Rate of disease progress was calculated using the logistic equation (Peanut Science 7:46-49, 1980). Fungicides that lowered the rate of disease progress increased peanut yields. Pooled over treatments, significant negative correlation (r^2 = 0.88) was obtained between the rate of disease progress and the average yield.

A Use Pattern for Chlorothalonil to Control Early Leafspot of Peanut Without Increased Severity of Sclerotinia Blight. P. M. PHIPPS. Tidewater Research Center, VPI&SU, Suffolk, VA 23437.

Spray programs using chlorothalonil with and without Soybean Oil(93% oil, 7% emulsifier) and iprodione were evaluated for efficacy in control of early leafspot (Cercospora arachidicola) and Sclerotinia blight (Sclerotinia minor) of Florigiant peanut in 1985. Plots were four 12.2-m rows, and were replicated in four randomized complete blocks. Sprays(140 L/ha) were applied at 345 kPa with a CO_2 pressurized sprayer equipped with three, $D_2$13 (disk-core) nozzles/row. Chlorothalonil at rates from 0.59 to 1.75 kg/ha applied seven times on a standard 14-day schedule gave excellent control of leafspot, but yields were low due to severe Sclerotinia blight. Where only two sprays were applied as indicated by the Virginia leafspot advisory program, chlorothalonil(1.17 kg/ha) controlled leafspot significantly (P=0.05) better than benomyl(0.28 kg/ha) plus sulfur(3.36 kg/ha) with no increase in Sclerotinia blight. Three applications of iprodione(1.12 kg/ha) on a 28-day schedule for control of Sclerotinia blight coupled with two sprays of chlorothalonil by the advisory program resulted in yields significantly (P=0.05) greater than benomyl plus sulfur with or without iprodione, chlorothalonil alone, or no treatment. Soybean oil(1.4 l/ha or 1% v/v) consistently improved leafspot control by chlorothalonil, but did not affect Sclerotinia blight control. Results of these tests and others since 1979 indicate that up to three sprays of chlorothalonil according to leafspot advisories can reduce the risk of yield loss to leafspot and not increase the incidence of Sclerotinia blight.

Use of Sublethal Doses of Fungicide to Obtain a Range of Late Leafspot Epidemics for Pod Loss Studies. F. W. NUTTER, JR.*, Department of Plant Pathology, University of Georgia, Athens 30602.

The relationship between disease severity levels and yield loss must be determined if disease control strategies, such as the use of fungicides and disease resistant cultivars, are to be evaluated and incorporated into a crop management system. In order to develop a reliable yield loss model, multiple levels of treatments are needed to obtain a range of stimulus-response levels. This is particularly important for studies designed to quantify crop losses caused by plant pathogens since the amount of yield reduction will be a function of the intensity of the disease epidemic. The objective, therefore, is to somehow obtain a range of epidemics of differing intensities and then measure the response of the crop (yield or yield loss) to facilitate model development. Obtaining different disease intensities is difficult with pathogens such as Cercosporidium personatum (late leafspot) which has an extremely high infection rate. Leafspot development with time (dy/dt) is a function of $ry'(1-y)$, where (r) is the apparent infection rate, (y) is the present level of disease severity and, (1-y) is the amount of healthy tissue remaining to be infected. Sublethal doses of fungicide were used in 1985 to differentially affect 'r' in the above equation which resulted in a range of discreet disease severities. Active ingredient concentrations of chlorothalonil, ranging from 2X to 0, provided a better range of epidemics for yield loss studies than equivalent concentrations of a sterol inhibiting fungicide. Pod yield ranged from 1,700 to 7,500 kg/ha which indicated achieved success in using sublethal doses of chlorothalonil to regulate 'r'. In this study, disease severity measurements accounted for greater than 90 percent of the variation in yield.

Potential for Use of New Systemic Fungicides to Control Late Leafspot of Peanut. F. M. SHOKES,* and D. W. GORBET, North Florida Research and Education Center, Quincy, FL 32351, and Agricultural Research and Education Center, Marianna, FL 32446.

Numerous new systemic fungicides have been tested for peanut leafspot control over the past seven years at the Agricultural Research and Education Center, Marianna, Florida. Several have good efficacy against late leafspot of peanut. Three "first generation" ergosterol-biosynthesis-inhibiting (SI) fungicides, Baycor, Tilt, and RO 15-1297 have good efficacy against late leafspot but the latter two do not control peanut rust. XE-779 and HWG 1608 two "second generation" (SI) fungicides have excellent activity against late leafspot and against peanut rust. Rates of 74-148 g ai/ha have given satisfactory leafspot control with most of the better systemics. Only minor improvement of efficacy has been noted when spray adjuvants have been added to RO 15-1297, Tilt, Baycor, and HWG 1608. Significant improvement in efficacy can be obtained by addition of Agridex spray adjuvant to XE-779. Plant growth regulator activity has also been observed with this fungicide. When labeled, XE-779 and HWG 1608 will have good potential for control of peanut leafspot diseases and peanut rust. Other new systemic fungicides might be useful for leafspot control if used in conjunction with a fungicide to control rust or in an alternate program with more efficacious fungicides.

Correlation of Early Leafspot Incidence in Peanut with a Weather-dependent Model of Infection Rate. E. L. JEWELL*, P. M. PHIPPS, AND J. L. STEELE. Tidewater Research Center, VPI&SU, Suffolk, VA 23437.

The development of early leafspot of peanut, caused by Cercospora arachidicola, was monitored after weekly field inoculations of Florigiant peanut in 1985. Plots (27-cm dia.) were 2.7-m apart within rows and 1.8-m apart across rows, planted 0.9-m apart. Prior to inoculation, three main stems in each plot were tagged at the internode beneath the second fully expanded leaf. Inoculations were made weekly from Jul 3 to Aug 28 with 20,000 conidia/plot, and were replicated in five randomized complete blocks. Plots inoculated on Jul 24 exhibited the greatest numbers of lesions on the two leaves above tags; 39.1 and 47.6 lesions/leaf at 2 and 3 wk after inoculation, respectively. Disease in plots inoculated at other times ranged from 0.5 to 8.7, and 1.8 to 13.9 lesions/leaf at 2 and 3 wk after inoculation, respectively. Weather parameters for computing daily infection rates, as reported by Jensen and Boyle (Plant Dis. Reptr. 50:810-814), were measured at 10 min. intervals by a computerized weather station at the field site. Disease incidence at 2 and 3 wk after inoculations correlated significantly ($P \leq 0.05$) with cumulative infection rates at day 3 through 12 after inoculation. Significant correlations with disease were also obtained using infection rates computed from data collected by a weather station 47-km to the northwest and another 51-km to the west. These results indicate that the infection rate model identifies periods of weather favorable for rapid disease increase, and that it can be applied to locations distant from weather data collection points.

Evaluation of Physiological and Morphological Variation in Isolates of Cercosporidium personatum from the USA and Thailand. THARMMASAK SOMMARTYA, B. B. SHEW*, and M. K. BEUTE, Univ. of Kasetsart, Bangkok, Thailand and Depts. of Crop Science and Plant Pathology, North Carolina State University, Raleigh, NC 27695.

Six isolates of Cercosporidium personatum from three peanut-growing areas in Thailand and USA isolates from Alabama, Florida, North Carolina, and Texas were individually inoculated on detached leaves of 14 peanut genotypes. Six genotypes were susceptible, moderately resistant, or highly resistant standards currently used in NC leafspot trials. Eight genotypes are Thai standards or are from resistance breeding tests in Thailand. Thai isolates of C. personatum produced more lesions on all genotypes than USA isolates. Thai and USA isolates varied in aggressiveness on susceptible and moderately resistant genotypes. Isolate aggressiveness did not vary on more resistant genotypes; three of four highly resistant genotypes suppressed development of all isolates. Conidial germination for all isolates was greatest at 16-20 C. At 30 and 32 C, 58 and 22% of conidia from Thai isolates germinated, respectively. Only 33 and 6% of conidia from USA isolates germinated at 30 and 32 C. Only Thai isolates germinated at 36 C. Conidia of all isolates had similar lengths and numbers of septa. All isolates produced conidia that were longer and had more septa than previously reported.

Temperature and Relative Humidity Effects on Components of Resistance to Late Leafspot. B. B. SHEW*, J. C. WYNNE, and M. K. BEUTE, Depts. of Crop Science and Plant Pathology, North Carolina State Univ., Raleigh, NC 27695.

Leaves detached from peanut plants having low (NC 3033, Robut 33-1), moderate (GP-NC 343), or high (PI 259747, NC Ac 17133 RF) resistance to late leafspot were maintained in moist sand and inoculated with Cercosporidium personatum. Infection efficiency was greatest on all genotypes when inoculated leaves were exposed for 6 days to 20 or 24 C and at least 12 hr/day of RH >96%. RH periods $\leq$12 hr/day at 28 or 32 C inhibited infection of all genotypes. Genotypes were ranked similarly by infection efficiency at all temperature and RH treatments. Leaves of NC 3033 exposed to constant high RH and 32 C for 1, 2, or 4 days following inoculation became heavily infected, but leaves exposed to 32 C for 6 days did not. After a 4-day infection period at constant high RH and 20 C, leaves of all genotypes incubated an additional 28 days at 20 and 24 C had larger lesions, shorter latent periods, and more sporulating lesions than leaves incubated at 28 or 32 C. Greatest disease development occurred on PI 259747 and NC Ac 17133 RF at 24 C; lesion development and sporulation on resistant lines were greatly inhibited at higher temperatures.

Comparisons of Progress of Late Peanut Leafspot in Florunner, Southern Runner, and UF 81206. T. A. KUCHAREK, G. R. WATSON*, F. M. SHOKES, and D. W. GORBET, Dept. of Plant Pathology, Univ. of Florida, Gainesville, FL, NFREC, Quincy, FL, and Dept. of Agronomy, AREC, Marianna, FL.

Late leafspot, caused by Cercosporidium personatum, was assessed eight times throughout the growing season in three canopy regions in unsprayed plots of Florunner, Southern Runner, and UF 81206. Southern Runner and UF 81206 have been shown to express resistance to late leafspot. Leaf area accumulation was also studied in these same plots and the amount of diseased leaf area (DLA) calculated by multiplying leaf area measurements by late leafspot severity (LLS) expressed as a proportion. Comparisons of late leafspot epidemics among the three genotypes were made by regressing LLS and DLA against time (days after planting) and statistically comparing the resulting regression coefficients. Regressions using untransformed LLS data and LLS data transformed by the Gompertz and logistic transformations showed that within each canopy region late leafspot progressed at a greater rate in Florunner than in Southern Runner and UF 81206. Epidemics of late leafspot in Southern Runner and UF 81206 were shown to be retarded when compared to Florunner using linear regressions of DLA, log DLA, and (-ln(-ln(DLA/10000))) against time (days after planting). From this study we can conclude that the resistance to late leafspot in Southern Runner and UF 81206 reduces the rate of progress of late leafspot epidemics.

Identification of the Components of Resistance in Two Peanut Genotypes. G. R. WATSON*, T. A. KUCHAREK, F. M. SHOKES, and D. W. GORBET, Dept. of Plant Pathology, Univ. of Florida, Gainesville, FL, NFREC, Quincy, FL, and Dept. of Agronomy, AREC, Marianna, FL.

Two peanut genotypes, Southern Runner and UF 81206, that express resistance to late leafspot, caused by Cercosporidium personatum were grown in the field and greenhouse and compared to Florunner for possible components of resistance. Latent period, sporulation amount, sporulation area, and lesion size were compared among genotypes. The median latent period-50 (time from inoculation until 50% of lesions sporulating) was found to be 25 and 35 days for Florunner and Southern Runner, respectively. Throughout greenhouse component analysis experiments, less than 10% of the lesions on UF 81206 supported sporulation. Using fluorescent microscopy on field produced leaves, the size of conidiophore tufts and sporulation area on Southern Runner and UF 81206 were found to be smaller than on Florunner. Fluorescent microscopy also showed a reduced number of lesions with conidiophore tufts on UF 81206 compared with Florunner. Lesions on Southern Runner and UF 81206 were smaller than those on Florunner. These and other components of resistance are responsible for retarding disease progress in Southern Runner and UF 81206.

Development of a Dynamic Threshold Model for Treatment of Cylindrocladium Black Rot of Peanut. J. E. BAILEY* and C. A. MATYAC, Dept. of Plant Pathology, N. C. State University, Raleigh, NC.
A dynamic threshold for the economic benefit of utilizing genetic resistance and chemical control was developed for Cylindrocladium Black Rot of peanut. Regression equations defining yield loss at various levels of disease and the dosage response of metam sodium on disease incidence on a resistant cultivar, NC8C, and a susceptible cultivar, Florigiant, were utilized to calculate the economic benefit of a recommended disease management strategy. Model inputs were the historical yield and disease incidence in fields where a susceptible cultivar was grown without chemical control. Developmental steps included the calculation of projected results given various sets of alternative management decisions such as: a) yield in the absence of disease, b) disease incidence on a resistant cultivar, c) level of disease control using fumigation on a resistant cultivar, d) increase in yield resulting from the use of fumigation of a resistant cultivar as compared to the nonfumigated suscept and, e) the resulting economic gain when fumigation and resistant cultivars are used. The economic gain is then used to determine the cost effectiveness of treatment. Thus, the treatment threshold was based on the historic disease incidence and yield on a per field basis. The information this model provides will allow growers to make preplant disease control management decisions.

Effects of cultural practices on enhancement of Cylindrocladium black rot resistance in peanut. J. R. Sidebottom* and M. K. Beute. Department of Plant Pathology, North Carolina State University, Raleigh 27695.
The use of cultural practices affecting soil temperature and moisture were investigated to determine their effect of Cylindrocladium black rot (CBR) caused by Cylindrocladium crotalariae (Loos) Bell & Sobers in two peanut genotypes: Florigiant (susceptible) and NC 18416 (partially-resistant). Cultural practices included row orientation (north-south or east-west), bed preparation (bedded or flat) and planting date (5-3, 5-17 or 5-31). Soil temperature was measured through the growing season (in row) at a depth of 10 cm. Average initial inoculum density was < 0.1 microsclerotia/g soil. By harvest the percentage of dead and wilted plants was significantly lower in NC 18416 (0.5%) than Florigiant (6.1%). There was a significant bed preparation by genotype interaction. Percent incidence in Florigiant was significantly lower in beded (3.5%) than flat (8.6%) and lower at planting dates 5-17 (4.4%) and 5-31 (3.4%) than 5-3 (10.4%). Soil temperature was slightly higher in bedded than flat plots. Temperature was significantly higher by the second and third planting dates (5-17, 5-31) than in the first (5-3). Preliminary studies indicate that cultural practices which influence soil temperature and effective in reducing CBR severity in peanut.

Transmission of Cylindrocladium crotalariae in Peanut Seed. D. M. PORTER* and R. W. MOZINGO, USDA-ARS and VPI & SU, Tidewater Research Center, Suffolk, VA.

Cylindrocladium crotalariae, the causal agent of Cylindrocladium black rot (CBR) of peanut (Arachis hypogaea), can be frequently isolated from seed (40%) and shells (65%) of freshly dug peanut pods from plants exhibiting symptoms of the disease. However, when pods are harvested and dried to a moisture content of about 8 - 10% and stored at ambient wintertime temperatures (3 to 4 months) C. crotalariae can be isolated but at a low frequency from nondamaged peanut seed (seed size > 16/64 x 1 inch) not treated with a seed protectant. Seed obtained from peanut plants grown in fields in Suffolk, VA, and Martin County, NC, where CBR was severe in 1985 were infested at a frequency of 1.5% and 1.4%, respectively. However, C. crotalariae was not isolated from seed treated with a seed protectant (DCNA + Captan). The fungus was not isolated from seed devoid of testae or seed embryos. However, C. crotalariae was isolated from seed testae at a frequency of 0.4%. Discolored seed (>16/64 inch) were infested at a frequency of about 8.0% but following seed treatment for 2 weeks, the isolation frequency dropped to zero. Discolored seed measuring <16/64 inch were infested with C. crotalariae at a frequency often exceeding 10%.

A Detached Shoot Technique For Evaluating Reaction of Peanut Genotypes to Sclerotinia minor. H. A. MELOUK* and C. N. AKEM. USDA/ARS, Dept. of Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078-0285.

Basal end of fifteen cm long shoot-tips from ten peanut genotypes were immersed individually in Hoagland's solution in 1 x 14 cm test tubes, and supported by foam plugs. All leaves were removed leaving about 1 cm of each petiole on the shoot. A 4 mm mycelial plug of Sclerotinia minor, taken from the periphery of a 2-day old culture grown on potato dextrose agar (PDA), was placed between the stem and a petiole in the middle of the shoot. Tubes with shoots were then placed in a fabricated polyethylene enclosure in a growth chamber at 31 ± 1 C and 25 ± 1 C during the day and night, respectively. Relative humidity (RH) was maintained at 95 to 100% by lining the bottom of the enclosure with wet burlap. Lesions appeared on shoots 3 days after inoculation, and their length was measured at various times. Two weeks after inoculation, tubes were drained, and shoots remained in the chamber at about 60-70% RH to allow sclerotial production. Sclerotia from each shoot were removed and counted, and their viability were determined by germination on PDA. This method is effective in differentiating reaction of peanut genotypes to S. minor.

An Epidemic of Spotted Wilt Disease in South Texas Peanuts in 1985. M. C. Black, P. F. Lummus*, D. H. Smith and J. W. Demski, Texas Agricultural Extension Service, Uvalde, TX 78802-1849 and Pearsall, TX 78061, Texas Agricultural Experiment Station, Yoakum, TX 77995 and Georgia Experiment Station, Experiment, GA 30212.

A high incidence of spotted wilt, caused by tomato spotted wilt virus (TSWV), occurred in runner and spanish market types in Frio and Atascosa Counties, TX in 1985. Spotted wilt was first observed in Texas in 1971. Incidence was low through 1983 and infection was usually observed on field edges. The disease was somewhat more prevalent in 1984. Spotted wilt symptoms in early plantings were seen in April 1985. Increased incidence and severity was associated with progressively later planting dates (March-July). Incidence in many late plantings was 100 percent by September 1985. Symptoms included ringspots, leaf distortion, stunting, bud necrosis, bud proliferation, and occasionally, plant death. Plants with increasingly severe symptoms had fewer and smaller pods. Small and many full size kernels from infected plants had dark red and/or brown mottled testae. Some discolored kernels had irregular narrow white streaks on testae. Western flower thrips (Frankliniella occidentalis (Perg.)), a known TSWV vector, and golden crownbeard (Verbesina encelioides (Cav.) Gray), a known TSWV host, were prevalent after abundant rain from October 1984 through July 1985. Populations of golden crownbeard seemed to be associated with the earliest and most severe spotted wilt. Seeding rates effected by thinning or foliar insecticides did not affect disease incidence, yield or quality under severe disease pressure.

Aiming the Magic Bullet for Sclerotium rolfsii. A. S. CSINOS. Department of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton, GA. 31793.

The necrotrophic nature of Sclerotium rolfsii in vivo has lead to control recommendations including deep turning of crop litter prior to a peanut crop. Observations of S. rolfsii occurring solely on the stem of lupine in the presence of uniform litter across the entire bed suggested that crop residue may be less important than other factors in disease development. Specific tests were initiated to determine the effect of targeting fungicide by reducing the width of chemical application to the center of the peanut row and concomitantly reducing the rates of fungicides. PCNB, PCNB-Lorsban and experimental compounds were equally effective in controlling S. rolfsii and increasing yield when either one quarter the recommended rates in a 10-15 cm band over the center of the row or the full rates in the recommended 40 cm band were used. The pros and cons of this technique of soil-borne disease control in peanut production are discussed.

Summary of On-Farm Trials Evaluating Lorsban for White Mold Suppression on Peanuts. A. K. HAGAN* and J. R. WEEKS, Alabama Cooperative Extension Service, Auburn University, AL 36849.

White mold (Sclerotium rolfsii) suppression on peanuts with the insecticide Lorsban 15G was compared to Terraclor 10G, and Terraclor 10G + Lorsban 15G. Treatments were applied at mid to late pegging in fields with histories of white mold. Disease loci counts were made after the peanuts were inverted. Only results from farms with serious white mold damage (≥ six hits per 30 m row) were included in the statistical analysis. During the four year study, disease loci counts in the Lorsban, Terraclor, and Terraclor + Lorsban treated plots were significantly lower than those in the untreated controls. Treatments containing Terraclor + Lorsban generally gave the best disease suppression and yield response. Differences in disease loci counts between Lorsban and Terraclor were minimal. However, Terraclor increased yield significantly over the untreated controls three years while Lorsban increased yield only one year. In addition, Terraclor significantly outyielded Lorsban two of four years. Despite similarities in white mold suppression, yield response from Terraclor was more consistant from year to year than Lorsban.

Effects of Tillage and Wheat Straw Mulch on the Germination and Incidence of Sclerotium rolfsii in Peanuts. D.L.COLVIN *, B.J.BRECKE, F.M.SHOKES, and D.G.SHILLING, University of Florida, Gainesville, FL 32611.

Field experiments were conducted in 1984 and 1985 at Quincy, FL and Branford, FL to evaluate the effects of variation in primary tillage and the incidence of Sclerotium rolfsii in peanuts (Arachis hypogaea L.) Tillage systems included; conventional tillage, strip-tillage and no-tillage. Plots established in 1984 at Quincy, FL were inoculated with laboratory grown sclerotia while 1985 studies in Branford, FL were established under grower conditions in an experimental area known to be previously infested with S. rolfsii. Data taken included S. rolfsii hit counts per 25' linear row and peanut yields. 1984 field results indicate S. rolfsii occured more frequently within conventional tillage plots than strip-tillage or no-tillage treatments. Peanut yields reflect the same trends as do S. rolfsii hit counts with conventional, strip and no-till yielding 3029, 4143, and 3370 kg/ha respectively. However, 1985 irrigated data show S. rolfsii to occur more frequently under strip-tillage while the disease occurrence was less in conventional tillage and no-tillage plots. A dryland study in 1985 at Branford showed S. rolfsii hit counts to be greater as tillage was varied from conventional, to strip-tillage respectively. Although hit counts varied, peanut yields were not significantly affected in the irrigated or dryland study in 1985. Laboratory studies have been initiated in early 1986 to determine if leachates from wheat straw may have a significant effect on the germination of sclerotia, and therefore, incidence of S. rolfsii in strip or no-till peanuts. Hypothesis and results from these studies will also be discussed.

Characterization of Partial Resistance to Sclerotium rolfsii in Field, Greenhouse, and Microplots. M. K. BEUTE, B. B. SHEW*, and J. C. Wynne, Depts. of Plant Pathology and Crop Science, North Carolina State Univ., Raleigh, NC 27695. Three of 12 peanut genotypes evaluated in the field in 1984 and 1985 had partial resistance to Sclerotium rolfsii. Resistant genotypes had fewer disease loci and lower plant mortality than susceptible genotypes. Two resistant genotypes (NC 2 and NC Ac 18016) have upright canopies, and one (NC Ac 17941A x Florigiant) has a spreading canopy similar to susceptible genotypes. In the greenhouse, moist soils at 28 C and high humidity near the soil surface were highly conducive to disease development. NC Ac 17941A x Florigiant had fewer lesions than the other resistant genotypes in the greenhouse. In microplots, fewer sclerotia were recovered after NC 2 was grown compared to the other resistant lines. Physiological and phenological components of resistance to S. rolfsii were expressed in different genotypes in field, greenhouse, and microplot evaluations.

Use of Monoclonal Antibodies (MCA) for Detection of Peanut Mottle Virus (PMV). J. L. SHERWOOD*, M. R. SANBORN, and H. A. MELOUK. Dept. of Plant Pathology Dept. of Botany and Microbiology, and USDA-ARS, Oklahoma State Univ., Stillwater, OK 74078-0285.

MCA produced against an isolate of PMV from wild peanut were tested for detection of other strains of PMV and for the detection of PMV in naturally infected field material. Anti-PMV MCA (Phytopathology 75:1358) were used in a double sandwich ELISA to test for reaction to seven isolates of PMV (provided by C. W. Kuhn) maintained in pea (cv. Little Marvel). ELISA plates were coated with anti-PMV rabbit IgG, followed by samples, then MCA, and by alkaline phosphatase linked anti-mouse IgG. The MCA reacted to all isolates of PMV. Different ELISA formats were tested for detection of PMV. Plates were coated with anti-PMV rabbit IgG or anti-PMV MCA, followed by samples, then either alkaline phosphatase linked anti-PMV rabbit IgG, alklaine phosphatase linked anti-PMV MCA, or anti-PMV MCA followed by alkaline phosphatase linked anti-mouse IgG. The combinations using anti-PMV rabbit IgG and anti-PMV MCA proved the most satisfactory. The use of MCA for detecting PMV in field grown plants gave better results compared to a double sandwich ELISA with only rabbit serum.

Occurrence of Peanut Mottle Virus on Peanut in Egypt. M. K. ABO-EL-DAHAB, E. H. WASFY, M. A. EL-GOORANI, H. M. EL-KASHEIR, E. E. WAGIH, and H. A. MELOUK*. Dept. of Plant Pathology, College of Agriculture, Univ. of Alexandria, Egypt and USDA/ARS, Dept. of Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078-0285.

Many virus-like symptoms commonly seen on peanut grown in the field are not mechanically transmissible, and are not considered to be caused by viruses. The most commonly observed symptom, mottling accompanied by upward leaf rolling, is caused by peanut mottle virus (PMV). An isolate associated with the above symptoms has been isolated and termed the Alex-isolate. This isolate gave characteristic symptoms on selected host range, and when physically characterized using bean variety Topcrop as a local lesion host, it was found to have a dilution end point between $10^{-3}$and 10^{-4}, thermal inactivation point between 60 and 65°C, and longivity in vitro for 96h at 25C. The virus was purified and the molecular weight of its coat protein monomer was estimated to be 35,500 daltons on SDS-discontinuous polyacrylamide gel. The Alex-isolate reacted with antiserum to an isolate of PMV from wild peanut (Sherwood; Peanut Science 11:40-42) in ring-interfacial tests. The Alex-isolate was compared to isolates of PMV from other countries.

(See paper page 13)

Antagonistic activities of an unidentified fungus against Thielaviopsis basicola in culture. S. W. BAARD and G. D. C. PAUER*, Department of Plant Pathology, University of the Orange Free State, South Africa.

An unidentified fungus recovered from groundnut pods showed antagonistic activities against Thielaviopsis basicola in culture. The hyperparasite grew over colonies of the host and prevented further growth. Hyphae and endoconidia became lysed shortly after contact. Penetration of these structures was observed, but endoconidia remote from invading hyphae also lost viability, indicating that enzymes and/or antibiotics may be involved. Young, infected chlamydospores of T. basicola became deformed and did not reach maturity. Invading hyphae attached to mature chlamydospores apparently killed some of them. However, when infected chlamydospores were stimulated to germinate by placement on carrot disks, germ tubes from the remaining viable chlamydospores were quickly lysed. Some chlamydospores escaped parasitism by the hyperparasite and formed new colonies.

Peanut Response to 1,3-D in Meloidogyne arenaria and Sclerotium rolfsii Infested Soil. N. A. MINTON* and A. S. CSINOS. USDA, ARS and Department of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

Rates and methods of applying 1,3-D were evaluated on Florunner peanuts in 1984 and 1985. Rates of 21.5 kg ai/ha, 31.2 kg ai/ha, 41.7 kg ai/ha, 52.1 kg ai/ha, 62.5 kg ai/ha and 93.7 kg ai/ha were included in one or more experiments. The 1,3-D in two experiments in 1984 was applied at planting 25.4 cm deep in the moldboard plow sole (MPS) with injection lines spaced either 20.3 cm or 40.6 cm apart laterally. In another 1984 experiment, 1,3-D was applied 8 days preplant in the MPS with 40.6 cm lateral spacing. In 1985, 1,3-D was applied 11 days preplant injected 30.5 cm deep in the row or applied in the MPS spaced 40.6 cm laterally. Treatments were stripped 6 rows wide and divided into 4 and 5 replications in 1984 and 1985, respectively. Distance of lateral placement of 1,3-D in the MPS had no effect on yield but significant ($P=0.05$) increases were obtained for most rates in both experiments. In one of the experiments, 52.1 kg ai/ha increased yields 1700 kg/ha or 42% and in another experiment 41.7 kg ai/ha increased yields 1508 kg/ha or 41%. In the 1984 preplant experiment, only the 62.5 kg ai/ha rate increased yields (959 kg/ha or 19%). In 1985, preplant injected 1,3-D at 52.1 kg ai/ha and MPS applied 1,3-D at 52.1 kg ai/ha, 62.5 kg ai/ha and 93.7 kg ai/ha increased yields. The 93.7 kg ai/ha rate increased yields 1427 kg/ha or 45%. Yields in all experiments were negatively correlated ($P=0.0001$) with root-knot indices but were not correlated with the incidence of S. rolfsii.

Rapid Analysis of Peanuts and Peanut Products by Enzyme Immuno Assay for Aflatoxin. B. P. RAM[2], L. P. HART[1]*, J. J. PESTKA[2], R. J. COLE[3], and B. M. MILLER[4]. Depts. of Botany and Plant Pathology[1], and Food Science and Human Nutrition[2], Michigan State Univ., E. Lansing, MI 48824; National Peanut Res. Lab[3], USDA, AES, Dawson, GA 31742; and Neogen Corp.[4], 620 Lesher Place, Lansing, MI 48912.

A simple procedure was devised for the routine screening of Aflatoxin B_1 in peanuts and peanut butter using enzyme-linked immunosorbent assay (ELISA). Samples of peanut butter were spiked with Aflatoxin B_1 and extracted by blending with 25 ml of 55% methanol and 10 ml hexane. The extract was filtered and aqueous filtrate analyzed by a direct competitive ELISA. Recovery of Aflatoxin B_1 added to peanut butter samples ranged from 85-112%, with a mean recovery of 97%. Coefficient of variation between test wells in the assay was 18.4%. Using this procedure, only 3 of 63 commercial samples of peanut butter showed detectable Aflatoxin B_1 (>5.0 ng/g).

DEPRESSION OF AFLATOXIN PRODUCTION BY FLAVONOID-TYPE COMPOUNDS FROM PEANUT SHELLS

by Anthony DeLucca*1/, Muriel Palmgren 2/, and Donald Daigle 1/. 1/ Southern Regional Research Center, USDA, New Orleans, LA, and 2/ School of Public Health and Tropical Medicine, Tulane School of Medicine, New Orleans, LA

Peanut shells contain three compounds, luteolin, eriodictyol, and 5,7-dihydroxychromone. In a published report the concentration of these compounds were stated as 0.8, 0.18, and 0.24g, respectively, per 1000 g of shells. Work in our lab indicates the concentrations vary with cultivar, location, and maturity of the plant. The individual flavonoid-related compounds, as well as a mixture of these compounds, were tested to determine whether they would affect aflatoxin production. Adye and Mateles broth medium (50 ml) was amended with 0.01, 0.02, and 0.06 mg/ml of the individual and mixed compounds, inoculated with 0.1 ml of an Aspergillus parasiticus spore suspension ($1x10^{10}$ spores/ml) and incubated at 27 C. At 4, 7, 11, and 14 days after inoculation, the mycelium was removed, dried, and weighed. The medium was extracted and quantitated for aflatoxin. No difference in the mycelial weights was observed between the controls and amended cultures. However, each individual compound at all concentrations depressed aflatoxin production as compared to the controls. The mixture of the compounds reduced aflatoxin levels to 5 per cent or less of the controls.

FARMERS' PLANTING SEED AS A SOURCE OF INOCULUM FOR ASPERGILLUS FLAVUS AND A. NIGER ON GROUNDNUT IN SENEGAL.

J. P. Stack*[1], A. Ba[2], and R. E. Pettit[1]. Texas Agricultural Experiment Station, Department of Plant Pathology & Microbiology, College Station, Texas 77843, and [2] Institut Senegalais de Recherches Agricole, Kaolack, Senegal.

From 24 farms throughout Senegal, 27 samples of seed for planting were collected, cleaned of debris, plated (100 seed/sample) on a nutrient medium containing antibiotics, and observed after 5-7 days incubation at 25 C. The level of contamination ranged from 23 to 97% (median = 65%) and 35 to 100% (median = 90%) for A. flavus (AF) and A. niger (AN), respectively. Additional seed from the same samples were surface sterilized (15 sec. in 70% ethanol followed by 2 min. in 5% bleach solution) prior to plating (50 seed/sample) and incubated at 35°C. The level of contamination in surface sterilized seed ranged from 0 to 50% (median = 6%) and 0 to 98% (median = 40%) for AF and AN, respectively. Both species were isolated from blemished and nonblemished seed. Other species isolated were: Penicillium spp., 0-73% and 0-8%; Macrophomina phaesolina, 0-5% and 0-28%; Fusarium spp., 0-4% and 0-6%, Mucoraceous spp., 0-89% and 0-12%; and Aspergillus spp. (glaucus group), 0-20% and 0-72% for nonsurface sterilized and surface sterilized seed, respectively. Soil was sampled at some of the same farms to determine, by dilution plating, the populations of Af, and AN prior to planting. Colony forming units/gram of soil ranged from 0 to 67 (median = 2) and 0 to 27 (median = 4) for AF and AN, respectively. The data support the hypothesis that the seed for planting can be an important source of AF and AN inoculum for groundnut in Senegal. It may also be an important source of M. phaseolina inoculum.

Incidence of Aspergillus flavus and Aspergillus niger in peanut pegs, immature pods, and kernels. R. E. Pettit, C. L. Martin, and O. D. Smith. Departments of Plant Pathology and Microbiology and Soil and Crop Sciences, Texas Agricultural Experiment Station, College Station, TX 77843.

Peanut pegs, immature pods, and kernels of 30 cultivars were harvested periodically from field plots during the growing season, surface sterilized, and plated on Griffin's medium. Aspergillus flavus and A. niger were recovered from 0.35% and 1.5%, respectively, of the aerial pegs. After pegs entered the soil, recovery rates increased to 8.1 and 7.2%. After immature pods had developed to 10-15 mm in length, the recovery of A. flavus and A. niger was 12.9 and 13.2%, respectively. Recovery of these fungi from mature kernels averaged 2.9 and 4.3%. Differences in cultivar susceptibility to A. flavus and A. niger were observed. Plant parts from Florunner and Tamnut-74 were infested more frequently than other cultivars. Kernels from PI 337409 contained a relatively high incidence of these fungi; those from the Toalson variety a low incidence. In addition, plant parts from several cultivars developed in the breeding programs in Georgia and Texas contained a low incidence of these fungi. Thus, the selection of peanut cultivars for use in the Aspergillus resistance-breeding program should consider plant types with parts that resist invasion early in the growing season.

Peanut Disease Loss Estimates for Major Peanut Producing States in the United States for 1984 and 1985. R. V. Sturgeon, Jr., Department of Plant Pathology, Oklahoma State University.

Disease continues to be a major factor in suppression of the yield potential of peanuts. Peanut disease loss estimates from ten states ranged from 5.25% reported by New Mexico in 1984 to 27.15% reported by Oklahoma in 1985. Disease severity varies between infection sites, fields and states because the severity of disease is dependent on several environmental factors interacting with one another and affecting both pathogen and peanut plant simultaneously. How much of this multi-million dollar loss could have been prevented is unknown, yet much of this loss could have been reduced by properly using available disease control practices. Early and late peanut leafspots, caused by Cercospora arachidicola and Cercosporidium personatum, accounted for the greatest yield losses and was reported to be most severe in Florida. Losses to Southern blight, caused by Sclerotium rolfsii, were reported to be as great in many states as those caused by nematodes. The pod and root rot disease complex caused as much damage as in past years. Seedling diseases continue to be a problem, but it is difficult to correlate loss in stand with yield loss. Sclerotinia blight, caused by Sclerotinia sclerotium and S. minor, continued to be a serious problem in Virginia, North Carolina, Oklahoma and Texas. Pythium wilt reported by Virginia and Rhizoctonia peg, stem, and foliar damage reported by Oklahoma are diseases that should be recognized. Estimating disease losses is difficult because of the many factors that influence diseases and yields. However, loss estimates can be reliable when proper techniques are used such as field monitoring programs, disease control trials, crop reporting service and surveys. Accurate disease loss estimates alert agricultural scientists, stimulate needed research and make the public aware of existing problems.

(See paper page 24)

Foliar Disease Assessment

Assessment of Late Leafspot and Rust. ICRISAT Methods. D. H. SMITH, Texas A&M University System, Texas Agr. Expt. Sta. at Yoakum.

Subrahmanyam et al. described disease assessment methods for late leafspot and peanut rust (1982. Peanut Science 9:6-10). The nine-point field scale for late leafspot is: (1) No disease, (2) Few, small necrotic spots on older leaves, (3) Small spots, mainly on older leaves, sparse sporulation, (4) Many spots, mostly on lower and middle leaves, disease evident, (5) Spots easily seen on lower and middle leaves, moderately sporulating, yellowing, and defoliation of some lower leaves, (6) As rating 5, but spots heavily sporulating, (7) Disease easily seen from a distance, spots present all over the plant, lower and middle leaves defoliating, (8) As rating 7 but more severe defoliation, (9) Plants severely affected, 50-100% defoliation. The scale for peanut rust is: (1) No disease, (2) Few, very small pustules on some older leaves, (3) Few pustules, mainly on older leaves, some ruptured, poor sporulation, (4) Pustules small or large, mostly on lower and middle leaves, disease evident, (5) Many pustules, mostly on lower and middle leaves, yellowing and necrosis of some lower and middle leaves, moderately sporulating, (6) As rating 5 but pustules heavily sporulating, (7) Pustules all over the plant, lower and middle leaves withering, (8) As rating 7, but withering is more severe, (9) Plants severely affected, 50-100% leaves withering.

Distinguishing between moderate and heavy sporulation of the late leafspot and peanut rust fungi is sometimes difficult when assessment is done in the field. In greenhouse experiments on assessment of late leafspot, lesion diameter, percentage defoliation, and sporulation were highly significantly correlated with the ICRISAT field assessment method. In some areas several foliar diseases including early leafspot, late leafspot, rust, and web blotch occur in the same field. Perhaps an assessment of remaining green leaf area would be useful to determine the combined effects of multiple foliar diseases.

An Objective Disease Assessment Method for Evaluating Leafspot in Runner Peanuts. M. A. CRAWFORD* and P. A. BACKMAN, Dept. of Plant Pathol., Alabama Agric. Exp. Sta., Auburn Univ., AL 36849.

Peanut leafspot caused by Cercospora arachidicola and Cercosporidium personatum has been evaluated in fungicide screening trials on Florunner for several years in Alabama using an objective rating method. Disease determinations were made on 5 or 10 central stems systematically cut off at ground level throughout the two center rows of each plot. For each stem, the following information was recorded: total leaflets = nodes X 4; percent defoliation = [(leaflets lost) / (total leaflets)] X 100; percent infection = 100 X (leaflets lost + leaflets infected) / total leaflets. Mean values for the plot were developed by averaging the scores for the individual stems. Critical point disease values were determined 15 ± 4 days before harvest. Critical point models (135 days p.p.) for estimating yield loss due to leafspot were highly significant and had an average r^2 of 0.70 for percent defoliation and 0.62 for percent infection over 4 years. In 1984 and 85, disease assessment was determined every 14 days beginning approximately 90 days post-plant. When estimating yield in a time-series model, the area under the disease progress curve was a better indicator of yield loss from leafspot (r^2 = 0.80) than the critical point model. This type of destructive sampling is very accurate in runner peanuts and has very little effect on yield. However, this method may not be suitable for bunch-type peanuts.

The Canopy Layer Method for Assessment of Peanut Leafspot Diseases.

F. M. SHOKES* and R. D. BERGER, NFREC, Rt. 3, Box 4370, Quincy, and Dept. of Plant Pathol., Univ. of Florida, Gainesville.

The canopy layer method described herein is a modification of that developed by Plaut and Berger (Peanut Sci. 7:46-49). This can be a very accurate technique of disease assessment and is especially useful when monitoring disease progress. It involves dividing the canopy into three hemispherical layers, assessing percent necrotic area in each layer, and evaluating defoliation in each layer. A standard leafspot diagram has been developed to assess the percent necrotic area. Disease severity for each layer may be determined by

$$X_c = \{](1-d) * X_v] + D\}$$

in which X_c = disease severity for a given canopy layer; d = proportionate defoliation for a given layer, and X_v = proportionate necrotic area for a given layer. The total disease severity (%) is then computed for the entire canopy of a plant by

$$\text{Disease Severity (\%)} = \frac{X_b + 3X_m + 5X_t}{9} \times 100\%$$

in which $X_b = X_c$ for the bottom canopy, $X_m = X_c$ for the mid canopy, and $X_t = X_c$ for the top canopy. The total is a weighted average for the three canopy regions based on the approximate value of the photosynthetic area of that canopy region. This assessment may be done for three to 10 plants in a plot and an average may be taken for the plot.

Monitoring Pathogen Stress with a Hand-held, Multispectral Radiometer.

F. W. NUTTER, JR., Dept. of Plant Pathology, Univ. of Georgia, Athens 30602.

Methods to assess pathogen stress in agricultural crops should be fast, accurate, and reliable. Accuracy and reliability can be achieved using visual disease assessment schemes but this is often achieved at the expense of increasing sample size (as well as time and money). By measuring and recording the amount and quality of sunlight reflected from small grain and/or peanut canopies and then relating these values to yield, approximately 11 to 15% more of the total variation in yield of these crops could be explained by reflectance measurements compared to models based upon visual estimates of pathogen stress. Reflectance measurements could be used to develop critical, multiple and/or area under the reflectance curve models in one-twentieth the time it takes to gather and process visual assessments. Variances among and within assessors was less using a radiometer compared to assessors using standard area diagrams as a means to estimate pathogen stress. The use of different narrow-band wavelengths to identify specific stress agents (fungi, viruses, nematodes, drought, etc.) may prove useful in the development of artificial intelligence systems to diagnose and quantify pathogen stress.

Need for Rapid and Accurate Methods of Assessing Peanut Foliar Diseases.
R. H. LITTRELL, Plant Pathol. Dept., Univ. of Georgia, Coastal Plains Exp. Sta., Tifton, GA 31793.
There is a need to assess leaf spot severity in plants and breeding nurseries, fungicide screening tests, and cultural practices. There is also a need to use accurate methods in development of plant growth models and to describe epidemics in forecasting programs. Presently there is no widely accepted method which needs the criteria of all individuals involved in assessing foliar diseases. The development of a standard method would be beneficial to research and extension personnel and chemical industry representatives. Improved communication among the groups would be enhanced and more rapid progress in developing disease resistant genotypes or more effective chemical compounds for leaf spot control would result. The method must be easily understood by all user groups and must reflect accurately the actual disease level and intensity. The purpose of this discussion session is to present the currently used methods and as an outgrowth of this meeting discuss a standard method that can be validated in field research plots.

Leafspot Disease Assessment in Breeding Programs.
D. W. GORBET*, A. J. NORDEN, F. M. SHOKES, D. A. KNAUFT, K. V. PIXLEY, and G. R. WATSON; Univ. of Florida, Agric. Res. and Educ. Center, Marianna; Dept. of Agron., Gainesville; N. Florida Res. and Educ. Ctr, Quincy; Dept. of Agron. and Dept. of Plant Pathol., Gainesville.
Breeding for resistance to leafspots (Cercospora arachidicola and Cercosporidium personatum) is a major objective in many peanut breeding programs around the world. A rapid and accurate screening and/or assessment technique for leafspot resistance is needed by breeders. Florida has used several methods, including a 1-10 subjective scale (1 = no disease - 10 = plants dead), 0-9 scale (0 = dead - 9 = no disease), lesion counts, lesion size, % necrosis (per leaflet and in leaf canopy layers), LAI (leaf area indexes), % defoliation, and sporulation indexing. In routine nurseries and yield tests, the subjective scales have been used most often since they are the easiest and fastest to use for large numbers of plots. These subjective ratings offer little or no information on mechanism(s) of resistance but have proved to be successful when employed in conjunction with overall agronomic assessment. The recently released 'Southern Runner' was developed using this method. A method(s) that is fast and accurate and helps identify the mechanism(s) of resistance is needed.

Industry's Needs for the Methods of Evaluation of Foliar Peanut Diseases.
R. F. NASH, Mobay Corporation, Tifton, Georgia 31793.
The concerns and needs of the commercial fungicide industry will be presented. Suggestions will given for standardization of the evaluation criteria in order to be more useful and meaningful from industry's point of view: the type of data needed; the ability to compare evaluation data across the peanut belt and the sensitivity of the evaluation methods when converted to per cent control.

Disease Assessment Methods Needed to Develop and Validate Interactive Crop-Disease Simulation Models. K. J.BOOTE* and R. D. BERGER, Univ. of Florida, Gainesville, FL 32611.
Objectives for developing interactive crop-disease models are to predict disease development and to predict crop growth and yield in response to weather and disease effects. To develop such models at the mechanistic level will require more specific disease assessment methodology. At least some researchers will need to study individual tagged leaves in field or controlled environments to follow foliar disease development (infection, percent necrosis, number of lesions/area, variable incubation period [days to visible disease appearance after inoculation], sporulation rate, and days to leaf abscision) as a function of environment, inoculum load, leaf age, and plant age. Disease assessment methodology to develop and test a crop-disease simulation model at the field level will need to consider the consensus of disease in the whole canopy, not just at a few upper leaves. Assessment methodology should also consider crop aspects of growth stage, total canopy leaf area, cultivar differences in assimilate allocation to foliage growth, and cultivar differences in maturity. Necessary information on foliar diseases to validate field-level crop-disease simulators can be obtained by sampling 4 to 5 main stems per plot at 14-day (or less) intervals for: 1) total main axis nodes produced (V stage), 2) number of leaflets missing, and 3) percent necrotic area of leaflets at defined node positions up and down the stem. From such a systematic disease sampling method, one can compute the overall effect on healthy versus diseased LAI and the effect of leaf position and leaf age on disease development. Both of these capabilities would be needed in a crop-disease simulator which considers leaf age structure (leaf cohorts) and considers healthy LAI effect on canopy photosynthesis.

Extension and Industry

Methods of Conducting Extension Pest Management On-Farm Demonstrations in Alabama.
J. Ronald Weeks* and Austin Hagan, Alabama Cooperative Extension Service, Wiregrass Experiment Station, Headland, AL 36345 and Auburn University, AL 36849.

For the last six years in Alabama, cooperative on-farm demonstrations have been conducted by Extension Pest Management group members in the areas of peanut disease, nematode and insect control. These demonstrations are conducted in such a way, not only to demonstrate to growers the current technology, but also to evaluate pesticides prior to registration. This allows extension specialists to better advise growers on use of materials when labeled. Standard methods and materials have been adopted for these demonstrations during the establishment, observation and harvesting phases to allow multi-year comparisons of the data obtained and to increase its reliability. This paper will highlight these standardized procedures (methods, materials, equipment) citing specific examples and results.

Advances in Formulation Technology Applied to Chlorothalonil. J. R. FRENCH* and G. W. HARRISON, Fermenta Plant Protection Company, Concord, OH, and Albany, GA.

An optimized formulation of chlorothalonil has been developed, which demonstrates more effective leafspot control and yield protection in peanuts and other crops. Greater tenacity of chlorothalonil residues, as measured under artificial rainfall, may account for increased effectiveness under field conditions. During field studies conducted in 1985, peanut yields in five southeastern states averaged 11% (448 lbs/acre) higher in plots treated with BRAVO® 720 than in those where BRAVO 500 was applied. BRAVO 720 is now available for agricultural use in the United States and some Latin American countries. Other experimental formulations of chlorothalonil, incorporating further improvements in resistance to weathering, are being tested during the 1986 season.

Tolclofos-methyl (Rizolex) Use in Control of Sclerotium rolfsii, Rhizoctonia solani, and Sclerotinia minor in Peanuts. R.H. NEILL* and D.H. WILLIAMSON, Sandoz Crop Protection Corp., 4101 Fairgreen Drive, Marietta, GA 30067, and 4705 Fallswood Place, Raleigh, NC 27612.

Tolclofos-methyl shows promise as a fungicide for use in controlling peanut pathogens. Data from three years of testing conducted throughout the peanut belt show that tolclofos-methyl provides excellent protection from diseases caused by Sclerotium rolfsii and Rhizoctonia solani. Test results showing activity against Sclerotinia minor also are discussed. An EUP is being pursued in 1986.

Ridomil® PC A New Fungicide For The Control of Peanut Pod Rot. H. V. MORTON*, A. MCMAHON and R. SMITH. CIBA-GEIGY Corporation, P. O. Box 18300, Greensboro, NC 27419.

Ridomil PC 11G is a newly registered fungicide containing 1% metalaxyl and 10% PCNB. Ridomil PC will control pod rot caused by both Pythium spp. and Rhizoctonia solani. For best results, Ridomil PC should be used in a program with cultural practices that aid in the control of pod rot. Where pod rot is a problem, the use of Ridomil PC has resulted in significant increases in peanut yield and quality.

An Evaluation of Twelve Herbicide Systems on Peanut Weed Control, Yield, and Grade. John HARDEN* and A. H. ALLISON, BASF Corp., Raleigh, N. C. 27612 and VPI & SU, Suffolk, VA 23437.

Through on farm studies, peanut weed control systems were evaluated in Southeastern Virginia. Two locations, (Suffolk and Southampton Counties) were established to compare twelve weed control systems for season long weed control, cost per acre, and crop value per acre. Weed control systems evaluated ranged from a pre-plant incorporated plus at plant surface blend plus at-crack plus layby (i.e. Vernam plus Lasso plus Dyanap plus Lasso) to an at-crack plus post-emergence as needed (i.e. Dyanap plus Dinitro plus Basagran plus Blazer plus Poast). Season long weed control was good with all herbicide systems. No significant differences in yield or value per acre were observed. Cost per acre of the various weed control systems in the two studies ranged from $16.69 to $44.50. To the grower, this reflects a potential return of $27.81 per acre for grower management of weeds as needed post-emergence.

Effects of TILT® (Propiconazole), Terraclor (PCNB), and RIDOMIL® PC™ (Metalaxyl + PCNB) on Sclerotium rolfsii of Peanuts. H. Ray SMITH* and T. A. LEE, CIBA-GEIGY Corporation, Greensboro, NC, and Extension Plant Pathologist, Texas A&M University, Stephenville, TX.

Sclerotium rolfsii, the cause of southern stem rot, is one of the most destructive pathogens of peanuts. In Texas and Oklahoma, S. rolfsii costs the peanut producer approximately 15 million dollars annually. Terraclor has been used for many years for its control; however, in recent years it has provided less than satisfactory control, suggesting possible tolerance to the organism. Trials were initiated at four locations in Texas to determine the optimum rate, timing, and method of application for its control. Two row plots, 30 m long, were arranged in a randomized complete block design with a minimum of three replications. TILT, Terraclor, and RIDOMIL PC were applied at 0.4 to 1.3 kg/ha, 6 to 11.1 kg/ha, and 6 to 11.1 kg/ha, respectively, at early pegging and 14 days later. Disease ratings were made before and after the peanuts were inverted. Plots were harvested with a field combine and yields calculated. Results indicated that timing and a split application treatment affected performance of all products.

FLUTOLANIL: An Effective New Fungicide for Control of Sclerotium rolfsii and Rhizoctonia solani on Peanuts. W. K. TAYLOR, Nor-Am Chemical Company, Tifton, GA 31794.

SN 84364 (flutolanil), a new fungicide under development by Nor-Am Chemical Company, was originally discovered and synthesized by Nihon Nohyaku, Tokyo, Japan. It is a systemic fungicide exhibiting both protective and curative properties against most Basidomycetous plant pathogens. On peanuts, flutolanil 50 WP demonstrates excellent activity for controlling Sclerotium rolfsii and Rhizoctonia solani when applied as a foliar spray at rates of 1.4 - 2.8 kg ai/ha over the row at pegging. Long residual activity and curative capability should make this product a candidate for either early or late application as desired. Flutolanil might also be tank mixed with Cercospora leaf spot treatments for once over application.

Quality Symposium

Peanut Quality: Effects of Amino Acid and Carbohydrate Composition on Roasted Flavor. H. E. PATTEE* and C. T. YOUNG. USDA-ARS and Botany and Food Science Departments, North Carolina State University, Raleigh, NC 27695.
In 1981, 51.7% of the total supply of shelled peanuts and 68.3% of the edible stock in the U.S. were roasted before processing and consumption. Roasting of the peanut can thus be considered a major processing factor. However it is the composition of the peanut at the time of roasting which provides the precursors that determine if the flavor generated is the one so unique and widely enjoyed or one that is less desirable or unpleasant. Peanut processors to a large degree base the value of their raw peanut commodity on size, thus within this presentation we will discuss relationships between screen size and roasted peanut flavor precursors. Amino acids and carbohydrates are the primary precursors of both atypical and typical roasted peanut flavor therefore change within individual amino acids and carbohydrates and/or selected combinations will be discussed in relation to flavor evaluation data. Evaluation of duplicate peanut butter samples by a 41-member consumer panel and a professional taste panel will also be discussed. Conclusions regarding the selection of screen sizes for virginia-type peanuts to reduce the presence of atypical roasted peanut flavors will be given.

Predicting Peanut Maturity Using Near Infrared Reflectance. T. B. WHITAKER*, H. E. PATTEE, USDA-ARS, W. F. MCCLURE, Professor, and J. W. DICKENS, USDA-ARS, Biological and Agricultural Engineering Department, N. C. State University, Raleigh, North Carolina 27695-7625.
The use of near infrared (NIR) spectroscopy to measure peanut maturity was investigated. NC6 virginia-type peanut kernels were divided according to kernel diameter into 10 groups. Kernels with diameters between 12/64 and 15/64 inch were in the group with the smallest kernels and kernels with diameters greater than 24/64 inch were in the group with the largest kernels. Because all peanuts were grown on the same plants, kernel diameter was assumed to be a relative indication of maturity. The NIR reflectance from 900 to 2600 nm was measured for 100 samples in each of the 10 maturity classes. The spectral curve, consisting of 1700 reflectance values, was smoothed and the second derivitive at each wavelength was computed. Using 50 derivitive spectra from each of the 10 maturity classes and multiple linear regression techniques, a calibration equation was developed where the maturity class was shown to be a function of the second derivitive of reflected energy at 10 specific wavelengths. The resulting calibration equation with the 10 wavelengths had a coefficient of determination of 0.953. Using the calibration equation, the maturity class of the remaining 500 samples was predicted with a standard error of prediction of 0.600.

Peanut Grading and Quality Evaluation. J. W. DICKENS*, U. S. Department of Agriculture, Agricultural Research Service, N. C. State University, Box 7625, Raleigh, NC 27695-7625.
Grade factors for farmers stock peanuts are designated by the Agricultural Stabilization and Conservation Service (ASCS) of the U. S. Department of Agriculture (USDA) and are used for price support purposes. Peanut growers and commercial buyers of peanuts use the grades as a guideline for trading. U.S. Standards have been established for shelled runner-type, spanish-type, and virginia-type peanuts and for cleaned virginia-type peanuts in the shell. The Southeastern Peanut Association has established additional grades for shelled runner-type peanuts. These standards and grades are used as a basis for trading in milled peanuts. Regulations related to the control of aflatoxin in peanuts are specified by the Peanut Administrative Committee (PAC) which administers the USDA Peanut Marketing Agreement. Peanuts are graded by the Federal-State Inspection Service (FSIS), which consists of individual state organizations under the supervision of the Agricultural Marketing Service (AMS) of the USDA. The FSIS also performs services related to the PAC aflatoxin control program. It is supported by fees charged for its services and will make other quality determinations specified by a financially interested party whenever it is capable of making the determinations and when necessary additional fees are paid.

Shelling Edible Peanuts for Quality and Marketability. G. M. GRICE, Vice President and Southwest Operations Manager, Birdsong Peanuts, Gorman, Texas 76454.
Shelling for Quality is defined as the ability to mill farmers stock peanuts into a finished product that 1) is free of foreign material, 2) has the desired count per ounce, 3) rides and falls through the prescribed screen for that grade, 4) meets USDA and Customer specifications on grade factors, 5) is free from aflatoxin and 6) has a good flavor. In order to accomplish the Quality Shelling and to successfully produce a quality product, the shelling process encompasses many operations that includes receiving, precleaning, shelling, screening, separating, sorting, sizing and packaging.

Peanut Blanching - Processing, Utilization and Effects on Quality and Product Shelf Life. W. A. PARKER, Seabrook Blanching Corporation, Edenton, NC 27932.

The types of blanching are reviewed with an explanation of the various methods of blanching including spin, buff, water and split-nut blanching. Data on the specifications and various applications for each type of blanching are reported. Product applications including oil roasting, dry roasting, reduced calorie peanuts, and peanut flour are reviewed for each type of blanching. Analytical data, typical yields and studies on shelf life tests are presented.

Peanut Quality in Curing and Storage. T. H. SANDERS*, J. S. SMITH, JR., and P. D. BLANKENSHIP, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Possibly, the greatest potentials for peanut quality deterioration exist in the handling processes commonly called curing and storage. Quality maintenance is closely related to moisture content and control. Curing, the process of water removal to approximately 10%, is normally accomplished with heated air. Delays and incorrect curing procedures may result in peanuts with poor flavor, decreased processability, and mycotoxin contamination. When peanuts are properly cured they may be safely stored in adequately ventilated large warehouses before shelling. Warehouse storage (farmers stock) can be accomplished such that initial quality is maintained. Quality maintenance in storage is related to the presence of dirt and other foreign material in the peanuts, sufficient aeration/ventilation to remove moist air from the warehouse, and adequate insect control.

Peanut Quality Requirements of Export Markets. D.T. ROSS, Grocery Products Marketing, Canada Packers Inc., 95 St. Clair Ave. W., Toronto Canada M4V 1P2.

Just as export markets vary considerably in their potential importance to the US peanut industry, so do their quality requirements. Their needs relate to the relative maturity of the end-usage categories in each market, the sophistication of the processors, and even the channels of distribution. The concerns of the end users include potential consumer related problem areas for their categories, as well as the more normally accepted quality attributes. In assessing the quality requirements of the foreign buyers, it is important to fully understand their individual attitudes to the U.S. peanut, both currently and as they may change, and to alternate source peanuts which compete for sales in each of the export markets. This information enables not only greater success to be achieved in terms of overall sales and value, it also provides clearer focus for export marketing efforts and for peanut research and development. This is essential for the the longer term health of the US growing and shelling industry.

Sensory Evaluation Method for Roasted Peanuts. M. M. Fletcher, Best Foods Research and Engineering Center, Division of CPC International, 1120 Commerce Avenue, Union, New Jersey 07083.

One of the most critical indicators of peanut quality is flavor. This is a difficult quality to measure, as there are many factors influencing an individual's perception of flavor and texture. The CLER (Critical Laboratory Evaluation of Roasted Peanuts) method for scoring peanut flavor, developed by CPC International in the 1960's has been widely used in the peanut industry. This method was recently modified to improve the original procedure. The revised CLER is similar to the former CLER because it requires the evaluation of 20 roasted peanuts per sample. However, due to more controlled conditions designed to correct the major weaknesses of the original CLER, the new CLER is a more reliable indicator of the sensory characteristics of a given peanut sample. Major changes include a new sample preparation procedure, a different scoring system, and flavor and texture attribute definitions.

Peanut processing in the United States: Conventional techniques.

J.J. HEINIS and CLYDE T.YOUNG, Department of Food Science. North Carolina State University. Raleigh, NC 27695-7624.

After harvesting, grading, shelling, blanching and curing, peanuts are processed. Although peanuts may be optimum in flavor quality before processing, improper formulation, over-processing or poor handling may lead to a poor quality product.Typical processing schemes and standards of identity for the three major products (peanut butter, roasted peanuts and peanut confections) are reviewed together with some defect sources.

In the US, peanut butter formulas have changed from a spanish:virginia blend (1:1) to almost 100% runner splits. Stabilizer choice depends on grinding (one or two-stage), chilling rate and storage conditions while sweeteners can be selected due to flavor and reduction of Maillard reactions. Packaging is usually in glass which insures a 4 year shelf life at 47°F.

Roasted peanuts meet several markets (low calorie, honey coating, or salted) with oil-cooked peanuts being regarded as having a better flavor. In-shell salting (salt low in $CaCl_2$, Fe and Cu) is often used while zein (28% in ethanol) retains skins in salted spanish market types. Shelf-lives of 1-2 yr (32-50F) depend greatly on packaging type and atmosphere.

In candies (nut roll, cups, brittle or dragees) peanuts provide texture contrast. Product stability depends on product moisture content/formulation, storage temperature and relative humidity. Bar packaging generally uses triple laminates (vertical fill) while glassine is used in peanut butter cups (horizontal fill).

Peanut Quality and Non-Conventional Processing of Peanut Seeds.

E. M. Ahmed, Dept. of Food Science and Human Nutrition, University of Florida, Gainesville, FL 32611.

Postharvest handling and storage methods of peanut seeds influence the functional properties of the protein present in the seeds. Handling methods that optimize peanut seed quality will result in optimized functional properties of the seed protein. Some of such properties are: solubility, binding ability, gelatin, viscosity and water holding capacity which influence the preparation of spun protein fibers. Suitability of peanut protein dope solutions for spinning depended on the interaction between protein concentration, pH, and dope maturity. Peanut protein spun fibers stored at 1 C for 3 wks exhibited increased tensile strength, strechability and shear strength than the non-stored fibers. Orientation tests showed that two fiber tows placed in a 45° orientation were more resistant to punch shear stresses than tows placed in 90°, random or parallel orientation. Other functional properties such as solubility, emulsifying capacity, foaming capacity and foam stability of peanut protein isolates were higher for the spray dried and freeze dried than the drum dried preparations. Defatted peanut meal could be used as extender for comminuted meat products. Sensory acceptability ratings for the extended (20%) were similar to the non-extended meat patties and loaves.

Peanut Stripe Virus

Peanut Stripe Virus in Arachis hypogaea L. J. W. DEMSKI* and D. WARWICK, Univ. of Georgia, Georgia Exp. Sta., Experiment, GA 30212.
Peanut stripe virus (PStV) continues to infect peanuts (Arachis hypogaea L.) in the United States since its discovery in 1982. Awareness of the problem and control measures have kept the virus out of commercial plantings. The virus was detected in peanuts in field tests for four continuous seasons at one location. Twelve commercial farms near this location did not have PStV in 1985, suggesting that long distance spread is not common. PStV has been isolated from Desmodium (beggarweed) and Indigofera (indigo); however, overwintering aspects are unknown. Although some soybean cultivars such as Braxton and Wright are susceptible, no seed transmission was found after testing 10,000 seed from over 20 different soybean cultivars. A seed test was developed to detect PStV in individual peanut seed without affecting germination and over 50,000 seed have been tested. However, an occasional infected seed (1 in 1,300) has been missed by this test. Thus many plants in large field plantings have become infected from the few infected seedlings. Data from two greenhouse and two screenhouse tests to determine yield reduction did not give statistically significant differences although averages from early infected treatments were over five percent in all tests.

Use of Immunodiffusion Tests in Surveys of Peanut Plantings in Florida for Presence of Peanut Stripe Virus (PStV) and Peanut Mottle Virus (PMoV). D. E. PURCIFULL, C. A. BAKER, E. HIEBERT, F. W. ZETTLER, and D. W. GORBET. Department of Plant Pathology, Univ. of Florida, Gainesville 32611; and Agric. Res. and Educ. Ctr., Univ. of Florida, Marianna, FL 32446.
Antisera prepared to PStV (PStV-As) (D. Purcifull and E. Hiebert, unpublished data) and PMoV (PMoV-As) (Xiong et al., Phytopathology 75: 1334, 1985) were used in sodium dodecyl sulfate-immunodiffusion tests for virus detection in extracts from leaf samples with virus-like symptoms (e.g., mosaic, mottle, chlorosis). The samples were collected during the 1984 and 1985 seasons. Of 34 samples collected in experimental plantings in September, 1984, 31 reacted with PStV-As and 31 with PMoV-As (most plants were doubly-infected). Of 84 samples representing 18 commercial fields, 2 reacted with PStV-As and 75 with PMoV-As. Samples collected in late summer and early fall of 1985 were also analyzed. Of 92 samples collected in experiment station plots where various experimental seed were planted, 86 reacted with PStV-As and 88 with PMoV-As. At an experiment station location where only seed harvested in 1978, 1979, or 1980 were planted, all 12 samples were negative with PStV-As but positive with PMoV-As. At two experiment station locations where only commercial seed was planted, none of a total of 77 samples reacted with PStV-As, although 73 reacted with PMoV-As. Of 239 samples collected from a total of 22 commercial fields, 3 reacted with PStV-As and 222 reacted with PMoV-As. None of 10 samples collected in a foundation seed increase field of the variety "Southern Runner" reacted with PStV-As but all reacted with PMoV-As. In the areas sampled in Florida in the 1984 and 1985 seasons, viruses of the PStV antigenic group were abundant only in certain experimental plantings, whereas PMoV occurred commonly in both experimental and commercial peanut plantings.

Status of Peanut Stripe Virus (PStV) in the Germplasm Collections of the S-9 Regional Project. G. LOVELL, Chief Curator, Regional Plant Introduction Station, Experiment, GA 30212.

During a similar panel discussion at the APRES Meeting in 1984, we reviewed the discovery and identification of PStV in new peanut introductions in the seed increase plots of the Regional P.I. Station at Experiment, GA. Dr. Grover Sowell, Research Pathologist/Retired, ARS, and Dr. Jim Demski, University of Georgia, cooperated in the verification and initial publication of PStV. Since 1982-83, we have identified 3,566 peanut lines (from the collection of 7,526 introductions) as having been exposed to contamination with PStV through grow-outs in seed increase fields which included peanut introductions from the Philippines, Indonesia, Thailand, Taiwan, and the Peoples Republic of China. These suspect seed increases occurred during the period of 1976-1985. As of June 20, 1986, 428 introductions have been checked and contamination by PStV was verified in 111 (26%). The clearance rate will increase after September 14, 1986, once the new Research Virologist is in place and has been able to train the necessary lab assistants. We have continued a very restricted distribution regime.

Exchange of Peanut (Arachis) Germplasm. G. A. WHITE, Plant Introduction Office, Germplasm Introduction and Evaluation Lab., USDA-ARS, Beltsville, MD 20705.

The Plant Introduction Office (PIO) coordinates the exchange of germplasm, documents passport data, assigns Plant Introduction (PI) numbers, provides liaison on quarantine matters, and supplies plant materials to AID missions. Both exports and imports of Arachis germplasm should be channeled through the Plant Germplasm Quarantine Center, Beltsville, Maryland, for quarantine inspection. All shipments to foreign recipients should include a phytosanitary certificate. Direct exchanges of peanut germplasm that bypass quarantine inspection should be discouraged. In addition, commercial importations for processing purposes should not be used for propagation. To minimize the risks of further introduction of stripe virus-infected peanut germplasm, scientists should obtain import permits as required and move materials through established channels. The stripe virus restriction applies to China, Philippines, and Thailand. Other countries may be added.

Effect of Peanut Stripe Virus on Peanut Breeding. J. C. WYNNE, N.C. State Univ., Raleigh.

Peanut stripe virus (PStV), first observed in the United States in 1982 in experimental plantings of introductions from China, has subsequently been found in breeding stocks in five states. Peanut stripe virus was considered to be a potentially serious pest because of aphid and seed transmission and possible yield reduction. Although PStV has not spread rapidly since its discovery and no statistically significant data on yield loss have been reported, the virus has had a drastic impact on peanut breeding in the USA. A survey of breeding programs indicates the following: (1) Exchange of germplasm has been severely reduced; (2) cooperating testing, important in cultivar release decisions, has been reduced; (3) field plots have been destroyed; (4) experimental plot and breeder seeds have been discarded; (5) winter nurseries have been eliminated and (6) limited resources have been diverted to PStV research.

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Board of Directors Meeting

Pavilion Tower Hotel, Virginia Beach, Virginia

July 15, 1986

President Don Smith called the meeting to order at 7:05 p.m. The following individuals were present: Don Smith, Gale Buchanan, Ron Sholar, Morris Porter, Johnny Wynne, Aubrey Mixon, Gerald Harrison, Max Grice, Terry Grinsted, Terry Coffelt, Harold Pattee, Bill Dykes, Kyle Rushing, Pat Phipps, Tom Whitaker, Walt Mozingo, Bobby Clary, Dallas Hartzog, and Craig Kvien.

Ron Sholar presented the Executive Officer report.

Don Smith presented the American Society of Agronomy (ASA) liaison report as prepared by Olin Smith. Currently the Society has a liaison to ASA but there is no liaison from ASA to APRES. Discussion was conducted on the possibility of having one individual fill both positions. The President will appoint an ad hoc committee to report back to the Society on this subject within 120 days of the annual meeting.

Gale Buchanan volunteered to serve as liaison to the Southern Agricultural Experiment Station Directors. This action was approved by the Board of Directors of APRES.

Gale Buchanan presented the nominating committee report. The following nominations were made:

President	- Morris Porter, USDA, VPI
President-elect	- Dan Gorbet, University of Florida
Executive Officer	- Ron Sholar, Oklahoma State University

The Publication Committee report was presented by Terry Coffelt. Harold Pattee presented the report on Peanut Science. Both reports were accepted.

Bill Dykes presented the Finance Committee report. A discussion was conducted on methods for improving the financial position of the Society. Currently the Society has a "flat" annual budget with income only slightly greater than expenditures. President Smith asked the Finance Committee to look into ways for improving the finances of the Society.

The Peanut Quality report was presented by Kyle Rushing. The report was accepted.

The Public Relations Committee report was given by Pat Phipps. The report was accepted.

Tom Whitaker announced that the winner of the Golden Peanut Research and Extension award was Al Allison, Extension Peanut Specialist at VPI.

The Fellows Committee report was presented by Ray Hammons. Those nominated were Olin Smith, Dan Hallock, and Clyde Young. The report was accepted.

The Bailey Award Committee report was presented by Marvin Beute. The report was accepted.

The Program Committee report was presented by Morris Porter. One hundred eighteen papers were presented at the 1986 meeting.

The Site Selection Committee report was presented by Walt Mozingo and Bobby Clary. The following was announced:

1987 - Orlando, FL, July 13-17, Marriott (International Drive)

1988 - Tulsa, OK, July 11-15, Sheraton Kensington

1989 - Winston-Salem, NC, Date and Hotel TBA

Dallas Hartzog reported on the ad hoc committee's efforts to improve sales of Peanut Science and Technology. One hundred two copies were sold during the past year.

Discussion was conducted on APRES becoming a member of CAST. The President will appoint an ad hoc committee to examine this possibility. The committee will report back at the annual meeting in 1987.

Craig Kvien of the University of Georgia made a proposal for the Society to cooperate in the project on computerizing peanut literature. This project is already underway at the Coastal Plain Experiment Station in Georgia. Dr. Kvien's proposal was for APRES to provide funding for expansion of this work. In return, APRES members would benefit by being provided reprints of articles maintained in the system. The President will appoint an ad hoc committee to study this issue and make a recommendation to the Board of Directors at the next annual meeting.

The meeting was adjourned at 9:05 p.m.

Minutes of the Regular Business Meeting of the

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Pavilion Tower Hotel, Virginia Beach, Virginia

July 18, 1986

The business meeting was called to order by President Don Smith at 8:15 a.m. The following committee reports were made and accepted:

Financial Statement

President's Report

Executive Officer's Report

Program Committee Report

Finance Committee Report

Publication and Editorial Committee Report

Peanut Quality Committee Report

Site Selection Committee Report

Public Relations Committee Report

Bailey Award Committee Report

Golden Peanut Award Advisory Committee Report

Nominating Committee Report

Liaison Representative Between APRES and the American Society of Agronomy Report

Fellows Committee Report

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Balance Sheet for FY1985-86

ASSETS	June 30, 1986	June 30, 1985
Cash in Checking Account	$ 17,512.14	$ 24,348.46
Certificate of Deposit #1	12,026.94	11,087.46
Certificate of Deposit #2	7,877.05	7,321.12
Certificate of Deposit #3	7,000.00	-----
Money Market Account	17,470.31	16,318.24
Savings Account (Wallace Bailey)	1,131.04	1,056.35
Inventory of Books	41,167.28	43,509.20
TOTAL ASSETS	$104,184.76	$103,640.83
LIABILITIES		
None	$ 0.00	$ 0.00
FUND BALANCE	$104,184.76	$103,640.83
TOTAL LIABILITIES AND FUND BALANCE	$104,184.76	$103,640.83

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Statement of Activity for Year Ending

RECEIPTS	June 30, 1986	June 30, 1985
Registration	$ 5,455.00	--------
Membership	16,298.24	$ 24,436.26
Proceedings & Reprint Sales	92.75	11.00
Special Contributions	7,000.00	975.00
Peanut Science & Technology	4,686.11	8,277.89
Peanut Science Page Charges & Repr.	8,894.72	11,123.67
Differential Postage	2,380.00	1,990.13
Checking Account Interest	1,024.87	1,142.86
Savings Account Interest	74.69	91.31
Ladies Activities	380.00	1,043.00
Certificate of Deposit #1 Interest	939.48	1,087.46
Certificate of Deposit #2 Int. & Prin.	555.93	7,321.12
Certificate of Deposit #3 Principal	7,000.00	---------
Money Market Account Interest	1,152.07	16,318.24
Quality Methods	465.90	836.00
TOTAL RECEIPTS	$ 56,399.76	$74,654.04
EXPENDITURES		
Proceedings Printing & Reprints	$ 3,978.32	$ 2,750.96
Annual Meeting	5,829.53	5,153.11
Secretarial	7,620.75	7,352.59
Postage	1,935.80	2,518.47
Office Supplies (includes IBM PC)	3,147.12	902.44
Travel - Officers	289.63	706.29
Corporation Registration	60.00	10.00
Miscellaneous	287.95	421.02
Peanut Science	21,500.00	16,400.00
Peanut Science & Technology	122.07	65.00
Bank Charges	1.00	67.00
Peanut Research	1,538.81	2,047.40
Certificate(s) of Deposit	7,000.00	7,000.00
Membership & Registration	7.00	67.50
Legal Fees	118.20	610.00
Quality Methods	0.00	680.47
Sales Tax	77.73	87.72
Money Market Account	0.00	15,000.00
(Secretary-self-employment tax	-------	396.97
TOTAL EXPENDITURES	$53,513.91	$62,236.94
EXCESS RECEIPTS OVER EXPENDITURES	$ 2,885.85	$12,417.10

Cash in Checking Account:

July 1, 1984 - $36,749.49 June 30, 1985 - $ 24,348.46

July 1, 1985 - $24,348.46 June 30, 1986 - $ 17,512.14

PRESIDENTIAL ADDRESS

D. H. Smith, Professor
Texas A&M University System
Texas Agricultural Experiment Station at Yoakum

APRES-YESTERDAY, TODAY, AND TOMORROW

The Peanut Improvement Working Group (PIWG), predecessor of APREA and APRES, was organized in 1957 to provide an organized way to exchanging information about all aspects of the peanut industry. PIWG existed for 11 years with no legal status, no funds to publish proceedings of annual meetings, and other limitations listed by C. T. Wilson in his 1974 article on Genealogy of APRES (1). At the 1968 PIWG meeting in Norfolk, Virginia, action was taken to terminate PIWG and form the American Peanut Research and Education Association (APREA). The first APREA meeting was held in Atlanta, Georgia, in July 1969 and Volume Number 1 of APRES PROCEEDINGS was published to document the activities of that meeting. To comply with Internal Revenue Service regulations relevant to the tax exempt status of APREA, the American Peanut Research and Education Association became the American Peanut Research and Education Society (APRES) in 1979. Therefore, Volume Numbers 1 to 10 are APREA PROCEEDINGS and subsequent volumes are APRES PROCEEDINGS.

After shedding a copious amount of blood, sweat, and tears, PEANUTS CULTURE AND USES, a comprehensive 684 page book with 20 chapters involving numerous authors was published by APREA in 1973. All copies of this book were sold, and a new 825 page book (PEANUT SCIENCE AND TECHNOLOGY) consisting of 20 chapters was published by APRES in 1982. Both of these books have enhanced the international reputation of APRES.

PEANUT SCIENCE, a technical journal consisting of two issues per year, (January to June and July to December) has been published by APREA and APRES since 1974. Data on geographical distribution of authors for PEANUT SCIENCE, number of articles per issue, number of pages per issue and number of Institutional members of APRES (libraries) that subscribe to PEANUT SCIENCE are shown in Tables 1, 2, and 3. Scientists from 18 states (USA) and 11 other countries have served as authors of PEANUT SCIENCE articles since 1974. The average length of an article ranges from 3.6 to 4.0 pages. The number of Institutional members (libraries) increased from 45 in 1976 to 95 in 1985. In addition, important international abstracting services are utilizing information published in PEANUT SCIENCE.

Total APRES membership has increased from 480 in 1975 to 742 in 1985 (Table 1). There are five membership categories in APRES, viz., Individual, Sustaining, Organizational, Student, and Institutional (libraries). A list of States (USA) and countries with previous and/or current APRES members is presented in Table 4. Thirty-five states (USA) and 62 countries are included in this list.

PEANUT RESEARCH, the quarterly newsletter of APRES, is mailed to all members. The list of literature citations in each issue is highly regarded, especially at remote locations where automated literature search services are unavailable.

Twenty-five methods for quantifying various characteristics of peanut quality have been published by APRES, and at least 25 more methods will eventually be published. Each of these methods has been carefully prepared by scientists who are widely recognized for their specific area of peanut quality research.

The geographical diversity of APRES members is a good omen. When we communicate with people from various countries who share a common interest in the welfare of a global peanut industry, we modify our provincial attitudes and expand our mental horizons.

With more than 700 members, APRES continues to operate with only two part-time paid workers, i.e., those who support the work of the Executive Officer in Stillwater, Oklahoma, and the Editor of PEANUT SCIENCE in Raleigh, North Carolina. This situation exists because many hours of voluntary labor are contributed by APRES members. The Executive Office in Stillwater has now acquired a computer, and this will be extremely useful for maintenance of membership records and financial data.

As we look to the future and continue to work for peanuts, it is evident that APRES is a stable organization. APRES is not a political action organization. It is an information exchanging professional society. With a record attendance at Virginia Beach, we look forward to a productive meeting and a bright long-term future for APRES.

Literature Cited

1. Wilson, Coyt T. 1974. The genealogy of APRES. PEANUT SCIENCE 1: 1-2.

TABLE 1. Geographical Distribution of Authors for Peanut Science (January 1974-December 1985).

Location	Frequency	Percent
Alabama	42	5.0
Arkansas	1	0.1
Australia	2	0.2
California	2	0.2
Colorado	6	0.7
Florida	65	7.7
Georgia	226	26.7
Ghana	2	0.2
Illinois	9	1.1
India	31	3.7
Jamaica	1	0.1
Louisiana	34	4.0
Malawi	2	0.2
Mali	1	0.1
Maryland	1	0.1
Massachusetts	1	0.1
Mississippi	2	0.2
New Mexico	2	0.2
New Zealand	2	0.2
Niger	1	0.1
North Carolina	229	27.1
Oklahoma	47	5.6
Ontario	11	1.3
Pennsylvania	9	1.1
Texas	52	6.1
United Kingdom	1	0.1
Venezuela	1	0.1
Virginia	62	7.3
Washington D. C.	1	0.1

TABLE 2. Length of Articles Published in Peanut Science.

Year	Number of Articles	Number of Pages		
		Mean	Maximum	Minimum
1974	25	3.92	8.00	2.00
1975	22	4.05	8.50	2.00
1976	23	3.98	6.50	2.00
1977	19	3.88	6.00	1.00
1978	28	3.62	9.00	2.00
1979	29	3.80	9.00	2.00
1980	29	3.96	6.75	2.00
1981	35	3.79	8.00	1.50
1982	30	3.29	5.00	2.00
1983	32	3.45	5.25	2.00
1984	32	3.38	6.00	1.50
1985	24	3.86	6.00	1.50

TABLE 3. APRES MEMBERSHIP (1975-1985)

MEMBERSHIP CATEGORY	1975	1976	1977	1978	1979	1980
Individual	419	363	386	383	406	386
Sustaining	21	30	29	32	32	33
Organizational	40	45	48	50	53	58
Student	-	-	14	21	27	27
Institutional	-	45	45	54	72	63
Total Members	480	483	522	540	590	567

MEMBERSHIP CATEGORY	1981	1982	1983	1984	1985
Individual	478	470	419	421	513
Sustaining	39	36	30	31	29
Organizational	66	65	53	52	65
Student	31	24	30	33	40
Institutional	73	81	66	58	95
Total Members	687	676	598	595	742

Note: Membership data are from the membership list published annually in APRES PROCEEDINGS.

TABLE 4. List of States (USA) and Countries with Previous and/or Current APRES members.

List of states (USA)	List of other countries	
Alabama	Antigua	Mauritius
Arkansas	Argentina	Malawi
Arizona	Australia	Mexico
California	Austria	Malaysia
Colorado	Barbados	Mozambique
Connecticut	Belgium	The Netherlands
Washington D. C.	Belize	New Zealand
Delaware	Bermuda	Nigeria
Florida	Burkina Faso	Niger
Georgia	Burma	Pakistan
Iowa	Bolivia	The Phillipines
Illinois	Brazil	Puerto Rico
Indiana	Cameroon	Rwanda
Kentucky	Canada	Senegal
Louisiana	China	Somalia
Massachusetts	Cyperus	South Africa
Maryland	Egypt	Spain
Michigan	England	Sri Lanka
Minnesota	Ethiopia	Sudan
Missouri	France	Suriname
Mississippi	Germany	Switzerland
North Carolina	Ghana	Taiwan
New Jersey	Greece	Thailand
New Mexico	Guyana	U.S.S.R.
New York	Haiti	Venezuela
Ohio	Honduras	Zambia
Oklahoma	Hong Kong	Zimbabwe
Oregon	Indonesia	
Pennsylvania	India	
South Carolina	Iraq	
Tennessee	Israel	
Texas	Italy	
Virginia	Jamaica	
Washington	Japan	
Wisconsin	Mali	

REPORT OF THE EXECUTIVE OFFICER

July 18, 1986

The eighteenth annual meeting of the American Peanut Research and Education Society is rapidly drawing to a close and with it, the conclusion of another year for the society. This meeting finds the society in good condition in terms of membership number, member participation, and financially. The final member tally after this meeting will exceed 700 with more than 500 individual members. More than 340 individuals registered for and participated in some phase of this meeting. The previous high was 290 at the Mobile, Alabama meeting in 1984, so attendance here was significantly higher. Financially, the assets of the society exceed $100,000.

As always, this meeting will serve as a source of ideas and encouragement for the continuation of our work with peanuts. The attendees at this meeting no doubt have profited from the sharing of knowledge and information which will enhance our individual and collective abilities to grow, process, and utilize peanuts.

During the last year, the society purchased an IBM-PC computer with which the records of the society will be maintained. With this action, like others we have taken, we hope to improve the professional services provided to the members. We now have a halftime assistant to the Executive Officer. I appreciate the support of the Finance Committee and the Board of Directors as we attempt to meet the needs of the society.

James R. Sholar
Executive Officer

PROGRAM COMMITTEE REPORT

This report of the 1986 Program Committee is divided into three sections: Local Arrangements, Technical Program and Ladies' Program. The chairperson and the members of each of these subcommittees contributed much time and energy in making our meeting a success. On behalf of the Society I extend to them our sincere appreciation.

The Local Arrangements Committee provided excellent logistical support throughout the meeting. The rooms, audio, morning and afternoon breaks, exhibits, the special events, the golf and tennis tournaments, etc., all helped make our meeting enjoyable. The numerous sponsors that contributed to the success of the program are listed on the next page.

The Technical Program Committee assembled an excellent program that included 118 presentations. The program included a symposium on Peanut Quality, discussion groups on Peanut Stripe Virus and Disease Assessment, and an Extension Industry Workshop. Our appreciation is extended to those who made presentations and to the session moderators and projectionists.

The Ladies' Program Committee provided coffee breaks, tours and information of the area to the women attending the meeting. Wednesday's tour and luncheon was attended by over 80 women.

To the other individuals who shared in making the 1986 annual meeting of our Society a success we extend our sincere thanks.

Program Committee

D. Morris Porter, Chairman

Local Arrangements:	Technical Program:	Ladies' Program:
Walton Mozingo, Chairman	Scott Wright, Chairman	Sylvia Porter, Chairperson
Allen Allison	Floyd Adamsen	Carol Adamsen
Charles Foster	Terry Coffelt	Betty Allison
Gerald Harrison	Gerald Elkan	Shirley Coffelt
Glen Heuberger	Bob Howell	Sarah Heuberger
Dave Hogg	Pat Phipps	Judy Mozingo
Les Mustin	Norris Powell	Diane Steele
Delbert O'Meara	John Smith	Betty West
Jim Steele	Tom Stalker	Joyce Wright
Tom West	Jim Young	Helen Zekert
Gary Zekert		

PROGRAM SPONSORS

The Program Committee on behalf of the Society wishes to acknowledge the many organizations who generously contributed money, talents and time that helped make our meeting a most successful one. The 31 sponsors who provided assistance are to be commended. We express our appreciation to:

DuPONT	DYNATECH LABORATORIES
NITRAGIN	AMERICAN CYANAMID CO.
FMC CORP.	DELTA TECHNOLOGY CORP.
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UNIROYAL CHEMICAL	PERT LABS-SEABROOK BLANCHING CORP.
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PPG INDUSTRIES, INC.	GILLAM BROTHERS PEANUT SHELLERS, INC.
O'CONNER & CO., INC.	VIRGINIA PEANUT GROWERS ASSOCIATION, INC.
	PEANUT GROWERS COOPERATIVE MARKETING ASSOC.

Special thanks go to the sponsors providing funding for the Society's social events. Their contributions helped make our meeting a memorable one and we are indebted to them.

Tuesday's ICE CREAM SOCIAL
Sponsored by RHONE-POULENC, INC.

Wednesday's LUNCHEON
Sponsored by UNION CARBIDE AG-PRODUCTS CO.

Wednesday evening's RECEPTION
Sponsored by FERMENTA PLANT PROTECTION CO.

Thursday's BBQ
Sponsored by UNIROYAL, INC.

We are also indebted to the following who contributed peanuts:

Virginia Peanut Board
North Carolina Peanut Growers Association
Nabisco Brands
The Peanut Gallery

PROGRAM
for the
Eighteenth Annual Meeting
of the
American Peanut Research and Education Society, Inc.

TUESDAY, JULY 15

1:00- 8:00 APRES Registration
1:00- 5:00 Ladies' Registration
1:00-10:00 Ladies' Hospitality

COMMITTEE AND BOARD MEETINGS

1:00 Assoc. Eds.-PEANUT SCIENCE
Site Selection
Public Relations

2:00 Publications and Editorial
Bailey Award

3:00 Finance
Peanut Quality
Peanut Crop Advisory

7:00 Board of Directors

8:00 Ice Cream Reception -- Sponsored by Rhone-Poulenc, Inc.

WEDNESDAY, JULY 16

8:00- 5:00 APRES Registration
9:30- 5:00 Exhibits
8:00-10:00 Ladies' Hospitality
9:00- 3:00 Ladies' Tour and Luncheon

GENERAL SESSION
D. H. Smith, presiding

8:30 Call to Order

Invocation - Ernest Wrenn

8:35 Introduction of the Mayor of Virginia Beach - E. R. Cockrell, Jr.

8:40 Welcome - Mayor, City of Virginia Beach

8:50 Introduction of Guest Speaker - J. H. Barlow

8:55 Keynote Address - Honorable Richard M. Bagley
Secretary of Commerce and Resources
Commonwealth of Virginia

9:15 Presidential Address - D. H. Smith

9:23 Presentation of Honorary Awards - D. H. Smith

9:30 Announcements
R. W. Mozingo, Local Arrangements Committee
F. S. Wright, Technical Program Committee

9:35 Break

THREE CONCURRENT SESSIONS

1. SESSION A--BREEDING AND GENETICS
2. SESSION B--HARVESTING, STORAGE AND HANDLING
3. SESSION C--FOLIAR DISEASE ASSESSMENT

SESSION A. BREEDING AND GENETICS
T. A. Coffelt, presiding

10:00 Evidence on the Evolution of Arachis hypogaea L. C. E. Simpson*, A. Krapovickas, J. R. Pietrarelli and R. O. Vanni.

10:15 Rescue of Arachis hypogaea L. Embryos by In Vitro Culture. H. T. Stalker.

10:30 Discussion

10:45 Inheritance of Fatty Acid Content in Peanut. L. C. Mercer*, J. C. Wynne and C. T. Young.

11:00 The Effect of Three Harvest Dates on Oil Quality, Yield and Grading Data of Five Peanut Genotypes Grown Without Leafspot Control. D. A. Knauft*, A. J. Norden and D. W. Gorbet.

11:15 Variability in Oil Quality Among Peanut Genotypes in the Florida Breeding Program. A. J. Norden*, D. W. Gorbet, D. A. Knauft and C. T. Young.

11:45 Lunch

SESSION B. HARVESTING, STORAGE AND HANDLING
F. S. Wright, presiding

10:00 Impact of the Food Security Act of 1985 on Determination of National Peanut Poundage Quotas. R. H. Miller.

10:15 Volatile Profiles measured by GC in Peanuts with Induced Freeze Damage. Norman V. Lovegren.

10:30 An Electronic Meter to Measure the Concentration of Alcohols and Aldehydes in Peanuts. J. W. Dickens*, A. B. Slate and H. E. Pattee.

10:45 Evaluation of Aspiration Systems for Peanut Cleaning. P. D. Blankenship* and J. I. Davidson, Jr.

11:00 Some Effects of Carbon Dioxide and Nitrogen Atmospheres in Peanuts. W. O. Slay.

11:15 Influence of External Environment Changes on Peanut Storage. J. S. Smith, Jr.

11:30 Effect of Pod Maturity and Plant Age on Seed Size Distribution of Florunner Peanuts. E. J. Williams* and G. O. Ware.

11:45 Lunch

SESSION C. FOLIAR DISEASE ASSESSMENT
Robert H. Littrell, presiding

10:00 Introduction - R. Littrell.

10:05 Assessment of Late Leafspot and Rust. ICRISAT Methods. D. H. Smith.

10:17 An Objective Disease Assessment Method for Evaluating Leafspot in Runner Peanuts. M. A. Crawford* and P. A. Backman.

10:29 The Canopy Layer Method for Assessment of Peanut Leafspot Diseases. F. M. Shokes* and R. D. Berger.

10:41 Monitoring Pathogen Stress with a Hand-held, Multispectral Radiometer. F. W. Nutter, Jr.

10:53 Need for Rapid and Accurate Methods of Assessing Peanut Foliar Diseases. R. H. Littrell.

11:05 Leafspot Disease Assessment in Breeding Programs. D. W. Gorbet*, A. J. Norden, F. M. Shokes, D. A. Knauft, K. V. Pixley, and G. R. Watson.

11:17 Industry's Needs for the Methods of Evaluation of Foliar Peanut Diseases. R. F. Nash.

11:29 Disease Assessment Methods Needed to Develop and Validate Interactive Crop-Disease Simulation Models. K. J. Boote* and R. D. Berger.

12:00 Lunch

THREE CONCURRENT SESSIONS

1. SESSION A--BREEDING AND GENETICS
2. SESSION B--PROCESSING AND UTILIZATION
3. SESSION C--EXTENSION AND INDUSTRY

SESSION A. BREEDING AND GENETICS
H. T. Stalker, presiding

1:00 Selection Among Early Generation Peanut Progeny for High and Low Acetylene Reduction and Plant Weight. S. Arrendell*, J. C. Wynne, G. H. Elkan and T. J. Schneeweis.

1:15 Effect of Bradyrhizobium Strain on Combining Ability of the Host Plant. T. D. Phillips*, J. C. Wynne, T. J. Schneeweis and G. H. Elkan.

1:30 Early Generation Identification of Crosses with Promise for Leafspot Resistance and Yield in Peanuts (Arachis hypogaea L.). R. N. Iroume* and D. A. Knauft.

1:45 Inheritance of Late Leafspot Resistance and Agronomic Traits in Peanut (Arachis hypogaea L.). S. Jogloy, J. C. Wynne*, M. K. Beute and J. O. Rawlings.

2:00 Origin, Inheritance, and Characteristics of a Yellow-Flowered Peanut from Bolivia. D. J. Banks* and R. N. Pittman.

2:15 An Additional Recessive Gene for Red Testa Color. C. C. Holbrook* and W. D. Branch.

2:30 The Occurrence and Genetics of an Unusual White Peanut Testa Color. W. D. Branch.

2:45 Break

SESSION B. PROCESSING AND UTILIZATION
J. R. Baxley, presiding

1:00 Changes in the Seed Composition of Peanut Seed During Boiling. V. Murugesu* and S. M. Basha.

1:15 Effect of Storage on the Chemical Composition and Quality of Packaged Roasted Peanuts. J. S. L. How* and C. T. Young.

1:30 Consumer Acceptance of Partially Defatted Peanut Flour Products in Thailand. P. Chompreeda, C. Oupadissakoon* and V. Haruthaitanasan.

1:45 Development of an Imitation Cheese Spread from Peanut Paste. A. V. A. Resurreccion*, B. L. Santos and P. E. Koehler.

2:00 Discussion

2:45 Break

SESSION C. EXTENSION AND INDUSTRY
R. D. Rudolph, presiding

1:00 Methods of Conducting Extension Pest Management On-Farm Demonstrations in Alabama. J. R. Weeks* and A. Hagan.

1:15-3:00 The Philosophy of Maximum Economic Peanut Yield: Similarities and Differences Between States.

W. C. Johnson, III
J. P. Beasley, Jr.
D. Hartzog
E. B. Whitty
G. A. Sullivan
A. H. Allison
D. T. Gooden
J. R. Sholar
L. Tripp
Discussion

3:00 Break

TWO CONCURRENT SESSIONS

1. SESSION A--PHYSIOLOGY
2. SESSION B--EXTENSION AND INDUSTRY

SESSION A. PHYSIOLOGY
E. J. Williams, presiding

3:00 Simulating the Growth and Yield of Florunner Peanut. K. J. Boote*, J. W. Jones, J. W. Mishoe and G. G. Wilkerson.

3:15 Prediction of Peanut Root Penetration Probability Through a Compact Layer: A Simulation Study. P. Singh* and J. H. Young.

3:30 Effect of Early Leafspot Invasion on Growth Analysis of Spanish Peanuts. D. L. Ketring.

3:45 Effects of Planting Pattern on the Light Interception, Yield, and Quality of Peanut Genotypes. Z. B. Jaaffar* and F. P. Gardner.

4:00 Effect of Soil Water on Water Relations, Nitrogen Fixation, and Nitrogen Accumulation of Peanut and Soybean. J. D. DeVries, J. M. Bennett, K. J. Boote*, S. L. Albrecht and C. E. Maliro.

4:15 Effect of Drought and Temperature Stress on Peanut Seed Composition. M. Musingo and S. M. Basha*.

4:30 Sterol Biosynthesis Inhibitors as Plant Growth Regulators. C. S. Kvien*, R. H. Littrell and A. S. Csinos.

4:45 Discussion

7:00 Reception -- Sponsored by Fermenta Plant Protection Co. (SDS BIOTECH)

SESSION B. EXTENSION AND INDUSTRY
R. D. Rudolph, presiding

3:15 Advances in Formulation Technology Applied to Chlorothalonil. J. R. French* and G. W. Harrison.

3:25 Tolclofos-Methyl (Rizolex) Use in Control of Sclerotium rolfsii, Rhizoctonia solani, and Sclerotinia minor in Peanuts. R. H. Neill* and D. H. Williamson.

3:35 Rovral: A New Tool for Sclerotinia Blight Control in Peanuts. R. Hanrahan and L. Williams*.

3:45 Developments in Peanut Leafspot Control from Griffin Corporation. J. R. Bone* and R. Kerby.

3:55 Ridomil PC, A New Fungicide for the Control of Peanut Pod Rot. H. V. Morton*, A. McMahon and R. Smith.

4:05 Gustafson 4-Way: A New Peanut Dust Seed Treatment. D. Powell

4:15 An Evaluation of Twelve Herbicide Systems on Peanut Weed Control, Yield and Grade. J. Harden* and A. Allison.

4:25 Effects on Tilt® (Propiconazole) Terraclor (PCNB), and Ridomil® PC™ (Metalaxyl + PCNB) on Sclerotium rolfsii of Peanut. H. R. Smith* and T. A. Lee.

4:35 FLUTOLANIL: An Effective New Fungicide for Control of Sclerotium rolfsii and Rhizoctonia solani on Peanuts. W. K. Taylor.

4:45 Sonilan--Effective Herbicide for Weed Control in Peanuts. D. Addison.

7:00 Reception -- Sponsored by Fermenta Plant Protection Co. (SDS BIOTECH)

THURSDAY, JULY 17

8:00-12:00 APRES Registration
8:00- 5:00 Exhibits
8:00-10:00 Ladies' Hospitality

THREE CONCURRENT SESSIONS

1. SESSION A--PATHOLOGY
2. SESSION B--ENTOMOLOGY
3. SESSION C--QUALITY SYMPOSIUM

SESSION A. PATHOLOGY
R. K. Howell, presiding

8:00 A Method of Assessing Severity of Peanut Leafspot and Relationship to Yield. R. H. Littrell and B. Mullinix*.

8:15 Effect of Fungicides on Rate of Disease Progress of Early Leaf Spot of Peanut. K. E. Jackson* and H. A. Melouk.

8:30 A Use Pattern for Chlorothalonil to Control Early Leafspot of Peanut Without Increased Severity of Sclerotinia Blight. P. M. Phipps.

8:45 Use of Sublethal Doses of Fungicide to Obtain a Range of Late Leafspot Epidemics for Pod Loss Studies. F. W. Nutter, Jr.

9:00 Potential for Use of New Systemic Fungicides to Control Late Leafspot of Peanut. F. M. Shokes* and D. W. Gorbet.

9:15 Correlation of Early Leafspot Incidence in Peanut with a Weather-dependent Model of Infection Rate. E. L. Jewell*, P. M. Phipps and J. L. Steele.

9:30 Evaluation of Physiological and Morphological Variation in Isolates of Cercosporidium personatum from the USA and Thailand. T. Sommartya, B. B. Shew* and M. K. Beute.

9:45 Temperature and Relative Humidity Effects on Components of Resistance to Late Leafspot. B. B. Shew*, J. C. Wynne and M. K. Beute.

10:00 Break

SESSION B. ENTOMOLOGY
J. W. Chapin, presiding

8:00 Insect Damage and Yield Assessment on Groundnuts. M. Keerati-Kasikorn* and P. Singha.

8:15 Evaluation of Chemicals for Managing Soil Insects in Florida Peanuts. M. E. Gilreath*, J. E. Funderburk and D. W. Gorbet.

8:30 Abundance of Lesser Cornstalk Borer Eggs, Larvae, and Adults in Florunner Peanut Fields. T. P. Mack*, C. B. Backman and D. W. Spurgeon.

8:45 Efficacy of LARVIN® Brand Thiodicarb Insecticide for Control of Fall Armyworm (Spodoptera frugiperda) and Corn Earworm (Heliothis zea) on Peanuts. C. F. Harden.

9:00 Insecticidal Control of Granulate Cutworm Larvae Feltia Subterranea (Fab) in Peanuts. L. W. Morgan* and H. Womack.

9:15 Peanut Stripe Virus: Effect on Growth and Yield of Florunner Peanut in Relation to Stage of Peanut Development When Infection Was Initiated. R. E. Lynch*, J. W. Demski, L. W. Morgan and W. D. Branch.

9:30 Effect of No-Till and Double-Cropped Peanuts on Insect Population, Damage and Peanut Yield. W. V. Campbell.

9:45 Southern Corn Rootworm Pheromone Trap Location in Relation to Trapping Success in Virginia-type Peanuts. J. C. Smith*, J. L. Steele and W. V. Campbell.

10:00 Break

SESSION C. QUALITY SYMPOSIUM
E. M. Ahmed, presiding

8:00 Peanut Quality: Effects of Amino Acid and Carbohydrate Composition on Roasted Flavor. H. E. Pattee* and C. T. Young.

8:20 Predicting Peanut Maturity Using Near Infrared Reflectance. T. B. Whitaker*, H. E. Pattee, W. F. McClure and J. W. Dickens.

8:40 Peanut Grading and Quality Evaluation. J. W. Dickens.

9:00 Shelling Edible Peanuts for Quality and Marketability. G. M. Grice.

9:20 Peanut Blanching - Processing, Utilization and Effects on Quality and Product Shelf Life. W. A. Parker.

9:40 Peanut Quality in Curing and Storage. T. H. Sanders*, J. S. Smith, Jr. and P. D. Blankenship.

10:00 Break

THREE CONCURRENT SESSIONS

1. SESSION A--PATHOLOGY
2. SESSION B--WEED SCIENCE
3. SESSION C--QUALITY SYMPOSIUM

SESSION A. PATHOLOGY
P. M. Phipps, presiding

10:15 Comparisons of Progress of Late Peanut Leafspot in Florunner, Southern Runner, and UF 81206. T. A. Kucharek, G. R. Watson*, F. M. Shokes and D. W. Gorbet.

10:30 Identification of the Components of Resistance in Peanut Genotypes. G. R. Watson*, T. A. Kucharek, F. M. Shokes and D. W. Gorbet.

10:45 Development of a Dynamic Threshold Model for Treatment of Cylindrocladium Black Rot of Peanut. J. E. Bailey* and C. A. Matyac.

11:00 Effects of Cultural Practices on Enhancement of Cylindrocladium Black Rot Resistance in Peanut. J. R. Sidebottom* and M. K. Beute.

11:15 Transmission of Cylindrocladium crotalariae in Peanut Seed. D. M. Porter* and R. W. Mozingo.

11:30 A Detached Shoot Technique for Evaluating Reaction of Peanut Genotypes to Sclerotinia minor. H. A. Melouk* and C. N. Akem.

11:45 An Epidemic of Spotted Wilt Disease in South Texas Peanuts in 1985. M. C. Black, P. F. Lummus*, D. H. Smith and J. W. Demski.

12:00 Lunch

SESSION B. WEED SCIENCE
W. C. Johnson, III, presiding

10:15 Interactions Between Imazaquin and Fenamiphos in Peanuts. F. T. Corbin, G. A. Sullivan* and D. P. Schmitt.

10:30 The Response of Peanuts to the Herbicides Imazaquin and Chlorimuron. G. Sims, G. Wehtje and J. W. Wilcut*.

10:45 Early-Season Stress Effect Resulting from Herbicide Injury and Insect Damage on Florunner and Early Bunch Peanuts. B. J. Brecke* and D. H. Teem.

11:00 Reduced Cost Weed Control Systems for Sunbelt Runner Peanuts. J. Cardina*, A. C. Mixon and G. R. Wehtje.

11:15 Efficiency and Economics of Peanut Weed Control with Herbicides and/or Cultivations. J. W. Wilcut*, G. R. Wehtje, R. H. Walker and M. G. Patterson.

11:30 Control of Bermudagrass in Peanut with Postemergence Grass Herbicides. W. J. Grichar.

12:00 Lunch

SESSION C. QUALITY SYMPOSIUM
H. E. Pattee, presiding

10:20 Peanut Quality Requirements of Export Markets. D. T. Ross.

10:40 Sensory Evaluation Method for Roasted Peanuts. M. M. Fletcher.

11:00 Peanut Processing in the United States: Conventional Techniques. J. J. Heinis* and C. T. Young.

11:20 Peanut Quality and Non-Conventional Processing of Peanut Seeds. E. M. Ahmed.

11:40 Discussion

12:00 Lunch

TWO CONCURRENT SESSIONS

1. SESSION A--PATHOLOGY
2. SESSION B--PRODUCTION TECHNOLOGY

SESSION A. PATHOLOGY
J. E. Bailey, presiding

1:00 Aiming the Magic Bullet for Sclerotium rolfsii. A. S. Csinos.

1:15 Summary of On-Farm Trials Evaluating Lorsban for White Mold Suppression on Peanuts. A. K. Hagan* and J. R. Weeks.

1:30 Effects of Tillage and Wheat Straw Mulch on the Germination and Incidence of Sclerotium rolfsii in Peanuts. D. L. Colvin*, B. J. Brecke, F. M. Shokes and D. G. Shilling.

1:45 Characterization of Partial Resistance to Sclerotium rolfsii in Field, Greenhouse, and Microplots. M. K. Beute, B. B. Shew* and J. C. Wynne.

2:00 Discussion

2:15 Use of Monoclonal Antibodies (MCA) for Detection of Peanut Mottle Virus (PMV). J. L. Sherwood*, M. R. Sanborn and H. A. Melouk.

2:30 Occurrence of Peanut Mottle Virus on Peanut in Egypt. M. K. Abo-El-Dahab, E. H. Wasfy, M. A. El-Goorani, H. M. El-Kasheir, E. E. Wagih and H. A. Melouk*.

2:45 Break

SESSION B. PRODUCTION TECHNOLOGY
F. J. Adamsen, presiding

1:00 Cultivar and Planting Date Effects on Peanut Diseases and Plant Deterioration. R. W. Mozingo*, D. M. Porter and T. A. Coffelt.

1:15 Peanut Cultivar Response to Row Spacing and Plant Density. J. S. Kirby* and C. Kitbamroong.

1:30 Simulation of Planting Date, Irrigation Treatment, and Defoliation Effects on Peanut Yields Using PEANUT. J. H. Young* and L. J. Rainey.

1:45 Rainfall Plus Irrigation Patterns and Soil Temperature Under the Canopy as Indication of Florunner Peanut Yield and Quality. J. I. Davidson, Jr.*, P. D. Blankenship, T. H. Sanders, R. J. Cole, R. J. Henning and W. R. Guerke.

2:00 Response of Peanuts to Phosphorus and Potassium Fertilization. D. L. Hartzog*, J. F. Adams and F. Adams.

2:15 Comparison of Soil and Foliar Applied Mn for Florunner Peanuts. M. E. Walker*, T. P. Gaines and B. G. Mullinix, Jr.

2:30 Calcium Studies on Peanuts in Florida. E. B. Whitty*, D. W. Gorbet, G. Kidder and F. M. Shokes.

2:45 Break

TWO CONCURRENT SESSIONS

1. SESSION A--PATHOLOGY AND MYCOTOXINS
2. SESSION B--PEANUT STRIPE VIRUS

SESSION A. PATHOLOGY AND MYCOTOXINS
Ruth A. Taber, presiding

3:00 Antagonistic Activities of an Unidentified Fungus Against Thielaviopsis basicola in Culture. S. W. Baard and G. D. C. Pauer*.

3:15 Peanut Response to 1,3-D in Meloidogyne arenaria and Sclerotium rolfsii Infested Soil. N. A. Minton* and A. S. Csinos.

3:30 Rapid Analysis of Peanuts and Peanut Products by Enzyme Immuno Assay for Aflatoxin. B. P. Ram, L. P. Hart*, J. J. Pestka, R. J. Cole and B. M. Miller.

3:45 Depression of Aflatoxin Production by Flavonoid-type Compounds from Peanut Shells. A. DeLucca*, M. Palmgren and D. Daigle.

4:00 Farmers' Planting Seed as a Source of Inoculum for Aspergillus flavus and A. niger on Groundnut in Senegal. J. P. Stack*, A. Ba and R. E. Pettit.

4:15 Incidence of Aspergillus flavus and Aspergillus niger in peanut pegs, immature pods, and kernels. R. E. Pettit*, C. L. Martin and O. D. Smith.

4:30 Peanut Disease Loss Estimates for Major Peanut Producing States in the United States for 1984 and 1985. R. V. Sturgeon, Jr.

5:30 BAR-B-Q & ENTERTAINMENT
Sponsored by UNIROYAL Chemical

SESSION B. PEANUT STRIPE VIRUS
Dan Gorbet, presiding

3:00 Peanut Stripe Virus in Arachis hypogaea L. J. W. Demski* and D. Warwick.

3:15 Use of Immunodiffusion Tests in Surveys of Peanut Plantings in Florida for Presence of Peanut Stripe Virus (PStV) and Peanut Mottle Virus (PMoV). D. E. Purcifull*, C. A. Baker, E. Hiebert, F. W. Zettler and D. W. Gorbet.

3:30 Status of Peanut Stripe Virus (PStV) in the Germplasm Collections of the S-9 Regional Project. G. R. Lovell.

3:45 Exchange of Peanut (Arachis) Germplasm. G. A. White.

4:00 Effect of Peanut Stripe Virus on Peanut Breeding. J. C. Wynne.

4:15 Peanut Stripe Virus--An APHIS Overview. S. Poe.

4:30 Discussion

5:30 BAR-B-Q & ENTERTAINMENT
Sponsored by UNIROYAL Chemical

FRIDAY, JULY 18

7:30 Breakfast
Awards Ceremony

8:30 Business Meeting

10:00 Adjourn

APRES

Finance Committee Report

July 15, 1986

The Finance Committee met on July 15, 1986 at the Pavilion Tower Hotel, Virginia Beach, VA.. The auditor's report and Peanut Science Editor's reports were reviewed and found to be in order.

The cash position of the Society was enhanced by $2,885.85; the inventory of Peanut Science and Technology was reduced by $2,341.92, thereby increasing the net worth by $543.93.

Present Net Worth: $104,184.76

The Committee prepared a proposed budget, and made the following recommendations to the Board of Directors:

1. *It is recommended that a system be devised to promote the sale of Peanut Science and Technology. (102 books were sold in 1985-86; remaining inventory, 1793).*
2. *It is recommended that an audit (audit-review) be conducted of the Society's books and Peanut Science's books each three (3) years.*

   Society - 1987 - 8

   Peanut Science - 1986 - 7

Respectfully Submitted,

Finance Committee:

W.E. Dykes, Chairman
T. West
J. Bone
J. Kirby
R.K. Howell

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
1986 - 1987 Budget

RECEIPTS	86-87 Budget
Membership & Registration	23,000
Proceedings & Reprint Sales	100
Special Contributions	3,000
Peanut Science & Technology	4,500
Peanut Science Page Charges & Reprints	13,000
Differential Postage Assessment - Foreign Members	2,500
Interest	3,000
APRES Methods Books	500
Total Receipts	49,600
EXPENDITURES	
Proceedings - Printing & Reprints	4,500
Annual Meeting	6,000
Secretarial	8,200
Postage	2,500
Office Supplies	1,000
Travel - Officers	1,000
Miscellaneous	700
Peanut Science	20,450
Peanut Science & Technology	800
Bank Charges	-
Peanut Research	2,200
Legal Fees	1,000
APRES Methods Books	500
Total Expenditures	48,850
Excess Receipts over Expenditures	750
Cash - Beginning of Period	63,017
Cash - End of Period	63,767

Publication and Editorial Committee

Five committee members and three ex-officio members were present at the annual meeting, July 15, 1986, at Virginia Beach, Virginia.

Harold Pattee, editor, reported that 34 manuscripts were submitted to Peanut Science from July 1, 1985, to June 30, 1986. The January-June 1985 issue consisted of 12 articles and 54 pages. The July-December 1985 issue consisted of 12 articles and 44 pages plus 3 index pages. The January-June 1986 issue consisted of 13 articles and 45 pages. This issue should be mailed to members by mid-August 1986 and will put Peanut Science back on schedule. One article has been accepted for the July-December 1986 issue and 20 articles are in review. Average article length was 3.86 pages.

Aubrey Mixon, editor, reported that four quarterly issues of APRES Peanut Research (Vol. 23, Issues 95-98 totaling 28 pages) were compiled, edited, published, and mailed to the APRES membership during the year. Circulation was approximately 700 in the U.S. and foreign countries. Peanut Research focused on news of people, grants, research thrusts by individuals and locations, updates on peanut scientists, APRES meetings, business of interest to members, and literature citations, consisting of 187 selected references and 19 theses and dissertations. Paul Backman, Bill Flanagen, Ron Hooks, David Knauft, Hassan Melouk, Morris Porter, Tom Stalker, and Leland Tripp served as reporters. All information from APRES Officers was published.

Sam Ahmed, editor, reported that 26 new copies of the Quality Methods book had been sold this year. One new method and one corrected method were completed this year and will be mailed to previous purchasers. Members with new methods are encouraged to contact the editor for publication in this book.

Terry Coffelt reported that the Proceedings of the 1985 APRES meetings were published with 184 pages consisting of two papers and 122 abstracts from seven technical sessions and three symposia/discussion sessions.

Terry Coffelt reported that 102 copies of Peanut Science and Technology had been sold this year.

The committee recommends that D. L. Hartzog (soils), J. H. Young (Modeling and Engineering), R. W. Mozingo (Production), M. K. Beute (Pathology), W. D. Branch (Breeding and Genetics), and T. H. Sanders (Physiology) be elected as Associate Editors of Peanut Science, and consideration be given to reducing the number of associate editors from 18 to 15 over the next 3 years if the rate of manuscript submission remains the same.

The committee recommends that the APRES Board of Directors reduce the price of Peanut Science and Technology to $20/copy to stimulate sales. If an across-the-board reduction in price was unacceptable, then the $20/copy price was suggested for foreign buyers, students, and buyers of a case (16) or more of books. The cost of mailing and handling would be in addition to the $20/copy price.

A subcommittee of Sam Ahmed (Chairman), Craig Kvien, and Mike Schubert was appointed to develop an editorial policy regarding publication by APRES of symposia papers presented at annual meetings. This policy is to be presented for discussion by the committee at the 1987 annual meeting in Orlando, Florida.

The committee, in behalf of the Society, expresses appreciation to our editors, authors, reviewers and other contributors to our Society publications.

Respectfully submitted:

D. J. Banks
W. T. Mills
N. L. Sugg
C. S. Kvien
A. M. Schubert
T. A. Coffelt, chairman
A. C. Mixon, Ex-Officio
H. E. Pattee, Ex-Officio
E. M. Ahmed, Ex-Officio

APRES Peanut Quality Committee

The meeting was called to order at 3:00 p.m. with 26 members present.

We discussed the importance and the impact on peanut quality that the 1986 growing conditions may have on this year's production. Three main areas of discussion were: a) Peanut Production (field practices), b) Digging (maturity testing), and c) Handling & Drying.

Mr. J. W. Dickens reported on the progress of investigations to improve and upgrade present grading standards. A suggestion to implement changes in handling procedures to remove LSK, trash, and dirt either at the farm or at the buying point was made. A discussion followed voicing the views of growers and shellers on this topic.

Mr. Doyle Welch introduced the topic of in-line sampling and asked for a progress report. Dr. J. I. Davidson, Jr. and Mr. J. W. Dickens gave this report.

Mr. Max Grice reported that PAC has adopted new storage standards for 1986 - maximum of 10% foreign matter and moisture level of 10%.

We discussed the recent issue of Kylar and its impact on the growers and shellers. A suggestion was made to direct this issue to the APRES Board of Directors, and for a letter to be drafted to EPA and the peanut industry expressing the Society's concern in the handling of the Kylar issue, and the potential impact in the future on products which are useful and necessary tools in quality peanut production. This was done by the chairman and the Board of Directors declined to get the Society involved at this time.

We discussed the new requirement by EPA, as of May 25, 1986, which requires each user of pesticides to provide training and have available material data safety sheets for each employee. Certain industries are exempt; therefore, each company should check with the State Pesticide Division to determine their status. Non-compliance may result in fines upon OSHA inspection of plant facilities.

Meeting adjourned at 4:40 p.m.

Committee members:

K. Rushing, chairman
D. T. Bateman
L. L. Khatri
E. J. Williams
K. Wanken
N. Lovegren
R. E. Pettit
T. H. Sanders
R. Pittman

SITE SELECTION COMMITTEE

The meeting was called to order at 1 p.m. on Tuesday, July 15 by chairman R. W. Mozingo. There were seven members, 1 ex-officio member and 1 guest present.

R. W. Mozingo made some general comments about the Virginia Beach meeting. The unexpected large attendance resulted in two other hotels providing rooms for APRES members. Van transportation between the hotels was obtained for these members.

Dan Gorbet and Ben Whitty reported on the Orlando, FL, meeting scheduled for July 13-17, 1987. A contract has been signed with the Marriott Inn for 80 rooms on July 13, 230 on July 14 & 15, 180 on July 16 and 30 on July 17. Rates will be $60 for a single and $65 for double, triple or quad during the meeting nights. A $50 flat rate will be honored the week-end before or after the meeting. The committee recommended that the room number be increased due to the large turnout at Virginia Beach. Dan and Ben will discuss this with the Marriott after receiving the exact room numbers occupied at this year's meeting. Literature on Orlando attractions was available at the APRES registration desk.

Bobby Clary reported that the Oklahoma group would like to recommend Tulsa for the 1988 meeting site. After discussion of three possible hotels, it was felt that the Sheraton Kensington for July 11-15, 1988, would be most suitable to our group. Minor details of the contract proposal were discussed. Bobby Clary and the Oklahoma group will work these out before signing the final contract. Fleet Sugg moved to accept this recommendation. Motion seconded and unanimously passed by the committee.

Fleet Sugg and Gene Sullivan reported that the North Carolina group would like to recommend Winston-Salem, North Carolina, for the site of the 1989 meeting. Historical Old Salem is located there plus R. J. Reynolds which owns Nabisco which owns Planters Peanuts and thus some ties to APRES. Also Ciba-Geigy headquarters is only about 20 minutes away. Hotel accommodations will be discussed at the 1987 meeting. Bobby Clary moved to accept the North Carolina delegation recommendation. Motion seconded and unanimously passed by committee.

The committee meeting adjourned at 3:15 p.m. R. W. Mozingo and Bobby Clary presented the recommendations of the Site Selection Committee to the APRES Board of Directors who approved their actions.

Respectfully submitted:

R. W. Mozingo, Chairman, Virginia
J. L. Steele, Virginia
E. B. Whitty, Florida
D. W. Gorbet, Florida
B. Berberet, Oklahoma
B. L. Clary, Oklahoma
G. A. Sullivan, North Carolina
N. L. Sugg, North Carolina

PUBLIC RELATIONS COMMITTEE REPORT

The public relations committee sent announcements of the annual meeting to over 100 persons in the agri-chemical industry on January 8, 1986. On June 26, additional letters were sent to major newspapers in Virginia and North Carolina as well as local TV stations representing the three major networks.

At the request of President D. H. Smith, the committee prepared a list of companies engaged in agri-business and with direct interest in the well-being of the peanut industry. Some 31 companies were identified who might have interest in becoming sustaining members of APRES. The list will be turned over to the Society's incoming president, D. M. Porter, for action as he deems appropriate.

The committee requested that resolutions from the APRES membership be sent to Fermenta Plant Protection Co., Rhone-Poulenc, Inc., Union Carbide Agricultural Products Co., and UniRoyal Chemical Co. expressing appreciation for their sponsorship of social activities. A resolution was also prepared to recognize the death of C. B. Smith, President of C. B. S. International Inc., Edenton, North Carolina.

Respectfully submitted,

P. M. Phipps, Chairman
C. Warnken
W. H. Bordt
D. L. Hartzog
D. Hogg
W. Fugate
H. Melouk

RESOLUTIONS

Whereas, **Fermenta Plant Protection Co.**, has contributed to the enjoyment of the annual meeting by supporting a social event,

Whereas, the event gives APRES members and families a time of fun and fellowship, and provides an incentive for meeting attendance,

Therefore, be it resolved that we express our sincere appreciation to all representatives of **Fermenta Plant Protection Co.** for their generous and continued support of APRES.

Whereas, **UniRoyal Chemical Co.**, has contributed to the enjoyment of the annual meeting by supporting a social event,

Whereas, the event gives APRES members and families a time of fun and fellowship, and provides an incentive for meeting attendance,

Therefore, be it resolved that we express our sincere appreciation to all representatives of **UniRoyal Chemical Co.** for their generous and continued support of APRES.

Whereas, Rhone-Poulenc, Inc., has contributed to the enjoyment of the annual meeting by supporting a social event,

Whereas, the event gives APRES members and families a time of fund and fellowship, and provides an incentive for meeting attendance,

Therefore, be it resolved that we express our sincere appreciation to all representatives of Rhone-Poulenc, Inc. for their generous and continued support of APRES.

Whereas, Union Carbide Agricultural Products Co., has contributed to the enjoyment of the annual meeting by supporting a social event,

Whereas, the event gives APRES members and families a time of fun and fellowship, and provides an incentive for meeting attendance,

Therefore, be it resolved that we express our sincere appreciation to all representatives of Union Carbide Agricultural Products Co. for their generous and continued support of APRES.

Whereas C. B. Smith, President of C. B. S. International Inc., Edenton, North Carolina, passed away in December 1985,

Whereas Mr Smith gave long and dedicated service to the peanut industry,

Therefore, be it resolved that we remember with reverence the life of Mr. Smith and his contributions to the peanut industry,

Therefore be it resolved that the American Peanut Research and Education Society, Inc. does hereby adopt these resolutions on the 18th day of July 1986.

BAILEY AWARD COMMITTEE REPORT

The 1986 Bailey Award for the best paper presented at the 1985 meeting in San Antonio, Texas, went to T. B. Brenneman, P. M. Phipps and R. J. Stipes for their paper entitled "Performance Characteristics of Dicloran, Iprodione and Vinclozolin for Control of Sclerotinia Blight of Peanut."

The selection process was basically as in the previous year (see 1983 APRES Proc., Vol. 15, p. 163). One paper from each of seven areas of specialization was nominated for the final judging. The following is a listing of dates and activities of the Bailey Award Committee for 1985-1986:

1) All nominees (7) were notified of their selection by mail by August 7, 1985.
2) Seven manuscripts were received by December 31, 1985.
3) Members of the Committee were sent copies of the manuscripts and score sheets on January 3, 1986.
4) Score sheets were returned to me by March 17, 1986. The papers were ranked by each evaluator on a scale of 1-20. The rankings produced a distinct winner.

The other six papers judged by the committee were (alphabetically by senior author):

1) W. F. Anderson, J. C. Wynne and C. C. Green. Potential for incorporation of early and late leafspot resistance in peanut.
2) P. D. Blankenship, R. J. Cole and T. H. Sanders. Comparative susceptibility of four experimental peanut cultivars and Florunner variety to preharvest aflatoxin contamination.
3) D. L. Hartzog and F. Adams. The effect of reduced tillage on peanut yields.
4) J. E. Pallas and N. Paz. Differences in phytosynthesis capacity among peanut genotypes related to carbon fixation by mesophyll cells.
5) L. M. Redlinger, H. B. Gillenwater and R. A. Simonaitis. Pirimiphos-methyl residues on packaged food commodities when applied as an ultra-low volume space treatment.
6) J. S. Smith. A semi-underground warehouse model for farmer stock peanuts.

Seven areas of specialization used in nominating papers presented at the 1985 meetings were:

1) Plant Pathology-Nematology
2) Production Technology-Pest Management
3) Physiology, Seed Technology, Processing and Utilization
4) Entomology
5) Breeding and Genetics
6) Extension Technology, Harvesting and Storage
7) Mycotoxins

Bailey Award Committee 1986:

M. K. Beute, Chairman	C. Swann	D. L. Ketring
J. C. Smith	M. C. Black	R. A. Taber

GOLDEN PEANUT AWARD ADVISORY COMMITTEE REPORT

The committee evaluated three nominees for the Golden Peanut Research and Education Award. The evaluation was forwarded to the National Peanut Council. The 1986 recipient, selected by the National Peanut Council, was A. H. Allison.

T. B. Whitaker, Chairman
D. A. Emery
A. J. Norden
L. Tripp
E. J. Williams
S. Drexler

NOMINATING COMMITTEE REPORT

The committee is pleased to nominate the following:

PRESIDENT-ELECT	Daniel W. Gorbet Agricultural Research Center Route 3, Box 493 Marianna, FL 32446
EXECUTIVE OFFICER	J. Ron Sholar Agronomy Department 376 Ag Hall Oklahoma State University Stillwater, OK 74078
BOARD OF DIRECTORS	
Industry Representative (Shelling, Marketing, etc.)	T. H. Birdsong, III P.O. Box 698 Gorman, TX 76454
Industry Representative (Manufactured Products)	Doyle Welch Columbia Peanut Company Box 226 De Leon, TX 76444

1985-86 Nominating Committee:

H. A. Melouk
Rufus Keel
Gale A. Buchanan, Chairman

Liaison Representative Report
American Society of Agronomy
American Peanut Research and Education Society

The 77th Annual Meeting of the American Society of Agronomy (ASA) was held in Chicago, December 1-6. The liaison representative was unable to attend.

Dale N. Moss was installed as president and Robert G. Gast as president-elect of ASA; James B. Beard as president and Donald V. Duvick president-elect of CSSA; and John Pesek as president and Larry L. Boersma president-elect of SSSA.

The ASA committee assignments were reviewed and a description of duties for the ASA liaison representative to APRES was prepared. The establishment of a similar set of guidelines by APRES for the liaison representative to ASA is suggested.

The 1986 annual meeting of the American Society of Agronomy will be held at New Orleans, La. November 30 - December 5, 1986.

Respectfully submitted

Olin D. Smith

FELLOWS COMMITTEE REPORT

The Fellows Committee nominated the following persons for election to Fellowship by the American Peanut Research and Education Society:

Olin D. Smith
Daniel L. Hallock
Clyde T. Young

Fellows Committee:

A. Perry, chairman
R. Hammons
L. Tripp
H. Pattee
A. Norden
W. Campbell
T. Boswell

FELLOWS - 1986

American Peanut Research and Education Society

Olin D. Smith, Professor, Soil and Crop Sciences Department, Texas A&M University, College Station, Texas, has been active in peanut breeding research since 1970. He has been author or co-author on 68 scientific papers, book chapters and technical papers and at least 30 articles in trade journals. He has been author or co-author on 26 abstracts and papers presented. His major research activity has been in developing peanut varieties with resistance to pod rot organisms and nematodes, but he has also played a major role in breeding for leafspot resistance and in the variety testing program. Dr. Smith has been co-developer on three peanut variety releases; 'Tamnut 74', 'Toalson', and 'Langley', and on two germplasm releases, 'TxAG-1' and 'TxAG-2'. He also teaches graduate level plant breeding and has served as major advisor for 11 graduate students and as committee member for 26 other students.

Dr. Smith has served as President of APRES and on the Board of Directors in that capacity. He has been Program Chairman, Technical Program Chairman and Coordinator of the APRES Proceedings. Committees he has served on include: Quality, Awards, Nominations, and Publications and Editorial. He has been vice-chairman and chairman of the Publications and Editorial Committee as well as chairman of the subcommittee on book sales. He is an Associate Editor of Peanut Science and the APRES Liaison Representative to the American Society of Agronomy.

Dr. Smith is recognized internationally for his peanut breeding expertise and currently serves on the Technical Committee for the CRSP program in the Semi-Arid Tropics. He has a major leadership role in the peanut research group at Texas A&M University, and The Texas Agricultural Experiment Station.

Daniel L. Hallock, retired Soil Scientist, Tidewater Research Center, Virginia Polytechnic Institute and State University, Suffolk, VA, has been active in peanut nutrition research since 1952. He retired on January 1, 1984. His research responsibilities were primarily in the areas of soil chemistry and soil fertility of general crops of southeastern Virginia. He authored or co-authored more than 150 scientific and professional publications and abstracts. His research contributes to an estimated $7.5 million annual grower savings in Virginia. These savings are the direct result of Dr. Hallock's soil nutrition research in the areas of disease control and suppression, seed germinability, internal seed damage control, indirect fertilization methods, time of plowing and landplaster usage. Much of his research is directly applicable to current peanut production practices and other regions of the U.S.

Dr. Hallock's collection and dissemination of agricultural weather data at the Tidewater Research Center is typical of his professional dedication to agricultural research and should be noted. His weather records, maintained from 1952 to 1984, have been used extensively by crop production research scientists, extension specialists, producers, processors and local industry.

Dr. Hallock has served as director, vice-chairman and chairman of PIWG, the first predecessor organization of APRES. In this capacity, he was a principal participant and motivator in the establishment of the American Peanut Research and Education Association at the last meeting of PIWG in Norfolk, VA, July 1968. He has served the Society in many other ways, as a member and chairman of the finance committee, as a member of technical program and local arrangements committees and as chairman of an ad hoc committee for revision of the book "Peanuts - Culture and Uses." He contributed to the establishment and development of Peanut Science, the refereed publication of APRES, and served as an associate editor for 6 years.

Clyde T. Young, Professor of Food Science, North Carolina State University, Raleigh, NC, has been active in peanut research since 1960 and has authored or co-authored over 190 scientific publications and presentations dealing with peanut flavor including 6 chapters in books. He developed and initiated use of the Arginine Maturity Index (AMI) and used it as an "in field" method of measuring peanut maturity. His interest in peanut flavor began during his work at the Georgia Experiment Station on chemical analysis of peanut flavor and continues at NCSU. At NCSU, he developed a rapid headspace analysis method for evaluating peanuts for flavor defects. His present research concentrates on the sensory evaluation of nut flavor. He was active in PIWG prior to transformation to APRES, is Associate Editor of PEANUT SCIENCE, past editor of PEANUT QUALITY METHODS, Chairman of the Quality Committee and co-editor of PEANUT SCIENCE AND TECHNOLOGY. He has recently completed sabbatical work in the Sensory Laboratory of Rose Marie Pangborn at the University of California-Davis.

BY-LAWS
of
AMERICAN PEANUT 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 educational 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 : $ 15.00
b. Institutional membership : $ 15.00
c. Organizational memberships: $ 25.00
d. Sustaining membership : $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 registration fee approved by the Board of Directors will be assessed at all regular meetings of the Society. The registration fee for student members shall be one-third that of members.

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 officer 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 officer 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. Forty voting members shall constitute a quorum for the transaction of business at the business meeting held during the annual meeting.

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 Society shall consist of the president, the president-elect, the immediate surviving past-president and the executive officer

of the Society who may be appointed secretary and treasurer and given such other title as may be determined by the Board of Directors.

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.

Section 3. The officers and directors, with the exception of the executive officer, 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, president-elect, and surviving past-president shall serve without monetary compensation. The executive officer shall be appointed by a two-thirds majority vote of the Board of Directors.

Section 4. The executive officer may serve consecutive yearly terms subject to appointment by the Board of Directors. The tenure of the executive officer may be discontinued by a two-thirds majority vote of the Board of Directors who then shall appoint a temporary executive officer 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 executive officer, 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 officer 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 officer 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 officer shall keep account of all monies, credits, debts, and property of any and every nature accrued and/or disbursed by this Society, 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 officer 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
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 education, 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. The president of the National Peanut Council.

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

Section 2. Terms of office for the directors' positions set forth in Section 1, paragraphs d, e, and f, shall be three years with elections to alternate from reference years as follows: e, 1972; d and f(1), 1973; and f(2) and f(3), 1974.

Section 3. 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 4. 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 5. 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 6. Contingencies not provided for elsewhere in these By-Laws shall be handled by the Board of Directors in a manner they deem desirable.

Section 7. An Executive Committee comprised of the president, president-elect, immediate surviving past president, and executive officer shall act for the Board of Directors between meetings of the Board, and on matters delegated to it by the Board. Its action shall be subject to ratification by the Board.

ARTICLE IX. COMMITTEES

Section 1. Members of the committees of the Society shall be appointed by the president and shall serve three-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 re-appointed to succeed himself, and may serve on two or more committees concurrently but shall not hold concurrent chairmanships. Initially, one-third of the members of each committee will serve one-year terms, and one-third of the members of each committee shall serve two-year terms, as designated by the president. The president shall announce the committees immediately upon assuming the office at the annual business meeting. The new appointments take effect immediately upon announcement.

Section 2. Any or all members of any committee may be removed for cause by a two-thirds approval by the Board of Directors.

Section 3. The existing committees of the Society are:

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. Publication and Editorial Committee: This committee shall consist of at least three members for three-year terms, one each representing State, USDA, and Private Business segments of the peanut industry. The members will normally serve two consecutive three-year terms, subject to approval by the Board. Initial election shall alternate from reference years as follows: private business, 1983; USDA, 1984; and State, 1985. This committee shall be responsible for the publication of Society-sponsored publications as authorized 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 seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from the university of the host state who will serve a one-year term to coincide with the term of the president-elect. The primary purpose of this person will be to publicize the meeting and make photographic records of important events at the meeting. 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. These shall include, but not be limited to, preparing news releases for the home-town media of persons recognized at the meeting for significant achievements.

(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 deceased members.

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

f. Bailey Award Committee: This committee shall consist of at least six members, with two new appointments each year, serving three-year terms. This committee shall be responsible for judging papers which are selected from each subject matter area. Initial screening for the award will be made by judges, selected in advance and having expertise in that particular area, who will listen to all papers in that subject matter area. This initial selection will be made on the basis of quality of presentation and content. Manuscripts of selected papers will be submitted to the committee by the author/s and final selection will be made by the committee, based on the technical quality of the paper. The president, president-elect and executive officer shall be notified of the Award

recipient at least sixty days prior to the annual meeting following the one atwhich the paper was presented. The president shall make the award at the annual meeting.

g. Fellows Committee: This committee shall consist of six members, two representing each of the three major geographic areas of peanut production and with balance among state, USDA and private business. Terms of office shall be for three years with initial terms as outlined in Section 1 of this ARTICLE. The committee shall select from nominations received, according to procedures adopted by the Society (P148-9 of 1981 Proceedings of APRES), qualified nominees for approval by the Board of Directors.

h. Golden Peanut Research and Education Award Committee: This committee shall consist of six previous Golden Peanut Award recipients, representing each of the three areas of peanut production. Terms of office shall be for three years as outlined in Section 1 of this Article. This committee shall serve as an advisory committee by screening nominations received by the National Peanut Council. The final selection shall be made by the National Peanut Council. For even-numbered years, the award shall be made for research accomplishments and for odd-numbered years, the award shall be made for educational accomplishments.

i. Site Selection Committee: This committee shall consist of eight members, each serving four-year terms. New appointments shall come from the state which will host the meeting four years following the meeting at which they are appointed. The chairman of the committee shall be from the state which will host the meeting the next year and the vice-chairman shall be from the state which will host the meeting the second year. The vice-chairman will automatically move up to chairman.

ARTICLE X. DIVISIONS

Section 1. A Division 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 consistently 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 12, 1985, San Antonio, Texas

1985-86 APRES MEMBERSHIP

Individuals	455
Students	27
Organizations	66
Sustaining	27
Institutional	102
TOTAL	677

MEMBERSHIP TYPE: INDIVIDUALS

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