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Somatic Embryogenesis from Peanut Embryo Axis Segments. T.K. HUANG*, B.B. JOHNSON, and D.L. KETRING, Dept. of Agronomy, Dept. of Botany, Oklahoma State University, and USDA-ARS, Southern Plains Area, Stillwater, OK 74076.

The successful exploitation of in vitro techniques in plant biotechnology depends on the establishment of efficient regeneration systems. Plant regeneration from cultured tissues of peanut occurs at a low frequency through organogenesis, which limits the application of biotechnology to the improvement of peanut. Somatic embryogenesis is another route for plant regeneration from in vitro culture. In this study we evaluated the effect of auxins at different levels on peanut somatic embryogenesis and the effect of activated charcoal and sucrose content on germination of somatic embryos and plant regeneration. Three genotypes, Okrun, Pronto, and SB-11 were used in this study. Embryo axes dissected from sterilized peanut seeds were shattered into segments after immersing in liquid nitrogen for three minutes. Embryo axis segments were cultured on modified SL medium containing 5, 10, or 20 mg/liter of 2,4 dichlorophenoxyacetic acid (2,4-D); 5, 10, or 20 mg/liter of naphthaleneacetic acid (NAA); or 0.5, 1, or 2 mg/liter of picloram to induce somatic embryogenesis. After 30 days, somatic embryos were transferred to SL basal medium containing 30 or 60 g/liter of sucrose with or without 3 g/liter of activated charcoal for germination and plant regeneration. Somatic embryo formation could be observed ten days after culture initiation. Most of the somatic embryos originated from the basal end of embryonic leaf segments. Among three genotypes, Okrun was most responsive to medium containing NAA and picloram. Picloram was the most effective growth regulator for the induction of somatic embryo formation. An increase in embryo formation with the increase of picloram concentration was observed in Okrun. Concentration of 2,4-D above 5 mg/liter reduced somatic embryo formation in Okrun and SB-11. Plants have been successfully regenerated from somatic embryos cultured on germination media. Medium containing 30 g/liter sucrose and 3 g/liter activated charcoal gave the highest regeneration rate while the NAA-induced somatic embryo showed the best regenerative response.

Effect of Crop Rotation and Irrigation on Soilborne Diseases and Yield of Florunner Peanut. J. C. JACOBI, P. A. BACKMAN, and R. RODRIGUEZ-KABANA. Department of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL 36849-5409.

Crop rotations involving corn (Zea mays L.), and bahiagrass (Paspalum notatum Flugge), with Florunner peanut (Arachis hypogaea L.) were evaluated to determine effects on Rhizoctonia limb rot (Rhizoctonia solani Kühn AG-4), stem rot (Sclerotium rolfsii Sacc.), and root-knot nematode (Meloidogyne arenaria (Neal) Chitwood). Plots were evaluated under both irrigated and non-irrigated conditions. In 1990, limb rot severity in irrigated plots was 158% higher than in non-irrigated plots. Limb rot severity in irrigated plots following either one or two years of bahiagrass was reduced 16 and 43%, respectively, from nonrotated peanuts. Limb rot severity was not reduced in peanut plots following one year of corn. Stem rot was not reduced in any of the cropping sequences evaluated. However, continuous peanuts had the lowest incidence of stem rot. Both corn and bahiagrass are nonhosts of S. rolfsii, and longer rotations with these crops should reduce inoculum potential. Population densities of M. arenaria were reduced with bahiagrass rotations. Peanut rotations with one or two years of bahiagrass had 16 and 43% higher yields, respectively, over continuous peanuts. The reduction in limb rot severity and root-knot nematode densities are both thought to be primary factors in yield increases for bahiagrass-peanut rotations. These preliminary results indicate that one and two year peanut rotations with bahiagrass had the potential to reduce limb rot and root-knot severity; however, stem rot was not reduced.

Feeding Behavior of Fall Armyworm on Florunner Peanut. S.S. DEITZ*, J.W. CHAPIN and J.S. THOMAS. Clemson University, Dept. of Entomology, Edisto Res. & Ed. Center, Blackville SC 29817.

Fall armyworm, *Spodoptera frugiperda* (J. E. Smith), is a common canopy inhabiting pest of peanut. This species is considered a foliage feeder due to the conspicuous leaf and terminal feeding of all larval instars. However, we have observed high rates of peg damage in fields infested with this and other canopy inhabiting species. Five 3rd instar larvae were placed on ten 'Florunner' peanut plants and feeding behavior was observed twice daily until pupation. The plant part feeding distributions were significantly different ($P = 0.05$) for each instar except the 3rd and 4th. Third and 4th instars fed primarily on young foliage, blooms, and axillary buds. The percent feeding observations being 40.3%, 27.8%, and 26.9%, respectively. Fifth and 6th instars combined, fed less on blooms (8.8%) and axillary buds (7.8%), and more on foliage (51%) and pegs (19.5%). Depending on instar, 50-65% of fall armyworm feeding observations were on blooms, pegs, and axillary buds rather than on foliage and terminals. One fall armyworm larva severed an average of seven pegs and partially damaged five more in its lifespan. Each larva also consumed an average of 4.4 tetrafoliate leaves (3rd-6th instars).

Prediction of Crop Maturity for Peanuts from percent Oleic Acid in Oil. **M.J. HINDS*, B. SINGH, G.M. SAMMY, W. A. MELLOWES.** Dept. of Chemical Engineering, University of the West Indies, St. Augustine, Trinidad; Dept. of Food Science, Alabama A & M University, Normal, AL 35762.

Weight percent of oleic acid in oil (OL) of composite seeds was previously used to establish optimum reaping time (ORT) for NC2 peanuts grown in St. Vincent, Eastern Caribbean. ORT for each crop was the digging day on which maximum percentage of mature pods was obtained by the Shellout Method. OL in composite seeds at ORT was $55.75 \pm 0.59\%$. To minimise sampling on the small Caribbean farms, theoretical estimation of OL from composite seeds for prediction of ORT was thus investigated. Factors related to soil conditions, air-temperature and solar irradiance were incorporated into regression analyses on OL values from samples collected periodically over 3 years from 2 soil types. The soil types were volcanic-clay and volcanic-sandy loams. Typical equations obtained were:

(i) $OL = b_0 + (b_1 * DAP) + (b_2 * L) + (b_3 * M)$, and

(ii) $DORT = b_0 + (b_1 * OL) + (b_2 * L) + (b_3 * M)$,

where b_0 = intercept; b_1, b_2, b_3, = regression coefficients; L and M - environmental factors; DAP = number of days after planting; DORT = number of days to optimum reaping time. These equations were tested over the month preceeding ORT for each crop. The equations reliably (i) estimated OL in composite seeds as crops matured, and (ii) predicted crop maturity to within 3 days of the ideal reaping day.

Production of Stable Transgenic Peanut Calli (*Arachis hypogaea* L.). T. E. CLEMENTE*, A. K. WEISSINGER, and M. K. BEUTE. Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.

Stable introduction of foreign genes into peanut callus has been achieved via high velocity microprojectile bombardment. Embryonic leaves excised from 4 day old peanuts were bombarded with 1.0 μm tungsten particles coated with plasmid DNA (pRT99-gus) carrying genes for both beta-glucuronidase (GUS) and the selectable marker, neomycin phosphotransferase II (NPT II), providing resistance to kanamycin. Each bombardment delivered approximately 377 ng of DNA. Bombarded leaflets were placed on an MS-based medium amended with 50 ppm kanamycin and subcultured at 2 week intervals onto fresh medium. Rapidly growing chlorophyllous islands of cells were observed within slow-growing, white calli, after two or three subcultures. These cell masses were transferred to fresh medium and subsequently characterized. A total of eight transgenic callus lines have been identified. DNA hybridization analysis (Southern blot) reveals the presence of multiple integrated copies of both NPT II and GUS sequences in each transgenic line. Polymerase chain reactions performed on genomic DNA isolated from these calli produced amplification products which are consistent with the presence of both full-length and rearranged copies of NPT II and GUS coding sequences in the transformants. NPT II assays were positive, though variable, for all lines tested. Five of the eight lines tested for GUS expression were also positive. Transgenic calli have been shown to grow significantly more rapidly on kanamycin amended medium than non-transgenic control calli.

Enhanced Elicitation of Phenolics in Peanut Cotyledons by N-Carboxymethyl Chitosan at Different Water Activity Levels. J. E. FAJARDO*, R. E. PETTIT, R. D. WANISKA and R. G. CUERO. Departments of Plant Pathology & Microbiology and Soil & Crop Sciences, Texas A & M University, College Station TX 77843; and Cooperative Agriculture Research Center, Prairie View TX 77446.

N-carboxymethyl chitosan (NCMC) was used to elicit phytoalexin production, mostly phenolics in nature, as a defense mechanism against fungal invasion in peanut. Accumulation of phenolic compounds was influenced by level of water activity (a_w), the available water for microbial growth and activity. Folin-Ciocalteu assay was used to determine the amount of total polyphenols (mg/g of tissue) in peanut cotyledons (cv. Starr). Treatments included NCMC at 0.5% (w/v), *Aspergillus flavus* (str. NRRL 3357) at 10^3 spores/ml concentration, NCMC + *A. flavus* and water (control). The seeds were adjusted to .85 and .95 a_w levels and incubated up to 72 hr. In all treated seeds, there were more free phenolic compounds (FPC) than bound phenolic compounds (BPC). More FPC (1.23-1.69 mg/g) and BPC (0.19-0.30 mg/g) were present at .85 a_w than at .95 a_w. The NCMC + *A. flavus* treated seeds had higher levels of BPC than the control. Maximum BPC level was obtained after 24 hr of incubation. More FPC was observed in seeds from NCMC treatment at .85 a_w (6-12 hr of incubation) and at .95 a_w (48-72 hr of incubation). High performance liquid chromatography (HPLC) revealed the presence of ferulic acid, *p*-coumaric acid and an unknown compound as bound phenolic acids. Free phenolic acids included *p*-hydroxybenzoic, caffeic, gentisic, ferulic and *p*-coumaric along with unknown compounds. This indicates that NCMC induced peanuts to increase production of free phenols quickly and bound phenols later in its response to stress. These increased levels of phenols could limit *A. flavus* invasion and aflatoxin production.

Diallel Analysis of Root Length, Root Volume, and Fruit Weight of Four Peanut Genotypes and Their F1 Hybrids. J.B. MORRIS*, D.L. KETRING AND J.S. KIRBY. USDA-ARS, Southern Plains Area and Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74075.

Four peanut (Arachis hypogaea L.) genotypes representing each botanical type (spanish, valencia, and virginia) were crossed in a diallel mating system to produce F1's. The 12 F1's and the four parents were evaluated for root length, root volume, and fruit weight in a replicated greenhouse and field test. The data were subjected to a combining ability analysis. General (GCA) and specific (SCA) combining ability effects were estimated. The results showed that both root length and fruit weight were controlled largely by nonadditive genetic effects. For root volume, both additive and nonadditive genetic effects were important. Estimates of GCA for UF 77318 and PI 405915 were good for root length. Other genotypes with good GCA were Chico and PI 355993 for root volume and UF 77318 for fruit weight. Positive SCA effects were identified for root length. PI 405915 X PI 355993 had a significant positive SCA effect for root volume. UF 77318 X Chico and its reciprocal showed a significant positive SCA effect for fruit weight. Positive associations between root length and root volume, and root volume with fruit weight should result in progenies with longer root lengths, and higher root volumes coupled with increased yields.

BREEDING AND GENETICS

Seed Size Variability Among Peanut Genotypes. D.A. KNAUFT*, D.W. GORBET, and F.G. MARTIN. Dept. of Agronomy, University of Florida, Gainesville FL 32611 and Marianna FL 32446, and Dept. of Statistics, University of Florida, Gainesville FL 32611.
Uniformity of seed size within a peanut genotype is a desireable attribute for improved processing efficiency and marketing of peanut products. This study was conducted to determine whether seed size uniformity differed among peanut genotypes. A four replication, randomized complete block experiment with thirteen peanut genotypes was grown at Gainesville and Marianna, FL from 1987 to 1989. Seed size variation was determined at harvest maturity by weighing the seed that were separated by a series of screens conforming to official grade standards. Average seed diameter and standard deviation were determined. Analysis of variance was used to examine differences in both parameters. One genotype, F1037, had the most uniform seed size at both locations and in all years of the experiment. F1011, a breeding line developed at Gainesville, was similar in variability to F1037 in each year of the study at Gainesville, but was more variable at Marianna. Conversely, the Marianna line UF86107 had more variation in seed size at Gainesville than F1037, but was similar to F1037 at Marianna. Runner market types were more uniform than virginia types, although seed size within the runner market type was not correlated with standard deviation. Because some genotypes were less variable than the standard cultivar Florunner, development of cultivars with more uniform seed size should be possible.

Restriction Fragment Length Polymorphism Evaluation of Six Peanut Species within the Arachis Section. O.G. PAIK-RO*, R.L. SMITH, and D.A. KNAUFT. Dept. of Agronomy, University of Florida, Gainesville FL 32611-0311.
Restriction fragment length polymorphism was assessed among six peanut species within the Arachis section; this included accessions from both subspecies of the tetraploid cultivated species, A. hypogaea L., subsp. hypogaea (runner market types 'Southern Runner,' 'Okrun,' F79308-1, and AT 22-714, and virginia market types F89109, F1036, and F892513), and subsp. fastigiata var. fastigiata (F89501, F89509, F89512) and var. vulgaris (F89506, F89508, F435, F78-1339); the tetraploid wild species, A. monticola Krap. et Rig. (PIs 219824, 263393, 405933, 467260, 467261, 468196, and 468199); and four diploid wild species, A. batizocoi Krap. et Greg. (PIs 298639, 468327, 468328, and 468326), A. cardenasii Krap. et Greg. nom. nud. (PIs 262141, 475999, 476011, and 476014), two interspecific hybrids of A. hypogaea and A. cardenasii (NC104 and NC303), A. duranensis Krap. et Greg. nom. nud. (PIs 219823, 468200, 468201, 475844, and 475846), and A. glandulifera Stalker (PIs 468336, 468341, 468342, and 468343). While two tetraploid species, A. hypogaea and A. monticola, did not show polymorphism with fifteen PstI-digested random genomic probes, two of seven cDNA probes detected polymorphism within the tetraploids. The RFLP variation detected by cDNA probes was related to structural changes occurring within tetraploid species. Subspecies fastigiata of A. hypogaea was shown to be more variable than subspecies hypogaea of A. hypogaea or A. monticola. A. monticola displayed the same restriction fragment patterns as the A. hypogaea subspecies and was found to be more closely related to subspecies hypogaea than to subspecies fastigiata. Diploid species, A. cardenasii, A. duranensis, and A. glandulifera showed considerable genetic diversity within species, but A. batizocoi showed little polymorphism. Genetic distance between cultivated peanut and wild diploid species was found to be closest for A. duranensis.

Variability Among In Vitro Regenerated Interspecific Hybrids in *Arachis*. C. SINGSIT* and P. OZIAS-AKINS. University of Georgia, Coastal Plain Experiment Station, Department of Horticulture, Tifton, GA 31793.

Several interspecific hybrids between *A. hypogaea* L. ($2n=4x=40$) and *A. stenosperma* Krap. et Greg. (*nom. nud.*) ($2n=2x=20$) were successfully regenerated by culturing immature embryos in vitro. Based on chromosome counts in root tips, the majority of these hybrids were triploid and a few had chromosome numbers lower than 30. Some of the triploid hybrids have been colchicine-doubled to hexaploid. A correlation between the chloroplast number in guard cells and chromosome counts in root tip cells was observed. Chloroplasts could be observed after scraping the mesophyll tissues from the abaxial epidermis, and staining with 0.5% fluorescein diacetate (FDA). A cover slip was mounted and chloroplasts were counted under a fluorescence microscope. The chloroplasts that absorbed the FDA appeared green whereas unstained chloroplasts were red due to auto-fluorescence of the chlorophyll. The number of chloroplasts per pair of guard cells corresponded to diploid, 6-8; triploid, 9-11; tetraploid, 11.5-13; and hexaploid, 14-16. We found that in vitro grown leaves allowed much easier preparation and scored more accurately than greenhouse or field material. Male fertility, as determined by percent stainable pollen in 1% acetocarmine, indicated high variabilty among the hybrids (0-59%). Most of the fertile triploid hybrids appeared to have restored pollen (unreduced gametes; $2n=3x$ pollen grains) instead of normal $1n$ gametes. Data on pollen stainability and some fruit set observed suggests that triploid hybrids can be useful to transfer the wild species genome into cultivated *A. hypogaea*. Preliminary results based on the amplification of random DNA segments with single primers of arbitrary nucleotide sequence have detected species-specific polymorphisms among hybrids.

Preliminary Evaluation of Peanut Plant Introductions for Minimum Descriptors and Resistance to Two Diseases. T.A. COFFELT* and D.M. PORTER. USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.

Developing pest resistant peanut (Arachis hypogaea L.) cultivars continues to be a major objective of most U.S. peanut breeding programs. Identifying sources of resistance is the first step in developing resistant cultivars. Over 500 plant introductions representing the four U.S. market types and three of the cultivated botanical types were grown at Suffolk, Virginia, in 1988 and 1989. Each entry was evaluated for characteristics on the minimum descriptor list and selected entries for resistance to both sclerotinia blight, caused by Sclerotinia minor, and early cercospora leafspot, caused by Cercospora arachidicola. Entries varied in growth habit (spreading to erect), flowers on the main stem (absent or present), stem color (purple to green), leaf color (light to dark green), plant size (dwarf to large), maturity (very early to late), pod characteristics (size and constriction), and seed characteristics (size and testa color). The plant introductions most resistant to Sclerotinia blight were PI 196756, PI 461461, PI 462322, PI 512245, PI 512247, PI 512268, PI 512269, PI 512274, and PI 512275. Eight of these lines were from China and one from Martinique. Two were valencia market types, two virginia market types, and five runner market types. All have either bunch or erect growth habit and early maturity. The plant introductions most resistant to leafspot were PI 109839, PI 162533, PI 179630, PI 179842, and PI 259658. They were from Venezuela, Argentina, India, and Cuba. Four are runner market types and one a valencia market type. Four have spreading growth habits and one a bunch growth habit. All were late maturing. Generally, plant introductions resistant to sclerotinia blight were highly susceptible to early cercospora leafspot, and those resistant to cercospora leafspot were highly susceptible to sclerotinia blight. Use of these plant introductions in breeding programs should help in the development of resistant cultivars.

Interspecific Incompatibility in the Genus Arachis. TALLURY P. S. RAU*, H. T. STALKER and H. E. PATTEE. Crop Science Dept. and USDA-ARS, Botany Dept., North Carolina State Univ., Raleigh, NC 27695.

Diploid Arachis species are potential gene sources of many economically important traits. Attempts to transfer these genes for agronomic improvement of A. hypogaea are restricted primarily because of genetic incompatibilities and reproductive barriers. To clarify causes leading to embryo abortion and failure of desired crosses, two A. hypogaea cvs., NC 6 (subsp. hypogaea var. hypogaea) and Argentine (subsp. fastigiata var. vulgaris), were crossed, in reciprocal, with four section Arachis species: A. spegazzinii (GKP 10038 11; PI 262133), A. cardenasii (GKP 10017; PI 262141), A. batizocoi (K 9484; PI 298639), and A. glandulifera (GKSSc 30098; PI 468341). Ten developing pegs were randomly collected at 1 through 7, 14, and 21 days after pollination for each cross as well as parent selfs. Materials were dehydrated, paraffin embedded, sectioned, and embryos microscopically observed. Fertilization occurred within 24 hours after self-pollination in NC 6, Argentine, and A. spegazzinii. In contrast, fertilization continued to occur up to 72 hours after selfing in A. glandulifera and A. cardenasii. However, developing embryos of similar growth stages were observed in the embryo sacs of parental species at 5 days after self-pollination, except in A. cardenasii. Arachis cardenasii females in crosses exhibited a very low reproductive efficiency and embryos aborted within 5 days. When using the other three species as females, normal embryo growth was observed through day 4, but then slowed resulting in abortion within 7 days. In female A. hypogaea cultivars, abortion occurred between 7 and 14 days in many crosses; but several late globular to early heart-shaped embryos were observed at day 21. This suggests that maternal parent may have a greater influence on interspecific crosses than choice of species in section Arachis for most crosses, indicating possible nuclear-cytoplasmic interactions may cause failure of crosses in peanut.

Ethnobotanical Evidence for the Bolivian Origin of the Valencia Peanut. D.E. WILLIAMS. Institute of Economic Botany, The New York Botanical Garden, Bronx, NY 10458.

A recent study of contemporary native cropping systems in the Bolivian Amazon sheds new evidence supporting the theory that this area was the center of origin for the valencia botanical type peanut (Arachis hypogaea L. ssp. fastigiata Waldron var. fastigiata). The characteristic morphological and phenological traits of the local valencia landraces are shown to correspond closely with the agronomic requirements of the indigenous peanut cropping system that utilizes the seasonally exposed sandbars of Amazonian headwater streams. Diagnostic subspecific plant characters such as earliness, sequential flowering, erect habit, fertile mainstem, loss of seed dormancy, and strong pegs are seen as direct adaptations to the short season, susceptability to flooding, and native planting and harvesting practices particular to this agroecosystem. Archeological and historical evidence, as well as the current distribution and diversity of local valencia landraces further support the notion that ancient people living in this region developed the valencia botanical type peanut in order to better exploit the rich agricultural potential of the riverine sand bars. This information has important implications for crop genetic resource conservation and local agricultural development projects.

Segregation of resistance to Meloidogyne arenaria in progeny of interspecific hybrids. J. L. STARR and C. E. SIMPSON*. Department of Plant Pathology and Microbiology, Texas Agricultural Experiment Station, College station, TX 77843; and Texas Agricultural Experiment Station, Stephenville, TX 76401.

Two lines of the root-knot susceptible Arachis duranensis (30069 and 30078) (female parent) were crossed with the nematode-resistant A. cardenasii (10017). All F_1 individuals were highly resistant to the reproduction of the nematode in greenhouse tests. In the F_2 generation, plants derived from the 30069 X 10017 cross had low vigor and 49/80 did not survive long enough to rate for resistance to nematodes. Of the surviving individuals, 3/31 plants were susceptible to nematode reproduction with 190 nematode eggs/g roots, 3/31 were moderately resistant with 2.5-12.5% of the number of eggs per gram of roots as were present on the susceptible parent, and 25/31 were resistant with <2.5% of the number of eggs per gram of roots of the susceptible parent. Plants from the F_2 generation of the 30078 X 10017 cross had greater vigor with 124/150 plants surviving. Of these plants, 4/124 were susceptible with 760 eggs/g roots, 7/124 were moderately resistant, and 113 were resistant. We have concluded that resistance to M. arenaria in A. cardenasii is conditioned by several dominant genes.

Resistance to Meloidogyne arenaria in Arachis hypogaea. C. C. HOLBROOK*, J. P. NOE and N. A. MINTON. USDA-ARS, Tifton, GA; Dept. of Plant Path. UGA, Athens, GA; and USDA-ARS, Tifton, GA.

The peanut root-knot nematode (Meloidogyne arenaria) causes significant economic losses throughout the southern part of the U.S. peanut (Arachis hypogaea) growing area. Chemicals for control of this pest are becoming increasingly limited, and there are no known sources of resistance within the U.S. A. hypogaea collection. The objectives of this research were: (1) rate egg mass production on 1,500 plant introductions using a greenhouse screening technique, (2) make selections based on high and low egg-mass ratings and (3) conduct more intensive field and greenhouse studies of these selections to evaluate this method for identifying resistance to the peanut root-knot nematode. Fifteen hundred plant introduction were examined using a preliminary greenhouse screen with three replications. Host response (galling) and pathogen reproduction (egg mass production) were rated using 0 to 5 scales. Selections with high and low ratings were subjected to more intensive greenhouse and field studies. Seventeen of the 27 low selection supported fewer ($P \leq 0.05$) egg masses than florunner. Seven of these genotypes supported less egg production per gram of fresh root weight than florunner. Three of the eight high selections supported more nematodes per plant than florunner, and had a greater host efficiency. One of these genotypes supported more eggs production per gram of fresh root weight than florunner. Soil around roots of field grown selections that rated low in the greenhouse had fewer M. arenaria juveniles throughout the growing season. These results show that resistance to M. arenaria exists in cultivated peanut and can be selected by rating egg mass production on greenhouse grown peanuts.

Development and Performance of Drought Tolerant Genotypes from the Georgia Peanut Breeding Program. W.D. BRANCH* and C.K. KVIEN. Univ. of Georgia, Dept. of Agronomy, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

During the early 1980's, a drought tolerant breeding program was begun at the University of Georgia, Coastal Plain Experiment Station. Several breeding and germplasm lines were subsequently evaluated for drought tolerance under automated rainout shelters. Results from these initial field tests showed that mid-season stress treatments were the most critical period for adversely affecting yield, and that the advanced Georgia breeding line, GA T-2465 had the highest overall yield performance. GA T-2465 was then crossed with Tifton-8, another drought tolerant, multi-resistant germplasm line, and F_2 through F_4 pedigree selections were made after an approximately 60-day drought stress period during mid-season each year. Preliminary yield trials were then conducted with $F_{4:6}$ and $F_{4:7}$ selections during 1989 and 1990 growing seasons, respectively. Performance of these drought tolerant Georgia selections suggest that significant progress has thus far been made in this breeding effort.

Field Systems for Evaluating Peanut Germplasm for Resistance to Preharvest Aflatoxin Contamination. M. E. MATHERON[1], C. C. HOLBROOK*[2] D. M. WILSON[3], W. F. ANDERSON[2], M. E. WILL[3] and A. J. NORDÉN[4]. [1] Univ. of Arizona, Somerton, AZ; [2] USDA-ARS, Tifton, GA; [3] Univ. of Georgia, Tifton, GA; [4] Univ. of Florida, Gainesville, FL.

Preharvest aflatoxin contamination (PAC) is one of the most significant challenges facing the U. S. peanut industry. The development of peanut cultivars with resistance to PAC would be a valuable tool in reducing the problem. Before breeding work can begin, techniques for large scale screening must be developed which will allow genetic differences in resistance to PAC to be measured reliably and efficiently. The objectives of this research were to examine different inoculation techniques for insuring adequate fungal pressure and to examine different systems for field screening at Yuma, AZ. Results for inoculation techniques indicate that the use of an organic carrier (corn) for fungal inoculation at midbloom resulted in greater and more stable fungal populations in the soil when compared to other techniques. This was reflected in higher colonization of pods and seeds. However, aflatoxin contamination was high in seed from all treatments, probably due to an adequate background population. Aflatoxin levels up to 2,000 ppb were observed in peanut from Yuma, AZ. Aflatoxin was more prevalent in peanut subjected to a summer drought than in peanut subjected to a fall stress period. The use of shade cloth to minimize the extreme summer temperatures at this location did not result in greater aflatoxin contamination, indicating that soil temperatures at Yuma do not get too hot for aflatoxin formation. Aflatoxin contamination was inconsistent at Yuma. This was probably due to the difficulty in imposing an extended drought stress on the pods without killing the plants.

Greenhouse Screening Methodology for Pre-Harvest *Aspergillus parasiticus* Invasion.

W.F. ANDERSON*, C.C. HOLBROOK, D.M. WILSON, JR., and M.E. WILL.
USDA-ARS and Mycotoxin and Tobacco Laboratory, Dept. of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

Fungal penetration by *Aspergillus parasiticus* and aflatoxin production within peanut require specific temperature and moisture conditions. Experiments were undertaken to determine adaquate procedures to screen peanut germplasm under greenhouse conditions. To allow for minimum plant and replication number the experimental procedure requires small variability within treatment. In two experiments, individual pods within potted plants were physically isolated to allow fungal growth without inducing drought-stress on the whole plant. Pod development was generally poor (37.5%) for the procedure of isolating pegs prior to development for Florunner and Pronto. Hull invasion (93%) and seed invasion (45%) proceeded well within the pods that did develop. A second method of pod isolation and fungal inoculation resulted in normal pod development and 100% hull invasion and 50% seed invasion. This second inoculation procedure was used in the second experiment which included seven *Arachis hypogaea* genotypes and one wild specie (*A. stenosperma*). No differences were observed between genotypes for hull invasion and there were minimal differences in seed invasion. Three experiments were conducted by inoculating whole pots of individual plants with *A. parasiticus* inoculum. Different soil textures and different inoculation methods were tested. Seed and hull invasion was uneffected by the soil texture for both genotypes tested (Florunner and Tifton-8) in one experiment. In a seperate experiment seed invasion was generally higher when plants were inoculated at midbloom versus at planting. Infected corn inoculation methods resulted in higher percentage of infection. Results of the third experiment supported the finding of improved seed infection with midbloom inoculation. Seed invasion by *A. parasiticus* of the two virginia genotypes (Tifton-8 and Florunner) was higher than the two spanish genotypes (Pronto and J-11).

HARVESTING, CURING, SHELLING, STORING AND HANDLING

Peanut Curing by Intermittent Heat and Air Using Dual Driers.
M J. BADER*, W ADKINS, and C. L. BUTTS. University of Georgia Extension Service, Tifton, GA and USDA Peanut Lab, Dawson, GA.
Research has indicated that fuel savings in peanut curing are possible by interrupting heat and air for a portion of the drying time. Demonstrations of the concept have been performed using single drying units. These demonstrations have shown that energy savings can be obtained by cycling dryers. A demonstration of this drying technique was performed using dual dryers at a local buying point. Two different drying methods were compared in the study: the conventional drying method and an alternate method of drying, which involved the controlled cycling of three dryers. Only two of the three cycled dryers run at any specific time. Data collection was limited due to this years drought. Thirty two loads of peanuts were dried using continuous drying and twenty eight loads using the controlled cycling method. Peak electrical demand was 23.8 KW for the cycled dryers and 32.1 KW for the continuous dryers. This is a potential saving for the drying operator, depending on the peak demand charge. Since it is recommended not to dry peanuts with initial moisture content above 25 percent using the cycling method, more higher moisture peanuts were dried using the continuous drying method. This probably had some influence on the energy usage comparison. Also, another factor in the demonstration which may have had an influence is that cycling a dual dryer with only one wagon attached to it may allow cycling to be more beneficial. Using the limited amount of data obtained this year an estimate of the energy savings per ton by cycling dual dryers was made. If peanuts with initial moisture content of 20 percent are dried using controlled cycled driers, a potential savings of 2.1 gallons of LP per ton with a LP price of $.89 a gallon yields a savings of $1.87 per gross ton peanuts dried. The electrical savings would be $.24 per gross ton using an electricity price of $.08 per KWH. This gives a savings of $2.11 per gross ton of peanuts dried.

Specific Energy Evaluations for Solar-Assisted Partial Air Recirculation Peanut Drying Facility. J.H. YOUNG*, J. JILEK, J.C. TUTOR, and A.A. Boyd. Biological and Agricultural Engineering Department, North Carolina State University, Raleigh, NC 27695-7625.
A computer simulation model called DRYSIM was used to simulate the drying of peanuts in a solar-assisted partial air recirculation drying facility designed for four peanut drying wagons. The program was modified to give predictions of the energy consumed per unit mass of water removed (specific energy) from the peanuts. Simulated results indicated that specific energy consumption decreased with an increase in ambient temperature, a decrease in ambient relative humidity, an increase in the capacity of heaters, a decrease in initial moisture content of the peanuts, and an increase in the number of wagons in the facility. A comparison of simulation values for the original inlet air damper control strategy with a proposed modification indicated that the modified control strategy would decrease specific energy consumption while only slightly changing the drying conditions within the structure. The control modification prevented inlet air dampers from opening if the temperature within the structure dropped below 26.5 C. Experimental results during 1989 and 1990 using the modified control strategy resulted in lower specific energy consumption values than previously reported values for 1987 and 1988 for the original control strategy. Experimental specific energy consumption values were lower than simulated values in most cases. This suggests that some aspects of the drying system are not being adequately simulated by the model. The most probable source of differences is the fact that the simulation model does not account for diffusion of moisture from the drying structure through the walls and shutters. It was apparent that diffusion did take place in the actual structure.

Effectiveness of Peanut Storage Exterior Coatings in Reducing Solar Radiation. J.S. SMITH, JR.* USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
White vs galvanized coatings can greatly reduce the heat load in peanut storages. An on-going test of three white paints on galvanized sheetmetal vs unpainted galvanized sheetmetal show that the painted surfaces had at least a 12 C mean cooler surface temperature over a four-month period. A maximum surface temperature of 62 C was recorded on the bare galvanized surface compared to 44 C temperature for the painted surface, both at a 34 C ambient temperature. Results indicate that lower building surface temperatures will translate into lower overspace and peanut temperatures which will reduce the condensation potential and heat load in the storages thereby maintaining better peanut quality.

Milling Quality in a Bulk Peanut Curing Model. J. M. TROEGER. USDA-ARS, Crop Systems Res. Unit, Tifton, GA 31793.
Peanuts cured with low relative humidity (RH) and high temperature are likely to exhibit poor milling quality as indicated by a high percentage of split kernels. Experiments were conducted to quantify the relationship between curing conditions and split kernels. Three years of data indicate that the percent of split kernels is highly correlated with RH but not with temperature. In a normal curing situation, however, high temperatures are usually accompanied by low RH. The data show that decreasing RH from 60 to 55% over a 24 hour period will increase splits by about .3 percentage points while dropping RH from 45 to 40% will increase splits by 0.7 percentage points. The data also showed that low RH during windrow curing can add 2. percentage points splits. These results are being incorporated into a peanut curing model for developing improved control strategies for curing peanuts.

Break-Even Analysis for Curing Farmers Stock Peanuts. C.L. BUTTS* and M.C. LAMB. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
The adaptation of new technology for a given process is driven by the difference in expected costs and benefits. Recent world events have again shown the volatile nature of the energy costs associated with curing peanuts. Data collected during the 1989 and 1990 crop years provided the basis for determining the break-even cost of fuel, electricity and labor when using various energy-efficient methods of curing peanuts. Data consisted of LP consumption, electrical energy consumption and drying time per net ton of farmers stock peanuts that were cured. Data collected in 1989 originated from using a constant 35 C thermostat setpoint and a variable setpoint based on ambient air conditions. During the 1990 season peanuts were cured using a constant 35 C thermostat setpoint, but were cured in 4.3 m (14 ft) and 6.4 m (21 ft) peanut trailers. The break-even levels of unit costs for LPG, labor, and shelled peanuts were developed compared to conventional curing methods (35 C, 4.3 m trailer).

Spectral Reflectance Characteristics of Undamaged and Damaged Peanut Kernels. F.E. DOWELL*. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Samples of shelled stock and farmers stock peanuts are graded by trained inspectors to determine quality and value. Grade factors such as kernel size and moisture content are determined objectively using machines; however, kernel damage, as indicated by kernel discoloration, is determined subjectively by the inspectors. In an effort to minimize the variability between inspectors when determining damage at the approximately 500 inspection points, research was initiated to develop a sensor to objectively detect kernel discoloration. Initial research concentrated on identifying the spectral reflectance from 400 to 700 nm of undamaged and damaged redskin and blanched peanut kernels. The spectral curves of 200 undamaged kernels were characterized by spectral reflectance ranges and line slopes at critical wave lengths. The minimum ranges and line slopes at those critical wavelengths were then used to classify 1000 damaged kernels and 1000 undamaged kernels. Results showed that over 99% of the undamaged kernels and about 93% of the damaged kernels were correctly classified by looking at minimum spectral reflectance values at four wavelengths. Future work will concentrate on developing a low-cost sensor to measure the spectral reflectance at critical wavelengths identified in this research.

PHYSIOLOGY

Micro-Scale Quantitation of Sugars in Peanuts. J.A. LANSDEN*. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
Quantitation of carbohydrates in peanuts has traditionally been accomplished by gas chromatography of silylated derivatives. Other derivatives of carbohydrates have been used in specialized cases but have not received the attention in development that silylation has. A micro-scale high pressure liquid chromatographic method, utilizing perbenzoylated derivatives of carbohydrates is capable of detecting carbohydrates in peanuts at the nanogram level. The method is particularly useful in quantitating raffinose, a trisaccharide, and stachyose, a tetrasaccharide, because the UV absorbance increases with the increasing number of hydroxyl sites which can be derivatized. Examples of the utility of the method include the effect on individual sugars with maturity and harvest date, and the quantitation of sugars in individual kernels and in single embryos. Studies of the effect of maturity on carbohydrate composition in Florunner peanuts found that stachyose decreased from 6.531 mg/g in immature peanuts to 4.245 mg/g in very mature peanuts, while raffinose decreased from 1.372 mg/g to 0.915 mg/g (fat-free flour).

Single Leaf Carbon Exchange and Canopy Radiation Use Efficiency of Four Peanut Cultivars. J. M. BENNETT *, L. MA, T. R. SINCLAIR, and K. J. BOOTE. Agron. Dept., Univ. of Florida, and USDA-ARS, Gainesville, FL 32611.
Understanding the interception of solar radiation by crop canopies and the conversion of that radiation into crop biomass is essential for predicting crop growth and yield as a function of the environment. A field experiment was conducted in 1990 at Gainesville, FL to determine if differences in single leaf carbon exchange rate, canopy light interception, radiation use efficiency (g dry matter per unit of radiation intercepted, g MJ^{-1}), and increase in pod harvest index exist among several peanut (Arachis hypogaea L.) cultivars. Four peanut cultivars (Florunner, Early Bunch, Southern Runner, and Marc I) were grown under fully-irrigated, intensively managed conditions on an Millhopper fine sand. At weekly intervals, total crop, pod, and seed dry matter accumulation was determined, and canopy light interception was measured. At 2-wk intervals, single leaf carbon exchange rates at midday in full sunlight were determined for the four cultivars and related to specific nitrogen content of the measured leaf. Single leaf carbon exchange rates were relatively constant and similar among cultivars (between 30 and 35 μmoles CO_2 m^{-2} s^{-1}) throughout most of the season, before declining during late pod filling. Although light interception differed somewhat among cultivars during early canopy development, total crop dry matter was linearly related to light interception in all four cultivars (r^2 = >0.98). Radiation use efficiency was similar among all cultivars with a mean of 1.0 g MJ^{-1}. The rate of increase in seed harvest index was linear (r^2 = >0.99) with time and was similar among the Early Bunch, Florunner, and Marc I cultivars (mean of 0.0063 d^{-1}), but slightly lower (0.0043 d^{-1}) for the later-maturing Southern Runner cultivar. These results indicate that the main physiological differences among cultivars were in the early-season development of the leaf canopy and the rate of pod growth, rather than the capacity to assimilate carbon dioxide.

Field Screening of Peanut Germplasm for Drought Resistance Using an Irrigation Gradient System. A. M. SCHUBERT* and O. D. SMITH. Texas Agricultural Experiment Station, Yoakum, TX 77995-0755; and Department of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474.

Selected peanut germplasm was field-tested during the 1989 and 1990 crop years at TAES-Yoakum for performance under a line-source irrigation gradient system. Irrigation lines were placed perpendicular to the rows which were planted in a northwest to southeast direction. The prevailing winds were from the south. Water levels were determined using rain gauges located at 3 m intervals perpendicular to the irrigation line. Peanut entries were divided into four tests based on expected growth duration and direction from the irrigation line in relation to prevailing wind: LATE-NORTH; EARLY-NORTH; LATE-SOUTH; and EARLY-SOUTH. Measurements made on the north (downwind) tests included leaf relative water content (RWC), leaf water status by hydraulic leaf press (HL), canopy/ambient temperature differences by infrared thermometry, yield, grade and its components, and crop value data. Significant differences were found among entries for peanut yield, grade, SMK %, OK %, SS %, and crop value per hectare; and RWC, HL, and canopy/ambient temperature differences at some measurement times during crop development. Varieties were compared using mean yields and coefficients of regression for yield on water level. Variety performance indices (VPI) were calculated which are the sums of mean yield and b-value for each entry normalized by the mean values for all entries. Significant differences in VPI were found among entries in most experiments in 1989 and 1990. VPI ranged from 1.25 to 2.62 for Tx855515 and Sn57-422, respectively, in the 1990 LATE-NORTH test. Average peanut yield for all water levels were 1,071 kg/ha for Tx855515 and 2,528 for Sn57-422. Florunner had a VPI of 1.88 and average yield of 1,727 kg/ha, and Southern Runner 2.23 and 2,084 kg/ha.

Physiological Traits Contributing to Yield Potential among Peanut Genotypes: Growth Traits and Yield. L. MA, K. J. BOOTE*, and F. P. GARDNER. Agronomy Dept., Univ. of Florida, Gainesville, FL. 32611.

Peanut (Arachis hypogaea L.) cultivars differ significantly in growth habit and yield potential. This research was undertaken to identify specific cultivar traits which contribute to yield potential. Field experiments were conducted at Gainesville, FL on eight peanut genotypes planted 5 May 1989 and four genotypes planted 15 May 1990. The soil type was a fine sand. Cultivars included Chico, Early Bunch, Early Runner, Florigiant, Florunner, Marc I, Southern Runner, and Tamnut. Leaf area index, leaf, stem, pod, seed, shell and total crop dry weights were determined at 7-10 day intervals beginning soon after planting. Crop growth rate (CGR) was calculated from the linear growth phase. In 1989, Marc I had the greatest CGR (17.2 g m^{-2} d^{-1}) and Chico had the lowest CGR (8.5 g m^{-2} d^{-1}). In 1990, Florunner had the highest CGR (18.1 g m^{-2} d^{-1}) compared to Southern Runner (15.9 g m^{-2} d^{-1}). Pod growth rates (PGR) were computed from the linear pod growth phase. Early Bunch had the highest PGR (10.0 g m^{-2} d^{-1}) in 1989, and Marc I had the highest PGR (10.4 g m^{-2} d^{-1}) in 1990 compared to Southern Runner which had the lowest PGR (6.1 g m^{-2} d^{-1} in 1989; 7.1 g m^{-2} d^{-1} in 1990). Pod yield differed significantly between spanish, runner and virginia type cultivars in 1989, but did not differ significantly between runner and virginia type cultivars in 1990. The effective pod filling duration (EPFD) was significantly longer for Southern Runner (78 days in 1989; 72 days in 1990) than most other cultivars, whereas Chico and Tamnut had the shortest EPFD (39 and 43 days in 1989). Virginia type cultivars showed high concurrent partitioning coefficients (PC). Pod yield was closely related to CGR (R^2=0.73), maximum LAI (R^2=0.63), and partitioning (PC) to pods (R^2=0.49). Stepwise multiple regression analysis showed that CGR, PC and EPFD accounted for 85% of pod yield variation among cultivars.

Physiological Traits Contributing to Yield Potential in Peanut: Simulating Different Genotypes with the PNUTGRO Model. K. J. BOOTE*, L. MA, and F. P. GARDNER. Agronomy Dept., Univ. of Florida, Gainesville, FL. 32611.
Crop growth simulation models have considerable potential for evaluating the contribution of genetic traits to yield potential. Previously, the PNUTGRO crop growth model had been used successfully to simulate growth of the Florunner cultivar only. The objective of this study was to calibrate the PNUTGRO model for eight cultivars representing different market types and growth habits. The hedgerow version of PNUTGRO was used because it has the capacity to simulate height, width, and light interception in addition to the normal outputs of PNUTGRO V1.02. A systematic procedure of model calibration was followed to improve prediction of vegetative stage, reproductive stages, canopy width, dry matter accumulation, growth rate per seed, and partitioning to pods and seeds for eight cultivars grown in 1989 and four cultivars grown in 1990 at Gainesville. Spanish type and "bunch" growth habit cultivars were simulated by reducing the rate of canopy width increase to account for reduced light interception and dry matter accumulation. It was also necessary to vary light-saturated leaf photosynthesis rate among cultivars to account for differences in dry matter accumulation rate. Next, growth rates per seed and per shell were adjusted to give the correct simulated increase in seed size and shelling percentage. Next, we calibrated the rate of pod addition (PODVAR) and the maximum partitioning intensity (XFRUIT), by simulating and comparing to observed pod harvest index increase. Cultivars differed in maximum partitioning intensity to pods, with highest values for Marc I, Florunner, and Early Bunch (89, 88, and 87 %, respectively) and lowest values for Southern Runner (74%). Cultivars differed as much as 8 days in beginning of pod growth and as much as 32 days in time to maturity. Low yield potential of spanish types was also related to short duration of pod fill. With calibration of these processes, the model has the capacity to emulate genetic differences among the eight cultivars.

MYCOTOXINS

Characteristics of Aflatoxin-Free Peanuts. J.R. REIZNER.*
Procter and Gamble, Cincinnati, OH 45224

Understanding the characteristics of aflatoxin-free peanuts is important to our ability to develop improved devices to inspect peanuts at shellers, custom blanchers, and manufacturers. Multi-sort methods were employed which demonstrated that peanuts which are clear of defined visual defects tend to be aflatoxin-free. In raw split nut blanched peanuts with an incoming level of 48.8 ppb aflatoxin, the 97.0% of visually accepted peanuts contained 0.6 ppb aflatoxin, whereas the 3.0% visually rejected peanuts contained 1627 ppb. In roasted split nut blanched peanuts, the 95.2% of visually accepted peanuts contained 0.7 ppb aflatoxin, whereas the 4.8% visually rejected peanuts contained 1271 ppb. A correlation between density and concealed damage is also shown. In raw whole unblanched peanuts, visual sorting removed 60.1% of the aflatoxin by rejecting 10.7% of the peanuts. Density sorting removed 64.0% of the aflatoxin by rejecting 5.2% of the peanuts. By combining visual and density sorting, 98.3% of the aflatoxin was removed by rejecting 15.2% of the peanuts. Three separate and distinct mold invasion mechanisms are proposed: hull invasion leading to visible damage; funicular invasion leading to concealed damage; and flower stage invasion leading to internal cotyledon damage. Various types of sorting technologies are compared for their effectiveness in sorting each type of damage. These techniques are compared for various peanut conditions i.e.: raw with testa intact, raw split nut blanched, and roasted split nut blanched.

Variability Associated with Testing Farmers Stock Peanuts for Aflatoxin. T.B. WHITAKER*, F.E. DOWELL, W.M. HAGLER, F.G. GIESBRECHT, and J. WU. USDA-ARS, N.C. State University, Raleigh, NC 27695-7625; USDA-ARS, National Peanut Research Laboratory, Dawson, GA 31742; Director, Mycotoxin Laboratory, N.C. State University, Raleigh, NC 27695-7608; Professor, Department of Statistics, N.C. State University, Raleigh, NC 27695-8203; and Chief, AMS Statistics Branch, USDA, Washington, DC 20204.

Forty farmers stock lots of runner peanuts suspected of containing aflatoxin were identified by the Federal State Inspection Service using the visual A. flavus method. A 900 kg portion was removed from each lot as the peanuts were being unloaded. Each 900 kg portion was divided into 50 2.27 kg (5 lb) samples, 50 4.54 kg (10 lb) samples and 50 6.81 kg (15 lb) samples. Each sample was shelled, all kernels in the sample were comminuted in a vertical cutter mill, and the aflatoxin in a 100 g subsample was quantified using HPLC methods. The total variability among the 50 aflatoxin test results was determined for each sample size and for each lot. Using regression techniques, the variance "V" was shown to be a function of the aflatoxin concentration "C" and could be described by the function $V=a(C)^b$. The value of "b" was 1.1447 for all three sample sizes, and the value of "a" was 98.3753, 53.9861, and 38.5413 for a 2.27, 4.54, and 6.81 kg sample, respectively. The coefficient of determination was 0.942. The variance relationships have been used to determine parameters of a computer model that predicts the percent of farmers lots that will be accepted or rejected using samples of various sizes. The model is presently being used to design aflatoxin testing plans for farmers stock peanuts.

Chemical Aflatoxin Testing For Peanut Buying Stations In The United States. P.D. BLANKENSHIP* and J.W. DORNER, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Aflatoxin analysis during official grading of farmers stock peanuts offers considerable opportunity for improving peanut quality in the United States. However, the peanut grading system does not currently offer a chemical test for aflatoxin primarily because of concern that chemical testing would excessively lengthen grading time. Aflatoxin laboratories were installed in all three United States peanut producing areas and operated during the 1990 harvest season (3 in the southeast; 1, Virginia-Carolina area; 1, southwest). A total of 4490 samples averaging 2191 gm were analyzed for aflatoxin with Neogen (Agri-Screen) and Vicam (Aflatest) rapid analysis kits. Newly trained personnel conducted Agri-Screen analyses at average speeds of 37.2 min; Aflatest, 25 min. This project demonstrated that the system could be adjusted to include an aflatoxin analysis within current daily time frames. In addition to small laboratories, data indicate that 2-4 more people than current grading personnel per buying station would be required for implementation. Aflatoxin averaged 8 ppb, 11 ppb, 69 ppb, 135 ppb, and 168 ppb for the Seg 1 samples analyzed at the buying stations. Aflatoxin data collected strongly support the premise that USA peanut quality can be improved with aflatoxin testing of farmers stock peanuts at marketing if used in a system that then segregates peanuts in relation to the data obtained.

Aflatoxin Control in Postharvest Peanut Kernels at Various Water Activities and Times: Effects of Chitosan and Bacillus subtilis. R.G. CUERO*, G.O. OSUJI, E.A.DUFFUS, R.D.WANISKA, R.E.PETTIT, and J.E.FAJARDO. Prairie View A&M University, CARC, Prairie View, TX 77446 and Departments of Soil & Crop Sciences and Plant Pathology & Microbiology, Texas A&M University System, College Station, TX 77843.

Aspergillus flavus growth and aflatoxin production in postharvest peanut kernels were determined after treatment with chitosan and Bacillus subtilis. Treatment effect was determined in peanut extract agar amended with chitosan, and in peanut kernels (Starr cultivar) inoculated with A. flavus (10^3 and 10^6 spores/ml) at various water activities (0.80, 0.85, 0.90) at 25 C and at different store times (0, 3, 12, 48, 72 h, and 8 days). Single or combined treatments were applied simultaneously. B. subtilis effect was only determined after 8 days of treatment. Chitosan reduced (60%) colony diameter and sporulation of A. flavus in peanut extract agar. B. subtilis inhibited A. flavus and the bacterium continued to grow unchanged through the fungal colony. Both chitosan and B. subtilis reduced significantly ($p<0.05$) A. flavus population (>50%) and aflatoxin accumulation in peanut kernels at all water activities (Aw); however the effect of chitosan was more marked at lower Aw (0.80 and 0.85). Overall, the combined treatment, B. subtilis + Chitosan, was the most effective in reducing A. flavus growth and aflatoxin production. The single treatments were only half as effective in inhibiting A. flavus growth and aflatoxin production. There was no aflatoxin production at lower Aw (0.80).

Evaluation of Four Mills for Use in Preparing Peanut Samples for Subsampling and Aflatoxin Analysis. J.W. DORNER* and R.J. COLE. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
Four grinding mills were evaluated for their effectiveness in producing homogeneous subsamples of peanuts for aflatoxin analysis. The mills included the AMS subsampling mill currently used by the Agricultural Marketing Service for official USDA aflatoxin analyses of shelled peanuts, commonly known as the Dickens mill (DM); a Stephan model VCM 12 vertical cutter mixer (SM); a Robot Coupe model R6Y-1 vertical cutter mixer (RC1); and a Robot Coupe model R10P vertical cutter mixer (RC2). The DM was specially constructed to provide 10 subsamples, instead of the normal two, each representing approximately 5% of the total sample. The DM, SM, and RC1 were used to process 20 2 Kg samples for analysis, and the DM, SM, and RC2 were used to process 20 4 Kg samples for analysis. The DM automatically provided 10 approximately 100 g subsamples from the 2 Kg samples and 10 approximately 200 g subsamples from the 4 Kg samples. Ten random 100 g or 200 g subsamples were taken from the vertical cutter mixers corresponding to the 2 Kg and 4 Kg samples, respectively. All subsamples were analyzed for aflatoxin by high performance liquid chromatography. Homogeneity associated with each mill was determined by calculating the coefficient of variation (CV) for each sample. Thus, 40 CVs were determined for both the DM and SM and 20 CVs for the RC1 and RC2. The mean CVs for the 2 Kg samples were 40.6%, 32.8%, and 17.2% for the DM, SM, and RC1, respectively. The mean CVs for the 4 Kg samples were 47.0%, 26.0%, and 19.2% for the DM, SM and RC2, respectively. Because the CVs for the RC1 and RC2 did not prove to be significantly different based on the Kruskal-Wallis test of ranks, all 120 CVs were ranked and tested by the Kruskal-Wallis test. The test showed that the variation associated with the RC1 and RC2 was significantly lower than the variation found with the DM and SM. Therefore, the Robot Coupe mills provided the most homogeneous distribution of aflatoxin for subsampling.

Aflatoxin Contamination of Peanuts from Separately Drought Stress Pods and Plants. T.H. SANDERS*, R.J. COLE, P.D. BLANKENSHIP, and J.W. DORNER. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
Florunner peanuts were grown in three consecutive years in plots modified to provide soil temperature and moisture differentials between pods and plant roots. The modification was effectively made by placing 2.54 cm thick polystyrene ca 7.6 cm below the soil surface and using porous rubber tubing and sprinklers to irrigate and heating cables for increased temperature in drought simulation. Treatments in each year were: (1) drought stressed pods on irrigated plants and (2) irrigated pods on drought stressed plants. In pod stress treatments, soil temperatures at 2.54 cm were 29.1 C, 29.6 C, and 29.3 C, while in plant stress treatments comparable temperatures were 24.9 C, 27.6 C, and 27.6 C in successive years. In each year, relatively high levels of aflatoxin were consistently found in all grade sized peanuts from the pod stress treatment. Aflatoxin was not generally found in peanuts from pods which were maintained in adequate moisture condition although plants were drought stressed. These data indicate that control of the inherent mechanism for aflatoxin resistance in peanuts is confined to the pod and/or seed. Average moisture content of seed from hull scrape maturity classes from the pod stress treatments were higher than those from the plant stress treatment. Pods with a mustard-colored appearance, found only in the pod stress treatment, contained seed with very low moisture contents and aflatoxin was confined almost exclusively to those seed.

Observations on Aflatoxin Contamination in Southern Runner in 1990. D.M. WILSON*, T.B. BRENNEMAN, R.W. BEAVER, A.K. CULBREATH, J.A. BALDWIN and J.P. BEASLEY, JR., Department of Plant Pathology, University of Georgia, Coastal Plain Experiment Station and Department of Agronomy, Cooperative Extension Service, Tifton, GA 31793.

The weather conditions in 1990 were favorable for aflatoxin contamination of preharvest Georgia peanuts. Because of these unique weather conditions we had an opportunity to compare aflatoxin contamination of Florunner and Southern Runner peanuts grown under minimal irrigation in five different tests. No aflatoxin contamination was detected in either cultivar in four of the five tests. In one test with five replications of three cultivars (Florunner, Southern Runner and Valencia A) and three harvest dates, there was sufficient aflatoxin contamination to obtain preliminary data. Valencia A had significantly ($P=0.05$) more preharvest aflatoxin contamination overall (mean-628 ppb) than either Florunner (mean-48 ppb) or Southern Runner (mean-110 ppb). Over all harvest dates, no differences were seen between Florunner and Southern Runner. However, there was significantly ($P=0.05$) more aflatoxin contamination at harvest date three than in harvest dates one and two. These preliminary results suggest that the rate of preharvest aflatoxin accumulation in Southern Runner may be considerably different than in Florunner and Valencia A. Further studies are needed and planned on aflatoxin accumulation rates in peanut cultivars.

Postharvest Aflatoxin Management Study. R.J. COLE*, J.W. DORNER, M.C. LAMB, and J.I. DAVIDSON, JR. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Approximately 44 tons of Segregation 3 farmers stock peanuts grading above 65% SMK plus sound splits were processed to determine the feasibility and costs associated with recovery of edible quality peanuts from highly contaminated lots of farmers stock peanuts using available technology. The cleanup potential and associated costs of each processing step were determined. These processing steps in the shelling plant included removal of high risk peanut kernels with belt screens, gravity tables, and electronic color sorting techniques. Following shelling plant operations, the medium category peanuts were processed by whole kernel blanching followed by split kernel blanching. This information should be useful in developing an aflatoxin management program to accommodate chemical testing at peanut buying points.

PRODUCTION TECHNOLOGY

Cultivar Response to Twin Row Planting. G.A. SULLIVAN*. Crop Science Department, North Carolina State University, Box 7620, Raleigh, NC 27695.

Twin row planting is on the increase in North Carolina. Growers are claiming significant increases in yields with the twin rows. In 1990, seven field tests were conducted comparing the performance of four cultivars in both twin rows and the traditional single rows. Plant populations in the twin rows averaged 25 percent higher than for the single rows. Average yields were higher for the twin row than for the single row pattern. Twin row crop yields for NC 7, NC 9, NC-V 11 and NC 10C averaged 314, 287, 167 and 28 pounds per acre higher, respectively, than for single rows. Grade differences were not detected between the twin and single row pattern.

Seeding Peanuts in Narrow Rows with Modified Commercial Planters. F.S. WRIGHT*, R.W. MOZINGO, and N.L. POWELL. USDA, ARS and VPI & SU, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.

Commercial planters were modified to seed peanuts in narrow rows and a field experiment was conducted to evaluate the pod yield response to this seeding pattern. Commercially available inclined plate-type planters were mounted on a three-point hitch frame in an arrangement to seed six rows of peanuts in a 72-inch wide space, instead of the conventional 36-inch row pattern. Three 9-inch rows were seeded in the space of one 36-inch conventional row and the set of three rows were spaced 12 inches from the adjacent set of three rows. The space where the tractor wheel traveled was 24 inches between rows. Each set of three planters was driven by one planter to provide an alternate intrarow seed spacing or the two drive planters were locked together to provide an alternate seed spacing across the 60-inch wide preshaped seedbed. Intrarow seed spacings used in the field experiment were 6 and 9 inches for three cultivars, VA 81B, NC 7, and NC-V 11. Quantity of seed required for the 9-inch intrarow spacing is equal to the seed required for conventional 36-inch rows with 3-inch intrarow seed spacing. Pod yields for the 6- and 9-inch intrarow seed spacings over 3 yr averaged 4413 lb/a and 4560 lb/a, respectively. That is, the yield for the 9-inch spacing was 1.3% higher and required 33% less seed than the 6-inch spacing. The potential exists for a significant improvement in net income with the use of narrow rows in peanut production.

Vacuum Planters: New Technology for Seeding Peanuts. J. P. BEASLEY, JR.* and M. J. BADER. Extension Agronomy Dept., University of Georgia, P. O. Box 1209, Tifton, GA 31793 and Extension Engineering Dept., University of Georgia, P. O. Box 1209, Tifton, GA 31793.

A new type of planter has become available to peanut producers in the Southeastern United States the past couple of years. These planters are called vacuum planters, air planters, or precision planters. There are two models available for producers to choose from: the John Deere "MaxEmerge 2" and the "Monosem". These planters use a vacuum to hold individual seed in place on a cell plate within each planter unit. As the vacuum is released, the peanut seed are metered in the furrow at the seed per foot of row rate set by the producer. These new vacuum planters will provide producers the opportunity to reduce seeding rates and maintain a more uniform final stand. A comparison of the new John Deere vacuum planter with a John Deere 71 planter at 11.5 and 19.7 seed m^{-1} was conducted in 1990 on a producer's field in Grady County, GA. Individual plots were 16 rows and varied in length, resulting in plots of 0.62 to 0.73 ha in a randomized complete block design with 3 replications. There was a significant treatment effect but it was due to seeding rate and not the planters. There was a trend, though not significant, of a yield increase for the vacuum planter at the lower seeding rate.

Effect of Calcium on Germination of Florunner, Sunrunner, GK 7, and Southern Runner. D. L. Hartzog* and J. F. Adams, Dept. of Agronomy and Soils, Auburn University, Auburn, Alabama 36849.
The most important soil fertility factor in peanut production is calcium. New varieties that have resulted in higher yields are being adopted by growers in the Southeast due to the selection for increased resistance to many soil-borne diseases. Seed Ca content has been shown to affect germination. The Florigiant variety has a minimum Ca concentration of 420 mg kg^{-1} required in the seed for maximum germination, but there is little data defining the Ca concentration required for Florunner, Sunrunner, GK 7, and Southern Runner. Also, there is little data correlating soil Ca with seed Ca concentration or germination of produced seeds. On-farm experiments were conducted from 1987-1989 on soils that ranged from "very low" to "high" in soil-test Ca to determine if these varieties had different soil Ca requirements. The runner varieties had significantly lower Ca requirements than the Virginia type peanut and correlating soil Ca with germination gave mixed results.

Peanut Response to Lime and Zinc. F.M. RHOADS, F.M. SHOKES* and D.W. GORBET. North Florida Research and Education Centers, Quincy, FL 32351 and Marianna, FL 32446.
Because previous research indicated differences in response to zinc (Zn) fertilization, experiments were designed to determine cultivar x lime x zinc interactions using Sunrunner and Southern Runner peanut cultivars. Both cultivars were grown in pots in experiment-1 but only Southern Runner was used in experiment-2. Dolomite was the lime source for experiment-1, while both calcite and gypsum were used as calcium sources in experiment-2. Lime rates were 0, 1 and 2 g kg^{-1} and Zn rates were 0, 5 and 25 mg kg^{-1} in both experiments. Normal growth of peanut occurred with 0 and 5 mg kg^{-1} Zn at all lime levels but 25 mg kg^{-1} Zn reduced plant growth. Lime increased plant growth at the 25 mg kg^{-1} Zn rate. Calcite was more effective than dolomite while gypsum had no effect. Gypsum increased Zn concentration in peanut tissue while calcite and dolomite decreased tissue Zn. Two way interactions were observed for cultivar x lime rate, cultivar x Zn-rate, and lime rate x Zn-rate. Zinc toxicity was related to Ca/Zn ratio in plant tissue but the critical level was different for each experiment.

Rapeseed Meal as a Potential Biological Control of CBR of Peanut. F. J. ADAMSEN*, D. M. PORTER, and D. L. AULD. USDA-ARS, Suffolk, Tidewater Agricultural Experiment Station, VA 23437, Dept. of Plant Soil and Entomological Sciences, and University of Idaho, Moscow, ID 83843.

Approximately 6% of the peanut acreage in the Virginia-Carolina peanut production area is affected by cylindrocladium black rot (CBR) caused by the soil borne fungus *Cylindrocladium crotalariae*. Unless soils are fumigated with metam-sodium or resistant varieties such as NC 10C are planted, yield losses from CBR can be severe. Some plants such as rapeseed (*Brassica napus* L.) contain glucosinolates which under favorable conditions decompose to form isothiocyanates, the same class of chemical compound produced by the decomposition of metam-sodium. The purpose of this study was to determine the effectiveness of rapeseed meal which had been crushed for oil in reducing the number of *C. crotalariae* microsclerotia in soil. Rapeseed meal containing 13 μmole g^{-1} of glucosinolate was added at a rate of 990 g m^{-2} to the top 150 mm of a soil column 50 mm in diameter and 300 mm long. The rate was in the range of dry matter production expected from the rapeseed cover. The soil was infested with *C. crotalariae*. The meal was either placed in a layer at the 150 mm depth (RP-A) or mixed with the top 150 mm of soil (RP-B). Metam-sodium was added to control treatments at a rate equivalent to 190 L ha^{-1} which is the recommended rate. The amount of active ingredient in the metam-sodium treated columns was more than 3 times that of the rapeseed meal treated columns. An untreated control was included. Distilled water was added to the soil columns to bring the soil to field capacity. The columns were incubated in the laboratory for 14 d and the number of microsclerotia surviving in the 0 to 75 mm depth (depth 1) and in the 75 to 150 mm depth (depth 2) was determined. The experiment was conducted with 2 soils. Soil 1 was a Nansemond loamy fine sand (Aquic Hapludult), and soil 2 was a Eunola loamy fine sand (Aquic Hapludult). The numbers of microsclerotia in depth 1 were not different between treatments for either soil. Soil 1 and soil 2 averaged 7.0 and 44.3 microsclerotia / g of dry soil (MSPG), respectively. In depth 2, the untreated soil MSPG values were 11.1 and 88.4 soils 1 and 2, respectively. In depth 2, soil treated with metam-sodium, MSPG values were reduced to less than 1 in soil 1 and 8.1 in soil 2. In depth 2 the rapeseed treated soils MSPG values averaged 4.0 and 49.9 in soils 1 and 2, respectively. Rapeseed meal used in this study showed activity against microsclerotia of *C. crotalariae* but the rapeseed meal was not as effective as metam-sodium, which may be a result of lower concentrations of active ingredient.

Evaluations of Pensacola Bahiagrass and Corn as Rotational Crops for Two Peanut Cultivars. J. A. BALDWIN* and J. W. TODD. Extension Agronomy Dept. University of Georgia and Dept. of Entomology, Coastal Plain Experiment Station, Tifton, GA. 31793.

Rotations are critical to maintaining peanut yields and grade. A two to three year rotation with grass crops is one recommended practice. The purpose of this study was to evaluate the response of two peanut cultivars to a one year rotation with either Pensacola bahiagrass (Paspalum notatum L. Flugge) or Pioneer X-304C Tropical Corn (Zea Mays L.). Bahiagrass or corn was planted May 29th, 1989 at Attapulgus, Georgia. On April 19th, 1990, either Southern Runner or Florunner peanut cultivars were planted in RCB split plot design experiment. Main plots were bahiagrass or corn and varieties were split plots. Significant yield differences occurred for both rotation crop and variety. Yields averaged over varieties were 3680 kg ha-1 and 3050 kg ha-1 following bahiagrass and corn respectively. Southern Runner yielded 3860 kg ha-1 compared to 2870 kg ha-1 for Florunner when averaged over rotation crops. No differences occurred for TSMK for either variety due to any treatment. Southern Runner outyielded Florunner by 860 kg ha-1 following a one year-old bahiagrass sod and by 1130 kg ha-1 following a crop of tropical corn. The one year-old bahiagrass sod produced greater yields for both Florunner and Southern Runner varieties over the corn with yield increases of 700 and 490 kg ha-1 respectively.

Peanut Yield and Thrip Counts as Influenced by Aldicarb, Paraquat and Alachlor Interactions. D. L. COLVIN and T. A. LITTLEFIELD*. Dept. of Agronomy, University of Florida, Gainesville, FL 32611.

Field experiments were conducted during 1988 in Marianna and Gainesville, FL, and during 1989 and 1990 in Gainesville, FL, to investigate peanut yield and thrip counts as influenced by aldicarb, paraquat and alachlor interactions. Sunrunner peanuts were planted in mid-May at all locations, all years, and seeded at a rate of 112 kg/ha on a 76 cm row spacing. Three varying intensity herbicide systems were applied at three different stages of peanut growth. Intensity of herbicide system was measured by the particular chemical(s) potential to be phytotoxic to peanut foliage. The low intensity system consisted of alachlor applied at 3.36 kg/ai/ha, the medium intensity system consisted of paraquat at 0.128 kg/ai/ha, and the high intensity system utilized a tank mixture of alachlor plus paraquat at 3.36 + 0.128 kg/ai/ha. These three herbicide systems were applied to peanuts in three physiological stages. Applications occurred at ground cracking, seven days after ground cracking, and 14 days after ground cracking. This study was designed in such a way that aldicarb was used on one half the test and the other half received no aldicarb. In order not to confound yield differences due to nematode interactions, the entire test area was treated with 1,3 dicloropropane at 46 L/ha four weeks prior to planting. Thrip counts were made from a 0.5 m length of row two weeks after the final herbicide application had taken place. Peanut yields were taken approximately 140 days after planting. Thrip populations were unusually low throughout the period in which these studies were conducted and few differences in population occurred between aldicarb treated plots and plots with no aldicarb. Early season crop injury rating showed that the most intense herbicide system injured the canopy most, and this injury was usually most intense 7 or 14 days after cracking. Peanuts treated with aldicarb regardless of the herbicide system intensity used, recovered from phytotoxic foliage injury sooner than non-treated plots. As has been reported in earlier studies, the peanut's ability to overcome early season injury is tremendous and this work reflects those same trends as few differences in yield were recorded regardless of soil insecticide or herbicide treatment.

Peanut Yield Decline in the Southeast and Economically Feasible Solutions. M.C. LAMB*, J.I. DAVIDSON, JR. and C.L. BUTTS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Peanut yields in the Southeast have decreased 11.1% during the 1980's. The decline has been attributed primarily to weather. An extensive data base was collected for the major peanut producing counties in the Southeast. The data was analyzed statistically to study the parameters causing the yield decline. Results indicate that weather is not the only limiting factor. Management factors, such as the number of peanut acres, crop rotation, irrigation, and farm economic conditions, have also contributed to the yield decline. Whole farm planning and management systems using expert system-based management strategies offer practical solutions to increase peanut yield, quality, and profitability by optimizing management strategies. EXNUT, an expert systems for managing irrigation and pests in peanuts, has consistently increased peanut yield, quality, and net returns while using less irrigation and chemicals. DRYNUT (proposed) is being developed to assist dryland peanut farmers in managing drought and other factors relevant to dryland peanut production. An economic analysis of both expert systems is provided.

Expert Systems to Manage Peanut Production. J.I. DAVIDSON, JR*, M.C. LAMB, and C.L. BUTTS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

New concepts and an extensive knowledge base were developed for managing peanut production. Using a peanut systems research approach, input variables associated with variety, weather, soil, pest, and management are related to output variables such as yield grade, outturn, food safety, return, germination, and environmental impact. The relationships are different for dryland and irrigated peanut production. Thus, management strategies to optimize the input variables to maximize the output variables are different for irrigated and dryland peanut production. Using modern computer technology called Expert Systems, a peanut management program, EXNUT, was developed and validated in Georgia for managing peanut irrigation and pest control. EXNUT consistently outperformed expert farmers during the past several years by providing higher yields, grades, quality, and net return while preventing aflatoxin in the field and reducing the use of water and chemicals. EXNUT versions are being prepared for other states and growing areas. A similar Expert System, DRYNUT, is being developed for managing dryland peanut production.

Supply, Quality, and Price Prediction Models for Farmers and Shelled Stock Peanuts. M.S. SINGLETARY*[1], M.C. LAMB[2], and J.I. DAVIDSON, JR.[2]. [1]Consultant, Albany, GA 31707; [2]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

The yield and quality of farmers stock peanuts are dependent on the environmental and management factors under which they are produced. Based upon new concepts developed at the National Peanut Research Laboratory and an extensive data base gathered over the past 11 years, plant growth stages, geocarposphere temperature, water, field yield potential, pest, and management factors were related to peanut yield, grade, aflatoxin, plant outturns, and germination. Models were developed and used in the Southeast to provide objective estimates of the maturing Southeast peanut crop. Yield and grade data for each field were gathered at harvest for comparison with predicted values. Samples were taken from each field to determine shelling outturns, aflatoxin, and germination. The models proved accurate for the predictions of yield, aflatoxin, plant outturns, and germination. Based upon the predicted yield and quality of farmers stock peanuts, models to estimate the total Southeast supply and price of farmers and shelled stock peanuts were also developed and tested.

ENTOMOLOGY

The Effects of Date of Planting and Insecticide Treatments on Thrips Populations, Tomato Spotted Wilt Virus Incidence and Yield of Peanut in Alabama. J. R. WEEKS* and A. K. HAGAN, Departments of Entomology and Plant Pathology, respectively, Auburn University, AL 36849.

Studies conducted during 1987, 1988 and 1990 on Florunner cv. peanuts indicated that April planted peanuts had significantly higher populations of thrips than May planted peanuts. The least number of thrips was collected on June planted peanuts. Tomato spotted wilt virus (TSWV) incidence was higher in April planted peanuts in 1987 and 1990. TSWV incidence in 1990 was significantly higher in June planted peanuts than the two previous planting dates and April planted peanuts had higher levels of TSWV than May planted peanuts. May planted peanuts had significantly higher yields in 1987 than April or June plantings. In 1990, due to a late season drouth, yields in June planted peanuts were significantly lower than the April or May plantings. May planted peanuts generally had fewer thrips, less TSWV and consistently high yields. Insecticide treatments significantly reduced thrips populations in all years, but had no significant affect on TSWV incidence. Peanut yields also were not improved by insecticide treatments.

Frankliniella fusca and *F. occidentalis*, Two Vectors of Tomato Spotted Wilt Virus in South Texas Peanuts, a Comparison of their Development and Reproductivity. V.K. LOWRY*, J.W. SMITH, JR. Texas A&M University, College Station, Tx. 77843, and F.L. MITCHELL. Texas Agricultural Experiment Station, Stephenville, Tx. 76401.

Tobacco thrips, *Frankliniella fusca* and Western Flower thrips, *F. occidentalis*, were reared at 25 and 30°C on peanut leaves in modified Tashiro cages. Developmental rates and reproductive rates were compared by temperature and between the two *Frankliniella* species. Comparative reproductive statistics, R_o, T_c, r_c, and survivorship curves, reveal the optimum temperature for reproduction and development. *F. fusca* reproduces, survives and develops more efficiently peanut than *F. occidentalis*.

Study of Feeding Behavior of Lesser Cornstalk Borer Larvae in Laboratory Conditions. V. BOREK* and T. P. MACK. Insect Chemical Ecology Unit, UOCHB, CSAV, Czechoslovakia and Department of Entomology, Auburn University, AL.

Phytophagous insects show specialized feeding habits. Host-plant selection in natural conditions consists of a sequence of behavioral responses to an array of stimuli associated with host and non-host plants. Identification of host-plant phagostimulants using laboratory feeding bioassay experiments is possible only in cases when larvae express natural behavioral reactions, namely searching and preference for better food. Searching behavior and feeding intensity factors have been studied using a laboratory-reared colony of lesser cornstalk borers. Feeding bioassay experiments were conducted using agar plugs with a variable content of synthetic diet, agar and cellulose. The results revealed that larval feeding intensity depended on the concentration of agar, cellulose and synthetic diet. Temperature, larval stadium, starvation time and other factors also affected larval feeding behavior. Results confirmed that under laboratory bioassay conditions, larvae can discriminate among several sources of food.

Interactive Effects of Lesser Cornstalk Borers and Aspergillus Incidence in Peanut. K. L. BOWEN* and T. P. MACK. Depts. of Plant Pathology and Entomology, Auburn University, AL 36849.

The interrelationship between lesser cornstalk borer larvae (LCB), insecticide treatment, Aspergillus flavus-type fungi, and aflatoxin contamination were investigated in the 1990 drought year. Field-collected LCB larvae were found to carry propagules of A. flavus-type fungi; 31% of the larvae carried the fungus externally, while frass from 17% of the larvae carried A. flavus-type fungi. In mid-September, prior to harvest, pods from untreated control plots had a higher incidence of infection with A. flavus (97%) than samples taken from insecticide-treated plots (average 81%). In samples taken at harvest at one location, there was a high positive correlation (0.94) between visible LCB damage and A. flavus. In insecticide-treated plots, the correlation between these two variables differed; the correlation coefficient between visible A. flavus and LCB damage was 0.44 with Lorsban treatment. At another location, Lorsban applied in a narrow band resulted in the lowest LCB damage (1.5%), as well as the lowest incidence of infection with A. flavus-type fungi (80%), compared to several treatments. Samples from the second location averaged 3.4% LCB damage and 90% incidence of infection. Further data is still being compiled.

Predicting the Abundance of Larvae of the Lesser Cornstalk Borer From Estimates of Adult Abundance. T. P. MACK*, D. P. DAVIS, and C. B. BACKMAN. Department of Entomology, Auburn University, AL 36849-5413.

The abundance of larvae and adults of the lesser cornstalk borer was monitored in conventionally tilled and planted *Florunner* peanuts at the Wiregrass Experiment Substation in Headland, Ala. from 1984 to 1986. Larval abundance was monitored by soil sieving ca. weekly throughout the growing season. The abundance of adults was monitored weekly by flushing male and female moths from rows by beating plants with a stick. Regression was used to determine if adults in week 'i' can explain the variation in larval abundance in week '$i+1$', over the three years of observation. The mean number of larvae from week '$i+1$' increased linearly with an increase in adult flush counts from week 'i' ($P<0.0001$, $r^2=0.91$), indicating that larval density could be predicted by adult abundance.

Observations from five separate peanut fields were taken in 1990 to determine if adult counts do reflect larval abundance as predicted by the regression equation. Means from four of five model validation fields fell within the 95% confidence limits for the regression equation, indicating excellent agreement with the field data. This equation could be a significant addition to management of the lesser cornstalk borer, because the use of adult flush counts allows for the prediction of damaging and difficult to sample larval populations before they occur.

Management of Southern Corn Rootworm in Virginia Peanuts. D.A. HERBERT, JR.* and T.A. COFFELT. Tidewater Agricultural Experiment Station, Virginia Polytechnic Institute and State University, USDA-ARS, Suffolk, VA 23437.

Southern corn rootworm, *Diabrotica undecimpunctata howardi* Barber, is an annual pest in Virginia peanuts, *Arachis hypogaea* L. Larvae feed directly on peanut pods reducing both yield and quality. Field tests were conducted to evaluate 7 cultivars for resistance (Test 1) and to determine the effect of pod damage on kernels (Test 2). Peanuts were planted on 3 and 8 May in Tests 1 and 2, respectively, using 91 cm row spacing. Production and management practices were consistent with Virginia Cooperative Extension Service recommendations. Pod damage was determined in mid-September from 100 pods per plot from 5 randomly selected plants per plot. Yields were determined from one 80 row-foot sample per plot, dug and combined with commercial equipment. In Test 1, pod damage was significantly different among cultivars (P=0.0196), and ranked (LSD=8.8%, P=0.05) as follows: NC 9 (29.8%), VNC 851 (29.0%), NC-V 11 (27.1%), NC 6 (22.4%), VA 861101 (21.2), VA 861120 (20.9%), and AgraTech VC-1 (15.6%). Yield was also significantly different among cultivars (P=0.0001) and generally decreased as pod injury increased. In Test 2, insecticide treatments were used to create different levels of pod damage in NC 10C peanuts. Also, a second pod injury rating was taken after harvest and kernel damage was determined for peanuts having pod damage. Pod injury at the first rating was significantly different (P=0.05) among insecticide treatments and ranged from 45.5 to 88.8%. After harvest, pod injury was less and ranged from 17.0 to 55.5%. Only 19.3 to 21.6% of the insecticide treated peanuts with pod damage had damaged kernels; 32.1% of the untreated peanuts with pod damage had kernel damage. Yields were significantly different among treatments and also decreased as pod damage increased.

ECONOMICS

Sustainability and Cost-Reduction: The Case of a Late Leafspot Weather-Based Advisory System in Georgia. F.D. MILLS, JR.* and F.W. NUTTER, JR. Dept. of Agriculture and Environment, Abilene Christian University, Abilene TX 79699; Dept. of Plant Pathology, Iowa State University, Ames IA 50011.

Bravo (chlorothalonil) has proven to be an effective aid in combatting late leafspot. Timely application reduces plant defoliation and subsequent yield losses in Florunner peanuts. A 14-day calendar-based spray schedule (14DCBSS) is currently recommended to control late leafspot, resulting in seven or eight sprays per season. Though effective, public pressure to reduce pesticide use and rising production costs have created the need to assess alternative spray reducing control methods. Field experiments were conducted at Plains and Tifton, GA, in 1988-1990, comparing a weather-based forecasting system (WBFS), the 14DCBSS and a nonsprayed control. Project design included recommended Extension cultural practices, weekly disease assessments and a weather-based forecasting system using Neogen's EnviroCaster. The EnviroCaster monitored leaf wetness duration, relative humidity and temperature within the peanut canopy converting the data into severity value units providing the basis for a no spray, get ready to spray, or spray message. From 1988-1990, an average of 7 sprays, using the 14DCBSS, was applied at each location. Conversely, only 4 sprays were applied according to the WBFS. Mean yields and sample standard deviations for each system were estimated. The coefficient of variation, yield risk relative to mean yields, was lower for the WBFS (Plains, 0.11; Tifton, 0.23) than the 14DCBSS (Plains, 0.14; Tifton, 0.34) and the nonsprayed controls except at Plains (Plains, 0.08; Tifton, 0.70). Mean yields and 1990 loan rates were incorporated into the 1991 University of Georgia risk-rated irrigated peanut budget. Partial budgeting was used to estimate the differences in the chance for profit and base budgeted net revenue between the spray systems. Assuming a 100 acre field, the WBFS generated the highest chance for profit (Plains, 97%; Tifton, 87%) relative to the 14DCBSS (Plains, 86%; Tifton, 74%) and the nonsprayed control (Plains, 1%; Tifton, 38%). The WBFS exhibited the highest base budgeted net revenue (Plains, $243/ac; Tifton, $273/ac) relative to the 14DCBSS (Plains, $152/ac; Tifton, $216/ac) and the nonsprayed control (Plains, -$134/ac; Tifton, -$124/ac).

Marketing Analysis, Profitability, and Risk in Growing Additional Peanuts. W. DON SHURLEY* and MARSHALL C. LAMB. Extension Agricultural Economics Dept., University of Georgia, Rural Development Center, P.O. Box 1209, Tifton, GA. 31793 and USDA-ARS, National Peanut Research Laboratory, 1011 Forrester Dr. S.E., Dawson, GA. 31742.

The Food and Agricultural Act of 1977 implemented the present two-tier price support system for quota and additional peanuts. Compared to quota peanuts which bring a 1991 national average support level of $642.79 per ton, additional peanuts are supported at a much lower rate based on crush value. For the 1991 crop, that level is $149.75 per ton. Subsequently, the 1981 Act eliminated the acreage allotment system and essentially allowed anyone to produce peanuts. Additionals, however, continue to be eligible only for the lower price support. The acreage (poundage) of additionals has increased dramatically in recent years. Production of additionals takes place under three scenarios: quota growers who for safety sake plant extra acres, quota growers who also intentionally plant additionals acreage, and non-quota owners who produce additionals only. Each situation is different with respect to relevant production costs and measures of profitability. In two of these three situations, additional peanuts are produced as an alternative to other enterprises. Additional peanuts must be contracted by September 15 for the export market. Additionals not contracted must be marketed through the associational pool where the grower is guaranteed only the support price at the time of delivery although he expects to eventually receive a prorated share of pool profits through the "buy-back" of uncontracted additionals for export, domestic edible use, or crush. Pool profits and the eventual price received, therefore, are very uncertain and places production and marketing of additionals at substantial price risk compared to quota peanuts. A historical price series was collected and analyzed to compare price and price risk for contracting of additionals versus support price plus pool profits. Budgets were developed for dryland and irrigated additional peanuts and breakeven prices and yields determined for comparison to other available enterprises. A computer spreadsheet program was also developed to calculate and analyze net returns of both quota and additional peanuts under various contract specifications.

Do World Peanut Prices Influence U.S. Prices and Production or Visa Versa?
D. H. CARLEY* and S. M. FLETCHER. Dept. of Agricultural Economics, University of Georgia, Griffin, GA 30223-1797.

In the 1980s U.S. exports of peanuts ranged from 503 mil lbs to 1,043 mil lbs making up nearly 20% of the total use of peanuts produced in the U.S. The European Community (EC) is the largest importer of U.S. peanuts. Argentina and China are major U.S. competitors for peanut imports into the EC. Edible peanut prices quoted from the Rotterdam market are recognized as the world reference price in peanut trade. Since the 1984 marketing year, monthly prices for U.S. 40/50 shelled peanuts in Rotterdam have ranged from below $600/MT in 1987 to more than $2,100/MT in 1990. A change of $100/MT in the Rotterdam value results in an estimated change in the value of U.S. farmers' stock peanuts of about $60/short ton. Price variability impacts on farmers' decisions regarding the acres of additionals to grow, contract timing and price, or placing them in the loan program. The variation in Rotterdam prices appears to be quite sensitive to the monthly estimates of U.S. peanut production. A price-quantity relationship showed that the price for U.S. peanuts in Rotterdam changed $55/MT in the opposite direction of a change of 100,000 lbs in estimated U.S. production. The Chinese price changed about $17/MT and the Argentina price about $31/MT in the opposite direction of the same change in estimated U.S. production. As U.S. production decreased, the price gap increased between U.S. and Chinese or Argentina peanuts. U.S. prices in Rotterdam were very sensitive to changes in production in the southeast U.S. indicating that for a 10% change in production U.S. prices changed 16% in the opposite direction. Also, there appears to be a critical southeast production threshold of about 2.5 bil lbs below which Rotterdam prices increase rapidly and substantially. To the U.S. peanut industry, including exporters, buyer-shellers, and peanut farmers, the Rotterdam price is the price barometer for domestic price levels for additional peanuts produced by U.S. farmers.

The International Peanut Market: Where Does the U.S. Stand? S. M. FLETCHER* and D. H. CARLEY. Dept. of Agricultural Economics, The University of Georgia, Griffin, GA 30223-1797.

Individual country policies can influence the international peanut market which can create world supply and demand imbalances that may disrupt commodity prices. The U.S. share of world trade of peanuts in 1978 and 1979 was about 50%. World trade competitors including China, Argentina, and India have captured an increased share of the world peanut trade. Peanut export trade trends in the 1980s show the U.S. barely maintaining a constant share, both China and Argentina increasing their share, and the African countries as a total continuing to decrease in importance. Imports of U.S. peanuts by specific countries or regions show mixed trends. For the period 1978 to 1986 the U.S. was the major supplier of peanuts to Canada with 90% or more in most years. However, in 1987 and 1988 the U.S. share decreased to less than 60% with China becoming the major competitor. The U.S. share of peanuts in the western European market has remained fairly steady at around 40%. However, the U.S. appears to be losing its import share of peanuts in Japan decreasing from above 40%, to 35%, and in 1987 and 1988 below 25%. Again, an increasing share is being imported from China. Shelled peanut import demand equations were estimated for the EC, Canada and Japan by source of imports (i.e., U.S., Argentina and China). Preliminary results indicate shelled peanut consumption is viewed as a luxury good; that is, a 10% increase in income results in a greater than 10% increase in peanut consumption. However, own and cross-price effects were negligible. This latter result suggests competition based on price is not the most fruitful means in expanding exports. Rather, nonprice competition such as the TEA program is the basis for export expansion. Further examination of the results along with the data indicates that U.S. production shortfalls, especially during the 1980s, may have had a greater impact on U.S. peanut export shares than the price effects. Unless the U.S. is able to change its world image as a reliable supplier, export expansion may be limited.

PROCESSING AND UTILIZATION

Germplasm Variation in Flavor Quality. H. E. PATTEE*, F. G. GIESBRECHT and R. W. MOZINGO. USDA-ARS, Box 7625; Dept. of Statistics, Box 8203, North Carolina State University, Raleigh, NC 27695 and Tidewater Agricultural Research Station, P. O. Box 7099, Suffolk, VA 23437.
Improvement of flavor quality is a desirable objective in breeding peanuts. Thirty virginia cultivars and breeding lines were grown in randomized complete block experiments at two locations in 1988. Roasted peanut paste samples were presented to a trained sensory panel in an incomplete block design with four samples tasted in each session. Fourteen sensory attributes were evaluated. They were Roasted Peanut, Overroast, Underroast, Sweet, Fruity, Bitter, Burnt, Nutty, Throat/Tongue Burn, Petroleum, Painty, Stale, Mold, and Astringent. The Fruity attribute was confirmed to be the only attribute evaluated with a significant suppressive effect on the Roasted Peanut attribute not controlled by roast color. Session-to-session variation was significant, indicating that incomplete block designs provide a powerful tool to control panel variation in the experimental error. Broadsense heritability estimates for several sensory attributes were higher than previously reported, H=0.36 for Roasted Peanut attribute in this study, while H=0.24 in virginia, runner, and spanish lines from across the entire US peanut producing region. Further calculations indicated that experiments with two replications at each of two locations should have a 40% chance of statistical significance for germplasm differences when testing at the 5% level. A similar experiment with two replications at four locations should have a 79% chance of declaring statistical significance under the same conditions. The Roasted Peanut attribute rating differences confirmed previous evaluations and indicated new germplasms for addition to the improvement resource pool.

Effects of Variety and Processing Methods on Phytic Acid and in Vitro Protein Digestibility of Peanuts. U. SINGH, B. SINGH*, O.D. SMITH, C. E. SIMPSON, Department of Food Science, Alabama A & M University, Normal,AL 35762, and Department of Soil and Crop Sciences, Texas A & M University, College Station, TX 77843.
Seed samples of nine cultivars/lines (TP171-2, TP172-2, TP175-3, TP175-6, TP1788-3, TXAG-3, RMP-12 and Florunner) grown at Texas A & M Experiment Station, Yoakum in 1990 were analyzed for phytic acid, total phosphorus, nitrogen solubility and protein digestibility. Peanuts processed by boiling, blanching and roasting methods were also analyzed for these constituents. The phytic acid content ranged from 2.89 mg/g to 3.96 mg/g indicating significant differences among varieties. Phytic acid content represented from 61.2 to 76.0% of the total phosphorus of the peanuts depending on the variety. Nitrogen solubility ranged between 49.74 and 60.5% and in vitro protein digestibility between 66.8% and 77.5%. The highest protein digestibility value was observed in TP178-3, the cultivar with the least phytic acid. Phytic acid content negatively correlated with in vitro protein digestibility. All processing methods, including boiling, water blanching, steam blanching and roasting, reduced the protein content. Boiling also resulted in a considerable reduction (15%) in phytic acid.

Modifying the Unsaturated:Saturated Ratio of Pork Fat by Feeding Growing-Finishing Swine Diets Containing High Oleic Acid Peanuts. R.O. MYER*, D.D. JOHNSON, D.A. KNAUFT, D.W. GORBET, J.H. BRENDEMUHL and W.R. WALKER. NFREC, Marianna 32446, Dept. of Agronomy and Dept. of Animal Science, University of Florida, Gainesville, FL 32611.

A high oleic acid peanut breeding line, developed by the University of Florida, was used in a study designed to determine the effects of feeding swine diets containing elevated levels of monounsaturated fatty acids as a means to increase the level of monounsaturates and total unsaturates in the resulting carcass fat. Forty-eight pigs were allotted to four treatments which consisted of nutritionally adequate corn-soy based diets that contained 1) high oleic acid peanuts (HOP), 2) regular 'Florunner" peanuts (RP), or 3) canola oil (CO), each added at a dietary level to provide 10% added fat/oil, and 4) a control diet with no added fat/oil. The oil of HOP averaged 75% oleic acid vs. 60% for CO and 53% for RP. The pigs were fed the experimental diets from an average liveweight of 33 to 102 kg, after which all pigs were slaughtered. Carcass composition traits, fatty acid profile of the carcass fat, and taste evaluations of broiled loin chops and fried cured bacon were done. All three dietary oil sources resulted in increases ($P<.01$) in monounsaturates in the carcass fat with the HOP diet resulting in the greatest increase (32% increase over control). Both CO and RP increased ($P<.01$) the level of polyunsaturates by nearly 2 fold; HOP resulted in a small decrease. Total unsaturates increased ($P<.01$) by 24%, 24% and 27%, for HOP, RP and CO treatments, respectively, over that obtained from the control treatment. Dietary fat/oil source had no effect ($P>.05$) on carcass compositional traits and various meat quality attributes (i.e., lean color); however, carcass fat was softer/oiler ($P<.05$) from pigs fed CO or RP diets but not with HOP diets in comparison to the pigs fed the control diet. Dietary oil/fat source also had no effect ($P>.05$) on taste panel evaluations of broiled loin chops and fried bacon; however, a high incidence of off-flavors were noted with bacon from the CO fed pigs and to a lesser extent with the RP pigs, but not from the HOP or control pigs. HOP increased the level of unsaturates in pork fat with essentially no detrimental effect on resulting carcass and meat quality characteristics.

Planting Date, Digging Date, and Market Grade Effects on Fatty Acid Composition of NC 7 Peanut. R. W. MOZINGO* and T. A. COFFELT. VPI&SU and USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.

Planting and digging dates have an affect on the maturity of large-seeded virginia-type peanut (Arachis hypogaea L.). Market grades are sold by seed size which may be a reflection of maturity. The objective of this 3-year study conducted at the Tidewater Agricultural Experiment Station in Suffolk, Virginia, was to determine if planting and digging dates or market grades affected the fatty acid composition of peanut seed. The cultivar NC 7 was planted at four 10-day intervals beginning about 23 April and dug at five 10-day intervals beginning about 12 September. A randomized complete block, split-plot design was used with digging dates the whole plot and planting dates the split-plot. Analyses of variance showed significant differences each year for all fatty acids among market grades, digging dates except eicosenoic one year, and planting dates except lignoceric for two years. A significant digging date by market grade interaction was obtained each year for all fatty acids except lignoceric one year. Some years some of the fatty acids exhibited a significant planting date by market grade interaction. Generally, larger seed size as measured by market grade (extra large, medium, and No. 1) resulted in higher percentages of stearic and oleic, lower percentages of palmitic, linoleic, eicosenoic, behenic, and lignoceric, and not much change for arachidic. In most years, earlier digging dates resulted in higher percentages of stearic, oleic, arachidic, behenic and lignoceric acid, lower percentages of linoleic and eicosenoic acid, and not much change for palmitic when compared to each 10-day delay in digging date. Planting date effects were noted mostly by the last planting around 23 May resulting in higher percentages of palmitic, linoleic, and eicosenoic acid and lower percentages of stearic and oleic acid when compared to the three earlier planting dates.

Extrusion Forming of Snacks form Partially Defatted Peanut Flour Combined with Wheat flour by Central Composite Design Experimentation. J. C. ANDERSON*, N. DUARTE and B. SINGH. Department of Food Science and Animal Industries, Alabama A&M University, Normal, AL 35762.

Experimentation to characterize and optimize a process and a product for a new form with a new piece of equipment is appropriate to establish the potential success of its commercialization. This experiment was planned for optimization of an extruded wheat and peanut product's output employing a computer-aided software design package for central composite specification and subsequent analysis for factors of defatted peanut flour content (15 - 30%), extruder screw speed (286 - 504 rpm) and flour mixture feed rate (10 - 16 arbitrary units) on a single-screw cooking extruder. Eighteen factor combinations (eight combinations with the primary factor permutations of -1 and +1 for the three variable parameters, six at plus and minus star points, and four replicates at the centerpoint) were processed on an AE303 extruder with a 12:1 L/D ratio, a 3.0 inch diameter screw, and steam-jacketed barrels. Water injection into the barrel at the feed end and steam application to establish suitable operation were adjusted as needed to initiate and maintain stable behavior of product output. The extruded forms were cut at the die plate by a single rotating blade set to run 180 rpm, products were dried for 120 minutes at 105°C in a cabinet dryer, and various determinations were accomplished on the dry forms including Warner-Bratzler shear cell testing assessing the peak force and work integral to shear the products. Regression equations that characterize the outcomes in terms of the design factor levels were determined with variations accounted for as follows: Shear peak force, r^2=.82; Shear work, r^2=.82; Bulk density, r^2=.70; Cut length, r^2=.65; Power, r^2=.88; Temperature, r^2=.87; Water feed, r^2=.70. Three-dimensional overlays of developed equations which allow for simultaneous selection of process space parameters for the product outcome characteristics considered most desirable have been found useful to select eventual process operational parameters.

Evaluation of Quality of Peanut Products in Burkina Faso. A. S. TRAORE* and B. SINGH. Department de Biochimie, ISN-IDR, Universite' de Ougadougou, BP 7021, Ougadougou 03, Burkina Faso; Department of Food Science, Alabama A & M University, Normal AL 35762.

Peanut is one of the major source of proteins in Burkina Faso. Most of the peanut produced in this country is used locally for human foods in various forms including roasted, boiled, sugar coated, peanut pastes (defatted and non-defatted) and as ingredients in various foods. Roasted peanuts, boiled peanuts, defatted peanut paste, non-defatted peanut paste and millet flour/peanut paste blends were collected from markets in Banfora, Bobo Dioulasso, Ougadougou and Tenkodogo. Also included were samples of peanut pastes produced by a local company packaged in tin cans. Nutrient analyses, microbiological contamination and aflatoxin levels were determined using standard procedures. As expected, significant variations were noted in nutrient compositions of each product. The most alarming was the result on aflatoxin levels and microbiological contaminations. Almost all peanut paste samples contained more than 20 ppb of aflatoxins and high counts of staphylococci and clostridia. The peanut paste packaged in tin cans were free from aflatoxins and microbial contaminations.

Chemical, Chromatographic and Sensory Assessment of Canadian Peanuts and an Extrusion Processed Peanut Butter. D.J.MOORE* and Y.KAKUDA. Department of Food Science, University of Guelph, Ontario, Canada, N1G 2W1.

The significance of peanuts as a valuable cash crop in Canadian Agriculture is increasing as a replacement crop for unused tobacco land. Peanut breeding and agronomic research is aimed at selecting and producing peanut varieties which prosper in Ontario growing conditions. The quality of these peanut varieties is of great interest to both breeders and growers. In an attempt to predict the stability of Ontario peanuts their fatty acid profiles, divalent metal ion levels, and tocopherol contents were determined. All three stability predictors indicated that Ontario peanuts were as stable as peanuts of export origins. These data, however, did not correlate with peanut stability as measured by Rancimat determination of resistance to oxidation. Sugars and amino acids, known to be precursors for roasted flavour, were found to be at levels required for proper flavour development. Volatile profiles of Ontario peanuts were predictive of good flavour quality and correlated to sensory evaluation. Volatile profiles and sensory evaluation used to compare peanut butters processed by a novel extrusion process and by conventional milling indicated comparable products were produced from the two processes. Multivariate regression models generated from volatile peak areas gave high correlation between sensory observed scores and predicted values.

PLANT PATHOLOGY AND NEMOTOLOGY

In-Field Comparisons Of Old And New Nematicides On Peanuts. M.R. GRAVES* and T. A. LEE, JR., Texas Agricultural Extension Service, Texas A & M University System, Stephenville, Texas 76401

The peanut root-knot nematode Meloidogyne arenaria, has continued to be a major problem in Texas peanuts. Sixteen chemicals and chemical combinations were compared in a randomized block design consisting of three replications of each treatment. Each replication was 2 rows X 36" X 100'. Root-knot nematodes were present in soil from the plot area in numbers too numerous to count. Yields varied from 414 pounds per acre for the untreated check to 1982 pounds per acre for the best treatment (ASC66824-10G ISK Biotech). All treatments, with the exception of Dichloropropene and ASC66824-7.5EC, outperformed the untreated checks. The granular formulation of ASC66824 outyielded the EC by an average of 1000 pounds/acre. This promising new chemistry deserves further investigation. Although Dichloropropene was not adequate when used alone, it performed well in combination with Aldicarb. Nematicides such as Fenamiphos and Aldicarb continued to give excellent control.

Influence of Meloidogyne arenaria and Sclerotium rolfsii on Performance of Florunner and Southern Runner Cultivars in Three Leafspot Control Regimes. A. K. CULBREATH*[1], N. M. MINTON[2], and T. B. BRENNEMAN[1], [1]Department of Plant Pathology, University of Georgia, and [2]USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Randomized complete block split-plot field experiments were conducted in 1989 and 1990 to examine the interrelationships and interactions of late leafspot, caused by Cercosporidium personatum, Southern stem rot, caused by Sclerotium rolfsii, and root-knot nematodes (Meloidogyne arenaria) on control of the respective diseases and yield in Florunner and Southern Runner peanut (Arachis hypogaea). Whole plot treatments consisted of factorial combination of the two cultivars, 0 and 1.125 kg ai/ha of chlorothalonil (Bravo 720 ®) applied seven times through the season for leafspot control, and 0 and 2.24 kg ai/ha of flutolanil (Moncut 50 W ®) applied twice during the season for control of stem rot. Additional treatments of seven applications of 0.675 kg ai/ha of chlorothalonil were included with both cultivars. Sub-plot treatments consisted of application of aldicarb (Temik 15 G ®) 3.36 kg ai/ha applied at planting. Stem rot and nematode pressure were extremely heavy in both years, and leafspot pressure was heavy in 1989. In both years, yields in both cultivars were affected more by control of stem rot and nematodes than control of leafspot. Leafspot ratings were higher in Florunner than in Southern Runner in plots receiving no foliar fungicide. Incidence of stem rot was lower in Southern Runner than in Florunner in 1989. Greatest yield responses were to flutolanil applications in 1989 and aldicarb application in 1990. Application of aldicarb reduced incidence of stem rot and severity of root galling in both years. In 1989, yield reductions due to nematodes appeared to be more severe in Southern Runner than in Florunner, as indicated by yield increases with aldicarb applications. In 1989, yield response to chlorothalonil applications in both cultivars was dependent upon control of stem rot and M. arenaria.

Cotton as a Rotation Crop for the Management of Root-Knot Nematode (Meloidogyne arenaria) and Southern Blight (Sclerotium rolfsii) in Peanut. R. RODRIGUEZ-KABANA, D. G. ROBERTSON*, L. WELLS, C. F. WEAVER, and P. S. KING. Department of Plant Pathology and Wiregrass Substation, Alabama Agricultural Experiment Station, Auburn University, AL 36849, and Headland, AL 36345.

The value of 'Deltapine 90' cotton (Gossypium hirsutum) in rotation with 'Florunner' peanut (Arachis hypogaea) for the management of root-knot nematode (Meloidogyne arenaria) and southern blight (Sclerotium rolfsii) was studied for six years in a field at the Wiregrass Substation in southeast Alabama. Peanut yields following either one or two years of cotton (C-P and C-C-P, respectively) were higher than those of peanut monoculture without nematicide [P(-)]. At-plant application of nematicide (aldicarb 15G) to continuous peanut [P(+)] averaged 22.1% higher yields than those for P(-) over the six years of the study. The use of aldicarb in cotton and peanut in the C-C-P rotations increased yields of both crops over the same rotations without the nematicide. When the nematicide was applied to both crops in the C-P rotation peanut yields were increased in only two of the possible three years when peanut was planted. Application of aldicarb to cotton only in the C-P rotation did not improve peanut yields over those obtained with the rotation without nematicide. Juvenile populations of M. arenaria determined at peanut-harvest time were lowest in plots with cotton. Plots with C-P or C-C-P had lower populations of the nematode than those with either P(-) or P(+). The incidence of southern blight (Sclerotium rolfsii) in peanut was lower in plots with the rotations than in those with peanut monoculture. Aldicarb application had no effect on the occurrence of southern blight.

Peanut Seed Testa Discoloration and Microsclerotial Populations as Related to Field Incidence of Cylindrocladium Black Rot. D.M. PORTER* and R.W. MOZINGO. USDA, ARS and VPI & SU, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.

The percentage of peanut plants in field plots (2 rows wide X 12.2-m long) exhibiting symptoms of Cylindrocladium black rot (CBR) at harvest (September 15) in 15 germplasm lines ranged from 14 to 69 percent. Infection percentages were determined by dividing the number of 0.3-m row segments exhibiting CBR symptoms by 24.4-m (total length of plot row). Peanuts were harvested and dried according to standard procedures. Pods from each plot were shelled and sized (6.0- by 25.4-mm slotted screen) to retain sound mature seed (SMK). The SMK seed lots averaged about 6.4 kg. Each seed lot was divided using a Sortex Scanner into two groups: 1) seed with normal colored testa and 2) seed with discolored testa. Seed with discolored testa were further examined visually and divided into two additional sub-groups: 1) seed with discolored testa exhibiting lesions typical of those caused by C. cylindrocladium and 2) seed with discolored testa not exhibiting lesions. Seed lots averaged 93.6% (range 60.9 to 99.6) normal colored testa, 2.7% (range 0.4 to 12.2) discolored testa with no C. crotalariae lesions, and 3.7% (range 0.03 to 28.2) exhibiting lesions typical of C. crotalariae. C. crotalariae was isolated from over 90% of the seed with discolored testa exhibiting lesions typical of this fungus, from about 15% of seed with discolored testa with no C. crotalariae lesions, and from about 4% of the seed with normal colored testa. Higher field disease incidence resulted in higher percentage of seed exhibiting typical C. crotalariae lesions. Microsclerotial populations (# of microsclerotia/g of soil) were positively correlated with disease incidence in the field. In plots with a disease incidence of 56, 27 and 1%, the number of microsclerotia per g of soil averaged 1143, 438 and 3, respectively.

Effects of Spotted Wilt on Selected Peanut Varieties. M. C. BLACK. Texas A&M University Agricultural Research and Extension Center, Uvalde, TX 78802-1849.

Losses in South Texas peanuts from tomato spotted wilt virus were severe in 1986, moderate in 1987 and 1990, and low for 1988 and 1989. Multiple location large-plot variety demonstrations were conducted from 1987-1990. Partial spotted wilt resistance rank in decreasing order was Southern Runner, GK-7, Florunner and Tamrun 88. Variety rank for spotted wilt resistance was consistent whenever notable disease levels occurred. Symptomatic plants of three varieties at one 1989 location and five varieties at one 1990 location were rated for symptom severity. Resistance to spotted wilt was expressed both as fewer row feet with symptoms and less severe symptoms (1-4 index). Interplot interference at some locations with two-row wide planting patterns may have masked both resistance and susceptibility compared to wider plots. High disease incidence resulted in severe yield loss at two locations near Dilley, TX in 1990. Yields since 1987 among locations and years were apparently affected less by spotted wilt at <50% incidence than by soil conditions and cultural practices at the various locations. A preliminary single-point yield loss model was developed from estimates of late season spotted wilt and yields. Parameters of the model, $yield=a(1-disease)^b$, were yield, kg/ha; a, y-intercept (yield at zero disease); disease, proportion of row with symptoms; and b, a parameter describing the shape of the curve. Estimates of a and b, respectively, were 4045 and 0.124 for Southern Runner, 4698 and 0.179 for GK-7, 4216 and 0.182 for Florunner, and 4881 and 0.285 for Tamrun 88. Most cooperators were not able to delay digging of Southern Runner for 2 weeks compared to other varieties so the estimate of a (y-intercept) for that variety was probably an underestimate. The $\log_e$(yield) transformation improved the model but made interpretation difficult.

Development of Control Recommendations for TSWV in Peanut in Alabama. A. K. HAGAN*, J. R. WEEKS, R. T. GUDAUSKAS, and J. C. FRENCH, Auburn University, AL 36849.

Although tomato spotted wilt virus (TSWV) incidence has remained so low that yield and grade losses have been minimal, recent epidemics in Georgia indicate that TSWV poses a threat to Alabama's peanut industry. Field trials were conducted yearly from 1987 to 1990 to determine 1) impact of planting date on disease, 2) effects of at- and post-plant insecticides on thrips vector populations and TSWV occurrence, and 3) identify TSWV-resistant peanut varieties. Planting dates of late April to mid-May are recommended for peanuts since TSWV indices were twice those in both the early April and mid-June planted peanuts. In addition thrips populations were higher on April-planted than the latter two planting dates. Although no correlation between disease incidence and control of the thrips vector could be detected over the four year study period, use of at-plant soil insecticides for thrips control is recommended to growers. At the low TSWV indices noted each year, post-plant insecticide sprays had little impact on the spread of TSWV. Compared with Florunner peanut, the Southern runner peanut demonstrated partial TSWV resistance and should be grown in those fields where significant damage has previously occurred. GK-7 runner peanut was intermediate in reaction to TSWV.

WEED CONTROL

Herbicide Systems for Weed Control in Southeastern Peanuts

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Field studies were initiated in 1990 at one site in Alabama (Headland), and at three sites in Georgia (Tifton, Plains, and Chula) to evaluate alternative alachlor herbicide systems for weed control. Five different herbicide options were applied at one week after ground-cracking (1 WGC) followed by one of four treatment options applied three weeks after ground-cracking (3 WGC) for a total of 20 different herbicide systems. Maximum Florida beggarweed (Desmodium tortuosum) control was obtained with a sequential application of bentazon+paraquat or by an application of bentazon+paraquat followed by pyridate+2,4-DB. Systems utilizing predominately imazethapyr or alachlor were only marginally effective. Maximum sicklepod (Cassia obtusifolia) control was obtained with bentazon+paraquat at 1 WGC followed by an application at 3 WGC of bentazon+paraquat+2,4-DB. All imazethapyr systems or alachlor failed to provide acceptable control of sicklepod unless followed by 2,4-DB, or a 2,4-DB tank-mixture. Ipomoea morningglory species control was greater than 90% for all systems that contained 2,4-DB at 3 WGC, or imazethapyr at 1 WGC. Imazethapyr provided greater than 95% control of smallflower morningglory (Jacquemontia tamnifolia), prickly sida (Sida spinosa), bristly starbur (Acanthospermum hispidum), and yellow nutsedge (Cyperus esculentus). Imazethapyr provided greater yellow nutsedge control than alachlor. Overall, the most consistent and most comprehensive weed control was obtained with systems that used an application of bentazon+paraquat at 1 WGC followed by an application of bentazon+paraquat+2,4-DB at 3 WGC.

Effect of Imazethapyr Application Method on Weed Control in Peanuts. A. C. YORK, J. W. WILCUT*, C. W. SWANN, and F. R. WALLS, JR. Crop Sci. Dep., N. C. State Univ., Raleigh, NC 27695, Dep. of Agronomy, Coastal Plain Exp. Stn., Tifton, GA 31793, Dep. Plant Pathol., Physiol., Weed Sci., Tidewater Research Station, Suffolk, VA 23437, and American Cyanamid, Goldsboro, NC 27530.

Field experiments were conducted at four locations in North Carolina and Virginia during 1989 and 1990 to evaluate weed control and peanut tolerance with 70 g ae/ha of imazethapyr applied preplant incorporated (PPI), preemergence (PRE), at ground cracking (GC) and postemergence (POST). Sequential applications of 35 followed by 35 g/ha applied PPI + GC, PPI + POST, and PRE + POST were also included. Paraquat at 0.14 kg ai/ha at GC followed by 0.28 kg ae/ha acifluorfen plus 0.56 kg ae/ha bentazon POST was included as a standard. All treatments received 0.84 kg ai/ha of pendimethalin PPI. Excellent peanut tolerance of imazethapyr was noted with all application methods. Excellent prickly sida control was noted with imazethapyr PPI and PRE while GC and POST applications gave poor control. Spurred anoda and common lambsquarters control was excellent with imazethapyr PPI, PRE, and GC but poor with POST applications. Morningglory control varied by application method and location but was generally good with all application methods. Common ragweed control was poor with all single application methods and with all sequentials. Except for common ragweed, sequential applications tended to give more consistent control of a range of weed species. Control of all species was good to excellent with the standard treatment. Control with imazethapyr exceeded that with the standard treatment only for spurred anoda.

Interaction of Paraquat and Other Herbicides When Used in Peanuts. G. WEHTJE*, J.W. WILCUT and T.V. HICKS. Dept. of Agron. and Soils. Auburn University, Auburn AL 36849; Dep. of Agron., Coastal Plain Exp. Station, Univ. of Georgia, Tifton, GA 31793.

Laboratory, greenhouse and field studies evaluated paraquat behavior when tank-mixed with either alachlor, bentazon, chloramben, metolachlor, naptalam, or 2,4-DB when applied postemergence (POST) to peanuts. Interactions, as determined by greenhouse and field observations on peanuts and selected weeds, were generally antagonistic (i.e. naptalam and chloramben) or independent (i.e. 2,4-DB, alachlor and metolachlor). Laboratory studies using ^{14}C-paraquat indicated that antagonism can generally be attributed to reduced paraquat absorption into treated tissue. With paraquat+naptalam, herbicide-containing deposits which remained on the leaf surface were visible through scanning electron microscopy.

A unique case was paraquat tank mixed with bentazon. Both herbicides were slightly antagonistic towards the other. While this was manifested in reduced phytotoxicity on peanuts, control of some weed species (e.g. Texas panicum [Panicum texanum] and Florida beggarweed [Desmodium tortuosum]) was reduced. But with weed species that are more sensitive to bentazon than to paraquat (e.g. smallflower morningglory [Jacquemontia tamnifolia] and bristly starbur[Acanthospermum hispidum]), overall control was superior with the tank mixture than with either herbicide used alone.

Bentazon and Naptalam Tank-Mixtures with Chlorimuron for Weed Control in Peanuts. J. W. WILCUT* AND G. R. WEHTJE. Dep. of Agronomy, Coastal Plain Experiment Station, Univ. of Georgia, Tifton, GA 31793-0748, Dep. of Agronomy and Soils, Auburn University, AL 36849.

Field and laboratory studies were initiated in 1990 to investigate chlorimuron tank-mixtures with bentazon or naptalam for safening chlorimuron on peanuts and for efficacy on Florida beggarweed (Desmodium tortuosum (Sw.) DC. Field studies were conducted in 1990 at Plains and Tifton, GA. Postemergence treatments consisted of 1) chlorimuron at 0.0078 lb ai/ac, 2) bentazon at 0.5 lb ai/ac, 3) chlorimuron+bentazon, 4) naptalam at 1.0 lb ai/ac, or 5) naptalam+ chlorimuron. These treatments were in a factorial arrangement with four application timings at 1, 3, 5, or 7 weeks after cracking (WGC) plus a standard of benefin PPI followed by two applications of bentazon +paraquat (0.125 lb ai/ac). All herbicides were applied with a nonionic surfactant at 0.25% (v/v). At Tifton, chlorimuron+bentazon yielded 326 lb/ac and chlorimuron+naptalam yielded 413 lb/ac more than chlorimuron alone, averaged across all application timings. Florida beggarweed control was at least as good with chlorimuron+bentazon as with chlorimuron alone. At Plains, chlorimuron+bentazon yielded greater than chlorimuron (400 lb/ac average for 1, 3, and 5 WGC) but 157 lb/ac less at 7 WGC. Naptalam averaged 165 lb/ac more at 3, 5, and 7 WGC and 35 lb/ac less at 1 WGC. Laboratory studies with ^{14}C-chlorimuron found 71% and 72% absorption after 24 and 48 hr, respectively. Tank-mixed with bentazon, chlorimuron absorption was 30% and 35% after 24 and 48 hr, respectively. We hypothesize that reduced chlorimuron absorption when applied with bentazon reduced injury to peanut. Florida beggarweed control was not antagonized, because Florida beggarweed cannot metabolize chlorimuron. As a result, absorped chlorimuron was lethal to Florida beggarweed. Averaged across both locations, chlorimuron+bentazon yielded 219, 220, 628, and 107 lb/ac more than chlorimuron at 1, 3, 5, and 7 WGC, respectively.

Control of Yellow Nutsedge (Cyperus esculentus) with Postemergence Metolachlor Applications. W. J. GRICHAR*, A. E. COLBURN, and P. A. BAUMANN. Texas Agricultural Experiment Station, Yoakum, TX 77995; and Texas Agricultural Extension Service, College Station, TX 77843 and Lubbock, TX 79401.
Studies were conducted to determine the efficacy of metolachlor when applied postemergence to peanuts (Arachis hypogaea) and yellow nutsedge. The experiments were conducted during 1989 and 1990 on a Tremona loamy fine sand and a Strabor loamy sand, respectively. The initial experiment conducted during 1989 examined metolachlor applied postemergence at 2.0 lb/A and was followed within 12 h by 0.75 in of overhead irrigation. The nutsedge was 8-10 in tall at application and the resulting control ranged from 68-79%, season-long. Further studies conducted during 1990 investigated postemergence metolachlor applications at several timings during the growing season; yellow nutsedge height ranged from 3 in early to 14 in at the late application. All applications were followed within 4 h by 0.75 in of overhead irrigation. When metolachlor was applied at 2.0 lb/A at peanut cracking and 10, 20, and 30 days thereafter, yellow nutsedge control was 96, 87, 96, and 73%, respectively, when rated 40 days after the last treatment date. With the exception of the 30 day after cracking treatment, yellow nutsedge control closely resembled the same rate applied preplant incorporated and preemergence. Yield data from 1990 indicated no reduction due to metolachlor treatments. These studies would indicate that postemergence applications of metolachlor can provide effective yellow nutsedge control when sufficient moisture is received after application to ensure herbicide movement into the soil and root uptake. Yellow nutsedge stage of growth also appears to influence the degree of control obtained, with the smaller plants being more susceptible to the herbicide.

Control of Cyperus Sp. in Peanuts with Imazethapyr. F.R. WALLS, JR.*, G.L. WILEY, and K.R. MUZYK. American Cyanamid Co., Princeton, NJ 08540.
Imazethapyr was evaluated for control of cyperus in peanuts during the 1990 growing season. Field trials were conducted in Florida, Georgia, and North Carolina. Herbicide treatments included imazethapyr at .07 kg/ha applied preplant incorporated (PPI), at cracking (AC) or postemergence (POST) alone, in tank mix, or following metolachlor (1.96 kg/ha) applied PPI or AC. All tests were conducted using a randomized complete block design and data were summarized across tests. Imazethapyr applied alone provided an average of 87%, 80%, and 70% season long control of yellow (Cyperus esculentus) and purple (Cyperus rotundus) nutsedge when applied PPI, AC, and POST, respectively. Metolachlor applied alone either PPI or AC, provided 70% and 55% control of nutsedge, respectively. Metolachlor plus imazethapyr applied PPI or AC as a tank mix provided 90% and 85% control of nutsedge, respectively. When metolachlor was applied PPI and followed by an AC or POST application of imazethapyr, nutsedge control was 90% and 87%, respectively.

Peanut Herbicide Tolerance as Influenced by Seed Size.
T. GREY*, G. WEHTJE and B.J. BRECKE. Dept. of Agron. and Soils. Auburn University, Auburn AL 36849 and Dept. of Agron. University of Florida, Jay, FL 32565.
Studies were conducted over a two year period at Headland, Ala. and at Jay, Fl. to evaluated the relationship between peanut seed size and herbicide tolerance. Three seed sizes, termed small (3340 seed/kg), medium (2615 seed/kg) and large (1820 seed/kg) were planted to achieve a common plant population of 20 plants/m row. Data collected included crop canopy development over the five week period immediately following herbicide application, and yield. Upon germination, small,medium and large seed resulted in progressively larger seedlings. However, averaged across all trials, no interaction between seed size and herbicide treatment was detected with respect to canopy development. Across all trials, two applications of paraquat, each at 0.14 kg/ha was the most damaging treatment as measured in canopy development and yield. All remaining treatments, i.e. single applications of paraquat at either 0.14 or 0.28 kg/ha, applied either alone or as tank-mixed combinations with alachlor (3.3 kg/ha) resulted in canopy development and yields equivalent to the untreated control. Peanut yield was increased with larger seed. However, this benefit was neither consistent nor very large. Seed size had an effect on yield in two of the four trials, and within these two trials the average yield improvement from large seed relative to medium and small seed was only 10 and 12% respectively. When seed cost, and the value of the resultant crop are considered, maximum net return was provided by medium sized seed in 3 out of the 4 trials; and in the remaining trial maximum net return was provided by large seed.

Weed Management in Peanut as Affected by Weed Management in Rotation Crops.
W.C. JOHNSON, III. USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.
Weed and crop management practices directly affect weed populations and seed production. It is theorized that weed problems in peanuts are magnified by poor weed management practices in corn. Studies were initiated in 1988 to evaluate the effects of weed control in corn on weed populations and control efforts in peanuts in a corn-corn-peanut crop rotation using a split, split-plot design. Main plots were four weed management systems in corn, which included a "standard" program with a layby treatment, total postemergence program with a layby treatment, cultivation followed by a layby treatment, and cultivation alone. Subplots were three levels of postharvest weed management in corn, which included herbicides postharvest, tillage postharvest, and nontreated. Subsubplots were three levels of weed management when peanuts were planted in 1990. They included a low input system of herbicides, high input system of herbicides, and cultivation only (no herbicides). Weed counts and crop yields indicated that low input weed control in corn made higher input weed control in peanuts essential. Conversely, higher levels of weed management in corn allowed for less herbicide use in peanuts. When properly timed, postharvest weed management in corn reduced weed seed production, making weed management in peanuts more successful.

A Committee Approach to Weed Control Recommendations. S. M. BROWN.
Extension Agronomy, University of Georgia, Tifton, GA 31793.

The University of Georgia Agronomy Division Crop Protection Committee is charged with making chemical weed control recommendations for various agricultural commodities and enterprises within the state. The Committee consists primarily of faculty from the four Agronomy Departments within the Agronomy Division. Other disciplines represented include Horticulture, Fisheries, and Forestry. Committee action requires majority vote. Members include Extension weed scientists and "crop" commodity specialists and Experiment Station research weed scientists from the University and USDA. Extension commodity specialists--for example, Agronomist-Peanuts--provide input on their respective crops. Committee leadership includes three offices: Chairman, Vice-Chairman, and Secretary. An ex-officio advisor from the Agronomy Division Executive Committee, the supervisory committee of the four Agronomy Departments, also serves on the Committee. Weed control recommendations are primarily based on field and laboratory data and observational information collected within the state and region by public-sector scientists. Individual crop sub-committees generally address information relative to specific recommendations on commodities. Inclusion on the list is based on considerations of weed control efficacy, crop response, and economics, and not every legal, labeled product is included. Recommendations are annually up-dated and published in the Georgia Pest Control Handbook (Special Bulletin 28) and in other references. Specific details by commodity involve a tabular list of products, active ingredients, rates, remarks and precautions, and weed species efficacy ratings. The Committee also generates special emergency (Section 18) and local need (Section 24c) requests which are forwarded to state and Federal regulatory agencies for action.

PLANT PATHOLOGY

Effect of Foilage Removal on Disease Progress of Sclerotinia Blight in North Carolina. J.E. Bailey. Dept. of Plant Pathology, North Carolina State University, Raleigh, N.C.

Sclerotinia minor requires moist conditions in order to grow and infect peanut tissue. Various procedures designed to increase air movement and sunlight penetration into the plant canopy have been shown to reduce the severity of this disease. In this work, foliage was removed from the top, sides, or top and sides of plants on 17 July or 16 August, 1990 in order to alter the microenvironment within the crop canopy. It was found that foliage removal on both pruning dates retarded disease progression. Removal of tissue from the top of the plant was more effective than removal from the sides. Yields of plants pruned on 17 July were from 22.3 to 25.6% greater than unpruned controls regardless of pruning method, and were not significantly different from plants treated 3 times with iprodione at 1 lb ai/acre.

Effectiveness of Fluazinam (ASC-66825), a New Broad-Spectrum Fungicide, with Chlorothalonil for Control of Both Sclerotinia Blight and Cercospora Leafspot of Peanut. F.D. SMITH*, P.M. PHIPPS and R.J. STIPES. Tidewater Ag. Exp. Station, VPI&SU, Suffolk, VA 23437-0099.

A field study conducted in 1990 compared control methods against the two most damaging diseases of peanut in Virginia: Sclerotinia blight, caused by *Sclerotinia minor*, and Cercospora leafspot, caused by *Cercospora arachidicola*. Historically, Sclerotinia blight has claimed an average of 6% of the peanut crop, and Cercospora leafspot has claimed 4%, in spite of current control recommendations. Simultaneous control of both diseases has been difficult to achieve in fields with heavy Sclerotinia blight pressure. Fungicide treatments were applied five times to peanut plots as recommended by the Virginia Peanut Leafspot Advisory (VPLA) using three $D_2$13 nozzles/row calibrated to apply low-volume sprays of 140 L/ha at a pressure of 345 kPa. Chlorothalonil (Bravo® 720) at 1.26 kg/ha for control of Cercospora leafspot was tested with and without additional fungicides for control of Sclerotinia blight. Treatments consisted of no fungicide, chlorothalonil alone, and chlorothalonil plus dicloran (Botran® 75WP) at 2.10 kg/ha, fluazinam (ASC-66825 50WP) at 0.56 kg/ha, or iprodione (Rovral® 4F) at 0.84 kg/ha. The incidence of Sclerotinia blight (hits/plot) at harvest in untreated plots and plots treated with chlorothalonil alone averaged 27.8 and 35.8, whereas yields averaged 3624 and 2251 kg/ha, respectively. Compared to plots treated with chlorothalonil alone, disease incidence was suppressed by 92, 25, and 25%, and yield was increased by 4020, 1925 and 1684 kg/ha in plots treated with chlorothalonil plus fluazinam, iprodione, or dicloran, respectively. Addition of fungicides for control of Sclerotinia blight to chlorothalonil resulted in significantly (P=0.05) improved control of Sclerotinia blight and increased yields, compared to plots treated with chlorothalonil alone. Incidence of Cercospora leafspot (% leaflets infected) was 51.3% in untreated plots and 0.1% in all other plots receiving chlorothalonil applications, indicating that the addition of fungicides to chlorothalonil did not affect control of Cercospora leafspot. Thus, applications of a tank mix containing fluazinam and chlorothalonil applied according to the VPLA provided a highly-effective means of controlling both Sclerotinia blight and Cercospora leafspot, a previously unattainable goal. Fluazinam was 48 times more active than iprodione and over 300 times more active than dicloran in inhibiting growth of *S. minor* in agar-based assays. The ED_{50} values for fluazinam in these *in vitro* studies against *S. minor*, *Sclerotium rolfsii* and *Rhizoctonia solani* were 0.0025, 0.035 and 0.19 µg/ml, respectively. Fluazinam may prove to be an effective treatment against several important fungal pathogens of peanut.

A Comparison of Ipodione, DCNA, and Biocontrol Treatments for Sclerotinia Blight Control. T.A. LEE, JR.* AND M.R. GRAVES, Texas Agricultural Extension Service, Texas A & M University System, Stephenville, Texas 76401

Sclerotinia blight caused by the fungus Sclerotinia minor infests at least 20,000 acres of Texas peanuts resulting in losses that often exceed $500.00 per acre. Although Iprodione is labeled for use and DCNA has annually received state labels, new weapons are needed to combat the fungus. Biocontrol agents as well as certain fungicides at varying rates and combinations were compared in a replicated randomized block design. A culture of the fungus Sporidesmium sp. provided by Agracetus, a division of W. R. Grace Company was the most effective biocontrol agent. The experimental chemical compound ASC66825 from ISK Biotech was the superior chemical tested with CGA455 from Ciba Geigy following closely behind. A significant increase in control by Iprodione was achieved when it was applied immediately after the soil temperature at the 5 cm depth fell to 28 C.

Potential Benefit of Two Experimental Fungicides for Control of Sclerotinia Blight in Oklahoma. K. E. JACKSON* and H. A. MELOUK. Dept. of Plant Pathology and USDA-ARS, Oklahoma State University, Stillwater, OK 74078-9947.

In 1990, efficacy of two experimental fungicides, ASC 66825 (fluazinam) and CGA 173506 (4-(2,2-difluoro-1,3-benzodioxol-4-yl)pyrrole-3-carbonitrile), was compared to iprodione and iprodione - dicloran combinations at Ft. Cobb, OK. Fungicides were applied to cv 'Florunner' infected with Sclerotinia minor with a wheelbarrow sprayer equipped with a flat fan nozzle over row attached to a canopy opener. The sprayer delivered 215 L liquid per ha. A randomized complete block design with four replications was used, and plots were 3.65 X 12.2 m with a row spacing of 0.91 m. Sclerotinia blight incidence (%) was recorded during the season, and the area under disease progress curve (AUDPC) was determined. The following rates were evaluated: two applications of ASC 66825 at 0.56, 0.84, and 1.12 kg ai/ha; three applications of CGA 173506 at 0.56 and 1.12 kg ai/ha; three applications of iprodione at 1.12 kg ai/ha; and two applications of iprodione at 1.12 kg ai/ha plus two applications of dicloran at 3.35 kg ai/ha. All fungicide treatments significantly (P=0.05) increased yields and reduced AUDPC values when compared to no treatment. Yields and AUDPC were similar between treatments of CGA 173506 and ASC 66825, and as rate of application increased so did pod yields and control of Sclerotinia blight. Higher rates of both experimental fungicides had significantly higher yields and lower AUDPC values than did iprodione but were statistically similar when compared to iprodione - dicloran combination treatment. Application of ASC 66825 prior to S. minor infection (July 27) increased yields 1440 kg/ha over the same treatment applied after infection (August 7) had occurred. Yields obtained from plots treated with these experimental fungicides were higher than 4500 kg/ha which is indicative of excellent control of S. minor.

Effects of Application Methods on Efficacy of Propiconazole for Control of Peanut Diseases. T. B. BRENNEMAN*, L. D. CHANDLER[2], H. R. SUMNER[2], and J. M. HAMMOND[3]. Dept. Plant Pathology, University of Georgia, and [2]IBPMRL/ARS, Coastal Plain Experiment Station, Tifton, GA 31793, and [3]Ciba-Geigy Corp., P.O. Box 2369, Auburn, AL 36830.
Propiconazole (Tilt(R)) was applied to Florunner peanut three times at 0.11 lb ai/A by conventional ground sprayer (20 or 60 GPA) or by chemigation (0.10 or 0.25 inches water/A). All plots were oversprayed with chlorothalonil (Bravo 720, 1.5 pt/A) every 2-wk. Terraclor 10G(R) (50 lb/A) served as a standard along with plots receiving no treatment for soilborne pathogens. Mean ratings for two harvests in 1989 showed that propiconazole applied in 0.25 inches of water provided 59% control of white mold (Sclerotium rolfsii) compared with 29% for Terraclor(R) and 12-35% for the other propiconazole treatments. Yields were increased by 1093 lb/A with propiconazole applied in 0.25 inches of water whereas Terraclor(R) increased yields by 581 lb/A. Yield increases for other propiconazole treatments varied from 374 to 628 lb/A. In 1990, reduced efficacy was observed with all treatments. Terraclor(R) provided the best white mold control (24%) and yield increase (1154 lb/A). Propiconazole in 0.25 inches of water still provided greater yield increases (680 lb/A) than the other propiconazole treatments although differences were not statistically significant (P = 0.05). An additional study utilized a center pivot irrigation system to apply propiconazole (0.22 lb ai/A) in 0.07 inches of water to Florunner peanuts either in addition to, or instead of, chlorothalonil spray number three or chlorothalonil sprays three and five. Late leafspot control was improved when propiconazole was applied in addition to chlorothalonil, but substituting it for chlorothalonil resulted in more severe foliar disease both years and decreased yields in 1989. Propiconazole had little or no effect on Rhizoctonia limb rot in both studies. Results indicate that propiconazole is most effective against white mold when applied by chemigation but that such applications are inadequate to replace chlorothalonil applied by a conventional ground sprayer for control of late leafspot.

Biological Peanut Seed Protectants. D. K. BELL* and R. D. HANKINSON, JR. Plant Pathology Department, Coastal Plain Experiment Station, Tifton GA 31793.
Peanut seed protectants are essential for an adequate plant stand with pathogen infected, mechanically damaged seed. Chemical fungicides have filled this need, but concern about chemical pesticides has prompted tests with biological agents. In 1990, we tested four biologicals and a chemical fungicide for control of pre- and postemergence damping-off and vigor enhancement. Florunner seed were treated with a 33% reduced rate of BoTec(R) (113.3 g/kg); and (1) Bacillus, Trichoderma and Gliocladium granules were applied at 6.7 kg/ha over BoTec treated seed in a furrow, and (2) Bacillus powder was applied at 201.2 g/kg on BoTec treated seed; and (3) BoTec alone (=BTS). Untreated Florunner seed were treated as described with Bacillus, Trichoderma and Gliocladium granules and Bacillus powder, and a nontreated control (=NTC). Treatments were replicated 6X in a randomized complete block design. Two-hundred seed were planted 3.8-cm deep and 4.0-cm apart/replicate. Ten days after planting (DAP), emergence counts with BoTec-Bacillus and BoTec-Trichoderma granules and BoTec-Bacillus powder were significantly (P=0.05) higher than for the BTS. There was no difference in counts between BoTec-Gliocladium granules and the BTS. Also at 10 DAP, counts with BoTec-biologicals and the BTS were higher than for the biologicals and the NTC. At 15 and 24 DAP, only BoTec-Trichoderma had higher counts than the BTS. Also at 15 and 24 DAP, counts from all biologicals were still less than for BoTec-biologicals and the BTS. Postemergence damping-off caused by Rhizoctonia solani AG-4 did not occur at 10 DAP, and not in the BTS or BoTec-Biologicals 15 and 24 DAP, but occurred in all biologicals 15 and 24 DAP. At 29 DAP, the vigor ratings from the BTS and BoTec-biologicals, except BoTec-Bacillus granules, were higher than for plants from the biologicals and the NTC. The BoTec-biologicals enhanced emergence 10-22% over the BTS through 10 DAP, but not through 15 and 24 DAP. The biologicals alone lowered emergence 0.1-12.9% 10 DAP compared to the NTC. Currently, potential use of the biological agents as peanut seed protectants appears more favorable combined with a reduced rate of BoTec or possibly other chemical fungicides.

AU-Pnuts Leafspot Advisory System Validation Studies. D. P. DAVIS*, J. C. JACOBI and P. A. BACKMAN. Department of Plant Pathology, Auburn University, Auburn, AL 36849.

A peanut leafspot advisory system developed for southeastern peanut growers was validated at the Wiregrass Substation, Headland Alabama, in irrigated fields. The advisory system, called AU-Pnuts, is based on number of days with daily precipitation exceeding 2.54 mm (referred to as an infection period, IP), occurrence of fog, and forecasted probabilities for precipitation (Proc. Amer. Peanut Res. Educ. Soc. 22:37). Validation studies conducted in 1990 focused on verification of initiation of spray program and scheduling of subsequent sprays in continuous and rotated peanut fields. In continuous peanut fields, initiating program at visible signs of disease (> 1% infected leaflets) or after 7 IP resulted in equivalent control when compared to a 14 day schedule and required 2 fewer sprays each. Initiating a spray program after 12 IP in continuous peanut resulted in significantly ($P < 0.05$) higher percent infected leaflets throughout the growing season. Subsequent sprays based on 3 IP recorded or predicted 10 d after previous sprays performed as well as a 2 IP program and required 2 fewer sprays in continuous peanut. Using 4 or 6 IP recorded or predicted 10 d after previous sprays resulted in significantly ($P < 0.05$) higher percent infected leaflets. In rotated peanut, initiating a spray program after 12 IP resulted in equivalent control when compared to a 14 d schedule and required 3 fewer sprays. Initiation at visible signs of disease did not differ ($P > 0.05$) from the 14 d schedule but resulted in significantly ($P > 0.05$) higher percent infected leaflets at the end of the season when compared to a program initiated after 12 IP. Initiation of a program after 7 IP resulted in significantly ($P < 0.05$) lower percent infected leaflets at the end of the season than the above and required 2 fewer sprays when compared to a 14 d schedule. These results indicate that starting a fungicide spray program after 7 IP and using 3 IP for subsequent sprays in continuous peanuts should provide adequate control for peanut leafspot and reduce the numbers of sprays needed. However, in rotated peanut fields, initiation of a spray program should occur before 12 IP, and perhaps as early as 7 - 9 IP. In both rotated and continuous peanut fields, further work is required to identify optimal rules for initiation of fungicide spray program.

Effectiveness of a Leafspot Advisory for Scheduling Fungicide Sprays for Management of Early Leafspot of Peanut in Oklahoma. J.P. DAMICONE* and K.E. JACKSON, Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

A modified Jenson & Boyle model (J. Bailey, N.C. State University) was used to schedule fungicide sprays for management of early leafspot (Cercospora arachidicola) at four locations in Oklahoma in 1990. Two sites were irrigated and two were dryland. The advisory schedule was compared to a conventional 14-day schedule and an untreated control. Treatments were arranged in a randomized complete block design with four replications. Chlorothalonil (Bravo 720) was applied at 1.26 kg/ha through three nozzles per row in 243 L/ha water. Three fewer sprays were made to advisory plots at each of the irrigated sites compared to 14-day plots. At one irrigated site where Spanco peanuts were planted, AUDPC (percentage of leaflets with leafspot) and defoliation (percentage of leaflets defoliated at harvest) of the advisory schedule were significantly greater ($P \leq 0.05$) than the 14-day schedule but less than the control. Yields of the advisory and 14-day plots were similar but significantly greater ($P \leq 0.05$) than the control. At the second irrigated site where Florunner peanuts were planted, leafspot increase was delayed until late season despite favorable conditions for leafspot increase. AUDPC and defoliation were similar for 14-day and advisory schedules but significantly less ($P \leq 0.05$) than the control while yields were the same for all schedules. Two fewer sprays were made to advisory plots compared to 14-day plots at the two dryland sites where Pronto or Spanco were planted. AUDPC for 14-day and advisory schedules were similar but were significantly less ($P \leq 0.05$) than the control. Drought conditions at the dryland sites in mid-August resulted in permanent plant wilting and low yields that were similar for all schedules. Results suggest a reduction in fungicide usage in Oklahoma is possible by use of a leafspot advisory, however the level of risk may be increased where leafspot potential is great.

The Georgia Late Leafspot Spray Advisory System: Evaluation and Validation Experiments Conducted in 1990. F. W. NUTTER, JR.* AND A. K. CULBREATH. Departments of Plant Pathology, Iowa State University, Ames IA 50011 and University of Georgia, Tifton, GA 31794.

Alternative late leafspot control programs that keep fungicide applications to a minimum, without sacrificing pod yield or pod quality would be of great benefit to peanut producers. The objective of this project was to compare the current Florunner-Chlorothalonil calendar control program with an alternative leafspot control program that utilizes and integrates the effect of weather on late leafspot development to reduce the need for continuous fungicidal protection. Experiments were conducted at Plains and Tifton, GA to (i) validate and compare the Georgia Late Leafspot Advisory System with the calendar spray system and (ii) determine the efficacy of different fungicides when they were applied according to GA Late Leafspot Advisory Model. Research-demonstration experiments were also conducted with the cooperation of two peanut growers; one in Tift Co. and the other in Randolph Co., GA. Disease assessments were conducted each week at each location to monitor the effect of scheduling systems and fungicides on late leafspot disease development. Fungicide applications were scheduled using the temperature-leaf wetness model for late leafspot developed at UGA. Canopy temperature and hours of leaf wetness were monitored in each field using an EnviroCaster (Neogen Corp., Lansing, MI). The Advisory Model successfully predicted the initial appearance of late leafspot lesions at all 4 locations. Although approximately 3 fewer sprays were applied using the GA advisory model compared with the calendar method, there were no significant differences in the levels of disease control, pod yield, or quality. Using the spray advisory, chlorothalonil gave the best disease control while the use of several sterol inhibitors (Folicur, Tilt, and Spotless) provided the highest yields. The Late Leafspot Advisory Model has tremdous potential to reduce the cost of fungicide inputs and to significantly reduce the amount of pesticide introduced into the farm environment without reducing pod yield or quality.

Performance of Cyproconazole in Peanut on Foliar and Soil-Borne Diseases. H. S. MCLEAN* and J. F. YODER. Sandoz Crop Protection Corporation, Cordele, GA 31015.

Cyproconazole (2-(4-chlorophenyl)-3-cyclopropyl-1(H-1,2,4-triazol-1-yl)butan-2-ol) is an ergosterol biosynthesis inhibiting triazole fungicide. Cyproconazole has been field tested in peanut since 1985. Trials conducted by Sandoz and universities throughout the peanut belt have confirmed excellent activity of cyproconazole on foliar and soil-borne diseases of peanut. Cyproconazole provides excellent control of late leafspot (Cercosporidium personatum), early leafspot (Cercospora arachidicola), and peanut rust (Puccinia arachidis). In addition, cyproconazole has been shown to provide effective control of rhizoctonia limb rot (Rhizoctonia solani) and Southern blight (Sclerotium rolfsii). Cyproconazole is not active on Sclerotina blight (Sclerotina sclerotium) when applied at normal rates, but does not appear to result in increased incidence of Sclerotina blight when used to control foliar pathogens. Cyproconazole can achieve effective disease control in a variety of application programs. Optimum use patterns include a full season two-week application interval (tank mixed with reduced rates of chlorothalonil for resistance management) or a minimum of four cyproconazole applications alternated (sequential or blocked) with chlorothalonil. Proposed seasonal rates of cyproconazole range from 0.375 to 0.616 pounds active ingredient per acre independent of applications per season. Peanut yields were observed to be greater with the use of cyproconazole than with standard fungicide programs.

SYMPOSIUM: PEANUT HEALTH MANAGEMENT

Peanut Growth and Development. D.L. KETRING* and J.L. REID. USDA-ARS, Southern Plains Area and Department of Agronomy, Oklahoma State University, Stillwater, OK 74075.

Optimum conditions for growth and development are rarely met in the field. Understanding the conditions necessary for optimum growth provides a way to assess why expectations may not have been met. High quality seeds are necessary to provide good stands and begin the growing season with a healthy crop. The total of relative humidity and temperature for acceptable peanut storage is about 100 within the temperature range of 35° to 45°F and relative humidity of 55 to 65%. Sowing high quality seed in a well prepared moist seedbed is essential for crop establishment. A vigorous, actively growing root system is essential for good crop establishment. Soil moisture and temperature determine the rate of germination and seedling emergence while atmospheric temperature determines the rate of crop development. Crop development is linked to the amount of temperature "heat" received by the crop and can be measured in day-degree units. The pattern of dry matter accumulation of a peanut crop is sigmoid shaped which is like that of most annual plant species. Both the rate of crop development and dry matter accumulation are dependent on soil water. Under field conditions in rainfed agriculture, the crop frequently must be made on stored soil water alone, but timely rains may occur. When irrigation is available, strategies for supplemental water use need to be developed. Soils provide the reservoir of water and plant roots the means to extract water from the reservoir. Because of the complex interactions between the soil and plant water status, the atmospheric conditions that influence both of these, and the critical timing for water application; considerable research effort is being devoted to computer assisted programs (models) to provide optimum amounts of water from emergence to maturity for maximum crop productivity and quality.

Management of Weeds. B.J. BRECKE*. University of Florida, Agricultural Research and Education Center, Jay, FL 32565-9524.

Weeds pose a formidable challenge to peanut growers and successful management of weeds is a major obstacle to profitable peanut production. Even though nearly $60 million worth of herbicides are purchased by peanut producers annually, weeds still cause an estimated $45 million loss each year. If left uncontrolled, weeds can reduce peanut yield by 70 to 95%. Both weed density and duration of competition affect the amount of yield loss observed. The density threshold and critical periods of competition vary among weed species. For most species evaluated thus far it appears that peanut requires a weed-free period of 4 to 6 weeks after emergence. An integrated approach to weed management should result in a high level of weed control at low cost and with the least possible stress on the environment. A combination of cultural, mechanical and chemical inputs is usually required to provide an optimum level of weed control. A well managed crop growing in a soil with optimum fertility and pH, with rows spaced as close as feasible and with good insect and disease control provides for a more rapid and competitive peanut canopy cover and reduced weed growth. Careful cultivation can provide a substantial increase in the level of weed control over that obtained with herbicides alone. Herbicides remain a key component to achieving the level of weed control needed for profitable peanut production. The use of herbicides at preplant, preemergence, at ground cracking and/or postemergence in combination with timely, careful cultivation provides the optimum level of weed control and the highest economic return. The key to such a system is timely and judicious use of both chemical and mechanical methods of managing weeds.

Management of Soilborne Fungal Pathogens and Nematodes. H.A. MELOUK, USDA-ARS, Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078; P.A. BACKMAN, Plant Pathology Department, Auburn University, Auburn, AL 36849; D.W. DICKSON, Department of Entomology and Nematology, University of Florida, Gainesville, FL 32611.

Several soil inhabiting pathogens cause diseases that adversely affect peanut health and productivity. Some of these diseases are widespread in all of the growing areas of the U.S., while others are limited in distribution. The pathogens causing these diseases typically have broad host ranges, are able to live saprophytically, and produce resistant structures that reduce the efficacy of cultural disease management practices. These problems are compounded by the limited chemotherapeutic options available to growers. This presentation will include discussions of the most common soilborne diseases of peanut such as Rhizoctonia limb, pod, and root rot, southern stem rot, Cylindrocladium black rot, black hull, Sclerotinia blight, Verticillium wilt, Pythium pod rot, Crown rot, and root-knot, sting and lesion nematodes. Symptoms and signs, disease initiation, development and spread, disease losses, and control strategies will be presented for the above mentioned diseases.

Management of Foliar Fungal Pathogens. F.W. NUTTER, JR., and F.M. SHOKES. Department of Plant Pathology, Iowa State University, Ames, IA 50011 and North Florida Research and Education Center, Quincy, FL 32351.

Foliar diseases of peanut remain among the most important yield-limiting factors in peanut production. Foliar diseases reduce the amount of healthy leaf area available to intercept light and thereby reduce the production of photosynthate. Pod yield is also greatly reduced by foliar diseases. As defoliation increases, pod connections become weaker resulting in mature peanuts to be left in the ground. This loss is accentuated as the date of digging is delayed beyond that recommended by the hull scrape method. Because management decisions may affect fungal pathogen populations, disease management tactics must be properly integrated to maximize return on expenditures for disease control. Two main strategies are advocated to manage foliar diseases. The first is to reduce the level of inoculum surviving intercrop periods by utilizing control tactics, such as crop rotation and destruction of volunteer peanut plants. The second strategy is directed at reducing the rate of pathogen reproduction during the cropping period. These tactics include the use of fungicides, spray advisory programs, and/or resistant cultivars. There is an important relationship between these two strategies: as the rate of pathogen reproduction is reduced during the season, strategies that reduce the level of inoculum will become more effective in delaying the start of an epidemic. Efficient foliar disease management programs will require the development of grower-accepted decision support and delivery systems.

Viral Diseases and Their Management. J.L. SHERWOOD* and H.A. MELOUK. Department of Plant Pathology and USDA-ARS, Southern Plains Area, Oklahoma State University, Stillwater, OK 74078.

Viruses are among the simplest in composition of the pathogens that infect peanut, but are probably the most difficult to manage and control. Control measures must be directed toward preventing the crop from becoming infected or keeping initial disease loci from serving as a source for further spread of the virus rather than trying to eliminate the pathogen from the crop. In developing management strategies for control of plant viruses, an understanding of the relationship of the virus with the crop and the environment is necessary. It is also important to understand the relationship of any vector of the virus with the crop and the environment because the movement of the virus is generally dependent on the movement of the vector. Hence, an understanding of the management of the virus disease requires an understanding of vector management. The purpose of this chapter is to provide information on 1) the ecology of plant viruses, 2) the epidemiology of important viruses of peanut in North America, and 3) some viruses of peanut that are of significance in other parts of the world.

Management of Physiological and Environmental Disorders of Peanut. C.K. KVIEN. Department of Agronomy, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793.

Physiology provides us understanding of how plants work and provides the insight needed to manage crop disorders successfully. Most physiological disorders are caused by environmental stresses that are either biotic or abiotic. Biotic stresses are caused by living things such as insects, bacteria, fungi, virus, nematodes and weeds. Abiotic stresses are related to conditions such as temperature, water, radiation, wind, equipment traffic, or chemicals including pesticides, nutrients, salts and gasses such as ozone. Plants adapt to stress by avoidance or tolerance. Avoidance mechanisms insulate plant cells and allow them to function normally by excluding the stress with a physical or chemical barrier. Plants tolerate stresses by preventing, decreasing or repairing damages. The presentation will include a brief description of how different biotic and abiotic disorders of peanut affect the plant, followed with suggestions on how to minimize their effects. Comments on biotic stresses such as those caused by insects, bacteria, fungi, nematodes and weeds will be restricted to their effects on plant physiology, and plant response to these stresses. Abiotic pressures including temperature, water, radiation, chemicals and equipment-induced-stresses interact with each other and with various biotic disorders, creating diagnostic puzzles. The causal agents for some abiotic stresses (water surplus or deficiency, calcium supply, equipment traffic and pesticide injury) are easier to manage than others (radiation, temperature, and ozone damage). As with biotic stresses, proper selection of peanut cultivars with resistance or tolerance to the abiotic stresses likely to be encountered is one of the best ways to manage these disorders.

Management of Mycotoxins. D.M. WILSON, Mycotoxin Laboratory, Department of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31794.

Aflatoxins are the only mycotoxins regulated in the peanut industry. Aspergillus flavus generally produces aflatoxin B_1 and B_2 and A. parasiticus may produce aflatoxin B_1, B_2, G_1 and G_2. Both fungi can grow and contaminate peanut with various amounts of each toxin. Aflatoxin B_1 is the most toxic and carcinogenic of the aflatoxins. It is essential to accurately monitor aflatoxin content. Therefore, reliable sampling and analytical methods must be used. Preharvest aflatoxin contamination is especially affected by low soil moistures and high soil temperatures related to late season droughts and by insect activity in dry soils. Irrigation may minimize aflatoxin contamination, perhaps because hydrated peanuts are capable of producing protective phytoalexins. Calcium is the only mineral nutrient that has been identified as affecting preharvest aflatoxin contamination. Calcium deficiency in certain soils is sometimes related to excessive preharvest aflatoxin contamination. After digging, seed moisture contents and ambient temperatures are the critical factors affecting aflatoxin accumulation. Aflatoxin will not be produced if an equilibrium relative humidity of 85% or below exists in peanut stored free of insects. This relative humidity roughly corresponds to storage with an inshell moisture content of 10-11% or a seed moisture content of 7-8%. Other mycotoxins that may be of concern to the peanut industry include cyclopiazonic acid, citrinin, and sterigmatocystin, and other toxic metabolites of Aspergillus, Penicillium or Fusarium species.

Pesticide Application Techniques For Peanut Health Management. T.A. KUCHAREK. Plant Pathology Department, University of Florida, Gainesville, FL 32611.

The purpose of this chapter of the book on Peanut Health Management is to consolidate and summarize the available information on application techniques associated with chemicals used for pest control for peanuts in the United States. Emphasis is placed upon techniques for which data bases are available and from which reliable conclusions can be stated. Benefits and shortcomings of the various application techniques in relation to better pest control, optional logistical approaches, and influences upon the environment are candidly presented. Some of the specific topics include: benefits of correct formulation selection, interpretations of ambiguous pesticide labels in relation to chemical dosage, understanding of the critical zone concept for common pests (fungi, nematodes, insects and weeds) limitations of seed treatments, correct placement of soil fumigants, influence of nozzle type, nozzle arrangement, spray pressure, spray volume and sprayer speed upon control of peanut leafspot, advantages and disadvantages of different application techniques, reasons why different tests with fungigation vary in relative control of diseases, weeds and insects, advantages and disadvantages of spray adjuvants, principles of chemical rate calculations, and calibration methods for different types of equipment.

SYMPOSIUM: STRATEGIES TO REDUCE THE ENVIRONMENTAL IMPACT OF PEANUT PRODUCTION

The North Carolina Center for Integrated Pest Management. H. D. COBLE*. Dept. of Crop Science, North Carolina State Univ., Raleigh, NC 27695-7620.
Management of pest species in agricultural environments has become highly technical since the introduction of synthetic chemicals as pesticides. These chemicals have been used very successfully to replace man and machine for the control of pest species, including insects, weeds, and plant and animal pathogens. Although in many cases pesticides are the most efficacious and economical means of controlling a pest population, the most effective use of these chemical tools is in an integrated effort utilizing cultural, mechanical, and biological controls as well. This approach is referred to as Integrated Pest Management (IPM), and involves a basic understanding of pest biology coupled with choices of control technology resulting in the most economically sound, environmentally compatible, and sociologically responsible outcome. Judicious use of pesticides is an integral part of the IPM philosophy. The major focus of the Center for Integrated Pest Management (CIPM) will be on research and technology transfer. Most of the research funded through the Center will be integrated across disciplines in order to more directly address issues of importance to the agricultural industry. Of great importance will be the utilization of new scientific technology in solving pest management problems and to rapidly transfer the knowledge generated to users. A major project will involve the development of computerized decision aid models for rapid implementation of IPM technology at the agribusiness and farm level simultaneously. The goal of the Center will be to serve the lead role in technology development and transfer, training, and public awareness for IPM at the state, regional, and national level. A major objective of the Center will be to serve as a link between basic research at the university and the agribusiness sector serving the region.

Breeding Strategy to Reduce Pesticide Use. D. W. GORBET*, D. A. KNAUFT and F. M. SHOKES. NFREC, Marianna 32446, Dept. of Agronomy and NFREC, Quincy 32351, University of Florida, Gainesville, FL 32611.
Growers throughout the U.S. currently spend a great deal of time, money, and energy on the control of various diseases, nematodes, insects, weeds, and other pests in peanuts (Arachis hypogaea L.). A reduction in the use of these pesticides would be economically and environmentally advantageous. Breeding for various types of pest resistance, especially diseases, constitutes a major part of the time and effort in many peanut breeding programs. Some peanut diseases that have received emphasis in the U.S. include early and late leafspot [C. arachidicola Hori and C. personatum (Berk. & Curt.) Deighton], sclerotinia blight (S. minor Jagger), cylindrocladium black rot (CBR - C. crotalariae Bell and Sobers), rust (Puccinia arachidis Speg.), southern blight/white mold (Sclerotium rolfsii Sacc.), pythium pod rot (P. myriotylum Drechsler), aflatoxin (A. flavus Link ex Fr.), and several others, including some viruses. Some progress has been made in identifying genetic resistance and incorporating this resistance into commercial cultivars. The Southern Runner cultivar has some degree of resistance to five major diseases, namely late leafspot, white mold, rust, web blotch, and tomato spotted wilt virus. Growers can reduce fungicide and insecticide (virus vectors) use on this cultivar with limited yield loss from these diseases. Cultivars have been released with resistance to CBR (NC8C and NC10C), web blotch (Florunner), pythium (Toalson), and sclerotinia (Tamspan 90, Va81B). Resistance to southern corn root worm (Diabrotica undecimpunctate haword; Barber) is available in NC6 and resistance to other insects has been identified. Limited progress has been made on identifying nematode resistance or weed tolerance. Another strategy is the use of earliness to escape major damage from some pest problems. Future peanut cultivars need to have multiple pest resistance or be adapted to growth strategies for escaping pest problems and reducing pesticide use.

Use of Multiple Pathogen Resistance for Management of Peanut Diseases. A. K. CULBREATH, T.B. BRENNEMAN, Dept. of Plant Pathology, J.W. TODD, Dept. of Entomology, Coastal Plain Experiment Station, Tifton, GA 31793, and J.W. DEMSKI, Dept. of Plant Pathology, Georgia Experiment Station, Griffin, GA 30223.

Peanut (Arachis hypogaea) cultivar Southern Runner was developed in Florida for resistance and tolerance to Cercosporidium personatum, the causal agent of late leafspot. Subsequent studies have shown that this cultivar also has moderate levels of resistance to Sclerotium rolfsii, which causes southern stem rot, to tomato spotted wilt virus (TSWV) and to other pathogens. Use of this cultivar may allow reduction in the number of fungicide applications for leafspot control or may allow the use of alternative fungicides that would not be adequate for control on susceptible cultivars. Similarly, benefits from resistance to S. rolfsii include potential for reduction in number of fields requiring fungicide applications for control of stem rot. At the present, use of this cultivar represents the only consistent control measure for supressing development of TSWV epidemics in peanut in the Southeast. Using this cultivar instead of attempting to control the virus through insecticide applications for vector control should be more effective and economically feasible. Combination of cultural practices such a good rotations, which also provide control of several pathogens and other pests, with resistance to one or more major pathogens can help reduce dependence on pesticides for peanut production.

Reducing the Tonnage of Pesticides for Production of Virginia-Type Peanuts. P. M. PHIPPS, Tidewater Agricultural Experiment Station, Va. Polytech. Inst. & State Univ., Suffolk, VA 23437-0099.
Peanuts are managed intensively because of the crop's high value per acre and vulnerability to heavy losses of yield to diseases, insects, and weeds. The central role of pesticides in peanut production has been sustained by the absence of effective alternatives. Extension programs for improving the efficiency of pesticide applications in Virginia include diagnostic services, the predictive nematode assay program, the peanut leafspot advisory program, pest alerts, pesticide applicator certification programs, field tours, and on-farm demonstrations. In the decade of the 80's, several of these programs combined with new pesticide chemistry were major contributors in reducing the tonnage of applied pesticides in peanut production. The predictive nematode assay program allowed growers to detect hazard levels of nematodes in soil and apply nematicides only in fields where these pests posed a threat to the crop. This program offered an annual savings of up to 800,000 dollars in production costs, and elimination of up to 212 tons of granular nematicide (ca. 32 tons a.i.) in the eight counties where peanuts are grown in Virginia. Also in the 80's, the peanut leafspot advisory program afforded an average of three fewer sprays annually in comparison to the 14-day calendar program. This program employs a computerized weather monitoring system to assimilate data on a timely basis and produce advisories concerning the need for fungicide applications to control the disease. Benefits to Virginia included an average annual savings of about 3 million dollars in production cost and as much as 54,000 gallons of fungicide (ca. 160 tons a.i./yr) on 96,000 acres of peanuts. The tonnage of chlorothalonil for leafspot control was reduced in the 80's by use of SoyOil 937 (Coastal Chem. Co.) as an adjuvant in sprays of chlorothalonil. At 0.5% of spray volume, SoyOil 937 plus chlorothalonil at 0.75 lb a.i./A provided disease control that was equivalent to chlorothalonil alone at 1.12 lb a.i./A. Registration of one or more of the new triazole fungicides for leafspot control in the decade of the 90's could further reduce the tonnage of fungicide by as much as 90%, or up to 172 tons of a.i./yr in Virginia. The advent of synthetic pyrethroids (e.g. fenvalerate, esfenvalerate) for corn earworm control in the 80's reduced the tonnage of insecticides for control of this pest by up to 98%, or 44 to 48 tons of a.i./yr in Virginia. New initiatives that seek to employ biological agents and innovations in biotechnology in crop protection may further reduce the dependency on pesticides.

Strategies to Reduce the Impact of Insects in Peanut. R.L. BRANDENBURG.* Department of Entomology, Box 7613, N. C. State University, Raleigh, NC 27695-7613.

Insect management in peanuts has traditionally incorporated a full complement of integrated approaches that include chemical, cultural, and biological control as well as host-plant resistance. Increasing concerns over the environmental impact of pesticides, the public's fear of pesticides, concern over food safety, the loss of certain pesticides along with new threats from thrips vectoring tomato spotted wilt virus have created new IPM challenges for the 1990's. New efforts in education on product stewardship, the use of predictive modeling and expert systems, research on pest biology and ecology, and cultural practices are producing a slow evolution in pest management strategies. Current examples and future proposal of IPM for insect control in peanuts are presented. More effective coordination of efforts between disciplines has also expanded due to herbicide/thrips injury interactions, thrips/TSWV incidence, and fungicide/spider mite interactions.

Strategies to Reduce the Environmental Impact of Weed Management in Peanut. J. W. WILCUT* and G. R. WEHJTE. Dept. of Agronomy, Coastal Plain Exp. Stn., Univ. of Georgia, Tifton, GA 31793, and Dept. of Agronomy and Soils, Auburn Univ., AL 36849.

Weed management in peanuts has historically incorporated the use of herbicides and cultivation along with cultural practices for weed management. Weed management programs for many producers prior to 1987 utilized approximately 9.0 to 10.0 lb ai/acre. The utilization of new technology coupled with more intensive management has reduced the herbicide use to 4.0 to 6.0 lb ai/acre with producers often using less than 3.0 lb ai/acre. The incorporation of new technology at low use rates as substitutes for high use rate compounds for weed control will allow for effective weed control at 2.0 lb ai/acre or less for many producers in the next several years. Research initiated in 1985 on alternative weed management systems has developed systems providing excellent weed control, high peanut yields, while maintaining peanut profitability. In many instances, these alternative systems have increased profit potential while reducing the amount of herbicide used. Integrating basic research on economic thresholds, weed biology and ecology, and population dynamics, along with development of expert systems that aid proper herbicide selection and application timing will further reduce the environmental impact of weed management programs. Education programs on weed identification, herbicide selection, scouting and mapping, and good pesticide stewardship are essential for a profitable and quality peanut crop while reducing the environmental impact of peanut production.

Pesticide Stewardship. DANIEL. L. COLVIN. Extension Weed Specialist, University of Florida, Gainesville, FL 32611.

Perhaps more than most people realize, farmers are concerned about the quality of the environment in which they live and are increasingly aware of environmental issues which affect them and the use of pesticides. It is the responsibility of the farmer to do everything possible to insure that pesticides are used safely and properly. Unfortunately, some farmers remain lackadaisical in their handling of pesticides and pesticide wastes by stockpiling unrinsed cans around vulnerable areas and container breakage that allows pesticides to enter the groundwater. Pesticide stewardship is managing pesticides and pesticide usage with proper regard for the environment and the rights of others. Well water contamination from the improper use of pesticides is a major environmental concern. To avoid improper use of pesticides is a major environmental concern. To avoid contamination problems with chemicals in our state, pesticide stewardship programs must become a priority for farmers. Several ideas put forth in pesticide stewardship consist of: 1) not mixing pesticides near a well-head, 2) pesticide mixing should take place at least 200 feet from wells, preferably with some type of a PVC line or long hose, or possibly even moving farther away to on-site mixing with the use of nurse tanks, 3) redistributing rinse water from sprayer cleanups back over registered sites, 4) washing sprayer exteriors in the field but not in the same location in the field every time, 5) triple rinse or flush all containers and the spray tank at mixing site and puncture the bottom of the containers, and finally, dispose of rinsed pesticide containers properly. Once containers have been punctured properly and triple rinsed, they may be disposed of through methods displayed on the pesticide container label. Florida allows for the burning of certain pesticide containers provided that they are generated in the farmers own operation, no more than one day's accumulation, and no more than 500 pounds per day. Some states prohibit the burning of containers, and therefore must be placed in sanitary landfills. Obviously, improper pesticide disposal practices cannot continue if we want to keep our environment clean. Pesticide application and disposal of wastes will gain increasing visibility as concerns for the environment and worker safety mount. Pesticide stewardship is the farmer's best strategy for insuring that important chemical tools will remain available in the 1990s.

Organic Peanut Production - Potential and Problems. J. BAILEY* and C. K. KVIEN. Dept. of Plant Pathology, North Carolina State Univ., Raleigh, NC 27695 and Dept. of Agronomy, Coastal Plain Experiment Station Univ. of Georgia, Tifton, GA 31793.

Environmentally and economically sound peanut production systems continue to be refined. These systems are most easily accomplished with appropriate synthetic chemicals. However, the development of organic production techniques helps reevaluate the need for many of our synthetic pesticide inputs. The organic approach fills a niche market where premiums can be expected, and provides consumers with a choice, thereby benefiting all production techniques. Studies in both North Carolina and Georgia found organic production techniques to be unprofitable at low yield levels. However, with proper management, high yield potential and an adequate supply of temporary low cost labor, organic production profits can equal or exceed standard production profits if a 20% premium for the organic production is available. Organic production methods reduce many of the off-target effects associated with synthetic chemical pest controls and helps stabilize the crop by increasing natural biological controls. But, no adequate organic pest controls are available for CBR, web blotch, late leafspot, southern corn rootworm, lesser cornstalk borer and most weed species. In addition, insects feeding on pods increase the likelihood of aflatoxin contamination. One of the most significant problems reducing organic peanut production profitability is weed control. Growers will probably spend $100 to $500/A to control weeds if only cultivation and hand weeding are used. By comparing many production systems, side by side, the strengths and weaknesses of each become apparent. Many organic techniques are not likely to gain widespread acceptance, but a few might be modified to help improve our current mainstream peanut farming techniques.

SYMPOSIUM: MOLECULAR GENETICS

In Vitro Culture Techniques for Peanut as Facilitators for Interspecific Hybridization and Genetic Manipulation. P. OZIAS-AKINS. University of Georgia, Coastal Plain Experiment Station, Department of Horticulture, Tifton, GA 31793.

Tissue culture has been used as a tool in many crop species for recovering interspecific hybrids, for propagation, and for gene transfer. The rate-limiting step often is the development of protocols for efficient plant regeneration from in vitro cultured tissues. Choice of explant and type of regeneration system desired, i.e., embryogenesis vs. organogenesis, are initial decisions. Media manipulation through adjustment of plant nutrients and growth regulators is conducted to achieve and optimize response. In peanut, several immature, actively growing tissues are capable of plant regeneration via embryogenesis or organogenesis. In many cases, the frequency of regeneration is low and cannot be sustained for a long period of time. For successful hybrid rescue, either a complex explant such as the entire ovule or embryo may be required, or if seed development proceeds to the cotyledonary stage, only embryo parts may be necessary. In vitro methods ranging from ovule culture to culture of excised immature embryos to produce shoots de novo or somatic embryos will be reviewed. The potential for genetic manipulation of the previously mentioned tissue cultures and cultures derived from explants from more mature tissues will be discussed.

Development of a Gene Transfer System For Peanut.
ARTHUR WEISSINGER, THOMAS CLEMENTE and MARVIN BEUTE. Departments of Crop Science and Plant Pathology, North Carolina State University, Raleigh, NC, 27695-7620.

A gene transfer (transformation) system for peanut would be extremely useful for enhancement of germplasm resources, through the introduction of genes for desirable traits which are unavailable within cultivated genepools. Unfortunately, no transformation system has been described. The morphology, growth characteristics, and culture response of peanut also pose formidable obstacles to recovery of transgenic plants. Microprojectile bombardment appears to offer ways to overcome many of these impediments, however, and therefore seems uniquely suited for gene transfer in this species. Transgenic plants have been produced by microprojectile bombardment of four different types of explant tissue, in several different crop species. Tissues include non-embryogenic suspension cultures (tobacco), embryogenic suspension cultures (maize, soybean), intact explants (tobacco), and meristematic tissues (soybean). We are currently attempting to transform peanut by bombardment of intact explants (leaf), meristems (apical meristems from mature embryos), and embryogenic callus cultures. All of these approaches offer promise, although at present, only intact explant tissues have produced stably transformed tissue. Response varies with genotype, although elite cultivars have performed well in the prototype system.

RFLP Mapping in Peanut. G. KOCHERT. Department of Botany, University of Georgia, Athens GA 30602.

Cloned DNA probes can be used to rapidly assess the degree of genetic variability present in plant populations and to construct genetic maps. Variability between plants is detected as differences in the size of DNA fragments produced after digestion with restriction enzymes, or restriction fragment length polymorphisms (RFLPs). We have used RFLP analysis to estimate genetic variability in peanut cultivars and wild species and to begin construction of an RFLP map. Using conventional RFLP analysis, four-cutter analysis, and amplification by the polymerase chain reaction using random primers, we find very low amounts of genetic variability in cultivated peanuts and in land races derived from the major South American centers of origin. This finding is paradoxical in light of the abundant morphological variation seen in these same lines. We believe the morphological variation to be the result of the action of only a few genes, which might be regulatory in nature. A low level of genetic variability also makes it unlikely that major new genes of agronomic importance will be found by screening tetraploid peanut accessions. We have detected a great deal of RFLP variability between wild species in section Arachis. By comparision of diploid and tetraploid RFLP patterns, the most likely progenitor species of tetraploid peanut are A. duranensis or A. spegazzinii for one genome and A. ipaensis for the other genome. We are using F2 populations derived from interspecific crosses between diploid wild species for the construction of a peanut RFLP map. Such populations exhibit abundant polymorphism and the expected segregation ratios. We propose a new method for introgression of desirable traits from peanut wild species consisting of the following steps: 1) tagging the desired trait with RFLP markers by mapping in wild species crosses 2) using RFLP assisted selection to monitor introgression into elite lines.

Use of Isozyme, Protein, and Other Molecular Markers in Arachis. H. T. STALKER, Dept. of Crop Science, North Carolina State University, Raleigh, NC 27695-7629.

Molecular markers are potentially valuable tools to aid selecting quantitative traits such as yield components, disease or insect resistances, identifying hybrids, or conducting biosystematic relationships. Several molecular systems have been studied in peanut, including restriction length polymorphisms (RFLPs), isozymes, proteins, and, to a lesser degree, cytoplasmic genes. This presentation will review pertinent results concerning isozymes, proteins, and chloroplast DNA. A survey of Arachis hypogaea L. cultivars and botanical varieties has led to a conclusion that isozymes have little value as molecular marker tools in this species. Seed storage proteins are more variable and subspecies can be distinguished, but separation of many cultivars is nearly impossible. Attempts to associate isozymes or proteins with foliar diseases or insect pests have thus far been disappointing. Additional work is needed, however, to attempt to associate seed proteins with soil-borne pathogens and insect pests. Surveys of Arachis species for both seed storage proteins and isozyme patterns have identified significant amounts of variation between species within and between sections of the genus. Cytoplasmic genes, isozymes, and seed storage proteins have been employed to propose probable progenitor species of A. hypogaea and biosystematic relations among other species. The variation between diploid species of section Arachis and A. hypogaea is sufficient to identify hybrids and to potentially follow introgression into the cultivated genome.

Identification and Cloning of Genes for Economically Important Traits in Peanut. A.G. ABBOTT*, C.C. AINSWORTH, G.L. POWELL, D.A. KNAUFT, and T. RAY. Dept. of Biological Sciences, Clemson University, Clemson SC 29634-1903; Dept. of Molecular Biology, Wye College, Kent, England; and Dept. of Agronomy, University of Florida, Gainesville FL 32611-0311.
Peanuts are currently the focus of our efforts to isolate and clone genes which encode traits of agronomic importance. Peanut oil is a particular focus, since peanut seed are approximately 50% oil and offer a rich source of high quality plant oil. The large production of oil and the abundance of material facilitate studies of those genes involved in oil synthesis and modification. To isolate and clone these "oil genes," we have constructed a lambda gt11, cDNA library of mRNA isolated from developing peanut seed and have initiated screening experiments to isolate the genes encoding the acyl carrier protein, the stearoyl-ACP desaturase, and the delta 12 desaturase. To date, we have isolated three clones with homology to an oligonucleotide derived from the sequence of Brassica ACP and by sequence analysis have determined that one of these clones carries a complete copy of the peanut ACP gene. Additional clones are being sequenced, and studies to examine the organization of this gene and the regulation of its expression are being carried out. We are also screening the library using a cloned probe for castor bean stearoyl-ACP desaturase and antibodies to partially purified delta 12 desaturase-competent microsomes in order to isolate the remaining genes of interest. Our goal is to understand the nature and regulation of these important genes and utilize this information to engineer or select for high quality peanut lines.

Peanut Molecular Genetics and Cultivar Development. D.A. KNAUFT. Dept. of Agronomy, University of Florida, Gainesville FL 32611.
Peanut cultivar development can be enhanced by molecular genetic tools only after a reliable transformation system is developed. Work with transformation vectors and tissue culture must continue until gene sequences can be routinely incorporated into whole plants. RFLPs have been found within wild Arachis species and among wild and cultivated peanut through utilization of genomic probes. CDNA probes have further identified variability within cultivated peanut. While maps developed from interspecific hybrids will enhance our understanding of the peanut genome, utility of RFLPs for cultivar development may be limited by our rudimentary understanding of basic peanut genetics and cytogenetics. Assuming a successful transformation system, incorporation of isolated gene sequences will be beneficial for cultivar development. While foreign DNA sequences may be used for peanut transformation, most available sequences, such as those for insect or herbicide resistance, have limited economic significance. Resistance to TSWV, from incorporation of the viral protein coat gene, may be one of the first foreign DNA sequences that could provide economic benefits for peanut growers. Possibilities for aflatoxin resistance may occur, but the biology of this system needs further understanding. Several peanut genes may have use in rapid incorporation into a range of germplasm. Genes for high oleic acid, white testa color, precocity, low oil content, and perhaps dormancy could be useful. Pest resistance from wild species, such as resistance to nematodes and leafspot, may be transferred, assuming a working protocol for isolation. A few genes from peanut may have benefit in other crops. The oleate desaturase gene from peanut appears to have less temperature sensitivity than the similar gene from sunflower and could be transferred and incorporated into sunflower or other crops.

POSTER ABSTRACTS

Pre-Plant-Incorporated Limestone as a Calcium Source for Peanut. G. J. GASCHO*, A. K. ALVA, S. C. HODGES and A. S. CSINOS. University of Georgia, Divisions of Agronomy and Plant Pathology, Coastal Plain Experiment Station and Cooperative Extension Service, Tifton, GA 31793.

Liming when soil pH is less than 6.0 is a well accepted practice in the Southeast. Lime for peanuts in Georgia is most often mixed with the soil by moldboard plowing. Since peanut requires high concentrations of Ca in the pegging zone (approx. top 3 in. of soil) and Alabama scientists have determined that pre-plant-incorporated (PPI) lime in the top 3-5 inches usually satisfied Ca needs, we compared PPI lime with bloom gypsum (BG) in replicated studies conducted for 10 site-years for both runner and Virginia types. The treatments consisted of PPI calcite, dolomite, gypsum and control plots split by BG or no BG. All PPI applications were 1000 lb material/ac and bloom gypsum was applied at 1000 lb/ac broadcast for 1988 and 1989 studies and at 500 lb/ac for a 12-14 inch band application in 1990. Soil tests were made at 10-14 days after planting. At harvest we obtained pod rot, yield and grade data. Value was calculated by use of the peanut loan schedule. Pod rot percentage was affected by applied Ca in 2 experiments for runner peanuts. In those cases and for Virginias it was reduced by either PPI lime or BG. For runners, yield, grade and value were affected little by gypsum applications, either PPI or BG, when pH was low and liming was needed. Under those conditions PPI calcite or dolomite increased gross value by an average of $200/ac over no application of Ca. Application of BG following PPI lime increased value by another $30 and $80/ac for runner peanuts for calcite and dolomite, respectively. For Virginias, BG without PPI limestone increased value/ac by an average of $545/ac over no Ca source. That increase was greater than the increase from PPI limestone without BG. Application of both PPI lime and BG resulted in value/ac increases of approximately $600/ac over no Ca applied. We conclude that PPI limestone, where pH is less than 6.0, may eliminate the need for BG, but in some cases, a loss in yield, grade and value may be incurred for runner peanuts if BG is not applied. Lime PPI is also a good practice for Virginia peanuts, however, BG is always required for highest yield, grade and value, and lowest pod rot.

Clustering of Mexican Entries of Peanut (*Arachis hypogaea* L.) by Numerical Taxonomy. S. SANCHEZ-DOMINGUEZ* and A. MUÑOZ-OROZCO. Departamento de Fitotecnia, Universidad Autónoma Chapingo y Colegio de Postgraduados, Chapingo, Méx. 56230 México.

Peanut is an important pulse crop in Mexico where it is cropped on 50,000 ha; mainly in southern areas of the Mexican Republic. For the purpose of studying the phylogenetic relations at the sub-species level, the objective of this research was to determine the phenotypic variability of the varieties (called "criollos" in Mexico) of peanut that are being grown by Mexican farmers. During 1987, sixty four genotypes of peanut were collected in the Mexican States of Morelos, Guerrero, Puebla, Oaxaca, Guanajuato, etc. These collections were grown during the rainy season of 1988 in two locations in the state of Morelos. Thirty five different characters of plant, pod and seed were measured and a cluster analysis was performed using the Euclidean Distance Method. A dendogram (not shown here) indicates that spreader varieties were clustered in cluster number 9 which includes 20 entries from Puebla, 1 from Guerrero, and RF-214 a Brazilian genotype; in cluster number 12, 21 entries from Puebla, 4 from Guerrero and 3 from Guanajuato were clustered. On the other hand, erect habit peanut entries were clustered in two different groups, namely, in clusters 3 and 20. Such genotypes are cultivated in a very reduced area in some Mexican states mainly in the northern and southeast states of Chihuahua, Yucatan and Chiapas. Even though some Mexican researchers indicate that 1-r (correlation coefficient complement) has shown good results in the cluster analyses of Mexican races of maize and beans, in this presentation we report that the Euclidean distance method was a good technique for separating some Mexican peanut genotypes differing in growth habit.

Effect of Blanching and Blanching Method of Peanut Seed Composition. S.M. BASHA[1]* C.T. YOUNG[2] and W.A. PARKER[3], [1]Florida A&M University, Tallahassee, FL., [2]N.C. State University, Raleigh, N.C., [3] PERT Labs, Edenton, N.C.

To determine the effect of blanching and blanching method, 34 peanut samples of Runner and Virginia market types that have been subjected to water blanching and spin blanching were obtained from Peanut Research and Testing Laboratories (PERT Labs), Edenton, N.C. The samples were ground into a meal, defatted with hexane and analyzed for protein, sugars and amino acids. The data showed that blanching had a significant effect on seed arachin composition. In the seed that have been subjected to water blanching arachin polymer and dimer peaks decreased significantly compared to the unblanched seeds. In contrast to water blanching, spin blanching caused a decrease only in arachin dimer peak, while the protein content of polymer and monomer peaks increased significantly. Comparison of blanching methods indicated that spin blanching method is milder than water blanching and caused lesser dissociation of arachin molecule. Examination of seed polypeptide composition by 2-D PAGE showed no major differences in the polypeptide composition indicating that blanching affected only the association and dissociation characteristics of arachin molecule, but did not cause structural alterations in its subunit composition.

Section 22 Import Quotas and the U.S. Peanut Program: Operation Under Current Law. R.H. MILLER. USDA-ASCS, Commodity Analysis Division, Washington DC 20013.

Since 1953, the U.S. Government has maintained an extremely small import quota of 1,709,000 pounds (shelled basis). This quota has protected the U.S. peanut industry, particularly the U.S. peanut farmers and the U.S. Department of Agriculture peanut support program from foreign competition. This umbrella has permitted U.S. growers to have domestic quotas to supply the the U.S. peanut market, receive returns well above world price levels, and still allow growers to compete for foreign markets at competitive prices. Section 22 of the Agriculture Adjustment Act (7 U.S.C. 624) gives the President the authority to impose import quotas or duties on farm commodities whenever imports render or tend to render ineffective or materially interfere with USDA programs. The law requires the Secretary of Agriculture to alert the President when such a condition exists, or when the quota should be relaxed to assure an adequate domestic supply. If the President agrees, then he directs the United States International Trade Commission (USITC) to conduct an investigation and develop a report, including findings and recommendations for his consideration. After receiving the Commission's report, the President may impose quotas or duties to protect the program. In cases in which USDA determines that an emergency exists, the President may take action before the USITC completes the investigation and submits the report. Any such emergency action that is taken would continue in effect pending the USITC eventual report and recommendation. In 1954, 1980, and 1990, drought conditions reduced the U.S. peanut crop and USITC conducted an investigation to review the supply and use situation. For 1954 and 1980 marketing years, the President took emergency action and later raised the import quota substantially after the USITC reported. For 1990, no emergency was found to exist, but USITC held a hearing in January 1991 and reported in March 1991 that changed circumstances require temporary modification of the import quota. A U.S. proposal to liberalize agricultural trade under the Uruguay round of international trade negotiations could result in the elimination of Section 22 import quotas, including those for peanuts. As of June 1991, the U.S. Congress agreed the to renew the President's trade negotiation authority; the President had taken no action on the USITC report.

Management of Tomato Spotted Wilt Virus in South Texas Peanut Fields. F. L. MITCHELL*, Texas Agricultural Experiment Station, Stephenville TX 76401, J.W. SMITH, JR. Department of Entomology, Texas A&M University, College Station TX 77843, C.R. CRUMLEY, Texas Agricultural Extension Service, Pearsall TX 78061, and J.W. STEWART, Texas Agricultural Extension Service, Uvalde TX 78801.

An epidemic of tomato spotted wilt virus (TSWV) occurred in peanut fields in Frio and Atascosa counties during the 1990 growing season. The epidemic was monitored by means of permanent transects placed in 66 grower fields. Each transect measured 30.5 meters and two to six transects were placed in each field. The number of plants per meter of row was determined for each field. Transects were examined at seven day intervals, or as field conditions allowed, for 90 days and plants expressing foliar symptoms of TSWV were marked with a wire flag. Disease prevalence was recorded as percent plant infection and used to determine whether insecticide applications for vector control were needed. Action thresholds for applications were based on a sliding scale, and ranged from 5% infection during the first 30 days to 20% at 90 days. This approach was generally successful in preventing rapid disease increases, and most fields remained below 10% infection during the 90 day observation interval. Analysis of TSWV prevalence demonstrated that the disease adversely affected both yield and grade, but accounted for less than 20% of the observed variation in either. Planting date was also a significant factor in disease prevalence, with early and late planted fields having stronger disease pressure than those planted at mid-season.

Biological Control of *Aspergillus flavus* and *Aspergillus parasiticus*. M.E. WILL*, D.M. WILSON, and D.T. WICKLOW, Dept. of Plant Pathology, Coastal Plain Experiment Station, Univ. of GA, Tifton, GA 31793, and NRRC/USDA/ARS, Peoria, IL 61604.

The first objective was to determine if *Paecilomyces lilacinus* would act as a mycoparasite of sclerotia and mycelia of *A. flavus* and *A. parasiticus* under laboratory conditions. The second objective was to evaluate the ability of *P. lilacinus* strains previously isolated from naturally colonized sclerotia in Georgia and Illinois to colonize *Aspergillus* sclerotia in the field. Mycelial cultures of *A. flavus* and *A. parasiticus* were challenged with *P. lilacinus*, *Trichoderma* species, and *Gliocladium* species using microscope slides thinly coated with PDA or water agar. On PDA a few of the *Paecilomyces* as well as the *Trichoderma* and *Gliocladium* isolates inhibited *A. flavus* and *A. parasiticus* growth suggesting that some diffusible antifungal metabolites were produced. On water agar the *P. lilacinus* grew and sporulated while the *A. flavus* and *A. parasiticus* only germinated. *P. lilacinus*, *Trichoderma*, and *Gliocladium* isolates seemed to invade, or at least colonize, *A. flavus* and *A. parasiticus* sclerotia when sclerotia were inoculated using a dense aqueous spore suspension and then placed at 25-30°C on moist sand with an a_w of .95 or above. The sclerotia did not germinate while the other fungi sporulated profusely on the surface of the sclerotia. The field experiments in Georgia and Illinois, where 'teaballs' containing soil and *A. flavus* or *A. parasiticus* sclerotia received various *P. lilacinus* inoculation, chitin and/or cellulose amendment treatments were established in May, and dug in November, 1990. Initial results indicate that *P. lilacinus* colonized more sclerotia in Georgia than in Illinois. There was no difference in percent sclerotia germinated between sites overall. However, there were differences in the ability of the *Aspergillus* isolates tested to survive and germinate in the soil. There was no treatment effect on percent germination of sclerotia.

Using Predictive Technology to Manage Peanut Leafspot. A. J. JAKS*. Texas Agricultural Experiment Station, Yoakum, TX 77995-0755.

The presence of inoculum in favorable environmental conditions can result in spore germination and infection of peanut tissue by the leafspot fungus, Cercosporidium sp. The Neogen EnviroCaster collects data on conditions of canopy temperature, leaf wetness, relative humidity, precipitation and soil temperature. This information is used in a software program model of the particular disease to predict fungicide application. This system used in Georgia over three years of testing resulted in a reduction of spray applications from eight to four or five without any loss in yield. The purpose of the test at Yoakum in 1990 was to evaluate fungicide applications of Bravo 720 6F predicted by disease forecasting versus fungicide application on a standard 14 day schedule for control of leafspot disease. Treatments included two versions of the predictive late leafspot model (an earlier version 1.5 and an updated version 2.0), a standard 14 day schedule, and an untreated check. The first standard 14 day spray was applied at 34 days after planting. Versions 1.5 and 2.0 advised sprays at 35 and 34 days after planting, respectively. Seven sprays were applied on the standard 14 day schedule. Five sprays were applied using version 1.5 and six with 2.0. Early leafspot (Cercospora arachidicola) was the predominant foliar pathogen in the test. Peanut rust (Puccinia arachidis) also infected plants in the test. Late leafspot (Cercosporidium personatum) incidence was less than early leafspot or rust. There was no significant difference between the 14 day schedule plots versus the version 2.0 plots in percent infection with leafspot. Version 1.5 treatments, which received one less spray than version 2.0 and two less sprays than the standard, had significantly higher leafspot infection than any of the other treatments. Rust infection levels were significantly higher with version 1.5 than with any of the other treatments. There was no significant difference between plots sprayed on a 14 day schedule and plots sprayed by advisory of version 2.0 in relation to percent infection with rust. Percent defoliation levels for the untreated check reached 75 percent at the digging date of October 8.

Determination of Thrips-vectored Tomato Spotted Wilt Virus Distribution in Peanut Plants by ELISA. K.K. KRESTA*, F.L. MITCHELL, Texas Agricultural Experiment Station, Rt. 2 Box 00, Stephenville TX 76401, and J.W. SMITH, JR. Department of Entomology, Texas A&M University, College Station TX 77843.

The disease caused by tomato spotted wilt virus (TSWV) reached epidemic proportions in Texas peanut during the mid-1980s and has continued to occur at economically important levels. Two of the known thrips vectors, Frankliniella fusca (Hinds) and F. occidentalis (Pergande), inhabit south Texas peanut fields. The association between virus infection and thrips feeding and breeding niches in terminals (folded quadrifoliates) on the host plants was addressed in addition to the relationship between disease presence and symptomatology. Both were based on the distribution of the virus in plants. Symptomatic Arachis hypogaea were collected from southern Texas counties where thrips-vectored TSWV prevails in peanut crops. Every leaflet on each plant was rated according to the visible symptoms, and a mean ordinal rating was determined for each leaf. Leaves were assayed by enzyme-linked immunosorbent assay (ELISA) to determine virus presence in relation to severity of symptoms. Reconstructions of the assayed plants demonstrated that virus concentration varied significantly from plant to plant, with symptoms significantly correlated to virus concentration. We concluded that the virus was not distributed uniformly throughout individual plants, symptoms were 98% accurate in representing the presence of the virus in a leaf or terminal, and the location of virus concentration in folded terminals was significantly higher than in open leaves.

Reaction of Selected Peanut (Arachis hypogaea L.) Lines to Southern Blight Disease. M.A. WELLS*, W.J. GRICHAR, and O.D. SMITH. Texas Agricultural Experiment Station, Yoakum, TX 77995 and College Station, TX 77843.

Five spanish and seven runner peanut candivars and five check varieties were compared for southern blight (Sclerotium rolfsii Sacc.) reaction on heavy fungus-infested soil. The candivars, derived from crosses with PI 365553 and US 224, were selected based on reaction to Pythium pod rot and agronomic performance. S. rolfsii inoculum density at the test site was enhanced by continuous years of residue management. Southern blight incidence occurred among various runner and spanish lines known to be partially resistent to Pythium pod rot indicating that the mechanism of resistance to Pythium pod rot and southern blight differs. When comparing runner checks and candivars averaged over a three year period, TxAG-3, Southern Runner, and four candivars, Tx855228, Tx833829, Tx835829, and Tx835820, resulted in a 28-56% reduction in disease loci over Okrun and Florunner. Less disease occurred in Tamnut 74 and one breeding line, TX 855138, than in the other spanish candivars. Three-year average yields of the runner candivars ranged to 25% higher than the runner checks, while among the spanish candivars, TX 855138 averaged 50% higher in yield than Tamnut 74. The coefficients of correlation for yield and southern blight incidence, and for southern blight incidence and disease-discolored pods were not statistically significant.

Characterization of *Sclerotinia minor* Isolates from Four Peanut Production Areas of Texas. K. E. WOODARD* and C. E. SIMPSON. Texas Agricultural Experiment Station, Stephenville TX 76401.

Five isolates of *Sclerotinia minor* Jagger were collected from diseased peanut (*Arachis hypogaea* L.) material obtained from four peanut production areas in Texas. *S. minor* isolates were grown on potato dextrose agar (PDA), corn meal agar (CMA), and Czapek Dox Agar (CDA) in a controlled environment at temperatures from 2-34 C in 2-C increments. After the growth period at each temperature, sclerotia were counted, weighed, tested for viability, and tested for secondary germination. Optimum temperature for radial hyphae growth (RHG) was growth medium X isolate dependent. On PDA, optimum RHG occurred at 26 C for one isolate and at 24 C for the other four isolates. On CMA, optimum RHG was at 20 C for three isolates and 22 C for two isolates. Four isolates had optimum RHG on CDA at 20 C and one at 22 C. Optimum sclerotia production on PDA occurred at 18 C for all five isolates and average sclerotia production/9 cm petri dish ranged from 1.2 for one isolate at 2 C to 1870 for one isolate at 18 C. Maximum sclerotia production on CMA was 73/plate and occurred in the range of optimum RHG of each isolate. Maximum sclerotia production on CDA was 214/plate at 18 C. Four isolates had peak sclerotia production in the 18-20 C range while one isolate peaked at 26 C. Weight, viability, and secondary germination of sclerotia were also dependent on growth medium and production temperature.

Laboratory and Field Assessments of Resistance to Peanut Leafspots.

M. OUEDRAOGO*, O.D. SMITH, C.E. SIMPSON, and D.H. SMITH. Dept. of Soil & Crop Sciences, Texas A&M Univ., College Station TX 77843; Texas Agricultural Experiment Station, Stephenville TX 76401; and ICRISAT Center, Patancheru, India.

Leaves of 4 week old interspecific derived peanut lines were inoculated with field collected spores of Cercospora arachidicola and Cercosporidium personatum. Petioles of the innoculated leaves were inserted into wet sand in polyethylene covered trays at 18 to 25^{0}C. The number of lesions were counted daily after appearance of the first lesion. The lines differed in lesion numbers, but the results were not always consistent among experiments. One line had consistently long incubation and latent periods for C. arachidicola (22 and 30 days respectively) in both years of the study. The same lines were tested in microplots using the same innoculum and in a field situation under natural infection. Disease incidence in the field with natural infection was lower in 1988 than in 1989. Late leafspot was the predominant disease in 1989. Some lines did not develop lesions in the laboratory or microplot experiments, but all had lesions in the field experiments. The year to year correlation for number of lesions per leaf in the field was very low for late leafspot (r= -0.15 - 0.15) and low to moderate for early leafspot (r= 0.04 - 0.53). When the lesions per leaf of the two diseases were combined, the correlation coefficient was high and significant. The correlation of number of lesions on lines in the laboratory assessment and field was variable among experiments (r= -0.19 to 0.43).

Germline Transformation of Legumes Mediated by Electric Discharge Particle Gun.

G.S. BRAR*, D.E. MCCABE, D.R. RUSSELL, and P. CHRISTOU, Agracetus, Inc., Middleton, WI 53562.

Commercially useful genetic engineering of crop plants requires an efficient, reproducible and genotype-independent transformation system, elite germplasm and the availability of genes determining valuable agronomic traits. The transformation of major legume crops such as soybean, bean (Phaseolus vulgaris), pea, cowpea, lentil, alfalfa and clover has met with various degrees of success in the past few years. We have been successful in developing a commercially viable transformation system for soybeans and Phaseolus which meets all of the above criteria. In this method, 1-3 µm size gold beads are coated with the exogenous DNA and are accelerated into cells of target tissues, preferably apical or axillary meristems of mature or immature seeds. The bombarded tissues are manipulated to produce multiple shoots which are screened for the reporter gene (GUS). The transformed plants are transferred to the greenhouse to produce transgenic seeds. By using these procedures, we have transferred genes for resistance to Bialaphos and other herbicides into elite soybean cultivars. These plants currently are in field trials. In Phaseolus, plants engineered for herbicide (Bialaphos) or virus (BGMV) resistance have also been developed using the same protocol. Efforts are underway to investigate whether procedures used for soybeans and Phaseolus transformation are adaptable to peanut transformation.

Minutes of the Board of Directors Meeting
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
La Vista Room
Hilton Palacio Del Rio
San Antonio, TX
July 9, 1991

1. The meeting was called to order at 7:05 pm by President Ron Henning. Those present were: R. Sholar, J. Wynne, R. Henning, D. Bishop, G. Sullivan, T. Sanders, H. Melouk, G. Buchanan, H. Pattee, D. Hale, W. Branch, T. Coffelt, J. Haney, T. Whitaker, K. Cutchins, F. McGill, P. Blankenship, T. Brenneman, T. Lee, and C. Simpson.

2. Reading of Minutes of Previous Meeting - Ron Sholar, Executive Officer
The minutes were read and approved.

3. Reports were made as follows:

a. Executive Officer Report - Ron Sholar

The Executive Officer reported on the financial status of the society. APRES remains in good financial condition. The Executive Officer reported that APRES has approximately 600 members. It is anticipated that approximately 300 will register for the 1991 meeting.

b. American Society of Agronomy Liaison Report - Bill Branch

Bill Branch reported that the 82nd annual meeting of the American Society of Agronomy was held October 21-26, 1990, in San Antonio, Texas. Members of APRES were authors or co-authors on 14 total presentations involving some aspect of peanut research.

The next ASA meeting will be in Denver, Colorado, from October 27 through November 1, 1991.

The report was accepted.

c. Southern Agricultural Experiment Station Directors Report - Gale Buchanan

Gale Buchanan reported that the spring meeting of the Southern Association of State Agricultural Experiment Station Directors was held in Jackson, Mississippi, on May 6-8, 1991. Dr. Buchanan reported that the 1990 Farm Bill had provided some relief for experimental quota for peanuts for research. The Farm Bill permits each state to use a portion of its "reserved quota" for support of research. This is done at the discretion of the ASCS. The allocation is to be based on the farm history of each experiment station.

Dr. Buchanan reported that peanuts have now been included as a specific commodity for consideration in the Southern Region IPM Grants Program. This is the first time peanuts have been identified for this program.

The report was accepted.

4. New Business - The following ad hoc committee reports were made:

a. By-Laws Changes - Dan Gorbet

Dr. Gorbet reported on the work of the ad hoc committee to recommend changes to the APRES By-Laws. (A complete report is given in the reports section of the Proceedings).

Recommendations were made in three areas:

(1) Article VIII (Section 6) (Board of Directors)

(2) Article IX (Committees)

A new section (2j.) was proposed which would create a standing committee as part of the By-Laws for selecting the Coyt T. Wilson Distinguished Service Award recipient.

(3) Article IX (Committees)

Changed wording to reflect the elimination of the systematic rotation of the NPC Research and Education Award between research and extension. Each year the award will be open for nominations from either category.

The report was accepted and approved.

b. Annual Meeting - Hassan Melouk

Length of meeting: The general recommendation is NOT to lengthen the meeting for reasons of economical consideration but to keep attending the meeting affordable. Also, it will be more expensive for APRES to lengthen the meeting because of the additional cost for coffee breaks, etc.

Graduate Student Paper Session: It is recommended that the graduate students paper session be retained and recognized as a valuable component of the annual meeting of APRES.

It is not desirable to have the graduate student session compete or overlap with other sessions.

Graduate student papers for competition should be included with the regular sessions in their respective fields; e.g. breeding and genetics; entomolgoy and weed science; plant pathology; physiology; harvest; and utilization. The amount of the student awards could be divided into four equal sums. Award only one student paper from each discipline. Of course the graduate students in the competition would be excluded from the Bailey Award. Also, this way it would be easier to identify judges for the student competition.

Papers and posters:

(1) Technical Program Committee should have the flexibility of accepting and arranging a poster session especially if a large number of papers are expected.

(2) Before submission to the Technical Program Chair, the abstract should be reviewed by two persons for clarity and technical content. At the bottom of the blue lined paper, a space should be provided for the signatures of the reviewers.

(3) It is recommended that a committee be formed to develop detailed guidelines for the preparation of the abstracts.

Dr. Melouk expressed thanks to the members of this ad-hoc committee: Bill Birdsong, Danny Colvin, Bill Flanagan, Max Grice, Corley Holbrook, Walt Mozingo, Olin Smith and Tom Stalker for their input in formulating these options.

The report was accepted.

Significant debate was generated by this report. The Board of Directors directed the President to appoint a committee to study this issue further.

c. Publication of New Book - Tom Whitaker

Dr. Whitaker reported that an ad-hoc committee was formed to determine the need for a new book to replace Peanut Science and Technology which was published in 1982. The ad-hoc committee was composed of members from the Publications and Editorial Committee and ex-officio members from Peanut Research, Peanut Science, and Quality Methods. The ad-hoc committee used as a resource chapter authors and both editors of Peanut Science and Technology. Input was collected through a survey sent to each member of the ad-hoc committee. The ad-hoc committee made the following recommendations:

(1) Publish a new book because enough new information has been developed in the past 10 years to justify this.

(2) The new book should contain only those present chapters in Peanut Science and Technology that can be substantially revised and new chapters not found in the present book. Emphasis should be on new material and not on old material.

(3) The book should have a new title to distinguish it from the old book.

(4) APRES should take responsibility for the new book in the same manner it did with Peanut Science and Technology. It will be ensured that sales of the book will be sufficient to cover publication costs and that no financial loss will be incurred by APRES.

(5) Find a publisher who will take the chapters on a floppy diskette for a camera-ready product. This should cut costs of the project.

(6) Start process immediately and fix time frame to three years maximum.

(7) Publish no more than approximately 1000 copies in the first printing.

The report was accepted.

Significant discussion was generated by this report. Several subjects including the following were discussed: how many copies should be printed? should all copies of Peanut Science and Technology be disposed of before APRES publishes a new book?

The Board of Directors concluded that 1500 copies was a practical number to have printed. The Board of Directors voted to implement the report with the change from **1000** copies to **1500** copies.

d. Special Report and Proposal by DowElanco - Dennis Hale

DowElanco proposed that APRES establish two new awards with DowElanco providing financial support for the awards. DowElanco is committed to supporting this program for a period of 4-5 years with the possibility of an extension. The selectees would receive financial awards of $1000 each with one award for Extension work and one award for research.

DowElanco will commit $4000 per year to APRES with $2000 going to support the awards and $2000 to help defray the costs of the annual meeting. The award would be made for a total research or Extension effort and not just for a singular accomplishment.

DowElanco requested that an APRES committee be established to develop procedures for how the award would be made. The funding will be available for the 1992 meeting. The exact title for the award will be left up to APRES.

Johnny Wynne moved that the DowElanco proposal be accepted and that a committee be appointed to establish guidelines for the award. The motion was seconded and passed.

5. Committee Reports

a. Nominating Committee Report - Johnny Wynne

The following nominations for the 1991-92 year were made:

President Elect - Walton Mozingo, Virginia Tech University
State Employees Representative SW Area - Ed Colburn, Texas A & M University

State Employees Representative SE Area - David Knauft, University of Florida
APRES Representative to CAST (3 year term) - Dan Gorbet, University of Florida

b. Finance Committee Report - Terry Coffelt

The proposed budget for the society and for Peanut Science was distributed. Terry Coffelt explained the proposed budget. The committee proposed the following changes in the annual meeting registration fees:

	Current	Proposed
Individual Member	$30	$55
Student	10	20
Nonmember	35	75

Currently funds generated through the registration fee are insufficient to pay all costs associated with the annual meeting. The annual meeting is actually being subsidized by other funding. Annual meeting costs include secretarial assistance, travel for officers, proceedings publication, special mailings, coffee breaks, and the Friday morning business meeting breakfast. The current registration fee generates only about $9000, while total costs associated with the meeting are over $16,000.

The Finance Committee also recommended changes in page charges for Peanut Science. For the past two years, the Peanut Science account has actually been in the red with almost $1200 being spent in excess of the amount budgeted. Page charges have not been raised in several years and the committee proposed that page charges be increased to $80 per page for the first four pages and $120 per page for each page over four pages. The Finance Committee also recommended that library subscription rates be raised from $15 to $25. With the changes, the Finance Committee believes that the increased costs of Peanut Science can be met for several years even if these continue to rise.

Dr. Coffelt reported to the Board of Directors that the Editorial and Publications Committee had recommended that membership dues be increased by $7 per member to support increasing costs for Peanut Science. The Finance Committee determined that an increase in page charges would be sufficient to cover increasing Peanut Science costs and they would not recommend an increase in membership dues other than that recommended for library subscriptions.

c. Peanut Quality Committee Report - Paul Blankenship

Mr. Blankenship reported on actions taken in the Peanut Quality Committee. Dr. Tim Sanders reported on the status of the NPC sponsored Peanut Quality videos and APRES Quality Methods.

Dr. Floyd Dowell described methods for "Improving Quality Measurements in Peanut Grade Samples". Paul Blankenship described a study to be conducted during the 1991 harvest season to collect an extensive aflatoxin data set from lots of farmer stock peanuts while they are being graded. Thirty-nine buying point will be equipped. The information collected may be used by ASCS to determine if it is desirable to adopt a chemical assay aflatoxin detection during peanut grading. The project is being funded by the NPC.

d. Public Relations Committee Report

No formal report was made by this committee.

General discussion was conducted on the need for any resolutions on behalf of APRES.

Chip Lee suggested the society recognize the passing of Mr. Jerry Didier, a peanut leader from Yuma, Arizona. Frank McGill indicated that Mr. Didier once held the national peanut yield record with over 5000 pounds per acre with the NC2 variety.

The Board voted to pass a resolution honoring Mr. Didier and requested that the Executive Officer send a copy to Mr. Didier's family in Yuma, Arizona.

e. National Peanut Council Research and Education Award Committee Report - Harold Pattee

Dr. Pattee reported that this committee considered six nominees for this year's award. The recipients for 1991 are Drs. Don Banks and Jim Kirby, co-awardees, of Oklahoma.

Dr. Pattee reported that the NPC has announced elimination of the rotation format with regards to separately recognizing research and educational contributions.

f. Fellows Committee Report - Frank McGill

Frank McGill reported that three APRES members were nominated as Fellows. They are Daniel Gorbet, Florida; Norfleet Sugg, North Carolina; and John French, Alabama. The committee determined that all were worthy of being elected as society Fellows.

The Board of Directors deferred action on the committee recommendation to an executive session to be conducted immediately after the Board of Directors meeting.

The committee report was accepted.

g. Bailey Award Committee Report - Tim Brenneman

Eleven papers were nominated for the Bailey Award following the 1990 APRES annual meeting held in Stone Mountain, Georgia. Nine nominees submitted manuscripts for judging for the Bailey Award.

The 1991 recipient of the Bailey Award is "Impact of chemical-use restrictions on disease, weed, and insect management in peanuts" by P. M. Phipps, D.A. Herbert, J. Wilcut, C.W. Swann, G.G. Gallimore, and D.B. Taylor of the Tidewater Agricultural Experiment Station, VPI & SU, Suffolk, VA.

The report was accepted.

h. Site Selection Committee Report - Chip Lee

Dr. Lee reported the following schedule for future APRES annual meetings:

July 7-10, 1992 - Norfolk, VA, Omni International Hotel
July 13-16, 1993 - Huntsville, AL, Huntsville Hilton
July 11-15, 1994 - City TBA, OK

Contracts have been signed for the 1992 and 1993 meetings. The Oklahoma group is beginning their work in selecting a site for the 1994 meeting.

The report was accepted.

i. Publications and Editorial Committee Report - Tom Whitaker

The Publications and Editorial Committee approved the following actions:

(1) Allow authors in Peanut science to have the option to use the "author/year" citation style. This will start with the July-December 1991 issue.

(2) The appointment of Dr. M. Basha Sheikh as an Associate Editor for Peanut Science to replace Dr. John Vercellotti who is stepping down.

(3) Increase the income for Peanut Science to cover expenditures by:

a) increasing page charges from $60 to $80 per page for the first four pages and the page charge for page five and higher will be $120 per page.

b) increasing library membership dues from $15 to $25.

The report was accepted.

j. Program Committee Report - Charles Simpson

Dr. Simpson cited the work of Dr. Olin Smith as chairman of the technical program, Dr. Chip Lee, Chairman of local arrangements, and Mrs. Barbara Lee, chair of the spouses program. He also cited the contributions of

meeting sponsors - M & M Mars, Nestle, Hershey Chocolate USA, The Texas Peanut Producers Board, DeLeon Peanuts, and the North Carolina Peanut Growers Association.

He cited the following companies for special contributions by paying for various meal functions: Rhone-Poulenc - ice cream social; ISK Biotech - Wednesday night social; DowElanco, Valent, and AmVac - Thursday night barbecue.

Reserved rooms totaled 235 and final registration was 300 members and non-members.

The report was accepted.

k. Other Business

Gene Sullivan questioned why the Fellows nominations are required so early in the year (January 1). He suggested that this is a difficult time to prepare nominations and that a March 1 date is more desirable. Dr. Sullivan moved that the Fellows nomination date be moved to March 1. The motion was seconded and passed.

Dr. Sullivan suggested that the society study moving the meeting times to start on Sunday afternoon for the Board of Directors meeting with paper sessions held on Monday and Tuesday, and conclude with the business meeting on Wednesday morning. This arrangement would permit members to arrive at the meeting on Saturday and take advantage of reduced airline rates where a Saturday night stay is involved. The Board of Directors requested that the new APRES president appoint an ad-hoc committee to study all of the implications of such a change. If such a change is sufficiently positive, the society membership will be polled for reactions to such a change. The first meeting where such a change would be possible would be in 1995 in North Carolina.

The meeting was adjourned by President Henning.

"A PARTNERSHIP FOR QUALITY"

Dr. Wayne Lord
President, Southco Commodities, Inc.
July 10, 1991

As I prepared this speech it occurred to me that in order to talk about the research which leads to world competitive quality peanuts and peanut products, we need to talk about the quality and character of the research itself and how we can focus and organize all research efforts to maximize impact and effectively utilize the great intellectual resources sitting in this room today. And not only that, but I began to realize just how close and really critical the relationship is between research and the peanut industry's successful marketing and profitability here and around the world. Following one of the worst Southeastern crops in history and with foreign peanuts entering the country even as we speak, I thought a focus on market oriented research was of great urgency and the most appropriate topic for me to discuss here today.

In the tradition of creative scientific inquiry of Dr. George Washington Carver and many of you in this room, very significant research achievements have been made. Great names of peanut research are part of our history: Frank McGill, W. C. Gregory, Ralph Matlock, R. C. Langley, Al Norton and Bill Dickens. And the list could go on and on. And we're grateful for and proud of those scientists' accomplishments.

But at this critical juncture in our industry's history, I believe that we must forge a powerful and aggressive partnership between commerce and science within our industry: "The U.S.A. Peanut Quality Corporation", if you will. I call for all of us to consider an even greater synthesis and synergy between the scientific and commercial sectors than we have ever seen before: a real Partnership for Quality. To do that, I believe we have to speak the same language: the language of business. Indeed, in my close dealings with many of you in technical seminars in Europe or major national research projects in the U.S., I have come to see how much the research profession is a business, just like mine. And the elements which make a successful research business are the same ones which make any business a success. Let's examine those elements which can make our partnership successful.

Business Elements for Success

1. Define the Need Through "Market" Research. Researchers must determine what the farmers, shellers, manufacturers and, most important of all, the consumers want in terms of peanut quality and product characteristics. The day is gone when peanut research can be conducted in isolation. But don't be overly-concerned, this process of defining the needs in the area of research is really not mysterious. Moreover, all of your potential clients for research services are readily available for consultation. Publications inside and outside the peanut industry are full of articles reflecting the major quality concerns of today and are there for your review. In a real sense, the first critical step in today's scientific "protocol" is to have a systematic approach to market research to determine the proper direction of scientific research.

The most anachronistic picture I can imagine today is of the torn-sweatered researcher, sitting in his musty office with papers stacked high in the corners of the room, and waiting for the phone call offering him a research project simply because the researcher's skill and experience and creativity "deserve" the recognition. That phone call simply will not come in today's competitive research environment. This is not to suggest that "pure" science should be entirely subsumed by "applied" science. But I do believe that the two cannot be mutually exclusive at this point in our industry's history.

2. Indeed, peanut research must not only be relevant and market-oriented, it must be (dare I say it?) SOLD! Like any business in the 1990's, intellectual property and intellectual products must be marketed. Scientists, like other professionals, will have to "work the crowds" in order to land contracts. This may seem offensively crass to some in the intellectual community, but I know it is reality. The good news is that, more than ever, creative scientific inquiry and innovative methodologies are urgently needed if our industry is to prosper and maybe even to survive. This creates a great opportunity for those in peanut and food science research. I invite you to attend industry meetings, find out our concerns and sell us on your ideas. The industry will be there; you should be too.

3. In building our American Peanut Quality Corporation, the third thing that must be done is to identify and mobilize the resources to get the job done. While solitary research may have its intellectual rewards, I would like to suggest that, given the limitation of financial resources on the one hand and the urgency of the tasks before us on the other, collaborative research must be considered as a viable vehicle for maximizing research impact. I guarantee that we will find enough neon lights to satisfy even the most inflated scientific ego--what we need are answers, and we need them now.

In reviewing the last several years of your scientific publications, I do see that there is a tradition of collaborative research in this industry and that is reassuring. What is clear is that the best and most effective possible marshalling of resources is required. Then, of course, we must mobilize those resources in the most dynamic and cost effective way possible to solve problems and create opportunities. There is not much room in peanut research today for the timid or the cost un-conscious. You must get beyond your own office and consider possible work with colleagues within your institution; mobilize graduate students and your best undergraduates to focus on specific and meaningful projects; explore possibilities of work with colleagues in other institutions, other growing areas, with sheller and manufacturer research and technical personnel and with other commodity specialists. "Synthesis" and "synergy" are terms very familiar to scientific inquiry. They must become central to scientific marketing as well. Without these characteristics, our peanut quality corporation cannot succeed.

4. But as one of your most outstanding members told me at the Dawson lab the other day, "All the philosophizing is nice, but what I need is the money." And that is not the first time Paul Blankenship has told it to me like it really is. Aggressive raising of funds and intelligent investment is central to any business and it must be to ours as well.

I am proud of the record of the National Peanut Foundation in raising money for peanut research, but I assure you that we have just begun. And I ask you to join these efforts by advising Kim Cutchins or me of any possibilities you may know where a proposal for funds might be made. We have the staff and the volunteer corps of executives who can make formal requests for funds and garner the monies we require to get on with your important work.

In addition to proper management of financial capital, we should also scrutinize your own investment of intellectual capital, which this industry should never take lightly. Prudent, savvy and strategic investment of your creative energy, research efforts, laboratory time and staff hours is very important because we simply cannot afford to waste any of these assets or expend them frivolously.

5. The fifth element of our research business profile is strategic planning. This element has two parts. The first is strategic planning for your own research career and that of your institution. Where are you now and where do you want to be professionally in five years, ten years? Where is the industry going and how can you position your research to take it there? The second part is identifying a basket of specific research projects which can show results in the short, the medium and the long-term. What is the critical path of the project and how can it intersect with the needs of the industry within various time frames? In short, the strategic planning process must involve simultaneous analysis of two continua: the design critical path and relevance of your own research as well as the requirements and reality of the peanut industry within its commercial and regulatory environment.

6. The sixth element is flexibility. While strategic planning is crucial, that does not and cannot mean that strategies can be set in concrete and become immutable. Situations change; the market place changes. We must be able to react quickly to the changing environment and if necessary re-direct research efforts or modify them to meet changing needs. Perhaps the best quotation to illustrate this point is that of Mohammed Ali: "You got to float like a butterfly and sting like a bee."

This flexibility and being ready to work on contingency plans reminds me of the story of the veterinarian whose business wasn't going so well. So he decided to go into the taxidermy business as well. That way he could have the sign out front of his office which said: "Dr. Rupert Jones - Veterinarian and Taxidermist". The sign then added his new slogan: "Either way, you get your dog back". This is the kind of flexibility we need.

Asking the "So What" Question?

What is the objective of all this research and the partnership for quality we can create? Simply put, it is to develop the highest quality peanuts which our knowledge and experience and technology will allow. As my senior professor in graduate school constantly asked me about my own research: "When it's finished can you answer the question: "So what?" No matter how clever the hypotheses, no matter how innovative the methodology and no matter how brilliant the results and conclusions may be, still the impudent question has to be asked: "So what?" And a major part of the answer must

be that the research done will lead the industry to higher quality peanuts and peanut products and thus to greater commercial success.

What is irrefutable in today's market place, in today's regulatory environment, in today's explosion of available food choices in the marketplace is that only quality will sell. Throughout the world we have today greater consumer awareness of food safety and nutrition than ever before. We have today greater governmental scrutiny than ever before. We have better technological means of defect detection than ever before. And the competition among origins is greater than ever before.

With the poor Southeastern crop of 1990, American exports fell almost 35% and the Chinese and Argentines were there happily to take up the slack. While the Chinese did do the U.S. a favor by sending peanuts of varying qualities into the market, they did fill the volume gap and gave world manufacturers a chance to use Chinese peanuts in their factories. Even more important is that Argentine Runner peanuts were well received in most markets. I have visited Argentina as some of you have and I can tell you that it is difficult to overestimate the potential of this country in agricultural production. Almost endless arable land, seven feet of topsoil, no chemical fertilizers and modern shelling plants. As our kids would say, "It's awesome".

Poor American export performance and consequent high prices have another negative effect for all origins: the down-turn in consumer demand. In the U.K., the Netherlands, and in Canada--all large and mature peanut markets--consumption of peanuts was down this year almost 10%. Of course, U.S. market share also plummeted in Canada; for example, down to 48% from well over 90% a few years ago. In other countries, the performance was similar. But what we cannot forget is that what is needed is a larger peanut market everywhere. No origin really gains from market turmoil.

Trends in the European Market

Not only some U.S. shellers, but also big European manufacturing companies are getting bigger. The vast majority of peanut kernel usage in Europe is now in the hands of less than 10 multi-national companies like UB, Sara Lee, Bahlsen, Nestle and Mars with other private companies like May Werke in Germany and Imko-Gelria in the Netherlands controlling large blocks of usage.

The NPC Export Committee believes that this trend will continue especially as the reality of 1992 and the unified market, which will result in the years that follow, dictate the decline of specialized country markets and the rise of pan-European strategies. These strategies will include all of Western and Eastern Europe--over 400 million people. Except for inshell peanuts, which may retain some degree of localized production and distribution, peanut products will be designed, marketed and distributed by large multi-national companies and sold to ever-enlarging, Europeanized retail stores and distribution systems.

We should note the new opportunities in Eastern Europe. This subject would require an entire speech, but suffice it to say that the NPC Export Committee staff is working independently and with our good manufacturer

friends in Western Europe to effectively position American peanuts in this part of the world. As we learned at the Nice forum, nut snacks are near the top ofthe list of desired items in Eastern Europe. Again, we should do everything possible to capitalize on this new market possibility.

"The total quality concept" idea is being adopted all over Europe as the basic principle for doing business. Consumer demands for food safety, a highly politicized regulatory environment and increasingly demanding and well-qualified technical experts within manufacturing companies require that we deliver an excellent product. This is no longer necessary for simple market advantage--this is a requirement just to be considered for business.

I believe that these trends benefit the U.S. peanut farmers and exporters because the American industry can relate easily to the big companies and can bring U.S. expertise to European marketing programs which stretch across wide expanses of population and geography like in the U. S. and can bring innovation and creativity and western business expertise to the Eastern European experiment. The export committee staff can be a real catalyst in the quest for quality in Europe through contacts with government officials, the press and the leading corporations. But the peanut scientific community must also be a key part of these efforts.

In this environment, competition among origins is tough, but we must not forget the other and more dangerous kind of competition: alternative food and snack items. As glorious as we may believe our peanuts and peanut products to be, the consumer does not have to buy them. This we must always keep in mind.

The Future of American Peanuts

In the future, dare we say it, we may see the American peanut program change or even be abolished through international negotiations going on in the General Agreement on Tariffs and Trade talks now going on in Geneva. If the peanut program were opened up in some major way (and we're getting only a hint of it in the current increased importation allowance), the entire U.S. peanut system would be thrown into a world competitive environment. The American peanut scientific community must be ready for this contingency.

The final reality in which we will all work in the future is an increasingly tough regulatory and consumer environment. There is absolutely no way that this trend will be reversed either here or abroad. (Aflatoxin limits in Europe, for example, include 3 ppb in Holland and 0 ppb in Switzerland.) All researchers and plant breeders and farmers and shellers and brokers and manufacturers and allied industries will have to live and work and survive in what must be seen as a hostile environment. But now is not the time for the weak-kneed. We have a great product, but we have to make it better.

So I call on you to join me in a new partnership for quality, a partnership which is supported and motivated by a solid scientific research business which must be built with your leadership. Let us re-fashion our expectations, work smarter, work better. If we do, we can build this new partnership. And together, I believe we can do it. And we had better do it, because each day we're betting our lives that we can!

NATIONAL PEANUT FOUNDATION SPEECH TO APRES

Kim Cutchins
President, National Peanut Foundation
July 10, 1991

Thank you for the opportunity to address the American Peanut Research and Education Society. When I joined the National Peanut Council almost three years ago, I knew peanuts grew in the ground and I felt really good about that. Don't laugh--this is more than the average consumer knows about peanuts and I thought that if I worked real hard I would be able to master all there is to know about peanuts in about a year; two years, tops. Then I came to my first APRES convention and I learned two things. One, I learned I didn't know a lot about peanuts and Two, APRES is the perfect place to learn everything you ever wanted to know about peanuts. This is my third APRES convention and I look forward to continuing my education. I want to thank Ron Sholar, Ron Henning, Charles Simpson, and everyone else involved in APRES for putting together this valuable meeting. It certainly has been a tremendous help to me and in return for your commitment to quality and education, I hope that as President of the National Peanut Foundation I will be able to help each of you.

The National Peanut Foundation has beeen raising money since 1986 to fund research and education to improve the quality of peanuts. Improving the quality of peanuts is not a novel idea. You have all been hard at work improving the quality of peanuts for years. The difference lies in how you define "improving quality". The founders of the National Peanut Foundation--a concerned group of growers, shellers, manufactureres, and brokers--felt the emphasis for research funded by the Foundation should be consumer drive. In essence, they wanted to ensure that the consumer received what they perceived to be the best quality product by funding research in the areas that impact the consumer the most. After many lengthy discussions about the future of the peanut industry and agriculture, the National Peanut Foundation Board of Directors established its current and future objectives according to consumers' real and perceived concerns. In priority order, they are:

1) The elimination of aflatoxin as a source of concern for the food supply;

2) The development of environmentally safe agricultural practices which ensure peanuts remain free of potentially harmful chemical residues; and

3) Educating both the grower and consumer to understand the food production chain's responsibility to providing an adequate supply of wholesome food products.

I'll let Wayne explain how we arrived at selecting these three items as consumers' top quality priorities for peanuts.

The elimination of aflatoxin is our number one priority. As such, the Foundation has worked cooperatively with the National Peanut Council and the Multi-Crop Aflatoxin Working Group (an informal coalition of corn, cotton, tree nut, and peanut associations) to address the issue. By working together, it was felt that the commodities affected by aflatoxin could pool their financial and

intellectual resources to increase the chances of success. A research strategy plan was developed and, over the past two years, the Group has secured $750,000 and $2.25 million respectively from Congress towards this effort. Research is being focused toward:

1) Ecological relationships and agronomic practices
This approach focuses on the relationship of fungal growth and toxin formation to such factors as insects; weather, including temperature and moisture; and planting, cultivation and harvest practices.

2) Biological Control which examines
Control methods based on living organisms.

3) Deliniation and Control of the Pathway of Toxin Formation
This point covers how the Toxin forms through the identification and isolation of enzymes and genes responsible for synthesis of aflatoxin.

4) Breeding for Resistance which deals with the
Identification of resistant germplasm and development of resistant cultivars.

5) Any other creative ideas that will contribute significantly to prevention of the occurrence of aflatoxin, such as the role of dust in the spread of aspergillus; OR identifying a common element between corn, cotton, tree nuts, peanuts which makes them susceptible to aflatoxin.

With NPC, the Foundation has worked diligently at improving control measures until a means to eliminate aflatoxin is found. In 1988, we funded a $1.2 million project which proved that removing damaged kernels, LSKs, and foreign material via a belt separator machine aflatoxin contamination was reduced significantly and improved processing accuracy and efficiency of removing any remaining levels. This machine has been implemented at most major buying points throughout the peanut belt. Additionally, NPF and NPC are hard at work at determining the effects of implementing a chemical test for determining aflatoxin content of farmers stock peanuts. A chemical test for aflatoxin will improve the industry's accuracy in separating edible and inedible grades of peanuts and subsequently improve storage conditions and processing accuracy and efficiency. The budget for this project is $1.6 million.

Objectives 2 and 3–residue reduction and education–have received limited funding, but briefly, the Foundation has primarily focused funding on how peanuts are affected by pesticides, meaning are there residues resulting from the use of pesticides in the final product and educational computer modules on production, grading, and storage. As the Foundation grows more funding will be directed into these areas.

I've covered why we exist and what we are doing, but not who makes all the decisions. The Foundation is managed by a 14-member Board composed of all sectors and segments of the peanut industry which ensures the widest possible consensus on research strategies and educational programs. Yearly, Board members review project proposals recommended by a carefully selected committee of technical and scientific experts from the food industry. Specifically, the Technical Review Committee is made up of the Board of

Directors, technical representatives from contributing companies, and the NPC Research Committee Chairman, Vice Chairman and Chairman of the Subcommittees on Aflatoxin, Wholesomeness, Foreign Material/Maturity, Flavor/Nutrition. Funding is approved for those projects identified as having the greatest potential for long-term improvement of the quality of peanut products which will benefit American and worldwide consumers.

That's it. There is no mystery to who or why certain projects get funded. But, I will leave you with a few tips on how to increase your chances of success:

1) Listen to the entire industry and focus your research on areas which will address their concerns.

2) Projects addressing the Foundation's priorities will be considered first, but all research requests will be reviewed.

3) Do a complete literature search to avoid duplication of research. Duplication wastes your time, talent, and money.

4) Follow the guidelines for submitting a proposal. A cover page briefly outlining your objectives and funding request is a must. We do read the entire proposal regardless of the size of your request.

5) Talk to your fellow researchers. Communcation is vital to solving all problems.

And, lastly, I would be a poor president if I didn't encourage you to become involved in the National Peanut Council. It provides the perfect opportunity to meet with all segments of the industry and many of the objectives of the Research Committee have translated into research funded by the Foundation.

The Board of Directors is working hard to fund each objective and plans to expand to other areas in the future. We have chosen to fund one area well--aflatoxin--to solve a problem rather than spread the money around and limit our potential for success. We are growing, slowly but surely. With a little perseverance, we hope to help each and every one of you.

Thank you again for this opportunity. The next call for proposals will be in November.

Opening Remarks by the President at the 1991 Business Meeting of APRES
July 12, 1991

Dr. Ronald J. Henning

Good morning ladies and gentlemen. It is my distinct pleasure to welcome each of you to the 23rd annual APRES business meeting. Thank you for making the meeting such a huge success. On behalf of the society I extend special thanks to all of you who have labored diligently to make the meeting here in San Antonio, Texas, both an enjoyable and learning experience.

First to President Elect, Dr. Charles Simpson and his committees. I know from experience that he could not have put this all together without the cooperation and help from a lot of folks. There are so many to whom we owe so much this morning time does not allow us to recognize each of you individually, but I would like all the persons serving on each of the committees to stand and let us express our appreciation to you. Local Arrangements Committee: under the leadership of Chip Lee; Technical Program Committee: chaired by Olin Smith; Spouses Program: chaired by Barbara Lee, we salute you and say thanks. Special thanks to our Executive Secretary, Dr. Ron Sholar, without whom many of the president's "jobs" would have fallen through the cracks this year. Ron has been diligent in keeping the tasks before me and following up to see that I had completed them--thanks, Ron.

Second, the society wishes to express a special word of appreciation to the various industries who believe in who we are and what we are doing and have demonstrated this by their active support of this meeting. First to those who sponsored our social events:

Rhone-Poulenc: ice cream social on Tuesday night
ISK Biotech: buffet on Wednesday evening
DowElanco, AMVAC and Valent: barbecue on Thursday night

Also, the society expresses appreciation to DowElanco, who this year has stepped forward with the commitment to support another special award to be presented annually by the society to its membership in recognition of excellence. You will be hearing more of this as our President Dr. Charles Simpson appoints a committee to work out the details.

You will hear details as each of the respective committee chairs offers their report. Therefore, to avoid redundance, I will not elaborate any further at this time. I would like to make a few remarks with respect to our society and the direction we are headed.

This is our 23rd year since we were born from what was known at that time as the Peanut Industry Working Group (PIWG). Our society has changed its name during its growth from APREA to APRES to comply with legal requirements. We are a unique group in that our membership includes all segments of the industry as well as every facet of research and extension education. We have such a rich heritage from which to draw.

Compliments are in order to our scientists. They are among the finest minds in the world. They are to be complimented for their contribution to the scientific database from which the industry can move forward as consumer concerns around food safety and wholesomeness continue to heighten and customer expectations from our peanut suppliers continue to rise. I would encourage us as scientists to stay abreast of the changing times in which we are marketing our product and to remain focused on the things that matter short term, while not losing sight of the longer term research needs.

I believe it should be the goal of every individual in the peanut industry, whether we are scientists, growers, shellers or manufacturers, to become and remain the peanut supplier nation of choice by our customers worldwide. We can accomplish this goal only as we consistently deliver product and services which meet or exceed our customer expectations. We will never, as an industry, achieve this goal without the continued support of our excellent research and extension programs. We are second to none in the world as far as a "peanut production database" is concerned. Every country in the world is seeking to learn from you. There is nothing wrong with that. However, it does mean that we can never slack up--we must remain attuned to the pertinent issues facing the marketing of our product today and continually seek creative ways to stay "out in front" of them.

What does it take to be successful? In closing I want to borrow some thoughts from an article which I recently reviewed in Zig Ziglar's publication *Top Performance*. The author Jeff Conley says that "all other things being equal in the market place, success is spelled with four c's: Character, Commitment, Cooperation and Communication". We must remember that our society is made of individual members and our success as a society will not rise above the corporate level of each of our characters, our commitment, our willingness to cooperate and the effectiveness of our communication.

I salute you and your efforts. May the Lord continue to lead us individually and corporately as we look to the future, that our works will not only be productive in a material sense, but also fruitful in the eternal sense.

Thank you so much for your thoughtful support as your president during the past year. I look forward to many more years of fruitful service to the society.

Minutes of the Regular Business Meeting
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Hilton Palacio Del Rio
San Antonio, TX
July 12, 1991

The meeting was called to order by President Ron Henning at 8:45 am. The following items of business were conducted:

1. President's Report - Dr. Ron Henning

2. Executive Officer Report and Reading of Minutes of Previous Meeting - Ron Sholar

3. The following reports were made and accepted. Copies of the official reports follow.

   a. American Society of Agronomy Liaison Report

   b. Southern Agricultural Experiment Station Directors

   c. Ad Hoc Committee Reports

      (1) By-Laws Changes - Dan Gorbet

An ad-hoc chaired by Dan Gorbet recommended three changes to the APRES By-Laws. (A complete report is given in the reports section of the Proceedings). Dr.Gorbet moved that all changes be accepted. The motion was seconded and passed without opposition.

Recommendations were made in three areas:

(a) Article VIII (Section 6) (Board of Directors)

Deals with contingencies not provided for in By-Laws.

(b) Article IX (Committees)

A new section (2j.) was proposed which would create a standing committee as part of the By-Laws for selecting the Coyt T. Wilson Distinguished Service Award recipient.

(c) Article IX (Committees)

Changed wording to reflect the elimination of the systematic rotation of the NPC Research and Education Award between research and extension. Each year the award will be open for nominations from either category.

(2) New Book - Tom Whitaker

d. Nominating Committee - Johnny Wynne

e. Finance Committee - Terry Coffelt

f. Peanut Quality Committee - Paul Blankenship

g. Public Relations Committee - Jack Simpson

h. NPC Research and Education Award Committee - Harold Pattee

i. Fellows Committee - Ron Sholar

j. Coyt T. Wilson Distinguished Service Award - Walt Mozingo

k. Joe Sugg Award - Charles Simpson

l. Bailey Award Committee - Tim Brenneman

m. Site Selection Committee - Chip Lee

n. Publication and Editorial Committee - Tom Whitaker

o. Program Committee - Charles Simpson

p. Other

4. Dr. Henning turned the meeting over to the new President, Dr. Charles Simpson of Texas, and the meeting was adjourned.

FINANCE COMMITTEE REPORT

The Finance Committee met on July 9, 1991, at San Antonio, Texas. Committee members present were D. E. Dougherty, O. D. Smith, and Chairman T. A. Coffelt. Others present were J.R. Sholar and H. E. Pattee.

The Committee reviewed the report of Executive Officer J. R. Sholar. It was moved and seconded to accept the report. Motion passed.

The Committee reviewed the budget for Peanut Science proposed by H. E. Pattee, editor. Since current levels of income would result in continued deficit spending for Peanut Science, it was moved to recommend to the Board of Directors two recommendations by the Publications and Editorial Committee: 1) that page charges be increased to $80 per page for the first four pages and $120 per page for each page over four pages and 2) to increase library subscriptions from $15 to $25. The motion was seconded and passed. It was moved, seconded, and passed not to recommend the recommendation by the Publications and Editorial Committee that dues be increased $7 per member to increase support for Peanut Science.

The Committee next reviewed the budget for the annual meeting. Estimated expenses were over $16,000, while at the current registration fee estimated income was under $10,000. In order to balance this budget, it was moved that the committee recommend to the Board of Directors an increase in the registration fee to $55 for members, $20 for student members, and $75 for non-members. The motion was seconded and passed.

The Committee next discussed the total budget for APRES for the 1991-92 fiscal year. It was moved to recommend the budget of estimated receipts of $63,240 and estimated expenses of $63,240. The motion was seconded and passed. A copy of the budget will be published in the Proceedings.

The Committee discussed the advantages and disadvantages of changing the fiscal year for the society. No action was taken.

Respectfully submitted,

T. A. Coffelt, Chairman
D. E. Dougherty
O. D. Smith
W. C. Odle

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BUDGET 1991-92

RECEIPTS

Registration	$14,500
Membership	17,400
Special Contributions (host state)	4,000
Differential Postage Assessment	2,000
Peanut Science & Technology	1,000
Quality Methods book	50
Proceedings and Reprint Sales	50
Peanut Science Page Charges & Reprints	18,240
Interest	6,000
TOTAL RECEIPTS	**$63,240**

EXPENDITURES

Annual Meeting	$ 8,400
Membership CAST	700
Office Supplies	1,100
Secretarial Services	10,500
Postage	3,500
Travel - Officers	1,200
Legal Fees	250
Proceedings - Printing & Reprints	3,500
Peanut Science	24,900
Peanut Science and Technology	50
Peanut Research	1,500
Quality Methods	100
Bank charges	150
Miscellaneous	250
On-line Computer Search Capability	2,000
Reserve	5,140
TOTAL EXPENDITURES	**$63,240**
Excess Receipts over Expenditures	0

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BALANCE SHEET FOR FY 1990-91

ASSETS	June 30, 1991	June 30, 1990
Petty Cash Fund	$ 200.39	$ 55.56
Cash in Checking Account	14,162.68	13,587.41
Certificate of Deposit #1	17,348.04	16,073.44
Certificate of Deposit #2	11,218.54	10,411.80
Certificate of Deposit #3	10,496.19	9,722.68
Certificate of Deposit #4	27,062.11	25,044.52
Certificate of Deposit #5	10,388.93	0.00
Money Market Account	2,542.13	6,218.38
Savings Account (Wallace Bailey)	1,205.06	1,195.41
Inventory of Books	27,322.40	28,929.60
TOTAL ASSETS	**$121,946.47**	**$111,238.80**
LIABILITIES		
None	0.00	0.00
FUND BALANCE	$121,946.47	$111,238.80
TOTAL LIABILITIES AND FUND BALANCE	**$121,946.47**	**$111,238.80**

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
STATEMENT OF ACTIVITY FOR YEAR ENDING

Receipts	June 30, 1991	June 30, 1990
Registration	$10,850.00	$10,699.00
Membership	16,843.00	5,917.00
Special Contributions	8,246.17	0.00
Differential Postage	2,279.50	1,889.00
Ladies Activities	659.00	751.95
Peanut Science and Technology	1,063.25	1,882.49
Quality Methods	30.00	85.00
Proceedings & Reprint Sales	2,560.99	130.00
Peanut Science Page Charges & Reprints	10,882.25	11,475.00
Checking Account Interest	663.33	876.71
Savings Account Interest (W. Bailey)	69.65	78.98
Money Market Account Interest	323.75	406.76
Certificate of Deposit #1 Interest	1,274.60	1,245.06
Certificate of Deposit #2 Interest	806.74	792.69
Certificate of Deposit #3 Interest	773.51	755.27
Certificate of Deposit #4 New & Interest	2,017.59	2,004.52
Certificate of Deposit #5 New & Interest	10,388.93	0.00
Transfer from Money Market to Checking Acct	4,000.00	0.00
TOTAL RECEIPTS	**$73,732.26**	**$49,029.44**
Expenditures		
Annual Meeting	$ 8,789.12	$ 5,275.41
Membership	679.00	613.60
Office Supplies	786.05	828.81
Secretarial Services	9,914.08	9,600.00
Postage	3,155.57	3,157.26
(minus petty cash fund balance)	(200.39)	(55.56)
Travel - Officers	1,207.16	687.00
Corporation Registration	55.00	55.00
Legal Fees	215.00	200.00
Sales Tax	35.45	44.30
Proceedings	5,994.08	2,322.62
Peanut Science	14,208.27	22,000.00
Peanut Science and Technology	51.36	81.84
Peanut Research	1,987.03	1,558.43
Quality Methods	155.00	0.00
Bank Charges	136.75	145.17
Money Market Account	4,000.00	0.00
Certificates of Deposit	10,000.00	0.00
Miscellaneous	193.00	64.00
TOTAL EXPENDITURES	**$61,361.53**	**$46,577.88**
EXCESS RECEIPTS OVER EXPENDITURES	$12,370.73	$ 2,396.88

Cash in Checking Account:

July 1, 1988 - $18,897.64 June 30, 1989 - $16,514.69
July 1, 1989 - $16,514.69 June 30, 1990 - $13,587.41
July 1, 1990 - $13,587.41 June 30, 1991 - $14,162.68

PEANUT SCIENCE BUDGET
1991-92

Income	
Page and reprint charges	$18,240.00
Foreign mailings	1,200.00
APRES member subscriptions	6,500.00
Library subscriptions	1,350.00
TOTAL INCOME	**$27,290.00**
Expenditures	
Printing and reprint costs	$16,200.00
Editorial Assistance	6,000.00
Miscellaneous expenses	500.00
Computer usage	200.00
Office supplies	100.00
Postage, domestic	700.00
Postage, foreign	1,200.00
TOTAL EXPENDITURES	**$24,900.00**

PEANUT SCIENCE AND TECHNOLOGY
SALES REPORT AND INVENTORY ADJUSTMENT
1990-91

	# of Books Sold	Remaining Inventory
Beginning inventory 1260		
1st Quarter	19	1241
2nd Quarter	13	1228
3rd Quarter	25	1203
4th Quarter	13	1190
TOTAL BOOKS SOLD	**70**	**1190**
BOOKS LOST IN SHIPPING	0	

70 books sold x $22.96 = $1,607.20 decrease in value of book inventory

1190 remaining books x $22.96 (book value) = $27,322.40 total value of remaining book inventory.

Fiscal Year	# of Books Sold
1985-86	102
1986-87	77
1987-88	204
1988-89	136
1989-90	112
1990-91	70

NOMINATING COMMITTEE REPORT

Officer nominations for the 1991-92 year are:

President Elect - Walton Mozingo, Virginia Tech University
State Employees Representative SW Area - Ed Colburn, Texas A & M University
State Employees Representative SE Area - David Knauft, University of Florida
APRES Representative to CAST - Dan Gorbet

Respectfully submitted,

Johnny Wynne, Chairman
Gerald Harrison
Darold Ketring

PUBLIC RELATIONS COMMITTEE REPORT

The Public Relations Committee met and developed the following resolution for consideration at the business meeting.

RESOLUTION

Be it resolved, that the American Peanut Research and Education Society (APRES) does recognize that the death of Mr. Jerry Didier, of Yuma, Arizona, will be a loss to the Peanut Industry in that he did much to educate people outside major peanut growing areas and held the national yield record in the late 1950's and early 1960's of 6,000 pounds per acre with the NC 2 variety.

We, therefore, recommend that this resolution be included in the official minutes of the 1991 Annual Business Meeting of APRES and a copy be sent to his widow at 4322 E. County 13th Street, Yuma, Arizona 85365.

Respectfully submitted,

Jack Simpson, Acting Chairman

PUBLICATION AND EDITORIAL COMMITTEE REPORT

Reports were presented by Peanut Research (Craig Kvien and Corley Holbrook), Peanut Science (Harold Pattee), and Peanut Quality Methods (Tim Sanders) and were accepted.

The Publications and Editorial Committee approved the following:

1) Increase the income for Peanut Science to cover expenditures by:

a) increasing page charges from $60 to $80 per page for the first four pages. The page charge for page five and higher will be $120 per page.

b) increasing library membership fee from $15 to $25.

2) Allow authors submitting publications to Peanut Science to have the option to use the "author/year" citation style.

3) The appointment of Dr. M. Basha Sheikh to replace John Vercellotti who is stepping down before his term ends.

Respectfully submitted,

T. B. Whitaker, Chairman
D. L. Ketring
W. Branch
J. W. Dorner
R. S. Wilkes
A. M. Schubert

FELLOWS COMMITTEE REPORT

Three APRES members were nominated as Fellows. They were Dr. Daniel Gorbet, Florida; Dr. John French, Alabama; and Mr. Norfleet Sugg, North Carolina. All were found to be worthy of being elected as society Fellows.

Respectfully submitted,

Frank McGill, Chairman
Donal Banks
Morris Porter
Dallas Hartzog
Clyde Young

BIOGRAPHICAL SUMMARY OF FELLOWS RECIPIENTS

Dr. John C. French, Professor Emeritus, Entomology Department, Auburn University, had an Extension and Research career of 36 years. His professional work on peanuts began in 1963 when he was appointed Extension Entomologist in Georgia. He continued his work on peanuts in South Carolina and Alabama. Dr. French authored and co-authored 35 Extension publications. Though his appointment was 100 percent Extension, he authored or co-authored 10 research publications. His mass media work was exceptional. He authored approximately 175 feature news articles on all aspects of insect control and pest management. He participated in more than 200 radio and TV programs on managing peanut pests. Dr. French conducted or assisted in conducting more than 200 result demonstrations.

Dr. French's greatest contributions to peanut industry include the following: 1) Development of a control for the lesser cornstalk borer in research conducted in 1968-70. At the time, this was the number one insect pest of peanuts in the southeastern and southwestern growing areas. 2) Development of a system for scouting peanuts for pests and initiate the first peanut scouting program. Work begun in Georgia in 1972 had been adopted by 16 counties in 1975. Coordinated the development of a similar pest management program for all peanut pests in Alabama in late 70's to the present. 3) Recognized the unnecessary use of foliar insecticides on peanuts and successfully promoted their use on an as-needed basis. This program substantially decreased cost of production and reduced concerns of environmental contamination by insecticides. 4) Organized a multi-state survey project for tomato spotted wilt on peanuts which has successfully tracked its spread throughout the eastern peanut growing areas.

Dr. French has served on many APRES committees and has organized and chaired various formal and informal sessions and discussion groups. He has given many papers on insect control and pest management at annual meetings.

Dr. Daniel W. Gorbet, Professor of Agronomy, University of Florida, North Florida Research and Education Center, Marianna, Florida, has been engaged in peanut genetics, breeding, and agronomic research for more than 20 years. He has authored or co-authored over 260 publications. His major research area has been in developing peanut germplasm and varieties with leafspot resistance and on the associated research on resistance to late leafspot and its components. He was primary developer of "Southern Runner" which has resistance to late leafspot and four other major peanut diseases. Dan has also been primary or co-developer of Early Bunch, Sunrunner, and Marc I peanut varieties. He also published the first report of a non-nodulating peanut genotype in the world literature. He serves as Assistant Director of the Marianna Center, coordinating all crops research at that unit.

Dr. Gorbet has served as President of APRES and on the Board of Directors. He has served as Program Chairman, Technical Program Chairman, and on the local arrangements committee. He has served on numerous

APRES committees (Bailey Award, Site Selection, Nominating and several ad hoc committees) and chaired five paper sessions at annual meetings. He has authored or co-authored 41 abstracts presented at APRES meetings, including five presentations nominated for the Bailey Award (co-recipient in 1985).

Dr. Gorbet has served on the advisory committee of 16 graduate students, acting as major professor for one Ph.D. and one M.S. student. He has international involvement in peanut research in Zimbabwe, Malawi, and South Africa. Dan currently serves as vice-chairman of the Peanut Crop Advisory Committee and chairman-elect of the Peanut Crop Registration Committee.

Dr. Gorbet has given numerous presentations on peanuts at field days and short courses in Florida and Georgia. He has served on the Florida Farm Bureau Crop Advisory Committee since 1975. He has played a major leadership role in peanut research in Florida, along with his regional, national, and international contributions.

Mr. Norfleet L. Sugg, Executive Secretary, North Carolina Peanut Growers Association, Rocky Mount, North Carolina, has had a distinguished career serving the peanut industry. He was a leader in passing the U.S. Farm Bills in 1981, 1985, and 1990 and instrumental in leading the U.S. Congress to maintain the peanut support program. As secretary of the North Carolina Peanut Growers Association, Norfleet has supported research and extension activities at North Carolina State University and at the Department of Agriculture. He has been an effective promoter of peanut products as an individual and with funding for marketing activities.

Mr. Sugg has been actively involved in APRES by serving on the Publications and Editorial Committee, Site Selection Committee and participating at annual meetings. He was responsible for establishing the Joe Sugg Graduate Student Award. Norfleet has also served on the board of directors and as president of the National Peanut Council.

Guidelines for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY FELLOW ELECTIONS

Fellows

Fellows are active members of the Society who have been nominated to receive the honor of fellowship by other active members, recommended by the Fellows Committee, and elected by the APRES Board of Directors. Up to three active members may be elected to fellowship each year.

Eligibility of Nominators

Nominations may be made by an active member of the Society except members of the Fellows Committee and the APRES Board of Directors. A member may nominate only one person for election to fellowship in any one year.

Eligibility of Nominees

Nominees must be active members of the Society at the time of their nomination and must have been active members for a total of at least five years.

The nominee should have made outstanding contributions in an area of specialization whether in research, extension or administration and whether in public, commercial or private service activities. Members of the Fellows Committee and APRES Board of Directors are ineligible for nomination.

Nomination Procedures

Preparation. Careful preparation of the nomination for a distinguished colleague based principally on the candidate's record of service will assure a fair evaluation by a responsible panel. The assistance of the nominee in supplying accurate information is permissible. The documentation should be brief and devoid of repetition. The identification of the nominee's contributions is the most important part of the nomination. The relative weight of the categories of achievement and performance are given in the attached "format".

Format. Organize the nomination in the order shown in the Format for FELLOW NOMINATIONS, and staple each copy once in the upper left corner. Each copy must contain (1) the nomination proper, and (2) one copy of the three supporting letters. Do not include more than three supporting letters with the nomination. The copies are to be mailed to the chairman of the Fellows Committee.

Deadline. The deadline date for receipt of the nominations by the chairman shall be March 1 of each year.

Basis of Evaluation

A maximum of 10 points is allotted to the nominee's personal achievements and recognition. A maximum of 50 points is allotted to the nominee's achievements in his or her primary area of activity, i.e., research, extension, service to industry, or administration. A maximum of 10 points is also allotted to the nominee's achievements in secondary areas of activity. A maximum of 30 points is allotted to the nominee's service to the profession.

Processing of Nominations

The Fellows Committee shall evaluate the nominations, assign each nominee a score, and make recommendation regarding approval by April 1. The President of APRES shall mail the committee recommendations to the Board of Directors for election of Fellows, maximum of three (3), for that year. A simple majority of the Board of Directors must vote in favor of a nominee for election to fellowship. Persons elected to fellowship, and their nominators, are to be informed promptly. Unsuccessful nominations shall be returned to the nominators and may be resubmitted the following year.

Recognition

Fellows shall receive an appropriate framed certificate at the annual business meeting of APRES. The President shall announce the elected Fellows and present each a certificate. The members elected to fellowship shall be recognized by publishing a brief biographical sketch of each, including a photograph and summary of accomplishments, in the APRES PROCEEDINGS. The brief biographical sketch is to be prepared by the Fellows Committee.

Distribution of Guidelines

These guidelines and the format are to be published in the APRES PROCEEDINGS and again whenever changes are made. Nominations should be solicited by an announcement published in "Peanut Research".

Format for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY FELLOW NOMINATIONS

TITLE: Entitle the document "Nomination of _____ for Election to Fellowship by the American Peanut Research and Education Society", inserting the name of the nominee in the blank.

NOMINEE: Include the name, date and place of birth, mail address (with zip code) and telephone number (with area code).

NOMINATOR: Include the typewritten name, signature, mail address (with zip code) and telephone number (with area code).

BASIS OF NOMINATION: Primary area: designate primary area as Research, Extension, Service to Industry, or Administration.

Secondary areas: include contributions in areas other than the nominee's primary area of activity in the appropriate sections of this nomination format.

QUALIFICATIONS OF NOMINEE: Complete parts I and III for all candidates and as many of II-A, -B, -C, and -D, as are applicable.

I. PERSONAL ACHIEVEMENTS AND RECOGNITION (10 points)

A. Degrees received: give field, date, and institution for each degree.
B. Membership in professional and honorary academic societies.
C. Honors and awards received since the baccalaureate degree.
D. Employment: give years, organizations and locations.

II. ACHIEVEMENT IN PRIMARY (50 points) AND SECONDARY (10 points) FIELDS OF ACTIVITY

A. Research

Significance and originality of basic and applied research contributions; scientific contribution to the peanut industry; evidence of excellence and creative reasoning and skill; number and quality of publications; quality and magnitude of editorial contributions. Attach a chronological list of publications.

B. Extension

Ability (a) to communicate ideas clearly, (b) to influence client attitudes, (c) to motivate change in client action. Evaluate the quality,

number and effectiveness of publications for the audience intended. Attach a chronological list of publications.

C. Service to Industry

Development or improvement of programs, practices, and products. Significance, originality and acceptance by the public.

D. Administration or Business

Evidence of creativeness, relevance and effectiveness of administration of activities or business within or outside the USA.

III. SERVICE TO THE PROFESSION (30 points)

A. Service to APRES

1. Appointed positions (attach list).
2. Elected positions (attach list).
3. Other service to the Society (brief description).

Service to the Society and length of service as well as quality and significance of the type of service are all considered.

B. Service to the profession outside the Society

1. Advancement in the science, practice and status of Peanut Research, education or extension, resulting from administrative skill and effort (describe).
2. Initiation and execution of public relations activities promoting understanding and use of peanuts, peanut science and technology by various individuals and organized groups within and outside the USA (describe).

The various administrative skills and public relations actions outside the Society reflecting favorably upon the profession are considered here.

EVALUATION: Identify in this section, by brief reference to the appropriate materials in sections II and III, the combination of the contributions on which the nomination is based. The relevance of key items explaining why the nominee is especially well qualified for fellowship should be noted. However, brevity is essential as the body of the nomination, excluding publication lists, should be confined to not more than eight (8) pages.

SUPPORTING LETTERS: Three supporting letters should be included, at least two of which are from active members of the Society. The letters are solicited by, and are addressed to, the nominator, and should not be dated. Please urge those writing supporting letters not repeat factual information that will

obviously be given by the nominator, but rather to evaluate the significance of the nominee's achievements. Attach one copy of each of the three letters to each of the six copies of the nomination. Members of the Fellows Committee, the APRES Board of Directors, and the nominator are not eligible to write supporting letters.

BAILEY AWARD COMMITTEE REPORT

Eleven papers were nominated for the Bailey Award at the 1990 APRES meeting held in Stone Mountain, Georgia. On August 3, 1990, the senior author of each nominated paper was notified of the nomination and an origianl manuscript based on the presentation was requested by January 5, 1991. Nine of the eleven nominees submitted a manuscript. These were judged by five of the six Bailey Award Committee members (one committee member's paper was nominated and a manuscript was submitted). Papers were judged on appropriateness, originality, clarity and scientific excellence. On April 9, 1991, the committee reached a consensus on the Bailey Award winner and the president, executive officer and president-elect were notified.

The 1991 recipient of the Bailey Award is "Impact of chemical-use restrictions on disease, weed, and insect management in peanuts" by P. M. Phipps, D. A. Herbert, J. W. Wilcut, C. W. Swann, G. G. Gallimore, and D. B. Taylor of the Tidewater Agricultural Experiment Station, VPI & SU, Suffolk, Virginia.

Respectfully submitted,

T. B. Brenneman, Chair
Ken Boote
T. A. Lee, Jr.
P. M. Phipps
H. T. Stalker
J. L. Starr

NOMINEES FOR BAILEY AWARD 1991

1. Comparison of peanut butter color determination by CIELAB L*a*b* and hunter color-difference methods and the relationship of roasted peanut color to roasted peanut flavor attribute response. H. E. Pattee, F. G. Giesbrecht and C. T. Young.

2. Pathogenicity of a dicarboximide-resistant isolate of *Sclerotinia minor* to peanut in microplots treated with fungicides. F. D. Smith, P. M. Phipps and R. J. Stipes.

3. Peanut genotype effects on occurrence of *Cercospora arachidicola* and *Cercosporidium personatum* in North Carolina. B. B. Shew and M. K. Beute.

4. Impact of chemical-use restrictions on disease, weed, and insect management in peanuts. P. M. Phipps, D. A. Herbert, J. W. Wilcut, C. W. Swann, G. G. Gallimore and D. B. Taylor.

5. Lesser cornstalk borer (Lepidoptera:Pyralidae) larval feeding on 20 host plants. T. A. Mack and X. P. Huang.

6. Peanut roots. An Enigma? D. L. Ketring and J. L. Reid.

7. The role of maturation in quality of stackpole cured peanuts. T. H. Sanders, J. A. Lansden, J. R. Vercellotti, and K. L. Crippen.

8. The use of a biocompetitive agent to control preharvest aflatoxin in drought stressed peanuts. J. W. Dorner, R. J. Cole, and P. D. Blankenship.

9. Effect of fungicide spray schedule and digging date on Florunner and Southern Runner peanuts. J. P. Beasley, Jr. and S. S. Thompson.

Nominated but not submitted were:

1. Impact of peanut demand factors on peanut farmers' income. D. H. Carley and S. M. Fletcher.

2. Phytotoxicity and peanut recovery from chlorimuron tank mixture applications. W. C. Johnson, III and S. M. Brown.

JOE SUGG GRADUATE STUDENT AWARD REPORT

Judges for the 1991 Graduate Student Competition were:

Mrs. Ruth Taber, chair
Dr. Morris Porter
Dr. Gary Kochert
Dr. Clyde Young
Dr. Tim Mack

The following winners were selected:

First Place: T. E. Clemente, A. K. Weissinger, and M. K. Beute. Production of stable transgenic peanut calli (*Arachis hypogaea* L).

Second Place: S. S. Deitz, J. W. Chapin, and J. S. Thomas. Feeding behavior of fall armyworm on florunner peanut.

Respectfully submitted,

Charles Simpson, Program Chairman

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT

The Coyt T. Wilson Distinguished Service Award Committee evaluated the nominees submitted by the deadline for this year's award. Evaluations were summarized by the chairman, and Dr. Leland D. Tripp of Texas was selected as the recipient of the 1991 award. He served as Executive Secretary-Treasurer of APRES during its formative years from 1969-1974. Dr. Tripp has been recognized by the Society as a Fellow, has served as President, and has won the prestigious Golden Peanut Research and Education Award.

Respectfully submitted,

Walton Mozingo, Chairman
John Baldwin
Bill Birdsong
Gerald Harrison
Darold Ketring

BIOGRAPHICAL SUMMARY OF COYT T. WILSON DISTINGUISHED SERVICE AWARD RECIPIENT

Dr. Leland D. Tripp is a peanut consultant from Bryan, Texas, serving growers, shellers, seedsmen, and related service companies in the Southwest. Prior to establishing his consulting business in 1986, Dr. Tripp served as an Extension Crop Specialist at Oklahoma State University for fourteen years, and later served as Extension Agronomist with the Texas Agricultural Extension Service for eleven years. As an Extension peanut specialist and private consultant, his recommendations have been implemented at the grower, sheller, and industry level far beyond the clientele whom he has served. He has truly been a leader in the southwestern peanut industry.

Dr. Tripp was secretary of the Peanut Improvement Working Group the year preceding organization of APRES, and secretary-treasurer of APRES for the first five years of its existence. Most of the organization's goals, procedures for operations, and functions were established while Leland served as secretary-treasurer. Leland has served on and given leadership to numerous APRES committees. He served as APRES President during 1976. He was recognized as a Fellow of the organization in 1983. Leland Tripp actively pursued and was a strong contributor in the transition of national peanut research, education, and industry representatives from a loosely knit, cooperative working group into the current international professional society known as APRES.

Guidelines for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
COYT T. WILSON DISTINGUISHED SERVICE AWARD

The Coyt T. Wilson Distinguished Service Award will recognize an individual who has contributed two or more years of distinguished service to the American Peanut Research and Education Society. It will be given annually in honor of Dr. Coyt T. Wilson who contributed freely of his time and service to this organization in its formative years. He was a leader and advisor until his retirement in 1976.

Eligibility of Nominators

Nominations may be made by an active member of the Society except members of the Award Committee and the Board of Directors. However, the nomination must be endorsed by a member of the Board of Directors. A nominator may make only one nomination each year and a member of the Board of Directors may endorse only one nomination each year.

Eligibility of Nominees

Nominees must be active members of the Society and must have been active for at least five years. The nominee must have given of their time freely and contributed distinguished service for two or more years to the Society in the area of committee appointments, officer duties, editorial boards, or special assignments. Members of the Award Committee are ineligible for nomination.

Nomination Procedures

Preparation. Careful preparation of the nomination based on the candidate's service to the Soceity is critical. The nominee may assist in order to assure the accuracy of the information needed. The documentation should be brief and devoid of repetition.

Format. TITLE: Entitle the document "Nomination of _____ for the Coyt T. Wilson Distinguished Service Award presented by the American Peanut Research and Education Society". (Insert the name of the nominee in the blank).

NOMINEE: Include the name, date and place of birth, mail address (with zip code) and telephone number (with area code).

NOMINATOR AND ENDORSER: Include the typewritten names, signatures, mail addresses (with zip codes) and telephone numbers (with area codes).

SERVICE AREA: Designate area as Committee Appointments, Officer Duties, Editorial Boards, or Special Assignments. (List in chronological order by year of appointment.)

Qualifications of Nominee

I. Personal Achievements and Recognition:
   - A. Education and degrees received: Give field, date and institution.
   - B. Membership in professional organizations
   - C. Honors and awards
   - D. Employment: Give years, locations and organizations

II. Service to the Society:
   - A. Number of years membership in APRES
   - B. Number of APRES annual meetings attended
   - C. List all appointed or elected positions held
   - D. Basis for nomination
   - E. Significance of service including changes which took place in the Society as a result of this work and date it occurred.

III. Supporting letters:

Two supporting letters should be included with the nomination. These letters should be from Society members who worked with the nominee in the service rendered to the Society or is familiar with this service. The letters are solicited by and are addressed to the nominator. Members of the Award Committee and the nominator are not eligible to write supporting letters.

Selection Committee and Procedure

A five-member selection committee shall be appointed by the APRES President. The committee shall be composed of an active Society member from each of the three production areas representing either research or extension plus two members representing industry from two different production areas. The committee shall review and rank the nominations, and submit these rankings to the committee chairman. The nominee with the highest rank shall be the recipient of the award. In case of a tie the committee will vote again only between the persons tied in order to select a winner.

Award and Presentation

The award shall be a bronze and wood plaque purchased by the Society and presented at its annual business meeting.

PEANUT QUALITY COMMITTEE REPORT

The Peanut Quality Committee met on July 9, 1991, at 3:00 p.m. Three committee members, one proxy, and 14 guests were present.

Dr. Tim Sanders reported on the status of National Peanut Council sponsored Peanut Quality Videos under preparation. Dr. Sanders also updated the committee on APRES Quality Methods.

Dr. Floyd Dowell described methods under study for "Improving Quality Measurements in Peanut Grade Samples". Automated changes after development will provide graders with more objective and automated tools to complete their tasks. The committee encouraged Dr. Dowell to continue his efforts for grading improvement.

Paul Blankenship described a study that is to be conducted during the 1991 harvest season to chemically collect an extensive aflatoxin data set from lots of farmers stock peanuts being graded. Thirty-nine buying points will be equipped with laboratories using either Vicam or Neogen apparatus. The laboratories will be distributed across all USA peanut producing areas and installed and operated during harvest. The data set will be considered by the industry and ASCS to decide if a chemical test will be used in peanut grading for aflatoxin detection. The project is being funded through the NPC National Peanut Foundation.

Respectfully submitted,

P. D. Blankenship, Chairman
T. H. Sanders
J. D. Simpson, proxy for G. M. Grice
G. A. Sullivan

PROGRAM COMMITTEE REPORT

The working committees of the 23rd meeting of the American Peanut Research and Education Society, held at the Hilton Palacio del Rio in San Antonio, Texas, July 8-12, 1991, were chaired by Dr. Olin D. Smith (Technical Program), Dr. Thomas A. (Chip) Lee, Jr. (Local Arrangements) and Mrs. Barbara Lee (Spouses Program). These three along with their committees did an outstanding job of preparing for the meetings. The committee members are listed below.

A total of 115 volunteer papers and 12 poster papers were accepted for presentation at the meetings. This included three excellent symposia and seven papers for the graduate student competition.

Industry support of the APRES meeting was outstanding in 1991. Product was provided by M & M Mars, Nestle, Hershey Chocolate USA, The Texas Peanut Producers Board, DeLeon Peanuts, and the North Carolina Peanut Growers Association.

The following companies made major contributions by paying for various meal functions: Rhone-Poulenc - ice cream social; ISK Biotech - Wednesday night social; DowElanco, Valent and AmVac - Thursday night barbecue. We thank these companies and organizations for their generous support.

Reserved rooms totaled 235 and final registration was 300 members and non-members, and approximately 30 registered for the spouses program. A total of 450 people attended the various functions.

The spouses program featured a luncheon on a riverboat ride down the San Antonio River, visits to the Alamo, Texas Culture Center, Rivercenter Mall, San Antonio Zoo, Seaworld of Texas, and the exhibition of "Mexico: Splendors of Thirty Centuries". A hospitality suite was maintained on Wednesday and Thursday mornings.

A hearty congratulations to the 1991 APRES meeting committees--your job was well done.

Respectfully submitted,

Charles E. Simpson, Chairman

1991 PROGRAM COMMITTEES

Local Arrangements

T. A. (Chip) Lee, Jr., Chairman
Mark Black
Clyde Crumley
Max Grice
Norman McCoy
Ray Smith
Mary Webb
George Alston
Ed Colburn
Scott Dunham
James Grichar
Bill Odle
Kurt Warnken
Doyle Welch

Technical Program

Olin D. Smith, Chairman
Ed Colburn
James Grichar
Robert Pettit
Jim Smith
Ruth Taber
Ken Woodard
George Alston
Max Grice
Forrest Mitchell
Mike Schubert
Jim Starr
Ralph Waniska

Spouse's Program

Barbara Lee, Chairperson
Janice Grice
Lynann Simpson
Bernadine Tripp
Shirley Woodard
Charlotte Alston
Annalee Schubert
Thelma Smith
Ivanna Warnken

1991 PROGRAM

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1990-1991

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PROGRAM COMMITTEE ..... Charles E. Simpson, Chairman

Local Arrangements

T.A. (Chip) Lee, Jr. Chmn.
George Alston
Mark Black
Ed Colburn
Clyde Crumley
Scott Dunham
Max Grice
James Grichar
Norman McCoy
Bill Odle
Ray Smith
Kurt Warnken
Mary Webb
Doyle Welch

Technical Program

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Mike Schubert
Jim Smith
Jim Starr
Ruth Taber
Ralph Waniska
Ken Woodard

Spouse's Program

Barbara Lee, Chairperson
Charlotte Alston
Annalee Schubert
Lynann Simpson
Thelma Smith
Bernadine Tripp
Ivanna Warnken

PROGRAM HIGHLIGHTS

Monday, July 8

5:00-8:30	Informal Discussion by Peanut CAC with David E. Williams ..... La Reina

Tuesday, July 9

8:30-12:00	Peanut CAC Meeting ..... La Reina
9:00-12:00	Extension Agronomists Discussion ..... La Vista
12:00-8:00	APRES Registration ..... La Corona
12:00-8:00	Spouses Registration ..... La Corona

Committee, Board and Other Meetings

1:00-2:00	Associate Editors
	Peanut Science ..... La Vista
	Public Relations ..... La Duquesa
2:00-3:00	Publications & Editorial ..... La Vista
	Finance ..... La Duquesa
	Bailey Award ..... La Princesa
3:00-4:00	Peanut Quality ..... La Vista
	Site Selection ..... La Duquesa
	Early Exhibit Setup ..... La Reina
4:30-6:00	Peanut Systems Workshop ..... La Duquesa
7:00-	Board of Directors ..... La Vista
8:00-10:00	Rhone-Poulenc ICE CREAM SOCIAL

Wednesday, July 10

8:00-12:00	APRES Registration ..... La Corona
	Spouses Registration ..... La Corona
8:00-10:00	Spouses Hospitality ..... La Vista
8:00-5:00	Industry Exhibits ..... La Reina
	GENERAL SESSION ..... Salon Del Rey, South/Central
8:30	Call to Order, Invocation, and Welcome ..... Ron Henning
8:45	Quality Through Research and Education – A quick look at the work of the National Peanut Foundation, Kimberly J. Cutchins, President, National Peanut Council
9:00	Quality: Prerequisite to Marketing US Peanuts (Keynote Address), Wayne Lord, President, National Peanut Brokers Association, Southco Commodities, Inc., Atlanta, GA.
9:40	Announcements:
	O.D. Smith ..... Technical Program
	T.A. (Chip) Lee, Jr. ..... Local Arrangements
10:30-12:00	Breeding & Genetics ..... Salon Del Ray North

10:30-12:00	Harvesting, Curing, Shelling, Storing and Handling	Salon Del Ray Central
10:30-12:00	Physiology	Salon Del Ray South
1:00-5:00	Poster Session I	La Duquesa
1:00-3:00	Mycotoxins	Salon Del Ray North
1:00-3:00	SYMPOSIUM: Peanut Health Management	Salon Del Ray Central
1:15-3:00	Production Technology	Salon Del Ray South
3:30-5:00	Entomology	Salon Del Ray North
4:00-5:00	Economics	Salon Del Ray Central
3:30-4:30	Production Technology	Salon Del Ray South
7:00-9:00	ISK Biotech BUFFET	
8:00-12:00	Poster Session II	La Duquesa
8:00-3:00	Industry Exhibits	La Reina
8:00-10:00	Spouses Hospitality	La Vista
8:00-12:00	Spouses Program	
8:00-10:00	Graduate Student Papers	Salon Del Ray North
8:00-11:30	SYMPOSIUM: Pesticide Reduction	Salon Del Ray Central
8:00-10:00	Processing & Utilization	Salon Del Ray South
10:30-12:00	Breeding & Genetics	Salon Del Ray North
10:30-12:00	Plant Pathology & Nematology	Salon Del Ray South

Thursday, July 11

1:00-4:00	Poster Session III	La Duquesa
1:00-3:30	SYMPOSIUM: Molecular Genetics	Salon Del Ray North
1:00-3:30	Weed Control	Salon Del Ray Central
1:15-3:30	Plant Pathology	Salon Del Ray South
5:30-8:00	Dow Elanco, AMVAC, and Valent BAR-B-QUE	Lone Star Brewery

Friday, July 12

7:30-8:30	Breakfast APRES Awards Ceremony	Corte Real
8:30-10:00	Business Meeting	Corte Real
10:30-3:00	Peanut CRSP	La Reina

PAPER PRESENTATION SESSIONS

Wednesday, July 10

Breeding and Genetics ..... Salon Del Rey North

Moderator: T.G. Isleib, North Carolina State Univ., Raleigh NC.

10:30 (1) Seed Size Variability Among Peanut Genotypes. **D.A. Knauft*, D.W. Gorbet, and F.G. Martin**, Dept. of Agronomy, University of Florida, Gainesville and Marianna FL; Dept. of Statistics, University of Florida, Gainesville FL.

10:45 (2) Restriction Fragment Length Polymorphism Evaluation of Six Peanut Species within the *Arachis* Section. **O.G. Paik-Ro*, R.L. Smith, and D.A. Knauft**, Dept. of Agronomy, University of Florida, Gainesville FL.

11:00 (3) Variability Among *In Vitro* Regenerated Interspecific Hybrids in Arachis. **C. Singsit* and P. Ozias-Akins**, University of Georgia, Coastal Plain Experiment Station, Dept. of Horticulture, Tifton GA.

11:15 (4) Preliminary Evaluation of Peanut Plant Introductions for Minimum Descriptors and Resistance to Two Diseases. **T.A. Coffelt* and D.M. Porter**, USDA/ARS, Tidewater Agricultural Experiment Station, Suffolk VA.

11:30 (5) Interspecific Incompatibility in the Genus *Arachis*. **Tallury P.S. Rau*, H.T.Stalker, and H.E. Pattee**, Crop Science Dept. and USDA/ARS, Botany Dept., North Carolina State University, Raleigh NC.

11:45 (6) Ethnobotanical Evidence for the Bolivian Origin of the Valencia Peanut. **D.E. Williams***, Institute of Economic Botany, The New York Botanical Garden, Bronx NY.

Harvesting, Curing, Shelling, Storing and Handling ..... Salon Del Rey Central

Moderator: G.D. Alston, Texas Agric. Ext. Serv., Stephenville TX.

10:30 (7) Peanut Curing by Intermittent Heat and Air Using Dural Driers. **M.J. Bader*, W. Adkins, and C.L. Butts**, University of Georgia Extension Service, Tifton GA; USDA Peanut Lab, Dawson GA.

10:45 (8) Specific Energy Evaluations for Solar-Assisted Partial Air Recirculation Peanut Drying Facility. **J.H. Young*, J. Jilek, J.C. Tutor, and A.A. Boyd**, Biological and Agricultural Engineering Dept., North Carolina State University, Raleigh NC.

11:00 (9) Effectiveness of Peanut Storage Exterior Coatings in Reducing Solar Radiation. **J.S. Smith, Jr.***, USDA/ARS, National Peanut Research Laboratory, Dawson GA.

11:15 (10) Milling Quality in a Bulk Peanut Curing Model. **J.M. Troeger***, USDA/ARS, Crop Systems Research Unit, Tifton GA.

11:30 (11) Break-Even Analysis for Curing Farmers Stock Peanuts. **C.L. Butts* and M.C. Lamb**, USDA/ARS, National Peanut Research Laboratory, Dawson GA.

11:45 (12) Spectral Reflectance Characteristics of Undamaged and Damaged Peanut Kernels. **F.E. Dowell***, USDA/ARS, National Peanut Research Laboratory, Dawson GA.

Physiology ..... **Salon Del Rey South**

Moderator: D.L. Ketring, USDA/ARS, Okla. State Univ, Stillwater OK.

10:30 (13) Micro-Scale Quantitation of Sugars in Peanuts. **J.A. Lansden***, USDA/ARS, National Peanut Research Laboratory, Dawson GA.

10:45 (14) Single Leaf Carbon Exchange and Canopy Radiation Use Efficiency of Four Peanut Cultivars. **J.M. Bennett*, L. Ma, T.R. Sinclair, and K.J. Boote**, Agronomy Dept., University of Florida, and USDA/ARS, Gainesville FL.

11:00 (15) Field Screening of Peanut Germplasm for Drought Resistance Using an Irrigation Gradient System. **A.M. Schubert* and O.D. Smith**, Texas Agricultural Experiment Station, Yoakum TX; and Dept. of Soil and Crop Sciences, Texas A&M University, College Station TX.

11:15 (16) Physiological Traits Contributing to Yield Potential among Peanut Genotypes: Growth Traits and Yield. **L. Ma, K.J. Boote*, and F.P. Gardner**, Agronomy Dept., University of Florida, Gainesville FL.

11:30 (17) Physiological Traits Contributing to Yield Potential in Peanut: Simulating Different Genotypes with the PNUTGRO Model. **K.J. Boote* L. Ma, and F.P. Gardner**, Agronomy Dept., University of Florida, Gainesville FL.

Poster Session I ..... **La Duquesa**
1:00 - 5:00 pm

P1 Pre-Plant-Incorporated Limestone as a Calcium Source for Peanut. **G.J.Gascho*, A.K. Alva, S.C. Hodges, and A.S. Csinos**, University of Georgia, Divisions of Agronomy and Plant Pathology, Coastal Plain Experiment Station and Cooperative Extension Service, Tifton GA.

P2 Clustering of Mexican Entries of Peanut (*Arachis hypogaea* L.) by Numerical Taxonomy. S. **Sanchez-Dominguez* and A. Munoz-Orozco.** Departamento de Fitotecnia, Universidad Autonoma Chapingo y Colegio de Postgraduados, Chapingo, Mexico.

P3 Effect of Blanching and Blanching Method on Peanut Seed Composition. **S.M. Basha*, C.T. Young, and W.A. Parker,** Florida A&M University, Tallahassee FL; N.C. State University, Raleigh N.C.; and PERT Labs, Edenton N.C.

P4 Section 22 Import Quotas and the U.S. Peanut Program: Operation Under Current Law. **R.H. Miller*,** USDA/ASCS, Commodity Analysis Division, Washington DC.

Mycotoxins ..... **Salon Del Rey North**

Moderator: R.E. Pettit, Texas A&M Univ., College Station TX.

1:00 (18) Characteristics of Aflatoxin-Free Peanuts. **J.R. Reizner*,** Procter and Gamble, Cincinnati OH.

1:15 (19) Variability Associated with Testing Farmers Stock Peanuts for Aflatoxin. **T.B. Whitaker*, F.E. Dowell, W.M. Hagler, F.G. Giesbrecht, and J. Wu,** USDA/ARS, North Carolina State University, Raleigh NC; USDA-ARS, National Peanut Research Laboratory, Dawson GA; Mycotoxin Laboratory, N.C. State University Raleigh NC; Dept. of Statistics, N.C. State University, Raleigh NC; AMS Statistics Branch, USDA, Washington, DC.

1:30 (20) Chemical Aflatoxin Testing For Peanut Buying Stations In the United States. **P.D. Blankenship* and J.W. Dorner,** USDA/ARS, National Peanut Research Laboratory, Dawson GA.

1:45 (21) Aflatoxin Control in Postharvest Peanut Kernels at Various Water Activities and Times: Effects of Chitosan and *Bacillus subtilis*. **R.G. Cuero*, G.O. Osuji, E. Duffus, R.O. Waniska, R.E. Pettit, and J.E. Fajardo,** Prairie View A&M University, CARC, Prairie View TX; Soil and Crop Sciences, and Plant Pathology and Microbiology Dept., Texas A&M University System, College Station TX.

2:00 (22) Evaluation of Four Mills for Use in Preparing Peanut Samples for Subsampling and Aflatoxin Analysis. **J.W. Dorner* and R.J. Cole,** USDA/ARS, National Peanut Research Laboratory, Dawson GA.

2:15 (23) Aflatoxin Contamination of Peanuts from Separately Drought Stressed Pods and Plants. **T.H. Sanders*, R.J. Cole, P.D. Blankenship, and J.W. Dorner,** USDA/ARS, National Peanut Research Laboratory, Dawson GA.

2:30 (24) Observations on Aflatoxin Contamination in Southern Runner in 1990. **D.M. Wilson*, T.B. Brenneman, R.W. Beaver, A.K. Culbreath, J.A. Baldwin, and J.P. Beasley, Jr.**, Dept. of Plant Pathology, University of Georgia, Coastal Plain Experiment Station and Department of Agronomy, Cooperative Extension Service, Tifton GA.

2:45 (25) Postharvest Aflatoxin Management Study. **R.J. Cole*, J.W. Dorner, M.C. Lamb, and J.I. Davidson, Jr.** USDA-ARS, National Peanut Research Laboratory, Dawson GA.

3:00 Break

Symposium: Peanut Health Management ..... Salon Del Rey Central

Moderators: H.A. Melouk, USDA/ARS, Okla. State Univ., Stillwater OK and F.M. Shokes, Univ. of Florida, Quincy FL.

1:00 Introduction

1:05 (26) Peanut Growth and Development. **D.L. Ketring and J.L. Reed**, USDA/ARS, Southern Plains Area and Dept. of Agronomy, Oklahoma State University, Stillwater OK.

1:20 (27) Management of Weeds. **B.J. Brecke**, University of Florida, Agricultural Research & Education Center, Jay FL.

1:30 (28) Management of Soilborne Fungal Pathogens and Nematodes. **H.A. Melouk, P.A. Backman, and D.W. Dickson**, USDA/ARS, Dept. of Plant Pathology, Oklahoma State University, Stillwater OK, Dept. of Plant Pathology, Auburn University, Auburn AL, and Dept. of Entomology and Nematology, University of Florida, Gainesville FL.

1:55 (29) Management of Foliar Fungal Pathogens. **F.W. Nutter, Jr., and F.M. Shokes**, Dept. of Plant Pathology, Iowa State University, Ames IA, and University of Florida, Quincy FL.

2:05 (30) Viral Diseases and Their Management. **J.L. Sherwood and H.A. Melouk**, Dept. of Plant Pathology, and USDA/ARS, Oklahoma State University, Stillwater OK.

2:20 (31) Management of Physiological and Environmental Disorders. **C.K. Kvien**, Dept. of Agronomy, Coastal Plain Experiment Station, University of Georgia, Tifton GA.

2:35 (32) Management of Mycotoxins. **D.M. Wilson**, Dept. of Plant Pathology, Coastal Plain Experiment Station, Tifton GA.

2:45 (33) Pesticide Application Techniques for Peanut Health Management. **T.A. Kucharek**, Dept. of Plant Pathology, University of Florida, Gainesville FL.

3:00 Break

Production Technology ..... **Salon Del Rey South**

Moderator: L.D. Tripp, Peanut Consultant, Bryan TX.

1:15 (34) Cultivar Response to Twin Row Planting. **G.A. Sullivan***, Dept. of Crop Science, North Carolina State University, Raleigh NC.

1:30 (35) Seeding Peanuts in Narrow Rows with Modified Commercial Planters. **F.S. Wright*, R.W. Mozingo, and N.L. Powell**, USDA/ARS and VPI & SU, Tidewater Agricultural Experiment Station, Suffolk VA.

1:45 (36) Vacuum Planters: New Technology for Seeding Peanuts. **J.P. Beasley, Jr.* and M.J. Bader**, Extension Agronomy Dept., University of Georgia, Tifton GA; Extension Engineering Dept., University of Georgia, Tifton GA.

2:00 (37) Effect of Calcium on Germination of Florunner, Sunrunner, GK 7, and Southern Runner. **D.L. Hartzog* and J.F. Adams**, Dept. of Agronomy and Soils, Auburn University, Auburn AL.

2:15 (38) Peanut Response to Lime and Zinc. **F.M. Rhoads, F.M. Shokes* and D.W. Gorbet**, North Florida Research and Eduction Centers, Quincy FL and Marianna FL.

2:30 (39) Rapeseed Meal as a Potential Biological Control of CBR. **F.J. Adamsen* and D.M. Porter**, USDA/ARS, Tidewater Agricultural Experiment Station, Suffolk VA.

2:45 (40) Evaluations of Pensacola Bahiagrass and Corn as Rotational Crops for Two Peanut Cultivars. **J.A. Baldwin* and J.W. Todd**, Extension Agronomy Dept., University of Georgia; Dept. of Entomology, Coastal Plain Experiment Station, Tifton GA.

3:00 Break

Entomology ..... **Salon Del Rey North**

Moderator: F.L. Mitchell, Texas Agric. Exp. Stn., Stephenville TX.

3:30 (41) The Effects of Date of Planting and Insecticide Treatments on Thrips Populations, Tomato Spotted Wilt Virus Incidence and Yield of Peanut in Alabama. **J.R. Weeks* and A.K. Hagan**, Depts. of Entomology and Plant Pathology, Auburn University, Headland AL.

3:45 (42) *Frankliniella fusca* and *F. occidentialis*, Two Vectors of Tomato Spotted Wilt Virus in South Texas Peanuts, a Comparison of their Development and Reproductivity. **V.K. Lowry*, J.W. Smith, Jr., and F.L. Mitchell**, Texas A&M University, College Station TX; Texas Agricultural Experiment Station, Stephenville TX.

4:00 (43) Study of Feeding Behavior of Lesser Cornstalk Borer Larvae in Laboratory Conditions. **V. Borek* and T.P. Mack**, Insect Chemical Ecology Unit, UOCHB, CSAV, Czechoslovakia; Department of Entomology, Auburn University, Auburn AL.

4:15 (44) Interactive Effects of Lesser Cornstalk Borers and Aspergillus Incidence in Peanut. **K.L. Bowen* and T.P. Mack**, Depts. of Plant Pathology and Entomology, Auburn University, AL.

4:30 (45) Predicting the Abundance of Larvae of the Lesser Cornstalk Borer From Estimates of Adult Abundance. **T.P. Mack*, D.P. Davis, and C.B. Backman**, Dept. of Entomology, Auburn University, Headland AL.

4:45 (46) Management of Southern Corn Rootworm in Virginia Peanuts. **D.A. Herbert, Jr.*, and T.A. Coffelt**, Tidewater Agricultural Experiment Station, Virginia Polytechnic Institute and State University, USDA/ARS, Suffolk VA.

Economics ..... **Salon Del Rey Central**

Moderator: W.D. Shurley, Rural Devel. Center, Tifton GA.

4:00 (47) Sustainability and Cost-Reduction: The Case of a Late Leafspot Weather-Based Advisory System in Georgia. **F.D. Mills, Jr.*, and F.W. Nutter, Jr.**, Dept. of Agriculture and Environment, Abilene Christian University, Abilene TX; Dept. of Plant Pathology, Iowa State University, Ames IA.

4:15 (48) Marketing Analysis, Profitability, and Risk in Growing Additional Peanuts. **W. Don Shurley* and M.C. Lamb**, Extension Agricultural Economics Dept., University of Georgia, Rural Development Center, Tifton GA; USDA/ARS, National Peanut Research Laboratory, Dawson GA.

4:30 (49) Do World Peanut Prices Influence U.S. Prices and Production or Vice Versa? **D.H. Carley* and S.M. Fletcher**, Dept. of Agricultural Economics, University of Georgia, Griffin GA.

4:45 (50) The International Peanut Market: Where Does the U.S. Stand? **S.M. Fletcher* and D.H. Carley**, Dept. of Agricultural Economics, University of Georgia, Griffin GA.

Production Technology ..... **Salon Del Rey South**

Moderator: J. Baldwin, Univ. of Georgia, Tifton GA.

3:30 (51) Peanut Yield and Thrips Counts as Influenced by Aldicarb, Paraquat and Alachlor Interactions. **D.L. Colvin and T.A. Littlefield***, Dept. of Agronomy, University of Florida, Gainesville FL.

3:45 (52) Peanut Yield Decline in the Southeast and Economically Feasible Solutions. **M.C. Lamb*, J.I. Davidson, Jr., and C.L. Butts**, USDA/ARS, National Peanut Research Laboratory, Dawson GA.

4:00 (53) Expert Systems to Manage Peanut Production. **J.I. Davidson, Jr.*, M.C. Lamb, and C.L. Butts**, USDA/ARS, National Peanut Research Laboratory, Dawson GA.

4:15 (54) Supply, Quality, and Price Prediction Models for Farmers and Shelled Stock Peanuts. **M.S. Singletary*, M.C. Lamb, and J.I. Davidson, Jr.**, Consultant, Albany GA; USDA/ARS, National Peanut Research Laboratory, Dawson GA.

Thursday, July 11

Poster Session II ..... **La Duquesa**
8:00 am - 12:00 noon

P5 Management of Tomato Spotted Wilt Virus in South Texas Peanut Fields. **F.L. Mitchell*, J.W. Smith, Jr., C.R. Crumley and J.W. Stewart**, Texas Agricultural Experiment Station, Stephenville TX; Dept. of Entomology, Texas A&M University, College Station TX; Texas Agricultural Extension Service, Pearsall TX, Texas Agricultural Extension Service, Uvalde TX.

P6 Biological Control of *Aspergillus flavus* and *Aspergillus parasiticus*. **M.E. Will*, D.M. Wilson, and D.T. Wicklow**, Dept. of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton GA; NRRC/USDA/ARS, Peoria IL.

P7 Using Predictive Technology to Manage Peanut Leafspot. **A.J. Jaks*** Texas Agricultural Experiment Station, Yoakum TX.

P8 Determination of Thrips-vectored Tomato Spotted Wilt Virus Distribution in Peanut Plants by ELISA. **K.K. Kresta*, F.L. Mitchell, and J.W. Smith, Jr.**, Texas Agricultural Experiment Station, Stephenville TX; Dept. of Entomology, Texas A&M University, College Station TX.

Graduate Student Papers ..... **Salon Del Rey North**

Moderator: R A. Taber, Texas A&M University (retired), College Station TX.

8:00 (55) Somatic Embryogenesis from Peanut Embryo Axis Segments. **T.K. Huang*, B.B. Johnson, and D.L. Ketring**, Dept. of Agronomy and Dept. of Botany, Oklahoma State University; USDA/ARS, Southern Plains Area, Stillwater OK.

8:15 (56) Effect of Crop Rotation and Irrigation on Soilborne Diseases and Yield of Florunner Peanut. **J.C. Jacobi*, P.A. Backman, and R. Rodriguez-Kabana**, Department of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, Auburn AL.

8:30 (57) Feeding Behavior of Fall Armyworm on Florunner Peanut. **S.S. Deitz*, J.W. Chapin, and J.S. Thomas**, Clemson University, Dept. of Entomology, Edisto Res. & Ed. Center, Blackville SC.

8:45 (58) Prediction of Crop Maturity for Peanuts from Percent Oleic Acid in Oil. **M.J. Hinds*, W.A. Mellowes, B. Singh**, Dept. of Chemical Engineering, University of the West Indies, St. Augustine Trinidad; Dept. of Food Science, Alabama A&M University, Normal AL.

9:00 (59) Production of Stable Transgenic Peanut Calli (*Arachis hypogaea* L.). **T.E. Clemente*, A.K. Weissinger, and M.K. Beute**, Dept. of Plant Pathology, North Carolina State University, Raleigh NC.

9:15 (60) Root Growth Dynamics as a Factor in Resistance of Peanut to Cylindrocladium Root Rot. **P.D. Brune* and M.K. Beute**, Dept. of Plant Pathology, North Carolina State University, Raleigh NC

9:30 (61) Enhanced Elicitation of Phenolics in Peanut Cotyledons by N-Carboxymethyl Chitosan at Different Water Activity Levels. **J.E. Fajardo*, R.E. Pettit, R.D. Waniska, and R.G. Cuero**, Dept. of Plant Pathology & Microbiology and Soil and Crop Sciences, Texas A&M University, College Station TX; Cooperative Agriculture Research Center, Prairie View TX.

9:45 (62) Diallel Analysis of Root Length, Root Volume, and Fruit Weight of Four Peanut Genotypes and Their F1 Hybrids. **J.B. Morris*, D.L. Ketring, and J.S. Kirby**, USDA/ARS, Southern Plains Area; Dept. of Agronomy, Oklahoma State University, Stillwater OK.

Symposium: Strategies to Reduce the Environmental Impact of Peanut Production ..... **Salon Del Rey Central**

Moderator: J.W. Wilcut, Coastal Plain Exp. Sta., Tifton GA.

8:00 (63) Introduction. **G. Buchanan**, Coastal Plain Exp. Stn., University of Georgia, Tifton GA.

8:15 (64) The North Carolina Center for Integrated Pest Management. **H. Coble**, Dept. of Crop Science, North Carolina State University, Raleigh NC.

8:30 (65) Breeding Strategy to Reduce Pesticide Use. **D.W. Gorbet**, NFRC, University of Florida, Marianna FL.

8:45 (66) Utilization of Rotations as an Alternative to Chemical Control of Peanut Pests. **R. Rodriguez-Kabana**, Dept. of Plant Pathology, Auburn University, Auburn AL.

9:00 (67) Use of Multiple Pathogen Resistance for Management of Peanut Diseases. **A. Culbreath**, Dept. of Plant Pathology, Coastal Plain Exp. Station, University of Georgia, Tifton GA.

9:15 (68) Reducing the Tonnage of Pesticides for Production of Virginia-Type Peanuts. **P. Phipps**, Tidewater Agric. Exp. Station, VPI & SU, Suffolk VA.

9:30 (69) Strategies to Reduce the Impact of Insects in Peanut. **R. Bradenburg**, Dept. of Entomology, North Carolina State University, Raleigh NC.

9:45 (70) Strategies to Reduce the Environmental Impact of Weed Management in Peanut. **J. Wilcut**, Dept. of Agronomy, Coastal Plain Exp. Station, University of Georgia, Tifton GA.

10:00 Break

10:30 (71) Pesticide Stewardship. **D. Colvin**, Dept. of Agronomy, University of Florida, Gainesville FL.

10:45 (72) Organic Peanut Production-Potential and Problems. **J. Bailey*, and C.K. Kvien**, Dept. of Plant Pathology, North Carolina State University, Raleigh NC and Dept of Agronomy, Coastal Plain Experiment Station, Univ. of Georgia, Tifton GA.

11:00 **Discussion**

Moderator: A.K. Culbreath, Univ. of Georgia, Tifton GA.

11:00 **Symposium Discussion**

Moderator: A.K. Culbreath, U. of Georgia, Tifton, GA.

Processing & Utilitization ..... **Salon Del Rey South**

Moderator: J.S. How, Kraft General Foods, Inc., Glenview IL.

8:00 (73) Germplasm Variation in Flavor Quality. **H.E. Pattee*, F.G. Giesbrecht, and R.W. Mozingo**, USDA/ARS and Dept. of Statistics, North Carolina State University, Raleigh NC; Tidewater Agricultural Research Station, Suffolk VA.

8:15 (74) Effects of Variety and Processing Methods on Phytic Acid and *in vitro* Protein Digestibility of Peanuts. **U. Singh, B. Singh*, and O.D. Smith**, Dept. of Food Science, Alabama A&M University, Normal AL; Dept. of Soil and Crop Sciences, Texas A&M University, College Station TX.

8:30 (75) Modifying the Unsaturated:Saturated Ratio of Pork Fat by Feeding Growing-Finishing Swine Diets Containing High Oleic Acid Peanuts. **R.O. Myer*, D.D. Johnson, D.A. Knauft, D.W. Gorbet, J.H. Brendemuhl and W.R. Walker**, NFREC, Marianna FL; Dept. of Agronomy and Dept. of Animal Science, University of Florida, Gainesville FL.

8:45 (76) Planting Date, Digging Date, and Market Grade Effects on Fatty Acid Composition of NC 7 Peanut. **R.W. Mozingo* and T.A. Coffelt**, VPI & SU and USDA/ARS, Tidewater Agricultural Experiment Station, Suffolk VA.

9:00 (77) Extrusion Forming of Snacks from Partially Defatted Peanut Flour Combined with Wheat Flour by Central Composite Design Experimentation. **J.C. Anderson*, N. Duarte, and B. Singh**, Dept of Food Science and Animal Industries, Alabama A&M University, Normal AL.

9:15 (78) Evaluation of Quality of Peanut Products in Burkina Faso. **A.S. Traore* and B. Singh**. Dept. de Biochimie, ISN-IDR, Universite' de Ougadougou, Ougadougou, Burkina Faso; Dept. of Food Science, Alabama A&M University, Normal AL.

9:30 (79) Chemical, Chromatographic and Sensory Assessment of Canadian Peanuts and an Extrusion Processed Peanut Butter. **D.J. Moore* and Y. Kakuda**, Dept. of Food Science, University of Guelph, Guelph, Ontario, Canada.

9:45 Discussion

10:00 Break

Breeding and Genetics ..... **Salon Del Rey North**

Moderator: R.N. Pittman, USDA/ARS, Agri. Exp. Stn., Griffin GA.

10:30 (80) Segregation of Resistance to *Meloidogyne arenaria* in Progeny of Interspecific Hybrids. **J.L. Starr and C.E. Simpson***, Department of Plant Pathology and Microbiology, Texas Agricultural Experiment Station, College Station TX; Texas Agricultural Experiment Station, Stephenville TX.

10:45 (81) Resistance to *Meloidogyne arenaria* in *Arachis hypogaea*. **C.C. Holbrook*, J.P. Noe, and N.A. Minton**, USDA/ARS, Tifton GA; Dept. of Plant Pathology, UGA, Athens GA; and USDA/ARS, Tifton GA.

11:00 (82) Development and Performance of Drought Tolerant Genotypes from the Georgia Peanut Breeding Program. **W.D. Branch* and C.K. Kvien**, University of Georgia, Dept. of Agronomy, Coastal Plain Experiment Station, Tifton GA.

11:15 (83) Field Systems for Evaluating Peanut Germplasm for Resistance to Preharvest Aflatoxin Contamination. **M.E. Matheron, C.C. Holbrook*, D.M. Wilson, W.F. Anderson, M.E. Will, and A.J. Norden**, University of Arizona, Somerton AZ; USDA/ARS, Tifton GA; University of Georgia, Tifton GA; University of Florida, Gainesville FL.

11:30 (84) Greenhouse Screening Methodology for Pre-Harvest *Aspergillus parasiticus* Invasion. **W.F. Anderson*, C.C. Holbrook, D.M. Wilson, Jr., and M.E. Will**, USDA/ARS; Mycotoxin and Tobacco Laboratory, Dept of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton GA.

11:45 Discussion

Plant Pathology & Nematology ..... **Salon Del Rey South**

Moderator: J.P. Damicone, Okla. State Univ., Stillwater OK.

10:30 (85) In-Field Comparisons of Old and New Nematicides On Peanuts. **M.R. Graves* and T.A. Lee, Jr.**, Texas Agricultural Extension Service, Texas A&M University System, Stephenville TX.

10:45 (86) Influence of *Meloidogyne arenaria* and *Sclerotium rolfsii* on Performance of Florunner and Southern Runner Cultivars in Three Leafspot Control Regimes. **A.K. Culbreath*, N.M. Minton, and T.B. Brenneman**, Dept. of Plant Pathology, University of Georgia; USDA/ARS, Coastal Plain Experiment Station, Tifton GA.

11:00 (87) Cotton as a Rotation Crop for the Management of Root-Knot Nematode (*Meloidogyne arenaria*) and Southern Blight (*Sclerotium rolfsii*) in Peanut. **R. Rodriguez-Kabana, D.G. Robertson*, L.Wells, C.F. Weaver, and P.S. King,** Dept. of Plant Pathology and Wiregrass Substation, Alabama Agricultural Experiment Station, Auburn University, Auburn Al and Headland AL.

11:15 (88) Peanut Seed Testa Discoloration and Microsclerotial Populations as Related to Field Incidence of Cylindrocladium Black Rot. **D.M. Porter* and R.W. Mozingo,** USDA/ARS and VPI & SU, Tidewater Agricultural Experiment Station, Suffolk VA.

11:30 (89) Effects of Spotted Wilt on Selected Peanut Varieties. **M.C. Black*,** Texas A&M University Agricultural Research and Extension Center, Uvalde TX.

11:45 (90) Development of Control Recommendations for TSWV in Peanut in Alabama. **A.K. Hagan*, R.T. Gudauskas, J.R. Weeks, and J.C. French,** Dept. of Plant Pathology and Dept. of Entomology, Auburn University, Auburn AL.

Poster Session III ..... **La Duquesa**
1:00 pm - 4:00 pm

P9 Reaction of Selected Peanut (*Arachis hypogaea* L.) Lines to Southern Blight Disease. **M.A. Wells*, W.J. Grichar, and O.D. Smith.** Texas Agricultural Experiment Station, Yoakum TX and College Station TX.

P10 Characterization of *Sclerotinia minor* Isolates from Four Peanut Production Areas of Texas. **K.E. Woodard* and C.E. Simpson,** Texas Agricultural Experiment Station, Stephenville TX.

P11 Laboratory and Field Assessments of Resistance to Peanut Leafspots. **M. Ouedraogo*, O.D. Smith, C.E. Simpson, and D.H. Smith.** Dept. of Soil & Crop Sciences, Texas A&M University, College Station TX; Texas Agricultural Experiment Station, Stephenville TX; and ICRISAT, Patancheru, Andhra Pradesh, India.

Symposium: Molecular Genetics ..... **Salon Del Rey North**

Moderator: D.A. Knauft, U. of Florida, Gainesville, FL

1:00 (91) *In Vitro* Culture Techniques for Peanut as Facilitators for Interspecific Hybridization and Genetic Manipulation. **P. Ozias-Akins*,** Dept. of Horticulture, Coastal Plain Experiment Station, University of Georgia, Tifton GA.

1:20 (92) Development of a Gene Transfer System For Peanut. **A. Weissinger*, T. Clemente, and M. Beute**, Depts. of Crop Science and Plant Pathology, North Carolina State University, Raleigh NC.

1:40 (93) RFLP Mapping in Peanut. **G. Kochert***, Dept. of Botany, University of Georgia, Athens GA.

2:00 (94) Use of Isozyme, Protein, and Other Molecular Markers in Arachis. **H.T. Stalker***, Dept. of Crop Science, North Carolina State University, Raleigh NC.

2:20 (95) Identification and Cloning of Genes for Economically Important Traits in Peanut. **A.G. Abbott*, C.C. Ainsworth, G.L. Powell, D.A. Knauft, and T. Ray**, Dept. of Biological Sciences, Clemson University, Clemson SC; Dept. of Molecular Biology, Wye College, Kent, England; Dept. of Agronomy, University of Florida, Gainesville, FL.

2:40 (96) Peanut Molecular Genetics and Cultivar Development. **D.A. Knauft***, Dept. of Agronomy, University of Florida, Gainesville FL.

3:00 Discussion

Moderator: H.T. Stalker, of NC State Univ, Raleigh, NC

Weed Control ..... Salon Del Rey Central

Moderator: D.L. Colvin, Univ. of Florida, Gainesville FL.

1:00 (97) Herbicide Systems for Weed Control in Southeastern Peanuts. **T.V. Hicks*, G.R. Wehtje, and J.W. Wilcut**, Dept. of Agronomy and Soils, Auburn University, Auburn AL; Dept. of Agronomy, Coastal Plain Experiment Station, University of Georgia, Tifton GA.

1:15 (98) Effect of Imazethapyr Application Method on Weed Control in Peanuts. **A.C. York, J.W. Wilcut*, C.W. Swann, and F.R. Walls, Jr.**, Crop Sci. Dept., North Carolina State University, Raleigh NC; Dept. of Agronomy, Coastal Plain Exp. Stn., Tifton GA; Dept. of Plant Pathology, Physiol., Weed Sci., Tidewater Research Station, Suffolk VA; American Cyanamid, Goldsboro NC.

1:30 (99) Interaction of Paraquat and Other Herbicides when used in Peanuts. **G. Wehtje*, J.W. Wilcut, and T.V. Hicks**, Dept. of Agronomy and Soils, Auburn University, Auburn AL; Dept. of Agronomy, Coastal Plain Exp. Station, University of Georgia, Tifton GA.

1:45 (100) Bentazon and Naptalam Tank-Mixtures with Chlorimuron for Weed Control in Peanuts. **J.W. Wilcut* and G.R. Wehtje**, Dept. of Agronomy, Costal Plain Experiment Station, University of Georgia, Tifton GA; Dept. of Agronomy and Soils, Auburn University AL.

2:00 (101) Control of Yellow Nutsedge (*Cyperus esculentus*) with Postemergence Metolachlor Applications. **W.J. Grichar*, A.E. Colburn, and P.A. Baumann**, Texas Agricultural Experiment Station, Yoakum TX; Texas Agricultural Extension Service, College Station and Lubbock TX.

2:15 (102) Control of *Cyperus* sp. in Peanuts with Imazethapyr. **F.R. Walls, Jr.*, G.L. Wiley and K.R. Muzyk**, American Cyanamid Co., Princeton NJ.

2:30 (103) Peanut Herbicide Tolerance as Influenced by Seed Size. **T. Grey*, G. Wehtje, and B.J. Brecke**, Dept. of Agronomy and Soils, Auburn University, Auburn AL; Dept. of Agronomy, University of Florida, Jay FL.

2:45 (104) Weed Management in Peanut as Affected by Weed Management in Rotation Crops. **W.C. Johnson, III***, USDA/ARS, Coastal Plain Experiment Station, Tifton GA.

3:00 (105) A Committee Approach to Weed Control Recommendations. **S.M. Brown***, Extension Agronomy, University of Georgia, Tifton Ga.

Plant Pathology ..... **Salon Del Rey South**

Moderator: M.A. Black, Texas Agri. Ext. Serv., Uvalde TX.

1:00 (106) Effect of Foliage Removal on Disease Progress of Sclerotinia Blight in North Carolina. **J.E. Bailey***, North Carolina State University, Dept of Plant Pathology, Raleigh NC.

1:15 (107) Effectiveness of Fluazinam (ASC-66825), a New Broad-Spectrum Fungicide, with Chlorothalonil for Control of Both Sclerotinia Blight and Cercospora Leafspot of Peanut. **F.D. Smith*, P.M. Phipps, and R.J. Stipes**, Tidewater Agricultural Experiment Station, VPI&SU, Suffolk VA.

1:30 (108) A Comparison of Iprodione, DCNA, and Biocontrol Treatments for Sclerotinia Blight Control. **T.A. Lee, Jr.* and M.R. Graves**, Texas Agricultural Extension Service, Texas A&M University System, Stephenville TX.

1:45 (109) Potential Benefit of Two Experimental Fungicides for Control of Sclerotinia Blight in Oklahoma. **K.E. Jackson* and H.A. Melouk**, Dept. of Plant Pathology and USDA/ARS, Oklahoma State University, Stillwater OK.

2:00 (110) Effects of Application Methods on Efficacy of Propiconazole for Control of Peanut Diseases. **T.B. Brenneman*, L.D. Chandler, and H.R. Sumner**, Dept. of Plant Pathology, University of Georgia, IBPMRL/ARS, Coastal Plain Experiment Station, Tifton GA.

2:15 (111) Biological Peanut Seed Protectants. **D.K. Bell* and R.D. Hankinson, Jr.**, Plant Pathology Dept., Coastal Plain Experiment Station, Tifton GA.

2:30 (112) AU-Pnuts Leafspot Advisory System Validation Studies. **D.P. Davis*, J.C. Jacobi, and P.A. Backman**, Dept. of Plant Pathology, Auburn University, Auburn AL.

2:45 (113) Effectiveness of a Leafspot Advisory for Scheduling Fungicide Sprays for Management of Early Leafspot of Peanut in Oklahoma. **J.P. Damicone* and K.E. Jackson**, Dept. of Plant Pathology Oklahoma State University, Stillwater OK.

3:00 (114) The Georgia Late Leafspot Spray Advisory System: Evaluation and Validation Experiments Conducted in 1990. **F.W. Nutter, Jr.* and A.K. Culbreath**, Dept. of Plant Pathology, Iowa State University, Ames IA, and University of Georgia, Tifton GA.

3:15 (115) Performance of Cyprocanozole in Peanut on Foliar and Soilborne Diseases. **H.S. McClean and J.F. Yoder**, Sandoz Crop Protection Corp., Cordele GA.

Contributors to the 1991 APRES Meetings

On behalf of APRES members and guests, the Program Committee thanks the following organizations for their generous contributions:

AMVAC
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SITE SELECTION COMMITTEE REPORT

On July 9, 1991, the Site Selection Committee met. Points of the meeting were:

A report concerning the plans for 1992 in Norfolk, Virginia, was reviewed and all plans and contracts were in order.

A report concerning the plans for 1993 in Huntsville, Alabama, was reviewed and all plans and contracts were in order.

The following meeting schedule has been set:

July 7-10, 1992 Norfolk, VA, Omni International Hotel
July 13-16, 1993 Huntsville, AL, Huntsville Hilton
July 11-15 1994 City TBA, Oklahoma

A report from the Oklahoma crew was made concerning the 1994 APRES meeting to be held in Oklahoma. A city and hotel has not yet been selected from that area, but Dr. Ketring assures us that plans are underway.

Plans were made to do a better job of passing on information concerning plans to future site selection committees. This should make the process run smoother.

There being no further business, we adjourned.

Respectfully submitted,

Thomas A. Lee, Jr., Chairman
C. E. Simpson
F. S. Wright
B. Birdsong
J. R. Weeks
G. Gregory
J. F. Damicone
D. L. Ketring

NATIONAL PEANUT COUNCIL
RESEARCH AND EDUCATION AWARD ADVISORY COMMITTEE REPORT

The NPC Research and Education Award Advisory Committee evaluated six nominees for this year's award. Materials required for the evaluation were provided to the committee. After each member of the committee carefully reviewed all documents, input was summarized by the chairman.

The National Peanut Council was advised of the recommendations by the NPC Research and Education Award Advisory Committee.

The recipients for the 1991 NPC Research and Education Award were identified as Drs. Donald J. Banks and James S. Kirby, co-awardees, of Oklahoma at the NPC Annual Meeting in Tucson, Arizona.

The NPC Research and Education Award Advisory Committee also provided advisory assistance to the National Peanut Council with regards to revising and updating the NPC Research and Education Award announcement brochure and official entry form during this past year. NPC has also announced the elimination of the rotation format with regards to separately recognizing research and educational contributions.

Respectfully submitted,

Harold E. Pattee, Chairman
R. W. Mozingo
L. D. Tripp
T. B. Whitaker
E. J. Williams

AMERICAN SOCIETY OF AGRONOMY LIAISON REPRESENTATIVE REPORT

The 82nd annual meeting of the American Society of Agronomy, Crop Science Society of America, and the Soil Science Society of America was held October 21 - 26, 1990, in San Antonio, Texas. Approximately 2,440 papers were presented in 277 sessions, and just under 50% of these were again given as posters. Members of APRES were authors or co-authors on some 14 total presentations involving various aspects of peanut research.

New officers of the Tri-Societies (ASA, CSSA, and SSSA) are as follows: D. R. Nielsen, president and D. N. Duvick, president-elect of ASA; V. L. Lechtenberg, president and G. H. Heichel, president-elect of CSSA; and F. P. Miller, president and W. W. McFee, president-elect of SSSA. Denver, Colorado, will host the 1991 meetings of these three sister societies from October 27 through November 1.

Respectfully submitted,

Wm. D. Branch
ASA/APRES Representative

CAST REPORT

The Council for Agricultural Science and Technology (CAST) is a consortium of 29 scientific societies, each of which is involved in research and educational programs that impact upon agriculture and food production. CAST also has 3,500 individual members, along with a number of corporate, nonprofit, and associate society members. Scientists, most of whom are members of the societies, volunteer their time and expertise to develop CAST reports and its science magazine. These scientists are the foundation upon which the program has been built. CAST reports summarize current scientific information on public issues in food and agriculture. They are intended for use by Congress, the executive branch and others who make decisions affecting agriculture and food, the media, and the public. *Science of Food and Agriculture* provides articles and exercises for teachers in 16,000 high school science departments and 7,000 FFA chapters.

Recent CAST publications are as follows:

Effective Use of Water in Irrigated Agriculture
Long-Term Viability of U.S. Agriculture
Ionizing Energy in Food Processing and Pest Control: II. Applications
Mycotoxins: Economic and Health Risks
Alternative Agriculture: Scientists' Review
Ecological Impacts of Federal Conservation and Cropland Reduction Programs
Reducing American Exposure to Nitrate, Nitrite, and Nitroso Compounds: The National Network to Prevent Birth Defects Proposal (Comments from CAST)
Antibiotics for Animals: The Antibiotic Resistance Issue (Comments from CAST)
Pesticides and Safety of Fruits and Vegetables (Comments from CAST)
Herbicide-Resistance Crops (Comments from CAST)

Forthcoming publications are as follows:

Food Fats and Health
Quality of U.S. Agricultural Products
Risks Associated with Foodborne Pathogens
Risk/Benefit Assessment of Antibiotics Use in Animals
Waste Management and Utilization in Food Production and Processing
Water Quality: Agriculture's Role
Agriculture and Global Climate Change
Contribution of Animal Products to Healthful Diets (Comments from CAST)
Integrated Animal Waste Management
Minor Use Pesticide Registration: Problems and Solutions (Comments from CAST)
Public Perceptions of Agricultural Drugs and Chemicals
Relationship of Value-Added Activities on Agricultural Products and the U.S. Trade Balance

Risk/Benefit Assessment of Agricultural Chemicals
The Impact of Alternative Agricultural Practices on the Environment

Respectfully submitted,

J. R. Sholar, CAST Representative

REPORT OF LIAISON REPRESENTATIVE FROM THE SOUTHERN ASSOCIATION OF STATE AGRICULTURAL EXPERIMENT STATION DIRECTORS

The spring meeting of the Southern Association of State Agricultural Experiment Station Directors was held in Jackson, Mississippi, on May 6-8, 1991. The Mississippi Agricultural and Forestry Experiment Station served as host for these meetings.

The effort to address the problem of experimental quota for peanuts involved in research was addressed in the 1990 Farm Bill. Regulations that were written implementing that portion of the farm bill did provide for some relief for experimental quota for peanuts in research. Basically, the provision was made that reserved quota in each state could be used at the discretion of ASCS for support of research. This allocation is to be based on the farm history of each experiment station involved.

Encouraged by several directors as well as the IPM Committee of the Southern Association of State Agricultural Experiment Station Directors resulted in the inclusion of peanuts as a specific commodity for consideration in the Southern Region IPM Grants Program. This marks the first time that peanuts have been so identified and will undoubtedly lead to some IPM research involving peanuts.

The Southern Association of State Agricultural Experiment Station Directors continues to have a special interest in APRES and in its role in supporting research and education in peanuts and enhancing the entire peanut industry.

Respectfully submitted,

Gale A. Buchanan

AD-HOC COMMITTEE ON NEW BOOK REPORT

An ad-hoc committee was appointed by President Ron Henning to determine the need for a new book to replace Peanut Science and Technology which was published in 1982. The ad-hoc committee was composed of members from the Publications and Editorial Committee and ex-officio members from Peanut Research, Peanut Science, and Quality Methods. The ad-hoc committee used as a resource chapter authors and both editors of Peanut Science and Technology. The ad-hoc committee makes the following recommendations:

1) To publish a new book because enough new information has been developed in the past 10 years.

2) The new book should contain only those present chapters that can be substantially revised and new chapters not found in the present book.

3) The book should have a new title.

4) APRES should take responsibility for the new book in the same manner it did with Peanut Science and Technology.

5) Find a publisher who will take the chapters on a floppy diskette for a camera-ready product.

6) Start process immediately and fix time frame to three years maximum.

7) Publish no more than 1500 copies in the first printing.

Respectfully submitted,

Tom Whitaker, Chairman

AD HOC COMMITTEE ON BY-LAWS CHANGES REPORT

The ad hoc committee appointed to study and propose changes to the by-laws proposed the following amendments to the APRES By-Laws. These changes were proposed to the Board of Directors and to the membership at the 1991 annual meeting in San Antonio, TX and were approved for inclusion in the By-Laws.

1. Article VIII Board of Directors (Section 6)

a. Previous wording

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

b. Proposed wording

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

2. Article IX Committees

a. Proposed new section: Section 2j. Coyt T. Wilson Distinguished Service Award Committee

This committee shall consist of six members, with two new appointments each year, serving three year terms. Two committee members will be selected from each of the three main peanut producing areas. This committee shall review and rank nominations and submit these rankings to the committee chair. The nominee with the highest ranking shall be the recipient of the award. In the event of a tie, the committee will vote again, considering only the two tied individuals. Guidelines for nomination procedures and nominee qualifications shall be published in the proceedings of the annual meeting. The president, president-elect, and executive officer shall be notified of the award recipient at least sixty days prior to the annual meeting. The president shall make the award at the annual meeting.

b. Proposed change to Section 2h. National Peanut Council Research and Education Award Committee:

(1) Previous wording:

This committee shall consist of six *previous National Peanut Council Research and Education 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 will be made for educational accomplishments.*

(2) Proposed wording:

This committee shall consist of six *APRES members appointed by the president and represent the three areas of peanut production. Three committee members shall be former winners (preferably most recent) and the other three members shall be selected so as to maintain a balance on the committee between the three production areas.* 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.[1]

[1]The NPC has decided to eliminate the requirement that the award will be alternated between research and education and all references to this requirement are no longer necessary and are dropped.

Respectfully submitted,

Dan Gorbet, Chairman

BY-LAWS

of the
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC.

ARTICLE I. NAME

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

ARTICLE II. PURPOSE

Section 1. The purpose of this 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 presentation 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 referesher 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 or 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	: $ 25.00
b.	Institutional memberships	: 15.00
c.	Organizational memberships	: 35.00
d.	Sustaining memberships	: 125.00
e.	Student memberships	: 5.00

(Dues were set at 1987 Annual Meeting)

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 discussion, 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 tresurer 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 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 education phase ofthe 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. Three State employees' representatives - these directors are those whose employment is state sponsored and whose relation to peanuts principally concerns research, and/or education, and/or

regulatory pursuits. One director will be elected from each of the three main peanut producing areas.

e. United State 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 activitiy 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, operation, 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 advisable.

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 appoints. 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, 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.

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 recommendation 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 in 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 Commitee: 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 at which 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 moninees for approval by the Board of Directors.

h. National Peanut Council Research and Education Award Committee: This committee shall consist of six APRES members appointed by the president and represent the three areas of peanut production. Three committee members shall be former winners (preferably most recent) and the other three members shall be selected so as to maintain a balance on the committee between the three production areas. 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.

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.

j. Coyt T. Wilson Distinguished Service Award Committee: This committee shall consist of six members, with two new appointments each year, serving three year terms. Two committee members will be selected from each of the three main peanut producing areas. This committee shall review and rank nominations and submit these rankings to the committee chair. The nominee with the highest ranking shall be the recipient of the award. In the event of a tie, the committee will vote again, considering only the two tied individuals. Guidelines for nomination procedures and nominee qualifications shall be published in the Proceedings of the annual meeting. The president, president-elect, and executive officer shall be notified of the award recipient at least sixty days prior to the annual meeting. The president shall make the award at the annual meeting.

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 two-thirds vote of the general membership. Likewise, in a similar manner, a Division may be dissolved.

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

Section 3. Division may make By-Laws for their own govenment, 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 appointment committees, provided the efforts thereof do not overlap or conflict with those of the officers and committees of the main body of the Society.

ARTICLE XI. AMENDMENTS

Section 1. These By-Laws may be amended consistent with the provision 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 Meeting of the
American Peanut Research and Education Society
July 12, 1991, San Antonio, Texas

APRES MEMBERSHIP (1975 - 1991)

MEMBERSHIP CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Individual	419	363	386	383	406	386	478	470	419	421	513	455	475	455	415	416	398
Sustaining	21	30	29	32	32	33	39	36	30	31	29	27	26	27	24	21	20
Organizational	40	45	48	50	53	58	66	65	53	52	65	66	62	59	54	47	49
Student	--	--	14	21	27	27	31	24	30	33	40	27	34	35	28	29	26
Institutional	--	45	45	54	72	63	73	81	66	58	95	102	110	93	92	85	67
Total Members	480	483	522	540	590	567	687	676	598	595	742	677	707	669	613	598	560

1991
MEMBERSHIP ROSTER

INDIVIDUAL MEMBERS

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