1995 PROCEEDINGS

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Peanut Molecular Biology Symposium

Transformation of Peanut With Genes Encoding Antimicrobial Peptides to Enhance Resistance to Fungi. A.K. Weissinger, L.A. Urban, R.M. Cade and J. Jaynes. Dept. of Crop Science, N.C. State Univ., and Demeter Biotechnologies, Ltd., Raleigh, NC.

Numerous fungal pathogens attack peanut, reducing yield and quality. Concerns about the economics of production, and the environmental impact of fungicide applications dictate the need for augmentation of chemical control measures by increased reliance on genetic mechanisms for protection of the crop against fungal pathogens. Transformation of peanut with genes encoding antimicrobial peptides offers an avenue through which resistance to fungi might be enhanced. Although numerous antimicrobial peptides have been described, there is currently little information regarding their efficacy against fungi when expressed in transgenic plants. Among the most promising are small linear peptides, such as the cecropins, derived from the silk moth, *Hyalophora cecropia*. These peptides are broadly cytolytic in vitro, showing lytic activity against a wide array of bacteria, fungi, and, at high concentration, plant cells. They are thought to lyse cells by forming hydrophilic pores in the target cell membrane, through which rapid ion influx can occur, causing osmotic disruption. We report here on the transformation of peanut with a gene encoding a synthetic cecropin analog, D5-C. Synthetic D5-C peptide has been shown to inhibit growth and reproduction of *Cercospora* and *Aspergillus* at concentrations as low as 5 micromolar. It exhibits acceptable levels of oral toxicity and hemolytic activity, and does not depress growth of tobacco cells at levels below 10 micromolar. We have introduced a gene encoding this peptide into peanut cv. NC 7 by microprojectile bombardment and have recovered putative transgenics through hygromycin selection.

In vitro Culture and Plant Transformation. P. OZIAS-AKINS. Department of Horticulture, University of Georgia Coastal Plain Experiment Station, Tifton, GA.

Arachis hypogaea L. (peanut or groundnut) can be cultured *in vitro*, and whole plants can be regenerated through two developmental pathways, organogenesis and embryogenesis. Organogenesis is induced most efficiently by exposure of cotyledons, epicotyl, hypocotyl or leaves to high concentrations of benzylaminopurine (up to 25 mg/l) or thidiazuron. Embryogenesis can be induced from similar explants but by a broader range of plant growth regulators including some that usually display cytokinin-like activity (thidiazuron, CPPU) and auxin-like compounds (picloram, 2,4-D, NAA, 2,4,5-T, and others). Repetitive embryogenesis on picloram-containing medium allows a steady supply of regenerable cultures for transformation experiments. Microprojectile bombardment of embryogenic cultures with plasmid DNA containing a hygromycin resistance gene, followed by selection for resistant cells on antibiotic-containing medium, allows the recovery of greater than one transgenic cell line, on average, from each bombardment. This method has resulted in the production of several hundred primary transgenic plants. Plants containing a modified *Bacillus thuringiensis* toxin gene have been tested for expression of the protein by ELISA and for efficacy against lesser cornstalk borer through *in vitro* bioassay. Some plants contain enough toxin to show 100% mortality of the insect pest. One Bt-positive progeny plant has been recovered thusfar. The advantages and disadvantages of alternative transformation systems will be discussed.

Molecular Mapping and use of Molecular Markers. G. KOCHERT. Depts. of Botany & Crop and Soil Sciences, Univ. of Georgia, Athens, GA.

Molecular marker research on the various species of *Arachis* has yielded interesting results in several fields of research. Genetic variability studies have shown that domesticated peanut has a very low level of genetic variation as assayed by molecular markers such as isozymes, RFLPs, and RAPDs, but there is abundant variability among the various wild *Arachis* species. RFLP analysis has been used to characterize the diploid progenitor species of domesticated peanut, and the current species most similar to the progenitors are *A. ipaensis* and *A. duranensis*. Molecular marker maps have been constructed using a mapping population obtained by crossing *A. stenosperma* and *A. cardenasii*. The maps have been used to analyze introgression in a wide cross between domesticated peanut and a diploid wild species, and introgressed segments from the wild species have been mapped and correlated with useful agronomic traits present in the introgression lines. A backcross population derived from one of the introgression lines has been used to analyze segregation for nematode resistance. RAPD, RFLP, and SCAR markers have been used to tag the resistance gene(s). Microsatellite analysis in domesticated peanut reveals a low level of genetic variability. Sequencing of mapped cDNAs has revealed the location of several known genes on the peanut molecular map.

Value-added genes: Modifying oil synthesis. G. L. POWELL. Department of Biological Science, Clemson University, Clemson, SC 29634-1903.

Peanut varieties are now available from the breeding program of the University of Florida (Norden, et al., 1987) which produce oil high in oleate. Instead of 45% oleate with up to 35% linoleate, high oleate varieties like F435 and SunOleate contain 85% oleate with correspondingly low levels of linloeate and linolenate. While oleate accumulated in developing seeds, in the leaves from germinating seeds, oleate decreased and linoleate quickly approached wild type compositions. Thus the high oleate trait is a characteristic of oil production in the seeds. The implications are that the composition of the oil can be engineered without effecting other characteristics of the plant. This conclusion was born out by field trials showing that this trait has few adverse consequences on growth or disease resistance. These peanut varieties were obtained by conventional breeding techniques; the molecular basis of the phenotype is unknown. Biochemical characterization (Ray et al., 1993) has shown the presence of activities associated with desaturation but the activity is reduced for the Δ12-desaturase, the enzyme that synthesizes the double bond. Using cDNA for this enzyme (J. Browse, Washington State U.) we have isolated the peanut Δ12-desaturase cDNA, sequenced it, and shown 69% amino acid homology with the *Arabidopsis* Δ12-desaturase. Using the cDNA as a probe, the mRNA for the Δ12-desaturase has been demonstrated in the developing seeds. These results are consistent with observations in soybean and canola (A.K. Kinney, DuPont) that antisense for the Δ12-desaturase results in a high oleate oil. There has been considerable commercial interest in high oleate varieties because of the longer shelf life of peanut-containing products like peanut butter and candies. Unchanged in flavor but high in oleate and low in polyunsaturates means that these products can be kept for a longer time without tasting rancid. Examples of what compositional changes in oilseed oil may be possible and the limitations comprise the remainder of the presentation. References: Ray, et al., 1993. The primary defect in developing seed from the high oleate variety of peanut (*Arachis hypogaea* L.) is the absence of Δ12-desaturase activity. Plant Science 91:15-21. Norden, et al., 1987. Variability in oil quality among peanut genotypes in the Florida breeding program. Peanut Science 14:7-11.

Conservation of an Aflatoxin/Sterigmatocystin Gene Cluster in *Aspergillus* spp.

N. P. KELLER*[1], D. BROWN[1], R. A. BUTCHKO[1], M. FERNANDES[2], H. KELKAR[1], C. NESBITT[1] and T. H. ADAMS[2], Dept. of Plant Pathology and Microbiology[1] and Dept. of Biology[2], Texas A&M University, College Station, TX 77843 USA.

Aflatoxin (AF) and sterigmatocystin (ST) are toxic and carcinogenic mycotoxins produced in peanuts by several *Aspergillus* spp. These two compounds are products of the same biochemical pathway where ST is the penultimate precursor in the *A. flavus* and *A. parasiticus* AF pathway and the endpoint metabolite in *A. nidulans*. Recent data from several laboratories has shown that the genes required for AF and ST biosynthesis are tightly clustered in the AF/ST-producing aspergilli. We have determined that *A. nidulans* possesses a ~60 Kb gene cluster containing > 20 genes proposed to encode both enzymatic activities and regulatory proteins necessary for ST biosynthesis. The ST cluster activities include a transcription factor (*aflR*), a polyketide synthase, an α fatty acid synthase (FAS), a β FAS, 5 monooxygenases, 1 esterase, 2 dehydrogenases, 1 *O*-methyltransferase and 2 kertoreductases. It appears that all but the two final enzymatic activities needed for making AF are active in the ST cluster. We have shown a ketoreductase and *aflR* to be regulated and to function in the same manner in *A. nidulans*, *A. flavus* and *A. parasiticus*. Thus, although some rearrangement in gene order has occurred, the AF and ST gene clusters appear to be functionally equivalent - suggesting that basic information gained in understanding AF/ST gene regulation in *A. nidulans* will be applicable to *A. flavus* and *A. parasiticus*.

Merging Molecular Biology with Plant Improvement. D.A. KNAUFT. Dept. of Crop Science, N.C. State Univ., Raleigh.

Successful development of transgenic peanut cultivars will be dependent on many factors. First, peanut molecular biology must be better understood. This includes the development of a routine system of transformation, the identification of genes with sufficient economic benefit to be incorporated into peanut, broader thinking of peanuts as a crop that can host value-added genes, and an overall improved understanding of peanut molecular biology. Second, the interactions between molecular biology programs and peanut breeding efforts must be strengthened. Both public and private institutions have initiated research in peanut molecular biology, while the number of breeding programs in the country has been reduced. The relationship of molecular biology and plant breeding is made complex by the relative lack of scientific interaction between the groups and the complexities of patent rights and royalties. The issue is further complicated by the political uncertainties surrounding the price support system for peanuts. Finally, society has not yet fully accepted transgenic foods, and there have been recent calls from religious groups to prevent patenting of DNA sequences. The peanut industry can look to successful acceptance of transgenic cultivars in other crops as a model for solving many potential problems. However, the issue is a complex one not solely dependent on successful solution of the appropriate science.

Graduate Student Competition

Use of Crop Rotation in the Management of Sclerotinia Blight of Peanut in Oklahoma.

R. K. SOUFI*, H. A. MELOUK, J. P. DAMICONE, and K. E. JACKSON. Department of Plant Pathology and USDA-ARS, Oklahoma State University, Stillwater, OK 74078-9947.

The effect of crop rotations on the populations of Sclerotinia minor in soil and the incidence of Sclerotinia blight was evaluated over a three year period from 1992-1994. The peanut cultivars Okrun (Sclerotinia susceptible) and Tamspan 90 (Sclerotinia resistant) were used in each rotation. The evaluated rotations were peanut/peanut/peanut, peanut/rotation crop/peanut, rotation crop/rotation crop/peanut, and fallow/fallow/fallow. Rotation crops were sudan grass, wheat, and grain sorghum. There were four replicate plots per treatment in a randomized complete block design. Soil in each plot was sampled several times from before planting to harvest. Populations of S. minor were determined by counting the number of viable sclerotia per 100 g soil following extraction using a wet sieving technique. Incidence of Sclerotinia blight was assessed in the middle two rows of each peanut plot several times from mid season to harvest. After harvest yield and grade data were also taken. In 1994, the sudan/sudan/Tamspan 90 rotation had an average of 1.5 viable sclerotia/100 g soil which was lower (P=0.05) than all other treatments. Disease incidence in the Okrun/Okrun/Okrun rotation was 60%, but was less (7.5%) in the Tamspan 90/Tamspan 90/Tamspan 90 rotation (P=0.05). All rotations with Okrun had a higher Sclerotinia blight incidence (P=0.05) compared to Tamspan 90. There were no significant differences in disease incidence between treatments in the Okrun or the Tamspan 90 rotations. The highest yield in the Tamspan 90 rotations was 4895 kg/ha in the sudan/sudan/Tamspan 90 rotation. All Tamspan 90 rotations had higher yields (P=0.01) than Okrun (3206 kg/ha for Okrun/Okrun/Okrun). The grade (%SMK and SS) for Tamspan 90 treatments was 70.5% which is significantly higher (P=0.01) than 67% for Okrun.

Root Growth Responses of Peanut Genotypes Following Mechanical Wounding to Simulate Damage by the Pathogen *Cylindrocladium parasiticum*.

P. D. BRUNE* and M. K. BEUTE. North Carolina State University, Raleigh, NC 27695-7616.

Differences in temporal and spatial root growth dynamics have been suggested as a mechanism of field resistance to Cylindrocladium black rot (CBR), thus affecting the probability of contact with pathogen propagules in soil. Previous studies have shown that peanut genotypes resistant to CBR produce fewer roots than susceptible genotypes. The current study employed mechanical wounding of root systems in order to mimic root pruning effects of the pathogen. Genotypes NC 7 (highly susceptible), NC 8C (less susceptible), NC 3033 (highly resistant), and advanced breeding line NC Ac 18016 (moderately to highly resistant), were grown in the greenhouse in plastic tubes (12.7 cm diameter, 90 cm long). Four weeks after planting, all root systems were cut longitudinally through the soil profile to a depth of 30 cm. One half of this profile was removed and replaced with fresh, root-free soil. At 4, 6, 8, and 10 weeks from planting, soil was removed from tubes in 3 lateral sections (0 to 30 cm, 30 to 60 cm, 60 to 90 cm depths). The uppermost section also was divided longitudinally, corresponding with the interface of original soil and fresh soil. Roots were removed from soil by wet sieving, and root length was estimated by a grid line intersect technique. Genotypes did not differ in root length at the two lower profiles (30 to 60 cm and 60 to 90 cm). In the upper profile (0 to 10 cm) where wounding had occurred, NC 8C produced less root length than NC 3033 and NC Ac 18016. Genotype NC 7 had an intermediate amount of root length, not being significantly different from either NC 8C or NC 3033 and NC Ac 18016. Highest root lengths were recorded for NC 3033 and NC Ac 18016. Because NC 7 is highly susceptible, recovery from root pruning may not be sufficient to overcome detrimental effects due to the pathogen. Although NC 8C has some resistance to CBR, its apparent inability to regenerate roots may explain its relatively poor field performance under high inoculum densities. The regrowth observed in NC 3033 and NC Ac 18016 would further contribute to observed field resistance.

Effect of Straw Amendment on Incidence of Disease Caused by Three Soilborne Pathogens of Peanut. L. M. FERGUSON* and M. K. BEUTE. North Carolina State University, Raleigh, NC 27695-7616.

Microplot studies were conducted from 1992 to 1994, to evaluate the effects of straw amendment on disease incidence of Cylindrocladium black rot, Sclerotinia blight and southern stem rot of peanut in NC. As minimum tillage becomes increasingly critical in conserving soil resources, investigation of the influence of these practices on disease is an important issue. Soil in microplots was infested at two inoculum densities, with either *Cylindrocladium parasiticum*, *Sclerotium rolfsii*, or *Sclerotinia minor*. During three field seasons, 1992, 1993, and 1994, plots were planted with NC 7 or NC 10C. Each year at planting, wheat straw was applied to selected microplots, simulating 80-90% soil surface coverage. Disease incidence data were collected biweekly in 1992 and weekly in 1993 and 1994. Through three years of continuous peanut, straw amendment had no influence on southern stem rot incidence. However, final assay for sclerotia of *S. rolfsii* indicated that inoculum density was twice as high in straw amended plots as levels found in clean plots. In 1992, CBR incidence was enhanced by straw for both cultivars and inoculum densities. Disease incidence in the same plots was not enhanced by straw in 1993. Continuing studies in 1994 revealed that amendment with wheat straw for a third year actually decreased incidence of CBR. Root rot severity was not increased with straw treatments, but was related to cultivar differences. Final examination of *C. parasiticum* inoculum densities showed no increase due to surface amendment. Our studies in 1992 and 1993 showed a clear and dramatic reduction in Sclerotinia blight with the addition of straw. Unfortunately, in 1994 there was no apparent connection between continuous straw amendment and Sclerotinia blight incidence.

A Relationship Between Damage From Lesser Cornstalk Borer And Southern Stem Rot Incidence in Peanuts. S. P. WOLF*[1], K. L. BOWEN[2], and T. P. MACK[3]. Depts. of [1]Entomology and [2]Plant Pathology, Auburn University, AL 36849, [3]Dept. of Entomology, Va. Polytech. Inst. and State Univ., Blacksburg, VA 24061.

Insects have been associated with the transmission of fungal pathogens since the turn of the century. One such insect-fungal interaction could be occurring in peanuts, one of the principle agricultural commodities in AL. Two of the major pests of peanuts are the lesser cornstalk borer (LCB), *Elasmopalpus lignosellus* (Lepidoptera: Pyralidae) and Southern stem rot (SSR), caused by *Sclerotium rolfsii*. LCB inhabits the top layer of the soil. Larvae feed at the root hypocotyl region of the peanut plant damaging stems, gynophores, and pods, all of which are susceptible to SSR infection. LCB damages the root hypocotyl region during dryer periods of the growing season and these wounds will serve as sites of entry for this fungus when soil moisture increases, thus increasing the likelihood of the peanuts becoming infected with SSR. In 1993 and 1994, studies were conducted in the greenhouse to determine whether direct feeding by LCB larvae enhances the likelihood of SSR infection in peanuts. Also, studies were conducted in the field to determine if simulated LCB damage to the root crown predisposes peanuts to the same disease. The design of the greenhouse study was a RCBD with a factorial arrangement of treatments. The factors were the presence or absence of *S. rolfsii* sclerotia and the presence or absence of LCB larvae. In all three runs of this study, incidence of SSR was greater in the treatment that contained both LCB larvae and *S. rolfsii* sclerotia compared with the treatment that contained only *S. rolfsii* sclerotia ($P < 0.025$). No SSR was observed in the control plants or the plants that had only LCB larvae. The field study was a set up as a paired comparison with one plant being damaged at the root-hypocotyl and one plant being a control. Fifty pairs of plants were treated each week for seven weeks in 1993 and for eight weeks in 1994. Incidence of SSR was significantly higher in the damaged plants compared with the control plants on six of the seven dates in 1993 and for all eight dates in 1994 ($P < 0.05$). These studies suggest an interaction between LCB damage and incidence of SSR in peanuts. Because of this study and previous studies linking LCB with aflatoxin contamination, we feel there is a need to modify the economic threshold for the lesser cornstalk borer in peanuts.

Efficacy of Fluazinam Applications and Canopy Alterations (Mechanical and Phenotype) on Sclerotinia Blight Incidence.
T.M. Butzler*, J.E. Bailey, and M.K. Beute. North Carolina State University, Raleigh, NC. 27695-7616.

Field tests (Langston and Umphlett farms) were continued in 1994 to further determine the effect of various genotypes (NC 7, VA 93B, NC Gp 18016, and Tamspan), mechanical pruning (by way of bush hog), and fluazinam applications on sclerotinia blight progress. Each cultivar was either pruned (8 August) or left intact. A second pruning event (9 September) was included on selected plots. Applications of fluazinam (4.67 kg ai/ha) were imposed on the genotype X pruning treatments. In the Langston field (low disease pressure), NC 7, NC Gp 18016, and VA 93B behaved similarly, with significantly higher disease incidence than Tamspan. Compared to the control (no fluazinam applications or pruning event), all treatments were effective in reducing disease incidence. Pruning alone was just as effective as fluazinam in disease management. In the Umphlett field (high disease pressure), there was a genotype X treatment interaction. Pruning twice (no fluazinam applications) reduced disease incidence in NC Gp 18016. Pruning once (without fluazinam applications) was just as effective as fluazinam sprays in NC 7, Tamspan, and VA 93B. The combination of pruning (1X) and fluazinam applications (2X) was the most effective treatment with NC 7. There was also a genotype X treatment interaction in yield at the Langston site. Regardless of fluazinam sprays, pruning once or twice in Tamspan and VA 93B significantly reduced yield compared to the control. Pruning twice reduced yield with both NC Gp 18016 and NC 7. In the Umphlett field, the best yielding treatment was application of fluazinam (no pruning event). Regardless of treatment, NC 7 was the lowest yielding genotype. A separate field trial was again conducted to determine whether plant debris left from pruning would influence the incidence of severity of *S. rolfsii* in the field. Results indicate that pruning did not increase the incidence of severity of *S. rolfsii*.

Fungicide Sensitivity of *Sclerotium rolfsii* from Peanut in Georgia.
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A total of 294 isolates of *Sclerotium rolfsii* was collected from four peanut fields in Georgia in 1994. Two of the locations had a history of exposure to PCNB and experimental fungicides such as the ergosterol biosynthesis inhibitors and flutolanil. The other locations had no exposure to these fungicides for peanut or any other crop grown in rotation. Each isolate was grown on potato dextrose agar (PDA) amended with tebuconazole or flutolanil at 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005, 0.001, or 0.0005 ppm or PCNB at 50, 20, 10, 5, 2, 1, 0.5, 0.2, or 0.1 ppm. Technical grade formulations of the fungicides were used and all dilutions were in acetone. Isolates were incubated at 26 C for three days. Radial growth after three days was measured in mm. ED_{50} values were estimated by regressing the percent inhibition [100 - (colony diameter on amended medium divided by colony diameter on controls* 100)] against the log of fungicide concentration. ED_{50} values of isolates from each location were lognormally distributed. Mean ED_{50} values of isolates from nontreated locations were 0.015, 0.029, and 1.95 ppm, for tebuconazole, flutolanil, and PCNB, respectively. Mean ED_{50} values of isolates from treated locations were 0.013, 0.026, and 1.20 ppm, respectively. There were significant differences ($p < 0.0006$) between ED_{50} values of isolates from treated and nontreated locations for flutolanil and PCNB ($p < 0.0001$). However, there were no differences ($p = 0.2763$) in treated and nontreated locations for tebuconazole. ED_{50} values were statistically different, due to the large number of isolates for each location, although the differences are probably not biologically meaningful.

Dimethenamid Activity on Yellow and Purple Nutsedge as Influenced by Application Placement. H. M. MCLEAN*, J. W. WILCUT, J. S. RICHBURG, III, AND A. E. SMITH. University of Georgia, Tifton, GA 31793; Crop Science Dep., North Carolina State University, Raleigh, NC 27695-7620; University of Georgia, Tifton; and University of Georgia, Griffin, GA 30223.

Dimethenamid is a new chloroacetamide herbicide currently being developed for peanut. Excellent crop tolerance allows for PPI, PRE, or POST application. Yellow and purple nutsedge are common and troublesome species in most peanut production areas and yellow nutsedge is a target weed for dimethenamid. Greenhouse experiments were conducted to evaluate the impact of application placement of dimethenamid on nutsedge growth and development. Soil placement was evaluated by establishing treated soil layers above, below, and above+below sprouted nutsedge tubers. Herbicide treated soil zones were separated by an activated charcoal layer. The experimental design was a randomized complete block design with five replications repeated over time. Yellow and purple nutsedge were evaluated in separate experiments. Herbicide toxicity was evaluated by measuring nutsedge shoot height, shoot emergence, shoot dry weight, and root weight. Evaluations were made at 30 and 60 days after planting (DAP). Dimethenamid at concentrations equivalent to 1.5 lb ai/ac greatly reduced the development of yellow nutsedge regardless of soil placement zone. The same experiment with purple nutsedge revealed good herbicidal activity when treated soil was placed above, below, or above+below purple nutsedge tubers. However, differences in herbicidal activity were observed at 60 DAP. Under greenhouse conditions, below application at the concentration equivalent to 1.5 lb ai/ac resulted in increased shoot height reduction, decreased shoot emergence, and increased shoot weight reduction in purple nutsedge at 60 DAP compared to other placements. Another series of experiments were conducted to evaluate the impact of POST application of dimethenamid on yellow and purple nutsedge. Dimethenamid at 1.5 lb ai/ac was applied to the foliage only, soil only, or foliage+soil on emerged nutsedge. Irrigations were made to the soil surface only to prevent foliar movement of the herbicide to the soil surface. Very little control of purple nutsedge was obtained with dimethenamid applied to the foliage, soil, or foliar+soil when applied POST. A similar trend was observed with yellow nutsedge, except that yellow nutsedge was more susceptible to POST application than purple nutsedge.

Breeding and Genetics

Evaluation of Peanut Breeding Lines with Resistance to the Peanut Root-knot Nematode. C. C. HOLBROOK[1*], J. P. NOE[2], D. W. GORBET[3], and M. G. STEPHENSON[1]. [1] USDA-ARS, Coastal Plain Exp. Sta., Tifton, GA; [2] Univ. of Georgia, Athen, GA; [3] Univ. of Florida, Marianna, FL.

The peanut root-knot nematode [*Meloidogyne arenaria* (Neal) Chitwood race 1] causes significant economic losses throughout the peanut (*Arachis hypogaea* L.) production area of the southern United States. Chemicals for control of this pest are becoming increasingly limited, and there are no resistance peanut cultivars. Although source of resistance have been indentified in the cultivated species and in several wild species of peanut, it will be several years before resistant cultivars are available. The objective of this study was to examine seven advanced generation breeding lines which were thought to have tolerance and/or resistance to the peanut root-knot nematode. These seven breeding lines and three check genotypes were evaluated in greenhouse trials to evaluate severity of galling and eggmass production. These genotypes were also evaluated in three field trials. One field trial had no nematode pressure, one had moderate nematode presure, and one had severe nematode pressure. Two of these gentypes had yield which was similar to florunner under no nematode pressure and significantly higher yield than florunner under severe nematode pressure. These breeding lines may provide a cultivar which could be used to provide some relief for the peanut root-knot nematode problem until cultivars with higher levels of resistance are available.

Meloidogyne arenaria Resistance in Advanced-Generation *Arachis hypogaea* x *A. cardenasii* Hybrids. H.T. STALKER*, B.B. SHEW, G.M. GARCIA, M.K. BEUTE, K.R. BARKER, C.C. HOLBROOK, J.P. NOE and G.A. KOCHERT. Depts. of Crop Science and Plant Pathology, N.C. State Univ., Raleigh, USDA-ARS, Tifton, GA, and Depts. of Botany and Plant Pathology, Univ. of Georgia, Athens.

The root-knot nematode (*Meloidogyne arenaria*) can be a serious problem to peanut and may significantly decrease both quality and yield. *Arachis hypogaea* has moderate levels of resistance, whereas high levels exist in several wild *Arachis* species. The objective of this study was to evaluate resistance to *M. arenaria* in *A. hypogaea* x *A. cardenasii* hybrids. Forty-six lines were evaluated in a greenhouse and then seven retested because galls and egg reproduction was suppressed as compared to checks. When *A. cardenasii* and selected lines were inoculated with 20,000 eggs/plant and rated after 58 d, five hybrids and the wild species had fewer than 300 eggs/g root as compared to 3000-4000 eggs/g for checks. Two selections (nos. 1-2 and 2) had very high resistance levels in all subsequent evaluations. During 2 yr of field testing in both microplots and row plots, both galling and nematode reproduction in selections was comparable to *A. cardenasii*. Analyses of (selection 2 x *A. hypogaea*) hybrids indicated that nematode resistance is conditioned by a dominant gene. F_2s segregated in a 3 resistant:1 susceptible ratio for both galls and egg number, indicating simple inheritance. Other crosses using moderately resistant lines segregated in more complex patterns, indicating that more than one gene may condition nematode resistance. The most resistant hybrid line and segregating F_2 progenies were evaluated with 458 randomly amplified DNA (RAPD) markers. A gene for galling was observed to be linked to one conditioning egg reproduction, and one RAPD marker was found to be linked to both nematode-resistance genes. This marker also was detected in hybrid no. 1-2, but not in moderately resistant lines. The marker was mapped to linkage group 1 of the *A. stenosperma* x *A. cardenasii* RFLP map and within a DNA segment known to have originated from *A. cardenasii*. This is the first report of a selectable marker associated with a resistance gene in peanut and, because of the difficulties in selecting nematode resistance, it should have value for increasing breeding efficiency.

Evaluation of Additional Sources of Resistance to the Peanut Root-knot Nematode in the Cultivated Species of Peanut. M. G. STEPHENSON[1*], C. C. HOLBROOK[1], J. P. NOE[2], and W. F. ANDERSON[3]. [1] USDA-ARS, Coastal Plain Exp. Sta., Tifton, GA; [2] Univ. of Georgia, Athen, GA; [3] AgraTech Seeds Inc., Ashburn, GA.

The peanut root-knot nematode [*Meloidogyne arenaria*(Neal) Chitwood race 1] causes significant economic losses throughout the peanut (*Arachis hypogaea* L.) production area of the southern United States. Chemicals for control of this pest are becoming increasingly limited, and there are no peanut cultivars with resistance. Seven resistant plant introductions have been identified, however, less than 25% of the germplasm collection has been examined for resistance based on nematode reproduction. The objective of this work was to examine an additional 1,000 plant introductions for resistance to the peanut root-knot nematode and to compare the most resistant P.I.'s to the seven previously reported sources of resistance. Preliminary greenhouse screening trials were conducted to rate severity of galling and amount of eggmass production. Promising accession were evaluated in additional greenhouse and field studies to quantify levels of resistance and to compare these sources of resistance to previously identified sources of resistance. Accession were observed which had a significantly higher level of resistance than Florunner, however, none of these accession had a significantly higher level of resistance than that observed in the previously identified sources of resistance. Results of this study provide additional sources of resistance which may provide different genes for resistance. In addition, some of these new sources of resistance exhibited significantly higher yield than the previously identified sources of resistance.

Screening the Peanut Core Collection for Resistance to Cylindrocladium Black Rot and Early Leaf Spot. T.G. ISLEIB*, M.K. BEUTE, P.W. RICE, and J.E. HOLLOWELL. Depts. of Crop Science and Plant Pathology, N.C. State University, Raleigh, NC

The peanut core collection, a representative sample of the USDA peanut germplasm collection, was screened for resistance to Cylindrocladium black rot (CBR, *C. parasiticum* Crous, Wingefield, et Alfenas) and early leaf spot (*Cercospora arachidicola* Hori) in 1994. The CBR screen was performed in the greenhouse during the winter and early spring of 1994. Plants were grown in plastic tubes filled with CBR-infested soil (25 microsclerotia g^{-1}). The core collection was divided into 16 sets with 49 entries (including checks) in each, each of which was tested in a 7x7 lattice design with five reps planted at 1-wk intervals. Temperatures were kept below 28 C to promote development of disease. Roots were washed and scored for disease incidence on an 11-point scale at 10-12 wk after planting. Of the 716 core collection lines tested, 11 (PIs 149265, 200439, 240551, 259719, 295234, 295243, 300593, 493815, 497460, 497660, and 502040) had mean diseases scores significantly lower than NC 3033, the resistant check, at the 5% level of probability. The screen for early leaf spot resistance was conducted in the field at the NCDA's Peanut Belt Research Station at Lewiston, NC, in the growing season of 1994. The core collection was divided into 16 sets of entries of similar maturities. Each set was tested in a 7x7 simple lattice design with the two reps contiguous in the field. Each plot was a single 3.6 m row with plats spaced 25 cm apart, flanked by two rows of 'NC 6' at similar spacing. Natural incidence of early leaf spot was heavy. Plots were rated for defoliation on a 9-point scale on 8/14, 8/28, and 9/14. The positive correlation between late maturity and apparent resistance was pronounced Medium or late maturing PIs 159786, 196622, 196719, 229659, 268996, 288099, 290566, 295730, 300962, 371521, 497317, and 497351 had significantly less defoliation than the resistant check, GP-NC 343. The early maturing lines with the least defoliation (PIs 196647, 262079, 268576, 325943, 403761, 429420, 429429, 430307, 442715, 468219, 471967, and 475872) were not significantly different from GP-NC 343 ($P < 0.05$).

Resistance to White Mold (*Sclerotium rolfsii*) within Wild Peanut Accessions. W.F. ANDERSON*, H.T. STALKER, L.J. GRIGNON, B.B. SHEW and M.K. BEUTE. Department of Botany, Univ. of Georgia, Athens, GA; Departments of Crop Science and Plant Pathology, North Carolina State Univ., Raleigh, NC.

White mold caused by *Sclerotium rolfsii* significantly reduces peanut yields. The cultivar Southern Runner has some general resistance, however, higher levels of resistance are desired. Wild peanut accessions have been used successfully in crosses to produce resistance to nematodes and leaf spot diseases. Greenhouse and field studies were conducted to determine the reaction to white mold among wild peanut accessions for use in interspecific crossing programs. Ten replications of 106 wild peanut accessions were planted in ten-foot single row plots at Ashburn, GA during the summer of 1994. Plants were inoculated with white mold infested ryegrass seed at 80 days after planting. Symptoms of white mold were recorded at 110 days after planting. Data was analyzed and means were compared to symptoms on an uninoculated field test. Means ranged from 0% dead or dying plants to 87%. A greenhouse experiment was conducted at North Carolina State University during the summer of 1994. Two experiments with a total of 83 accessions of 19 wild *Arachis* species plus two *A. hypogaea* cultivars (NC 7 and Florunner) were grown for 40 days in 6-inch clay pots. Two lateral branches on each plant of seven single-plant replications were inoculated with white mold by placing infected wheat kernels on stems and tying them in place with cheese cloth. Inoculum was removed after three days, and plants were scored for lesion length, dead branches and plant death every two days for 14 days and then at day 21. Sixty-four of 85 genotypes had lesions on more than 75% of the inoculated branches; with 33 wild species accessions having more than 90% infected branches. Lesion lengths on branches for many genotypes were already 20-30 mm long by 3 days after inoculation, however, 12 accessions did not have any dead branches on day 21. Data from field and greenhouse studies were not always consistant, however, accessions of *A. kempff-mercadoi* were generally resistant, with 30085 as the most resistant accession in the greenhouse test.

Isolation and Characterization of Polypeptide Components of Methionine-rich Protein from Peanut. R. SATHANOORI* and S. M. BASHA. Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307.

Peanut, like other legumes is low in methionine. Attempts to improve the methionine level of peanut were unsuccessful due to lack of genetic variation in seed methionine content. Earlier a complex methionine-rich protein (MRP) containing > 4% methionine has been isolated from peanut seed. The objective of this study was to identify the MRP polypeptide component rich in methionine, and to determine developmental changes in the amino acid composition of individual MRP polypeptides from maturing peanut. For this purpose proteins were extracted from peanut seed of different maturities and MRP polypeptides resolved by two-dimensional polyacrylamide gel electrophoresis. The proteins were blotted onto the polyvinylidene difluoride membrane and the MRP polypeptides were cut out. The polypeptide spots were hydrolyzed with 6N HCl and the resulting amino acids were analyzed by high performance liquid chromatography. The amino acid data revealed that of the six polypeptides only polypeptides MRP-3 and MRP-6 contained highest amount of methionine (> 4%) while the methionine level of the other four polypeptides (MRP-1, MRP-4, MRP-5) ranged between 1 to 2.4%. Among the other amino acids, glutamic acid constituted the highest amount (17 to 26%), followed by arginine (11 to 17%), leucine (7 to 13%). Comparison of amino acid composition of MRP polypeptides from peanut seed of different maturities revealed no major differences in their amino acid composition among the five maturity classes. These data suggest that increasing levels of protein observed in MRP polypeptides during seed maturation is due to increased protein deposition, and the MRP polypeptide in all the maturity classes are similar in quality.

Evaluation of *Bradyrhizobium* Isolates from Soil Samples Obtained from Pods of Mexican *Hirsuta* Type Landraces. L. BARRIENTOS-PRIEGO*, G.L. WAGNER, G.H. ELKAN, T.G. ISLEIB and H.E. PATTEE. Departments of Crop Science, Microbiology and USDA-ARS, Botany, North Carolina State University, Raleigh, NC 27695-7629.

The standard procedure for isolating nitrogen-fixing *Rhizobium* and *Bradyrhizobium* from the soil has been an indirect isolation method that uses host plants to trap the bacteria. However, there are circumstances in which bacteria must be isolated directly from soil samples. Such is the case when there is no direct access to host plant nodules from the area of interest and only small soil samples are available. *Bradyrhizobium* strains were isolated from small soil samples collected from pods of *Arachis hypogaea* ssp. *hypogaea* var. *hirsuta* bulk samples (PIs 576633, 576634, 576635, 576636, 576637, and 576638). Using the single colony plating technique on YEM agar, *Bradyrhizobium* isolates were obtained for PIs 576633 and 576636. A selective medium, BJSM slightly modified, was used to obtain isolates from the other PIs. The isolates were tested for effectiveness in genotypes other than the *hirsuta* landraces in order to detect genotype and strain type interactions. The ANOVA for these genotypes showed significant differences (1%) per host for nodule mass, for *Bradyrhizobium* strains and between the PI strains. The authentication of isolate strain types was done on PIs 576633, 576636, and 576638 which represented the environmental variation of the *hirsuta* landraces in question. No significant differences were found among the studied landraces. However, the *Bradyrhizobium* strains presented significant differences (1%) among and within Pis of the state of Puebla and Guanajuato. Different levels of effectiveness of the isolate strain types were found, indicating in some instances a possible coevolution process between the *hirsuta* landraces and strains. On the other hand, not all the isolated strains were used and further testing is needed.

Isolation and Characterization of cDNA Sequence(s) Encoding the Methionine-rich Protein from Peanut.. M. ARUNA* and S. M. BASHA. Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL, 32307.

Peanut is an excellent source of plant protein, but is deficient in one of the essential amino acid, the methionine. We have previously identified and isolated a complex, six subunit, 120 kDa methionine-rich storage protein (MRP) from peanut, containing about 4% methionine. In order to test the potential of the peanut MRP gene to transform peanut and the possibility of increasing the content of methionine by overexpression of this gene, an understanding of the nature of the subunits and the protein at molecular level is an important prerequisite. Therefore, the objectives of the present research are, to (1) understand the complex subunit structure of the MRP protein and (2) isolate and characterize cDNA(s) corresponding to MRP from peanut cDNA library. Currently we are investigating the developmental expression and post translational modifications of the subunits by *in vitro* translating the mRNA isolated from peanut seeds representing different stages of maturity. Qualitative differences in protein subunit expression are studied by electrophoresing the *in vitro* translated proteins by two dimensional polyacrylamide gel electrophoresis. Amino acid analysis of the protein subunits identified the two 15.5 kDa subunits as relatively rich in methionine (4%) compared to other four subunits (around 2%). one of the 15.5 kDa subunit was sequenced and forty amino acid sequence information from the N-terminal end was obtained. The sequenced region is rich in arginine and the sequence has no homology to any of the proteins in protein sequence data base. A degenerate oligonucleotide primer was designed using the sequence of the amino acids from position 27 to 32 and the cDNA corresponding to this subunit is being isolated. cDNA library constructed in the expression vector λgt11 is being screened by direct PCR screening using the designed gene specific primer and the λgt11 forward and reverse primers. Progress of the research and pertinent results will be presented and discussed.

Detection of Polymorphic DNA Markers in Cultivated Peanut. G. HE, M. WATTS and C. S. PRAKASH*. Plant Molecular Genetics Lab, Tuskegee University, School of Agriculture and Home Economics, Tuskegee, AL 36088.

Peanut (*Arachis hypogaea* L.) is unique among crop plants, because many RFLP and RAPD studies have hitherto detected little or no DNA polymorphism within the cultivated species, although other related *Arachis* species exhibit high genetic variation. We tested whether DNA polymorphism can be detected in cultivated peanuts using an improved DNA amplification fingerprinting (DAF) approach. Nearly five hundred primers including 8-mer, 10-mer and hairpin primers of arbitrary sequence, and sequence-specific primers from heterologous species were screened. An optimized PCR reaction was employed using genomic DNA isolated from peanut landraces representing botanical varieties–*hypogaea, hirsuta, fastigiata, peruviana, aequatoriana* and *vulgaris*. We have identified some primers which detect high polymorphism between and also within the botanical varieties. The use of Stoffel fragment *Taq* polymerase in the PCR, vinyl-polymer of polyacrylamide gel to resolve fragments and silver staining to visualize the DNA produced informative, reproducible and clear DNA profiles. Although the extent of DNA variation is still low in cultivated peanut, our studies show that the DAF approach using informative primers specific to hypervariable regions of the peanut genome may be useful in the peanut genetic research including analysis of genetic diversity in the germplasm collections, estimation of genetic relationship among accessions, and further saturating the existing peanut genetic map. *Research Supported by grants from USDA and NASA.*

Evaluation of Somatic Embryogenesis in Mature Zygotic Embryo Explants of Peanut Cultivars Grown in the Southwest. J.A. BURNS* and H.A. MELOUK. USDA-ARS, 1301 N. Western Street, Stillwater, OK 74075.

Recently the use of mature dried seed as an effective, convenient explant source for somatic embryogenesis has been reported for peanut lines grown in the southeast. To date, very few embryogenic systems have been reported which are capable of producing a repetitively embryogenic culture which is critical for stable genetic transformation via microprojectile bombardment. We report on the production of stable, continuously embryogenic tissue cultures of peanut cultivars (*Arachis hypogaea* L.) grown in the southwest. Mature, dry zygotic embryo axes of cv Okrun were cultured on MS medium containing four concentrations each of 2,4-D, PBA, 2,4,5-T and picloram. Somatic embryos (SEs) were produced on all growth regulators tested with the exception of PBA. 2,4-D required a higher concentration for activity than either picloram or 2,4,5-T. After 4 weeks exposure to plant growth regulators, embryo axes responded differently to the various treatments, where 90% responded to > 10μM 2,4-D, 70% responded to > 1μM 2,4,5-T, and 87% responded to > 1 μM picloram. SE germination and plant recovery was significantly greater with 2,4-D than other plant growth regulators. On solidified medium, repetitively embryogenic cultures were produced via picloram and 2,4,5-T, but stable long-term cultures were only obtained via picloram exposure. When axes were cultured on 2 μM picloram, there were significant differences in embryogenic response between cultivars. Although greater than 83% of explants from all cultivars responded with at least one SE, NC-7 produced twice the number of SEs than Okrun or TS90. Okrun and TS90 responded similarly, producing more than double the number of SEs than Southwest runner. Interestingly, embryogenic callus production was significantly elevated in cultivars with Spanish parentage. The cultivar Okrun is preferred for long-term repetitive cultures and microprojectile bombardment, due to stability of SE quality, reduced callus production, and a high degree of SE proliferation.

Plant Recovery in *Arachis* by *in vitro* Culture of Peg Tips, Ovules, and Embryos.

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Embryo abortion is a major barrier to interspecific hybridization between cultivated and wild species of *Arachis*, and *in vitro* culture has potential for rescuing embryos before they abort. The objective of this research was to develop an *in vitro* system to rescue embryos derived from pollination and then to apply these *in vitro* techniques to obtain interspecific hybrids. *Arachis hypogaea* and four diploid wild species--*A. duranensis*, *A. glandulifera*, *A. batizocoi*, and *A. valida*--which have different rates of compatibility with *A. hypogaea*, were used in the experiments. Peg tips were excised 10 days after self- or cross-pollination and cultured on the combined MS and B_5 media with 0-1.0 mg/L NAA, 0-0.5 mg/L GA_3, and 0-0.05 mg/L 6-BAP for 90 days. *In vitro*-developed ovules and embryos were isolated and subcultured on MS media to regenerate plants. The results indicated that *A. hypogaea* had a higher frequency of pod formation and seed recovery than the wild species. *Arachis glandulifera* produced the most pods and seeds among the wild species. No significant differences in pod or seed production was found between *A. duranensis* and *A. valida*, but *A. batizocoi* had significantly lower rates of both pod and seed recovery. Selfed plants were recovered from all five genotypes by *in vitro* techniques. *In vitro* development of hybrid proembryos to the cotyledonary stage was observed in all eight interspecific crosses obtained from crosses of *A. hypogaea* x four *Arachis* species and reciprocals. Compared to *in vivo* embryo development, peg tip culture promoted embryo growth in the incompatible cross (*A. hypogaea* x *A. glandulifera*) and its reciprocal cross. Several *A. glandulifera* x *A. hypogaea* hybrids were recovered from *in vitro*-obtained embryos which underwent somatic embryogenesis. Mature hybrids of the other crosses also were recovered via peg tip culture but at a lower frequency than from culture of immature embryos from *in vivo* pods. This study demonstrated that hybrid proembryos of *Arachis* can be rescued by peg tip culture.

Comparison of Somaclonal Variation Caused by Three Peanut Regeneration Methods.

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A good transformation procedure minimizes alterations of characters other than the one designated for change. Plant regeneration, one of the important steps in transformation, may cause alterations called somaclonal variation. Field evaluation was conducted to compare yield and morphological variation among lines derived from a common set of mother plants by three regeneration methods of potential use in peanut transformation: embryonic axis culture (EAC), immature embryo culture (IEC), and immature leaflet culture (ILC). These methods were compared with sexual reproduction (seed). 192 $R_{1:2}$ families were developed from 6 mother plants, 4 culture methods (including seed), 2 R_0 / mother plant / method, and 4 R_1 / R_0. Families were grown in 1994 at NCDA research stations at Lewiston and Rocky Mount, NC. Traits with no significant differences among regeneration methods in means and variance estimates for R_0, R_1, loc-R_0, and location-R_1 were: 1) pod traits: beak, reticulation, constriction, length, seed length, no. seed/20 pods, and seed size; 2) cotyledonary lateral traits: length, no. vegetative and reproductive branches, and RV ratio; and 3) mainstem traits: height and number of primary branches. Being observed only at one location, means and variance estimates of pod width, weight of vegetative portion, total plant weight, and harvest index were not significantly different among regeneration methods for R_0 and R_1. For pod number, pod yield, and seed yield, variability of R_0 among EAC, IEC, and ILC did not differ significantly from the control; no significant variability of R_1 among the four methods; and variability of R_0 families of IEC tended to be larger than EAC and ILC. For meat and pod weight, variability of R_1 families among EAC, IEC, and ILC tended to be less than control at Lewiston, and no different at Rocky Mount; variability of R_0 did not differ significantly among the four methods. For leaflet length and width, variability of R_0 and R_1 of EAC tended to be larger than control plants. EAC, IEC, and ILC appeared not to significantly induce variability to most agronomic traits observed.

Long Term Storage of Arachis Seed. C.E. SIMPSON*, D.L. HIGGINS, and WM. H. HIGGINS, JR. Texas Agricultural Experiment Station, Texas A&M University System. Stephenville, TX. 76401-0292.

Seed from twenty-two wild Arachis species representing sections Arachis, Procumbentes, Heteranthae, and Erectoides were stored in sealed plastic bags in a frost proof freezer for 10 years. Fifty seeds were pulled each year for germination tests. Many of the species required ethylene treatment the first two or three years to break dormancy and a few required ethylene treatment through seven years of storage. Germination percent was low on some species from the beginning while other species started with high percent germination and remained high. Studies were also conducted on seed stored in sealed containers or paper bags in a frost proof freezer for a maximum of twenty-two years. These tests included materials from the same sections as the ten-year study plus Extranervosae, Triseminatae, and Caulorrhizae. Germination remained high on most of this material through the nineteenth year, but many deteriorated rapidly after that point. A few species had a high initial germination but dropped to zero in 3 to 5 years. These studies show that most of the Arachis sp. seed we studied can be stored in sealed plastic bags, in shell for 10 years at -13°C with little or no loss of germination. Our studies also show that most Arachis sp. seed can be safely stored in shell at -13°C in paper bags for maximum of 18 to 20 years. Seed with low initial germination percent apparently did not deteriorate any more rapidly than did good (high germ.) seed. These studies also confirmed an earlier observation that seeds of some species of Arachis do not store well regardless of the initial seed quality. This includes seeds of some members of sect. Erectoides, Heteranthae, and Extranervosae.

Economics

A Cost of Production and Income Estimator For Peanuts Using Spreadsheet Modeling. W. DON SHURLEY. Department of Agricultural and Applied Economics, University of Georgia, Cooperative Extension Service, Tifton, GA. 31793.
Peanut producers must know their cost of production to make economical production and marketing decisions. Given changes in peanut production technology and forthcoming changes in government peanut program provisions, producers need a method for tailoring production practices to their operation to determine cost of production and impacts on income and net returns. A "model" has been developed that allows peanut producers to determine costs of production and develop an enterprise budget based on production practices, machinery and agronomic characteristics for their farming operation. The program consists of a series of integrated spreadsheets that collect the information and data required and perform the needed computations. Model results include total enterprise costs and returns, per acre and per ton costs and returns, quota returns versus additionals returns, and owned versus leased quota. The model also provides a risk analysis in tabular and graphic form showing the probabilities associated with various levels of net return. This approach to budgeting is particularly useful in analyzing machinery decisions, rental arrangements and price contract opportunities. The producer can also budget the impacts of price, management practices and other factors on peanut income and profit.

The Influence of Irrigation, Rotation and Folicur on the Net Returns to Land and Management from Quota Peanut Production. W. A. MILLER[1], B. E. GAMBLE*[2], and T. D. MAHONEY[2]. [1]Department of Agricultural Economics, Purdue University, West Lafayette, IN 47907 and [2]Wiregrass Experiment Station, Auburn University, Headland, AL 36345.
Experimental plot peanut yields and grades were observed in 1992 and 1993 for selected treatments. These data were used to estimate the net returns to land and management from quota peanut production. The influence of the treatments on those net returns was evaluated. Rotation treatments consisted of the continuous control and an every other year rotation of peanuts and corn. Subplots were used within each rotation to compare a treatment involving 2 applications of Folicur 3.6F at .5 pints/acre each and 20 lbs./acre of Temik 15G applied in an 8" band at planting to a less expensive treatment involving 4 lbs./acre of Temik applied in-furrow at planting and no Folicur. A conventional fungicide program was used with both of these treatments. The additional chemicals associated with the more expensive chemical treatment added \$76.00/acre to total chemical costs in 1992 and \$79.52/acre in 1993. Other costs also increased in response to the Folicur/Temik treatment, such that the peanut yield required to breakeven over all costs except land and management over the two-year period increased 674 lbs./acre for \$300/ton additional peanuts on the average and 469 lbs./acre for \$680/ton quota peanuts. The two years were very different with drought conditions influencing results in 1993. Net returns from the rotated peanuts averaged \$85.81/acre higher than the continuous peanuts in 1992 and \$46.56/acre higher in 1993. The small increase in 1993 reflects the fact that the corn-peanut rotation did not produce a statistically significant increase in net returns from the peanuts grown in the irrigated block. Net returns from the Folicur treated peanuts averaged \$163.71/acre higher than the lower cost alternative in 1992 and \$38.34/acre in 1993. The small increase in 1993 reflected the fact that the Folicur treatment was associated with a small decline in net returns from peanuts grown in the nonirrigated block. Net returns from the irrigated peanuts averaged \$232.03/acre lower than the nonirrigated peanuts in 1992 and \$194.89/acre higher than the nonirrigated peanuts in 1993. The Folicur treatment in 1992 produced statistically significant increases in net returns from peanut production in both the irrigated and nonirrigated blocks.

An Analysis of the Yield Trend for Peanuts in Georgia. P. ZHANG, S.M. FLETCHER,* D.H. CARLEY. Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797.

Peanut yields per acre in Georgia had tripled during the 1960s and 1970s, increasing from about 1,000 pounds to over 3,000 pounds. The peanut yield, however, experienced a decline during the second half of the 1980s and early 1990s. Have peanut yields reached a plateau? Is the decline in yields temporary or permanent? This study examines the issue of changes in yield trends over time in Georgia. Georgia supplied nearly 43 percent of peanuts produced in the U.S. in 1992. County data on yields, harvested acreage, and meteorological factors including monthly rainfall and maximum temperature were collected between 1957 and 1993. Fourteen counties were selected for the analysis based on data availability and coverage of a broad geographical area of peanut production counties. A regression procedure was used to model the change in county yields over time. Results from this study support the following conclusions. First, differences in yield responses to economic and meteorological factors exist among different counties. Attention, therefore, should be given when data pooling is necessary in modeling yield behavior. Second, July rainfall and August temperature are among the most important meteorological factors affecting the peanut yield. This result is consistent with experimental results from agronomists. Third, planting acreage had a negative effect on yields, but this negative effect was not significant until the last ten years or so. Changes in the peanut program in 1982, which eliminated the acreage allotment provision, had resulted in a dramatic increase in peanut planting acreage in some counties. This contributed significantly to the decline in peanut yields, particularly since 1986. Finally, a significant change in yield trends was found over time. Peanut yields increased in a linear trend from 1957 to 1974, and then fluctuated around the 1974 level. Starting in 1986 and continuing, the peanut yield has shown a decline in trend. The model used, however, cannot offer specific reasons for these changes in yield trends. Further investigation of more specific causes which resulted in these distinct trend changes in yields is continuing.

An Analysis of Peanut Price Support Issues. D.H. CARLEY* and S.M. FLETCHER, Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797.

Strong differences of opinion have been expressed among the various segments of the peanut industry concerning the level of the price support for quota peanuts. Under the current statute the price support for quota peanuts is adjusted to reflect any increase in the cost of peanut production to a maximum of 5% from the previous year. The price cannot be decreased. From 1986 to 1995, the quota price support increased a modest 1.3% annually compared to 3.8% annual increase in the index of prices by farmers for production items, goods and services. Adjusted for inflation, the real price in 1994 is down $69 per ton since 1986. Even with price supports, the degree of risk associated with producing peanuts has been high. From 1981 to 1993, USDA data indicate a range of returns per acre of $42 per acre in 1983 to $183 per acre in 1986. If the current statute for determining price supports remains until the year 2000, the price support may increase to $725 per ton. At that price level the breakeven world price for peanuts plus the tariff could be close to the expected shelled peanut price for domestic peanuts. Thus, the trade agreements may impact on the price support program for peanuts. It has been suggested that the quota price support be allowed to decrease as well as increase with changes in the cost of production. If the support price had been allowed to decrease and increase since 1986 within a 5% limit, the price support in 1995 using the USDA option A would be $659 per ton instead of $678 per ton. If the price had moved both ways in the 1982 to 1993 marketing years, the estimated returns to quota, risk and management for a ton of quota peanuts would have averaged $110 per ton which is a $65 per ton lower average return than under the current prices. Based on USDA cost of production data, a 15% decrease in the quota support price would reduce net returns to the average peanut farmer by more than 36%. In the longer term, the lower price could reduce land values by an estimated $400 per acre. Both a 15% decrease in support and a 20% decrease in quota could reduce net income as much as 50%. Thus, peanut farmers face a dilemma in decisions concerning the peanut program direction.

Impact of the National Poundage Quota Provisions of The Peanut Program.

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The Food, Agriculture, Conservation and Trade Act of 1990 requires that the national poundage quota must equal the quantity of peanuts estimated to be devoted to domestic edible, seed, and related uses in each marketing year, but not less than 1.35 million tons. During the debate on the 1990 Farm Bill, USDA made no recommendations about the quota formula. However, the 1990 Act raised the minimum quota from the previous level of 1.1 million tons. After the 1990-crop quota was set at 1,560,000 tons, USDA successively reduced the quota to the statutory minimum in 1994. The same level prevails for the 1995 crop. However, due to the continuing decline in consumption of U.S.-grown peanuts for food, the minimum quota remains above the demand for domestic quota peanuts. Domestic demand has declined because of rising prices and perhaps a shift away from snack foods with high fat content. Imports of peanuts and peanut butter under NAFTA and the Uruguay Round agreement have displaced demand for higher priced U.S.-grown peanuts. Individual farm poundage quotas are increased for undermarketings in previous years, but the national total of all increases is limited to 10 percent. For several years, the basic quota plus the undermarketings carried forward (effective quota) has equalled 110 percent of the basic quota. Peanut program outlays in fiscal years 1992-96 are expected to average $55 million compared with average annual outlays of $13 million during the FY83-91 period. The net realized loss for fiscal years 1996-2000 is an estimated $76 million annually. In May 1995, USDA recommended for the 1995 Farm Bill that the Administration would support efforts to convert the peanut program to a no-net-cost program. Eliminating the statutory minimum quota, the carryover of undermarketings, and the disaster transfer allowance could assist in reducing peanut program outlays, but may not address the changing economic and political environment that farm programs face in 1995.

An Analysis of Peanut Farmers' Participation in Setting Peanut Policy Guidelines for the 1995 Farm Bill.

G. WANG, D.H. CARLEY,* P. ZHANG, and S.M. FLETCHER. Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797.

Peanut farmers in Georgia were provided the opportunity to have a voice in creating the peanut program segment of the 1995 Farm Bill. In January and February of 1995 the Georgia Peanut Producers Association conducted meetings in 61 counties in which modifications in the peanut program were discussed, and then voted on by the peanut farmers in attendance. It was hypothesized that the vote was affected by certain county-wide characteristics including ratio of peanut acreage to cultivatable land, percent that quota was of total production, acres of peanuts harvested, and major peanut production areas versus other areas of production. Nearly two-thirds of the votes by counties were against sale and transfer of quota across county lines or spring lease across county lines. All voted for fall lease across county lines. As the ratio of quota to total production increased the more likely the farmers voted no to sale or spring lease across county lines. All votes were in favor of setting quota according to usage. About one-half voted for setting a statutory minimum quota. Counties with greatest total acreage and largest ratio of quota to production more likely voted yes. More than 80% voted to eliminate undermarketings while 20% voted to phase undermarketings out. About 66% voted no to using additional peanuts for seed. As the ratio of quota to total production increased the vote was more likely no indicating the concern of losing quota. Only 15% voted to lower the support price but all voted to allow the support to go down as well as increase when cost of production so indicated. Most voted to eliminate area pool cross compliance but voted for individual farmer cross compliance. More than 80% voted for a no-net cost assessment to be paid by producers while two-thirds favored an assessment to be paid by shellers. In general, peanut farmers were indicating that they were supportive of making some major modifications in the peanut program of the 1995 Farm Bill. The results of the voting were given to an advisory council who were responsible for taking the expressed desires of the peanut farmers to policy makers for further consideration.

Estimates of Peanut Support Price and Peanut Product Price Relationships. S.M. FLETCHER,* D.H. CARLEY and P. ZHANG. Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797.

In discussions concerning the peanut program it has been presented as fact that the program adds 40 cents to the cost of a typical 18 oz. jar of peanut butter. This analysis was designed to separate the rhetorical from the factual and to show an estimated price for farmers' stock peanuts if the 40 cent reduction would come from the decrease in the farmers' stock peanut price. At the support price of $678 per ton, the average kernel cost of peanuts was an estimated $.66/lb. From these data it was estimated that the cost of the farmers' stock peanuts in an 18 oz. jar of peanut butter is $.644 at the support price of $678 per ton. For a decrease of 15% in the support price to $576 per ton, the estimated cost of farmers' stock peanuts would decrease to $.546, or about 10 cents. In order to reduce the cost 40 cents a jar, the support would have to decrease to $260 per ton, or $418 per ton less than the current support price. If the entire support price decrease was passed on to the consumer, the retail price would decrease from a $2.14 per jar average price in 1994 to $1.74. However, it has been estimated that only about 60% of the price decrease would be passed on. Therefore, the retail price may decrease to $1.90 instead of $1.74 per jar. Even at the additionals contract price of $400 per ton, somewhat near the equivalent world price for farmers' stock peanuts, the cost of peanuts in a jar of peanut butter would decrease only about $.26. The cost of farmers' stock peanuts would decrease just 7 cents in a 12 oz can of snack peanuts with a 15% decrease in the support price.

An Examination of Peanut Butter Consumption, Trends and Trade. SCOTT O. SANFORD* and W. DON SHURLEY. USDA-ERS-Oil Crops Analysis Section, Washington, D.C. 20005 and Department of Agricultural and Applied Economics, University of Georgia, Cooperative Extension Service, Tifton, GA. 31793.

U.S. edible consumption of peanuts has declined 11.3 percent since the 1989 crop marketing year. Consumption fell 12.6 percent in 1990, improved in 1991 but has declined each year since 1991. The largest food category decline has been in peanut butter which accounts for 46 percent of total consumption. Use of peanuts for peanut butter declined 19 percent from 1989 to 1993. Approximately 86 percent of peanuts used in the manufacture of peanut butter are Runner-type which are produced primarily in the Southeast (Georgia-Florida-Alabama) production region. The reasons for the reduction in peanut butter demand are difficult to isolate. Changing consumer preferences and awareness regarding fat content of food products may be a major factor. Increased competition from price-competitive, convenience competitive substitutes may also be reasons for peanut butter's decline. Peanut butter trade (imports and exports) are important in determining the "real" changes in U.S. peanut use and peanut butter consumption. Imports of peanut butter have increased eight-fold since 1989 and accounted for approximately 10 percent of peanut butter consumption in 1994. Imports reduce the demand for U.S. quota. Imports and reduced U.S. demand for peanut butter have been partially offset by modest growth in exports of peanut butter. Government purchases of peanut butter (for school lunch and other government nutritional programs) account for 10-15 percent of total peanut butter consumption. Purchases fell sharply during the 1990 and 1994 crop years. Adjusted for government purchases and net trade, U.S. consumption of peanut butter actually improved 9 percent during the 1994 crop year. This compares to a 1 percent drop in shelled peanut use for peanut butter.

Entomology

Efficacy of Peanut Containing the B.t. Gene for Delta Endotoxin Against the Lesser Cornstalk Borer. R. E. LYNCH*, C. SINGSIT, and P. OZIAS-AKINS. USDA-ARS, Insect Biology and Population Management Research Laboratory, and Department of Horticulture, University of Georgia, Tifton, GA 31793-0748.
The bacterium Bacillus thuringiensis produces a crystalline protein during sporulation that is toxic to certain insects, especially lepidopterous larvae, when ingested. The crystalline protein is encoded by a single gene. The *CryIA(c)* gene was transferred to Florunner and MARC I peanut using microprojectile bombardment of peanut tissue. Peanut callus tissue and leaves from regenerated plants were evaluated against the lesser cornstalk borer, *Elasmopalpus lignosellus* (Zeller), for B.t. activity. Evaluation of peanut callus tissue showed reduced survival and larval weights when larvae were fed several of the peanut lines containing the B.t. gene. No larvae survived on callus from T33-7. Reduced larval survival and decreased larval weights were also noted when larvae fed on leaves from regenerated peanut plants. No larvae survived on peanut lines T33-7, T31-5, T26-8, T33-10, T26-11, and T26-3-7. Correlation of the insect bioassay on peanut leaves with ELISA readings on B.t. protein in the leaves produced significant coefficients of -0.4955 with larval survival and -0.4285 with larval weight.

Thrips Populations and Spotted Wilt Disease Progress on Resistant/Susceptible Cultivars Treated with Various Insecticides. J. W. TODD*, Department of Entomology and A. K. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.
Insecticides have not proven to be effective or economical management tactics for control of thrips-vectored spotted wilt disease of peanut. Similar results have been observed with almost all other crops and virus diseases vectored by insects. Varietal resistance (to the virus), however; has been shown to be an effective means of helping to keep many virus diseases at tolerable levels. 'Georgia Browne' has been reported to have a moderate level of resistance to TSWV while 'Tamrun-88' is considered to be highly susceptible. Both varieties have been shown to have similar thrips populations to most other commonly grown cultivars. All of the currently registered systemic insecticides are effective for control of thrips larvae but have little impact on populations of thrips adults. Thrips reproduction seems to be largely concentrated in seedling peanut prior to anthesis with *Frankliniella fusca* (Hinds) being the most important species relative to numbers and damage. *Frankliniella occidentalis* (Pergande), although not known to reproduce at significant levels in peanut, may be more important as an immigrant virus-vectoring adult. The various combinations of susceptible and resistant peanut cultivars with the currently available candidate and registered insecticides has not been previously described. Results of this study show that the combined effects of plant virus resistance and insecticidal control of insect vectors may be more important than previously thought.

Plant Damage and Yield Loss from Soil Insects in Alabama Peanuts. J. R. WEEKS*, A. K. HAGAN and K. L. BOWEN, Departments of Entomology and Plant Pathology, Auburn University, AL 36849.

Studies were conducted from 1992 to 1994 in 30 Alabama grower's fields. Populations of lesser cornstalk borer (LCB) and wireworms were monitored throughout the three growing seasons. Insect population levels, plant damage, pod damage and yields were compared between chlorpyrifos treated and untreated plots at each location. Since 1992 and 1994 were generally wet growing seasons, populations of LCB did not reach significantly damaging levels in any field. However in 1993, when over 30 days during the growing season were hot and dry, LCB populations were found at eight of twelve locations, seven out of the twelve locations had significant differences in pod damage and four had enough insect damage to see significant differences in yields. In 1992, eight of twelve fields had low level pod damage from wireworms, but only one had high enough damage to affect yields. In 1994, five of six locations had pod damage during the growing season. Soil sieve samples indicated this damage to be associated with low levels of wireworms. However, there were no reductions in peanut yields related to soil insect damage. Three years of monitoring for soil insects in Alabama peanut fields demonstrated the extreme variability of these insect pest populations. While a few fields had significant yield losses from LCB or wireworms, ninety percent of the time low levels of damage did not cause significant yield loss. These results reaffirm the Alabama Cooperative Extension recommendations that insecticide treatments for soil insects should be based upon field scouting results.

Adult Southern Corn Rootworm (Coleoptera: Chrysomelidae) Trapped by Three Attractants in Peanut Fields and Relationship to Two Soil Characteristics and Pod Damage. D. A. HERBERT*, JR.[1], B. N. ANG[1], and R. L. HODGES[2]. [1]Dept. of Entomology, Virginia Polytechnic Institute and State University, Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437, [2]Dept. of Crop and Soil Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Field studies were conducted in 12 locations in southeastern Virginia to evaluate three trap attractants, TIC, cinnamaldehyde and the SCR sex pheromone for monitoring adult southern corn rootworm (SCR), *Diabrotica undecimpunctata howardi* Barber, in peanut, *Arachis hypogeae* L; to determine the relationship of soil drainage and texture on trap catch; and to determine the relationship of trap catch to peanut pod and peg damage. SCR sex pheromone traps caught more beetles than TIC or cinnamaldehyde on most sample dates and at most locations. Pheromone traps detected two distinct beetle peaks, the first between 16 and 23 June, and the second between 21 and 28 July, and consistently caught more males than females. TIC and cinnamaldehyde traps caught more females in 14 out of 180 observations (15 sample dates, 12 locations), but both attractants failed to detect the second beetle peak. Trap catch was not significantly influenced by soil characteristics of the field in which the trap was located. Peak peanut pod damage by SCR larvae consistently lagged behind the second peak in the beetle population by 2.08+0.51 weeks. Number of beetles trapped accounted for only 10% of the variance observed in peak pod damage.

Extension Technology and Physiology

Development and Implementation of a Bulletin Board System for Information Transfer to the Peanut Industry. S. H. DECK* and P. M. PHIPPS, Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437.

Peanut growers are continually seeking ways to improve net profit, minimize risk, and reduce their dependency on pesticides. To achieve these goals, the grower must have a timely and comprehensive supply of information such as weather forecasts, disease advisories, heat unit reports, frost advisories, and up-to-date recommendations on cultural practices and pesticide use. An electronic bulletin board system (BBS) has been established at the Tidewater Center in Suffolk for distributing this information in a unified framework to all segments of the peanut industry in 1995. Disease advisories, heat unit reports, and weather summaries are obtained from a network of EnviroCaster® units in the peanut production area of Virginia. The hardware setup at each collection site includes an external modem, surge protectors, and telephone service. EnviroCaster® units are equipped to record air temperature, dew point, soil temperature, and rainfall. These units also prepare early leaf spot advisories, sclerotinia advisories, heat unit reports, and crop maturation advisories. A data processing computer at the Tidewater Center automatically retrieves weather data and crop advisories at the conclusion of each calendar day. This computer also maintains a running archive of weather data, prepares daily weather summaries, and uploads information to the BBS computer. Microsoft® Visual Basic computer language was used in conjunction with The Norton pcANYWHERE™ communication software to develop programs for data retrieval, processing, and transfer to the BBS. Wildcat! BBS software is being used to provide user-friendly access to information of importance to crop management. An up-to-date library describing recommended pesticides and use patterns, cultural practices, peanut varieties, and pest information are being added to the system. The BBS can be accessed by personal computers through a toll-free, in-state 800 number. This approach to technology transfer is expected to enhance the role of local county extension units in providing timely information to producers and the peanut industry as a whole. Future plans for expansion will include additional lines for accessing the BBS computer and workshops for clients in the field.

A Generic Method of Developing and Deploying Weather-based Disease Advisories. J. BAILEY* and K. Campbell, Professor and Extension Specialist, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616, and Programmer/Designer, Interface Technologies, Wake Forest Business Park, 853-I Durham Rd., Wake Forest, NC 27587.

A major roadblock to the development, testing, and deployment of computerized decision models is the laborious and expensive process of writing and debugging computer programs. This usually requires communicating epidemiological algorithms to programmers so that they can be translated into computer code. The labor, expense, and time needed to write reliable computer code, and the difficulties in assembling reliable hardware which is suitable for farmer use has been a substantial barrier to weather-based pest model deployment. Intuitive information, learned through years of experience is often not used in automated systems because it is not "refined" enough to establish thresholds. Knowledge from experienced extensionists needs to be explored in a manner that does not stifle the creative process, and allows for a quick and easy way to explore variations on a central idea. A method of programming models was developed whereby users can create testable algorithms, without knowledge of programming, in a few minutes. Many variations on an algorithm may be tested quickly, allowing for sensitivity analysis. Models created in this manner automatically generate histograms for each day showing the hours of favorable weather, threshold(s) and last favorable spray date. The algorithm computes how "favorable" an hour has been by computing whether adequate moisture was present. Temperature is then used as a rate-determining factor. Variables for each model are input by the user in a "fill in the blank" screen. Inputs can include rain, dewpoint, relative humidity, air or soil temperatures, conducive hours required for a favorable day, number of favorable days (or hours) for spray threshold, and days (or hours) spray is effective. Models created in this manner may be used with weather monitoring hardware (AMS, Inc., Raleigh, NC) designed to work with IBM PC-compatible computers. Data is automatically collected every 15 minutes either by a cable or wireless connection through the serial port. Results of each model are automatically computed and displayed.

Comparing Two Methods of Estimating Leaf Area in Dryland Peanuts. S.D. STEWART[1], K.L. BOWEN*[2], T.P. MACK[4], J.H. EDWARDS[3] and J.W. KLOEPPER[2]. Depts. Entomology[1], Plant Pathology[2], and Agronomy and Soils[3], Auburn University, AL 36849; Dept. Entomology, Virginia Polytechnic Institute and State University[4], Blacksburg, VA 24061.

Leaf area indices are often used as a measure of a crop's condition. Two measures of leaf area were taken in 1993 and 1994 for dryland, Florunner peanuts in southeastern Alabama. Optimal and late row spacing. Between-row spacings were normal (91 cm), wide (137 cm), and twin (23 cm rows spaced alternately at 56 cm and 91 cm). In-row plant spacing for a single, twin row were about 2/3 that of the normal and wide rows. Thus, the ratio of plant density (per ha) for twin, normal and wide replicates was 1.00 : 0.75 : 0.5. Weekly estimates of relative leaf area were made in each replication during August with a LAI-2000 Plant Canopy Analyzer (LI-COR, Inc., Lincoln NE). One sample per replicate was taken about 9 AM using a 45^{o} lens cap. Each sample consisted of one above-row measurement and four ground-level measurements taken diagonally from row center to about two-thirds the distance to the adjacent row. In twin replicates, we sampled between pairs of rows that were spaced by 56 cm. Also during August, 3-7 plants per replicate were returned to the laboratory each week, and leaf area (cm^2) for individual plants were measured with a LI-3100 Plant Canopy Analyzer (LI-COR Inc., Lincoln, NE) after the leaves were removed from the plant. For each row spacing, we then calculated an average leaf area ratio by adjusting for the different plant densities in each row spacing and comparing that to the leaf area in twin-row replicates. During August, the LI-3100 estimated a relative leaf area ratio of 1.00 : 0.65 : 0.56, respectively for twin, normal and wide row replicates. By comparison, the LAI-2000 estimated a leaf area ratio of 1.00 : 0.86 : 0.57. We found that the LAI-2000 gave a reasonable estimate of leaf area when compared with actual leaf area as measured by the LI-3100 but may have overestimated leaf area in the normal row spacing. Measurements by LAI-2000 had similar precision to estimates from the LI-3100 but was much more time and labor efficient.

Use of Planting Date, Cultivars, and Selected Pesticide to Reduce the Impact of Southern Stem Rot and Nematodes on the Yield of Peanut. A. K. HAGAN*, J. R. WEEKS, and L. WELLS. Auburn University, AL 36849.

In 1993 and 1994, studies were conducted to determine the impact of planting date and selected pesticide treatments on the severity of southern stem rot (Sclerotium rolfsii) and peanut root-knot nematode (Meloidogyne arenaria) on the yield of an early (Andru 93), an intermediate (Florunner), and a late (Southern Runner) maturing peanut (Arachis hypogaea L.) cultivar. Planting dates were mid-April (early), late April to early May (mid-season), and mid-May (late). The selected pesticide treatments were Temik 15G at 1.0 lb. a.i./A in-furrow, a split application of Temik 15G at 1.5 lb. a.i./A banded at-plant and 40 DAP, and a non-treated control. A RCB, split-plot design with planting date as the main plot, peanut cultivar as subplots, and Temik 15G treatments as sub-subplots was used. The field selected was infested with S. rolfsii and M. arenaria. The hull-scrape method was used to determine optimum date of harvest. Both years, stem rot severity across all cultivars was highest in the early-planted peanuts, then declined through the late planting date. In 1993 planting date across all cultivars had no consistant impact on the level of root-knot damage on the roots, pegs, and pods. Early planted peanuts in 1994 suffered less root-knot damage than at the later planting dates. Stem rot severity was significantly lower but root-knot damage higher in Southern Runner than on the other two cultivars. In one of two years, stem rot severity was lower in Andru 93 than Florunner, however root-knot damage on both cultivars was similar. Across dates of planting and pesticide treatments, Andru 93 yielded significantly higher than the other two cultivars. In one of two years, yield of Southern Runner was significantly lower than that of Florunner. The application of the nematicidal rate of Temik 15G gave the highest yield gains for all cultivars. Similar stem rot severity was noted in both the Temik 15G-treated plots and the non-treated control. In 1993, yield of Andru 93 and Florunner increased from the early to the late planting date while Southern Runner yields declined. Highest yields in 1994 for all three cultivars were recorded at the mid-season planting date.

Genetic Variability in Peanut Seed Response to Germination Temperatures. S.C. MOHAPATRA. Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695-7625.

Temperature is the single most important determinant of seed germination rate and percentage in all species. While most agronomic seeds germinate well under room conditions (about 23-25°C), this is by no means the optimum germination temperature for all germplasms of all species. Further, temperature in the soil often varies not only between days but also between morning and evening in the same day. Thus, optimum temperature may or may not be available following planting. Peanut (Arachis hypogaea) seeds are often planted in early May in North Carolina. This period has the risk of too low or too high soil temperature for optimum peanut stand establishment. With advances in seed science and technology and biotechnology, it is now feasible to plant pregerminated seeds. This will not only improve adaptability to variable temperatures, but the seeding can also be delayed until the soil temperature becomes less variable without sacrificing other timings. An additional advantage of pregermination is that this can be accomplished indoors under optimum temperatures instead of exposing the seeds to variable temperatures in the soil. In order for pregermination to be most effective, the optimum germination temperature for each cultivar must be known. This information is important in view of the fact that considerable germplasm variability exists in other crops such as tobacco (Nicotiana tabacum). This study was undertaken to determine the optimum germination temperatures for each of the four popular genotypes (NC 6, NC 7, NC 9, NC 10) grown in this state. Seeds were sandwiched between wet paper towels and germinated at 17-39°C, with 2°C increments, in a thermogradient incubator built in this laboratory. Three replications were used at each temperature and the experiment was repeated one more time. All genotypes gave 85-90% germination at room temperature. However, the optimum temperature for maximal germination for NC 10 and NC 7 were 23 and 27°C, respectively. NC 6 had the broadest optimum temperature range (23-27°C) while the optimum range for NC 9 was 23-25°C. The thermal profile of the germination percentage of each cultivar generally reflected germplasm tolerance to temperature stress. For example, NC 6 not only had the broadest temperature range (23-27°C) for maximum germination, but it gave higher germination percentages than the other three genotypes at 39°C.

Plant Pathology

Southern Stem Rot Inoculation Techniques. F. M. Shokes*, North Florida Research and Education Center (NFREC), Quincy, FL 32351, K. Rozalski, Agricultural University, Poznan, Poland, D. W. Gorbet, NFREC, Marianna, FL 32344, and T. B. Brennemann, Coastal Plain Experiment Station, Tifton, GA.

Four glasshouse and one field experiment were conducted in 1994 at the NFREC, Marianna, FL, to determine the most effective technique for inoculation with *S. Rolfsii*. 'Florunner' plants were grown in the glasshouse experiments in 20.3 cm diameter pots and inoculated at 48 days after planting (DAP). Plants were placed in plastic bags for 48 hr to maintain high relative humidity. Plants in the field experiment were grown in plots 2.74 m long on 0.91 m centers. Plants were thinned to get 11 plants per plot and every other plant was flagged for inoculation. Plants were inoculated at 48 DAP and watered before inoculation and on two consecutive days thereafter. Inoculation techniques used in all experiments were 1) a sclerotium pre-germinated on a 1 cm diameter agar plug placed at the crown of each plant, 2) mycelia of a composite of six isolates growing on sterilized oat seed placed near the stem of each plant (20 g), 3) 2-3 ml of a PDA slurry with actively growing mycelia applied to the base of each plant, 4) PDA-impregnated toothpicks with mycelia inserted into stem bases, 5) toothpicks with mycelia inserted into soil near stem base, and 6) PDA-impregnated clothespins with mycelia clamped around stem bases. The most effective methods in all experiments were the agar plug technique (1) and the clothespin technique (6). The oat inoculum technique was only slightly less effective than techniques 1 and 6. Techniques 1 and 6 have the advantage of distinct single-plant inoculation. The oat inoculum technique allows the use of a composite of multiple isolates and allows for inoculation of entire rows of plants. All three of these techniques (1,2, and 6) were very effective and other techniques were significantly less effective ($P \leq 0.05$).

Potential Use of Optical Scanners to Separate Seed with a Testal Symptom Associated with Seedborne Cylindrocladium parasiticum. B.L. RANDALL-SCHADEL*, J. E. BAILEY, M. K. BEUTE, and F. E. DOWELL. Seed Section,North Carolina Dept Agriculture, Raleigh, NC; Dept. Plant Pathology, North Carolina State University, Raleigh, NC; and USDA-ARS, National Peanut Research Laboratory, Dawson, Ga.

A technique for minimizing seedborne *Cylindrocladium parasiticum* is removing the symptomatic peanut seed during conditioning. Preliminary studies were conducted to determine if optical scanners could be used to distinguish speckled testae from normal testae. Samples were randomly collected from 5 seed lots per variety (NC 7 , NC 10C). These samples were visually inspected and symptomatic seed removed. Two subsamples (200 gm) were randomly taken from each sample. Known amounts of symptomatic seed (10 g) were added to each of the subsamples. Subsamples were run through a Delta Technology Corporation high resolution monochromatic scanner at each of three different light reflectance settings, which were used on each subsample to compare the sensitivity in rejecting the symptomatic seed. Analysis of variance indicated the setting was a significant source of variation for the acceptance and rejection of asymptomatic (P=0.0001) and speckled seed (P=0.03). Seed lot was another significant source of variation for the acceptance and rejection of asymptomatic (P=0.0001) and speckled seed(P=0.03). Further research is needed to determine if optical scanners can be adjusted to reject symptomatic seed in a cost effective manner and at the high volumes many conditioning facilities are now using.

Lack of Spotted Wilt Control in Peanut After Rogueing Symptomatic Plants. M. C. BLACK* and D. ALCALA. Texas A&M University, Dept. of Plant Pathology and Microbiology, Uvalde, TX 78802-1849.

Spotted wilt disease, caused by tomato spotted wilt virus (TSWV), has been a threat to South Texas peanut production since the mid-1980's. This disease is often a problem in peanut research plots addressing problems unrelated to TSWV. Removing symptomatic peanut plants early in the season theoretically could reduce one of the inoculum sources and also subsequent disease. A six-location study was conducted in 1994 in South Texas commercial peanut fields to determine if spotted wilt could be reduced in small-plot peanut experiments by early-season rogueing of symptomatic peanut plants. The treatments were 1) symptomatic plants pulled, placed in plastic bags, and removed from the field; 2) symptomatic plants pulled and dropped in the furrow; 3) thinned control with plants dropped in furrow (stand reduced by the same number of plants at the same relative positions as plants rogued in treatment #1 in that replication); and 4) control. These treatments were planted in a randomized complete block design with six replications in all but one location. At the Tschirhart location, treatment #2 was omitted, there were 10 replications, and all pulled plants (healthy and symptomatic) were bagged and removed from the field. Individual plot size was 12 rows by 36 feet. Original plant populations among locations ranged from 2.0 to 3.1 plants/foot of row. Rogueing did not significantly affect spotted wilt at any of the six locations on any date of disease assessment. Final average spotted wilt ratings (including late season symptoms of yellowing, wilting, and plant death) for three locations in Frio County were 90 (Vaughn location, GK-7 cultivar), 91 (Tschirhart, Florunner), and 94% (Phillips, GK-7) row-feet with symptoms. The final ratings for the three Atascosa County locations were 25 (Marsh, GK-7), 43 (Wier, GK-7), and 47% (Friesenhahn, Florunner) row-feet with symptoms. All Frio County locations were planted in May and all Atascosa County locations were planted in June. Possible explanations for the lack of control include thrips acquisition of TSWV from infected peanut plants before symptom expression and high numbers of immigrant viruliferous thrips into small plots from outside the field or from the surrounding commercial fields.

Resistance to Sclerotinia blight and Southern Stem Rot in Breeding Lines of Virginia Peanut. B. B. SHEW*, M. K. BEUTE, and T. G. ISLEIB. Departments of Plant Pathology and Crop Science, North Carolina State University, Raleigh, NC 27695-7616.

Diseases caused by soil-borne pathogens are difficult to control and are major constraints on peanut production. Incorporation of resistance to several soil-borne pathogens into a single cultivar would help to minimize disease losses. Preliminary studies have indicated that germplasm lines such as NC 3033 and NC Ac 18016, which possess high levels of resistance to Cylindrocladium black rot (CBR) caused by *Cylindrocladium parasiticum*, also have resistance to Southern stem rot caused by *Sclerotium rolfsii* and Sclerotinia blight caused by *Sclerotinia minor*. Two disease nurseries were established at the Upper Coastal Plain Research Station in order to evaluate resistance to *S. minor* and *S. rolfsii* in breeding lines of virginia-type peanut that were selected primarily for resistance to CBR. Sixteen genotypes were planted in four, two-row plots in each nursery and were inoculated in August with oat grains infested with the appropriate pathogen. Percentage disease incidence and percentage mortality were determined from counts taken at digging. Lesion numbers also were counted on selected plants. Genotypes differed significantly in resistance to Sclerotinia blight and stem rot in 1993 and 1994. In both years, incidence of Sclerotinia blight was least on Chico, a field-resistant spanish type; NC 3033 had slightly, but not significantly, more disease than Chico. Incidence of Sclerotinia blight on three of the virginia-type breeding lines did not differ significantly from incidence on NC 3033 in 1993; two of the lines had levels of disease equal to that on Chico. In 1994, disease incidence on four virginia-type breeding lines did not differ from that on NC 3033. Breeding lines N92054 and N92056, which originated from a cross of NC-V11 and NC Ac 18016, had superior resistance to Sclerotinia blight in both years. Resistance to Southern stem rot also was found in these lines in both years.

Possible Resurgence of Peanut Pod Rotting Diseases in North Carolina. J. HOLLOWELL* and M. K. BEUTE. Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.

Incidence of pod rot diseases has been an important aspect of peanut production in North Carolina during the last three decades. Although sporadic in occurrence state-wide, yield losses due to pod rotting were estimated to exceed 20% during 1970-79. Changes in cultural practices appeared to have minimized losses in years subsequent to 1979, but growers have recently suggested that a resurgence in pod rotting is occurring in North Carolina. We also have observed that the incidence of pod rot is uncharacteristically high in research plots used to study conservation-tillage. A multiyear study was initiated to determine whether a resurgence of pod rot diseases was occurring state-wide, and whether changes in tillage practices contribute to pod rot incidence, possibly by altering soil biota. A preliminary survey was made of selected farms in the fall of 1994 to identify specific pod rot pathogens associated with "problem" fields. Partially-rotted pods (200) from 15 grower fields were collected to incubate for identification of pathogens. Fifty pods per field were assayed on a medium selective for *Pythium* sp.; 50 pods were assayed on CBR-selective medium; 50 pods were assayed on water-agar for isolations of *Rhizoctonia* sp.; and 50 pods were incubated on moistened towels in plastic chambers to observe growth of *Sclerotinia minor* and *Sclerotium rolfsii*. *Rhizoctonia* sp. were identified from all 15 fields (26% of total pods); *Pythium* sp. occurred in 14 fields (25% incidence); *Cylindrocladium* occurred in 9 fields (17% incidence); *S. rolfsii* occurred in 8 fields (2% incidence), and *S. minor* occurred in 1 field (1% incidence). Combinations of pathogen-types were identified in 12% of rotted pods from 14 fields. The most frequent association occurred with *Pythium* and *Rhizoctonia*; i.e., both pathogens were isolated from pods from the same fields. Field microplots were established in 1994 to evaluate effects of winter cover-crops on *Pythium*, *Rhizoctonia*, and P+R-induced pod rot incidence.

Screening for Resistance to Cylindrocladium parasiticum among Runner-type Peanut Genotypes. G. B. PADGETT*, T. B. BRENNEMAN, and W. D. BRANCH, Dept. of Plant Pathology and Crops and Soil Sciences, Cooperative Extension Service and Coastal Plain Experiment Station, University of Georgia, Tifton, GA.

Cylindrocladium black rot (CBR), caused by *Cylindrocladium parasiticum*, has caused significant reductions in Georgia's peanut crop for the past four years. Resistance is an effective, economical means to manage disease, but CBR resistant runner-type cultivars are not available. A preliminary greenhouse experiment was conducted (January 1994) to evaluate a screening method for CBR resistance. Peanut genotypes ('Florunner', 'Georgia Runner', 'Georgia Browne', CBR R2, NC 8C, or NC 3033) were seeded in conetainers (1 seed/conetainer) containing soil infested with 0, 1, 5, or 20 microsclerotia/gram of soil. Soil moisture was kept at field capacity during the experiment. Forty-nine days after planting, individual plants were removed from conetainers, roots were washed and rated for root necrosis (0-5, where 0 = no disease and 5 = completely deteriorated root system). For each genotype, CBR severity increased with increasing microsclerotia. CBR root ratings were greatest for Florunner (3.0) and least for CBR R2 (1.8). An additional greenhouse/field experiment to identify CBR resistance was conducted (March 1994) to evaluate three peanut cross combinations: 1) Georgia Browne X NC 8C, 2) Georgia Runner X NC 3033, and 3) Georgia Runner X CBR R2. F_2 populations (1179) were individually seeded in conetainers containing soil infested with 5 microslcerotia/gram of soil. Seedling were maintained and rated for root necrosis as described previously. Forty-six days after planting, each seedling was rated for root necrosis. Plants from the Georgia Runner X CBR R2 and Georgia Browne X NC 8C crosses exhibited the most resistance to CBR. Selections were transplanted to the field for seed increase and further agronomic evaluations. The results from this study appear promising for differentiating between CBR resistant or susceptible runner-type peanut genotypes.

Sclerotinia Blight, Southern Blight and Peanut Yield as Affected by Applications of Cornmeal.

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Whole kernel yellow corn, ground to a meal consistency was applied over peanuts at 30 and 60 days after planting. Plots were located in Mason, Motley and Comanche counties of Texas. Each application consisted of 448.5 kg/ha concentrated into a 30.48 cm band over the row. Plants were monitored throughout the season and yields were measured. Sclerotinia minor the fungus that causes Sclerotinia blight remained depressed throughout the season in treated plots. Sclerotium rolfsii the fungus that causes Southern blight increased rapidly following each application. This increase lasted about 10 days after which there was no further increase. It appeared that the naturally occurring soil fungus Trichoderma sp. built rapidly following cornmeal applications and had parasitized most existing colonies of S. minor and S. rolfsii within 10 days. Yields increased in all locations where cornmeal was applied.

An Algorithm for Predicting Outbreaks of Sclerotinia Blight of Peanut and Improving the Efficiency of Fungicide Sprays.

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Moisture, soil temperature, vine growth and foliar canopy in peanut fields have been associated with outbreaks of sclerotinia blight. An algorithm based on indices of these factors was developed for assessing disease risk and determining the optimum time(s) for fungicide application. Weather data were collected at two sites with a history of sclerotinia blight. Each field was planted to either NC 7 or NC-V 11, and managed according to recommended practices. Plots were replicated in four randomized complete blocks and consisted of four, 35-ft rows spaced 36 inches apart. Fungicide treatments were applied to the two, center rows of each plot with one 8010LP nozzle over each row and providing complete coverage of the canopy with an output of 40 gal/A. Moisture was assigned an index of one each day if accumulations of rainfall were ≥0.5 inches over the previous 5 days, ≥1.0 inches over the previous 10 days, or RH was ≥95% for ≥8 hrs the previous day. Soil temperature at the 4-inch depth was assigned an index of three, two, or one when the mean for the previous day was ≤71.6, ≤77, or ≤82.4, respectively. Moisture and soil temperature values outside these parameters were assigned an index of zero. Vine growth indices were three, two, or one when vines were overlapping between rows, ≤6 inches of overlapping, or >6 inches from overlapping, respectively. Likewise, numerical indices of three, two, or one were assigned to the foliar canopy when >95%, ≥75% or <75% of the soil surface was shaded by foliage. A 5-day index (FDI) of disease risk was developed by multiplying the indices on a given day, and then summing the values for the previous 5 days. FDI levels from 16 to 48 were tested for fungicide treatment. After a fungicide application was made, the FDI was reset to zero for a 3-week period to reflect fungicide activity. Two applications of Fluazinam (0.5 lb a.i./A) at the FDI=32 threshold in 1994 suppressed disease incidence by 54% at harvest and increased yield by 1820 lb/A. The standard demand spray at disease onset followed by a repeat application 4 weeks later suppressed disease by 33% and increased yield by 1200 lb/A. Sprays at 60 and 90 days after planting suppressed disease by 44% and increased yield by 1516 lb/A. Untreated plots averaged 38.4 infection foci per plot at harvest and yielded 2055 lb/A. These results are being used to construct a sclerotinia advisory program for peanut in Virginia.

Effect of Tebuconazole, Chlorothalonil, Propiconazole, and Flutolanil on Disease Control and Peanut Yield in Oklahoma. K.E. JACKSON*, J.P. DAMICONE, and H.A. MELOUK. Department of Plant Pathology and USDA-ARS, Oklahoma State University, Stillwater, OK 74078-9947.
The fungicides, chlorothalonil at 1.2 ai kg/ha, chlorothalonil at 1.2 ai kg/ha + flutolanil 1.1 ai kg/ha, tebuconazole at 0.25 ai kg/ha, and propiconazole at 0.14 ai kg/ha, were evaluated over a 10 year period from 1984-1994 for foliar and soilborne disease control in spanish-type peanut. Except for flutolanil, which was applied once at 60 days after planting (DAP), treatments were applied six times on a 14-day schedule with the first application at ca. 45 DAP. Fungicides were applied with a wheelbarrow sprayer equipped with hollow cone nozzles at 243 liter per ha. In 1993 and 1994, propiconazole .07 ai kg/ha was applied as a tank mix with chlorothalonil 0.75 ai kg/ha. Both propiconazole and tebuconazole were applied 4 times between an initial application and the final application of chlorothalonil during 1993 and 1994. Incidence of early leaf spot (*Cercospora arachidicola*), southern stem rot (*Sclerotium rolfsii*), and Sclerotinia blight (*Sclerotinia minor*) were determined at harvest. Compared to the no treatment (50-87% leaf spot) leaf spot infection was significantly reduced in the tebuconazole, propiconazole, and chlorothalonil treatments which were 1-9%, 5-7% and 3-6%, respectively. Only tebuconazole and flutolanil provided significant (P = 0.05) control of southern stem rot. Disease incidence was 0.1-2%, 1-6%, 0.4-11%, and 1%, in plots treated with tebuconazole, propiconazole, chlorothalonil, and flutolanil, respectively, compared to the untreated control (0.4-14%). Incidence of Sclerotinia blight in the plots was 5-6%, 6%, 7-9%, 9%, and 1-2% for tebuconazole, propiconazole, chlorothalonil, flutolanil and the untreated control, respectively, which suggested that these fungicides significantly increased incidence of Sclerotinia blight. Yield increases of 549-851 kg/ha, 455-650 kg/ha, 266-562 kg/ha, and 942 kg/ha were obtained from plots treated with tebuconazole, propiconazole, chlorothalonil, and flutolanil, respectively with consistently significant yield increases occurring in treatments of tebuconazole, propiconazole, and flutolanil. Results suggest that the use of tebuconazole, propiconazole, and flutolanil in Oklahoma will increase yields due in part to enhanced soilborne disease control.

Effect of Tank-Mix Combinations of Tebuconazole and Chlorothalonil on Leaf Spot Epidemics in Peanut.

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Epidemics of early (*Cercospora arachidicola*) and late (*Cercosporidium personatum*) leaf spot of peanut (*Arachis hypogaea* L.) were monitored in plots treated full season with tebuconazole at rates of 0, 0.038, 0.076 and 0.114 lb ai/A applied alone and in combination with 0.375 lb ai/A of chlorothalonil. These treatments were compared to plots treated with 1.125 lb ai/A of chlorothalonil full season (seven total sprays), and plots treated with chlorothalonil at 1.125 lb ai/A for the first two and seventh sprays and tebuconazole at 0.20 lb ai/A for sprays 3-6. Leaf spot epidemics were severe, and early leaf spot was the predominant foliar disease throughout the season. Final Florida Scale leaf spot ratings (1-10 where 1 = no disease and 10 = plants defoliated and killed by leaf spot) were 9.6, 6.6, 4.5, and 3.4 for the 0, 0.038, 0.076 and 0.112 lb ai rates, respectively of tebuconazole alone, and 8.6, 4.3, 2.9, and 2.3 (LSD = 0.7) for the respective rates of tebuconazole plus 0.375 lb ai of chlorothalonil. Leaf spot ratings for the 1.125 lb ai chlorothalonil standard and the chlorothalonil-tebuconazole block treatments were 4.8 and 2.9 respectively. Pod yields were 1337, 3785, 4068, and 4294 lb/A for the 0, 0.038, 0.076 and 0.114 lb ai rates, respectively of tebuconazole alone, and 2565, 3938, 3938, and 4475 lb/A (LSD = 463) for the respective rates of tebuconazole plus 0.375 lb ai of chlorothalonil. Pod yields for the 1.125 lb ai/A chlorothalonil standard and the chlorothalonil-tebuconazole-chlorothalonil block treatments were 3698 and 3916 lb/A respectively.

An Historical Summary of Nematode Control by TEMIK® brand Aldicarb Pesticide on Peanuts in Georgia from 1969 through 1994.

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Between 1969 and 1994, 48 replicated peanut nematicide trials which included aldicarb were conducted by USDA-ARS and the Coastal Plains Experiment Station in Georgia. Trials were conducted in Decatur (5), Calhoun, Worth, and Tift (41) counties. Yield was used to measure treatment differences across trials. Aldicarb was applied banded at-plant at 1.0, 2.0 and 3.0 lb ai/A and as a split application 1.5 lb ai/A at-plant plus 1.5 lb ai/A banded at pegging. Telone II (1,3-dichloropropene) was evaluated as a spring injected broadcast treatment 12" deep at 37 lb ai/A. The peanut root-knot nematode (*Meloidogyne arenaria*) was most consistent across trials. Lesion (*Pratylenchus brachyurus*) and Ring (*Criconemella* spp.) nematodes were present at some sites. In 30 trials from 1969-1989, the average yield with aldicarb at 3.0 lb ai/A was 3571 lb/A while the untreated yield was 3071 lb/A. In only 3 of the 30 trials was the yield increase in aldicarb treated plots less than a "break-even" 200 lb peanuts/A. Root knot indices (1-5 scale, 5=severe) averaged 3.6 for the untreated and 2.5 for aldicarb. Lower rates of aldicarb, evaluated beginning 1988, exhibited a linear yield increase. In four trials with the untreated averaging 1711 lb peanuts/A, the yield increase from aldicarb treatments was 357 lb/A at 1.0 lb ai/A, 684 lb at 2.0 lb ai/A and 871 lb/A with the split application of aldicarb 1.5+1.5 lb ai/A. A split application of aldicarb (1.5+1.5 lb ai/A) resulted in a 748 lb/A yield increase (9 trials) in comparison with 648 lb/A yield increase with aldicarb 3.0 lbai/A at-plant and 342 lb/A yield increase for fenamiphos at-plant 2.5 lb ai/A. Aldicarb and Telone II soil fumigant (1,3-dichloropropene) had an additive effect on yield when used together at-plant. In four trials from 1988-1991, an average yield increase of 1700 lb/A was achieved with a combination of 1,3-dichloropropene 37 lb ai/A plus aldicarb 1.0 lb ai/A. In those trials, the yield increases for aldicarb 3.0, 1.5+1.5 split application and 1,3-dichloropropene 37 lb ai/A were comparable at 1090 and 1094 lb/A (untreated yield = 1973 lb/A).

Formation of Sclerotia of *Sclerotinia minor* in Mixed Cultures.

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Two isolates of *Sclerotinia minor* (9M-N, a nonsclerotial forming isolate; and C, a sclerotial forming isolate) were grown together in potato dextrose broth. Sclerotia were collected after 14 days incubation at 23±2 C. Ninety-seven percent of the sclerotia produced mycelial growth on potato dextrose agar (PDA) with sectors that were void of sclerotia. Also, in paired culture tests on PDA in 9-cm petri plates, the two isolates exhibited incompatibility where mycelial growth was scant in the middle of the plates. No sclerotia formed in the 9M-N section of the plates after two weeks of incubation. However, sclerotia formed in the C section of the plate. Ninety-six percent of all sclerotia formed by isolate C that were adjacent to the barrier between the isolates formed sectors void of sclerotia when cultured. Fifty-seven percent of sclerotia within 0.5 cm from the barrier zone also developed 9M-N sectors without sclerotia. None of the sclerotia formed >0.5 cm from the barrier produced sectors. These results suggest that during sclerotial formation, pseudoparenchymatous mycelial tissue of isolate C can entrap mycelia of 9M-N. Results also suggested that 9M-N's nonsclerotial forming mycelia is able to survive in the sclerotia of isolate C. However, transfer of a non-sclerotial forming factor did not occur through anastomosis because sclerotia formed away from 9M-N mycelial growth did not produce sectors.

Processing and Utilization

Pod and Seed Size Relation to Maturity in Virginia-type Peanuts. K.L. MCNEILL and T.H. SANDERS*. Department of Food Science and USDA, ARS, Market Quality and Handling Research, North Carolina State University, Raleigh, NC 27695-7624.

In-shell peanuts sales provide a consistent market for virginia-type peanuts. Roasted peanuts are often sold in small packages with high sales appeal at ball park and other similar events. In this market, maintenance of a high quality product that includes fresh roasted peanut flavor is a recurring challenge. A maturity-seed size-quality relationship has been established for shelled peanuts. To determine if this relationship is true in in-shell peanuts, the relationship of maturity, pod size and seed size was investigated. In two crop years for 3-5 consecutive days, virginia-type peanuts (NC 9) were harvested and sorted into hull-scrape classes: black, brown, orange B, orange A, and yellow. After pods were dried, they were screened to determine the pod size distribution. Sized pods were hand-shelled, and the seed were screened to obtain the seed size distribution from each pod size from each maturity class. Hull-scrape pod maturity profiles revealed a decrease of ca 14% in yellow/orange A and an increase of ca 20% in brown/black over the 3-5 day period. Overall pod size distribution was slightly different in the two years but neither changed with time. Pod size distributions of maturity classes were variable. The data indicate that a high percentage of immature pods are included in both Jumbo and Fancy in-shell grades. The immature seed from these pods, which are generally consumed individually, have low roast flavor and short shelf-life which results in increased potential for off-flavor.

Effect of Water Activity on Off-flavors in Low-fat Peanut Paste. M. J. HINDS*. Food Science Unit, Human Environment & Family Sciences Department, 102 Benbow Hall, North Carolina A&T State University, Greensboro, NC 27411.

There is a need to develop a variety of low-fat value-added peanut products because of adverse health implications of high-fat foods. This study investigated off-flavors in pastes made from low-fat peanut flours in order to identify their potential for developing new products. Commercial brands of low-fat (12% or 20% fat, dry basis [12F, 20F]) flours, which were made by partially defatting dark-roasted peanuts, were used. Pastes were prepared by mixing flours with water in ratios of 1:1.25 and 1:1.5 (w:v) for 12F and 20F flours, respectively. Pastes twists (~4cm long x 5mm diameter) were formed using a pastry pump and deposited into petri dishes. Dishes were stored at 24°C in dessicators containing saturated salt solutions of LiCl, K_2CO_3 and NaCl corresponding to water activity (WA) levels of 0.12, 0.44 and 0.76, respectively, until samples attained equilibrium moisture. Gas chromatography was used to characterize headspace volatiles of flours, freshly-made pastes and stored paste twists. Fat % and WA influenced the type of off-flavors formed in the paste twists. Negligible off-flavors were formed in 12F and 20F twists at 0.44 WA and in 20F twists at 0.76 WA. 12F twists at 0.76 WA produced n-methyl pyrrole (musty flavor). Greatest oxidation occurred in all twists at 0.12 WA: hexanal, n-methyl pyrrole, pentanal, 2-methyl butanal, 3-methyl butanal, 2-methyl propanal and pentane were present. Correlation with sensory attributes indicate that 20F twists at 0.12 WA would have more beany and musty flavors but less throat burn than 12F ones. 12F flour and freshly-made 12F paste contained higher levels of compounds responsible for beany, musty and fruity flavors and throat burn than corresponding 20F samples. Results indicate that 0.12 WA may promote formation of hexanal (beany), n-methyl pyrrole and pentane (musty flavor and taste) in products containing 20% fat. Products at 0.44 WA made from flours containing 12 or 20% fat and products at 0.76 WA made from 20F flours may have the least off-flavors.

Headspace Analysis and Fatty Acid Composition of Peanut Seed from CBR Infested Fields. R. W. MOZINGO*, C. T. YOUNG, and D. M. PORTER. Tidewater Agricultural Research and Extension Center, Virginia Tech, Suffolk, VA 23437; Food Science Dept., NCSU, Raleigh, NC 27695; and ARS, USDA, New England Plant, Soil, and Water Lab., Orono, ME 04469.

Cylindrocladium black rot (CBR), caused by *Cylindrocladium parasiticum* Crous, Wingfield and Alfenas (formerly *C. crotalariae*), is a disease that causes large yield losses in peanut fields in the Virginia-Carolina production area. The objective of this study was to determine if peanut seed from fields exhibiting symptoms of CBR and having flecked testa (seed symptom typically caused by *C. parasiticum*) differed in oil quality and headspace volatiles from sound mature kernels (SMK) without flecked testa. Peanut pods from two CBR resistant genotypes (NC 10C and NC 18469) and two susceptible genotypes (NC 7 and VP 8129) were harvested from variety tests that had severe yield reductions from CBR. Tests were grown at two locations in 1989 and 1992 using a randomized complete block design with two replications per test. Peanuts from each replication were shelled, screened over a 6.0- by 25.4-mm slotted screen, and seed with regular damage removed. Seed lots were hand sorted into two groups: SMK with flecked testa and SMK without flecked testa. Fatty acid composition was determined by gas chromatography. The SMK with flecked testa had a lower percentage of linoleic acid, higher percentage of all saturated fatty acids, lower iodine value, and higher O/L ratio than SMK without flecked testa. Oleic acid percentage did not differ between the two. These results show a more stable oil with a longer shelf life for SMK with flecked testa, suggesting that they could be more mature than SMK without flecked testa. During the sorting of these two groups, it was noted that SMK with flecked testa were larger and appeared more mature than SMK without flecked testa. Roasted peanut volatiles were also measured by gas chromatography using a rapid headspace analysis method. These results indicate less musty aftertaste, tongue or throat burn, musty flavor, and beany volatiles for SMK with flecked testa. This again would indicate more mature peanuts with less oxidation. The aging volatile was higher for SMK with flecked testa. The results of this study show that SMK with flecked testa, associated with CBR symptoms but not classified as damaged, would be acceptable in the marketplace. Peanut volatiles and oil quality would not be significantly affected.

Relationship of Maturity to Volatiles of Raw and Roasted Peanuts. T.H. SANDERS*[a], N.V. LOVEGREN[b], J.R. VERCELLOTTI[b], K.L. BETT[b], and P.D. BLANKENSHIP[c]. [a]USDA, ARS, MQHR, Box 7624, Department of Food Science, NCSU, Raleigh, NC 27695; [b]USDA, ARS, SRRC, PO Box 9687, New Orleans, LA 70179-0687; [c]USDA, ARS, NPRL, 1011 Forrester Drive SE, Dawson, GA 31742.

Metabolism of low molecular weight peanut volatile carbon compounds was carefully studied over three crop years (1985, 1986, 1987) to compare the distribution of these volatiles in hull-scrape maturity classes. Volatiles were determined both for medium raw and roasted peanuts from each maturity class. In each crop year peanuts were windrow dried, subjected to hull-scrape classification and dried to ca. 9% moisture content before pods were shelled and seed were screened into commercial sizes. In raw peanuts total volatiles content declined from 15-20 ppm in the immature peanuts (yellow 2/orange A/orange B) to 4-6 ppm in mature peanuts (brown and black). For each crop year linear regressions of maturity classes with 25 GC-MS identified marker volatile compound concentrations resulted in high R^2 values (0.90-0.99) for each, both in individual crop years as well as the mean across all three crop years. In roasted peanuts from the maturity classes, 18 identified compounds exhibited expected patterns of higher quantity of volatiles (immature peanuts, 50 to 60 ppm; mature, 15 to 30 ppm) than in the raw peanuts. A number of compounds significant in raw peanuts were found to be important in the roasted peanut volatile profiles. Although individual compounds had unique slopes in plots of concentrations from least mature to most mature, in both raw and roasted peanuts the quantities of various compounds decreased inversely with maturity. Identical inverse relationships between volatiles and maturity were also observed in peanuts subjected to variable temperature curing conditions, the highest temperature-cured peanuts having the most pronounced volatile content.

Enhanced Roasted Peanut Stability in the High Oleic Acid Breeding Lines.

D.A. SMYTH*, C. MACKU, J. GOGERTY, O.E. HOLLOWAY and D.W. GORBET. Planters, Nabisco Technical Center, East Hanover, NJ 07936, and University of Florida, North Florida Research and Education Center, Marianna, FL 32446.

Breeding peanuts (*A. hypogaea* L.) for improved oil chemistry with higher oleic acid content has been a goal because of potential increased product stability and improved nutritional characteristics. High oleic acid peanut oil has greater oxidative stability than oil from current cultivars, while providing consumers with a richer source of monounsaturated lipid. This study examined whether products using whole, roasted peanuts would benefit from the high oleic acid trait. Fatty acid profiles and oxygen stability indexes of 26 Florida breeding lines and the cultivar Florunner were measured on peanuts grown at the Marianna, NFREC. Breeding lines with the high oleic acid trait had about 80% oleic acid in lipid. Increased oleic acid was associated with decreased linoleic acid content. Cold-pressed peanut oils from high oleic acid lines have about 3 to 5 times the stability of genotypes with 50 to 65% oleic acid, when measured for oxygen stability index. Peanuts from six of these breeding lines and Florunner were oil roasted, and evaluated by a descriptive sensory panel. Important quantitative traits such as roasted peanut flavor were similar in the seven peanut lines chosen. Breeding lines F1250, F1316, and Florunner were further evaluated for whole nut stability and flavor volatiles. Roasted peanuts of lines F1250 and F1316 were substantially more stable than Florunner in a model system where aldehyde production at elevated temperature was measured. The results suggest that high oleic acid peanuts have the roasted quality of current cultivars, while showing the additional benefit of greater oxidative stability.

Stability of Sweet and Instability of Roasted Peanut and Other Attribute Intensities in Long-Term Sensory Studies Using Freezer-Stored Roasted Peanut Paste.

H. E. PATTEE* and F. G. GIESBRECHT. USDA-ARS, South Atlantic Area, Market Quality & Handling Research and Dept. of Statistics, North Carolina State University, Raleigh, NC 27695

Flavor-fade in peanut butter or roasted peanut paste under ambient storage conditions is generally accepted. However, documentation of the stability or instability of selected sensory attributes from roasted peanut paste stored under -20 C conditions for up to nine months has not been previously presented. Long-term sensory studies used in the evaluation of pedigree sources of peanut flavor enhancement were used to determine if these changes occurred. The experimental design of the studies was an incomplete block to permit investigation of both between and within panel session variation. In both a four-month study in 1993 and a nine-month study in 1994-95 the sensory attribute sweet was stable with average first-two week LS mean intensities of 2.9 and 3.1 at the beginning and 3.0 and 3.2 averages for the last-two weeks, respectively. Roasted peanut attribute declined from 4.7 at the beginning of both studies to 4.0 at the end of four-months and 3.8 at the end of nine-months. The attribute stale was initially 2.8 and 2.9 and 3.4 at end of 4-months and 3.8 at end of nine-months. These observations indicate that a staling process is still in progress even though the samples have been maintained at -20 C. Whether the staling process is responsible for the concurrent decline of the roasted peanut attribute or it's decline is an independent process can not be determined from these data. These data also indicate that special precautions must be taken in undertaking long-term sensory studies, such as utilizing an incomplete block design, to account for the sensory attribute changes that are occurring.

Production Technology

Prohexadione Calcium, a Potential New Growth Regulator for Use in Peanuts (Archis hypogaea). J. R. EVANS and J. M. MITCHELL*. BASF Corporation, Research Triangle Park, NC 27709.
Prohexadione calcium (BAS 125W or BAS 9054W) is an experimental growth regulator with a potential use in peanut production. Prohexadione-Ca acts within a plant to block the biosynthesis of gibberellin resulting in shorten internode length. In peanuts, applications of prohexadione-Ca will result in clearly definable peanut row shape at harvest. This will allow for greater harvesting efficiency. The anticipated use pattern will call for the first application to be applied at row closure and for repeated applications to occur at three to four week intervals as needed. Preliminary tests with prohexadione calcium indicate that it is essentially non-toxic to animals. The compound does not persist in the environment with a DT50 in soil of about one day. Uptake of the prohexadione-Ca formulation is greatly increased if ammonium ion is present in the spray solution. This can be achieved by adding the liquid fertilizer, urea ammonium nitrate (UAN) to the spray solution at the rate of at least one quart per acre. An alternative to UAN would be to add high grade ammonium sulfate to the spray solution.

Response of NC 9 Peanut to Chlorimuron. C. W. SWANN. Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437-0219.
Field studies were conducted in 1992-1994 at the Tidewater Agricultural Research and Extension Center to evaluate the effect of postemergence applications of chlorimuron on row definition, yield and grade of NC 9 peanut. Chlorimuron was applied as single treatment of 0.004 lb ai/A at 55 days after planting (DAP) or at 0.008 lb ai/A at 55, 78 or 96 DAP. Multiple treatments of chlorimuron at 0.002 lb ai/A were applied at 55 + 78 DAP and 55 + 78 + 96 DAP and 0.004 lb ai/A at 55 + 78 DAP. All treatments were applied with 0.25% V/V nonionic surfactant. The experimental design was a randomized complete block with four replications. All chlorimuron treatments resulted in significant vine growth suppression and improved row definition relative to untreated peanut when evaluated by visual estimates. Peanut yield was unaffected by chlorimuron application. In all years ELK and SMK grade factors were significantly reduced with multiple applications of either 0.002 or 0.004 lb ai/A treatments. Value per acre was significantly reduced for peanuts treated with sequential applications (55 + 78 + 96 DAP) of 0.002 lb ai/A of chlorimuron in 1994. These studies indicate that chlorimuron has potential for use in vine growth suppression and for improvement of row definition of peanut, however, these beneficial effects may be accompanied by detrimental impacts on grade factors and value per acre with some treatment regimes.

Critical Deficiency Concentration of Manganese in Peanut Leaves. N. L. POWELL*, C. W. SWANN, R. W. MOZINGO, D. C. MARTENS, and S. H. DECK. Virginia Polytechnic Institute and State University, Suffolk, VA 23437-0099.

Manganese (Mn) deficiency is a yield limiting factor for maximum yield of the large-seeded virginia-type peanut (*Arachis hypogaea* L.) on many Atlantic coastal plain soils. Foliar application has proven more efficient and effective than soil application for the correction of Mn deficiency in peanut. Research data is needed on the concentration of Mn required in the virginia-type peanut for optimum production. 'NC-V 11', 'NC 7', and 'VA-C 92R' peanut were grown on several Virginia coastal plain soil types during a four year period to determine the effect of foliar Mn application on pod yield and peanut nutrition. Treatments of foliar applied Mn increased pod yield from 0 (no yield response) to 11 times the untreated check. A modified Mitscherlich response equation was used to quantify the critical deficiency concentrations (CDC) and sufficient nutrient concentration (SNC) by characterizing plant growth as a function of leaf tissue nutrient concentration. The model used is $y = \beta(1-\gamma e^{-\alpha x})$ where y represents pod yield or crop value at tissue concentration x. The parameters α, β, and γ are estimated by nonlinear regression statistics. Definition of CDC is 90% of maximum pod yield or crop value and SNC as 99% of maximum pod yield or crop value. The CDC's for Mn were 15, 17, 23, and 28 mg kg^{-1} for pod yield and 15, 16, 20, and 27 mg kg^{-1} for crop value from leaves collected 7, 11, 15, and 17 weeks after planting, respectively. The SNC's were 25, 31, 46, and 59 mg kg^{-1} for pod yield and 24, 30, 40, and 55 mg kg^{-1} for crop value from leave collected 7, 11, 15, and 17 weeks after planting, respectively. Peanut Mn deficiency occurred in soils with a pH range of 5.3 to 6.8.

Effects of Band Width and Timing of Chlorpyrifos Granule Applications on White Mold Incidence and Wireworm Damage to Irrigated Peanut. S. L. BROWN* and T. BRENNEMAN. Department of Entomology and Plant Pathology, respectively, The University of Georgia, Tifton, GA 31794.

The objective of this study was to determine if time of application and band width affected the insecticidal and fungistatic activity of chlorpyrifos granules applied to irrigated peanut. At two locations, and in three years, chlorpyrifos granules were applied to flowering-stage or pegging-stage Florunner peanuts through a drop-tube or in 23 cm or 46 cm bands centered over the row. At mid-season, all treatments, except the widest band width applied at pegging, significantly reduced the incidence of white mold, but no differences were found at harvest. Wireworm populations were highly variable among tests, but when numbers were sufficient for evaluation, all chlorpyrifos treatments reduced wireworm populations and numbers of damaged pods. Application method and timing had little effect on the efficacy of chlorpyrifos as an insecticide. Even though all chlorpyrifos treatments reduced wireworm damage to peanut pods and at least delayed the onset of white mold, only the drop-tube application at flowering resulted in increased yield at one location. Orthogonal contrasts of flowering-stage applications vs. pegging-stage applications indicated that the flowering-stage applications resulted in higher yields and values per hectare.

Peanut Cultivar Yield Tests Utilizing Folicur with and without Irrigation. W.D. Branch* and T. B. BRENNEMAN. University of Georgia, Coastal Plain Experiment Station, Dep. Crop and Soil Sci. and Plant Path., respectively, Tifton, GA 31793-0748.

Tebuconazole, a systemic foliar fungicide, was recently registered by the U. S. Environmental Protection Agency for use in peanut (Arachis hypogaea L.) production as Folicur 3.6F. It is recommended in a block of four sprays following two applications of a non-sterol fungicide for control of Cercosporidium personatum, Sclerotium rolfsii, and Rhizoctonia solani. For the past three years (1992-1994), yield tests have been conducted at the Georgia Coastal Plain Experiment Station involving 10 runner-type cultivars and 6 virginia-type cultivars with and without irrigation following recommended applications of tebuconazole to determine which cultivars had the highest yield and the lowest incidence of white mold or stem rot (S. rolfsii). These yield trials suggest higher white mold incidence in the irrigated tests than without irrigation, and 1993 had a higher incidence of white mold than 1992 or 1994. The two peanut cultivars, Georgia Browne and Georgia Green, had the highest yields and lowest white mold incidence among the runner-types under both irrigated and nonirrigated conditions. Among the virginia-types, NC 10C consistently had the highest incidence of white mold over all three years, and NC 7, VA-C 92R, and NC-V 11 had the highest yields. Although Folicur provides good peanut disease control, these results show that certain runner and virginia-type cultivars perform significantly better than others utilizing the current recommended application of this new fungicide.

Trends and Placement of Herbicides by Implements. M. J. BADER*, and P. E. SUMNER. Extension Engineering, University of Georgia Extension Service, Tifton, GA..

Since the early 1960's when the herbicide incorporation concept was initially promoted by university and industry personnel, equipment has changed dramatically and has probably caused some incorporation problems. According to the county agent survey in Georgia, only 70 percent of peanut producers used herbicides in 1964. Ninety six percent of producers used herbicides by 1968. After 1968, the question "Who used chemical weed control?" was removed from the county agent survey. In 1979, the question of "What type of herbicide incorporation implement was used?" was added. In 1979, 65% used disk-harrows, and 35% used PTO devices. The 1993 county agent survey indicated 42% used disk-harrows, 26% used PTO devices and 29% used field cultivators. How these methods of herbicide incorporation compared to each other was raised. Herbicide incorporation clinics were conducted by the University of Georgia Cooperative Service to answer these questions and to educate peanut producers on proper herbicide incorporation. These clinics were conducted at the request of county agents. Incorporation implements used in the clinics were supplied by producers and equipment manufacturers. Incorporation with most types of implements was adequate when they were properly maintained, adjusted and operated at the correct speed and depth. When these conditions were not met, many implements did not do an adequate job of incorporation.

Some Effects of Elevation and Drainage on Peanut Yield, Quality and Value. J.I. DAVIDSON, JR.* and M.C. LAMB, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742 and Auburn University, c/o National Peanut Research Laboratory, Dawson, GA 31742.

During CY 1994 in Southwest Georgia, Tropical Storm Alberto and other smaller storms produced excessive rainfall, flooding and excessive soil moisture conditions. While the excessive rainfall produced good yields and good quality peanuts on high elevated, well drained land, the excessive amounts of rain disrupted field operations and caused plant stunting and sometimes death in low and poorly drained areas. By taking samples at different elevations above the water table, some relationships were developed showing the effects of elevation and drainage on peanut yield, grade, maturity, shelling outturns and economic returns. The elevations and drainage needed to provide the maximum yield, grade, maturity, shelling outturns and economic returns were obtained by differentiating the regression equations; setting the resulting equations to zero; and then solving for the optimum elevations. The optimum elevation values above the water table at field capacity for an Orangeburg soil was 5.3', 4.4' 5.0', 3.9' and 5.0' for yield, grade, maturity, outturns and economic returns, respectively. These elevations, root studies and field data indicated that peanut yield, quality, and maturity would be lowered if the water table approached and stayed within 3.3' of the top of the ground for at least 7 days. The amount of reduction would depend upon the amount of root pruning, the plant stage and subsequent weather.

Advances in Peanut Foliar Fertilization in Southern Mexico. S. SANCHEZ-DOMINGUEZ. Depto. de Fitotecnia, Universidad Autonoma Chapingo, Chapingo Mex, 56230.

Peanut is an important leguminous crop grown in southern Mexico. However, poor technology is used. In some regions (Morelos, Puebla, Guerrero and Oaxaca) they are grown during the rainy season. Under these climatic conditions farmers do not use fertilizer. The objective of this research was to evaluate peanut yield when foliar fertilizers were applied. Two experiments were conducted during the summer season (1992 and 1994) in Cuauchichinola, Morelos, Mexico. Six treatments were tested under a randomized block design with four replications: 1) Control, 2) Agromil-V, 3) Biozyme T. F. (4cc/l of water) 4) Biomicron, (4cc/l of water), 5) Roniphos-bio (16 cc/l of water), and 6) Citocrop (5cc/l of water). Treatments were applied at early bloom and at 15-d intervals until three applications were made. Peanut pod yield and other components were recorded. Statistical analysis indicate that dry pod yield; seed weight, 100 seed weight, seed percentage, biological yield, dry matter yield and harvest index were not significantly different. All products contain N, P_2O_5, K and other micro nutrients. Also, some contained indol acetic acid, giberellic acid and cytokinins. However, they did not increase significantly peanut pod yield or other yield components. The data indicates natural soil fertility was good. Numerical data indicates that Roniphos-bio (brand of Rhone Poulenc) was the best treatment giving a peanut pod yield of 347 g (from ten plants), compared to 222 g (from ten plants) when Biozyme T.F. was sprayed. Control yield was 265 g of pods. Main conclusion is that Roniphos-bio could be sprayed in order to increase peanut yield by 50% in some areas of southern Mexico. More information is needed for improvement of peanut production in Mexico.

Effect of Seed Size on Yield and Grade of GK-7 and Georgia Runner Peanuts. J.A. BALDWIN* and J.P. BEASLEY, JR., Dept. of Crop and Soil Science, The University of Georgia, Athens, GA.

A single lot each of GK-7 and Georgia Runner peanut cultivars (Arachis hypogaea, L.) were planted at two locations in Georgia during 1994 to demonstrate the effect of seed sizes planted on yield and grade of peanut. Treatments were three seed sizes: (1) 5.95 - 7.14 mm, (2) 7.14 - 8.33 mm, and (3) 5.95 - 8.33 mm (25% 5.95 - 7.14 mm and 75% 7.14 - 8.33 mm) planted in a randomized complete block design with four replications. The peanuts were planted with vacuum planters at 19 seed/meter of row in 90 cm rows. Seed/100g were determined to be 22.4, 16.0, and 17 for the GK-7 cultivar and 25.2, 17.9, and 19.6 for the Georgia Runner cultivar respectively. There were no significant interactions due to cultivar at either location so cultivars were combined when analyzing the data. Location one yields were 4917 Kg ha^{-1}, 5264 Kg ha^{-1} and 5085 Kg ha^{-1} for treatments 1, 2 and 3 respectively. There was a response at location two where treatment 3 yielded higher than treatment 1. Yields were 4245 Kg ha^{-1}, 4491 Kg ha^{-1}, and 4738 Kg ha^{-1} for treatments 1, 2, and 3 respectively.

Do Yield Enhancing Products Work in Peanut? J.P. BEASLEY, JR.*, S. R. JONES and G.H. Harris, Jr., Crop and Soil Sciences Dept., The University of Georgia, Tifton, GA 31793.

Previous research indicates peanut (Arachis hypogaea, L.) does not respond to direct fertilization when soil test levels of P and K exceed minimum sufficiency levels of 17 and 45 kg ha^{-1}, respectively. The most critical micronutrient required for proper fruit development in peanut is boron. Boron is routinely applied at initial bloom. Zinc can become toxic when plant tissue levels exceed 60 mg kg^{-1} in combination with soil pH below 5.7. Several new products now available for application to peanut contain less than 0.1 g kg^{-1} of B, Zn and Fe. They also contain low levels (less than 1 g kg^{-1}) of naturally-occurring growth hormones such as auxins, gibberillins, cytokinins or indol-acetic acid. Tests were conducted in crop years 1991-1994 to determine the response of peanut yield, grade factors and main stem height to various rates and application timing of these products when compared to an untreated check. In crop years 1991-1994, none of the treatments differed significantly in yield (≤ 0.05). In crop year 1993, three treatments had significantly higher percent total sound mature kernels (TSMK) than the untreated check. In crop years 1991, 1992 and 1994, there was no significant difference among treatments for percent TSMK.

Research-Based Fertilizer Recommendations for Peanuts in the Coastal Plain. G. J. GASCHO* and C. C. MITCHELL. Crop and Soil Sciences, Coastal Plain Experiment Station, Univ. of Georgia, Tifton, GA 31793-0748 and Agronomy and Soils, Auburn University, Auburn, AL 36849.

Research on the fertilizer requirements of peanuts has been conducted for decades in the Coastal Plain. However, some large differences in official state recommendations were evident to researchers, extension personnel and farmers. Under the umbrella of SERA-IEG-6 (Soil Testing and Plant Analysis) research and extension personnel met for four years and summarized all available applicable studies. The consensus was that the data as a whole were not contradictory among the states; interpretations and personal observations were responsible for the significant differences in recommendations. Data supported some changes in recommendations in all states. Data were particularly conclusive in showing that peanuts rarely respond to applied phosphorus and potassium in a good rotation where adequate fertilizer is applied to the rotational crops. Based on soil tests, all states are now reducing the rates of phosphorus and potassium recommended for direct applications for peanuts. A thorough review of research on calcium led to a conclusion that both limestone and gypsum are valuable sources and the recommendations for the preferred source(s) should depend on soil pH, available soil calcium, the type of peanut planted (runner or virginia) and the use of the crop (commercial or seed). Southern Cooperative Series Bulletin No. 380 "Research-based soil testing interpretation and fertilizer recommendations for peanuts on coastal plain soils" was published in 1994 as a guide for official state recommendations.

Poultry Litter Effects on Yield and Grade of Runner Peanut. D.L. HARTZOG* and J.F. ADAMS, Agronomy and Soils Department, Auburn University, AL.

Expansion of poultry production in Southeast Alabama has resulted in large amounts of litter being applied on agricultural land. Litter is not normally recommended for peanuts since nitrogen is not recommended and phosphorus and potassium are not needed in large amounts. Five on-farm poultry litter experiments were conducted from 1993 to 1994 in the Wiregrass area of Alabama on Coastal Plain soils. Four experiments had applied poultry litter that was turned with a moldboard plow at rates of 0, 1, 2, 4 ton/acre and a 2 ton rate disked treatment, while the second experiment had turned poultry litter at rates of 0, 2, and 4 ton. In 1993 litter treatments were compared to phosphorus and potassium fertilizer at a rate of 80 lb/acre of P_2O_5 and K_2O in two experiments. In 1994 the fertilizer consisted of N, P, K, and micronutrients at a rate equivalent to 2 tons of poultry litter. In 1993 poultry litter treatments had yields higher than the "check". In 1994 only one experiment had higher yields from a litter treatment. SMK's appeared to be unaffected by litter treatments.

Reduced Tillage for Peanuts Following Bahiagrass. J.F. ADAMS* and D.L. HARTZOG, Agronomy and Soils Department, Auburn University, AL.

Peanuts in Southeast Alabama are increasingly being rotated with bahiagrass. Farmers traditionally disk several times before using a moldboard plow, followed by more disking after plowing for herbicide incorporation and seedbed preparation. Nine on-farm experiments were conducted from 1992-1994. Alternative tillage schemes were compared to conventional tillage (moldboard plow and disking) to determine if less soil disturbance would reduce yield. Treatments consisted of disk, chisel and disk, and conventional tillage in eight experiments. In the other experiment, treatments had chiselvator subplots in each tillage treatment. In six of eight experiments, the disking and chisel treatments had equal or higher yields than the conventional tillage treatment. Peanut grades were unaffected by tillage treatments.

Effects of a Cotton-Peanut Rotation with and without Rye on Diseases, Nematodes and Crop Yields. T.B. BRENNEMAN*, N.A. MINTON, S.H. BAKER, G.A. HERZOG, and G.J. GASCHO. Coastal Plain Experiment Station, Tifton, GA 31794.

A peanut-cotton-rye-fallow rotation was conducted from 1988-1993 on Tifton loamy sand infested with *Meloidogyne incognita*, *Belonolaimus longicaudatus*, *Criconemella ornata*, *Sclerotium rolfsii*, and *Rhizoctonia solani*. Whole plots were continuous peanut, continuous cotton, cotton-peanut, or peanut-cotton. Subplots were winter rye or fallow. Sub-sub plots were treated or not treated with aldicarb (3.4 kg a.i./ha) for cotton, and treated or not treated with aldicarb (3.4 kg a.i./ha) plus flutolanil (1.1 kg a.i./ha) for peanut. Mean peanut yields across all treatments were 552 kg/ha greater after cotton than continuous peanut, and 216 kg/ha greater after rye than fallow. Aldicarb plus flutolanil increased yield 1172 kg/ha. Mean seed cotton yield across all treatments was 903 kg/ha greater after peanut than continuous cotton. Yield of seed cotton after rye was 617 kg/ha greater than after fallow in continuous cotton plots, whereas rye increased seed cotton yields only 35 kg/ha in plots rotated with peanut. Aldicarb increased mean seed cotton yields by 1140 and 124 kg/ha in continuous cotton plots and those rotated with peanut, respectively. Rotation to peanut reduced populations of *M. incognita* and *B. longicaudatus*; rotation to cotton reduced populations of *C. ornata*. Incidences of stem rot (*S. rolfsii*) and Rhizoctonia limb rot (*R. solani*) on peanut were not affected by rotations. Both diseases were reduced by aldicarb plus flutolanil.

Storing, Curing, and Mycotoxins

Kernel Size Distribution of Southwest Runner Peanut. J. S. KIRBY*, T. E. STEVENS, JR., J. R. SHOLAR, K. E. JACKSON, and H. A. MELOUK, Depts. of Agronomy and Plant Pathology, and USDA-ARS, Oklahoma State Univ., Stillwater, OK 74078.
Kernel size distributions of Southwest Runner were compared with those of Okrun and Florunner. The samples analyzed were obtained from 10 locations where the varieties were grown under the same conditions. The kernel distribution among four sizes was determined: intact kernels riding slotted screens measuring 0.83cm (21/64in), 0.71 (18/64), and 0.64 (16/64) by 1.91cm (3/4in), and sound splits riding a 0.67cm (17/64in) round screen. These four sizes are equivalent to the U.S. Federal Grade Standards of Jumbo Runner, Medium Runner, U.S. No. 1 Runner, and U.S. No. 1 Runner Splits, respectively. On the average, 31.31% of the Southwest Runner "Farmer Stock" was kernels which rode the top or "jumbo" screen compared with 35.68 and 32.69% for Okrun and Florunner, respectively. Southwest Runner produced slightly more Mediums than the other two varieties, so, if the top two sizes, Jumbos and Mediums, are combined, our data showed 62.76% for Southwest Runner compared with 63.71 and 61.70% for Okrun and Florunner, respectively. Our data also indicated 3.2% U.S. Splits for Southwest Runner, compared with 5.08 and 5.41% for Okrun and Florunner, respectively. Shellers indicate many sales are based on the "count per 28.35g (oz)". According to standards established by the American Peanut Shellers Association, Jumbo Runner peanuts must have a count from 38 to 42 per 28.35g, while Medium Runner peanuts must have a count from 40 to 50. Our data averaged 45.7, 56.6, and 81.3 kernels per 28.35g for Southwest Runner, compared with 38.8, 48.6, and 73.1 for Okrun and 38.7, 48.2, and 76.1 for Florunner, in each of the three sizes Jumbo, Medium, and No.1, respectively. This again indicates that the individual kernels are slightly smaller for Southwest Runner. Far greater differences were observed within each variety from location to location than between the three varieties grown under the same conditions at one location. For example, Southwest Runner farmer stock averaged 31.31% Jumbos, but the different locations varied from 14.05 to 49.44% Jumbos. Okrun averaged 35.68% Jumbos, but ranged from 18.54 to 50.68%. Florunner averaged 32.69%, but varied from 22.26 to 39.63% Jumbos. The highest percentage of Jumbos for all three varieties was obtained at the same location, while another location resulted in the lowest percentage of Jumbos for each of the three varieties. Significance of these size and count differences will be discussed.

Peanut Curing in High Capacity Rectangular Bins in West Texas. C. L. BUTTS. USDA, ARS, National Peanut Research Laboratory, Dawson, Georgia 31742.
The four-row and six-row peanut combines have significantly increased the flow rate of peanuts into the buying point. Two full hoppers from these larger combines can fill a conventional peanut drying trailer, thus increasing the number of peanut trailers required by the grower in a given day. Many growers transport their peanuts to the buying points in over-the-road semi-trailers with a capacity in excess of 22 Mg of peanuts. This practice is prominent in areas where peanuts must be transported in excess of 32 km. Once the peanuts reach the buying point in these large containers, they must be transferred to as many as five conventional peanut drying trailers. This increases the complexity of maintaining lot identity and may increase the damage due to handling . Ten stationary drying bins measuring 12.2 long, 2.3 m wide, and 3.0 m high, were constructed at a commercial buying point in Seminole, Texas prior to the 1994 harvest. A single 22-kW fan supplied unheated air at a rate of approximately 10 $m^3 \cdot min^{-1} \cdot m^{-3}$ of peanuts. Peanuts were transported to the buying point in over-the-road semi-trailers, emptied into a dump pit, passed over a sand screen, then loaded by conveyor belt into the bins. Air entered the peanuts from a 1 m wide plenum located down the side of the drying bin, flowed through the peanuts across the 2.3 m width, then exhausted into a 1 m return plenum on the other side. After drying, peanuts flow out of ports in the floor onto a shuttle conveyor and loaded back onto the truck for grading and transport to their final destination. Nineteen loads of peanuts were cured in the bins from 15 October through 28 October, 1994. The average initial moisture content was 14.9% wet basis and ranged from 22.9 to 10.8%. The final moisture content ranged from 11.2 to 9.9 and averaged 10.7%. The moisture content determined by the official grade ranged from 8 to 10% and averaged 9.47%. As recorded on the ASCS-1007, the load net weight ranged from 17.6 to 35.4 Mg and averaged 24 Mg. The average drying time was 42.5 h for each load and the average moisture removal rate was 19.3 $kg \cdot h^{-1}$. These dryers had a drying capacity of 0.77 $Mg \cdot h^{-1}$ using ambient air compared to approximately 0.32 $Mg \cdot h^{-1}$ using conventional peanut drying trailers.

Solar Assisted Partial Air Recirculation Curing of Peanuts. J. H. YOUNG*, J.C. TUTOR, and L.CHAI. Biological and Agricultural Engineering Department, North Carolina State University, Raleigh, NC 27695-7625.

Experimental and simulation studies of a solar assisted partial air recirculation peanut curing facility have been conducted at the Peanut Belt Research Station at Lewiston, NC since the 1987 harvest season. Energy requirement for electricity and LP-gas has been monitored and found to average approximately forty percent less than that for conventional single-pass peanut curing facilities. In addition, drying rates were more consistent and drying times somewhat less than for conventional systems. Simulation of the system under various weather conditions has been used to evaluate the economic feasibility of the current system and possible modifications of structural materials and controls. It has been found that system performance increases with increased moisture permeability but decreases with increased thermal conductance of walls. Increases in air flow rates through the wagons result in greater curing capacity for the system at relatively constant energy requirements. However, operating costs increase somewhat with air flow rate due to a substitution of electrical energy for fossil fuel energy. The economic feasibility of the current system is questionable unless peanut quality can be improved by use of the system. However, some recirculation may be induced in conventional systems in a more economical fashion.

Peanut Storage in Shed-Roof and Gable-Roof Containers. F.S. WRIGHT[1], S.H. DECK[2], and J.S. CUNDIFF[3]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742, [2]Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437, and [3]Department of Biological Systems Engineering, Virginia Tech, Blacksburg, VA 24061-0303.

Introduction of the four-row and six-row peanut combines has overloaded peanut handling systems during the harvest season. There is a need for on-farm storage. A system is envisioned whereby the harvester dumps peanuts into trailer-sized containers which are transported to the drying shed and cured. Tops are attached and the containers set outside for storage until shipment to the shelling plant. Peanuts were stored in two half-trailer-size containers in 1993, one with a shed-rooftop and one with a gable-rooftop. Temperature and relative humidity in the headspace was approximately equal to ambient, indicating that the eave and ridge openings provided the desired natural ventilation. Moisture content of the top layer was 11% to 12% initially and did not change over the 16-week storage period (late October-mid-January). Peanuts stored in trailers parked under a shed typically reach an equilibrium moisture content of 7%. Though the top-layer peanuts did not dry as expected, no mold growth or other quality degradation was observed. In 1994 four containers (shed and gable roofs with natural ventilation, identical shed and gable roof with forced ventilation) were stored. Similar results were obtained for the two naturally ventilated containers; top-layer peanuts did not dry, but no mold growth was observed. The naturally ventilated containers (five air changes per hour from 1000 to 1800 hrs each day) did lose moisture over storage. Top-layer peanuts were 11% at the beginning of storage and 8.5% after 16 weeks. There appears to be potential for storing peanuts in containers. The moisture gradient established during curing does not result in quality degradation of top-layer peanuts if adequate natural ventilation is provided. Research must continue to determine if a practical container design (low cost with adequate strength) can be developed.

A Parallel Belt, Multi-Separation Belt Screen. P.D. BLANKENSHIP* and M.P. WOODALL. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742 and Lewis Carter Manufacturing Company, Donalsonville, GA 31745.

Belt screens currently used in the peanut industry separate farmers stock peanut materials into two size categories based on diameter. Utilizing belt screens for obtaining more than two size categories requires two or more screens with different spacings between belts for each screen. A new type of belt screen is being developed cooperatively by the National Peanut Research Laboratory and Lewis M. Carter Manufacturing Company with multiple spacings between belts incorporated into a single machine. The machine is equipped with spacings appropriate for screening farmers stock, runner-type peanuts for performance testing. Three separation areas are provided with 1.27 cm diameter belts spaced to provide 0.635 cm, 1.032 cm and 2.54 cm openings between belts. These separation areas provide the ability to separate small foreign materials, large vegetative foreign materials and loose shelled kernels and small pods from farmers stock peanuts. In addition to multiple separation capability, preliminary testing indicates that the new screen offers higher capacities than normal vibratory screens and self-cleaning. The screen should improve on-farm and commercial cleaning capabilities and peanut shelling plant pre-sizing.

Inhibitory Effects of Soybean Lipid Metabolites on Aflatoxin and Sterigmatocystin Biosynthesis in *Aspergillus* spp. G. B. BUROW* and N. P. KELLER. Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843-2132.

Aflatoxin (AF) and sterigmatocystin (ST) are two carcinogenic mycotoxins produced by *Aspergillus* spp. on oil seed crops such as peanuts, cottonseed, and tree nuts. One oil seed crop which is resistant to *Aspergillus* infection and subsequent AF contamination is soybean. A previous report had suggested that lipid metabolites of soybean could be associated with the resistance of soybean to infection by *Aspergillus* and to subsequent mycotoxin contamination (Doehlert *et al.*, 1993, Phytopathology, 83: 1473-1477). We have initiated experiments on the effects of soybean lipid metabolites (SLM) on expression of AF and ST genes in *A. parasiticus* and *A. nidulans*, respectively. The expression of *ver-1* and *verA* (analogous enzymatic genes needed for AF and ST biosynthesis) were analyzed by Northern Blot in *A. parasiticus* and *A. nidulans* grown in liquid cultures treated with different concentrations of various types of SLM. Treatment with different SLM suppressed *ver-1* and *verA* transcription for 24 - 48 hr in AF/ST inducing growth media with a concomitant decrease or absence of AF/ST depending on the concentration and type of SLM. These results suggest that specific SLM could have a role in the regulation of the genes of the AF/ST pathway and may play a direct role in suppressing AF/ST production in *Aspergillus* infected soybean seed. These metabolites and the genes directly involved in their production could potentially be useful in controlling AF contamination in susceptible crops such as peanut.

Weed Science

Grass Control with Cadre and Cadre - Graminicide Tank Mixtures. K. M. JENNINGS*, J. W. WILCUT, and A. C. YORK. Crop Science Dep., Box 7620, North Carolina State University, Raleigh, NC 27695-7620.

Experiments conducted from 1991 to 1994 evaluated Cadre alone, various graminicides alone, tank mixtures of Cadre plus graminicides, and sequential systems for control of seedling and rhizome johnsongrass, and various annual grass species including broadleaf signalgrass, crowfootgrass, goosegrass, large crabgrass, southern crabgrass, and Texas panicum. There were at least two locations for each grass species. Treatments evaluated included Cadre at 0.064 lb ai/ac, Assure II at 0.05 lb ai/ac, Fusilade 2000 at 0.188 lb ai/ac, Poast Plus at 0.188 lb ai/ac, or Select at 0.1 lb ai/ac applied alone. Tank mixtures evaluated included Cadre with each of the four graminicides at the aforementioned rates. Sequential systems evaluated included applying Cadre 24 hours prior to graminicide application, and graminicides applied 24 hours prior to Cadre application. An untreated check was included for comparison. All postemergence applications were made with a crop oil concentrate at 1.25% (v/v) except when Cadre was applied alone, which was applied with a nonionic surfactant at 0.25% (v/v). Cadre controlled all annual grasses greater than 85% when applied to grasses that were less than 2 inches tall or 2 inches in diameter. Cadre provided excellent control of seedling johnsongrass and 72 to 95% control of 1 to 4 foot tall rhizome johnsongrass. Cadre did not antagonize grass control with any graminicide as a tank mixture application or in sequential systems. Cadre generally provided grass control equivalent to the postemergence graminicides. However, Cadre will not control annual grasses taller than 2 inches as well as the postemergence graminicides.

Control of Large Crabgrass (*Digitaria Sanguinalis*) in Peanuts with Cadre. D.T. GOODEN* and G.F. STABLER, Clemson University, Clemson, SC, K.E. KALMOWITZ and M.B. WIXSON, American Cyanamid Company, Princeton, NJ.

Experiments were conducted in 1993 and 1994 at the Pee Dee Research and Education Center in Florence, SC to evaluate the effects of Cadre (AC-263,222) on large crabgrass (*Digitaria sanguinalis*) DIGSA control in peanuts. Cadre was applied at cracking and post at three rates-- .032, .047, and .064 lb ai per acre. Other treatments included standard crabgrass herbicides, such as Prowl, Dual and Poast Plus at 1.0, 2.0 and .19 lb ai per acre, as well as some combinations of Cadre and the standard grass herbicides. The standard treatment of Prowl followed by Starfire + Basagran and a weedy check were also included. 1993 was a very dry year, while 1994 had greater than normal rainfall. In 1993, Cadre at all rates and methods of application gave excellent season long control of crabgrass. However, in 1994, only .063 at cracking and .047 and .063 early post gave excellent control of crabgrass. The standard of Prowl followed by Starfire + Basagran gave excellent control in 1993 and good control in 1994, while Prowl, Dual and Pursuit alone gave good control in 1993 and only fair control in 1994. Prowl followed by either Cadre or Poast Plus gave excellent results both years, while Poast Plus alone gave excellent control in 1994 but dropped to good control in 1993. There was no crop injury in 1994, but, in 1993, the early post treatments of Cadre gave some vine suppression. In 1993, it was very dry, and the soil was more droughty than in 1994. In 1993, yields were low because of drought but closely reflected the level of weed control. In 1994, yields were reduced by excess moisture during harvest and, consequently, gave similar results for all treatments, except the untreated check was lower than all other treatments.

Pursuit and Cadre Carryover in Peanut/Cotton Rotations. R. B. Batts*, A. C. York, and J. W. Wilcut. Crop Science Department, N. C. State University, Raleigh, NC 27695-7620.

Experiments were conducted during 1991 to 1994 in North Carolina and 1993 to 1994 in Georgia to determine the potential for Pursuit (imazethapyr) and Cadre (AC 263,222) applied to peanuts to carry over to cotton planted the following year. In addition to a check, treatments applied to peanuts in North Carolina in 1991 included 1 oz ae/A of Pursuit applied at ground cracking (GC) or 0.5, 1, and 2 oz ae/A of Cadre applied either preplant incorporated (PPI) or at GC. In 1992 and 1993, treatments applied to peanuts included 1 and 2 oz/A of Pursuit at GC and Cadre at rates ranging from 0.5 to 2 oz/A postemergence (POST). Treatments applied to peanuts in Georgia in 1993 included Cadre at 1 or 2 oz/A applied PPI, preemergence (PRE), or POST. As a comparison, Scepter (imazaquin) at 2 oz ae/A was applied PPI. Except for herbicide treatments on peanuts, production practices for both crops were standard for the areas. Carryover injury to cotton was greatest at 40 to 60 days after planting, with less injury before and after this period. Pursuit applied at GC caused less than 10% injury to cotton and did not affect yield in any year. In North Carolina cotton in 1992, no injury was noted from Cadre applied at GC at 1 oz/A in 1991. Cadre at 2 oz at GC gave 20% injury but no yield reduction. Greater injury was noted when Cadre was applied PPI. Injury was 19 and 58% with 1 and 2 oz/A, respectively, applied PPI. Cadre applied PPI at 2 oz /A reduced cotton yield 43% and reduced fruiting on nodes four through nine. In Georgia, Cadre applied PPI or PRE to peanuts caused greater injury to cotton than Cadre applied POST. Greater carryover was noted with 1 oz/A of Cadre applied PPI or PRE than with 2 oz/A of Scepter applied PPI. Cadre at 2 oz/A (2X normal rate) reduced cotton yield regardless of application method.

Comparison of Cadre with Registered Herbicides for Weed Management in Peanut. P. V. GARVEY*, J. W. WILCUT, and A. C. YORK. Crop Science Dep., Box 7620, North Carolina State University, Raleigh, NC 27695-7620.

Experiments conducted at Tifton, GA in 1993 and 1994 compared weed management systems containing Cadre with currently registered herbicide systems. Prowl was applied PPI at 1.0 lb ai/ac to all plots. Systems evaluated included 1) Prowl alone (Prowl will not be mentioned in the following systems since it is in all systems); 2) Cadre applied at cracking (GC) at 0.063 lb ai/ac; 3) Cadre applied at 3WGC (3 weeks after cracking) at 0.063 lb/ac; 4) Starfire at 0.125 lb ai/ac plus Basagran at 0.25 lb ai/ac applied at GC; 5)Starfire plus Basagran at 0.25 lb/ac at GC fb Starfire plus Basagran at 0.5 lb/ac at 3WGC, 6) Tough at 0.9 lb ai/ac at 3WGC; 7) Starfire plus Basagran at GC fb Classic at 0.008 lb ai/ac at 8WGC, 8) Starfire plus Basagran plus Pursuit at 0.063 lb ai/ac at GC, 9) Starfire plus Basagran plus Dual at 1.5 lb ai/ac at GC, and 10) Starfire plus Basagran at GC fb Tough at 5WGC. All POST applications were made with a nonionic surfactant at 0.25% (v/v). Cadre controlled yellow nutsedge at least 81% and sicklepod at least 85% with 3WGC application being more effective than GC application for sicklepod control. Florida beggarweed control was 91% with Cadre at GC and 70% with 3WGC application. Two applications of Basagran plus Starfire provided control of yellow nutsedge and sicklepod equivalent to Cadre. Cadre applied at GC was more effective (91%) for Florida beggarweed control than two applications of Basagran plus Starfire (77%). Basagran plus Starfire applied GC fb Classic at 8WGC controlled Florida beggarweed 88%. Peanut yields were 4,530 lb/ac for the system that used two applications of Basagran plus Starfire. Equivalent yields were provided by Cadre at GC (4,020 lb/ac), Cadre at 3WGC (3,970 lb/ac), and Basagran plus Starfire at GC fb Classic at 8WGC (3,920 lb/ac).

Weed Management in Peanut with Cadre as Influenced by Rate and Method of Application. T. M. WEBSTER*, J. W. WILCUT, and H. D. COBLE. Crop Science Dep., Box 7620, North Carolina State University, Raleigh, NC 27695-7620.

Experiments were conducted in 1991 and 1992 at Midville, GA and in 1991 at Attapulgus, Plains, and Tifton, GA to evaluate different rates and methods of Cadre application versus a commercial standard for weed control, peanut tolerance, and yield. Prowl was applied PPI at 1.0 lb ai/ac as a blanket treatment to all plots. Cadre treatments that were evaluated included 0.032 or 0.064 lb ai/ac applied PPI or PRE. POST treatments of Cadre included 0.016, 0.032, 0.048, or 0.064 lb/ac in a factorial arrangement with two postemergence timings, ground-cracking (GC) or POST. Sequential Cadre systems evaluated included Cadre applied at 0.024 lb/ac at GC and again POST or 0.032 lb/ac applied at GC and POST. The commercial standard was Basagran at 0.25 lb ai/ac plus paraquat at 0.125 lb ai/ac at GC followed by (fb) Basagran at 0.5 lb/ac plus paraquat at the aforementioned rate plus 2,4-DB at 0.25 lb ai/ac POST. All postemergence applications included a nonionic surfactant at 0.25% (v/v). Cadre applied GC or POST at 0.064 lb/ac provided control of bristly starbur, coffee senna, common cocklebur, Florida beggarweed, Ipomoea morningglories, prickly sida, purple nutsedge, sicklepod, smallflower morningglory, and yellow nutsedge at least equivalent to the commercial standard. Peanut tolerance to Cadre was excellent. Peanut yields generally increased with increased rate of Cadre application.

Prohexadione Calcium - A New Growth Regulator for Peanut. W. E. MITCHEM* and A. C. YORK. Crop Science Department, N. C. State University, Raleigh, NC 27695-7620

Prohexadione calcium (hereafter referred to as BAS 125W) is a gibberellin inhibitor being developed as a growth regulator for peanut. Two experiments in 1992 compared BAS 125W applied to the NC 9 cultivar at 140 to 560 g ae/ha at early pegging (PG) or at row closure (RC). Greater suppression of main stem (MS) was noted when BAS 125W was applied at RC. BAS 125W applied at RC decreased MS and CLB length at harvest 16 to 27% and 14 to 39%, respectively, and greatly improved row visibility. BAS 125W applied at PG generally reduced yield and the percentage of extra large kernels (ELK), fancy pods (FP), and total sound mature kernels (TSMK) but had no effect on crop maturity. BAS 125W applied at RC generally had no effect on yield or TSMK but increased ELK, decreased FP, and enhanced crop maturity. Two experiments in 1993 compared BAS 125W applied to the NC 9 cultivar at rates of 47 to 280 g/ha applied at RC or at RC and again 3 weeks later (RC3). BAS 125W at 140 and 280 g/ha applied at RC suppressed MS and CLB length at harvest 11 to 18% and improved row visibility. BAS 125W applied sequentially was no more effective than when the same total rate was applied once at RC. BAS 125W had no effect on yield, maturity, or ELK, FP, and TSMK in 1993. An experiment in 1994 using the NC 10C cultivar compared BAS 125W at rates of 186 to 280 g/ha applied at RC and RC3 or at RC and RC3 and 6 weeks after RC (RC6). Results were similar with all BAS 125W treatments. MS and CLB length at harvest was reduced 29 to 34% and 28 to 32%, respectively, and row visibility was greatly improved. BAS 125W increased yield 8% and increased ELK but had no effect on FP and TSMK. Kylar (daminozide) was included in all experiments as a comparison. Row visibility and suppression of MS and CLB length at harvest in BAS 125W-treated peanut were at least as great as in Kylar-treated peanut. Results indicate BAS 125W can be an effective replacement for Kylar.

Evaluation of Classic and PGR-IV as Growth Regulators for Peanuts.
A.C. YORK* and W.E. MITCHEM. Department of Crop Science, N. C. State University, Raleigh, NC 27695-7620.

Classic herbicide (chlorimuron) was evaluated as a growth regulator on NC9 peanut in 1992 and 1993. Treatments included Classic at a total of 8.8 g ae/ha applied once at 60, 75, or 90 days after emergence (DAE) or in equal portions applied twice at 60 and 75, 60 and 90, or 75 and 90 DAE or three times at 60, 75, and 90 DAE. Kylar (daminozide) at 950 g ai/ha applied 75 DAE was included as a comparison. In a year with excessive vine growth, Kylar and all Classic treatments except 8.8 g/ha applied 90 DAE reduced cotyledonary lateral branch and main stem length at harvest 9 to 20 and 12 to 24%, respectively, due to suppression of internode length. Sequential applications of Classic generally suppressed growth more than single applications. No improvement in row visibility at harvest was noted. In a dry year with limited vegetative growth, neither Classic nor Kylar affected cotyledonary lateral branch or main stem length at harvest. Classic at 2.9 g/ha applied 60, 75, and 90 DAE reduced yield 18% at one of four locations; no other treatment affected yield. Classic at 8.8 g/ha applied 60 DAE or 4.4 g/ha applied 60 and 75 DAE reduced the percentage of fancy pods (FP) and extra large kernels (ELK) at one or more locations. No treatment affected the percentage of total sound mature kernels (TSMK). Results suggest chlorimuron has little to no potential for use as a growth regulator. PGR-IV was evaluated at two locations in 1994. Treatments included 6 oz of formulated product per acre at 21, 45, 60, or 75 days after emergence (DAE) or split application of 3 oz followed by 3 oz/acre at 21 and 45 DAE or 45 and 60 DAE. Cultivars included NC7 and NC9. No effects of PGR-IV on peanut vigor, MS or CLB length, yield, maturity, or grade were noted.

Comparison of Aldicarb In-Furrow and Seed-Applied Acephate for Peanut Recovery Following Varying Levels of Contact Herbicide Injury.
S.M. BROWN, S.L. BROWN, AND D.L. COLVIN, University of Georgia, Tifton, GA 31793; and University of Florida, Gainesville, FL 32611.

Previous research indicates that effective thrips control facilitates recovery of peanuts following contact herbicide injury. Peanut growth and yield were compared for in-furrow applications of aldicarb (Temik) at 7.0 lb/A and seed treatments of acephate (Orthene) 4 oz/90 lb seed/A with varying early season foliar herbicide injury. Levels of herbicide injury were achieved with postemergence applications of a) pyridate (Tough) plus 2,4-DB (Butoxone) at 0.94 plus 0.25 lb/A; b) paraquat (Starfire) plus bentazon (Basagran) at 0.125 plus 0.5 lb/A; and c) paraquat plus metolachlor (Dual) at 0.25 plus 2.0 lb/A. Studies were conducted at Tifton, GA, and Archer, FL. At Tifton, visual ratings 3 days after treatment indicated distinct levels of crop injury, with less than 5 percent foliar damage following pyridate plus 2,4-DB; 20 percent with paraquat plus bentazon; and 60 percent with paraquat plus metolachlor. At the time of herbicide application, thrips injury was only light to moderate. Thrips counts were not made. As measured by canopy width, bloom count, and visual rating, crop recovery was influenced far more by herbicide treatment than by insecticide or any herbicide by insecticide interaction. For several weeks, crop canopy was reduced slightly for the paraquat plus bentazon treatment and severely reduced following paraquat plus metolachlor compared to pyridate plus 2,4-DB. Canopy reduction 5 weeks after treatment was 7 and 23 percent for the two paraquat treatments, respectively. Bloom counts 2 weeks after treatment averaged 23, 15, and 0 per 3 row feet, and peanut yields were 4120, 4070, and 3570 lb/A for the herbicide treatments, respectively. Averaged across herbicide treatments, yield for aldicarb, acephate, and no-insecticide treatments were 4160, 3800, and 3810 lb/A, respectively. At Archer, yield was not significantly affected by treatment.

AC 263,222 for Broadleaf Weed Management in Peanut. B. J. BRECKE*, D. L. COLVIN and K. R. MUZYK. University of Florida, AREC, Jay, FL 32565, Dept. of Agronomy, Gainesville, FL 32611 and American Cyanamid, Brandon, FL 33511.

Field studies were conducted near Jay and Gainesville, FL during 1993 and 1994 to evaluate AC 263,222 for postemergence broadleaf weed control in peanut (Arachis hypogaea L.). The herbicide was applied at rates of 35, 53 and 70 g/ha alone at-cracking (AC) and at 35 and 53 g/ha early postemergence (EP) following an AC application of paraquat + bentazon. All treatments included a non-ionic surfactant at 0.25% (v/v). AC 263,222 applied either AC or EP at 70 g/ha provided 85 to 95% control of sicklepod (Senna obtusifolia (L.) Irwin and Barneby) redweed (Melochia corchorifolia L.) and morningglory species (Ipomoea sp.). Florida beggarweed (Desmodium tortuosum (Sw.) DC.) and hairy indigo (Indigofera hirsuta Harvey) control ranged from 40 to 80%. When paraquat plus bentazon was applied prior to the EP application of AC 263,222, control of these two species improved to 90% or better. Bristly starbur (Acanthospermum hispidum DC.) control was 80% when treated with AC 263,222 at 70 g/ha AC. Cultivation improved control of all species by 10 to 15%. In general, AC 263,222 applied at 70 g/ha EP provided better weed control than when applied at a lower rate or AC. Cultivation improved control of all species evaluated. The best fit for AC 263,222 appears to be as a postemergence treatment following an AC application of paraquat + bentazon.

Copperleaf (Acalypha ostryifolia) Control Using Postemergence Herbicides. W. J. GRICHAR*, R. G. LEMON, and A. E. COLBURN. Texas Agricultural Experiment Station, Yoakum, TX 77995; Texas Agricultural Extension Service, College Station, TX 77843; and University of Arkansas, Monticello, AR 71656

Field studies were conducted in 1993 and 1994 in Comanche County near DeLeon, Texas to evaluate various postemergence herbicides for control of hophornbeam copperleaf. No PPI or PRE herbicides were applied. Annual grasses were controlled with a POST application of Poast Plus. POST treatments were made when copperleaf was 4 to 6" tall. The appropriate crop-oil concentrate or non-ionic surfactant was used with the various herbicides when necessary. Cadre alone at 0.032 to 0.063 lb ai/A provided inconsistent copperleaf control (62-83%). When Blazer, Cobra, Storm, or Tough was added to Cadre at 0.063 lb ai/A, control was consistently better than 80%. Cobra at 0.25 lb ai/A provided better than 95% control in each year while Pursuit at 0.063 lb ai/A controlled less than 70% copperleaf. Tough alone at 0.9 lb ai/A or in combination with Butoxone controlled better than 80% copperleaf. However, Tough at 0.45 lb ai/A alone or in combination with Butoxone controlled less than 80% copperleaf. The addition of Butoxone to Tough did not improve control over Tough alone. Butoxone alone provided 70% copperleaf control in 1993 but only 43% control in 1994. Control of copperleaf with Blazer varied from 77 to 88%. Storm controlled 89% copperleaf in 1993 but only 57% in 1994. Starfire plus Cobra applied at CRACK controlled only 47% copperleaf; however, Starfire plus Cobra applied POST controlled greater than 80% copperleaf. CGA 152005 at 0.009 to 0.017 lb ai/A controlled 68-78% copperleaf. Peanut yields were not obtained in either year of the study due to heavy and prolonged rains during the digging and harvesting operation.

Hophornbeam Copperleaf (*Acalypha ostryifolia*) Control with Soil Applied Herbicides. R.G. LEMON*, W.J. GRICHAR, and A.E. COLBURN. Texas Agricultural Extension Service, College Station, TX 77843; Texas Agricultural Experiment Station, Yoakum, TX 77995; and University of Arkansas, Monticello, AR 71656

Hophornbeam copperleaf is becoming a troublesome weed in the central and north Texas peanut production regions. Field studies were conducted in 1993 and 1994 in Comanche County, Texas to evaluate numerous soil applied herbicides for effectiveness in controlling copperleaf. PPI, PRE and PPI/PRE treatment combinations were studied. Herbicides were applied with a compressed-air bicycle sprayer using Teejet 11002 flat fan nozzles, delivering a water spray volume of 20 gal/A at 26 psi. PPI herbicides were immediately incorporated to a depth of 2.0 in. with a tractor-driven power tiller. PRE applications were made shortly after planting. Rainfall was received within two weeks following PRE applications in both years. The study design was a randomized complete block with three replications. Early-season control ratings for all treatments were superior to late-season observations in both years. PPI applications of dinitroaniline herbicides tank-mixed with Pursuit® or Dual® provided the most consistent control in both years, but the level of control was only 70% in 1993, compared to 87% with these treatment combinations in 1994. Pursuit® or Dual® alone provided poor control of copperleaf in both years. However, Dual® in combination with Pursuit® (applied either PRE or EPOST) provided good to excellent control of copperleaf each year. PRE applications of RH1658 provided the most consistent full-season control (90%) in both 1993 and 1994. Copperleaf control with Frontier® was not acceptable in 1993, but was good in 1994. Pod yields were not obtained in either year due to heavy and prolonged late-season rainfall that occurred during the digging and harvesting operations.

Total Postemergence Weed Management Systems for Peanut. J. ISGRIGG, III*, J. W. WILCUT, and A. C. YORK. Crop Science Dep., Box 7620, North Carolina State University, Raleigh, NC 27695-7620.

Experiments were conducted in 1990 at Tifton and Midville, GA and in 1991 at Plains and Tifton to compare total POST weed management systems with a commercial system that used Balan applied PPI. POST systems evaluated were a factorial arrangement of herbicide applications made at 2WGC (two weeks after cracking), 4WGC, and 8WGC. All total postemergence systems received a blanket application of Fusilade 2000 at 0.188 lb ai/ac at 5WGC. The 2WGC options were a) nothing, b) Starfire at 0.125 lb ai/ac, or c)Starfire plus Basagran at 0.25 lb ai/ac. The 4WGC options were a) nothing, b) Starfire plus Basagran at 0.5 lb/ac plus Butyrac at 0.25 lb/ac, or c) Starfire plus Butyrac. The 8WGC options were a) nothing or b) Classic at 0.0078 lb ai/ac. Additional systems evaluated were Fusilade 2000 alone at 5WGC and the commercial system which used Balan applied PPI at 1.5 lb ai/ac followed by (fb) Lasso at 3.0 lb ai/ac plus Basagran at 0.25 lb/ac plus Starfire applied at 2WGC fb Starfire plus Basagran at 0.5 lb/ac plus Butyrac applied at 4WGC, and a nontreated weedy check. Starfire provided excellent burndown control of *Ipomoea* morningglories, Texas panicum, Florida beggarweed, and sicklepod. Starfire applied once or twice with Butyrac included in the second application did not provide adequate control of smallflower morningglory, prickly sida, or coffee senna. At least one application of a Basagran mixture was required for good control of coffee senna, prickly sida, and smallflower morningglory. Annual grass control (Texas panicum, crowfootgrass, large crabgrass, and southern crabgrass) was good in POST systems that used at least one paraquat application in addition to Fusilade 2000. Peanut yield with POST systems that provided good weed control was equivalent to the commercial system. Management inputs were more intensive for total POST systems.

Weed Management Systems in Peanut with Prosulfuron. J. M. ROBBIE*, J. W. WILCUT, and A. C. YORK. Crop Science Dep., Box 7620, North Carolina State University, Raleigh, NC 27695-7620.

Experiments were conducted at two locations in Georgia in 1994 to evaluate weed control, peanut tolerance, and peanut yield with prosulfuron (CGA152005). Seventeen herbicide systems were evaluated. Prowl was applied PPI at 1.0 lb ai/ac to all plots. Prosulfuron was applied at 0.018 and 0.027 lb ai/ac in a factorial arrangement with two methods of application (PPI and PRE), and with two POST options (nothing or Basagran at 0.5 lb ai/ac plus Starfire at 0.125 lb ai/ac plus Butyrac at 0.25 lb ai/ac applied at 3 weeks after cracking [3WGC]). Prosulfuron was also evaluated at 0.009, 0.018, and 0.027 lb/ac applied at 1WGC with and without a 3WGC application of Basagran plus Starfire plus Butyrac. Three additional systems evaluated included Prowl applied PPI alone; Prowl applied PPI followed by (fb) Starfire plus Basagran at 0.25 lb/ac at 1WGC fb Starfire plus Basagran at 0.5 lb/ac plus 2,4-DB at 3WGC; and Prowl applied PPI fb Cadre at 0.063 lb ai/ac at 3WGC. All POST treatments were applied with a nonionic surfactant at 0.25% (v/v). The peanut variety planted was Georgia runner. Prosulfuron most injurious to peanut when applied at 1WGC with discoloration ratings of approximately 30%. Peanut recovered within 2 weeks at Attapulgus. However at Tifton, prosulfuron at 0.027 lb/ac applied at 1WGC reduced peanut stand 14%. Prosulfuron controlled common ragweed at least 96% with all rates and methods of application while Cadre controlled 77%. Florida beggarweed control at Attapulgus was erratic and unacceptable with prosulfuron while Cadre controlled 77%. At Tifton, prosulfuron controlled Florida beggarweed at least 90% while Cadre controlled 7%. Cadre controlled sicklepod 90% at Attapulgus and 80% at Tifton. Prosulfuron controlled sicklepod approximately 80% when applied PPI at the higher rate, control with PRE applications was inconsistent. Prosulfuron was less effective as a 1WGC application for sicklepod control. Peanut yields were improved when Basagran plus Starfire plus 2,4-DB was used in prosulfuron systems.

Frontier, A New Herbicide for Weed Management Systems in Peanuts. *T. BAUGHMAN, Sandoz Agro, Inc., Garner, NC 27529 and R. L. RATLIFF, Sandoz Agro, Inc., Leland, MS 38756.

Frontier [active ingredient dimethenamid: (2-chloro-N-[(1-methyl-2-methoxy)ethyl]-N-(2,4 dimethyl-thien-3-yl)-acetamide) is a unique thiophene-based chloroacetamide herbicide for control of most annual grasses, certain annual broadleaf weeds, and sedges. Frontier has been extensively tested under the Sandoz number SAN 582H since 1985. University studies have been conducted throughout the U. S. since 1991. Data from Sandoz Agro, Inc. and university trials have demonstrated that Frontier provides weed control equal or superior to current standards. Peanuts have excellent tolerance to Frontier. Frontier is a herbicide for application preplant-incorporated, preemergence, postemergence, or as a split applications in peanuts. Frontier will be used in tank mixtures or applied sequentially with other peanut herbicides to provide a full spectrum weed control program. Frontier is commercially formulated as a 7.5 lb/gal emulsifiable concentrate. Use rates range from 13-25 fl oz/acre (0.76 to 1.46 lb ai/acre) depending on soil texture, organic matter content, weed spectrum and use pattern. Federal registration was approved by the U.S. EPA for Frontier use on corn in 1993 and on soybean in 1994. Submissions have been made for expansion of uses to include peanut, sorghum, dry bean and sweet corn. Registration for these crop uses is expected in 1996.

Bentazon and Imazethapyr are Antagonistic on Nutsedge. A. S. Culpepper*, A. C. York, and J. W. Wilcut. Crop Science Department, N. C. State University, Raleigh, NC 27695-7620.

Field and greenhouse experiments were conducted to evaluate control of purple nutsedge (*Cyperus rotundus* L.) and yellow nutsedge (*Cyperus esculentus* L.) with combinations of bentazon and imazethapyr applied postemergence. Combinations of the sodium salt of bentazon at 560 or 1120 g ae/ha and the ammonium salt of imazethapyr at 35 or 70 g ae/ha were antagonistic on purple nutsedge in field and greenhouse experiments. Combinations of bentazon at 560 g/ha and imazethapyr at 35 or 70 g/ha were additive on yellow nutsedge in field experiments but antagonistic in greenhouse experiments. Combinations of bentazon at 1120 g/ha and imazethapyr at 35 or 70 g/ha were antagonistic on yellow nutsedge in field and greenhouse experiments.

An Economic Assessment of Paraquat and Bentazon Use in Peanut : A Research Analyses.

J. W. WILCUT*. Crop Science Dep., Box 7620, North Carolina State University, Raleigh, NC 27695-7620.

A recent report appeared to indicate that paraquat registration could be cancelled without a net economic loss to southeastern peanut producers. A review of research conducted from 1990 to 1994 in Georgia indicates otherwise. Six different studies were conducted in that time frame which allowed for economic assessment of returns to land and management from use of paraquat systems. Each study was conducted at two to four locations. Four of the studies are published or are in press with *Peanut Science*, *Weed Technology*, and *Weed Science*. Net returns from a dinitroaniline herbicide application ranged from -$400/ac to -$26/ac with an average net return of approximately -$162/ac (average of 17 experimental sites). A postemergence application of paraquat and bentazon following a dinitroaniline application had net returns that ranged from $353/ac to $480/ac with an average net return of $359/ac (average of 13 locations). Paraquat plus bentazon plus 2,4-DB applied postemergence following a dinitroaniline application provided returns ranging from $367/ac to $378/ac with an average net return of $373/ac (average of seven locations). A system that used a dinitroaniline herbicide followed by two applications of paraquat plus bentazon with or without 2,4-DB applied once provided net returns that ranged from $378/ac to $714/ac with an average net return of $533/ac (average of 12 locations). Systems that used a dinitroaniline herbicide with Pursuit at 0.064 lb ai/ac applied PPI or postemergence provided returns that ranged from $17/ac to $342/ac with an average net return of $227/ac (average of 16 locations). There is no registered herbicide treatment available to southeastern peanut producers that controls as many weeds as cheaply and cost effective as paraquat plus bentazon. The only other registered herbicide for postemergence control of Florida beggarweed is pyridate. Pyridate is approximately twice as costly to apply as paraquat plus bentazon at 0.25 lb/ac. Pyridate must be applied with 2,4-DB for acceptable control of most broadleaf weed species. Additionally, there are no carryover problems to any rotational crops and potential for herbicide resistance to develop to a paraquat plus bentazon system is negligible.

Late Season Weed Control in Peanut Using a Rope-wick. T.A. LITTLEFIELD* and D.L. COLVIN, Agronomy Department, University of Florida, Gainesville 32611 and W.C. JOHNSON, III, USDA-ARS, Tifton, GA.

Field experiments were conducted in 1994 near Archer, FL and Tifton, GA to evaluate the potential of controlling late-season weeds using a wick-bar. Weeds not controlled early in the season typically interfere with harvest and late season insecticide and fungicide applications. Glyphosate, paraquat and endothall were applied at 25, 50, 75, and 100% v/v. Each was compared to an untreated check in a split-plot experimental design. Treatments were applied to 3' tall Florida beggarweed (Desmodium tortuosum (Sw) DC.) at both locations and 3' tall sicklepod (Cassia obtusifolia L.), common ragweed (Ambrosia artemisiifolia L.) and hairy indigo (Indigofera hirsuta) at the FL location. Applications were 80 days after emergence (DAE) and 72 DAE at the FL and GA locations, respectively. Treatments were applied in two passes, in opposite directions, at 2 mph. Neither herbicide nor rate affected foreign material contamination at the GA location. The only effect on yield was a reduction due to excessive injury at the GA location from increasing rates of glyphosate. All weed control parameters and visual peanut injury were significantly affected by herbicide and rate. Peanut injury was minimal with paraquat and endothall. Peanut injury with glyphosate was rate responsive. At the two lower rates there was minimal injury while the two higher rates resulted in up to 23% injury. All glyphosate and paraquat rates provided acceptable control of common ragweed, Florida beggarweed, sicklepod and hairy indigo. Endothall exhibited a rate response but never provided acceptable weed control. 1994 data shows that glyphosate or paraquat are adequate to control late season Florida beggarweed, sicklepod, hairy indigo and ragweed when applied through a wick bar.

Posters

Introduction of Virus Resistance and Salt Tolerance Genes into Peanut H.D. WILDE[1]*, Z.V. MAGBANUA[1], Z. MANN[1], Y. XIAO[2], H.Y. WETZSTEIN[2], and W. A. PARROTT[1].
[1] Department of Crop and Soil Sciences and [2] Department of Horticulture, University of Georgia, Athens, GA 30602
Genetic transformation of peanut cultivar VC1 was optimized using the ß-glucuronidase (*gus*) and hygromycin phosphotransferase (*hph*) genes of plasmid pTRA140. The target tissue was an embryogenic suspension culture, which produced somatic embryos that converted into plants at a frequency of 20.2%. Peanut cultures were transformed biolistically with pTRA140 and regenerated into plants within 6 months. Co-transformation with a second plasmid was used to introduce genes of interest into peanut. A plasmid containing the nucleocapsid (N) gene from a tomato spotted wilt virus (TSWV) peanut isolate was combined with pTRA140 in a 1:1 molar ratio. One gram of embryogenic tissue was placed in empty Petri plates and bombarded with gold particles coated with the DNA mixture. After 4-5 weeks of selection in liquid medium containing 20 mg/l hygromycin, clonal cell lines were initiated from individual antibiotic-resistant cell clusters. Over 500 independent transformants were recovered from 23 bombarded plates. Of 150 cell lines analyzed by PCR, 84% contained the N gene carried by the unselected plasmid. Southern blot analysis showed that the number of copies of the N gene integrated into the genomes of transgenic cell lines ranged from 2 to approximately 20. Genomic analysis with a probe for *hph* demonstrated that this gene integrated at a similar frequency as the N gene in each cell line, but into different sites in the genome. RT-PCR showed that both *hph* and the N gene were transcribed in transformed embryogenic cultures. Somatic embryos have been regenerated from cultures transformed with the N gene and germination of the somatic embryos is in progress. Co-transformation of VC1 cultures with another gene, *mtlD*, was carried out by similar procedures. The bacterial gene *mtlD* encodes mannitol-1-phosphate dehydrogenase, which synthesizes mannitol in transgenic plants. The synthesis of mannitol has been found by other researchers to provide osmotic stress tolerance in tobacco plants transformed with *mtlD*. One plate of peanut tissue bombarded with pTRA140 and an *mtlD*-bearing plasmid yielded 37 independent transformants. PCR analysis of 20 hygromycin-resistant lines showed that *mtlD* was present in 14 lines (70%). Embryogenic cell lines transformed with the marker gene *bar* have been recovered which are resistant to 8 mg/l of the herbicide bialaphos. Co-transformation experiments with *bar* and *mtlD*-bearing plasmids have been initiated.

Use of Bravo 720 and/or Folicur 3.6F on Selected Peanut Varieties with Extended Spray Schedules. A. J. Jaks* and W. J. Grichar. Texas Agricultural Experiment Station, Yoakum, TX 77995.
Six peanut varieties including GK-7, Florunner, Southern Runner, Sunrunner, Georgia Runner, and Georgia Browne were sprayed in a 1994 field test with fungicides on 14, 21 and 28-day schedules. Bravo 720 (1.5 pt./A) and Folicur 3.6F plus Induce (8.0 fl. oz./A + 0.19% v:v) were used for the 14 and 21-day schedule treatments. Folicur plus adjuvant alone was used on the 28-day schedule sprays. Sprays on the 14, 21 and 28-day schedules were initially applied at 33 days after planting (DAP). Seven sprays were applied on the 14-day schedule using Bravo for sprays 1, 2 and 7 and Folicur for sprays 3, 4, 5 and 6. Five sprays were applied on the 21-day schedule with Bravo applied at spray 1 and Folicur at sprays 2, 3, 4 and 5. Four Folicur sprays were applied on the 28-day schedule. Disease pressure was severe late in the season. Early leafspot was present through the season with late leafspot becoming dominant at the final disease rating. Ratings at 88 DAP indicated disease levels for all unsprayed varieties was higher than for any of the spray schedules. Varieties sprayed on the 14-day schedule had less leafspot than those sprayed on the 21-day schedule with the exception of Southern Runner and Florunner. There was no difference in infection with any of the varieties sprayed on the 21 or 28-day schedule. At 133 DAP there was no difference in infection between varieties sprayed on the 14 and 21-day schedules with the exception of Sunrunner and Southern Runner which had more disease when sprayed on the 21-day schedule. Varieties sprayed on the 28-day schedule had more disease than those sprayed on the 14 or 21-day schedules with the exception of Sunrunner which showed no difference in infection between 21 and 28-day schedules. Due to late season infection pressure and variability between plots, there was no difference in yield between unsprayed and schedule sprayed varieties with the exception of GK-7 and Georgia Runner which had lower yields in unsprayed plots. However, varieties sprayed on the 14, 21 or 28-day schedules showed no difference in yields when averaged across varieties. These yields were higher than that of the unsprayed plots.

Isolation of Peanut Seed Coat- and Pod-Specific Genes using Differential Hybridization and Differential Display Methods. R. L. SMITH and D. V. BELIAEV. Agronomy Department, University of Florida, Gainesville, FL 32611.

We are interested in cloning seed coat- and pod-specific genes in order to obtain promoters that will permit the engineering of foreign antifungal genes into peanuts that will be only expressed in pod and seed coat tissues. Such systems could be very valuable in engineering aflatoxin and pathogen resistance into peanuts without expressing the antifungal products in the edible seed. This would allow much more latitude in the type of genes transferred without affecting food safety or quality. We reported isolating seed coat-specific genes by differential hybridization earlier. Here, we report the use of the new differential display method to isolate pod-specific genes. The differential display involved PCR amplification of the first strand cDNA made by reverse transcribing RNA from immature and intermediate maturity seed and pods. Primers for the reverse transcription (RT) were $(dT)_{12}MN$ (where M=a mixture the three nucleotides excluding thymine and N=one of the four nucleotides). The other primers for the PCR were 10-mers selected for good amplification. The amplified fragments were labeled with ^{35}S-dATP incorporated during the PCR amplification. Pod and seed reactions were compared by separating them in side-by-side lanes in an acrylamide gel.

Whereas, screening 2,000 plaques by differential hybridization yielded two related seed coat-specific clones, one differential display gel consisting of 20 paired reactions (40 lanes - the four possible $(dT)_{12}MN$ primers each with five 10-mer primers) yielded seven pod-specific clones and 15 additional clones strongly expressed in pods and expressed weakly in seeds. The gel also contained six seed-specific clones (not expressed in pods) and about 13 additional clones expressed strongly in seed but expressed at a low level in pods. The pod-specific clones are being cloned and characterized. The results of those characterizations will be reported.

Laboratory and Field Evaluations of Peanut Cultivars for Resistance to *Diabrotica undecimpunctata howardi* Barber. W. J. PETKA*[1], D. A. HERBERT, JR.[1], and T. A. COFFELT[2]. [1]Dept. of Entomology, Virginia Polytechnic Institute and State University, Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437-0219; [2]USDA, ARS, PWA, U. S. Water Conservation Lab, Phoenix, AZ 85040.

The southern corn rootworm (*Diabrotica undecimpunctata howardi* Barber) is the primary soil insect pest to peanut (*Arachis hypogaea* L.) in Virginia and North Carolina. The newer cultivars, which are planted on the majority of acreage, have not been extensively screened for rootworm resistance. The objective of this study was to evaluate five new cultivars (NC-V 11, VA-C 92R, VA 93B, NC 10C, and AgraTech VC-1) and 12 advanced breeding lines (N90013E, VA 861101, VA 9211920, VA 9211289, VA 891438, VA 901072, VA 9010343, VA 8911115, VA 9109213, VA 9109235, VA 9109237, and VA 9111309) for resistance to southern corn rootworm in the laboratory and in the field. NC 7 and NC 9 were used as susceptible checks. NC 6 was used as a resistant check. All 20 lines were screened in a laboratory bioassay using first and third instar larvae placed on newly germinated seedings. Peg and pod tissue was removed from field plantings of the eight released cultivars (only) and fed to larvae in the laboratory. Further field testing was initiated with four cultivars by introducing rootworm eggs into field cages placed over planted rows. Rootworm mortality and feeding were measured from bioassays in the lab. Peg and pod damage were obtained from field plots. NC 6 showed some significant differences in rootworm mortality compared to VA 93B. NC 6 is still the only cultivar of those evaluated that exhibits significant resistance to southern corn rootworm.

Roast Quality of Some Commercial Peanuts from Foreign Sources. O.E. HOLLOWAY*, D.A. SMYTH, C. MACKU, D.M. DEMING, J. GOGERTY, L. SLADE, and H. LEVINE. Planters and Nabisco Fundamental Sciences and Sensory Services, Nabisco Technical Center, East Hanover, NJ 07936

Foreign peanuts (*A. hypogaea* L.) will be increasingly available in the U.S. because of changing trade practices. Commercial peanut lots thus have the potential to contain peanuts of widely varying composition dependent on factors such as cultivar type, agronomic practice, and postharvest handling. Roasting characteristics and some elements of chemical composition of Mexican and Argentine Jumbo Runner-type peanuts were compared to domestic peanuts of equivalent grade. The Mexican and Argentine peanuts had lower oleic acid/linoleic acid ratios than domestic Jumbo Runners. Blanched peanuts were oil roasted in the laboratory at 315 F. Roast color developed in a similar fashion in both domestic and Mexican peanuts. Argentine peanuts developed both roast color and some flavor volatiles more quickly than domestic peanuts of equivalent grade. A descriptive sensory panel detected differences in flavor profile and texture among peanut sources. The Argentine peanuts had about 50% more sucrose, and double the content of free amino acids such as arginine, lysine, and serine, as compared to the domestic peanuts tested. Greater concentrations of free amino acids and sugars might account for more rapid browning reactions in the Argentine peanuts. These preliminary results suggest that roast quality factors such as roast color may differ greatly in foreign source peanuts.

Foliarly Applied Miticides for Spider Mite Control in South Texas Peanut. C.R. CRUMLEY*, B.A. BESLER, W.J. GRICHAR and A. J. JAKS. Texas Agricultural Extension Service, Pearsall, TX 78061 and Texas Agricultural Experiment Station, Yoakum, TX 77995.

Spider mites, Tetanychus uticae (Koch) and T. cinnebarinus (Boisduval), are potentially serious pests of peanut. With the recent loss of a miticide and foliar insecticide use for thrips control (TSWV) more prevalent, spider mite outbreaks were common in south Texas fields. Additionally, the only remaining product available for spider mite control in Texas has preformed erratically, when applied by air with a low volume of water. Phytotoxicity has also been reported. Treatments on GK-7 runner-type peanuts of Comite at 1.64 lb a.i./acre, Comite + Bravo 720 at 1.64 lb a.i./acre + 1.13 lb a.i./acre, Capture 2E at 0.06 lb a.i./acre and Capture 2E at 0.08 lb a.i./acre were initiated on August 3 in a randomized complete block design with 4 replications; plots were two 36 inch-center rows, by 25 feet long. All treatments were sprayed with a backpack CO_2 sprayer using 3 hollow cone nozzles, with D2 tips and #13 cores at 20 gallons/acre finished solution. On August 3, pretreatment spider mite populations were ascertained by sampling 5 leaflets, with an area of 2.25 cm^2, in the lower, middle and upper canopy per plot. Two posttreatment ratings were conducted 5 (August 8) and 9 (August 12) days afterwards, using the same sampling methods. Mean spider mite populations were subjected to Duncan's Multiple Range Analysis. Comite at 1.64 lb a.i./acre, Comite at 1.64 lb a.i./acre + Bravo 720 at 1.13 a.i./acre, Capture 2E at 0.06 a.i./acre and Capture 2E at 0.08 lb a.i./acre with a high volume of water did an excellent job of controlling spider mites up to 9 days posttreatment (DPT) in south Texas peanut. Statistically significant differences were obtained using all these products at the given rates as compared to the control. The combination of rainfall and irrigation which occurred during this study also proved to be beneficial in reducing this pests' populations in the control plots at 9 DPT. A small amount of phytotoxicity was observed in the Comite 1.64 a.i./acre treatment at 5 DPT. However, no adverse effects were recorded later in the season.

Germination of Selected Peanut Varieties in Small Grain Residue Extracts. B. A. BESLER*, W. J. GRICHAR, and O. D. SMITH. Texas Agricultural Experiment Station, Yoakum, TX 77995 and College Station, TX. 77843.

The effect of wheat, oat, and rye extracts on the germination of eight peanut varieties was evaluated at 72° and 82° F in the laboratory. Each test was replicated 3 to 4 times for each temperature, and data were combined over tests within temperature. The number of normal, healthy seedling for each treatment were compared as a percent of the germination of each entry in a distilled water control. Upon completion of germination, radicles were severed and fresh radicle weights were recorded. Radicle weights, as a percent of the control, were determined. Test x entry interaction were not significant (P=0.05) for neither percent germination nor fresh radicle weights at 72° F. In combined data, Florunner, among the varieties tested, had the highest germination percentage and radicle fresh weights in all three extracts. Starr had the lowest radicle weight. At 82° F, a significant test x entry interaction occurred for peanut germination in the rye extract. In two of four tests, GK-7 and Southern Runner each had the highest and lowest germination, respectively. GK-7 had the highest percentage germination in the combined data for the extracts of wheat and oat at 82° F. Significant test x entry interaction also occurred with all three extracts when fresh radicle weights were combined over tests. GK-7 had the highest percentage fresh radicle weight in test 1 for all three grain extracts, while Tamrun 88 had the highest percentage fresh radicle weight in test 2 for all three grain extracts. Fleur 11 had the highest percentage fresh radicle weight in test 3 using rye and oat extracts.

Minutes of the APRES Board of Directors Meeting
Adam's Mark Charlotte
Charlotte, North Carolina
July 11, 1995

President Bill Odle called the meeting to order at 7:00 p.m. Those in attendance were: Max Bass, Tim Brenneman, Danny Colvin, Kim Cutchins, Pam Gillen, Dewitt Gooden, Austin Hagan, Dallas Hartzog, Corley Holbrook, Tom Isleib, David Knauft, Chip Lee, Hassan Melouk, Bill Odle, Wil Parker, Harold Pattee, Pat Phipps, Norris Powell, Mike Schubert, Bob Scott, Jan Spears, Tom Stalker, Charles Swann, Doyle Welch, Tom Whitaker, and Scott Wright.

Approval of the 1994 Minutes of the APRES Board of Directors

The minutes of the 1994 Board of Directors meeting were approved as published in the 1994 PROCEEDINGS.

Executive Officer Report - Hassan Melouk

Dr. Hassan Melouk presented the Executive Officer report in the absence of Ron Sholar, Executive Officer. It was reported that the Society remains stable with about 600 members. This year's annual meeting looks like it will be well attended. A detailed financial report will be given by the Finance Committee Chair.

Southern Association of Agricultural Experiment Station Directors Report - Max Bass

Max Bass has been appointed as interim representative to APRES due to Gale Buchanan's promotion to Dean and Director of Agriculture at the University of Georgia. Max Bass is pleased to be associated with our group and looks forward to working with APRES.

American Society of Agronomy Liaison Report - Tom Stalker

The annual meetings of the joint American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America were held in Seattle, Washington, on November 13-18, 1994. Approximately 3400 scientific presentations were made. Of these, 15 were devoted to peanut research and 19 members of APRES authored or co-authored presentations. Dr. Roy Pittman co-chaired a symposium on germplasm collection and maintenance. Dr. Janet

Spears is the 1995 chair of the CSSA's C-4 Division--Seed Physiology, Production, and Technology. Dr. Tom Stalker is the 1995 chair of the CSSA's Budget and Finance Committee.

The next annual meeting will be held in St. Louis, Missouri, from October 29 - November 3, 1995.

ADVANCES IN PEANUT SCIENCE Report - Tom Stalker

The articles of ADVANCES IN PEANUT SCIENCE are bound and everything is completed for the book except the index and front pages. Projected publication is this fall. Books will be sold at the annual meeting for $40 + $2.50 handling; after July 31 the price will be $45 + $2.50 handling. Estimated production cost was $13 per book for 450 pages; actual production cost will be approximately $20 per book since the number of pages has increased to 640. About 1500 copies will be printed. Many peanut grower associations have agreed to provide publicity space in their magazines to provide an opportunity for ordering the book.

Joe Sugg Graduate Student Award Report - Hassan Melouk

There will be seven presentations in the competition this year with Dr. Clyde Young serving as moderator and Chair of the Committee for judging the competition. It was moved and seconded that this committee become a standing committee effective 1995-96. Motion passed.

Future Meeting Site Rotation Committee Report - Dewitt Gooden

Most members of this committee felt that holding the annual meeting in other locations would be good but there was concern about who would handle the arrangements. The committee suggested four possibilities for meeting rotation: 1) continue as is being done now-- rotating the regions, and within the regions, rotating the states; 2) adopt a round robin rotation, with the 7 states rotating and each state hosting the meeting every 7 years; 3) have the southeast host the meeting every other year (Alabama, Georgia, Florida would host the meeting every 6 years and the other states would host every 8 years); 4) have a permanent site every year with technical program responsibilities being rotated among states. After some discussion, it was moved and seconded that the round robin option be established for meeting sites. The motion carried.

Future meeting sites will be as follows:

1996 - Florida	2003 - Florida
1997 - Texas	2004 - Texas
1998 - Virginia	2005 - Virginia
1999 - Georgia	2006 - Georgia
2000 - Alabama	2007 - Alabama
2001 - Oklahoma	2008 - Oklahoma
2002 - North Carolina	2009 - North Carolina

Nominating Committee Report - Dallas Hartzog

The Nominating Committee consisted of Dallas Hartzog, Olin Smith, Tim Sanders, and Larry Hawf. The Committee has selected the following slate of officers for 1995-96:

President Elect - Fred M. Shokes
State Employee Representative (V/C area) - Jim Young
USDA Representative - Robert Lynch
Industry Representative (Shelling/Marketing/Storage) - Bobby Walls

This slate will be presented to the membership during the 1995 business meeting for their approval.

Finance Committee Report - Scott Wright

The Finance Committee found the books to be in good standing for 1994-95. Total receipts for 1994-95 were $70,423.14 and total expenditures were $66,636.79, giving an excess of receipts over expenditures of $3,786.35. It was reported that income for PEANUT SCIENCE exceeded expenditures by $1,654.63. The proposed budget for 1995-96 in the amount of $98,600 was recommended to the Board. A motion was made and seconded that this proposed budget be accepted as presented. Motion carried.

Fellows Committee Report - Pat Phipps

Nominations were received and evaluated according to the guidelines as published in the PROCEEDINGS. Two APRES members were selected into Fellowship--David Knauft and Charles Simpson.

The Committee Chair and three members of the committee met on July 11, 1995. Discussions were held on reporting deadlines and evaluation of nominees. No recommendations were made for consideration at the Board of Directors meeting.

Bailey Award Committee Report - Austin Hagan

The Bailey Committee met on July 11 and reviewed deadline dates for receiving manuscripts. The Committee would like to move the date up. Fourteen manuscripts were submitted and evaluated. The 1995 recipients for the Bailey Award are J. S. Richburg and J. W. Wilcut for their paper titled "The behavior of imazethapyr and AC 263, 222 in purple (Cyperus rotundus) and yellow nutsedge (C. escultntus)".

Coyt T. Wilson Distinguished Service Award Committee Report - Norris Powell

Nominations were received and the award will be given to Clyde T. Young.

The Committee has two suggestions: 1) six copies of the nomination should be sent to the Committee Chair; 2) move deadline statement in the guidelines so it is either at the beginning or at the end of the guidelines (instead of buried in the middle).

DowElanco Award Committee Report - Mike Schubert

Four nominations were received for the DowElanco Award for Excellence in Extension and three nominations were received for the DowElanco Award for Excellence in Research. All nominees had excellent credentials. Dr. Gene A. Sullivan was selected as the Excellence in Extension Award recipient; Dr. Frederick M. Shokes was selected to receive the Excellence in Research Award.

Public Relations Committee Report - Jan Spears

The Public Relations Committee has two deaths to report--Ben Spears and Art Harrison. Resolutions will be prepared to be read at the business meeting and to be published in the PROCEEDINGS. The Committee recommended that the APRES brochure be updated. There was a motion that the Public Relations Committee revise the brochure before next year's meeting. The motion was seconded and passed.

Publications and Editorial Committee Report - Tim Brenneman

There are three Associate Editors rotating off the PEANUT SCIENCE editorial board. Tim Brenneman will be replaced by Jack Bailey, Dave Knauft will be replaced by Tom Isleib, and Ed Colburn will be replaced by Walt Mozingo. It was reported that the transition of the new PEANUT SCIENCE editor has gone well. There have been a few delays in printing, and this problem will be pursued with the publisher after the printing of ADVANCES IN PEANUT SCIENCE.

PEANUT RESEARCH is continuing on schedule. Marie Griffin, our co-editor, has stepped down this past year. Corley Holbrook will find a replacement.

Site Selection Committee Report - Tom Isleib

The 1996 meeting will be held at the Omni Rosen Hotel in Orlando, Florida, July 9-12. The 1997 meeting will be held July 8-11 at the Hyatt Regency Hotel in San Antonio, Texas. Lengthy discussion was held regarding the 1998 meeting, and the committee recommends that the meeting be held in Norfolk, Virginia. A motion was made and seconded that the 1998 annual meeting dates be July 7-10. Motion carried.

CAST Report - David Knauft

The CAST Board of Directors met in Washington, DC, February 25-27, 1995. A Kellogg grant has been obtained by CAST to provide support for a workshop held in St. Louis, Missouri, for member societies. This October workshop will examine the role of professional societies in the future. APRES has been asked to provide five representatives to the workshop. A full CAST Report will be printed in the PROCEEDINGS.

Program Committee Report - Harold Pattee

This year's working committees were headed up by Gerald Harrison and Fred R. Cox. Contributions were headed up by Gene Sullivan. Six major contributors (Rhone-Poulenc, ISK Biosciences, American Cyanamid, Bayer, Valent, and DowElanco) will support four major events, and numerous other organizations have given financial assistance. A complete listing of these organizations is in the program section of these PROCEEDINGS.

For this meeting, there are 7 poster papers scheduled, 7 papers in the graduate student competition, 11 symposium presentations, and 87 volunteered papers.

Other Business

President Bill Odle stated that he received back approximately 35 of the completed survey forms that were mailed to members in May. It was moved and seconded that incoming President Harold Pattee appoint a committee to review these survey forms and make recommendations to the Board as the committee determines. Motion carried. A motion was made that this committee also be charged with the responsibility of devising a membership biographical form to be sent to members along with the next membership notice (March 1996). Motion was seconded and approved.

A discussion was held concerning the CAST request for five delegates from APRES to attend the workshop in October. Dr. Harold Pattee will be responsible for finding five representatives. CAST will pay for 70% of the cost of attending this meeting. A motion was made that APRES defray the remaining 30% cost of attending the meeting if the APRES representative needs it. Motion was seconded and passed.

Peanut Quality Committee Report - Corley Holbrook

The committee formed a sub-committee to determine how to develop chemical quality standards. The committee voted to discontinue the updating of the QUALITY METHODS handbook, with the stipulation that the formed sub-committee would look into publishing a reference list of methods. The sub-committee will report back to the Board next year.

With no further business to discuss, meeting adjourned.

Respectfully submitted,

Pam Gillen, for
James R. Sholar, Executive Officer

Opening Remarks by the President
at the 1995 Business Meeting
of APRES
July 14, 1995

Bill Odle

I would like to welcome the members and their families and guests to the Awards Presentation and Annual Business meeting of the American Peanut Research and Education Society. We have had an outstanding meeting here in our host state of North Carolina.

One of the first things I would like to do this morning is recognize some of the people whose hard work and sacrifice have made this meeting such a success. I know all of us are especially grateful to Harold Pattee, this year's Program Chairman, and all of our North Carolina colleagues who have taken such good care of us this week. The local arrangements committee, co-chaired by Fred Cox and Gerald Harrison, did a tremendous behind-the-scenes job of coordinating all of the activities and support people throughout the meeting. The technical program committee, chaired by Jim Young, put together some excellent paper sessions and symposia for this year's meeting. The chairs and other members of the local arrangements and technical program committees deserve our special recognition and gratitude. These people have contributed many hours of work over the last several weeks and months in order to ensure the success of this annual meeting. Because our meeting is such a family-oriented affair, the spouses program committee also has an important function. I would like to recognize this committee's chair, Rhee Sutton, and all of the other members and thank them for coordinating activities involving the spouses' hospitality room and sightseeing/shopping tours. The names of all committee members are list on page 1 of your meeting program. Please make an effort to express your appreciation to these individuals for their contributions.

Industry support for our society remains as strong as ever. I would like to thank the corporate sponsors of our special social events this week. The Ice Cream Social on Tuesday night was sponsored by Rhone Poulenc. ISK Biosciences provided the Discovery Place Tour, dinner and Omnimax Show on Wednesday evening. The Appreciation Dinner on Thursday was hosted by American Cyanamid and Bayer, and the Awards Breakfast this morning was provided by Valent and DowElanco. In addition to these special events, monetary and merchandise contributions for support of our breaks and other activities were received from more than 50 additional companies. The names of these contributors are listed on the back of your program. Special recognition is deserved by Gene Sullivan for his efforts in coordinating these efforts. Thanks again to all the corporate sponsors for your outstanding support and generosity.

I would like to offer my personal thanks to several people who have provided me with invaluable assistance. Of course, my greatest help came from Ron Sholar, our Executive Officer. Without his assistance and guidance, my term as President would have been virtually impossible. Due to a conflict with military reserve duties, this is the first annual meeting that Ron has missed. In his absence, Pam Gillen and Hassan Melouk did a great job of making sure that the registration and various meeting activities ran smoothly. I would like to thank ISK Biosciences, my employer, and Howard Thomas, my supervisor, for allowing me to divert some of my company time and resources toward the fulfillment of my APRES duties. I would also like to express my thanks to Donna, who is my wife, secretary and soulmate, for her assistance and support. My appreciation and thanks also go to all of our members who donated their time to serve on the various standing committees and ad hoc committees. These people are the real lifeblood of our Society. Finally, I want to commend our Oklahoma members for validating the contributions and importance of private industry members of APRES by nominating me for President. This was a gesture of confidence intended not just for myself but, more importantly, for all of our industry members. It has been an honor and privilege to serve as your President. I have always considered APRES to be a special organization because of the professionalism and values demonstrated by its membership.

During the next few minutes I would like to comment on some concerns I have as a representative of the agricultural chemical industry. Mark Twain once said that it is better to remain silent and be thought a fool, than to speak up and remove all doubt. He may have plagiarized that wisdom from a Higher Source because the Bible says in Proverbs 17:28 "Even a fool, when he holdeth his peace, is counted wise: and he that shutteth his lips is esteemed a man of understanding." Although I normally try to follow this advice, today's circumstances require that I speak briefly.

It seems like every year we talk about change, and today is no different. Things are changing more rapidly than ever before in areas of international trade, farm programs, environmental regulations, the economy and society in general. Many of these changes will cause additional burdens and stresses on agriculture; however, not all of the recent changes are negative. Since the last national election, Congress has begun to seek a more balanced approach toward environmental issues as evidenced by debates being conducted in areas such as food quality, worker protection standards and endangered species. Of course, all of these areas need regulation, but we need reasonable regulations based on science and common sense. We, as agricultural workers need to seize this opportunity to support positive change. Let your congressional representatives hear your opinions about pending legislation, because the environmental groups certainly will promote their radical agenda. We should all be "environmentalists", but we must reconcile environmental protection with food production in a reasonable manner that will accomplish both.

For decades the United States has been the world leader in agriculture. Our growers are the most productive and efficient because of the efforts of people like you who have developed the technology to make it all possible. In order to compete globally in the future, we must continually develop and improve our food production technology. As we have heard in this week's paper sessions and symposia, the untapped potential in the vast area of biotechnology is exciting, and it should be aggressively pursued. However, I have a serious concern that we may soon face an information gap because the rapid increase in biotechnology efforts is being accomplished at the expense of applied research. As applied scientists at our universities retire, their positions are all too often eliminated or replaced with basic research personnel. Of course, some of this reallocation of resources is essential as we move into new areas of research. However, there seems to be little thought given toward an effective transitional phase as we move from today's chemical technology into the future of biotechnology.

I encourage you and your growers to insist that universities and government agencies allocate an adequate amount of resources to applied research programs. This is the only way to generate information that growers can use today, tomorrow and 10 years from now. We are just beginning to see a few practical applications of biotechnology in the area of pest control; however, traditional chemical programs will continue to be the only effective control option for many of the growers' problems during the next several years. It is exciting to dream about the new biotechnology era that is gradually emerging, but in the meantime, farmers must cope with their pest problems today in the real world. If the demise of applied research continues at its current pace, farmers may soon find themselves without adequate crop production recommendations from traditional university sources. In this situation, manufacturers, distributors and private research groups would become the primary information sources. Growers would have to make decisions without advice from an unbiased third party. Most reputable companies which market reliable products encourage evaluation of their products by research and extension personnel at the universities. Recommendations based on these unbiased, scientific evaluations give the grower confidence in a product's performance and value. This system also helps the grower to avoid bogus products and practices which are ineffective and a waste of time and money. Some groups are critical of universities for accepting research grants from chemical companies. They believe this will bias the scientists' data and recommendations. While working in this industry for almost 20 years, it has been my experience that 99.9% of the university personnel act in the best interest of farmers, and they strive to provide them with honest, reliable information. This is a must in order for them to maintain their credibility in the eyes of growers, as well as other groups.

During past decades, agricultural scientists conducted their research primarily for the benefit of the American Farmer, and farm groups had the greatest influence in determining research emphasis and direction. Today's circumstances are much more complicated. I would like to share some figures with you that I recently came across in the CAST (Council for Agricultural Science and Technology) Issue Paper Number 5, entitled "Challenges Confronting Agricultural Research at Land Grant Universities". At the turn of the century, 75% of the U.S. gross national product and 85% of employment opportunities came from agriculture. As we near the next turn of the century, agriculture is responsible for 18% of the GNP and 16% of the employment opportunities. As a result of this dramatic shift, much of todays' agricultural research agenda is decided not by farmers, but by consumers. In the 1930's and 1940's, congressional farm bills were developed with input from about a dozen groups, most of which were agricultural based. By 1990, over 260 environmental, industrial, consumer and agricultural groups had input in the process. This CAST report goes on to discuss some of the studies currently being conducted to determine new directions for research programs at our land grant universities.

We are faced with a dilemma in which consumers demand an abundant, high-quality, pest-free food supply with little, if any, pesticide use. Farmers, on the other hand, must rely on current chemical technology to economically produce the necessary yield and quality. Since agriculture has such a relatively small base in today's society, we must all be more effective in communicating agricultural needs and problems to the general public. More than ever before, it is critical that policies and regulations be based on scientific data and facts, rather than unfounded fears and emotions. The United States currently has the safest, most abundant and most economical food supply ever enjoyed by mankind. Unfortunately, most Americans take this blessing for granted.

As the secrets of biotechnology are gradually unlocked, a new era of food production will unfold. As this transition occurs, we must continue to maximize our current chemical control technologies through applied research programs.

BUSINESS MEETING AND AWARDS CEREMONY
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Adam's Mark Charlotte
Charlotte, North Carolina
July 14, 19956

The meeting was called to order at 8:15 a.m. by President Bill Odle. The following items of business were conducted:

1. President's Report - Bill Odle

2. The following awards were presented and reports made. Detailed reports are presented in the PROCEEDINGS.

    a. Fellows - Bill Odle

    b. Bailey Award - Austin Hagan

    c. Joe Sugg Graduate Student Competition - Hassan Melouk and Bob Sutter

    d. DowElanco Awards for Research & Extension - Mike Schubert

    e. Coyt T. Wilson Distinguished Service Award - Norris Powell

    f. Past President's Award - Bill Odle

    g. Peanut Science Associate Editors - Tom Stalker

3. The following reports were made, accepted, and approved by the membership. Detailed reports are presented in the PROCEEDINGS.

    a. Executive Officer Report and Reading of Minutes of Previous Meeting - Hassan Melouk

    b. New Book Committee (ADVANCES IN PEANUT SCIENCE) -Tom Stalker and Harold Pattee

    c. Joe Sugg Graduate Student Award Committee - Hassan Melouk

    d. Future Meeting Site Rotation Committee - Dewitt Gooden

    e. Nominating Committee - Dallas Hartzog

    f. Finance Committee - Scott Wright

    g. Public Relations Committee - Ken Jackson

h. Peanut Quality Committee - Corley Holbrook

i. Site Selection Committee - Tom Isleib

j. Publications and Editorial Committee - Tim Brenneman

k. Program Committee - Harold Pattee

4. The following New Business was conducted:

   a. A vote was taken on making the Joe Sugg Graduate Student Committee a standing committee and a part of the By-Laws. The membership voted in favor of this.

   b. An an-hoc committee has been appointed to review and make recommendations to the Board of Directors concerning the information on the survey questionnaire that was distributed to members in May.

   c. Five delegates will represent APRES at a CAST workshop to examine the role of professional societies. The APRES representatives will be Ron Henning, Chip Lee, David Knauft, Harold Pattee, and Fred Shokes.

5. Dr. Odle turned the meeting over to the new President, Harold Pattee of North Carolina, who then adjourned the meeting.

FINANCE COMMITTEE REPORT

The Finance Committee met at 3:00 p.m., July 11, 1995, in Charlotte, North Carolina. Committee members present were: Fred Cox, Roger Bunch, Charles Simpson, Ron Weeks, Ray Smith, Scott Wright, and President Bill Odle. Others present included Harold Pattee, Tim Brenneman, and Tom Stalker.

The Committee reviewed and approved the financial report sent to committee members by Executive Officer Ron Sholar. For the 1994-95 year, the Society received a total of $70,423.14 and expended $66,636.79 for an excess of receipts over expenditures of $3,786.35.

The June 30, 1995, assets totalled $138,954.34 which is an increase of $2,876.35 over the June 30, 1994, balance.

Tom Stalker, editor of PEANUT SCIENCE, reported that income for PEANUT SCIENCE exceeded expenditures of $27,110.36 by $1,654.63.

After much discussion by the Committee and input for printing costs ($32,500) from the editors for the new book ADVANCES IN PEANUT SCIENCE, a total budget for 1995-96 in the amount of $98,600 was recommended to the Board and was approved. A copy will be published in the PROCEEDINGS.

The meeting adjourned at 4:30 p.m.

Respectfully submitted,

F. Scott Wright, Chair

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BUDGET 1995-96

RECEIPTS

Annual Meeting Registration	$15,500
Membership Dues	15,000
Special Contributions	11,000
Differential Postage	2,500
Peanut Science & Technology	1,000
Quality Methods	0
Proceedings and Reprint Sales	100
Peanut Science Page Charges & Reprints	17,000
Interest	4,000
Advances in Peanut Science (sales)	20,000
Other income (from CD transfer)[1]	12,500
TOTAL RECEIPTS	**$98,600**

EXPENDITURES

Annual Meeting	$10,500
CAST Membership	1,000
Office Supplies	2,000
Secretarial Services	12,400
Postage	3,000
Travel - Officers	1,200
Legal Fees	500
Proceedings	3,600
Peanut Science	30,000
Peanut Science and Technology	100
Peanut Research	1,500
Quality Methods	100
Bank charges	150
Miscellaneous	50
On-line Computer Search Capability	0
Advances in Peanut Science[1]	32,500
Reserve	0
TOTAL EXPENDITURES	**$98,600**

Excess Receipts over Expenditures	0

[1] The Board of Directors approved the transfer of $12,500 from a CD for the purpose of helping pay for printing of Advances in Peanut Science.

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BALANCE SHEET FOR FY 1994-95

ASSETS	June 30, 1994	June 30, 1995
Petty Cash Fund	329.32	$ 662.09
Checking Account	35,897.15	25,343.38
Certificate of Deposit #1	19,937.60	20,755.92
Certificate of Deposit #2	12,755.43	13,418.81
Certificate of Deposit #3	11,952.14	12,540.18
Certificate of Deposit #4	31,340.10	32,734.23
Certificate of Deposit #5	11,888.24	12,332.18
Certificate of Deposit #6		10,000.00
Money Market Account	2,830.33	2,945.66
Savings Account (Wallace Bailey)	1,157.68	1,141.89
Inventory of Books	7,990.00	7,080.00
TOTAL ASSETS	**$136,077.99**	**$138,954.34**

LIABILITIES		
No Liabilities	0.00	0.00
TOTAL FUND BALANCE	**$136,077.99**	**$138,954.34**

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

	June 30, 1994	June 30, 1995
RECEIPTS		
Annual Meeting Registration	$16,680.00	$15,005.00
Award Income	2,000.00	0.00
Contributions	9,100.00	16,975.00
Differential Postage	2,880.00	2,237.50
Dues	16,573.00	15,235.00
Interest	4,110.12	4,677.08
Peanut Research	52.00	90.00
Peanut Science	702.00	690.00
Peanut Science Page Charges	16,437.70	13,866.30
Peanut Science and Technology	1,130.00	1,127.50
Proceedings	127.00	26.00
Quality Methods	30.00	30.00
Spouse Registration	2,045.00	243.00
Other Income	32.00	220.76
TOTAL RECEIPTS	**$71,898.82**	**$70,423.14**
EXPENDITURES		
Annual Meeting	$ 9,968.74	$11,920.15
Bank Charges	49.25	91.50
CAST Membership	552.50	478.40
Corporation Registration	115.00	100.00
Federal Withholding	540.00	666.00
FICA	1,242.48	1,330.32
Legal Fees	300.00	315.00
Medicare	290.64	311.04
Miscellaneous	50.00	0.00
Office Expenses	936.20	1,693.42
Oklahoma Withholding	221.88	270.60
Peanut Research	2,535.28	6,681.19
Peanut Science	25,468.98	25,284.83
Peanut Science and Technology	0.00	80.00
Postage	2,926.58	3,620.99
Proceedings	3,600.42	3,410.06
Quality Methods	0.00	0.00
Sales Tax	40.22	35.60
Secretarial Services	8,491.56	8,970.72
Spouse Program Expenses	2,857.53	1,028.76
Travel - Officers	1,252.21	348.21
Other Expenses	0.00	0.00
TOTAL EXPENDITURES	**$61,439.47**	**$66,636.79**
EXCESS RECEIPTS OVER EXPENDITURES	**$10,459.35**	**$ 3,786.35**

PEANUT SCIENCE BUDGET
1995-96

INCOME

Page and reprint charges	$19,000.00
Foreign mailings	1,100.00
APRES member subscriptions (500 x $13.00)	6,500.00
Library subscriptions (80 x $15.00)	1,200.00
TOTAL INCOME	**$27,800.00**

EXPENDITURES

Printing and reprint costs	$14,000.00
Editorial assistance	12,000.00
Office supplies	200.00
Postage	1,600.00
TOTAL EXPENDITURES	**$27,800.00**

PEANUT SCIENCE AND TECHNOLOGY
SALES REPORT AND INVENTORY ADJUSTMENT
1994-95

	Books Sold	Remaining Inventory
Beginning Inventory		799
1st Quarter	68	731
2nd Quarter	8	723
3rd Quarter	3	720
4th Quarter	12	708
TOTAL	91	

91 books sold x $10.00 = $910.00 decrease in value of book inventory.

708 remaining books x $10.00 (book value) = $7,080.00 total value of remaining book inventory.

Fiscal Year	Books Sold
1985-86	102
1986-87	77
1987-88	204
1988-89	136
1989-90	112
1990-91	70
1991-92	119
1992-93	187
1993-94	85
1994-95	91

PUBLIC RELATIONS COMMITTEE REPORT

The APRES Public Relations Committee met on July 11, 1995, at the Adam's Mark Hotel in Charlotte, North Carolina. Two members were present. Initial discussions included the status of the APRES brochure. The brochure was last printed in 1994 and should be revised to reflect the 1996, 1997, and 1998 meeting dates and locations. The brochure should also include publication information for ADVANCES IN PEANUT SCIENCE.

The Public Relations Committee will recognize members and leaders in the peanut industry who passed away in 1994-95. Dr. Art Harrison and Ben Spears, both of Texas, passed away in 1994. These two will be recognized on Friday morning during the business meeting and formal resolutions will be prepared.

Respectfully submitted,

Jan Spears, Chair

RESOLUTIONS

Whereas Dr. Arthur Leslie Harrison, retired Professor of Plant Pathology at the Texas A&M University Experiment Station at Yoakum, was a leader in peanut disease research, and

Whereas Dr. Art Harrison made major contributions to the peanut industry in the area of disease management in peanuts, particularly fungicide application and efficacy for control of leaf spot, and

Whereas Dr. Harrison received numerous awards and honors, including the 1970 National Peanut Council Golden Peanut Award for his contributions towards improvement in yield and quality of peanuts produced in south Texas, and

Whereas Dr. Harrison served APRES through membership and active participation, and

Whereas Dr. Art Harrison passed away in Yoakum, Texas, on March 25, 1994,

Be it resolved that Dr. Harrison's life and contributions to the peanut industry and APRES are honored by the American Peanut Research and Education Society.

Whereas Ben R. Spears, Jr., State Extension Agronomist at Texas A&M University, was a leader in peanut extension in the area of peanut production for over 30 years, and

Whereas Ben Spears made numerous contributions to the peanut industry, including development of herbicide recommendations for peanut production in Texas and construction of a peanut plot thresher, and

Whereas Ben Spears represented the Texas peanut industry through numerous trips to Washington, D.C., to promote the Peanut Program and the Farm Bill, and

Whereas Ben Spears was recognized as a valued leader and teacher, having received the Distinguished Faculty Award from the Texas A&M Former Students Association, and

Whereas Ben Spears served APRES through membership and active participation, and

Whereas Ben Spears passed away in College Station, Texas, on November 28, 1994,

Be it resolved that Ben Spears, Jr.'s life and contributions to the peanut industry and APRES are honored by the American Peanut Research and Education Society.

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT

The Publications and Editorial Committee of APRES met July 11, 1995, at Charlotte, North Carolina. Members present were Bill Branch, Dave Hogg, Kim Cutchins, Jim Kirby, and Tim Brenneman. Harold Pattee, Corley Holbrook, Tim Sanders, and Tom Stalker were also present.

Old Business:

The Committee received Tom Stalker's PEANUT SCIENCE Editor's report. Volume 21 of PEANUT SCIENCE had 36 manuscripts totalling 161 pages. Volume 22, #1, will have 17 manuscripts. Some printing delays have been experienced and these are being pursued with the publisher. More long articles and lower-than-anticipated printing costs resulted in a cash surplus of $1,654.63. Tom Stalker presented a revised version of the "Suggestions to Contributors" for PEANUT SCIENCE that was prepared with input from the Publications and Editorial Committee and the Associate Editors of PEANUT SCIENCE. These were discussed and approved. They will appear in future issues of PEANUT SCIENCE and should result in a more uniform format for the journal.

Retiring from the PEANUT SCIENCE editorial board after six years of service are Dave Knauft (Breeding and Genetics) and Tim Brenneman (Plant Pathology). Ed Colburn is stepping down after a three-year term. Replacements recommended are Jack Bailey (Plant Pathology), Tom Isleib (Breeding and Genetics), and Walt Mozingo (Production).

ADVANCES IN PEANUT SCIENCE is on track for fall availability and Kim Cutchins will coordinate publicity. She indicated that a number of publications have agreed to provide free advertising space. The price will still be $45 plus handling with an early purchase option of $40 plus handling prior to July 31, 1995. Tim Sanders reported that the QUALITY METHODS handbook would not be updated and therefore did not need to be advertised.

Corley Holbrook reported that his co-editor of PEANUT RESEARCH, Marie Griffin, is moving and has requested that a replacement be found. The Committee authorized him to recruit a suitable replacement.

New Business:

None.

Respectfully submitted,

Tim Brenneman, Chair

NOMINATING COMMITTEE REPORT

The 1994-95 Nominating Committee of APRES consisted of: Dallas Hartzog, Chairman; Olin Smith; Tim Sanders; and Larry Hawf.

This Committee met July 11, 1995, at 3:00 p.m. in the Governor's 5 Room of the Adam's Mark Hotel at our annual meeting.

The Nominating Committee has selected the following slate of officers for 1995-96:

President Elect - Fred M. Shokes
State Employee Representative (Virginia/Carolina area) - Jim Young
USDA Representative - Robert Lynch
Industry Representative (Shelling/Marketing/Storage) - Bobby Walls

This concludes the report of the Nominating Committee for the 1995 annual meeting.

Respectfully submitted,

Dallas Hartzog, Chair

FELLOWS COMMITTEE REPORT

Nominations for recognition as APRES Fellow were received on or before March 1, 1995, as required. Nomination packets and evaluation forms for each nominee were sent to the Committee members by overnight carrier on March 3. The chair and all five members of the committee evaluated each nomination according to the guidelines as published in the PROCEEDINGS of APRES Volume 16, pages 117-121. Scores were compiled and compared with respect to the total points received and ranking. A tabulation and summary of the results were sent by overnight carrier to the APRES president, William C. Odle, on April 3, 1995.

The chair and three members of the committee met at 1:00 p.m. on July 11, 1995, to review work completed in 1994-95 and responsibilities in 1995-96. Discussions were held on: 1) reporting deadlines and 2) evaluation of nominees. No recommendations were made for consideration at the Board of Directors meeting.

Respectfully submitted,

Patrick M. Phipps, Chair

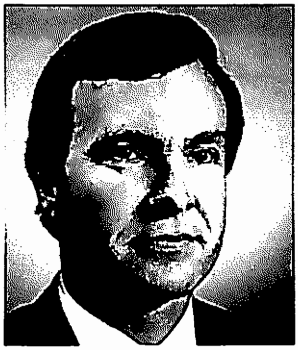
BIOGRAPHICAL SUMMARIES OF FELLOWS

Dr. Charles E. Simpson, Professor of Soil and Environmental Sciences, Texas A&M University, has devoted his career to increasing genetic resources for breeding peanut varieties with improved agronomic characteristics and resistance to disease. Subsequent to cooperative studies with Dr. W. C. Gregory at North Carolina State University, Dr. Simpson became the leader for exploration and collection of peanut germplasm under auspices of the International Board of Plant Genetic Resources. He has participated in 20 expeditions (18 as leader and co-leader) to South America for the purpose of acquiring exotic peanut and associated bradyrhizobium collections. He also has participated as co-leader in absentia, advisor, and recipient for the increase, characterization, and distribution of germplasm for 24 other expeditions. More than 2400 cultivated and 900 wild collections of *Arachis*, and more than 300 accessions of bradyrhizobium have been acquired through these efforts. Included are not less than 42 new species of *Arachis*. Dr. Simpson has applied 53 minimum descriptors to the 2000 accessions of *Arachis hypogaea* collected in South America from 1977 to 1986, and authored two detailed catalogs of minimum descriptor data along with important passport information.

Dr. Simpson and colleagues have screened essentially all of the cultivated germplasm for resistance to early leaf spot, and the newly-collected germplasm groups for resistance to web blotch, peanut root knot nematode, Sclerotinia blight, and late leaf spot. He has also evaluated large quantities of the germplasm for agronomic and morphological traits, and examined cross-compatibility among several wild species. He has devised and employed a bridge-cross technique that uses a wild diploid species in addition to the targeted sources of resistance genes for introgression of leaf spot resistance, root knot nematode resistance, and short growth duration from wild to cultivated species. Through his introgression program, two breeding lines (TxAG-6 and TxAG-7) have been released which are highly resistant to parasitism by the peanut root knot nematode. This achievement provided the first sexually-compatible source of nematode resistance for breeders to use in developing commercial cultivars. Dr. Simpson has also been a leader and cooperator in the release of several peanut cultivars and germplasm lines. Among these are the highly successful spanish cultivars Starr and Tamspan 90.

Dr. Simpson has been very active in APRES, serving as President, a member of the Board of Directors, and member of several committees since 1967. He has served as a member and/or co-chair of eight M.S. and seven Ph.D. graduate student advisory committees. Dr. Simpson has served as

Interim Director of the TAMU Research and Extension Center at Stephenville from 1968-70 and during the spring of 1993. He was awarded the Frank M. Myer Medal for Plant Genetic Resources in 1993 by the American Society of Agronomy.



Dr. David A. Knauft, Professor and Head of Crop Science at North Carolina State University, became well known as a scientist for his contributions in peanut breeding and genetics during his tenure at the University of Florida from 1978 to 1993. He has authored over 150 publications which include 52 refereed journal articles and five chapters in books. He was a co-developer of the cultivar Southern Runner, the first to have resistance to late leaf spot, and his research helped define the physiological aspects of resistance. He has worked with many pests including nematodes, leaf spots, rusts, weevils, whitefly and several viruses. He has developed selection indices for breeding programs to incorporate quality and pest resistance into the same line. Dr. Knauft was also a co-developer of the cultivar Marc I. His research to explain the genetic control of quality factors, the inheritance of resistance to diseases and pests, and genotype x environment interactions has enabled development of improved selection strategies for breeding programs. He was responsible for calculating and publishing the coefficient of parentage (i.e. relatedness) for present and historic cultivars of peanut. This publication has been a valuable and frequently used resource for all peanut breeding programs. He was the leader in research to define the genetic control of the high oleic acid trait and integrating this trait into the commercially-accepted cultivar, SunOleic 95R. In addition to providing for a longer shelf life, the high oleic acid peanut is thought to provide a more healthy product for consumers.

In 1991, Dr. Knauft organized the first molecular genetics symposium on peanuts at the annual meeting of APRES. A year later he initiated the Southern Regional Information Exchange Group, wherein breeders and molecular biologists were brought together to discuss common problems and interests. As chair of the Peanut Crop Advisory Committee, Dr. Knauft has taken a proactive role to help direct national USDA germplasm policies and, more specifically, policies concerning the U.S. peanut germplasm collection. He has served APRES as a member of the Board of Directors and several committees, as contributing editor for PEANUT RESEARCH for 11 years, and as Associate Editor for PEANUT SCIENCE for 6 years. He has been a member of APRES since 1978.

Dr. Knauft has chaired 15 graduate students to the completion of their degrees and served as a committee member for 56 other students. Early in his career he taught a variety of courses and received high student evaluation scores. In addition, he has conducted on-site training in statistics and breeding in both Africa and Asia. Today, he continues to support all phases of peanut research and education as an administrator at North Carolina State University. His dedication to undergraduate education was recognized in 1989 when he received the Gamma Sigma Delta Junior Faculty Award of Merit.

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 (minimum of three but not more than five). 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: A minimum of three (3) but not more than five (5) supporting letters are to be included for the nominee. Two of the three required supporting letters must be 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 to 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

Fourteen manuscripts were submitted and evaluated by the members of the Bailey Award Committee. Candidate papers are listed below.

The Bailey Award winners for 1995 are J. S. Richburg and J. W. Wilcut for their paper titled "The behavior of imazethapyr and AC 263,222 in purple (*Cyperus rotundus*) and yellow nutsedge (*C. escultntus*)".

The committee meeting was attended by three members.

Respectfully submitted,

Austin Hagan, Chair

Papers Submitted for the 1995 Bailey Award

1) J. S. Richburg, III and J. W. Wilcut. The behavior of imazethapyr and AC 263,222 in purple (*Cyperus rotundus*) and yellow nutsedge (*C. escultntus*).

2) T. G. Isleib, H. E. Pattee, and F. G. Giesbrecht. Ancestral contributions to roasted peanut flavor.

3) S. M. Fletcher, P. Zhang, and D. H. Carley. Potential impact on peanut farmers and food manufacturers from changes in peanut prices.

4) D. T. Grimm, T. H. Sanders, H. E. Pattee, D. E. Williams, and S. Sanchez-Dominquez. Chemical composition of *Arachis hypogaea* ssp. hypogaea var. hirsuta peanuts.

5) K. S. Rucker, C. K. Kvien, K. Calhoun, R. J. Henning, S. R. Ghate, and C. C. Holbrook. Improving peanut quality, maturity, and reducing aflatoxin risk by sorting and pod density.

6) P. M. Phipps. Assessment of environmental conditions preceding outbreaks of Sclerotinia blight of peanut in Virginia.

7) W. D. Branch and A. K. Culbreath. Combination of early maturity and leafspot resistance with an advanced Georgia peanut breeding line.

8) B. N. Ang, D. A. Herbert, and W. J. Petka. Effects of soil texture and drainage on peanut pod damage by southern corn rootworm.

9) R. Rodriquez-Kabana, N. Kokalis-Burelle, D. G. Robertson, and L. W. Wells. Evaluation of sesame for control of *Melodogyne arenaria* and *Sclerotium rolfsii* in peanut.

10) T. B. Brenneman, D. R. Sumner, and R. E. Baird. Effects of rotation with Tifton 9 bahiagrass on peanut diseases, soil, shell microflora, and pod yield.

11) R. W. Mozingo and N. L. Powell. Influence of calcium and agronomic characteristics on 'VA-C 92' peanut.

12) M. J. Bader and J. A. Baldwin. The influence of furrow diking on peanut yield in 1993.

13) B. J. Brecke. Growth and development of wild poinsettia (*Euphorbia heterophylla* L.) selections in peanut.

14) M. C. Black, H. Tewolde, C. J. Fernandez, and A. M. Schubert. Effects of seeding rate, irrigation, and cultivar on spotted wilt, rust, and southern blight diseases of peanut.

Guidelines for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY BAILEY AWARD

The Bailey Award was established in honor of Wallace K. Bailey, an eminent peanut scientist. The award is based on a two-tier system whereby nominations are selected based on the oral paper presentation in sessions at the annual APRES meeting, and final awards are made after critiquing manuscripts based on the information presented during the respective meeting.

For initial selection, the session chairman shall appoint three persons, including him/herself if desired, to select the best paper in the session. None of the judges can be an author or co-author of papers presented during the respective session. No more than one paper from each session can be nominated for the award but, at the discretion of the session chairman in consultation with the Bailey Award chairman, the three-member committee may forego submission of a nomination. Symposia and poster presentations are not eligible for the Bailey Award. The following should be considered for eligibility:

1. The presenter of a nominated paper, whether the first or a secondary author, must be a member of APRES.

2. Graduate students being judged for the Joe Sugg Award are also eligible for the Bailey Award if they meet all other criteria for eligibility.

Oral presentations will be judged for the Award based on the following criteria:

1. Well organized.

2. Clearly stated.

3. Scientifically sound.

4. Original research.

5. Presented within the time allowed.

Final evaluation for the Award will be made from manuscripts submitted to the Awards Committee, after having been selected previously from presentations at the APRES meetings. These manuscripts should be based on the oral presentation and abstract as published in the PROCEEDINGS.

Authorship of the manuscript should be the same (both in name and order) as the original abstract. Papers with added author(s) will be ruled ineligible. Manuscripts are judged using the following criteria:

1. Appropriateness of the introduction, materials and methods, results and discussion, interpretation and conclusions, illustrations and tables.

2. Originality of concept and methodology.

3. Clarity of text, tables and figures; economy of style; building on known literature.

4. Contribution to peanut scientific knowledge.

The presentation of bookends will be made to the speaker and other authors appropriately recognized.

JOE SUGG GRADUATE STUDENT AWARD REPORT

Six papers were qualified to enter the competition in this session. The competition among the students was keen, and all gave an outstanding effort presenting their paper and answering questions. Five judges scored the papers based on clarity of presentation, quality of visual aides, originality and contribution to peanut science, overall quality and clarity of abstracts, and responding to questions.

Clyde Young moderated the session and was the Chair of the judging committee. The other four judges were Art Assad, James Grichar, Barry Brecke and Mike Matheron. John Wilcut and Hassan Melouk (members of the committee) declined to participate in scoring the presentations because of a conflict of interest.

The first place award went to P. D. Brune, North Carolina State University, for his presentation titled "Root growth responses of peanut genotypes following mechanical wounding to simulate damage by the pathogen *Cylindrocladium parasiticum*". The paper was co-authored by M. K. Beute.

The second place award went to M. D. Franke, University of Georgia, for his presentation titled "Fungicide sensitivity of *Sclerotium rolfsii* from peanut in Georgia". The paper was co-authored by T. B. Brenneman and K. L. Reynolds.

Cash awards given by the North Carolina Peanut Growers Association (NCPGA) were presented to the winners by Mr. Robert Sutter, Chief Executive Officer of the NCPGA. The first place winner received $200 and the second place winner received $100.

Respectfully submitted,

H. A. Melouk, Chair

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT

Dr. Clyde T. Young was recognized for outstanding contributions to APRES and the peanut industry and received the 1995 Coyt T. Wilson Distinguished Service Award.

Respectfully submitted,

Norris Powell, Chair

BIOGRAPHICAL SUMMARY OF
COYT T. WILSON DISTINGUISHED SERVICE AWARD RECIPIENT

Dr. Clyde T. Young received the B.S. and M.S. degrees in Animal Industry from North Carolina State University and the Ph.D. from Oklahoma State University in Food Science. He is Professor of Food Science and Crop Science at North Carolina State University. Dr. Young has contributed to the success of the Society and to the betterment of its membership by his dedicated leadership and enthusiastic service on many committees as member and chairman the past 26 years.

Dr. Young's academic contribution is to finished peanut quality. Through the development of rapid qualitative and quantitative analytical methods, he has been able to provide information on the finished product quality contributions of varieties, agronomic practices, maturity, and roasting. His interactions with the processing industry have contributed to the quality of the final peanut products in the marketplace, and enhanced the reputation of the Society.

Dr. Young's most significant contributions to the Society have been in the form of services rendered as editor of QUALITY METHODS, co-editor of PEANUT SCIENCE AND TECHNOLOGY, and associate editor of PEANUT SCIENCE.

In the late 1970's and early 1980's, the Society, through the Quality Committee, saw a need to publish methods used for laboratory analysis of peanut. Dr. Young edited these methods published by the Society as QUALITY METHODS. Under his leadership the Society published 25 methods that are in use today. He carefully reviewed each method to assure its accuracy and usefulness in quality analysis. These methods have been and still are of tremendous benefit to the peanut industry and research scientist.

As co-editor of the book PEANUT SCIENCE AND TECHNOLOGY, Dr. Young contributed to the excellent reputation of the Society with the publication of one of the two best reference sources on peanut. His countless hours of work as co-editor aided in making PEANUT SCIENCE AND TECHNOLOGY <u>the</u> book on peanut since its publication in 1982. This book has benefitted everyone associated with the peanut industry worldwide. It is a valuable resource on any subject involved with peanut from breeding to final consumption.

Dr. Young has served the Society as an associate editor of PEANUT SCIENCE - the journal of the American Peanut Research and Education Society. He has a well-respected reputation as the peanut quality expert and has helped establish the reputation of this journal as the source of technical information on peanut worldwide.

Dr. Young was honored by the Society when he was named Fellow in 1986.

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

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

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. Six copies of the nomination packet should be sent to the committee chair.

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.

Award and Presentation

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

DOWELANCO AWARD COMMITTEE REPORT

The APRES DowElanco Awards Committee consisted of Zackie Harrell, John Beasley, Lance Peterson, Barry Brecke, Rick Brandenburg, and Mike Schubert.

We received four nominations for the DowElanco Award for Excellence in Extension and three nominations for the DowElanco Award for Excellence in Research. All nominees had excellent credentials. Unfortunately, we can award only one winner in each category. We encourage nominators to resubmit their nominees for consideration next year.

Dr. Gene A. Sullivan was selected to receive the Excellence in Extension Award and Dr. Frederick M. Shokes was selected to receive the Excellence in Research Award.

Respectfully submitted,

Mike Schubert, Chair

BIOGRAPHICAL SUMMARY OF DOWELANCO AWARD FOR EXCELLENCE IN EXTENSION RECIPIENT

Dr. Gene A. Sullivan is Extension Peanut Specialist at North Carolina State University, Raleigh, North Carolina. He received his B.S. degree in Agricultural Economics from North Carolina State University in 1962, his M.S. degree in Adult Education (minor--Agronomy) from North Carolina State University in 1966, and his Ph.D. in Crop Physiology (minor--Economics) from North Carolina State University in 1973. Dr. Sullivan began his extension career as Assistant Agricultural Agent in Baden County, North Carolina, in 1962. In 1967 he assumed the duties of Crop Science Extension Specialist (Seed) at North Carolina State University. In 1981 he became the Crop Science Extension Specialist (Peanut). His current official title is Professor and Crop Science Extension Specialist (Peanut), North Carolina State University, Raleigh, North Carolina.

Dr. Sullivan is recognized for developing and implementing an outstanding educational program for peanut production, marketing, and utilization in North Carolina. The program provides peanut producers with the knowledge and skills needed to make intelligent production and marketing decisions. It involves county extension agents, other specialists, allied agencies, agribusiness representatives, and peanut commodity organizations.

County extension agents working in peanut producing counties have received in-service training in 25 sessions. Information presented is coordinated with all specialists and researchers with peanut responsibility in North Carolina. Dr. Sullivan has conducted over 400 on-farm tests. He distributes information throughout the growing season by a multitude of television, radio, and print media outlets, as well as extension publications and personal presentations and visits. He initiated publication of a comprehensive peanut production manual revised annually. This manual is the "bible" for North Carolina growers and county agents; it is also widely used as a reference in other states. Dr. Sullivan has been active in promoting peanut quality and in educating producers and handlers on how to achieve higher peanut quality. He has actively participated in departmental and university programs, national organizations and programs, international education and peanut promotion, and professional organizations.

During his 32 years as an extension educator, Dr. Sullivan has received many awards from the peanut industry, North Carolina State University and its agencies, and agricultural and agribusiness organizations. He stresses teamwork and involvement of all segments of the peanut industry in his educational programs. He is respected by all segments of the peanut industry, including growers, shellers, brokers, processors, manufacturers, and research and extension colleagues.

BIOGRAPHICAL SUMMARY OF DOWELANCO AWARD FOR EXCELLENCE IN RESEARCH RECIPIENT

Dr. Frederick M. Shokes is Professor and Plant Pathologist at the University of Florida, Institute of Food and Agricultural Sciences, North Florida Research and Education Center at Quincy, Florida. He received his B.S. degree in Plant and Soil Science from Texas A&M University in 1974, his M.S. degree in Plant Physiology from Texas A&M University in 1975, and his Ph.D. in Plant Pathology from the University of Georgia in 1978. He has worked as Plant Pathologist at NFAREC-Quincy since 1978.

Dr. Shokes is a leader and innovator in developing and integrating disease control tactics to reduce the risk of yield reductions in peanut. Simultaneously, he has stressed the use of the minimum quantity of pesticides required to accomplish this goal. His colleagues praise the practicality as well as the scientific rigor of his research. As one co-nominator writes, "I have integrated results from many of Fred's tests into recommendations. Fred is one of the best researchers in the country in relation to conducting useful research. Yet, most of his research can be published in refereed journals..." Another co-nominator states, "He is well respected by his peers throughout the United States and the world. He is regarded by many colleagues as a leading authority in peanut pathology." Dr. Shokes' peers cite the importance of his contributions in the development of accurate and precise disease assessment scales to evaluate peanut germplasm for resistance to leafspot and southern stem rot. This research has been critical in the development and release of disease resistant cultivars, such as "Southern Runner" and "Georgia Browne". Dr. Shokes' research on disease component mechanisms that contribute to disease resistance is innovative and is held in high regard.

Dr. Shokes' research on fungicide efficacy and fungicide programs has contributed greatly to southeastern peanut growers. His research on when in the crop year to initiate fungicidal sprays and on how to schedule those treatments, based on weather factors favorable or unfavorable for disease development, has been valuable to the peanut industry.

Dr. Fred Shokes has been very active in professional societies, especially APRES. He has organized symposia, chaired sessions, served on committees, and served as associate editor of PEANUT SCIENCE. His presentations at annual APRES meetings have been excellent, as indicated by his receiving two Bailey Awards for best paper. He is a co-editor for a book entitled "Peanut Health Management" to be published by APS Press in 1995. Dr. Shokes' nominator writes, "The title of this book is an excellent reflection of Fred's career as he has been totally devoted to improving the health of peanuts and is a researcher who is most deserving of the DowElanco Award for Excellence in Research."

Guidelines for

DOWELANCO AWARDS FOR EXCELLENCE IN RESEARCH AND EXTENSION

I. DowElanco Award for Excellence in *Research*

The award will recognize an individual or team for excellence in research. The award may recognize an individual (team) for career performance or for an outstanding current research achievement of significant benefit to the peanut industry. One award will be given each year provided worthy nominees are nominated. The recipient will receive an appropriately engraved plaque and a $1,000 cash award. In the event of team winners, one plaque will be presented to the team leader and other team members will receive framed certificates. The cash award will be divided equally among team members.

Eligibility of Nominees

Nominees must be active members of the American Peanut Research and Education Society and must have been active members for the past five years. The nominee or team must have made outstanding contributions to the peanut industry through research projects. Members of the DowElanco Awards Committee are ineligible for the award while serving on the committee.

II. DowElanco Award for Excellence in *Extension*

The award will recognize an individual or team for excellence in educational programs. The award may recognize an individual (team) for career performance or for an outstanding current educational achievement of significant benefit to the peanut industry. One award will be given each year provided worthy nominees are nominated. The recipient will receive an appropriately engraved plaque and a $1,000 cash award. In the event of team winners, one plaque will be presented to the team leader and other team members will receive framed certificates. The cash award will be divided equally among team members.

Eligibility of Nominees

Nominees must be active members of the American Peanut Research and Education Society and must have been active members for the past five years. The nominee or team must have made outstanding contributions to the peanut industry through education programs. Members of the DowElanco Awards Committee are not eligible for the award while serving on the committee.

Eligibility of nominators, nomination procedures, and the DowElanco Awards Committee are identical for the two awards and are described below:

Eligibility of Nominators

Nominators must be active members of the American Peanut Research and Education Society. Members of the DowElanco Awards Committee are not eligible to make nominations while serving on the committee. A nominator may make only one nomination each year.

Nomination Procedures

Nominations will be made on the Nomination Form for DowElanco Awards. Forms are available from the Executive Officer of APRES. A nominator's submittal letter summarizing the significant professional achievements and their impact on the peanut industry may be submitted with the nomination. Three supporting letters must be submitted with the nomination. Supporting letters may be no more than one page in length. Nominations must be postmarked no later than March 1 and mailed to the committee chair.

DowElanco Awards Committee

The APRES President is responsible for appointing the committee. The committee will consist of seven members with one member representing the sponsor. After the initial appointments, the President will appoint two new members each year to serve a term of three years. If a sponsor representative serves on the awards committee, the sponsor representative will not be eligible to serve as chair of the committee.

NOMINATION FORM FOR DOWELANCO AWARDS

General Instructions: Listed below is the information to be included in the nomination for individuals or teams for the DowElanco Award. Ensure that all information is included. Complete Section VI, Professional Achievements, on the back of this form. Attach additional sheets as required.

****

Indicate the award for which this nomination is being submitted.
Date nomination submitted:

___ DowElanco Award for Excellence in Extension

___ DowElanco Award for Excellence in Research

****

I. Nominee(s): For a team nomination, list the requested information on all team members on a separate sheet.

Nominee ______________________________

Address ______________________________

Title ______________ Tel No. ______________

II. Nominator:

Name ______________ Signature ______________

Address ______________________________

Title ______________ Tel No. ______________

III. Education: (include schools, college, universities, dates attended and degrees granted).

IV. Career: (state the positions held by listing present position first, titles, places of employment and dates of employment).

V. Honors and Awards: (received during professional career).

VI. Professional Achievements: (Describe achievement in which the nominee has made significant contributions to the peanut industry).

VII. Significance: (A "tight" summary and evaluation of the nominee's most significant contributions and their impact on the peanut industry.) This material should be suitable for a news release.

PEANUT QUALITY COMMITTEE REPORT

The annual meeting of the Peanut Quality Committee convened at 3:05 p.m. on Tuesday, July 11, 1995. There were 24 people in attendance.

The meeting began with a discussion on the focus, or mission, for this Committee. The group agreed that this Committee serves as a valuable forum for bringing together various facets of the peanut industry to address current or future issues dealing with peanut quality.

The group then moved to discussions on the short-term goals for this Committee. Various goals were discussed and a consensus was reached that a high priority need was the compilation and publication of a set of chemical quality standards. A subcommittee was appointed to compile this list and propose a means for publishing this list by the time of the 1996 committee meeting. The subcommittee consists of: Debbie Mieners (chair), Ron Henning, Tim Sanders, Wil Parker, and Jay Williams.

The group also agreed on the need to discuss pesticide residues in peanuts at the 1996 committee meeting. Corley Holbrook agreed to arrange for this.

Tim Sanders reported that he has surveyed many experts and they have agreed that there is no need to publish another book on analytical methods for measuring quality, since this information is readily available from other sources.

A motion was made and seconded to terminate the development of another quality methods book with the stipulation that a reference list of these methods be compiled and published. The previously appointed subcommittee agreed to assume this responsibility, and motion carried.

The meeting adjourned at 4:10 p.m.

Respectfully submitted,

Corley Holbrook, Chair

PROGRAM COMMITTEE REPORT

The 27th annual meeting of the American Peanut Research and Education Society was held in the Adam's Mark Hotel in Charlotte, North Carolina, on July 11-14, 1995. The working committees were chaired by Gerald W. Harrison and Fred R. Cox (Local Arrangements), James H. Young (Technical Program), and Rhee Brisson Sutton (Spouses' Program). The complete listing of all committee members is included in the program section of these PROCEEDINGS.

In the Technical Program, there were 7 poster papers, 7 papers in the graduate student competition, 11 presentations in the symposia, and 84 volunteer papers.

Six major contributors (Rhone-Poulenc, ISK Biosciences, American Cyanamid, Bayer, Valent, and DowElanco) supported four special events. Additional organizations gave financial assistance and supplied peanut products for the breaks. A complete listing of these organizations is in the program section of these PROCEEDINGS.

Persons in attendance at the 1995 annual meeting totaled 477. This included 292 registered participants (representing 19 states and 6 countries other than the U.S.), and 185 spouses and children.

A special thank you and congratulations to all 1995 APRES meeting committees for a job well done.

Respectfully submitted,

Harold E. Pattee, Chair

1995 PROGRAM

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Gerald W. Harrison, Co-chair
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Rhee Brisson Sutton, Chair
Phyllis Pattee
Sherlene Beute
Jill Whitaker
Iris Sullivan
Betty Rogerson

PROGRAM HIGHLIGHTS

Tuesday, July 11

10:00 -	Golf Tournament	Mallard Head Country Club
08:00 - 12:00	Peanut CAC Meeting	Carolina A
12:00 - 08:00	APRES Registration	Permanent Desk-Convention Foyer
01:00 - 05:00	Spouses' Hospitality	Executive Board Room
01:00 - 02:00	Associate Editors, Peanut Science	Governor's 3-4
	Site Selection Committee	Governor's 5
	Fellows Committee	Governor's 6
	Coyt T. Wilson Award Committee	Cardinal 1
02:00 - 03:00	Publications and Editorial Committee	Governor's 3-4
	Public Relations Committee	Governor's 5
	Bailey Award Committee	Governor's 6
	DowElanco Awards Committee	Cardinal 1
03:00 - 04:00	Nominating Committee	Governor's 5
	Joe Sugg Graduate Student Award Committee	Governor's 6
	Peanut Quality Committee	Governor's 3-4
03:00 - 05:00	Finance Committee	Cardinal 1
04:30 - 06:00	Peanut Systems Group	Cardinal 2-3
07:00 - 11:00	Board of Directors	Executive Board Room
08:00 - 10:00	RHONE-POULENC ICE CREAM SOCIAL	Carolina A-B

Wednesday, July 12

08:00 - 04:00	APRES Registration	Permanent Desk-Convention Foyer
08:00 - 04:00	Spouses' Hospitality	Executive Board Room
	Preview Room	Governor's 4
08:00 - 05:00	Industry Exhibits	Governor's 1-3
08:00 - 09:50	General Session/Peanut Policy and Economics: A New Agenda and Implications for Research and Extension Programs Symposium	Carolina A,B,C
09:45 - 10:15	Break	Convention Foyer
10:15 - 12:00	Peanut Molecular Biology Symposium	Carolina A,B,C
01:00 - 02:45	Graduate Student Competition	Carolina A,B
01:00 - 02:30	Storing, Curing, and Mycotoxins	Mecklenburg 1
01:00 - 02:45	Extension Technology and Physiology	Mecklenburg 2
01:00 - 05:00	Poster Session I	Governor's 3
02:45 - 03:15	Break	Governor's 1-3
03:15 - 04:15	Entomology	Mecklenburg 1
03:00 - 05:00	Economics	Carolina C
03:15 - 04:45	Processing and Utilization	Mecklenburg 2
06:30 - 10:00	ISK BIOSCIENCES TOUR/DINNER/ OMNIMAX SHOW	Discovery Place

Thursday, July 13

08:00 - 12:00	APRES Registration .	Permanent Desk-Convention Foyer
08:00 - 04:00	Spouses' Hospitality	Executive Board Room
	Preview Room	Governor's 4
	Industry Exhibits	Governor's 1-3
08:00 - 12:00	Poster Session II	Governor's 3
08:00 - 10:00	Breeding and Genetics I	Carolina A,B
	Production Technology I	Carolina C
10:00 - 10:15	Break	Convention Foyer
10:15 - 12:00	Breeding and Genetics II	Carolina A,B
10:15 - 12:00	Production Technology II	Carolina C
01:00 - 03:15	Weed Science I	Carolina A,B
01:00 - 02:45	Plant Pathology I	Carolina C
03:00 - 03:30	Break	Convention Foyer
03:15 - 05:00	Plant Pathology II	Carolina C
03:30 - 05:30	Weed Science II	Carolina A,B
06:30 - 09:00	AMERICAN CYANAMID/BAYER APPRECIATION DINNER	Carolina A,B,C

Friday, July 14

07:30 - 08:30	VALENT AND DOWELANCO AWARDS BREAKFAST	Mecklenburg 1-2
08:30 - 10:00	APRES Awards Ceremony and Business Meeting	Mecklenburg 1-2

SPECIAL EVENTS

Tuesday, July 11

08:00 - 10:00 ICE CREAM SOCIAL
Rhone Poulenc . . . . Carolina A,B

Wednesday, July 12

06:30 - 10:00 TOUR/DINNER/OMNIMAX SHOW
ISK Biosciences . . . . Discovery Place

Thursday, July 13

06:30 - 09:00 APPRECIATION DINNER
American Cyanimid/Bayer . . . . Carolina A,B,C

Friday, July 14

07:30 - 08:30 AWARDS BREAKFAST
Valent and DowElanco . . . . Mecklenburg 1-2

SPOUSES' EVENTS

Wednesday, July 12

09:00 - 03:00 "Getting to Know Charlotte" Guided Tour

Thursday, July 13

09:00 - 03:30 Shopping Spree

GENERAL SESSION

Wednesday, July 12

08:00-09:50 .... **Carolina A,B,C**

08:00 Call to Order
William Odle, APRES President

08:10 Welcome to Charlotte

SYMPOSIUM - VISION 2000: THE CHANGING ECONOMIC ARENA AND IMPLICATIONS FOR RESEARCH AND EXTENSION PROGRAMS
Moderator: W.D. Shurley

08:20 The Quality and Competitive Environment for Peanuts
Wayne Lord, Southco Commodities

08:35 The Changing Peanut Consumer
Larry Hockman
Mazur and Hockman
Albany, Georgia

08:50 The Current Focus and Status of Peanut Research: A National Overview
Ron Henning
National Peanut Council

09:05 Future Research and Extension Needs: A Grower's Perspective
David T. Bateman
North Carolina Peanut Producer

09:20 Retooling Research and Extension Programs: Challenges and Opportunities Ahead
Johnny C. Wynne
North Carolina Agricultural Research Service

09:35 Announcements
Technical Program
James H. Young
Local Arrangements
Gerald Harrison

09:45 Break .... Convention Foyer

TECHNICAL SESSIONS

Note: Professional affiliation and location is given only for the indicated speaker in all technical paper sessions.

Wednesday, July 12

Peanut Molecular Biology Symposium .... Carolina A, B, C
Moderator: H.T. Stalker

10:15 (1) Transgenic Plant Protection Strategies. **A.K. Weissinger.** North Carolina State Univ., Raleigh, NC.

10:30 (2) *In vitro* Culture and Plant Transformation. **P. Ozias-Akins.** Univ. of Georgia, Tifton, GA.

10:50 (3) Molecular Mapping and Use of Markers. **G.A. Kochert.** Univ. of Georgia, Athens, GA.

11:10 (4) Value Added Genes--Modifying Oil Synthesis. **G.L. Powell.** Clemson Univ., Clemson, SC.

11:30 (5) Aflatoxin Biosynthesis. **N.P. Keller.** Texas A&M Univ., College Station, TX.

11:45 (6) Merging Molecular Biology with Plant Improvement. **D.A. Knauft.** North Carolina State Univ., Raleigh, NC.

Graduate Student Competition .... Carolina A,B
Moderator: C.T. Young

01:00 (7) Use of Crop Rotation in the Management of Sclerotinia Blight of Peanut in Oklahoma. **R.K. Soufi*, H.A. Melouk, J.P. Damicone, and K.E. Jackson.** Oklahoma State Univ., Stillwater, OK.

01:15 (8) Root Growth Responses of Peanut Genotypes Following Mechanical wounding to Simulate Damage by the Pathogen *Cylindrocladium parasiticum.* **P.D. Brune* and M.K. Beute.** N.C. State Univ., Raleigh, NC.

01:30 (9) Effect of Straw Amendment on Incidence of Disease Caused by Three Soilborne Pathogens of Peanut. **L.M. Ferguson* and M.K. Beute.** N.C. State Univ., Raleigh, NC.

01:45 (10) A Relationship Between Damage From Lesser Cornstalk Borer and Southern Stem Rot Incidence in Peanuts. **S.P. Wolf*, K.L. Bowen, and T.P. Mack.** Auburn Univ., Auburn, AL.

02:00 (11) Efficacy of Fluazinam Applications and Canopy Alterations (Mechanical and Phenotype) on Sclerotinia Blight Incidence. **T.M. Butzler*, J.E. Bailey, and M.K. Beute.** N.C. State Univ., Raleigh, NC.

02:15 (12) Fungicide Sensitivity of *Sclerotium rolfsii* from Peanut in Georgia. **M.D. Franke*, T.B. Brenneman, and K.L. Reynolds.** Univ. of Georgia, Tifton, GA.

02:30 (13) Dimethenamid Activity on Yellow and Purple Nutsedge as Influenced by Application Placement. **H.M. McLean*, J.W. Wilcut, J.S. Richburg, III, and A.E. Smith.** Univ. of Georgia, Tifton, GA.

Storing, Curing, and Mycotoxins .... Mecklenburg 1

Moderator: T.B. Whitaker

01:00 (14) Pod and Kernel Size Distribution of Southwest Runner. **J.S. Kirby*, T.E. Stevens, Jr., J.R. Sholar,K.E. Jackson, and H.A. Melouk.** Oklahoma State Univ., Stillwater, OK.

01:15 (15) Peanut Curing in High Capacity Rectangular Bins in West Texas. **C.L. Butts*.** USDA-ARS, Dawson, GA.

01:30 (16) Solar Assisted Partial Air Recirculation Curing of Peanuts. **J.H. Young*, J.C. Tutor, and L. Chai.** N.C. State Univ., Raleigh, NC.

01:45 (17) Peanut Storage in Shed-Roof and Gable-Roof Containers. **F.S. Wright*, S.H. Deck, and J.S. Cundiff.** USDA-ARS, Dawson, GA.

02:00 (18) A Parallel Belt, Multi-Separation Belt Screen. **P.D. Blankenship* and M.P. Woodall.** USDA-ARS, Dawson, GA.

02:15 (19) Inhibitory Effects of Soybean Lipid Metabolites on Aflatoxin and Sterigmatocystin Biosynthesis in *Aspergillus* spp. **G.B. Burow* and N.P. Keller.** Texas A&M Univ., College Station, TX.

Extension Technology and Physiology .... **Mecklenburg 2**
Moderator: G.A. Sullivan

01:00 (20) Development and Implementation of a Bulletin Board System for Technology Transfer to the Peanut Industry. **S.H. Deck*** **and P.M. Phipps.** VPI&SU, Suffolk, VA.

01:15 (21) A Generic Method of Developing and Deploying Weather-based Disease Advisories. **J. Bailey*** **and K. Campbell.** N.C. State Univ., Raleigh, NC.

01:30 (22) Comparing Two Methods of Estimating Leaf Area in Dryland Peanuts. **S.D. Stewart*, K.L. Bowen, T.P. Mack, J.H. Edwards, and J.W. Kloepper.** Auburn Univ., Auburn, AL.

01:45 (23) Use of Planting Date, Cultivars, and Selected Pesticide to Reduce the Impact of Southern Stem Rot and Nematodes on the Yield of Peanut. **A.K. Hagan*, J.R. Weeks, and L. Wells.** Auburn Univ., Auburn, AL.

02:15 (25) Genetic Variability in Peanut Seed Response to Germination Temperatures. **S.C. Mohapatra*.** N.C. State Univ., Raleigh, NC.

Poster Session I .... **Governor's 3**
1:00-5:00 (Authors present 3:30-4:30)
Coordinator: T. H. Sanders

(27) Introduction of Virus Resistance and Salt Tolerance Genes into Peanut. **H.D. Wilde*, Z.V. Magbanua, Z. Mann, Y. Xiao, H.Y. Wetzstein, and W.A. Parrott.** Univ. of Georgia, Athens, GA.

(29) Use of Bravo 720 and/or Folicur 3.6F on Selected Peanut Barieties with Extended Spray Schedules. **A.J. Jaks*** **and W.J. Grichar.** Texas Agr. Expt. Stat., Yoakum, TX.

(112) Isolation of Peanut Seed Coat- and Pod Specific Genes using Differential Hybridization and Differential Display Methods. **R.L. Smith and D.V. Beliaev.** Univ. of Florida, Gainesville, FL.

Entomology .... **Mecklenburg 1**
Moderator: J.W. Chapin

03:15 (30) Efficacy of Peanut Containing the B.t. Gene for Delta Endotoxin Against the Lesser Cornstalk Borer. **R.E. Lynch*, C. Singsit, and P. Ozias-Akins.** USDA-ARS, Tifton, GA.

03:30 (31) Thrips Populations and Spotted Wilt Disease Progress on Resistant/Susceptible Cultivars Treated with Various Insecticides. **J.W. Todd* and A.K. Culbreath.** Univ. of Georgia, Tifton, GA.

03:45 (32) Plant Damage and Yield Loss from Soil Insects in Alabama Peanuts. **J.R. Weeks*, A.K. Hagan, and K.L. Bowen.** Auburn Univ., Auburn, AL.

04:00 (33) Adult Southern Corn rootworm (Coleoptera: Chrysomelidae) Trapped by Three Attractants in Peanut Fields and Relationship to Two Soil Characteristics and Pod Damage. **D.A. Herbert, Jr.*, B.N. Ang, and R.L. Hodges.** VPI&SU, Suffolk, VA.

Economics .... **Carolina C**

Moderator: W.M. Birdsong, Jr.

03:00 (34) A Cost of Production and Income Estimator for Peanuts Using Spreadsheet Modeling. **W.D. Shurley*.** Univ. of Georgia, Tifton, GA.

03:15 (35) The Influence of Irrigation, Rotation and Folicur on the Net Returns to Land and Management from Quota Peanut Production. **W.A. Miller, B.E. Gamble*, and T.D. Mahoney.** Wiregrass Expt. Stat., Headland, AL .

03:30 (36) An Analysis of the Yield Trend for Peanuts in Georgia. **P. Zhang, S.M. Fletcher*, and D.H. Carley.** Univ. of Georgia, Griffin, GA.

03:45 (37) An Analysis of Peanut Price Support Issues. **D.H. Carley* and S.M. Fletcher.** Univ. of Georgia, Griffin, GA.

04:00 (38) Impact of the National Poundage Quota Provisions of the Peanut Program. **R.H. Miller*.** USDA-CFSA, Tobacco and Peanuts Div., Washington, DC.

04:15 (39) An Analysis of Peanut Farmers' Participation in Setting Peanut Policy Guidelines for the 1995 Farm Bill. **G. Wang, D.H. Carley*, P. Zhang, and S.M. Fletcher.** Univ. of Georgia, Griffin, GA.

04:30 (40) Estimates of Peanut Support Price and Peanut Butter Price Relationships. **S.M. Fletcher*, D.H. Carley, and P. Zhang.** Univ. of Georgia, Griffin, GA.

04:45 (41) An Examination of Peanut Butter Consumption Trends and Trade. **S.O. Sanford* and W.D. Shurley.** USDA-ERS, Oil Crops Analysis Section, Washington, DC.

Processing and Utilization . . . . **Mecklenburg 2**

Moderator: W.A. Parker

03:15 (42) Pod and Seed Size Relation to Maturity in Virginia-type Peanuts. **K.L. McNeill and T.H. Sanders***. USDA-ARS, Raleigh, NC.

03:30 (43) Effect of Water Activity on Off-flavors in Low-fat Peanut Paste. **M.J. Hinds***. N.C. A&T Univ., Greensboro, NC.

03:45 (44) Headspace Analysis and Fatty Acid Composition of Peanut Seed from CBR Infested Fields. **R.W. Mozingo*, C.T. Young, and D.M. Porter.** Tidewater Agr. Res. and Ext. Cent., Suffolk, VA.

04:00 (45) Relationship of Maturity to Volatiles of Raw and Roasted Peanuts. **T.H. Sanders*, N.V. Lovegren, J.R. Vercellotti, K.L. Bett, and P.D. Blankenship.** USDA-ARS, Raleigh, NC.

04:15 (46) Enhanced Roasted Peanut Stability in the High Oleic Acid Breeding Lines. **D.A. Smyth*, C. Macku, J. Gogerty, O.E. Holloway, and D.W. Gorbet.** Planters, East Hanover, NJ.

04:30 (47) Stability of Sweet and Instability of Roasted Peanut and Other Attribute Intensities in Long-Term Sensory Studies Using Freezer-Stored Roasted Peanut Paste. **H.E. Pattee* and F.G. Giesbrecht.** USDA-ARS, Raleigh, NC.

Thursday, July 13

Breeding and Genetics I . . . . **Carolina A,B**

Moderator: C.E. Simpson

08:00 (48) Evaluation of Peanut Breeding Lines with Resistance to the Peanut Root-knot Nematode. **C.C. Holbrook*, J.P. Noe, D.W. Gorbet, and M.G. Stephenson.** USDA-ARS, Coastal Plain Exp. Sta., Tifton, GA.

08:15 (49) *Meloidogyne arenaria* Resistance in Advanced-Generation *Arachis hypogaea* x *A. cardenasii* Hybrids. **H.T. Stalker*, B.B. Shew, G.M. Garcia, M.K. Beute, K.R. Barker, C.C. Holbrook, J.P. Noe, and G.A. Kochert.** N.C. State Univ., Raleigh, NC.

08:30 (50) Evaluation of Additional Sources of Resistance to the Peanut Root-knot Nematode in the Cultivated Species of Peanut. **M.G. Stephenson*, C.C. Holbrook, J.P. Noe, and W.F. Anderson.** USDA-ARS, Coastal Plain Exp. Sta., Tifton, GA.

08:45 (51) Screening the Peanut Core Collection for Resistance to Cylindrocladium Black Rot and Early Leaf Spot. **T.G. Isleib*, M.K. Beute, and J.E. Hollowell.** N.C. State Univ., Raleigh, NC.

09:00 (52) Resistance to White Mold (*Sclerotium rolfsii*) within Wild Peanut Accessions. **W.F. Anderson*, H.T. Stalker, L.J. Grignon, B.B. Shew, and M.K. Beute.** Univ. of Georgia, Athens, GA.

09:15 (53) Isolation and Characterization of Polypeptide Components of Methionine-rich Protein from Peanut. **R. Sathanoori* and S.M. Basha.** Florida A&M Univ., Tallahassee, FL.

Production Technology I . . . . **Carolina C**

Moderator: D.T. Gooden

08:00 (56) Prohexadione Calcium, a Potential New Growth Regulator for Use in Peanuts (Arachis hypogaea). **J.R. Evans and J.M. Mitchell*.** BASF Corp., Research Triangle Park, NC.

08:15 (57) Response of NC 9 Peanut to Chlorimuron. **C.W. Swann*.** VPI&SU, Suffolk, VA.

08:30 (58) Critical Deficiency Concentration of Manganese in Peanut Leaves. **N.L. Powell*, C.W. Swann, R.W. Mozingo, D.C. Martens, and S.H. Deck.** VPI&SU, Suffolk, VA.

08:45 (59) Effects of Band Width and Timing of Chlorpyrifos Granule Applications on White Mold Incidence and Wireworm Damage to Irrigated Peanut. **S.L. Brown* and T. Brenneman.** Univ. of Georgia, Tifton, GA.

09:00 (60) Peanut Cultivar Yield Tests Utilizing Folicur with and without Irrigation. **W.D. Branch* and T.B. Brenneman.** Univ. of Georgia, Tifton, GA.

09:15 (61) Trends and Placement of Herbicides by Implements. **M.J. Bader* and P.E. Sumner.** Univ. of Georgia, Tifton, GA.

09:30 (62) Some Effects of Elevation and Drainage on Peanut Yield, Quality and Value. **J.I. Davidson, Jr.* and M.C. Lamb.** USDA-ARS, Dawson, GA.

09:45 (63) Advances in Peanut Foliar Fertilization in Southern Mexico. **S. Sanchez-Dominguez*.** Universidad Autonoma Chapingo, Chapingo, Mexico.

Poster Session II . . . . **Governor's 3**

8:00-12:00 (Authors Present 10:30-11:30)

Coordinator: T. H. Sanders

(64) Laboratory and Field Evaluations of Peanut Cultivars for Resistance to *Diabrotica undecimpunctata howardi* Barber. **W.J. Petka*, D.A. Herbert, Jr., and T.A. Coffelt.** VPI&SU, Suffolk, VA.

(65) Roast Quality of Some Commercial Peanuts from Foreign Sources. **C. Macku*, D.A. Smyth, D.M. Deming, J. Gogerty, L. Slade, H. Levine, and O.E. Holloway.** Nabisco Technical Center, East Hanover, NJ.

(66) Foliarly Applied Miticides for Spider Mite Control in South Texas Peanut. **C.R. Crumley*, B.A. Besler, W.J. Grichar, and A.J. Jaks.** Texas Agr. Ext. Serv., Pearsall, TX.

(74) Germination of Selected Peanut Varieties in Small Grain Residue Extracts. **B.A. Besler*, W.J. Grichar, and O.D. Smith.** Texas Agr. Expt. Stat., Yoakum, TX.

Breeding and Genetics II . . . . **Carolina A,B**

Moderator: D.A. Knauft

10:15 (67) Evaluation of *Bradyrhizobium* Isolates from Soil Samples Obtained from Pods of Mexican *Hirsuta* Type Landraces. **L. Barrientos-Priego*, G.L. Wagner, G.H. Elkan, T.G. Isleib and H.E. Pattee.** N.C. State Univ., Raleigh, NC.

10:30 (68) Isolation and Characterization of cDNA Sequence(s) Encoding the Methionine-rich Protein from Peanut. **M. Aruna* and S.M. Basha.** Florida A&M Univ., Tallahassee, FL.

10:45 (69) Detection of Polymorphic DNA Markers in Cultivated Peanut. **G. He, M. Watts, and C.S. Prakash*.** Tuskegee Univ., Tuskegee, AL.

11:00 (70) Evaluation of Somatic Embryogenesis in Mature Zygotic Embryo Explants of Peanut Cultivars Grown in the Southwest. **J.A. Burns* and H.A. Melouk.** USDA-ARS, Stillwater, OK.

11:15 (71) Plant Recovery in *Arachis* by *in vitro* Culture of Peg Tips, Ovules, and Embryos. **Q.L. Feng*, H.T. Stalker, and H.E. Pattee.** N.C. State Univ., Raleigh, NC.

11:30 (72) Comparison of Somaclonal Variation Caused by Three Peanut Regeneration Methods. **S.D. Utomo*, A.K. Weissinger, H.T. Stalker, and T.G. Isleib.** N.C. State Univ., Raleigh, NC.

11:45 (73) Long Term Storage of Arachis Seed. **C.E. Simpson*, D.L. Higgins, and W.H. Higgins, Jr.** Texas Agr. Expt. Stat., Stephenville, TX.

Production Technology II .... Carolina C

Moderator: R.W. Mozingo

10:30 (75) Effect of Seed Size on Yield and Grade of GK-7 and Georgia Runner Peanuts. **J.A. Baldwin* and J.P. Beasley, Jr.** Univ. of Georgia, Athens, GA.

10:45 (76) Do Yield Enhancing Products Work in Peanut? **J.P. Beasley, Jr.*, S.R. Jones, and G.H. Harris, Jr.** Univ. of Georgia, Tifton, GA.

11:00 (77) Research-Based Fertilizer Recommendations for Peanuts in the Coastal Plain. **G.J. Gascho* and C.C. Mitchell.** Coastal Plains Expt. Stat., Tifton, GA.

11:15 (78) Poultry Litter Effects on Yield and Grade of Runner Peanut. **D.L. Hartzog* and J.F. Adams.** Auburn Univ., Auburn, AL.

11:30 (79) Reduced Tillage for Peanuts Following Bahiagrass. **J.F. Adams* and D.L. Hartzog.** Auburn Univ., Auburn, AL.

11:45 (80) Effects of a Cotton-Peanut Rotation with and without Rye on Diseases, Nematodes and Crop Yields. **T.B. Brenneman*, N.A. Minton, S.H. Baker, G.A. Herzog, and G.J. Gascho.** Coastal Plains Expt. Stat., Tifton, GA.

Weed Science I .... Carolina A,B

Moderator: C.W. Swann

01:00 (81) Grass Control with Cadre and Cadre-Graminicide Tank Mixtures. **K.M. Jennings*, J.W. Wilcut, and A.C. York.** N.C. State Univ., Raleigh, NC.

01:15 (82) Control of Large Crabgrass (*Digitaria Sanguinalis*) in Peanuts with Cadre. **D.T. Gooden*, G.F. Stabler, K.E. Kalmowitz, and M.B. Wixson.** Clemson Univ., Clemson, SC.

01:30 (83) Pursuit and Cadre Carryover in Peanut/Cotton Rotations. **R.B. Batts*, A.C. York, and J.W. Wilcut.** N.C. State Univ., Raleigh, NC.

01:45 (84) Comparison of Cadre with Registered Herbicides for Weed Management in Peanut. **P.V. Garvey*, J.W. Wilcut, and A.C. York.** N.C. State Univ., Raleigh, NC.

02:00 (85) Weed Management in Peanut with Cadre as Influenced by Rate and Method of Application. **T.M. Webster*, J.W. Wilcut, and H.D. Coble.** N.C. State Univ., Raleigh, NC.

02:15 (86) Prohexadione Calcium - A New Growth Regulator for Peanuts. **W.E. Mitchem* and A.C. York.** N.C. State Univ., Raleigh, NC.

02:30 (87) Evaluation of Classic and PGR-IV as Growth Regulators for Peanuts. **A.C. York* and W.E. Mitchem.** N.C. State Univ., Raleigh, NC.

02:45 (88) Comparison of Aldicarb In-Furrow and Seed-Applied Acephate for Peanut Recovery Following Varying Levels of Contact Herbicide Injury. **S.M. Brown*, S.L. Brown, and D.L. Colvin.** Univ. of Georgia, Tifton, GA.

03:00 (89) AC 263,222 for Broadleaf Weed Management in Peanut. **B.J. Brecke*, D.L. Colvin, and K.R. Muzyk.** Univ. of Florida, Jay, FL.

Plant Pathology I . . . . Carolina C

Moderator: P.M. Phipps

01:15 (90) Southern Stem Rot Inoculation Techniques. **F.M. Shokes*, K. Rozalski, D.W. Gorbet, and T.B. Brennemann.** North Florida Res. and Educ. Center, Quincy, FL.

01:30 (92) Potential Use of Optical Scanners to Separate Seed with a Testal Symptom Associated with Seedborne Cylindrocladium parasiticum. **B.L. Randall-Schadel*, J.E. Bailey, M.K. Beute, and F.E. Dowell.** North Carolina Dept. of Agr., Raleigh, NC.

01:45 (93) Lack of Spotted Wilt Control in Peanut After Roqueing Symptomatic Plants. **M.C. Black* and D. Alcala.** Texas A&M Univ., Uvalde, TX.

02:00 (94) Resistance to Sclerotinia blight and Southern Stem Rot in Breeding Lines of Virginia Peanut. **B.B. Shew*, M.K. Beute, and T.G. Isleib.** N.C. State Univ., Raleigh, NC.

02:15 (95) Possible Resurgence of Peanut Pod Rotting Diseases in North Carolina. **J. Hollowell* and M.K. Beute.** N.C. State Univ., Raleigh, NC.

02:30 (96) Screening for Resistance to Cylindrocladium parasiticaum among Runner-type Peanut Genotypes. **G.B. Padgett*, T.B. Brenneman, and W.D. Branch.** Univ. of Georgia, Tifton, GA.

Weed Science II . . . . **Carolina A,B**

Moderator: Bobby Walls

03:30 (97) Copperleaf (Acalypha ostryifolia) Control Using Postemergence Herbicides. **W.J. Grichar*, R.G. Lemon, and A.E. Colburn.** Texas Agr. Expt. Stat., Yoakum, TX.

03:45 (98) Hophornbeam Copperleaf (Acalypha ostryifolia) Control with Soil Applied Herbicides. **R.G. Lemon*, W.J. Grichar, and A.E. Colburn.** Texas Agr. Ext. Serv., College Station, TX.

04:00 (99) Total Postemergence Weed Management Systems for Peanut. **J. Isgrigg, III*, J.W. Wilcut, and A.C. York.** N.C. State Univ., Raleigh, NC.

04:15 (100) Weed Management Systems in Peanut with Prosulfuron. **J.M. Robbie*, J.W. Wilcut, and A.C. York.** N.C. State Univ., Raleigh, NC.

04:30 (101) Frontier, A New Herbicide for Weed Management Systems in Peanuts. **R. Ratliff*.** Sandoz Agro, Inc., Greenville, MS.

04:45 (102) Bentazon and Imazethapyr are Antagonistic on Nutsedge. **A.S. Culpepper*, A.C. York, and J.W. Wilcut.** N.C. State Univ., Raleigh, NC.

05:00 (103) An Economic Assessment of Paraquat and Bentazon Use in Peanut: A Research Analysis. **J.W. Wilcut*.** N.C. State Univ., Raleigh, NC.

05:15 (104) Late Season Weed Control in Peanut Using a Rope-wick. **T.A. Littlefield*, D.L. Colvin, and W.C. Johnson,III.** Univ. of Florida, Gainesville, FL.

Plant Pathology II . . . . **Carolina C**

Moderator: M.K. Beute

03:15 (105) Sclerotinia Blight, Southern Blight and Peanut Yield as Affected by Applications of Cornmeal. **T.A.Lee*, Jr., J.A. Wells, and K.E. Woodard.** Texas A&M Univ. Res. & Ext. Cent., Stephenville, TX.

03:30 (106) An Algorithm for Predicting Outbreaks of Sclerotinia Blight of Peanut and Improving the Efficiency of Fungicide Sprays. **P.M. Phipps*.** VPI&SU, Suffolk, VA.

03:45 (107) Effect of Tebuconazole, Chlorothalonil, Propiconazole, and Flutolanil on Disease Control an Peanut Yield in Oklahoma. **K.E. Jackson*, J.P. Damicone, and H.A. Melouk.** Oklahoma State Univ., Stillwater, OK.

04:00 (108) Effect of Tank-Mix Combinations of Tebuconazole and Chlorothalonil on Leaf Spot Epidemics in Peanut. **A.K. Culbreath*, T.B. Brenneman, and G.B. Padgett.** Coastal Plain Expt. Stat., Tifton, GA.

04:15 (109) An Historical Summary of Nematode Control by TEMIK brand Aldicarb Pesticide on Peanuts in Georgia from 1969 through 1994. **N.A. Minton and H.S. Young*.** Coastal Plains Expt. Stat., Tifton, GA.

04:30 (110) Formation of Sclerotia of *Sclerotinia minor* in Mixed Cultures. **X. Li*, H.A. Melouk, J.P. Damicone, and K.E. Jackson.** Oklahoma State Univ., Stillwater, OK.

CONTRIBUTORS TO THE 1995 APRES MEETING

On behalf of APRES members and guests, the Program Committee says "THANK YOU" to the following organizations for their generous financial and product contributions:

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SITE SELECTION COMMITTEE REPORT

Members present at the July 11, 1995, meeting were: Chairperson T. G. Isleib (North Carolina), Danny Colvin (Florida), Dewitt Gooden (South Carolina), Ames Herbert (Virginia), Charles Swann (Virginia), and Mark Black (Texas). President-Elect Harold Pattee also attended the meeting.

The meeting was called to order at 1:00 to consider meeting sites for the 1996, 1997, and 1998 APRES meetings. The 1996 meeting will be held at the Omni Rosen Hotel in Orlando, Florida, July 9-12, 1996. The 1997 meeting will be held at the Hyatt Regency Hotel in San Antonio, Texas, July 8-11, 1997. A contract has been signed.

Following a report by Dewitt Gooden, chair of the ad hoc committee on meeting site rotation, it was determined that South Carolina had insufficient manpower to organize the 1998 meeting. Therefore, the 1998 meeting will be held in Norfolk, Virginia, July 6-10, 1998, at a hotel to be named later. The Virginia representatives to the committee indicated that they were negotiating with two hotels–the Omni Norfolk and the Marriott.

Respectfully submitted,

T. G. Isleib, Chair

AMERICAN SOCIETY OF AGRONOMY LIAISON REPRESENTATIVE REPORT

The annual meetings of the joint American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America were held in Seattle, Washington, on November 13-18, 1994. Approximately 3400 scientific presentations were made. Of these, 15 were devoted to peanut research and 19 members of APRES authored or co-authored presentations. Dr. Roy Pittman co-chaired a symposium on germplasm collection and maintenance.

Dr. Janet F. Spears is the 1995 chair of the Crop Science Society of America's C-4 division--Seed Physiology, Production, and Technology. Dr. H. Thomas Stalker is the 1995 chair of the Crop Science Society of America's Budget and Finance Committee.

The next annual meeting will be held in St. Louis, Missouri, from October 29 to November 3, 1995.

Respectfully submitted,

H. Thomas Stalker

CAST REPORT

CAST, the Council for Agricultural Science and Technology, is an organization dedicated to serve as the science source for food, agricultural, and environmental issues. It is composed of 30 scientific and professional societies in food and agriculture.

The Board of Directors met in Washington, D.C. February 25-27, 1995. In the prior 12-month period, the organization published and distributed nine reports. CAST is increasingly serving in its role of providing unbiased information on issues related to food, agriculture, and the environment. CAST held a highly visible and successful conference in Washington, D.C. in January on sustainable agriculture and the 1995 farm bill. One CAST report has been used as a backbone of food safety recommendations by the President's Council on Science and Technology for submission to Congress, used for a workshop training program for Congressional staff, used as a basis of testimony before a Congressional Committee, and used as a standard for its subject area by House Agriculture members. They have responded repeatedly through internet connections, mailings, and direct testimony to provide important information. For example, a major television network canceled a news media story when the reporter realized that the science provided by CAST totally negated the story. Many different activities of CAST have been a part of the ongoing debate in Washington, D.C. regarding structure of the 1995 Farm Bill as well as the national budget for items related to food, agriculture, and the environment.

An Ambassador new member program is in operation to target increasing membership for CAST. Most individuals at land-grant institutions should have received information about the benefits of CAST membership in recent months. The new member program is part of a larger effort by CAST to increase funding for the organization and to continue efforts toward more efficient operation. In that regard, it was voted to cancel the second Board meeting traditionally held each year in August. We have also been asked to determine whether our society would pay for travel of its board member to a board meeting each year.

A Kellogg grant has been obtained by CAST to provide support for a workshop for member societies to be held in St. Louis October 14-16. The purpose of this workshop is to examine the role of professional societies in the future, and to discuss this issue among the member societies of CAST. APRES has been asked to provide representation at this workshop. The CAST Board of Directors is also planning to meet in conjunction with this workshop.

CAST has approved a strategic plan that includes three main objectives: increasing name recognition among targeted legislators, regulators, and the media; to generate a gross annual income of $3 million by 2000; and to evaluate critically the complex issues of major importance to the organization. Much of the work in 1994-95 has gone toward the first goal. The 1995-96 Board is conducting many activities to improve the finances of the organization, including embarking on a major contribution campaign.

Issue papers published in the past year included: Pesticides in Surface and Ground Water, Risks and Benefits of Selenium in Agriculture, Labeling of Food-Plant Biotechnology Products, Challenges Confronting Agricultural Research at Land Grant Universities, Foodborne Pathogens: Risks and Consequences, and Public Perception of Agrichemicals. A total of 18 issue papers and task force reports are in various stages of activity.

Dr. Dale Bauman, Animal Science Professor at Cornell University, was honored as the 1995 recipient of the Charles A. Black Award. Dr. Bauman was cited for aiding public understanding of agricultural science, particularly bovine somatotropin, through presentations, articles for farmers and agribusiness personnel, news media contacts, and educational materials.

Respectfully submitted,

David Knauft

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 such member, participant, or representative upon appropriate written notice filed with the president or committee chairperson 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, Inc.

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 business meeting. Minimum annual dues for the five classes of membership shall be:

a.	Individual memberships	: $ 25.00
b.	Institutional memberships	: 25.00
c.	Organizational memberships	: 35.00
d.	Sustaining memberships	: 125.00
e.	Student memberships	: 5.00

(Dues were set at 1992 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 the current year's dues 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.

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. Opportunity shall be provided for discussion of these and other matters that members 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 by two-thirds vote, or upon request of one-fourth of the members. 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 chairperson of each annual meeting of the Society. Except for certain papers specifically invited by the Society president or program chairperson 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 in conjunction with the annual meeting by Society members, 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 as they deem advisable.

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 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 most recent available past-president and the executive officer of the Society, who may be appointed secretary and treasurer and given such other title as may be determined by the Board of Directors.

Section 2. The president and president-elect shall serve from the close of the annual meeting of this Society to the close of the next annual meeting. The president-elect shall automatically succeed to the presidency at the close of the annual meeting. If the president-elect should succeed to the presidency to complete an unexpired term, he/she 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 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 business meeting from nominees selected by the Nominating Committee or members nominated from the floor. The president, president-elect, and most recent available 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 annual 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 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 chairperson, responsible for development and coordination of the overall program of the education phase of the annual meeting.

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 recent available past-president
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 U.S. 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 activity with peanuts concerns: (1) the production of farmers' stock peanuts; (2) the shelling, marketing, and storage of raw peanuts; (3) the production or preparation of consumer food-stuffs or manufactured products containing whole or parts of peanuts.
g. The President of the National Peanut Council
h. The Executive Officer - non-voting member of the Board of Directors who may be compensated for his services on a part-time or full-time salary stipulated by the Board of Directors in consultation with the Finance Committee.

Section 2. Terms of office for the directors' positions set forth in Section 1, paragraphs d, e, and f, shall be three years with elections to alternate from reference years as follows: d(VC area), e and f(2), 1992; d(SE area) and f(3), 1993; and d(SW area) and f(1), 1994.

Section 3. The Board of Directors shall determine the time and place of regular and special board meetings and may authorize or direct the president by majority vote 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, most recent available 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 chairperson of each committee from among the incumbent committee members. The Board of Directors may, by a two-thirds vote, reject committee appointees. Appointments made to fill unexpected vacancies by incapacity of any committee member shall be only for the unexpired term of the incapacitated committee member. Unless otherwise specified in these By-Laws, any committee member may be re-appointed to succeed him/herself, and may serve on two or more committees concurrently but shall not chair more than one committee. 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 consist of six members, three representing State employees, one representing USDA, and two representing Private Business segments of the peanut industry. Appointments in all categories shall rotate among the three U.S. peanut production areas. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendations as they deem necessary or as requested or directed by the Board of Directors. The term of the chairperson shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given on the work of the Finance Committee under his/her leadership, whichever is later.

b. Nominating Committee: This committee shall consist of four members appointed to one-year terms, one each representing State, USDA, and Private Business segments of the peanut industry with the most recent available past-president serving as chair. 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 the annual business meeting) prior to the election. No person may succeed him/herself as a member of this committee.

c. Publications and Editorial Committee: This committee shall consist of six members appointed to three-year terms, three representing State, one USDA, and two Private Business segments of the peanut industry with membership representing the three U.S. production areas. The members may be appointed to two consecutive three-year terms. 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 consist of 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 consist of seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from 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 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 U.S. peanut production with balance among State, USDA, and Private Business. Terms of office shall be for three years. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. From nominations received, the committee shall select qualified nominees for approval by majority vote of the Board of Directors.

h. 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 chairperson of the committee shall be from the state which will host the meeting the next year and the vice-chairperson shall be from the state which will host the meeting the second year. The vice-chairperson will automatically move up to chairperson.

i. 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 U.S. peanut producing areas. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. This committee shall review and rank nominations and submit these rankings to the committee chairperson. 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.

j. Joe Sugg Graduate Student Award Committee: This committee shall consist of five members. For the first appointment, three members are to serve a three-year term, and two members to serve a two-year term. Thereafter, all members shall serve a three-year term. Annually, the President shall appoint a Chair from among incumbent committee members. The primary function of this committee is to foster increased graduate student participation in presenting papers, to serve as a judging committee in the graduate students' session, and to identify the top two recipients (1st and 2nd place) of the Award. The Chair of the committee shall make the award presentation 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 of the Board of Directors.

Section 3. Division may make By-Laws for their own government, provided they are consistent with the rules and regulations of the Society, but no dues may be assessed. Divisions and Subdivisions may elect officers (chairperson, vice-chairperson, and a secretary) and appoint 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 14, 1995, Charlotte, North Carolina

APRES MEMBERSHIP
(1975-1985)

MEMBERS	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Individual	419	363	386	383	406	386	478	470	419	421	513
Sustaining	21	30	29	32	32	33	39	36	30	31	29
Organizational	40	45	48	50	53	58	66	65	53	52	65
Student	--	--	14	21	27	27	31	24	30	33	40
Institutional	--	45	45	54	72	63	73	81	66	58	95
TOTAL	480	483	522	540	590	567	687	676	598	595	742

(1986-1995)

MEMBERS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Individual	455	475	455	415	416	398	399	400	377	363
Sustaining	27	26	27	24	21	20	17	18	14	18
Organizational	66	62	59	54	47	50	40	38	43	26
Student	27	34	35	28	29	26	28	31	25	35
Institutional	102	110	93	92	85	67	71	74	76	72
TOTAL	677	707	669	613	598	561	555	561	535	514

1995-96
MEMBERSHIP ROSTER

INDIVIDUALS

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