1993 PROCEEDINGS

Ray O. Hammons

APRES

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POSTERS

GRADUATE STUDENT COMPETITION

Survival Mechanisms of Ditylenchus destructor (Nematoda) in Peanut Seed and Hull Stubble. CHERYL VENTER (1), G. VAN ASWEGEN (2), H. FOURIE (1), and C. J. SWANEVELDER* (1). (1) Grain Crops Institute, Potchefstroom; (2) Dept. of Anatomy, PU for CHE, Potchefstroom, RSA.

Ditylenchus destructor, Thorne 1945, causes severe downgrading of peanut (Arachis hypogaea L.) yields and is currently recognized as the most important nematode on this crop in South Africa. Anhydrobiotic nematodes and eggs were found in decaying hulls of cv. Sellie, and probably play an important role in the over-wintering survival of the nematode in hull stubble. Hulling in or alongside the field during harvesting is therefore discouraged. Eggs were found in increased numbers in late-harvested kernels of the same cultivar. Since this nematode is known to be seed-borne, timely harvesting is encouraged in the production of peanuts for seed.

Effects of Pre-Inoculation and Post-Inoculation Application of Fluazinam on Sclerotinia minor using Three Peanut Genotypes. T.M. Butzler*, J.E. Bailey, and M.K. Beute. North Carolina State University, Raleigh NC 27695-7616.

Greenhouse studies were initiated to determine the efficacy of pre- and post-inoculation applications of fluazinam on Sclerotinia minor. Lateral branches of greenhouse-grown peanut genotypes NC 7,VA 81B, and NC Ac 18016 were cut into 180 mm lengths. After removal of pegs and leaves, (but not petioles), the branches were placed in beakers containing washed sand. The fungicide fluazinam was sprayed on limbs at a rate of 35µg/l of water with a ModelE-300 Airbrush. The seven treatments included: application of fluazinam 0,2,4,6 days before inoculation or 2 or 4 days after inoculation and a control of inoculum alone. Inoculum was an oat grain colonized with S. minor, placed on each branch in the junction of a petiole, and covered with a piece of cheesecloth. Branches were maintained under a bench and exposed to a misting schedule. After inoculation, severity (length of lesions per lateral limb) of S. minor was measured daily for 14 days and area under the disease progress curve (AUDPC) was calculated. Most pre-inoculation treatments had smaller AUDPCs for severity of S. minor in comparison to post-inoculation treatments. Cultivars NC7 and VA 81B responded similarly to all treatments. With NC Ac 18016, however, fluazinam applied 6 days before inoculation resulted in a higher AUDPC than either the inoculated control or the treatment receiving post-inoculation sprays. Branches sprayed post-inoculation AUDPCs similar to the inoculated control in all treatments. Fluazinam appears to have protective rather than curative characteristics.

Root Growth Dynamics as a Factor in Resistance of Peanut to Cylindrocladium Root Rot. *P.D. BRUNE* and M.K. BEUTE. Dept. of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.*

Metabolic resistance of peanut to Cylindrocladium Root Rot (CBR) has been identified, but physiological response does not account fully for field resistance. A monolith method of recovering roots from field soil was employed to investigate the possible role of peanut root growth parameters in resistance to CBR. Field plots of genotypes NC 7 (high susceptibility), NC 10C (low resistance), NC 8C (moderate resistance), and the advanced breeding line NC Ac 18016 (high resistance) were established in rows in an infested field. Monoliths (30 cm³) were excavated in 3 horizontal layers (0-10 cm, 10-20 cm, 20-30 cm depths) at 4 weekly intervals beginning at 3 weeks from seeding. A grid-line intersection technique was used to measure length of roots recovered from soil by wet sieving. Resistant genotypes NC 8C and NC Ac 18016 had similar rates of root length increase. NC 7 and NC 10C were also grouped together, having less total root length than the resistant group at 3 weeks, but producing more root length by the last sampling date (6 weeks). Increased root growth rate in genotypes NC 7 and NC 10C increases the probability of contact with Cylindrocladium microsclerotia in soil and provides more infection sites for initiation of disease.

AU-Pnuts Leaf Spot Advisory: Modification of the Rule-Based System for a Partially Resistant Peanut Cultivar. J. C. JACOBI* and P. A. BACKMAN. Dept. of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL 36849.

The AU-Pnuts Leaf Spot Advisory was originally developed for peanut cultivars which are highly susceptible to early and late leaf spot. The system uses a combination of recorded daily rainfall and 5-day average National Weather Service precipitation probabilities to provide warning for the need to apply fungicides. Field studies were conducted during 1990-1992 to evaluate modifications of the advisory for use on the moderately resistance cultivar Southern Runner. For a susceptible leaf spot cultivar, the advisory (AU-Pnuts 6/3) triggers the first fungicide application after recording six days with rainfall ≥ 2.54 mm following peanut emergence, and subsequent sprays are applied after a combination of three recorded or predicted days with rainfall. The advisory system was modified for Southern Runner by increasing the action thresholds for both the initial and subsequent fungicide applications. Each of the modified advisory treatments was evaluated along with the following treatments: unsprayed control, 14-day schedule, and 21-day schedule. Averaged over multiple seasons (1991-1992), the AU-Pnuts version 9/4 saved 0.5 and 2.5 fungicide applications per season, when compared to the 21-day and 14-day schedules, respectively. These timed fungicide applications controlled leaf spot as effectively as did the 21-day schedule. Yields were not significantly different between the AU-Pnuts 9/4 treatment and either the 14-day or 21-day schedules in 1991 and 1992. We conclude that the modified rules (AU-Pnuts 9/4) of the AU-Pnuts leaf spot advisory can be used to predict infection periods of early and late leaf spot, thereby allowing growers to anticipate the need to apply fungicides to Southern Runner peanuts.

Cadre and Pursuit Mixtures for Weed Control in Georgia Peanuts. J. S. RICHBURG, III*, J. W. WILCUT, AND G. WILEY. Dep. of Crop and Soil Sciences, Coastal Plain Experiment Station, Univ. of Georgia, Tifton, GA 31793-0748 and American Cyanamid Co., Tifton.

Field studies in 1991 and 1992 at three locations investigated Pursuit and Cadre applied alone and in various mixtures for weed control, peanut tolerance and yield. Pursuit and Cadre were each applied alone at 1, 2, 3, or 4 fl. oz./ac. A replacement series was utilized to evaluate different mixtures of Pursuit and Cadre. All possible mixtures of Pursuit and Cadre were evaluated where a grand total of no more than 4, 3, or 2 fl. oz./ac of Pursuit and Cadre were applied together. The Pursuit, Cadre, and mixture combination treatments were applied approximately two weeks after cracking. For comparative purposes, a standard of Basagran at 0.25 lb/ac plus Starfire at 0.125 lb/ac at cracking followed two weeks later by Basagran at 0.5 lb/ac plus Starfire at 0.125 lb/ac plus Butyrac at 0.25 lb/ac was used along with a weedy and weed-free check. Sonalan at 0.75 lb ai/ac was applied preplant incorporated to all plots except the weedy check. A nonionic surfactant at 0.25% (v/v) was applied with all Basagran plus Starfire, Pursuit, Cadre, and Pursuit plus Cadre mixtures. Weed species in the test area included bristly starbur (Acanthospermum hispidum ACNHI), sicklepod (Cassia obtusifolia CASOB), Florida beggarweed (Desmodium tortuosum DEDTO), smallflower morningglory (Jacquemontia tamnifolia IAQTA), and coffee senna (Cassia occidentalis CASOC). All POST treatments provided >95% control of IAQTA. Cadre provided better control of all other broadleaf weeds than Pursuit at comparable rates. There was no benefit to mixing Pursuit with Cadre but Cadre mixtures with Pursuit provided better control than Pursuit alone. Cadre must be applied at 2 fl. oz./ac to provide >90% control of CASOC, and 4 fl. oz./ac for >90% control of ACNHI, DEDTO, and CASOB. Yields equivalent to the standard required at least 3 fl. oz./ac of Cadre. No Pursuit only treatment provided yields equivalent to the weed-free check or the standard.

V-53482 Systems for Weed Control in Georgia Peanut. C. J. ZORN*, J. W. WILCUT, J. S. RICHBURG, III, and M. G. PATTERSON. Dep. of Crop and Soil Sciences, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793-0748 and Agronomy and Soils Dep., Auburn University, AL 36849.

Field studies in 1991 and 1992 evaluated V-53482 systems at Plains and Tifton, GA for weed control, peanut tolerance and peanut yield. Two rates of V-53482 (0.063 and 0.094 lb ai/ac) were applied preemergence (PRE) in a factorial arrangement with early postemergence (EPOST) and POST applications of Starfire+Basagran, Cobra+Butyrac, or Cadre (0.032 lb/ac) compared to a commercial standard of Basagran+Starfire EPOST and POST. The experiments received a blanket application of Balan at 1.5 lb ai/ac. Weed species evaluated included smallflower morningglory (Jacquemontia tamnifolia IAQTA), Florida beggarweed (Desmodium tortuosum DEDTO), sicklepod (Cassia obtusifolia CASOB), Ipomoea morningglory species (IPOZZ), prickly sida (Sida spinosa SIDSP) and yellow nutsedge (Cyperus esculentus CYPES). V-53482 controlled IAQTA and DEDTO >92%, IPOZZ 74 to 78%, V-53482 at the low rate controlled SIDSP 75% and the high rate = 100%, and did not control CASOB and CYPES. Cadre controlled CYPES >91% and CASOB 78%. V-53482 at 0.094 lb/a applied PRE and Cadre EPOST or POST provided the best overall weed control and high yields.

Effect of Seed Size and Maturity on Peanut Yield and Growth. K. S. Rucker* and C. K. Kvien. Univ. of Georgia, Coastal Plain Experiment Station, Dept. of Crop Science. Tifton, GA, 31793.

The effect of seed size and maturity on peanut emergence, growth, and development was studied. Seed size is closely linked to seed maturity within a cultivar. Therefore, to separate the effects of seed maturity from seed size, Florunner and Southern Runner seed were first sized into individual screen sizes (15/64th -19/64th) and then into three maturity groups (immature, mid-mature, and mature) within each size. Within a cultivar we found smaller seed are generally more immature, slower to emerge, lower in emergence percentages, and produce smaller, slower growing plants and lower yields than do larger seed. In 1992 yield trials conducted at the SW Georgia Branch Station near Plains, Southern Runner and Florunner yields of 3738 and 4047; 4073 and 4476; 3773 and 4816 kg/ha were recorded for 15/64th, 17/64th, and 19/64th screen sizes respectively. Mature seed were faster to emerge and had higher emergence percentages than immature seed.

Peanut Cultivar Variation in Chilling Tolerance. M.J. BELL[1]*, R.C. ROY[2], T.E. MICHAELS[1] and M. TOLLENAAR[1]. [1]Crop Science Dept., University of Guelph and [2]Agriculture Canada, Delhi Research Station, Ontario, Canada.

Many peanut production regions are characterized by large diurnal temperature fluctuations and night temperatures <20°C during the growing season. Field studies have suggested variation in radiation use efficiency (RUE) of peanut cultivars between environments may be due to effects of low (<20°C) night temperatures. Studies were undertaken to examine effects of night temperature on leaflet and whole plant carbon exchange rates (CER) and carbon balance of peanut cultivars in the field and in growth cabinets. Unhardened plants of the Valencia cultivars OAC Ruby and OAC Garroy, the Spanish cultivar Chico and the Virginia cultivar Early Bunch all showed a linear decline in leaflet CER with decreasing night temperature (20° - 9°C), with both stomatal and nonstomatal limitations significant. However the OAC cultivars showed an ability to acclimate under both fluctuating night temperatures outdoors (11-19°C) and constant cool night temperatures indoors (9° - 12°C), which resulted in reduced sensitivity to temperature *per se*, and night temperature in particular. Such acclimation ability was not evident in Chico or Early Bunch. Acclimation to 10°C night temperatures in OAC Ruby reduced the optimum temperature for whole plant CER from 25° to 22°C and also reduced CER depression at both suboptimal (12.5-20°C) and supraoptimal (25-33°C) temperatures. Acclimation in OAC Ruby was accompanied by higher specific respiration rates, with indications that this effect may be due to increased maintenance respiration. Leaflet CER and crop RUE data in 1992 at Delhi confirmed the cultivar differences observed in indoor studies.

Acetaldehyde and Ethanol Formation in Peanuts During High Temperature Curing. G.S. OSBORN* and J.H. YOUNG. Department of Bio. and Ag. Engineering, North Carolina State University, Raleigh, N.C. 27695-7625.

Previous studies have associated the off-flavors produced in peanuts cured at temperatures above 35° C, with higher than normal amounts of acetaldehyde (AcAld) and ethanol (EtOH) present in the kernel. AcAld and EtOH amounts produced during curing of immature NC-9 variety peanuts were measured. The curing air temperature used was 40° C, maturity was orange class as determined by the hull scrape method, and the peanuts were grown in 1992 at Lewiston, NC. For comparison, the same measurements were made using mature pods (brown/black class) cured at 40° C and immature pods cured at 35° C. The largest amounts of AcAld and EtOH were produced in immature pods cured at 40° C. Insignificantly low amounts were produced in mature pods cured at 40° C. Immature pods cured at 35° C produced low but significant amounts of AcAld and EtOH. During the curing process of the immature samples, AcAld and EtOH levels did not increase until 15-20 hours into the tests, at which point levels increased rapidly to peak 20-30 hours into the tests. After peaking, AcAld amounts in the immature peanuts decreased slightly, but remained higher than pre-curing amounts. After peaking, EtOH levels decreased to near pre-curing amounts in the 40° C immature tests, but remained high in 35° C immature test. During these curing tests, the peak levels of AcAld and EtOH occurred at kernel moisture contents of 20-25% (wet basis) for the immature 40° C tests, and 10-15% (wb) for the immature 35° C test. The rate of increase and decrease in AcAld and EtOH amounts during curing appeared to be a function of temperature, maturity, moisture content and time. In order to examine specific production rates, further tests were performed measuring AcAld and EtOH amounts in immature kernels at 40° C, held at the constant moisture levels of 25%, 40%, and 50% (wb). Peanuts were hand harvested and dried from field moisture content to the desired level at an air temperature of 25° C. Once the required moisture content was reached, pods were placed in air flow conditions of 40° C, and near 100% relative humidity to prevent drying over the eight hour test. Equations were developed to predict the AcAld and EtOH content as a function of time for orange maturity kernels, at 40° C, at each of the three fixed moisture contents.

Restriction Fragment Length Polymorphism (RFLP) Analysis to Monitor Alien Germplasm Introgression in Peanut (*Arachis hypogaea* L.). TALLURY P. SHYAMALRAU*, H. T. STALKER and G. KOCHERT. Crop Science Dept., N. C. State University, Raleigh, NC 27695-7629 and Dept. of Botany, Univ. of Georgia, Athens, GA 30602.

RFLP analysis was conducted on triploid F_1s and hexaploid F_2C_1 and F_3C_2 progenies generated from crosses involving *Arachis hypogaea* ($2n = 4x = 40$; cvs. NC 6 and Argentine) and the three diploid *Arachis* species *A. stenosperma* (Coll. HLK 410; PI 338280), *A. cardenasii* (Coll. GKP 10017; PI 262141) and *A. batizocoi* (Coll. K 9484; PI 298639). The objective of this study was to augment selection efficiency for peanut improvement by identifying species-specific RFLP markers which could be used to select and monitor germplasm introgression in early generation interspecific hybrids. A total of 49 peanut cDNA clones that were polymorphic between *A. hypogaea* and the above-mentioned *Arachis* species were selected as probes. Analyses of triploids and hexaploids revealed 12 (24.5%) of the markers which clearly identified wild species DNA in interspecific hybrids. The 12 marker loci were scattered over the genome and located in six of the 11 linkage groups on the RFLP linkage map. Selected DNA clones will be used to study tetraploid hybrid derivatives generated from these populations to select stable 40-chromosome lines with introgressed genes from the *Arachis* species and potentially to associate markers with desirable agronomic traits.

Identification of Molecular Markers Associated to Disease and Insect Resistance Genes in an Interspecific Hybrid Population. G. M. GARCIA*, G. D. KOCHERT and H. T. STALKER. Crop Science Dept., N. C. State University, Raleigh, NC 27695-7629 and Dept. of Botany, Univ. of Georgia, Athens, GA 30602.

The genus *Arachis* contains a large number of wild diploid species ($2n = 2x = 20$) with many desirable traits such as disease and insect resistance. A set of 50 recombinant inbred lines (RIL) ($2n = 4x = 40$) derived from *A. hypogaea* and the wild species *A. cardenasii* showing resistance to leafspots, peanut rust, and nematodes have been evaluated for introgression using RAPD markers and RFLPs. The two parents were screened with 210 RAPD primers generating an average of 1.05 *A. cardenasii*-specific polymorphic bands/primer as compared to the *A. hypogaea* parent. DNA from resistant and susceptible individuals for each pathogen/insect line will be separately bulked and screened for introgression using RAPD and mapped RFLP markers. Linkage between an introgressed marker and the target resistance locus will be confirmed and quantified using F_2 populations derived from crossing the resistant RIL line and the susceptible *A. hypogaea* parent.

Comparison of Leafspot Advisory Systems for Managing Early Leafspot of Peanuts in Oklahoma. L. J. WU*, J. P. DAMICONE, and K. E. JACKSON. Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078-9947.

Weather-based advisory systems for scheduling chlorothalonil sprays (1.26 kg/ha) for early leafspot management were compared to a 14-day schedule and a non-sprayed control in 1991 and 1992. Three modifications of the Jenson and Boyle model, and the new Virginia advisory at the thresholds of 36-96 time duration values (TDVs) were tested on Spanish (Spanco) and runner (Florunner and Okrun) cultivars. Leafspot incidence was assessed at 2-week intervals and defoliation was assessed at harvest. Leafspot incidence was low in 1991 and had no impact on yields but was high in 1992 and reduced yields of Spanco but not the runner cultivars. The Virginia schedules of 36 TDVs in 1991 and 36 and 48 TDVs in 1992 resulted in yields and defoliation but not AUDPCs (Area Under Disease Progress Curve) equal to the 14-day schedule with 3-4 fewer sprays for Spanco. The Virginia schedules of 36-96 TDVs in 1991 and 36-72 TDVs in 1992 resulted in yields and defoliation equal to the 14-day schedule with 3-5 fewer sprays for the runner cultivars. The Virginia schedule at 48 TDVs on the runner cultivars resulted in the same AUDPC as the 14-day schedule in 1992 but not in 1991. The Jenson and Boyle model resulted in 3-4 fewer sprays and yields equal to the 14-day schedule in 1991. However, defoliation of Spanco did not differ from the non-sprayed control. In 1992, the Jenson and Boyle model did not schedule any sprays due to low temperatures. This is the first report of failure of the Jenson and Boyle model to adequately schedule leafspot sprays. Over two years, the Virginia schedules of 36 TDVs with 3 fewer sprays for Spanco and 48 TDVs with 4 fewer sprays for the runner cultivars provided the best leafspot control of the advisories tested.

Development of Bioassays to Evaluate Fungicide Distribution, Tenacity and/or Longevity on Peanut Plants and Soil. K.W. SEEBOLD* and P.A. BACKMAN. Dept. of Plant Pathology, Alabama Ag. Exp. Station, Auburn University, Auburn, AL 36849.

Two bioassay systems were tested to evaluate the effects of adjuvants and application placement on iprodione longevity on peanut. Iprodione was applied alone and with five adjuvants, using three different application methods, in order to determine whether control of two soilborne diseases of peanut was best achieved by protecting plant surfaces or by soil contact. An untreated check and a flutolanil positive check were also included. A limb piece assay was designed to test for fungicide presence over time on peanut limbs. Four 2.5 cm limb sections, spaced equidistantly along the initial 30 cm of pod-bearing limb in contact with soil , were arranged in a square formation in the center of a 90 mm petri plate containing acid-PDA approximately 2.5 cm from the edge. Limb samples were taken at 3, 7, and 14 days after application to test fungicide persistence over time. Plugs of *Rhizoctonia solani* AG-4, 5 mm in diameter, were placed in the plate center and plates were incubated at 25 °C for 48 hours, after which they were evaluated for mycelial growth around limb pieces. All plates showed increasing mycelial growth around limb sections over the course of sampling. In general, fungal inhibition was dependent on the adjuvant / application method used. Signficant mycelial inhibition was often associated with the use of sticker-type adjuvants and in-canopy applications. By the end of the sampling period, no differences in mycelial growth were recorded between any treatment. A second bioassay was developed to test for fungicide presence in soil. Five oat grains infected with either *R. solani* or *S. rolfsii* were arranged equidistantly on petri plates into which 30 cc of soil, sampled from the upper 5 cm of subcanopy soil of peanut plots that had received three spray applications, had been added. Plates were incubated at 30 C and evaluated at 48 hours and 6 days after inoculation. Plates containing *R. solani* were rated for mycelial growth and, in addition to mycelial growth, *S. rolfsii* plates were evaluated for numbers of sclerotial initials and mature sclerotia. Forty-eight hours after inoculation, flutolanil-treated soils were more inhibitory to *R. solani* than iprodione-treated and untreated soils; however, when plates were rated 6 days post-inoculation, no differences were seen among treatments. Inhibition of *S. rolfsii* was dependent upon adjuvant type and application method, with sticker-type adjuvants + iprodione (applied in-canopy) often showing greatest reductions in growth and number of sclerotial initials. The number of mature sclerotia did not differ significantly among treatments. These results suggest that the limb piece assay and soil plate assay can be effectively used to detect fungicide persistence in soil and on plants over time.

The Effect of Air Flow Rate on Drying Times and Costs in a Solar-Assisted Partial Air Recirculation Peanut Drying Facility.

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In conventional non-recirculating peanut drying systems, an air flow rate of 10 $m^3/min-m^3$ is recommended. Drying systems utilizing air recirculation need not consider inefficiency due to unsaturated air exiting the system; since the extra drying capacity of the air will eventually be utilized. As a result, the air flow rate recommendation for recirculation drying systems is being reexamined. The simulation model DRYSIM2G is used for this study along with weather data from the 1992 drying season at Lewiston, NC. Air flow rates (AQ) of 5, 7.5, 10, 12.5, 15, 17.5, 20, and 22.5 $m^3/min-m^3$ are used to simulate drying in a solar-assisted facility with a capacity of four wagons. The initial moisture content of the kernels in the wagons is assumed to be 25% (w.b.). The peanuts are assumed to be dry when kernel MC in the top layer of each wagon reaches 10% (w.b.). Once all four wagons are dry, they are simultaneously replaced by four wet wagons. The fuel consumption, electricity consumption, fuel cost, electricity cost, total cost, wagon drying times, and drying system seasonal capacity are calculated by the model for each of the air flow rates of the study.

BREEDING

Forage Potential of Cultivated Peanut (Arachis hypogaea L.). D.W. GORBET*, R.L. STANLEY, JR. and D.A. KNAUFT. University of Florida, North Florida Research and Education Center (NFREC), Marianna, FL 32446; NFREC, Quincy, FL 32351; and Agronomy Department, Gainesville, FL 32611.

Livestock production enterprises in the southern USA depend primarily on forage for feed. Peanuts (*Arachis* Sp.) are well adapted to this area and have the potential of producing a high quality forage that is comparable to alfalfa. With the development of peanut (*A. hypogaea* L.) lines with good leafspot resistance in the Florida breeding program, studies were initiated in 1983 at Marianna to evaluate the forage potential of some of this material. Small plot studies with no fungicide applications for leafspot control were grown and clippings made to evaluate forage production. Single and two clippings were compared on each genotype. Pod yields were taken at the end of each season. Some lines produced dry matter forage yields exceeding 9000 kg ha^{-1} from the total of two clippings. Single clippings at the end of the season (140±d) produced dry matter forage yields exceeding 7000 kg ha^{-1} on some entries. There were significant differences among genotypes and years, as well as clipping treatments. Two clippings produced the greatest forage yield for all genotypes in all years but always reduced pod yields, with some entries reduced 50% when compared to one clipping. Some entries produced pod yields of 4000 kg ha^{-1} with the single clipping. Crude protein values for the forages were generally higher for two clippings (14.0 - 19.6%) compared to the single clipping (12.5 - 15.1%). Digestibility (IVOMD) ranged from 59.6 - 72% for forage samples. These forage production and quality values compare favorably to alfalfa and current forage type peanut cultivars (*Arach*. Sp.). Pod production could probably best be used in a "hogging-off" operation if the vines were harvested for forage.

Use of a Core Collection to Enhance Utilization of the U.S. Peanut Germplasm Collection. C. C. HOLBROOK*[1], W. F. ANDERSON[1] and R. N. PITTMAN[2]. [1] USDA-ARS, Coastal Plain Exp. Stn., Tifton, GA 31793; [2] USDA-ARS, Griffin, GA 30223.

The U.S. germplasm collection for peanut consists of 7,432 accessions and contains a great amount of genetic diversity. Information on economically important traits does not exist for most accessions due to the time and labor required for evaluation. The development of a core collection for peanut would provide a subset of accessions which could be extensively examined. The objective of this research was to select a core collection for peanut and to see how effective it would have been in identifying sources of resistance to late leafspot in the entire germplasm collection. Data for six morphological traits for the U.S. peanut germplasm collection were obtained from the Germplasm Resource Information Network (GRIN). The entire germplasm collection was then stratified by country of origin and data were analyzed using multivariate statistical analysis. Results allowed the accession to be clustered into groups which, theoretically, are genetically similar. Random sampling was then used to select approximately ten % from each group. The resulting 831 accessions form a core collection for peanut. Examination of data for the six morphological traits indicated that the genetic variation expressed for each trait in the entire collection has been preserved in this core collection. Using data on leafspot resistance for the entire collection, we determined that a core collection screening approach would have required screening 27% of the entire collection and would have identified 54% of the resistant accessions in the entire collection. This approach would have resulted in the identification of the best four and eight of the best ten sources of resistance in the entire collection. These results demonstrate that the peanut core collection can be used to improve the efficiency of peanut germplasm evaluations.

Use of Mass Selection for Developing Leafspot-Resistant Peanut Lines. D.A. KNAUFT*, C.C. HOLBROOK, and D.W. GORBET. Dep. of Agronomy, University of Florida, Gainesville FL 32611, USDA-ARS, Tifton, GA 31793, and Dep. of Agronomy, University of Florida, Marianna, FL 32446.

Mass selection is not commonly used in peanut breeding programs, in spite of its low cost and ability to accommodate large amounts of genetic diversity. We examined the use of mass selection for development of late leafspot-resistant peanut lines. Sixty-eight crosses were made between adapted breeding lines and fourteen sources of leafspot resistance. Equal numbers of F_2 seed were combined from each cross to form two populations. In Gainesville, FL one population was grown without disease control (LSBNC) and the other was grown with disease control (LSBC). The entire population was harvested each year from the two treatments, and a random sample of seed was used to plant the next generation. After five generations of mass selection, breeding lines were extracted from the two populations. The eleven best breeding lines from each were tested for yield and grade under disease pressure in 1991 and 1992 at Gainesville and Marianna, FL and Tifton, GA. Two of the best lines developed from the base population using the pedigree method were included in the test, as was 'Southern Runner.' LSBNC selections had average disease ratings of 6.2, while LSBC selections averaged 6.6. However mean yield of the LSBC selections was 1540 kg ha^{-1}, and mean yield of the LSBNC selections was 1986 kg ha^{-1}. Among the lines from the two populations, the eight best lines for pod yield included one mass selected under disease pressure and seven selected with no pressure. The highest yielding line in the study was one of the lines derived from pedigree selection. Its average yield was over 550 kg ha^{-1} greater than the best mass-selected line. Although interactions existed among year, location, and genotypes, no line consistently performed better than either of the two lines derived from pedigree selection. There were no consistent differences among any of the lines for market grade characteristics or fatty acid composition. For production under disease pressure, mass selection without disease pressure produced better lines than did mass selection with disease pressure. Lines derived from pedigree selection under disease pressure produced the highest yielding lines in this study.

Progress in Breeding Sclerotinia Blight Runner-type Peanuts with TxAG-5 as the source of Resistance. O.D. SMITH*, C.E. SIMPSON, and H.A. MELOUK. Texas Agricultural Experiment Station, College Station and Stephenville, TX; and USDA-ARS, Stillwater, OK.

Field screening of single and backcross populations derived from TxAG-5 and adapted runner cultivars and breeding lines have been effected on a family basis for three years. Supplementation of infected-plant frequencies with visual plant health scores on a plot basis gives evidence that physiological resistance, in addition to canopy structure, is a factor in plant response. Among the resistant selections, open-canopy plant forms, both upright and spreading, segregates are the most frequent, but dense-canopy resistant segregates have emerged. Preliminary yield and grade data indicates that resistant segregates, grown in the absence of disease pressure, range in yield similar to the susceptible, with some F_2 derived family yields approaching that of commercial cultivars. In the presence of disease, yields of resistant selections exceed that of commercial runner cultivars. Some tendency towards lower grades for resistant families, compared to check cultivars, have been observed. Our results indicate that multiple criteria must be considered in effective selection for resistance with attention given both to resistance reaction and important agronomic traits. Reactions of in vivo seedling reaction to disease relative to ajust plant field reactions are being examined.

Utility of Late-Generation Selections within Peanut Breeding Programs. W. D. BRANCH*, University of Georgia, Dept. of Crop and Soil Sciences, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Normally in the pedigree breeding method for peanut (*Arachis hypogaea* L.), individual plant selections are made within the early generations (F_2-F_4) of cross populations. These early-generation selections are then yield tested beginning around the F_5 or F_6 generation for another three years or more. This study was conducted to determine the utility of making additional late-generation (F_8+) plant selections within advanced breeding lines derived from early-generation selections. Three such advanced Georgia breeding lines were used for this purpose: GA T-2449, GA T-2465, and GA T-2566. Nine late-generation selections were made within each breeding line, and progeny rows from these were increased one generation before beginning evaluation. Yield tests were conducted using a randomized complete block design for three years to compare selections with the original breeding line. In general, late-generation selections were not found to be significantly better than the original breeding line for yield. However, some differences were noted among these advanced selections which suggest that late-generation selections may be advantageous to at least maintain overall performance of breeding lines and pure-line cultivars while increasing homozygosity.

Pre-harvest Aflatoxin Screening of Peanut Germplasm. W.F. ANDERSON*, C.C. HOLBROOK, D.M. WILSON and M.E. MATHERON. USDA-ARS, UGA, Coastal Plain Exp. Stn., Tifton, GA 31793 and Univ. of Arizona, Somerton, AZ.

Aflatoxin contamination of peanut results from the invasion of pods and seed by *Aspergillus* sp. and subsequent production of aflatoxin. In efforts to reduce aflatoxin contamination, a peanut core germplasm collection is being screened for genotypes with potential resistance to fungal invasion and/or aflatoxin contamination. Field and greenhouse studies were conducted using techniques that included drought stressing peanut plants within soil that was highly contaminated with *A. parasiticus* and *A. flavus*. Dried seed samples were then ground and aflatoxin was extracted and measured using the Aflatest procedure. Two groups (85) of peanut plant introductions were tested in 1991. The genotypes that averaged the highest and lowest levels of pre-harvest aflatoxin from these groups were tested in three environments during 1992. Aflatoxin contamination was highly variable within and among tests. All peanut plant introductions were susceptible to some degree, however, a small number had lower levels of aflatoxin production than Florunner and Tifton-8 and there was high variability among plant introductions. In addition, a study was conducted over four environments to examine 11 peanut genotypes that have been reported to have partial resistance to *in vitro* colonization of rehydrated, mature, stored, undamaged seed by *A. flavus*. No substantial resistance was found among these lines for pre-harvest aflatoxin contamination. Studies are continuing for the discovery of better sources of resistance.

Development of a Large-Scale Field Screening System which can be used to Examine Peanut Germplasm for Resistance to Pre-harvest Aflatoxin Contamination. M. E. MATHERON*[1], C. C. HOLBROOK[2], D. W. WILSON[3], W. F. ANDERSON[2] and M. E. WILL[3]. [1] Univ. of Arizona, Somerton, AZ 85364; [2] USDA-ARS, Coastal Plain Exp. Station, Tifton, GA 31793; [3] Univ. of Georgia, Coastal Plain Exp. Station, Tifton, GA 31793;

Pre-harvest aflatoxin contamination (PAC) of peanut occurs under prolong periods of drought and heat stress. Screening of peanut germplasm may identify valuable sources of resistance to PAC. This screening will require a large scale screening system. The objective of this research was to develop a large-scale field system for screening peanut germplasm for resistance to PAC at Yuma, Arizona. Yuma, Arizona is located in a desert and has great potential as a site for large scale screening for resistance to PAC. Field studies were conducted at Yuma in 1990 to determine if aflatoxin contamination would occur in peanut. Aflatoxin levels up to 2,260 ppb were observed, however, the number of escapes and the C.V. were unacceptably large. During testing at Yuma in 1990 it was noted that drought stressed plants rapidly died due to the low air humidity. A subsurface irrigation system was installed in 1991 to alleviate this problem and allow for an extended period of drought stress in the pod zone. Results for 1991 in comparison to 1990 showed a greatly increased mean aflatoxin contamination, a 50 % reduction in the C.V., and a virtual elimination in the occurrence of escapes. Ninety-seven percent of the Yuma plots in 1991 were contaminated with aflatoxin. This was a drastic improvement over 1990, when no subsurface irrigation was used and 52% of the plots were escapes. A study was conducted in 1992 to compare plots with and without subsurface irrigation to determine if the differences observed between 1990 and 1991 were due to the installation of subsurface irrigation. The use of subsurface irrigation in 1992 increased the mean contamination by 100%, reduced the C.V. by over 50%, and reduced the number of escapes by over 80%.

Genetic Transformation of Valencia-type Peanut via *Agrobacterium tumefaciens*. M. CHENG*, D.C.H. HSI, and G. C. PHILLIPS. Dept. of Agronomy and Horticulture, New Mexico State University, Las Cruces, NM 88003-0003, and Agricultural Science Center at Los Lunus, NM 87031.

Three genetically different *Agrobacterium tumefaciens* strains, four regenerable seedling explants from NM Valencia A peanut, and three transformation procedures were used in peanut transformation experiments. Three positive primary transformants, as confirmed by nopaline and zein gene expressions, were recovered from petiolule-with-blade-attached explants inoculated with strain CKS (A208:pTi37 ASE X pEMZ) with a long cocultivation time on regeneration medium. An interaction among strain X explant X transformation procedure was exhibited. *Agrobacterium* strain CKS + petiolule-with-blade-attached explant + long cocultivation time on regeneration medium may be the best combination of treatments for valencia-type peanut transformation via *Agrobacterium*, based on this research. If the zein gene proves to be stably inherited in progeny of these transformants, then this genetic transformation approach should prove useful for the development of nutritionally-balanced peanut germplasm.

Agrobacterium-mediated Transformation of Somatic Embryos in Peanut (*Arachis hypogaea* L.).

R. GILL* and P. OZIAS-AKINS. Department of Horticulture, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

Peanut (*Arachis hypogaea* L.) is one of the most important protein-rich oilseed legumes. Development of an efficient transformation method holds great potential for incorporating genes for desirable traits. Transformed peanut plants can be obtained from embryogenic calli by microprojectile bombardment. However, we have made an additional attempt to develop an *Agrobacterium*-mediated transformation system using the hygromycin phosphotransferase (*hph*) marker gene under control of the CaMV 35S promoter. Somatic embryos from three-week-old embryogenic cultures of cvs. Toalson, Sunrunner and Tifrun were cocultivated for 10 minutes with overnight-grown cultures of *Agrobacterium* (1-5 x 10^8 bacterial cells). Treated cultures were blotted dry and incubated in the dark (28°C) on maintenance medium, i.e., Murashige and Skoog basal medium supplemented with picloram (3 mg/l) and glutamine (1 g/l). After two days, these cultures were washed repeatedly with sterile water, blotted dry and placed on the previously described maintenance medium supplemented additionally with cefotaxime and carbenicillin (125 mg/l each). After a month, putative transformants from all three cultivars were selected by further supplementing the maintenance medium with hygromycin (20 mg/l). Prolonged culture under selection inhibited the growth of non-transformed tissues whereas putatively transformed tissues continued to grow. DNA from hygromycin-resistant cultures showed PCR amplification of the *hph* gene. Further confirmation by Southern blot analysis is in progress.

Random Amplified Polymorphic DNA in Peanut: Molecular analysis of intra and inter-specific lines. M. OUEDRAOGO*[1], A.H. PATERSON[1], C.E. SIMPSON[2], and O.D. SMITH[1]. [1] Dept. of Soil & Crop Sciences, Texas A&M Univ., College Station TX 77843, and [2]Texas Agricultural Experiment Station, Stephenville TX 76401.

Inter-specific hybridization allows the transfer of traits of economic importance between species. The present study examines the use of the RAPD technique in detecting segments of DNA introgressed from the wild species to elite cultivars. The plant material used consisted of: *Arachis* species *cardenasii*, *chacoensis*, *batizicoi*, and *hypogaea* subspecies *hypogaea*; a complex hybrid of the above species; and BC_2F_2, BC_3F_2, and $BC_4F_{4:10}$ using *A. hypogaea* as the recurrent parent. Of 200 primers tested, 150 yielded two to five bands of size generally less than 1900 bp. As expected, analysis of the banding pattern revealed a higher incidence of polymorphism between *A. hypogaea* and the other species than between *A. hypogaea* and the advanced inter-specific lines. These results indicate that DNA segments were successfully transferred from the wild species to the cultivated *hypogaea* and that genetic diversity in peanut can be assessed using RAPD markers. Evidence of linkage between any of these RAPD markers and traits of interest has not yet been established. The RAPD technique allows for the identification of large number of DNA polymorphisms that distinguish among these peanut species and their derived lines. This is of particular importance in peanut where RFLP or isozyme markers are very limited.

Pistil Characteristics and Pollination, Seed Production of *Arachis* L. J. LU[1,2]* and B. PICKERSGILL[1]. 1. Department of Agricultural Botany, University of Reading, Reading RG6 2AS, U. K. 2. Division of Agriculture, Florida A & M University, Tallahassee, FL 32310

It is well-known that the perennial species of *Arachis* set few seeds in living collections and are difficult to use as seed parents in interspecific crosses, while the annuals produce many seeds from self- and compatible interspecific pollinations. There are three types of stigma in *Arachis*. Most perennial species have very small, hair-guarded stigmas and are difficult to pollinate effectively. Most annuals have larger stigmas without hairs and are easily pollinated. A few annual and perennial species have stigmas intermediate between the other two types. *A. glandulifera* is the only annual species in section *Arachis* with intermediate type of stigma. In addition, the perennial species also have their stigmas further beyond the position of anthers and have longer stylar hairs than annual species. The difficulty of pollination to the stigma of perennials seems at least as a part of the reason why they set few seeds after self-pollination or interspecific cross-pollination. The pistil characteristics of perennial *Arachis* species make them adapted to cross pollination, while annual species are predominantly autogamous.

Fixed-Effect Genetic Analysis of Diallel and Factorial Mating Designs in Peanut. T.G. ISLEIB*.

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Diallel and factorial matings are commonly used in peanut as a means of genetically combining agronomically superior pure lines with sources of desirable traits such as disease resistance. Genetic interpretation of random-effects statistical models for diallel and factorial matings in self-pollinated crop species is limited due to use of unrelated homozygous parental lines. Interpretation of GCA and SCA as indicative of additive and dominant genetic effects is not valid because the parents as a rule are not derived by random sampling from an identifiable random-mating base population. At the same time, estimates of GCA and SCA are of little interest because they are limited to the hybrid populations at the particular level of inbreeding at which the phenotypic measurements were made. Utilization of a fixed-effect genetic model allows estimation of genetic parameters whose contributions to genotypic value vary, if at all, only as a function of inbreeding of inbreeding coefficient. The model accommodates additive effects, dominance, and epistasis. If more than one inbred generation is tested simultaneously, dominant and epistatic effects may be separated. If progressively more inbred generations are tested in successive years, one may still compare goodness of fit provided by additive-dominant and additive-epistatic models. Estimates of fixed effects may be used to predict the value of any hybrid population at any level of inbreeding.

Variation in *Arachis duranensis*, a Possible Progenitor of *A. hypogaea*. G. D. KOCHERT*, H. T. STALKER and J. S. DHESI.

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Arachis duranensis Krap. et Greg. *nom. nud.* is an annual species native to northern Argentina and southern Bolivia. Approximately 15 collections are maintained in germplasm nurseries and accessions readily produce seeds under cultivated conditions. The objective of this study was to characterize the species *A. duranensis* morphologically, molecularly, and cytologically in order to better understand its role as a likely progenitor of *A. hypogaea*. Fifty-six vegetative and reproductive traits were measured on three plants for each of 17 accessions, including two accessions which have been assigned at various times to *A. duranensis* or to *A. spegazzinii*; thus, their taxonomic status is uncertain. Principal component and cluster analyses of the morphological data illustrated a large amount of subspecific diversity. Isozyme and restriction fragment length polymorphism (RFLP) analyses indicated that variation also can be detected at the molecular level. F_1 hybrids were then produced among nine accessions to determine biosystematic relationships. Cytological analyses indicated that most hybrids are highly fertile, whereas a few are semisterile; however, chromosomes pair normally with 10 bivalents, and no evidence of multivalents or other cytological irregularities were observed. The data indicate that *A. duranensis* has significant levels of intraspecific variation and the species is in a dynamic state of evolution.

Origin and Dispersal of Arachis stenosperma Krap. et Greg. in Brazil. C.E. SIMPSON*, J.F.M. VALLS, R.N. PITTMAN, AND D.E. WILLIAMS. Texas Agric. Exp. Stn., Stephenville, TX 76401; CENARGEN/EMBRAPA Brazilia, Brazil; USDA, ARS, Griffin, GA 30223; and USDA, ARS, Beltsville, MD 20705.

Arachis stenosperma was first collected for germplasm preservation by Hammons, Langford, and Krapovickas in 1968 (HLK-408, PI 338279 and HLK-410, PI 338280). These collections were made on the southeast Brazilian coast near Paranagua. Since that time at least fourteen additional collections of *A. stenosperma* representing four locations along the coast line of Brazil have been made. In 1982 a collection by Allem (AViW-2796) near Barra do Garcas, Mato Grosso (some 1250 km inland from the collection sites of HLK-408/410) appeared morphologically similar to *A. stenosperma*, but was not cross compatible with HLK-410. Other morphologically similar materials have recently been collected farther west near General Carneiro and north of B. do Garcas, near Vale dos Sonhos. A third collection, near Rondonopolis, is morphologically indistinguishable from HLK-410 in herbarium specimens. Cross compatibility studies of these three accessions with HLK-410 show the hybrids to be highly fertile. Our morphological evaluation of the materials and Stalker's studies of the HLK-410 and V. dos Sonhos collections all indicate that these materials are undoubtedly *A. stenosperma*. RFLP analyses by Halward et al., support this conclusion, at least on the Vale dos Sonhos material they tested. The coastal collections have always seemed outside of the normal distribution of section *Arachis*, at least to those of us who have accomplished the bulk of the wild *Arachis* germplasm collection. Theories for how *A. stenosperma* was distributed from its area of origin in the headwaters of the Araguaia and Paraguay Rivers to the coastal locations will be discussed.

Promising Peanut Lines Developed at the Institute of Plant Breeding In the Philippines. Remedios Miranda-Abilay, Institute of Plant Breeding, UPLB, College, Laguna, Philippines.

Two peanut lines (IPB Pn 85-10-68 and IPB Pn 85-3-86) developed at the Institute of Plant Breeding (IPB) were identified to be high yielding, resistant to leafhopper damage, rust and late leafspot infection. IPB Pn 85-10-68 is a line selection from the cross between E.G. Pn 18 and NC 7 while IPB Pn 85 -3-86 is a derived line from the hybridization of IPB Pn 48-90 with Florigiant. Advanced yield tests of 14 peanut entries (9 breeding lines from IPB, 4 breeding lines from the Bureau of Plant Industry and a check cultivar) were conducted at Laguna, Isabela, North Cotabato and Bohol on November, 1991 to February, 1992. Data from these cooperative tests showed that line IPB Pn 85-10-68 was the top yielder across locations with a mean seed yield of 2.40 tons/ha. The other promising IPB peanut line (IPB Pn 85-3-86) had an average seed yield of 2.34 tons/ha. Both lines are among the 12 entries that have been evaluated in the national cooperative tests at 7 locations in the Philippines. These are also being tested in on-farm trials at major peanut growing areas and both are being seed increased at Pampanga and Isabela.

Origin and Evolution of Peanut from Archaeological Evidence. D.J. BANKS*, P.O. Box 2286, Stillwater, OK 74076, T. POZORSKI and S. POZORSKI, Dept. of Psychology, University of Texas Pan American, Edinburg, TX 78539, and C.B. DONNAN, Museum of Cultural History, University of California, Los Angeles, 90024.

Studies are underway to determine the size/age relationships of some remarkably well-preserved samples of peanut pods recovered by Shelia and Tom Pozorski in the Casma valley of Peru. The peanut samples came from five sites spanning a range of ca. 1800 B.C. to 1500 A.D. Preliminary studies indicate fairly good correlations of pod size and age (i. e., the larger samples are the youngest). The oldest pods recovered resemble and may actually have been wild species of *Arachis*. Wild peanuts are not native to coastal Peru but they could have been brought from Argentina or Bolivia. Interestingly, at ca. 500 B.C. there appears to have been a significant increase in pod size. The finding suggests that during this period a tetraploid peanut was evolving in the valley. It is possible that two wild peanut species, under garden culture by early indians, may have been crossed by insect pollinators. Spontaneous autoploidy of flower tissue of such a hybrid could create a useful fertile tetraploid on which mutation and selection could act. The recent discovery of golden necklaces and other beautiful artifacts depicting peanut pods associated with the warrior-priest at Sipán, Peru (ca. 100 to 700 A.D.), reported in the National Geographic (174:510-549, 1988), deserves attention. It seems clear that the artifacts deliberately dipict the *peruviana* variety of peanut. However, archaeological material of actual peanut hulls of that time period in coastal Peru usually represent the *hirsuta* variety. Based on the usual rationale for depictions of art in Moche culture, the *peruviana* peanut was probably chosen to be commemorated for mystical or ritualistic reasons. Further study in this area is suggested.

BARD-699: A New Peanut Variety of Pakistan. A. REHMAN*, Dr. F. W. SMITH, S. B. WALLS and S. MALIK. BARD Project, NARC, Park Road, Islamabad, Pakistan.

Peanut is a major cash crop of rainfed areas with sandy/sandyloam soil in Pakistan. Peanut varieties take 180-200 days to mature when planted in March/April subject to severe drought in May/June till the onset of monsoon. Wheat, the staple food of the area could not be planted after peanut in October/November and land was left fallow for one year to plant wheat. BARD-699 is a bunch type variety and is a composite of ICGS-37 and ICGS-44. It is an early maturing, high yielding variety as compared to local variety Banki. ICGS-37 and ICGS-44 are both sister lines of selections from ICRISAT (India) line Robut 33-1. These lines were first introduced in 1984 with the onset of Barani (Rainfed) Agricultural Research and Development project and were put in National Preliminary Yield Trials for two years at NARC as well as at 4 other locations in which average yield over 2 years of these lines was over 50% than Banki. In 1987 these lines were tested in National Uniform Groundnut Yield Trials conducted at 4 locations and average yields of ICGS-37 and ICGS-44 were 100% and 50% higher respectively than Banki. In 1988 these lines were tested in Large Scale Yield Trials (LSYT) at 4 locations which included only 6 lines. Looking at the past 4 years data, which showed these lines giving almost same yields at each location respectively, it was decided to make a composite of these two lines in order to have a heavy bulk of seed for demonstration and seed production. In 1989, another LSYT was conducted with BARD-699 included in it along with its components. Yield of BARD-699 was intermediate as compared to its two components, possibly indicating that each line was contributing equally to the yield of BARD-699. In 1990 this variety was approved by PARC Variety Evaluation Committee and the National Seed Registration Department after conduction of On-farm Yield Trials at 4 locations. In 1991 it was approved by National Seed Council of Pakistan and was released for farmers production.

Results of a Recent Plant Exploration in Mexico to Collect the Hirsuta Peanut.

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A plant exploration was undertaken in November 1992 with the express purpose of collecting landraces of the hirsuta peanut, sometimes known as "Peruvian runner" (*A. hypogaea* ssp. *hypogaea* var. *hirsuta*). The variety remains severely underrepresented in international collections, with only 5 accessions specifically identified as hirsuta in the U.S. National Plant Germplasm System. The primary objective of the exploration was to conserve representative samples of the Mexican landraces of this unusual variety and make them available to peanut breeders. Another major objective was to gather information regarding the present distribution of this variety in Mexico, the special farming techniques used to grow it, its local uses and market value, and its *in situ* conservation status. The hirsuta peanut is known in Mexico from two disjunct, relatively restricted areas in the central highland states of Puebla and Guanajuato. In Puebla, near the town of Atlixco, different landraces of hirsuta peanut are still cultivated using age-old planting and harvesting techniques including, in some cases, specialized hand tools. In the Atlixco region, hirsuta peanuts are preferred for roasting and boiling for local sale and consumption, but in recent years they have been largely displaced by more commercial runner types due to the growth of local peanut roasting and candying industry. In Guanajuato, around the town of Salvatierra, only a single landrace of hirsuta peanut is cultivated, to the near total exclusion of any other type, including introduced commercial varieties. One collection was made at an elevation of over 2000 meters. Despite the hirsuta's comparatively low yield and difficulty of harvest, it is in great demand by local consumers who are willing to pay a higher price for its superior flavor. Because of the strong consumer demand, the hirsuta peanut does not appear to be threatened in Guanajuato. A total of 25 accessions of Mexican peanuts were collected, including 12 hirsutas, 9 runners or virginias, and 4 valencias. These accessions may provide peanut breeders with new sources of insect resistance, drought tolerance, and improved flavor.

Characterization of a Shriveled Seed Mutant in Peanut. L.R. Jakkula, D.A. Knauft*, and D.W. Gorbet. Dep. of Agronomy, University of Florida, Gainesville FL 32611 and Marianna FL 32446.

More than half the fully matured seed in a group of Florida peanut breeding lines show notable shriveling when dried. This character is expressed at different levels within a single, true-breeding plant. Research was conducted to characterize this mutant. The three shriveled-seeded lines and 'Sunrunner' were grown in a replicated RCBD at Gainesville, Florida. After harvest, fully matured seed were grouped into five shriveled phenotypic classes based on degree of shriveling, and each class was analyzed for total lipid, protein, sucrose, starch, and mineral concentrations. Highly significant differences were observed for the total lipid, sucrose and protein concentrations among the shriveled seed classes. There were no significant differences for starch and mineral concentrations. The most shriveled class in line 529B had 21% oil, and the defatted meal had 38% protein and 21% sucrose. Normal seed of line 529B had 50% oil, and the defatted meal had 52% protein and 9% sucrose. The first pods developing on plants from the shriveled lines had less than 30% of the seed showing shriveling, while the latest mature pods formed on the plant had nearly 100% shriveled seed. Shriveled F_1, F_2, and F_3 seed have not been recovered from any of three crosses with shriveled lines as female parents and Sunrunner as the male parent.

Differential Expression of Peanut Genes. W.L. ZEILE*, R.L. SMITH, and D.A. KNAUFT. University of Florida, Dep. of Agronomy, Gainesville, FL 32611.

Identification of temporally or spatially regulated peanut genes can be useful for understanding peanut genetics, for manipulation of peanut genes for improved products, and for an understanding of the control of gene regulation. Using previously characterized cDNA clones exhibiting seed-specific expression, a peanut cDNA library was screened for full length cDNA clones. Northern analysis identified clones that are expressed in specific tissue or during specific stages of development. These clones include those only expressed in the embryo (pscAIA), only in the testa (psc12), only in late seed development (psc34-1), and differentially in testa or all plant tissue (pscBIANO). These cDNA clones have been cloned, and sequence homology of psc12 is similar to a class of cell wall proteins, homology of psc34-1 is comparable to a class of seed storage proteins, and pscBIANO corresponds to a class of heat shock proteins. Genomic clones are presently being characterized with the intent of identifying associated promoter regions. Promoters with known specificities will be useful in the control of genes used for peanut transformation.

ECONOMICS

A Comparison of International Peanut Production Costs: U.S. versus China. P. ZHANG,* S.M. FLETCHER, and D.H. CARLEY. Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797

During the GATT and NAFTA negotiations, U.S. peanut farmers were concerned about the competitiveness of U..S peanuts in the international market and the impact of trade liberalization. A key component of U.S.'s competitiveness is determined by its production costs relatively to its competitors. China is a major U.S competitor in the world peanut market. This study analyzed cost of peanut production in the U.S. and China using survey data at the farm level for the years 1984 to 1990. Results indicate that U.S. farmers were capital intensive while Chinese farmers were labor intensive, as expected. The average labor cost per ton for Chinese farmers was approximately twice as much as for the U.S., but the average capital cost was only 17% of the U.S. cost. The average total economic cost, excluding quota value, was $442 per ton in the U.S. This amount was about twice as high as China's average total economic cost. However, for China's total economic cost, land rent is not included since it does not exist while it does for U.S. When the production cost for both countries were converted to world trade prices, China did not seem to be selling their peanuts below cost on the world market. Thus, the Chinese may have a significant comparative advantage over the U.S. in selling peanuts on the world market, if one ignores the difference in peanut quality. Thus, U.S. peanut farmer's income could be significantly affected by trade liberalization. The U.S. peanut industry must develop new technologies in order to achieve a competitive advantage in the world market in addition to emphasizing the quality of U.S. peanuts.

An Economic Analysis of Japan's Peanut Imports: Implications to U.S. Exports. S.M. FLETCHER,* P. ZHANG, and D.H. CARLEY. Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797.

U.S. peanut exports to Japan were worth approximately $23 million annually from 1978 to 1991 but have been declining in recent years. During the 1988 U.S.-Japan trade negotiations, the U.S. requested Japan to increase its import quota level for raw edible peanuts from 60,000 metric tons in 1988 to 75,000 metric tons in 1990. The objective of this study was to investigate the Japanese demand for raw peanuts and major peanut products from different export suppliers and to determine whether an increase in the raw peanut import quota would be beneficial to the United States, both absolutely and relatively to the U.S. competitors. Japanese import demand for raw peanuts, roasted peanuts, and peanut butter was estimated using the Rotterdam model for the years 1978 to 1991. Results indicate that an increase in the Japanese import quota for raw peanuts would not result in an automatic increase in U.S. peanut exports to Japan. An increase in U.S. peanut exports to Japan requires further efforts by the U.S. to improve its competitive position in the Japanese peanut market. Producing the type of peanuts preferred by Japanese consumers with a consistent export supply could be essential for expanding U.S. raw peanut exports to Japan. Furthermore, U.S. peanut butter and roasted peanut exports could decrease if the increased quota led to a decline in peanut product imports. Strengthening the Japanese demand for U.S. peanut butter and roasted peanuts through such means as the USDA's Market Promotion Program may be an effective way to increase U.S. exports. Finally, China, which is the major U.S. competitor in the Japanese peanut market, appears to benefit more than the U.S. from an increase in the Japanese raw peanut import quota.

Relationship of Retail Prices for Peanut Products to Changes in Peanut Policies. D.H. CARLEY,* S.M. FLETCHER and P. ZHANG. Department of Agricultural and Applied Economics, University of Georgia, Griffin, GA 30223-1797.

If freer world trade or a change in the price support policy were to result in decreases in domestic farm prices for farmers' stock peanuts, how much may consumers expect to benefit? A 1992 survey of retail prices for peanut butter showed prices ranged from $.97 to $4.20 per lb. Even though the cost of raw shelled peanuts per unit in a jar of peanut butter or in a package of peanut snacks should be about the same regardless of store location, brand, container size, or type of product, the consumer is faced with an array of prices. Furthermore, from 1984 to 1991 the farm value of peanuts in one pound of peanut butter increased $.10 while the average retail price increased $.66. The impact of peanut policy changes on retail prices was estimated under the two scenarios of a reduction in the support price and peanuts imported at world prices. At the current support price of $675 per ton for farmers' stock peanuts (FSP), the estimated farm value of the peanuts in an.18 oz. jar of peanut butter is $.56. Decreasing the support price to $600 or even $500 per ton FSP would result in a farm value in peanut butter of $.50 and $.42, respectively. Shelled peanuts entering the United States at $800 to $1,000 mt would be equivalent to $300 to $425 per ton FSP. The estimated farm value of such peanuts would range from $.25 to $.35 in an 18 oz. jar of peanut butter. If the entire price decrease was passed on, the retail price of a $1.89 jar of peanut butter would decrease to a range of $1.83 at $600/ton FSP to $1.58 at $300/ton FSP. However, economic theory predicts that with an oligopolistic industry structure all input price decreases would not be passed on. For the consumer, the retail price decrease could amount to $.80 to $1.38 per capita annually or for a family of four in the range of $3.20 to $5.50 if all the price decreases were passed on. The decrease in retail prices may result in an increase in the use of peanuts in peanut butter by 4% to 6%. This analysis of retail price and policy change relationships shows that with the wide variation in retail prices, consumers could save more by shopping for lower priced peanut products than may be saved as a result of lower prices for raw shelled peanuts.

Economic Performance Characteristics of the Irrigated and Nonirrigated Production of Continuous Peanuts and a Peanut-Corn Rotation. W. A. MILLER* and B. E. GAMBLE. Extension Agricultural Economics and Alabama Agricultural Experiment Station, Auburn University, Headland, AL 36345.

Selected data from the first four years of a long-term, sod-based rotation experiment, that began in 1988, were summarized. The experimental work was conducted at the Wiregrass Experiment Station in Headland, Alabama. Crop yields, graded peanut values, and net returns were evaluated relative to irrigation and rotation treatments. The two rotations evaluated were continuous Florunner peanut production and an every-other-year rotation of Florunner peanuts and corn. Conventional cultural practices were used. Production inputs were utilized at recommended rates, including Temik at a thrips control rate. The field history of the test site was characterized by severe disease and nematode problems. Irrigation scheduling was based solely on the water needs of the peanuts in the peanut-corn rotation. The average variability of peanut and corn yields were compared using the coefficent of variation. Net returns per acre to land and management were computed using four alternative assumed ratios of quota peanuts to additional peanuts in the peanut product mix. The $62.70 per acre average annual cost of the winter cover crop was allocated to a grazing activity, even though the cost of the grazing was not recovered. Corn yields averaged 72 and 132 bushels per acre for the nonirrigated and irrigated alternatives, respectively. Peanut yields per acre and graded values per ton averaged as follows: 1,891/$645.91 for nonirrigated continuous peanuts, 2,282/$650.09 for irrigated continuous peanuts, 2,057/$652.03 for nonirrigated rotated peanuts, and 2,711/$650.21 for irrigated rotated peanuts. Average annual net returns to land and management per acre by cropping system were as follows: -$17.18 for nonirrigated continuous peanuts, -$67.00 for irrigated continuous peanuts, $5.90 for the nonirrigated peanut and corn rotation, and $3.74 for the irrigated peanut and corn rotation. The coefficent of variation in corn yields was lower with irrigation (at .12) than without irrigation (at .21). The coefficent of variation in peanut yields was higher with irrigation than without, but increased to a lesser extent in the rotated peanuts (.164 versus .185) than in the continuous peanuts (.131 versus .278).

MNUT: An Expert System That Uses Peanut Supply and Price Prediction Models to Reduce Marketing Risk.

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All segments of the peanut industry incur risk due to variability in peanut (*Arachis hypogaea* L.) yield, quality and price. MNUT reduces risk by using empirical models to provide timely and objective predictions of peanut yield, quality and price. The supply prediction model uses a system of equations derived from 12 years of data to relate peanut yield and quality to production practices, field conditions and meteorological data. Supply predictions are initiated on July 31 and updated weekly until harvest. Actual field yields and field samples are gathered at harvest for evaluations. Field level predictions include yield (lbs/a), farmers stock (FS) grade (% SMK+SS), shelling outturn distribution, seed quality (% germination), and aflatoxin (ppb). MNUT uses the field predictions to predict the state, regional, and U.S. supply. Price predictions include farmers stock ($/FS ton), shelled stock peanut prices ($/lb), and peanut seed price ($/lb) for the following year. From 1987 through 1992, July 31 prediction of field yield in the Southeast averaged within 231 (lbs/a) of the actual field yield. The quality predictions (July 31) of FS grade, percent jumbos (ride 21/64 x 3/4" slotted screen; runner-type), germination, and aflatoxin averaged within 1.3%, 1.0%, 2.2%, and 16.7 (ppb; oil stock) of the actual values, respectively. The supply and price predictions and the integration into a risk management decision framework (MNUT) will also be discussed.

A Review of the General Accounting Office Report on the Peanut Program.

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The U.S. General Accounting Office (GAO) February 1993 report reviews the U.S. Department of Agriculture's peanut program and discusses changes that have occurred in peanut farming since the 1930's and the impact of the program on producers, "consumers" (i.e., first buyers), the government, and international trade. The peanut program adds from $314 million to $513 million each year to the cost of buying peanuts. To operate the program, USDA incurred average annual costs of $34.4 million for 1986-90 to cover administration, disaster transfers, export promotion, and net loan losses. GAO recommends Congress should (1) reduce the annual quota support level; (2) allow the quota support to decrease, as well as increase, in line with production costs; (3) assign quotas so a larger quota share is owned by persons who actually grow peanuts, and (4) permit government agencies to purchase peanuts at world market price rather than the higher quota support price. Although peanuts were designated a basic agriculture commodity in 1934, a marketing quota was not authorized until 1941 and was not applied until 1949. Structural characteristics examined were farm size, farms producing peanuts, and other production characteristics. During debate on the 1990 Farm Bill, USDA recommended changes in the quota support formula to parallel changes in target price commodities and in the restrictions on lease and transfer of quotas to make the program more efficient, cost-effective, and responsive to market forces.
About 68 percent of quota peanuts were produced in 1990 by persons other than the landowner; however, much of that leased quota was produced by a cash or share tenant on the landowner's own property. Since 1981, the farm's quota is forfeited, if peanuts were not produced on the farm two out of three years. A special price category for U.S. government purchases of peanut products, would tend to reduce the income of growers and probably require more peanuts to be crushed.

Understanding Economic and Financial Concepts in Peanut Production With Emphasis on Cost of Production and Profitability. W. DON SHURLEY* and KEITH D. KIGHTLINGER. Department of Agricultural and Applied Economics, University of Georgia, Rural Development Center, P.O. Box 1209, Tifton, GA 31793.

The cost of producing peanuts is an important mechanism in the U.S. government regulated peanut supply/price control program. The support price (loan rate) for quota peanuts is adjusted annually for increases in cost of production. There is much debate, however, concerning "What does it cost to grow peanuts?" and such debate has widespread policy implications. This issue is compounded by lack of a widespread generally accepted method of calculating cost and thus measuring profit. Inaccurate and incomplete data has often been used to argue that peanut growers are making extremely high profits. Claims of high profit have further been used as reasons for elimination or major adjustment of the peanut program. There are differences between accounting and economic measurements of cost and profit. Among these, economic evaluation of cost considers opportunity cost on assets such as land and quota, the value of the farmer's labor and management, and "real" or inflation-adjusted capital replacement for machinery rather than tax-basis depreciation. Accurate farm records are essential to calculating costs and profits. A procedure to pro-rate fixed expenses from a whole-farm basis to an enterprise level is needed. Calculation of cost and profit must also consider both the indebtedness and equity of the farm operation. There is no clear, concise and widely accepted calculation of profit. A more acceptable calculation is Net Return where Net Return is Total Revenue minus any subset of costs. The Net Return would be the return to resources or inputs not considered. To approach economic profit, all inputs including land, quota and farmer labor must be considered. Both cash and non-cash expenses must be considered. Most additional peanuts in the Southeast are grown by quota farmers and grown as an alternative to other crops. When growing additionals, only marginal costs need to be considered and then produced only if additional peanuts provide the highest return above variable cost compared to other crops.

ENTOMOLOGY

Are There Any Patterns in Ten Years of Pheromone Trap Data for the Lesser Cornstalk Borer? T. P. MACK*. Department of Entomology, Auburn University, AL 36849-5413.

I monitored the abundance of adult males of the lesser cornstalk borer, *Elasmopalpus lignosellus* (Zeller) (Insecta: Lepidoptera: Pyralidae) weekly throughout the growing season in Alabama from 1982 to 1992. All fields that were monitored were conventionally tilled, and most were conventionally planted with 'Florunner' peanuts. Pherocon 1C traps were held aloft on one meter pipes that were placed in rows. Traps were placed at least 60 meters apart and we monitored them at least once a week. Trap bottoms were changed weekly or when a total of about 100 moths were captured on a trap. We used a commercially available rubber septa impregnated with a pheromone for the lesser cornstalk borer. Widespread outbreak populations occurred in 1986 and 1990, while populations were sporadic in the intervening years. Unimodal, bimodal, and even polymodal abundance curves were obtained, with no apparent difference between trap captures in outbreak versus latent years. Adult male trap counts were often periodic, with a common peak of ≥15 adults per trap per night occurring between 189 and 220 Julian days.

Chlorpyrifos Effects on Pod Damage, Disease Incidence, and Yield in Standard (Chlorothalonil) and Developmental (Tebuconazole) Peanut Fungicide Programs. J.W. CHAPIN* and J.S. THOMAS. Department of Entomology, Edisto Research and Education Center, Clemson University, Blackville, SC 29817.

The benefits of chlorpyrifos (Lorsban 15G) soil insecticide treatment in standard (chlorothalonil) and developmental (tebuconazole) peanut fungicide programs were compared in five field tests over a 3-yr period. Chlorpyrifos treatment significantly reduced white mold (WM), Sclerotium rolfsii Sacc., incidence and insect pod injury, while increasing yield in the standard fungicide program. In contrast, chlorpyrifos treatment did not measurably affect WM incidence or yield in the tebuconazole program, and insect pod injury was reduced in only one of three years. Tebuconazole reduced Rhizoctonia limb rot and WM incidence, and decreased insect pod injury ratings relative to the standard chlorothalonil program. Tebuconazole increased yield 804 kg/ha (716 lb/ac) over the standard fungicide. Chlorpyrifos increased yield 503 kg/ha (448 lb/ac) for a net return of $315/ha ($128/ac) in the standard fungicide program. However, in the developmental program, chlorpyrifos increased yield only 79 kg/ha (70 lb/ac) for a net return of -$2/ha (-$1/ac). Labeling of ergosterol biosynthesis inhibitor (EBI) fungicides such as tebuconazole would significantly affect peanut insect management in some production areas by reducing the economic incentive for prophylactic treatments of organophosphate insecticides.

Effects of Insecticides on Sweetpotato Whitefly Mortality and Distribution on Peanut Leaves.

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Sweetpotato whitefly control is difficult to obtain with insecticides. One of the factors making sweetpotato whiteflies difficult to control is their tendency to stay on the underside of leaves protected from standard spray applications. On peanut, however, sweetpotato whitefly nymphs have been observed on the upper surface of leaves. Adults may oviposit on the upper leaf surface at night when peanut leaves are folded. The purpose of this test was to determine 1) the degree of control that can be expected with multiple Asana+insecticidal soap (M-Pede, Mycogen Corp.) applications, 2) if Orthene applications result in an increase in sweetpotato whitefly populations and 3) the distribution of sweetpotato whitefly nymphs on the upper and lower leaf surface of peanut leaves. Insecticide application dates were 8/24, 8/31 and 9/9. Leaf samples were taken on 8/24, 8/31 and 9/8 prior to insecticide application and again on 9/14. A binocular microscope was used to count whitefly eggs and immature whiteflies on the top and bottom leaf surface. Sweetpotato whitefly populations in the untreated plots increased until the last sample date. On the last sample date heavy mortality was noted due to parasites and a fungal pathogen. Orthene was ineffective for sweetpotato whitefly control but, after three applications, did not cause increased populations. After one, two and three applications, Asana+M-Pede gave 8, 77 and 72 percent control respectively of the overall population of immatures. After one, two and three applications, overall egg populations were 54 percent lower, 59 percent lower and 66 percent higher respectively than the untreated check. In the untreated check, 27 percent of the total immature whiteflies were found on the upper leaf surface. Twenty percent of the total whitefly eggs were found on the upper surface. Applications of Asana+M-Pede or Orthene did not significantly change the proportion of eggs or immatures on the upper leaf surface. The percentage of eggs and immatures on the upper leaf surface significantly increased with time.

Peanut Maturity and Yield Responses to Tobacco Thrips and Herbicide Injury.

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NC7 virginia-type peanuts were stressed in 2 field tests with postemergence herbicide treatments and feeding injury by tobacco thrips, *Frankliniella fusca*. Peanuts were planted 4 May (test 1) and 11 May (test 2), 1992 using 36-inch (91.4 cm) row spacing; plots were 4 rows by 35 feet (10.6 m); a split plot experimental design was used with 4 replicates. Plant nutrients and diseases were managed according to Virginia Cooperative Extension recommendations; nematodes were suppressed with ehthoprop (Mocap 10G) at 2 lb a.i. per acre (test 1) and metham-sodium (Vapam) at 31.8 lb a.i. per acre (test 2). Feeding injury by thrips was managed with aldicarb (Temik 15G) at 1 lb a.i. per acre, acephate (Orthene 75S) at 0.75 lb a.i. per acre, or an untreated control. Insecticides were applied into the seed furrow at planting. Different degrees of herbicide injury were established with paraquat (Starfire 1.5SC) at 0.125 lb a.i. per acre, acifluorfen (Blazer 2EC) at 0.375 lb a.i. per acre, or pyridate (Tough 3.75EC) at 0.94 lb a.i. per acre. Herbicides were applied either once at late ground cracking (LGC), about two weeks after planting, or at LGC plus at early postemergence (EPO), about four weeks after planting. Injury by thrips feeding and herbicides was rated subjectively using damage rating scales. Plant canopy height and width, peg and flower number, and yield were determined using objective measurement systems. Three digging dates were used: Sep 10, 24 and Oct 8. Pod color was determined using the Hull-Scrape maturity assessment system. Results showed that aldicarb and acephate treatments suppressed thrips injury and resulted in significantly higher yields than untreated controls. Pyridate caused significantly less plant injury than either paraquat or acifluorfen and resulted in significantly higher yields. Digging date also significantly affected yield with successively higher yields with later dates. Only digging date had a consistent effect on hull color. Higher percentages of white, yellow and orange colored hulls (indicating immaturity) were associated with earlier dates; higher percentages of brown and black colored hulls (indicating maturity) were associated with later dates. In test 2, suppression of thrips injury with aldicarb did not affect terminal leader height but did significantly increase lateral branch width at 6 and 10 weeks after planting. Number of pegs, in two 10-row foot (3 m) samples per plot, was not affected by aldicarb, but flower number, in two 3-row foot (.9 m) samples per plot, was significantly higher at 8 and 10 weeks after planting.

<u>Management of Peanut Insect Pests</u>. E.P. CADAPAN* and T.A. DE LA ROSA, Department of Entomology, University of the Philippines at Los Baños, College, Laguna, Philippines.

A total of 63 species of insects and mite pests had been found to feed on peanut plants in the Philippines. However, the following species were considered the most important: leaffolder - *Homona coffearia*, common cutworm - *Spodoptera litura*, leafhoppers - *Empoasca biguttula*, leafminer - *Sproaerema modicella*, pod borer - *Maruca testulalis*, black bean aphid - *Aphis craccivora*, corn earworm - *Helicoverpa armigera*, the two species of tussock moths - *Dasychira mendoza* and *Orgyia postica australis* and a mite - *Tetranychus kansawaii* Kishida. Another insect pest, red fire ant *Solenopsis geminata*, was found to be harmful after planting and during pod development stage. The highest yield reduction that is attributed to insect pest damage in the field was about 40%. Evaluation of cultural practices show that planting during the month of October at population of 540,000 plants/ha produced the highest yield. February planted crops with a population of 300,000 plants/ha also produced high yield when provided with ample irrigation. Insect population and its damage increased as the date of planting was delayed. Several natural enemies of major peanut insect pests like nuclear polyhedrosis virus (NPV), *B. thuringiensis*, *Nomurea rileyi*, *Trichogramma* spp., *Telonomus* species, *Apanteles* and tachinids were studied and some were utilized in managing these pests. A simplified procedure in establishing ETL for defoliating insects has been developed based on the different degrees of effect of leaf damage on yield. Results showed that reproductive stage from pod to seed development was most susceptible to defoliation. An IPM package was assembled and tested in the field. IPM plot had higher return of investment (ROI) than the farmer's plot.

Development and Evaluation of a Frost Advisory Program for Peanut in Virginia. D. R. WALKER* and P. M. PHIPPS. Dept. Env. Sci., Univ. Va., Charlottesville, VA 22903, and Tidewater Agric. Exp. Sta., Va. Polytechnic Inst. and State Univ. (VPI&SU), Suffolk, VA 23437

Medium range forecasts (MRF) of minimum temperatures from the National Meteorological Center and historical weather data were used to develop predictive advisories for frost damage in peanut fields. Historical data from Suffolk, Capron and Waverly were collected at peanut canopy level (ca. 0.3 m above ground) by the agro-environmental monitoring system (AEMS) which is operated and maintained through cooperative agreement of USDA-ARS and VPI&SU. Models for predicting daily low temperatures at each site were developed and tested through analyses of predicted and historical data over a three year period (1989-1991). MRF data were obtained for Richmond, Norfolk and Rocky Mount. The MRF for Richmond was the most highly correlated and stable statistic for predicting low temperatures at all three sites. MRF data were accessed each morning at ca. 7:25 AM EDT. The daily advisory was then developed and transmitted to county extension offices through Internet electronic mail on or before 8 AM. Forecasts included a table of predicted minimum temperatures by location and appropriate warnings for frost or freeze damage to peanuts. Forecasts also included a simply worded statement concerning the overall weather forecast. On or before 8:30 AM, county agents recorded daily advisories on a "peanut hot-line" for area-wide, toll-free access by growers. Actual temperatures recorded at each site were collected by AEMS and used as "ground truth measurements" for validation of forecasts. The correlation of predicted temperatures (Y) to actual temperatures (X) was tested for each location and forecast day. Coefficients of determination (r^2) ranged from 0.79 to 0.86 for day 1, 0.55 to 0.62 for day 2, 0.44 to 0.54 for day 3, 0.48 to 0.61 for day 4, and 0.28 to 0.38 for day 5. These analyses indicated a significant relationship ($P \leq 0.05$) between predicted and actual temperatures at all three locations up to and including the five day forecast. Values of r^2 for day 6 and day 7 ranged from 0.11 to 0.16, and were not significant ($P \leq 0.05$). The first damaging frost in 1992 occurred on October 20 at all three locations and was predicted by the advisory program on each of the preceding 7 days. Approximately 75% of the crop was harvested prior to this frost. Apparently, only a small percentage of the remaining crop was inverted just prior to the frost as a result of the repeated forewarnings of frost. Marketing reports indicated that only 0.7% (ca. 884 tons) of the total harvest exhibited frost damage and graded in the segregation 2 category. These reports and testimonials by growers and industry workers suggest that the frost advisory program was beneficial in preventing heavy losses of market value and quality in 1992.

Scheduling Peanut Irrigation in Southeast Alabama. T.W. TYSON* and L.M. CURTIS, Auburn University, Alabama Cooperative Extension Service, Auburn University, Al 36849-5626

A computer driven irrigation scheduling procedure was developed to predict irrigation dates and calculate recommended irrigation amounts for peanuts in southeast Alabama. Crop water use curves were used as the predictor of future irrigation events. Soil moisture sensors installed at 9" and 18" depths were used to analyze the status of soil moisture relative to the crop water use curve on a two times per week basis. Net rainfall and irrigation amounts were recorded and used to adjust the soil moisture balance status and future predicted irrigation dates. A menu driven computer software package ("MOISTMIS") was developed by Tyson and Curtis for this procedure. Field soil type, depth, and water holding capacity taken from Alabama Soil Conservation Service county soil surveys, made the process field specific. The procedure was carried out in farmer fields from 1987 thru 1992. The MOISTMIS procedure was continually refined during this period. Yield data were taken each year from randomly selected irrigated and rainfed plots in each monitored field. Irrigated yield exceeded rainfed yields in each year except 1992. Average irrigated versus rainfed yields for the entire period was 3711 and 2910 #/acre respectively. This MOISTMIS scheduling procedure has also been modified to schedule cotton and corn irrigation in South Alabama and cotton irrigation in North Alabama.

Yield and Economic Return of Florunner and Southern Runner Peanut in Response to Different Pest Management Inputs. S. L. BROWN, J. A. BALDWIN*, J. P. BEASLEY, JR., S.M. BROWN, AND W. D. SHURLEY. University of Georgia Cooperative Extension Service, Tifton, GA 31793.

Many disease, weed, insect, and nematode pests impact peanut *Arachis hypogaea L.* production in Georgia. Although non-pesticide controls are valuable tools, pesticides remain an integral part of peanut production to insure quality and profitability. The purpose of this demonstration was to measure yield, quality, and economic response of Georgia's most common peanut cultivar 'Florunner' and a multi-pest resistant cultivar 'Southern Runner' to four different levels of pesticide inputs. The two-tiered price support system for peanuts along with differences in grower's pest management philosophy, results in wide variations in pesticide impacts. Depending on the nature and severity of local pest problems, the level of pesticide usage can impact peanut yield, quality, foreign material, profitability and potential pesticide residue levels. The demonstration was conducted on the Sunbelt Expo Farm near Moultrie, Georgia during 1992. Peanut cultivars were planted on June 5th in separate blocks in a randomized complete block design with three replications. Various combinations of herbicides, insecticides, and fungicides were used in providing four levels of pest control from minimum to high levels of input with monetary limits set at $30, $60, $120, and $240 per acre. Project leaders used accepted management techniques to protect the crop to the best of their ability given the monetary limitations. Levels of pesticide input affected yield but not grade of peanuts. No pesticide residues were found in either cultivar grown under any level of pesticide input. Both Florunner and Southern Runner yield and net return were greatest under the level 3 inputs. The added cost of production in level 4 along with slightly lower yields, made level 4 less profitable than level 3.

A Weather-Monitoring Network for Improved Peanut Disease Management. P. M. PHIPPS*. Tidewater Agric. Exp. Sta., Virginia Polytechnic Institute and State Univ., Suffolk, VA 23437.

Predictive models that are driven by real-time environmental data offer promising opportunities for improving the efficiency of crop management. The early leaf spot advisory program (R. M. Cu and P. M. Phipps, Phytopathology 83:195-201) is a working example of the benefits of this approach in controlling disease and reducing fungicide use. Major concerns in deployment of predictive models have been the cost of data collection, the need for trained technicians to operate equipment, and the reliability of recommendations when used at distant locations from data collection sites. Through support of the Va. Agric. Foundation, a project was initiated in 1991 to determine the utility of the EnviroCaster® for addressing these concerns. The EnviroCaster® is a user-friendly, computer-driven, environmental monitor that is manufactured by the Neogen Corp. of Lansing, Michigan. Cooperative research with Neogen resulted in programming the EnviroCaster® with the early leaf spot advisory and an experimental peanut "heat-unit" advisory for predicting crop maturity. The operation of units and the delivery of advisories in two localities was coordinated with county agents in 1991. As a result of the success of this approach, ten additional EnviroCaster® units were placed on farms in 1992. These units were purchased through support of the Virginia Peanut Growers Assoc. Inc., the Virginia Farm Bureau, the Peanut Soil and Water Conservation District, the Peanut Shellers Organization, independent growers, and the agrichemical industry. A network of units was created in 1992 to maximize service in the peanut production area. County agents organized support for this expanded effort, coordinated the purchase of units, and administered telephone and radio recordings of advisories in each county. Each EnviroCaster® was positioned over turf adjacent to peanut fields. Sites were selected after careful consideration of external factors that might influence the accuracy of data. Advisories for control of early leaf spot were estimated to save growers an average of three applications of fungicide at each location in 1991. The Isle of Wight County cooperator realized a savings of ca. $17,760 in managing 610 acres of peanuts, and the Dinwiddie County cooperator saved ca. $6,120 on managing 204 acres. Utilization of the leaf spot advisory in 1992 resulted in an estimated savings of two fungicide sprays when averaged over all ten locations. During both years, growers reported good to excellent control of early leaf spot and expressed their support for additional expansion of the program. Future uses for data collected by the EnviroCaster® will include the deployment of a predictive model for Sclerotinia blight, the validation of low temperature predictions by the Virginia Frost Advisory Program, and improvements in predicting crop growth and maturity.

Utilization of Environmental Thresholds to Minimize Fungicide Applications for Control of Sclerotinia Blight of Peanut.

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Several computerized, environmental models for improved timing of fungicide sprays for control of sclerotinia blight were tested in North Carolina, Texas, Virginia and Oklahoma. Two algorithms each of a Texas (TX1 and TX2) and a North Carolina (NC1 and NC2) spray advisory program were initiated just prior to plant growth overlapping between rows. The spray threshold for the TX models was rainfall >=0.5 inches in the preceding 7 days and soil temperatures remaining <=82.4°F at a 4-inch depth for a minimum of 24 hr. After a fungicide application, TX1 and TX2 programs were restarted at 2 wk and 4 wk, respectively. The NC1 and NC2 programs were based on hours of dew point depression <=3.6°F and a minimum temperature during the high RH period. A nomogram of these factors was then used to determine if weather conditions were conducive to disease development. NC1 used a spray threshold of 4 consecutive days, whereas NC2 required 8 consecutive days. Following a fungicide application, both models were restarted after a 3 WK waiting period. The TX models appeared to give the most satisfactory results in the majority of the experiments. Model applications were as good as, or better than, conventional "demand" treatments which resulted in the same number of sprays. It was concluded that these models represent an important new of timing fungicide applications for sclerotinia blight control. Experiments planned for 1993 should help in refining and verifying this approach as a practical tool for farmers.

SM-9 and Control of Southern Stem Rot of Peanut.

A. K. HAGAN* and J. R. WEEKS. Auburn University, AL 36849-5624.

SM-9 spray adjuvant has been marketed in Alabama for the control of southern stem rot (*Sclerotium rolfsii*) on peanut. On-farm trials were conducted in 1992 in two non-irrigated fields with a history of southern stem rot damage to determine if SM-9 could control this disease on peanut. Applications of SM-9 at 1.2 l/ha and Folicur 3.6F at 0.6 l/ha were made on July 1, July 14, July 27, and August 4. A single application of Moncut 50W at 2.2 kg/ha was made on July 14. A non-treated control was also included. Treatments were applied as full canopy sprays using a two-row boom with three D2-25 nozzles per row at a spray volume of 140 l/ha. Plots were two 15.2 m rows spaced 0.9 m apart and were randomized in four complete blocks. All plots were oversprayed with chlorothalonil to control leaf spot diseases. Southern stem rot damage was assessed within 2 days of digging and yields were adjusted to 10% moisture. At one site, a significant reduction in stem rot severity (25.3 stem rot loci), as compared to the non-treated control (31.0 stem rot loci), was observed in the plots treated with SM-9. At the second site, however, disease severity in the non-treated controls (7.8 stem rot loci) and the plots treated with SM-9 (9.3 stem rot loci) were similar. Folicur 3.6F and Moncut 50W gave significantly better control of southern stem rot (0-2.0 stem rot loci) at both sites than did SM-9. No enhancement of leaf spot control was observed with SM-9. At both sites, yields from the Folicur 3.6F and Moncut 50W-treated plots were significantly higher than those of the non-treated control, while four applications of SM-9 did not increase yields above those of the non-treated control. Also, considerable foliar burn was consistently observed after each application of SM-9.

Effects of Application Method and Rate on Control of Sclerotinia Blight of Peanut with Iprodione. J.P. DAMICONE* and K.E. JACKSON. Department of Plant Pathology, Oklahoma State University, Stillwater OK 74078-9947.

The fungicide iprodione is registered for control of Sclerotinia blight of peanut but is expensive and often provides unsatisfactory control. In 1991 and 1992, various application methods and rates were compared in a field infested with *Sclerotinia minor* in order to optimize iprodione effectiveness. Plots were planted with the *Sclerotinia*-susceptible cultivar Okrun. Three applications of iprodione at 1.12 (full rate), 0.56, and 0.28 kg/ha were made on 21-day intervals beginning at the first sign of disease. These rates were applied as banded sprays with canopy openers (30-cm band, 159 l/ha), 8008LP nozzles (37-cm band, 281 l/ha), or broadcast with 8003VS nozzles (215 l/ha). Half-rates of iprodione were also tank mixed with chlorothalonil (1.25 kg/ha), which controls leafspot, and applied six times through TX-10 nozzles (243 l/ha) on a 14-day schedule. Incidence of Sclerotinia blight in the control at harvest was 68% in 1991 and 96% in 1992. Application with canopy openers at full rate resulted in the highest yield and lowest disease incidence both years but yield and disease control was not significantly ($P=0.05$) better than 8008LP application at full rate. Reduced rates were generally more effective when applied with canopy openers than by other methods. Broadcast and tank-mix applications were generally less effective than banded applications. Most of the treatments significantly increased yields over the control but none provided adequate disease control as yields were low (2778 kg/ha or less). Final disease incidence in the best treatment was only 33% and 19% less than the control in 1991 and 1992, respectively. Isolates of *S. minor* were collected from this and other fields in Oklahoma and assayed for *in-vitro* sensitivity to iprodione to detect the possible occurrence of fungicide resistance.

Effectiveness of Fosthiazate and SM-9 for Control of Nematodes, Thrips and Southern Stem Rot of Peanut. N. A. MINTON* and T. B. BRENNEMAN, USDA-ARS and Plant Pathology Department, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Fosthiazate (ASC-66824) was evaluated in 1990, 1991 and 1992 and SM-9 (Tergitol®) in 1991 and 1992 for efficacy of controlling *Meloidogyne arenaria* (peanut root-knot nematode), *Frankliniella* spp. (thrips) and *Sclerotium rolfsii* (southern stem rot) on peanut grown on Tifton loamy sand. Fenamiphos and/or aldicarb served as treated standards. Fosthiazate and SM-9 were evaluated in separate but adjacent experiments in the field in 1991 and in separate fields in 1992. The experimental design was a modified paired plot with two treatments sharing a common untreated control. Plots were two rows 0.9 m apart and 7.6 m long. Fosthiazate was replicated six times in 1990 and 1992 and five times in 1991 and SM-9 was replicated six times in 1991 and seven times in 1992. Eight fosthiazate or fosthiazate combination treatments and three SM-9 treatments were tested. In 1990 and 1991, most fosthiazate treatments reduced root gall indices and thrips damage and increased yields significantly. Fosthiazate increased peanut yields as much as 72% and 44% in 1990 and 1991, respectively. In 1992, most fosthiazate treatments reduced root gall indices and thrips damage, but yields were not increased significantly. Three fosthiazate treatments in 1990 and one in 1991 reduced southern stem rot significantly. Numbers of disease loci in all other fosthiazate-treated plots were less than in untreated plots both years, but differences were not significant. Nematode and thrips control and yield increases in fosthiazate treatments were equal to comparable rates of aldicarb and fenamiphos. SM-9 treatments did not reduce root gall indices, southern stem-rot loci and thrips damage or increase peanut yields significantly in 1991 and 1992. Conversely, aldicarb reduced nematode and thrips damage and increased yields significantly both years.

PHYSIOLOGY AND CURING

Peptides as Indicators of Peanut Maturity and Protein Changes. S.Y. CHUNG*, H.J. ULLAH, and T.H. SANDERS. USDA-ARS, Southern Regional Research Center, 1100 Robert E. Lee Blvd., P.O. Box 19687, New Orleans, LA 70179.

There is increasing evidence that peptides are associated with protein changes during peanut maturation. To support this, peptide maps of proteins were developed, in which peptides unique to mature and immature peanuts were identified. Peptide maps were produced by digesting peanut proteins with an arginyl endopeptidase and then subjecting the resultant peptide mixtures to separation by C-18 reversed-phase high performance liquid chromatography (HPLC) or immobilized anhydrotrypsin (IMAT) affinity chromatography. Peptide fractions obtained from HPLC or IMAT were further analyzed by capillary zone electrophoresis (CZE). Peptide maps of proteins from immature peanuts were shown to contain peptides different from those from mature peanut proteins. This finding indicates that proteins change structurally during peanut maturation and that the peptides unique to mature and immature peanuts may be useful in screening for peanut maturity and protein changes.

Reducing the Costs and Risks of Overdrying Farmers Stock Peanuts. C. L. BUTTS*. USDA-ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Peanuts are harvested with moisture contents typically ranging from 12 to 24 percent wet basis. After harvest, the moisture content is reduced to below 10.49 percent wet basis (w.b.) prior to marketing. Drying the peanuts to moisture contents below the allowable 10.49 percent w.b. unnecessarily increases the energy, time and labor required to dry peanuts. Overdrying peanuts also causes a reduction in the value of farmers stock peanuts and increases milling losses during subsequent shelling. Tests were conducted during the 1992 crop year to determine the current cost of overdrying peanuts. Three farmers stock lots of peanuts were obtained after being cured and marketed at 10% w.b. Each of the three lots were overdried to a final moisture content of 9, 7 and 5% w.b., respectively, using air heated 8°C above ambient not to exceed 35°C. Energy consumption in the form of propane and electricity were measured for each trailer. Drying time was recorded. Official farmers stock grades for each trailer were obtained both before and after overdrying. A single 45 kg sample was obtained from each trailer after overdrying and shelling outturns evaluated. To dry peanuts from 10 to 9% w.b. required an additional hour per Mg and required an additional 6 L/Mg of propane, and 36 kWh/Mg of electricity. This equated to an additional $2.40 per Mg in labor and energy costs. Drying peanuts from 10 to 7% w.b. required 10 h/Mg, 97.5 L/Mg of propane and 51 kWh/Mg of electricity and cost $16 per Mg. To dry peanuts from 10 to 5 % w.b. cost $47.5 per Mg. The time and energy required were 29 h/Mg, 179 L/Mg of propane, and 489 kWh/Mg of electricity. The farmers stock value determined based upon official grades decreased after the peanuts were dried below 10 % w.b.. The lots of farmers stock peanuts dried to 9, 7 and 5 % w.b. decreased in value by $31, $123, and $345, respectively. An increase in the percent split kernels contributed significantly to the decreased value. Peanuts dried to 7 and 5% w.b. had increased LSK and higher foreign material. Peanuts dried to 5% w.b. also lost marketable weight due to being dried below the market standard of 7% w.b.. Other tests were conducted to calibrate a sensor to measure peanut moisture content and control the drying process. Calibration curves were developed. Standard error of the estimated moisture content was 1.7% w.b. compared to moisture contents determined using the standard oven method.

Automated Controls for Mechanically Ventilated Farmers Stock Peanut Storages. J. S. SMITH, JR.* USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Most mechanically ventilated warehouses allow the fan(s) to operate continuously while peanuts are in storage. This is especially true in the southeast peanut production area, although it is not necessary for the fan(s) to run constantly during storage in order to maintain peanut quality. The generally high relative humidities coupled with warm days and cool nights in this area produce conditions favorable for condensation formation in the warehouse and accompanying drip lines on the peanut mass. These drip lines generally contain peanuts with very high concentrations of aflatoxin. Continuous operation of the fan(s) greatly reduces the possibility of condensation drip lines, but at times it can be costly to the warehouseman by overdrying the peanuts during periods of low overspace relative humidities and temperatures. A microprocessor based programmable data logger (Campbell Scientific CR-7), humidity sensor, two type "T" thermocouples, and a time run totalizer were installed in a warehouse that is 180 ft x 80 ft x 24 ft with a 12/12 roof slope to control and record the operating time of two 5 hp, 4 ft dia fans. This fan control system, based on the ambient overspace temperature, relative humidity, and roof temperature, reduced fan operation by 34% while preventing condensation drips on the peanuts. Criteria for operating the fans was based on meeting any of the following programmed conditions: 1) overspace relative humidity is equal to or greater than 80%; 2) overspace temperature is equal to or greater than 70 F; or 3) overspace temperature minus roof temperature is equal to or greater than 13 and the relative humidity is equal to or greater than 60%. Reduced peanut weight loss (moisture loss below 7% m.c.) and reduced milling loss (splits, broken kernels, etc.) plus energy savings from reduced fan operation could be of considerable monetary value to the warehouse operator.

The Development of Peanut Flavor Potential During Curing. K.L. BETT*, B.T. VINYARD and T.H. SANDERS. USDA-ARS, Southern Regional Research Center, New Orleans, LA 70179-0687; and USDA-ARS Market Quality and Handling Research, North Carolina State University, Raleigh, NC 27695-7624.

Curing of peanuts is important for preservation of raw peanuts and for maximizing flavor development during roasting. The purpose of this experiment is to investigate the development of flavor potential during windrow and stackpole curing. Peanuts were sampled daily from windrows and at ten day intervals from stackpoles and sorted into maturity classifications as indicated by mesocarp color (black, brown, orange and yellow) prior to drying with forced ambient air as needed. The peanuts were roasted and evaluated for flavor using descriptive flavor analysis. Data were subjected to regression analysis. A separate regression was run on each curing treatment/maturity combination. An analysis of variance and LSD means comparison was used to compare the final samples of the windrow and stackpole processes. There were no significant differences between curing methods for each flavor attribute. The regression analysis on each curing treatment/maturity combination indicated that the flavor of the most mature, those with the black mesocarp, did not change during the curing process for both curing methods. The flavor of the other maturities, brown, orange and yellow mesocarps, did change during curing. The yellow maturity classification displayed the most obvious and consistent changes. Roasted peanutty increased with curing time in the yellow classification during both curing methods. Fruity/fermented decreased during curing for the windrowed cured yellow maturity classification, but in the stackpole cured peanuts it did not change with curing.

Development of Rotary Screen Sizer to Grade Farmers Stock and Milled Peanuts. T.B. WHITAKER*, A.B. SLATE, and J.W. DICKENS. USDA-ARS, Market Quality and Handling Research, Biological and Agricultural Engineering Dept., N.C. State University, Box 7625, Raleigh, NC 27695-7625.

Both farmers stock and milled peanuts are sized as part of the grading process by the Federal State Inspection Service (FSIS) using a high frequency shaker with flat screens. At the request of FSIS, a new sizing devise was designed where screens were rolled into a cylindrical shape 12 inches in diameter and 18 inches long. Peanuts are placed inside the cylindrical screen which is rotated at a specified RPM and length of time. Studies were conducted to determine the RPM and run time required for the percent kernels falling through cylindrical screens to equal the percent kernels falling through flat shaker screens. Both slotted and round hole cylindrical screens were studied using a single 1000 g sample of epoxy coated peanuts. The percent kernels falling through a 16/64 by 3/4 inch slotted cylindrical screen rotating at 26.75 RPM for 26 second was approximately the same percent kernels passing though as flat shaker screen with the same slot size. The percent kernels falling through a 17/64 inch round cylindrical screen rotating at 26.75 RPM took 115 seconds to obtain equal fall through. Repeated screenings, using the same 1000 g sample of coated peanuts, showed that the coefficient of variation associated with the rotary sizer was less than the shaker sizer for both slotted and round holed screens. For round screens, the CV's were 14.7 versus 3.3 % for flat and cylindrical screens, respectively. For slotted screens, the CV's were 5.0 and 2.8 % for flat and cylindrical screens, respectively. Several rotary sizers are now being field tested by FSIS. The cylindrical screen is also being evaluated at the National Peanut Research Laboratory as a sizing component on an automated grading device that cleans, shells, and sizes farmers stock peanuts.

Effect of Harvest Date on Maturity, Maturity Distribution and Flavor of Florunner Peanuts. T.H. SANDERS and K.L. BETT. USDA, ARS, MQHRU, Dept. Food Science, N.C. State University, Raleigh, NC 27695 and USDA, ARS, FFQ, Southern Regional Research Center, New Orleans, LA.

Many factors are known to affect quality of peanuts. Harvest date studies have been conducted to evaluate maturation, seed size, and yield. In 1988 and 1990, irrigated plots were harvested at weekly intervals to examine the progression of maturity profile, maturity distribution in commercial sizes, roast color distribution, and descriptive flavor. Samples taken 3 weeks before through 2 weeks after Hull Scrape optimum revealed consistent maturity progression through the optimum date and a progression of higher percentages of more mature peanuts in each commercial size. In 1990, the total percentage of seed from black and brown Hull Scrape classified pods in the medium commercial size progressed from ca. 48% at 3 weeks before optimum to ca. 89% at optimum harvest date. Distributions of roasted colors in 100 medium commercial size single seed contained fewer dark colored seed with progressive harvest date and earlier harvests produced darker roasted peanut paste. Descriptive flavor analysis of medium size peanuts indicated maximum roasted peanutty flavor at optimum harvest date and a decrease in dark roasted flavor and bitter taste up to optimum harvest.

Minimum Temperatures and Groundnut Yield. C. J. SWANEVELDER*, G. DE BEER & W. JANSEN. Grain Crops Institute, Agricultural Research Council, Republic of South Africa.

Temperature is a very important environmental variable in groundnut production in South Africa due to high altitudes (1000m+). Different methods are being used to evaluate the effect of temperature on plant development and ultimately, seed production. An early maturing cultivar, Harts was planted under irrigation at three localities during 1989 with three planting dates, three weeks apart starting middle October. Daily minimum, maximum temperature recorded and seed yields were determined. During 1989 and 1990 additional trials with 5 and 7 planting dates were planted at Vaalharts which data is also being used. The linear relationship between the occurrence of different minimum temperatures from 5 to 20°C was determined. Subsequently the linear relationship between the slope from the equations and the corresponding temperature was determined. High frequencies of low temperatures have a negative effect on yield which decreases as the minimum temperature rises. At the coolest site the relationship becomes positive at 11,5°C and at the hottest site at 15°C. There will thus be a temperature of which the frequency of occurrence during the growing season has no influence on yield. This was determined by determining the relation between the slope and the corresponding temperature and was 12.8; 13.2; 13.6; 14.2 and 14.3°C for the different trials with a general temperature of 13.4°C.

An Automated Grading System for Farmers' Stock Peanuts. F. E. DOWELL*. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

An improved farmers' stock grading system was developed to reduce labor, variability between grades, grading time, subjectivity, human errors, and costs. The system was requested by numerous industry segments including the National Peanut Council, Southeastern Shellers Association, and the Peanut Administrative Committee. A systems engineering approach ensured time, accuracy, safety, cost, and labor requirements imposed by all industry segments were met. The improved system removes foreign material, shells all pods, sizes kernels, records weight and moisture data, and calculates grades from a 1800g sample. The system utilizes the following: 1) Air columns to remove light and heavy foreign material, loose shelled kernels, hulls, and recirculate unshelled pods through sheller stages until all pods are shelled; 2) a stick remover; 3) a split kernel separator; 4) more precise kernel sizing; and 5) a computer to collect scale weights and moisture contents, compute percentages, and print grades. Sampling errors are reduced with this system since all pods from the 1800g sample are shelled, thus increasing sample size by about 3 times, instead of the 500g sample shelled in the current system. Since all pods from the 1800g sample are shelled, opportunity for current inspector bias is eliminated. This bias may occur in the present system if only large pods are selected for the current 500g pod sample removed from the 1800g sample. Cleaning and shelling is more efficient, thus reducing hand cleaning and hand shelling. In addition, cleaning, shelling, and sizing occurs in one step, thus labor is further reduced since transporting samples from one machine to the next is eliminated. The cost of the automated cleaner, sheller, sizer is projected to be no more than the current equipment it replaces. Automated data collection and calculation removes inspector errors in recording and calculating grade weights and percentages. One study of the current system showed approximately 25% of all grade sheets contain illegible data. Further studies of the current system show inaccurate calculations resulted in overpayment of 17% of all lots by about $9/ton by overestimating kernel outturns. The automated system is currently being field tested. The completed system will provide more accurate grade information to buyers and sellers while reducing labor.

Palm Oil (unhydrogenated) as a stabilizer for Peanut Butter. M.J. HINDS*, M.S. CHINNAN and L.R. BEUCHAT. Center for Food Safety & Quality Enhancement, Department of Food Science and Technology, University of Georgia, Experiment Station, Griffin, GA 30223.

Stabilizers are essential in peanut butter to prevent separation of the less dense oil from the denser solid particles during room temperature storage. Hydrogenated vegetable oils with melting points above room temperature are commonly used. In this study, unhydrogenated Malaysian (RBD) palm oil (from mesocarp of *Elaeis guineensis*) was investigated as an alternative stabilizer. Peanut butter was prepared from Florunner seeds. After screening tests for oil separation, the level of palm oil (PO) selected was 2.5%. A factorial arrangement of 2 stabilizers [2.5% PO, slip mp = 43°C, and 1.5% Fix-X (FX), mp = 64.5°C] and 5 storage temperatures [ambient (21-22°C)=t1, 25°C=t2, 30°C=t3, 35°C=t4, 65°C=t5] was used to monitor oil leakage, viscosity and color. Results after one week's storage are presented. (1) Oil leakage: PO - 0% at t1, t2 & t3, 1.2% at t4, and 3.5% at t5; FX - 0% at t1, t2, t3 & t4, and 6% at t5. (2) Viscosity: at t1 FX samples were 2.5 times as viscous as PO samples. Compared with t1 values: viscosity of FX treatments increased by 25% at t2 and t3 , and decreased by 20% and 90% at t4 and t5, respectively; while viscosity of PO treatments showed no change at t2, but decreased by 50%, 57%, and 60% at t3, t4 and t5, respectively. (3) Color: there were no significant differences (Lab values) due to type of stabilizer or storage temperature. These preliminary results suggest the potential of PO as a stabilizer for peanut butter. Tests (objective and sensory) to improve overall quality and stability of peanut butter made with palm oil are in progress.

Maximization of Variant Roasted Peanut Attribute Values Resulting From Aberrant CIELAB L and Fruity Attribute Values. H. E. PATTEE and F. G. GIESBRECHT. USDA-ARS, South Atlantic Area and Dept. of Statistics, North Carolina State University, Raleigh, NC 27695

Documentation of broad-sense heritability of the sensory attribute roasted peanut suggests that improvement can be obtained through breeding strategies. To best utilize the information available from roasted peanut sensory data in developing these breeding strategies the effects of roast color and fruity attribute intensity, which cause sub-optimal roasted peanut attribute values to be obtained, must be adjusted in the raw data. To make the proper adjustments the nature of surface response equations for factors was determined and roast color and fruity attribute intensity shown to be unaffected by genotype and location effects. Statistical analysis showed the fruity attribute on roasted peanut effect to be linear and the roast color on roasted peanut effect to be quadratic. Adjusting for genotype and locations effects in the roasted peanut data was shown to have non-significant effect on mean optimal roast color value nor the slope values of the linear equation of the fruity - roasted peanut attribute relationship. These findings enabled development of a maximization method for roasted peanut attribute intensity values using a modified SAS routine. This method was applied to six data sets spanning a five year period. The capability to maximize the roasted peanut attribute values has several potential applications, one of which is to use such data to evaluate parentage contribution to flavor enhancement or flavor reduction.

The Relationship of Hull Mesocarp Color To Peanut Seed Maturity. J. M. FERGUSON, Crop Science Department, North Carolina State University, Raleigh NC 27695-7620.

The classification of peanuts based on pod mesocarp color has become a popular means of estimating peanut maturity. Though developed for use on runner-type peanuts, this technique has been widely adapted by producers of large seeded Virginia-type peanuts. A study was initiated to determine if the hull scrape technique could be used for the production of seed peanuts. NC 7 and NC 9 peanuts were harvested by hand in 1990, 1991 and 1992 and separated, according to external mesocarp color, into maturity classes yellow 1 (Y1), yellow 2 (Y2), orange (OR), brown (BR) and black (BL). Seed from these maturity classes were evaluated for moisture, dry weight, germination and vigor. Seed moisture content and percentage of final dry weight within a maturity class varied with variety and production year. There was however, a significant relationship ($r^2 = 0.94$) between seed moisture and percent final dry weight for both varieties and all three production years. Germination of NC 7 seed increased significantly in 1990 as seeds approached maturity. Immature NC 9 seed (Y1 and Y2) grown in 1991 had substantially lower germination than seed from mature pods. There were no significant increases in germination during maturation of NC 7 seed harvested in 1991 or NC 9 from 1990. Seed leakage during imbibition, as measured by electrical conductivity of seed soak water, decreased significantly as seed matured. The lowest leakage levels occurred when seed had reached physiological maturity (BL). Germination following accelerated aging (AA) increased as seed progressed from Y1 to near physiological maturity. Maximum AA of NC 7 seed occurred when seed had reached 77 and 84% of their final dry weight in 1990 and 1991, respectively. NC 9 seed achieved maximum AA when seed accumulated 96 and 94% of their final dry weight in 1990 and 1991, respectively.

Leaf and Canopy Assimilation in Relation to Growth and Dry Matter Accumulation of Peanut. K. J. BOOTE*, G. BOURGEOIS, N. B. PICKERING, and J. M. BENNETT. Agronomy Dept., Univ. of Florida, Gainesville, FL. 32611, and Agriculture Canada, St-Jean-sur-Richelieu, Quebec, Canada J3B 3E6.

It is important to understand the relationship of leaf and canopy photosynthesis to peanut growth and yield. Single leaf photosynthesis and canopy photosynthesis were measured on field stands of Florunner peanut during several different seasons. Relationships to light intensity, leaf area index (LAI), light interception, row spacing, and seasonal factors such as late season decline in leaf N status were determined. During early season, single leaf photosynthesis held steady at about 1.3 mg CO_2 m^{-2} s^{-1}. By contrast, canopy gross assimilation increased with increasing LAI, in part dependent on row spacing. The canopy light extinction coefficient at mid-day ranged from 0.54 to 0.63. Canopy gross assimilation (sum of apparent assimilation plus the absolute value of respiration from canopy-pods-soil) reached a peak of 2.0 to 2.2 mg CO_2 m^{-2} s^{-1} at LAIs of 5 to 6. During mid-season, concurrent respiration from the canopy-pods-soil was 0.5 to 0.6 mg CO_2 m^{-2} s^{-1}, which corresponded to about 30 % of canopy gross assimilation, with 19% from canopy-pods and 11% from soil-roots. During pod fill, leaf N concentration gradually declined, as did canopy gross assimilation. Based on data from a row-spacing experiment with half-day diurnal measurements of leaf and canopy assimilation, canopy gross assimilation was shown to be closely predicted with a hedgerow canopy photosynthesis model based on input of LAI, time of day, day of year, light intensity, row spacing, canopy height-width, and input of light-saturated leaf photosynthesis measured on single leaves. Further, when the single leaf rate was input into the PNUTGRO crop growth model with hedgerow photosynthesis, seasonal dry matter and yield were predicted within 10-15% of observed values. These studies demonstrate reasonable "closure" on the carbon balance budget and show that dry matter accumulation can be predicted from single leaf photosynthesis.

PLANT PATHOLOGY

Tank Mix Applications of Cyproconazole and Tebuconazole with Chlorothalonil for Control of Peanut Leaf Spot. A. K. CULBREATH*, and T. B. BRENNEMAN, Dept. of Plant Pathology, The University of Georgia, Tifton, GA 31793-0748.
Field tests were conducted in two fields (A and B) near Tifton, GA, in 1992 to determine the efficacy of seven bi-weekly applications of cyproconazole (Alto 100) and tebuconazole (Folicur 3.6F) at rates of 0.03, 0.06, and 0.09 lb ai/A alone and in tank-mix combinations with 0.55 lb ai/A of chlorothalonil (Bravo 720) for control of leaf spot diseases of peanut (Arachis hypogaea) caused by Cercosporidium personatum and Cercospora arachidicola. Treatments in both locations also included a nontreated control, and chlorothalonil applied alone at 0.55 and 1.1 lb ai/A. Experimental design was a randomized complete block with four replications in field A and five in field B. Percent defoliation was determined on 12 stems collected from each plot prior to digging. At field A, final percent defoliation was 30.0, 26.8, and 11.1% for 0.03, 0.06 and 0.09 lb ai, respectively, of cyproconazole alone, and 37.2, 15.5, and 3.3% for those same rates tank-mixed with 0.55 lb ai/A of chlorothalonil. Final percent defoliation was 81.4, 45.9, and 47.1% for 0.03, 0.06 and 0.09 lb ai, respectively, of tebuconazole alone, and 18.0, 16.1, and 27.3% for those same rates with 0.55 lb ai/A of chlorothalonil. Final percent defoliation was 85.1 and 39.3% for 0.55 and 1.1 lb ai/A of chlorothalonil alone and 98.6% for the non-treated control. At field B, final percent defoliation was 32.9, 8.7, and 0.5% for 0.03, 0.06 and 0.09 lb ai, respectively, of cyproconazole alone, and 4.7, 1.4 and 0.5% for those same rates when applied with 0.55 lb ai/A of chlorothalonil. Final percent defoliation was 20.6, 5.8, and 4.6% for 0.03, 0.06 and 0.09 lb ai, respectively, of tebuconazole alone, and 11.7, 1.2, and 0.3% for those same rates with 0.55 lb ai/A of chlorothalonil. Final percent defoliation was 59.5 and 2.4% for 0.55 and 1.1 lb ai/A of chlorothalonil alone and 99.5% for the nontreated control. Tank mix applications of either of these sterol inhibiting fungicides with low rates of chlorothalonil show potential for providing leaf spot control better than that achieved with standard recommended applications of chlorothalonil alone.

A Climatological Test of Peanut Leafspot Spray Schedules in South Carolina. D.E. LINVILL and C.E. DRYE. Agric. Weather Office, and Edisto Research and Education Center, Clemson University, Clemson, SC 29634
Peanut Leafspot diseases can devastate a peanut crop. The disease organisms, Early Leafspot (Cercospora arachidicola) and Late Leafspot (Cercosporidium personatum), can be controlled by a foliar fungicide such as Chlorothalonil. Early leafspot control guidelines using temperature and leafwetness were developed by Jensen and Boyle. Researchers at Auburn University have used observed and forecast rainfall to predict spray application dates (AUPNUT). The 1980-1990 climatological data for Sumter, Florence, and Blackville, South Carolina, were used to simulate spray dates. Dates reported in the Crop Reporting Service Weekly Weather and Crop Bulletin defined the 15%, 50%, and 85% planting dates and the 25%, 50%, and 75% harvest dates. Spray schedules each year were initiated on 15 June, at cracking plus 30 days, on the date determined by Jensen and Boyles criteria and by AUPNUT. For mean planting and harvest dates, 90 applications were made on a 14 day calendar schedule starting on 15 June. Starting at cracking plus 30 days decreased applications to 86. Jensen and Boyle's starting criteria required 97 applications at Blackville, 98 at Florence, and 91 at Sumter. The AUPNUT schedule used rainfalls greater than 0.1 inches to apply 72 sprays at Blackville, 66 at Florence and 64 at Sumter. When all rains were considered, 79 sprays were applied at Blackville, 82 at Florence and 77 at Sumter. Other planting and harvest date combinations showed similar reductions. Sequences of days and not total number of days with rainfall determine the number of applications. Adoption of AUPNUT scheduling in South Carolina can result in less foliar fungicide usage when compared to a 14 day calendar based spray schedules.

Botrytis Leafspot of Peanuts and Potential for Control by *Gliocladium*. D. M. PORTER*, R. A. TABER, and H. L. WARREN. USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437; 210 Forest Drive, LaVale, MD 21502; and Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

A peanut leafspot, caused by *Botrytis cinerea*, was observed in Virginia on leaflets of several cultivars in the fall of 1990 and 1992. Lesions per leaflet ranged from one to 35. Small necrotic spots on the adaxial leaflet surface were the first sign of disease. Lesions enlarged and often exceeded 10 mm in diameter. Lesions were visible on both adaxial and abaxial surfaces. Conidiophores and conidia were produced sparingly on both surfaces. The pathogen could be readily isolated from necrotic lesion tissues. Morphological comparisons of the leafspot *Botrytis* and isolates of the Botrytis blight fungus (known to be caused by *B. cinerea*) showed that sclerotial production was similar between the two isolates; however, conidial production in culture was sparse in isolates of the leafspot *Botrytis*. Electrophoretic and isoenzyme assays were employed to define relationships among isolates. A mycoparasite, *Gliocladium* sp., was constantly associated with leafspot isolates of *B. cinerea*. In culture, *Gliocladium* parasitized conidiophores, conidia, and sclerotia of the leafspot Botrytis and the foliage blight isolate.

Tilt[R] Use in Southwest Peanut Health Programs. A. McMAHON*, C. PEARSON, B. W. MINTON and H. R. SMITH. Plant Protection Division, Ciba-Geigy Corporation, Greensboro, NC 27419

TILT 3.6E (propiconazole) is a broad spectrum, systemic fungicide with curative and protective activity against numerous fungal species, including several pathogenic fungi of peanuts. Chemistry, toxicology, mode of action and physical properties are identified. TILT incorporated into a planned Plant Health Program will improve the control of peanut diseases. TILT has activity against Cercospora arachidicola, Cercosporidium personatum and Sclerotium rolfsii. Foliar sprays at 2.5 and 4.0 fl oz/A will provide effective control of early and late leaf spot, respectively. With infections at the basal portion of the plant, S. rolfsii is more difficult to monitor and control. Dense foliage can impede fungicide penetration and placement at the infection site. Applications by chemigation and foliage canopy openers have proven beneficial in placing fungicides at the infection court (site). TILT performance in Oklahoma and Texas, methods and schedules of application, seasonal use strategy, and pending registration will be discussed.

Utilizing a Sterol Demethylation Inhibiting Fungicide in a Predictive Spray Schedule to Manage Foliar and Soilborne Diseases of Southern Runner Peanut.

T. B. BRENNEMAN* and A. K. CULBREATH. Dept. of Plant Pathology, Coastal Plain Experiment Station, Tifton, GA 31793.

The development of forecasting systems such as AUPNUTS is resulting in fewer sprays to manage foliar peanut diseases. Additionally, the use of sterol demethylation inhibiting (DMI) fungicides allows growers to manage foliar and soilborne pathogens with one chemical. To prevent fungicide resistance, DMI's are used in conjunction with chlorothalonil, a protectant. This study evaluated eleven programs utilizing chlorothalonil (1.12 lb/A) and/or tebuconazole (0.225 lb/A) applied according to growers' schedules or AUPNUTS. In 1991 and 1992, five and eight sprays, respectively were applied according to AUPNUTS versus seven and eight in 1991 and 1992, respectively on the 14-day grower schedule or five on the 21-day schedule. The mean percent control of leafspot with chlorothalonil for both years was 59, 41 and 52% for the 14-day, 21-day and AUPNUTS schedules, respectively. Schedules including tebuconazole utilized 2 to 4 sprays of the DMI in 1991 and 2 to 6 DMI sprays in 1992. The mean percent control of leafspot for each treatment utilizing tebuconazole ranged from 49-69% and the percent control of white mold (Sclerotium rolfsii) ranged from 49-69% versus 26% in a standard program of chlorothalonil on a 14-day schedule plus PCNB (5.0 lb ai/A) applied at pegging. Due to severe nematode damage in 1991, only 1992 yield data are reported. Plots treated with chlorothalonil applied on the 14-day, 21-day and AUPNUTS schedules yielded 4465, 3572 and 3949 lb/A, respectively. Where PCNB was used plots yielded 4392 lb/A and tebuconazole treatments produced yields ranging from 4450-5184 lb/A. Plots receiving no fungicide were 92 and 90% defoliated in 1991 and 1992, respectively and yielded 2744 lb/A in 1992. Differences in efficacy of tebuconazole were observed according to timing of application and those schedules with more tebuconazole applications resulted in less white mold and higher yields than schedules with few or no tebuconazole sprays.

TILT: Disease Control in Southeastern Peanuts.

J.M. HAMMOND*, P.C. KENNEDY, and C.A. PEARSON, CIBA Plant Protection, Greensboro, NC.

Propiconazole, the active ingredient of TILT, is a broad spectrum fungicide which has shown good efficacy against the major fungal pathogens of peanut in the southeastern United States. Data summaries will be presented which demonstrate the activity of TILT against Cercospora arachidicola, Cercosporidium personatum, and Sclerotium rolfsii. Registration status, labeling, and projected use patterns will be discussed.

Evaluation of Groundnut Foliar Diseases in Yield Loss in Guinea.

N. B. TOUNKARA*, S. DOPAVOGUI AND M. R. CAMARA. Centre De Recherche Agronomique, De Foulaya, Republique De Guinee.

Foliar diseases notably leaf spot and rust are main constraints in groundnut production in Guinea. Also to estimate their economical importance to engage or not the struggle against diseases, evaluation trials were conducted in the field in 1990, 1991 and 1992 in two places in the country (Foulaya and Forecariah). A split-plot design were used with two factors: the first factor is fungicide treatment with two levels (A1 or no plot treatment and A2 or plot treatment with Corvet CM). The second factor with six levels consisted of the varieties: 28-206, 55-437, 47-16, ICGA 11, ICG (FDRS) 4 and ICG (FDRS) 10. Fungicide treatments were applied every 10 days from 30 days after sowing at 2 kg per hectare. In 1990, the yield loss caused by foliar diseases are higher: 40.62% of pod and 32.05% of bio-mass in Foulaya Center. At the same time, the losses were 31% and 21% respectively of pod and biomass in Forecariah. For 1991, the pod yield losses are 43.2% and 24.39% and 36.88% and 39.54% for biomass respectively in Foulaya and Forecariah. However in 1992, the yield losses are lesser for all places. They were 31% for pod and 25.83% for biomass in Foulaya; in Forecariah, the losses are smaller and were 18% and 23% respectively for pod yield and biomass. In general for all three years in Foulaya the losses means are 38.27% in pod yield and 31.59% in biomass. However, they were 21.13% and 31.18% respectively for pod yield and biomass in Fodecariah.

Relationship Between Field Incidence of Sclerotinia Blight and Seed Infection of Peanut with Sclerotinia minor.

H. A. MELOUK*, J. P. DAMICONE and K. E. JACKSON, USDA-ARS, and Department of Plant Pathology; J. R. SHOLAR, Agronomy, M. E. PAYTON, Statistics, Oklahoma State University, Stillwater, OK 74078.

Pods of Spanish and runner peanuts were sampled 7-10 days prior to digging from commercial fields, Caddo County, OK, infested with *Sclerotinia minor* in 1990, 1991 and 1992. Field sites were classified for incidence of sclerotinia blight as low (<5% infection, moderate (>5 to <20%) or high (>20% infection). Four samples, consisting of all plants within a 3-m row segment, were taken each year from two field sites of Spanish and runner cultivars that represented the three disease incidence classes. Pods were removed from plants in the field either by hand or a stationary thresher. Pods were dried at about 27 C to ca. 10% moisture and seeds were shelled by hand. Two hundred fifty seeds from each sample of Spanish (retained on 15/64 inch screen) and runner (retained on 17/64 inch screen) peanuts assayed for infection by *S. minor* by plating on potato-dextrose-agar amended with streptomycin sulfate (100 mg/L) as previously described (Plant Dis. 74:216-219). Slope coefficients (*b*) of rank correlation between disease incidence in the field and the level of seed infection over the three years were 0.47 (*p*=0.0035) and 0.61 (*p*=0.0036) for Spanish and runner cultivars, respectively. All of the seed, sampled from the low disease incidence field sites, of both Spanish and runner peanuts were negative for *S. minor*. Results indicate that seed infection increases with field infection but that seed infection does not significantly differ between fields with a moderate and high incidence of sclerotinia blight.

Resistance to Southern Stem Rot in Selected Peanut genotypes and yield effects. F. M. SHOKES*, D. W. GORBET, and D. A. KNAUFT. North Florida Research and Education Center (NFREC), Quincy, FL 32351; NFREC, Marianna, FL 32446; and University of Florida, Gainesville, FL 32611.

Twelve peanut (*A. hypogaea* L.) genotypes, including five cultivars and seven advanced breeding lines, were tested at two locations for the effects of southern stem rot on pod yields. Eleven of the genotypes had shown evidence of stem rot resistance in an least two screening tests in 1991. Genotypes had been screened by inoculating individual plants with a sclerotia-agar-plug. The cultivar Florunner was used as a susceptible check. Equal parts of three virulent isolates of *Sclerotium rolfsii*, grown on autoclaved oat seed and mixed with equal parts cracked corn and rolled oats, were applied to two rows of the 4-row plots. The other two rows were kept relatively disease free by two applications of thifluzamide at 0.5 lb ai/A. Assessments were made of disease loci pre-harvest, number of infected plants inverted at harvest, disease severity (1-5 scale), and pod yield. The most resistant genotypes were UF81206-2-Z16-62-B, a runner type, and UF79X4-6-2-1-1-b3-B-21-b2-B, a Virginia type. Yield losses to stem rot for the cultivars were: Florunner 61%, Marc I 40%, Andru 93 39%, Southern Runner 34%, and Early Bunch 32%. The most resistant runner line had a yield loss of only 24% and the most resistant Virginia line lost 22%. Yields of the diseased sub-plots ranged from 1934 kg/ha for Florunner to 4739 kg/ha for the most resistant Virginia line. Implications of these data are that significant progress has been made by selecting for resistance to southern stem rot using the screening method in which individual plants were inoculated.

Peanut Serendipity - A Case for Genetic Diversity. J. S. KIRBY*, H. A. MELOUK, D. J. BANKS, T. E. STEVENS, JR., K. E. JACKSON, J. R. SHOLAR, and J. P. DAMICONE. Dept. of Agronomy, USDA-ARS, and Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

Breeding programs are continually faced with the dilemma of what to do with the numerous breeding lines that are developed, advanced through a series of evaluation trials, and found to be "good", but "not quite good enough" for release. New varieties must be comparable with current varieties in most traits, and improved in one or more traits, to have any chance of succeeding commercially. It is also understood by people in variety development that a newly developed line, a potential new variety, can only be evaluated in relation to the factors and conditions to which it was exposed during the generations of selection and testing. The Oklahoma peanut breeding program has many "good" lines that were exposed to various stress factors during their development. Although these lines were not quite "good enough" for release, they have been retained in the working collections, probably because of our conservative nature. In the mid-80's, Sclerotinia blight was rapidly becoming a devastating disease in Oklahoma. Beginning in 1990, lines in our program were planted on the Caddo Research Station in an area which was heavily infected with *Sclerotinia.* As serendipity would have it, apparent resistance to *Sclerotinia* was exhibited by a few of the lines screened. Some of these were derived from a cross of Comet X Florunner, made several years previously by Dr. D. J. Banks, USDA-ARS Retired. Neither Comet nor Florunner were known to have any usable level of resistance, although much more susceptible varieties are known. After two years of replicated tests, the line OK-CF83-126 appeared to have the best combination of *Sclerotinia* resistance and other agronomically desirable traits. In a 4-rep test in a heavily *Sclerotinia* infected area in 1991, the 126 line averaged 4258 kg/ha compared with 1787 and 1608 kg/ha for Florunner and Okrun, respectively. In 1992, the 126 line yielded 84% and 30% above the averages of Florunner and Okrun in heavily and moderately infected areas, respectively, while yielding intermediate to the two in a very lightly infected area. Line 126 was planted in plots where a new and effective fungicide was being evaluated for its efficacy on *Sclerotinia*. The yield for untreated 126 equalled that of Florunner + the best chemical treatment. Line 126 has slightly smaller seed, but grades slightly higher than Florunner and Okrun. The discovery of *Sclerotinia* resistance where it was not expected is a case of serendipity, and the excellent performance of OK-CF83-126, when exposed to *Sclerotinia*, supports the maintenance of the genetic diversity in these previously "good", but "not quite good enough" lines.

MONCUT® - A New Fungicide For Control Of *Sclerotium rolfsii* And *Rhizoctonia solani* In Peanuts.

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NOR-AM Chemical Company, Wilmington, DE 19803

MONCUT® (flutolanil) is a new benzanilide fungicide for control of southern stem rot (SSR), *Sclerotium rolfsii*, and limb rot/pod rot, *Rhizoctonia solani*, in peanuts, *Arachis hypagaea*. MONCUT has been extensively field tested during the past eight years in all peanut growing areas where SSR and limb rot/pod rot are important peanut disease problems. During this development period, rate, timing and method of application have been determined for use of MONCUT in peanuts. Applied at 1-2 lb ai/A 60-70 days after planting (DAP), MONCUT provided very effective control of SSR. Average peanut yield increases with MONCUT applied at 1 lb ai/A in ten trials each in Alabama and Georgia over a six year period were over 900 pounds per acre higher than the untreated control, and 366-734 pounds per acre more than treatments with PCNB, PCNB-Mocap or Lorsban. Under heavy disease pressure, or under prolonged conditions for disease development, MONCUT at 2.0 lb ai/A 60-70 DAP, or MONCUT at 1.0 lb ai/A 60-70 DAP followed by a second 1 lb ai/A about 30 days later, have given better control than a single 1 lb ai/A application. In trials where both SSR and limb rot/pot rot were limiting diseases, the 1.0 lb ai/A repeat application has been particularly effective. Field trial results show the most effective application method for control of both SSR and limb rot/pod rot is to apply MONCUT as a broadcast foliage spray with equipment commonly used to apply leafspot fungicide treatments. MONCUT may be applied in tank mix with chlorothalonil leaf spot spray treatments. Data from field trials show MONCUT is compatible with chlorothalonil in tank mixes, with no adverse or positive effects from chlorothalonil on SSR control by MONCUT, or no effect from MONCUT on leafspot control by chlorothalonil.

Vertical Distribution of Sclerotia of *Sclerotinia minor* before and after Moldboard Plowing in a Soil Planted to Peanut.

K. E. JACKSON*, and H. A. MELOUK. Dept. of Plant Pathology and USDA-ARS, Oklahoma State University, Stillwater, OK 74078-9947.

To determine the vertical distribution of sclerotia of *Sclerotinia minor*, soil samples were taken at various depths in spring of 1991 and 1992 from a field infested with *S. minor* located at the Caddo Research Station near Ft. Cobb, OK and continuously cropped to peanut (cv. Okrun). Incidence of Sclerotinia blight at harvest was 39.5% and 66% from crop years 1990 and 1991, respectively. Soil samples (700 g) were taken from 10 and 12 random sites within a 1500 m^2 area in 1991 and 1992, respectively. Samples were taken at three depths: 0 - 8 cm, 8 - 20 cm, and 20 - 30 cm from the same sites both before and after moldboard plowing. The depth of moldboard plowing was approximately 30 cm. Sclerotia were extracted from air-dried soil samples by wet sieving (Plant Dis. Reptr. 63: 349-351). Viability was determined by plating surface-disinfected sclerotia-like bodies on potato dextrose agar containing 100 mg/ml of streptomycin sulfate. Viable sclerotia of *S. minor* were recovered from the entire plow layer before and after moldboard plowing. Prior to moldboard plowing in 1991, the highest sclerotial density was in the upper layer and lowest in the bottom layer. After moldboard plowing, sclerotial density increased with depth. Prior to moldboard plowing in 1992, the highest sclerotial density was also in the upper layer, however the highest sclerotial density was in the middle layer following moldboard plowing. In both years, viable sclerotia of *S. minor* were found at all depths of the plow layer and moldboard plowing decreased the number of viable sclerotia in the surface layer by 77% and 51% in 1990 and 1991, respectively.

Beneficial Effect of Bahia Grass on the Yield of Florunner Peanut Grown in Soil Infested with *Rhizoctonia solani* AG-4. D. K. BELL* and D. R. SUMNER, Plant Pathology, Coastal Plain Experiment Station, Tifton, GA 31793-0748.
A 25-30 cm deep natural profile of Fuquay loamy sand in field microplots (MP) (0.9 m diam) was fumigated with 424 L/ha of metam sodium in 4.3 ha cm of water. Three wks later the MP were infested (1:1000 v/v) with 3% w/w corn meal-sand inoculum of a *Rhizoctonia solani* AG-4 isolate that was highly virulent to peanut. Six plants were grown 135 days in the MP, harvested and the vines + pods, attached pods, loose sound pods and loose rotten pods were dried to 10% moisture and weighed. Treatments were bahia, peanut, peanut, peanut; bahia, bahia, peanut, peanut; bahia, bahia, bahia, peanut; and continuous peanut, 1988-1991. Only bahia roots were returned to the soil. In 1989, there were no differences (P=0.05) in yields of vines (V), pods + vines (VP), attached pods (AP), loose sound pods (LSP) and loose rotten pods (LRP), with peanut after one yr bahia vs one year in peanut. In 1990, yields of V (988 g), VP (1580 g) and AP (592 g) after two yrs bahia were greater than yields after one yr bahia + one in peanut (V=433 g; VP=783 g; AP=350 g); or two in peanut (V=498 g; VP=900 g; AP=403 g). There were no differences with LSP and there were more LRP after two yrs bahia (15 g) than after two in peanut (2 g). In 1991, yields of V (1100 g), VP (1778 g) and AP (678 g) after three yrs bahia were greater than yields after one yr bahia + two in peanut (V=719 g); VP=1093 g; AP=374 g); two yrs bahia + one in peanut (V=845 g; VP=1213 g; AP=368 g); or three yrs peanut (V=589 g; VP=975 g; AP=386 g). There were no differences with LSP and there were more LRP after two yrs bahia (58 g) than after one yr bahia + two in peanut (23 g). The beneficial effect of bahia grass on the yields of peanut V, VP, and AP produced in soil infested with a highly virulent isolate of *R. solani* AG-4 was evident after one yr in bahia and became increasingly more pronounced after two and three yrs in bahia. The weight of LSP was reduced the first yr after two yrs bahia, but increased the next year. Conversely, the yields of V, VP and AP were increased the first yr after two yrs bahia, but decreased the next yr. Thus, the beneficial effect of bahia was strongest the first yr out of bahia and in peanut and decreased thereafter, but some beneficial effect to peanut was noted two yrs out of bahia.

Relationship Between Symptoms on Testae of Peanut (*Arachis hypogaea*) and Isolation of *Cylindrocladium crotalariae* from Seed and Plants. B.L. RANDALL-SCHADEL*, J.E. BAILEY, M.K. BEUTE, and F.E. DOWELL, NC Dept. Agri., Raleigh, NC 27611; NC State Univ., Raleigh, NC 27695-7616; and USDA-ARS, Dawson, GA 31742.
Seed from three peanut cultivars (NC 9, NC 10C, NC-V11) were harvested from plots in a *Cylindrocladium crotalariae* infested field. The number of colonies of *C. crotalariae* isolated on CBR-selective medium was compared to nine categories of symptoms. Symptom categories were not equally associated with isolation frequencies. More colonies were isolated from seed with cinnamon brown "speckles" than from seed without speckles (P=0.0001). Spectral analysis of reflected light (500-700 nm) indicated reflectance curves of speckled seed tended to be the flatter in slope and have lower relative reflectance than symptomless seed. Preliminary data indicate speckled seed can be separated by electronic eye sorting.
Speckled seed were hand-picked out of bins of commercially conditioned peanut seed (NC 7, NC 10C). Seed of cultivar NC-V11 were not speckled. The seed of each cultivar were divided into two subsamples: one subsample was treated with Vitavax seed treatment. Seed were planted in fumigated (methyl bromide) raised flat field beds covered with black plastic. Seed of each cultivar-treatment combination were planted, 100 per plot in four replications in a completely randomized block design. Untreated seed were also plated on CBR-selective media: 10%, 15% and 0% positive isolations were observed for NC 10C, NC 7 and NC-V11, respectively. In the field plots only two plants were symptomatic and had positive isolations for *C. crotalariae* (one each from untreated seed of NC 7 and NC 10C), indicating a low transmission rate from speckled seed (0.25%). No symptomatic plants with positive isolations occurred with treated seed.

Parasitism of Peanut by *Meloidogyne javanica* in Egypt. J. L. STARR*, M. A. M. KHALIL, A. R. A. EL DEEB and E. K. TOMASZEWSKI. Dept. Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843; and Onion and Oil Crops Section, Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt.

During a limited survey of three peanut production areas of Egypt, 14 populations of root-knot nematodes were collected. Each population was identified to species by examination of perineal pattern, morphometrics of second-stage juveniles, esterase and malate dehydrogenase isozyme phenotypes, and by restriction fragment length polymorphisms of mtDNA sequences amplified by the polymerase chain reaction. All populations were identified as *Meloidogyne javanica* based on correspondence with reported species characteristics for all parameters measured, except for esterase isozyme phenotype. Individuals from three populations from one location exhibited two esterase isozyme phenotypes; some individuals exhibited the three-isozyme phenotype characteristic of *M. javanica* whereas other individuals exhibited a two-isozyme phenotype which lacked the fastest migrating isozyme from the three-isozyme phenotype. All populations of *M. javanica* collected from peanut in Egypt reproduced on the *M. arenaria*-susceptible peanut cultivar 'Florunner' in greenhouse tests, producing 820 to 7,220 eggs/g root, but produced less than 50 eggs/g roots on the *M.arenaria*-resistant genotype TP-135-4. These data confirm previous reports of *M. javanica* as a parasite of peanut is some regions of the world and provide evidence that sources of resistance to *M. arenaria* currently being developed will be effective also in the management of *M. javanica* populations that are parasitic on peanut.

Microplot evaluations of resistance to *Meloidogyne arenaria* in *Arachis hypogaea, A. cardenasii, A. chacoense* and genotypes derived from a cross of *A.hypogaea x A. cardenasii.* B.B. SHEW*, H. T. STALKER, and M. K. BEUTE**. Departments of Crop Science and Plant Pathology**, North Carolina State University, Raleigh, 27695-7616.

Twelve peanut genotypes were evaluated in field microplots for resistance to *Meloidogyne arenaria* in 1991 and 1992. Five of the test entries were derived from a cross of PI 261942 (susceptible) x *Arachis cardenasii*. *A. cardenasii* is a diploid species with partial resistance to *M. arenaria*. The parental lines and a second diploid species, *A. chacoense* (NC 10602), also were included. Additional lines evaluated were PI 259572, PI 259639, NC 18000, and the susceptible cultivar Florunner. Microplots were fumigated with methyl bromide (1991) or metham-sodium (1992) before planting. Calibrated suspensions of freshly-extracted nematode eggs were used to infest plots in each year. Nematodes were extracted and counted from soil samples taken twice in each year. At digging, pods and roots were rated visually for nematode damage, and roots were removed for further assay. Roots were washed, weighed, and processed for extraction of eggs. In 1991, 4 of the 5 entries from the interspecific cross had ratings and transformed counts of eggs/g root, eggs/root system, and nematodes/500 ml soil less than or equal to those for the resistant wild parent, *A. cardenasii*. All counts and ratings were significantly less than for the susceptible parent. In 1992, 2 of the 5 entries had egg counts less than or equal to the wild parent and 3 of the entries had significantly smaller counts than the susceptible parent. Florunner and NC 18000 were highly susceptible and PI 259572 and PI 259639 were intermediate in both years. *A. chacoense* consistently appeared slightly more resistant to *M. arenaria* than *A. cardenasii* although differences were not significant.

Fall Application of 1,3-D for Control of Root-knot Nematode. P.S. KING*, R. RODRIGUEZ-KABANA, D. G. ROBERTSON, and L. W. WELLS. Department of Plant Pathology, Auburn University, Alabama Agricultural Experiment Station, Auburn, Alabama 36849-5409.

The efficacy of post-harvest fall application of 1,3-D for control of *Meloidogyne arenaria* and yield response of 'Florunner' peanut (*Arachis hypogaea*) was compared with that of pre-plant spring application of the fumigant. The study was initiated in 1991 in a field at the Wiregrass substation, near Headland, Alabama, that had been in peanut for at least 3 years and was heavily infested with the nematode. Fall in-row injection of the nematicide at 84 L/ha resulted in increased yield over the no treatment control and in higher yield than that obtained with spring application of the material at the same rate. Fall or spring application of 1,3-D at 56 L/ha had no effect on yield. Combination of fall-injected 1,3-D at 84 L/ha followed by at-plant application of aldicarb [30 g. a.i./100 m row in a 20-cm-wide band with light incorporation (2-3 cm) into the soil] did not improve yield over what was obtained with the fall treatment singly. The use of aldicarb alone had no effect on yield. The only treatments that suppressed numbers of *M. arenaria* juveniles, determined near harvest time, were those with 1,3-D.

Velvetbean for the Management of Root-knot in Peanut. C.F. WEAVER*, R. RODRIGUEZ-KABANA, D.G. ROBERTSON, and L.W. WELLS. Department of Plant Pathology, Auburn University, Alabama Agricultural Experiment Station, Auburn, Alabama 36849-5409.

The value of velvetbean (*Mucuna deeringiana*) as a rotation crop for control of root-knot nematode (*Meloidogyne arenaria*) in 'Florunner' peanut (*Arachis hypogaea*) was studied in a field experiment initiated in 1990 at the Wiregrass substation, near Headland, Alabama. The field had been in peanut for the preceeding 10 years and was heavily infested with the nematode. Plots in the experiment were 10 m long and 8-rows wide set on a 91-cm row spacing. There were 8 replications (plots) per treatment arranged in a randomized complete block design. Treatments in the experiment were: peanut monoculture without nematicide [P(-)]; peanut monoculture with the nematicide aldicarb [P(+)]; and peanut without nematicide following 2 years of velvetbean (V-V-P). Aldicarb was applied at-plant in a 20-cm- wide band with light incorporation (2-3 cm) into the soil. Each year the field was kept fallow during the winter. In 1992 peanut yields obtained with the V-V-P rotation were 18.4% higher than the yields obtained with P(-); the P(+) system resulted in a 12.8% increase in yields over that obtained with P(-). There were no significant numbers of *M. arenaria* juveniles in soil with the V-V-P system in the years (1990, 1991) when velvetbean was planted; however, in 1992, when peanut was planted in these plots, numbers of the juveniles determined at harvest time were higher in V-V-P plots than in those with monoculture [P(-) and P(+)]. The V-V-P rotation had no effect on the incidence of southern blight (*Sclerotium rolfsii*) in peanut.

Soybean-Peanut Rotations for the Management of Nematode Problems in Peanut. D.G. ROBERTSON*, R. RODRIGUEZ-KABANA, AND L.W. WELLS. Department of Plant Pathology, Auburn Universitiy, Alabama Agricultural Experiment Station, Auburn, Alabama 36849-5409.

The value of 'Kirby' soybean as a rotation crop for the management of root-knot nematode (*Meloidogyne arenaria*) in 'Florunner' peanut was studied for seven years (1985-1992) in a field experiment at Wiregrass substation, near Headland, Alabama. The field had been in peanut and winter fallow for the preceeding five years and was heavily infested with the nematode. The experiment contained the following treatments: 1. peanut monoculture with no nematicide [P(-)]; 2. peanut monoculture with at-plant application of nematicide [P(+)]; 3. soybean with no nematicide followed by peanut with no nematicide [S(-)-P(-)]; 4. soybean with nematicide followed by peanut without nematicide [S(+)-P(-)]; 5. soybean with no nematicide followed by peanut with nematicide [S(-)-P(+)]; 6. soybean with nematicide followed by peanut with nematicide [S(+)-P(+)]. Aldicarb nematicide was applied in a 20-cm-wide band at 20 gm a.i./100 m row. Every year the field was left fallow in winter. There were eight replications (plots) per treatment in a randomized complete block design. A plot was eight rows wide and ten m long with an area of 73 m^2. S(-)-P(-) and S(-)-P(+) rotations did not differ in peanut yield but both rotations resulted in higher yields than the yield obtained with P(-). Highest peanut yields in the experiment were obtained with the S(-)-P(+) and S(+)-P(+) rotations which were superior to the yield obtained with P(+). There was no advantage in peanut yield for the S(+)-P(+) system over the S(-)-P(+) system. When all plots were in peanut all treatments in the experiment resulted in end-of-season numbers of *M. arenaria* juveniles > 100/cm^3 soil and there were no differences among treatments in numbers of juveniles in soil.

Primary Spread of Tomato Spotted Wilt Virus on South Texas Peanut. V.K. LOWRY*, J.W. SMITH, JR., Department of Entomology Texas A&M University, College Station, Tx. 77843-2475, & F.L. MITCHELL, Texas Agricultural Experiment Station, Rt. 2 Box 00, Stephenville, Tx. 76401.

Tomato Spotted Wilt Virus (TSWV) has been a major problem to peanut producers in south Texas since 1985, when the virus reached epidemic proportions. Both a primary and secondary spread of the virus by thrips vectors appears important. Adult and immature thrips were collected from peanut terminals in a "temporal window" from 1-10 days after cracking, to identify the thrips species responsible for primary spread and to estimate proportions of immigrant thrips contaminated with TSWV in cultivated and volunteer peanut. In the laboratory thrips were removed from peanut terminals, identified and individually assayed via a Double Antibody Sandwich Enzyme-Linked ImmunoSorbent Assay (DAS-ELISA) for the presence of TSWV. Tobacco thrips were the most abundant species present (77%) and the dominant thrips contaminated with TSWV (71%). Western Flower Thrips (WFT) comprised 19% of the total thrips population but only a single thrips was confirmed as contaminated with TSWV. The proportion of thrips determined positive by the DAS-ELISA was 1.58%, and these thrips are considered responsible for the initiation of the primary spread of TSWV in south Texas peanut fields.

Interplot Interference in Field Experiments with Spotted Wilt Disease of Peanut.

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Spotted wilt, caused by tomato spotted wilt virus, occurred sporadically throughout the USA peanut belt in the last decade. South Texas growers experienced periodic yield loss but some states had non-damaging levels. The most severe epidemics in South Texas occurred when Florunner was the standard cultivar, in seasons that followed above average autumn rainfall, and in areas where the TSWV hosts potato and spinach were grown in winter. Replicated two-row plots have been used in South Texas since 1986 to rank cultivars and breeding lines for partial resistance to TSWV with no regard for interplot interference. More information was needed in order to design efficient disease screening nurseries for small segregating populations and to understand the area-wide impact of partial resistance. A split-plot design with four replications was used in a 1992 experiment near Jourdanton. Three cultivars were assigned in all possible combinations to main plots (background, 36 x 108 ft outside dimensions) and sub-plots (tester, 6 x 36 ft, end to end in the center of each main plot). Cultivars were highly resistant Southern Runner, moderately resistant GK-7, and highly susceptible Tamrun 88. Spotted wilt was rated in the center 16 ft (10 ft border on each end) of the two tester rows at 26, 41, 61, 81, 118 and 136 days after planting. Ratings were the percent of row feet with symptoms of TSWV infection and included leaf symptoms in terminals, systemic yellowing, wilting, and plant death. Spotted wilt disease was significantly affected ($P \leq 0.01$) by both tester and background cultivars at 136 days after planting. The background x tester interaction was not significant at any date. Final spotted wilt ratings within backgrounds of Southern Runner, GK-7 or Tamrun 88, respectively, were 8, 14, and 23 for Southern Runner tester plots; 10, 14, and 35 for GK-7 tester plots; and 34, 37, and 54 percent row feet for Tamrun 88 tester plots. These data support a secondary spread hypothesis that spotted wilt inoculum originates primarily from other peanut plants. Growers in Atascosa and Frio Counties have apparently reduced area-wide risk from spotted wilt by adopting moderately resistant GK-7. A successful 1992 field selection nursery near Pearsall with 74 $F_{2:3}$ single row families utilized one row of highly susceptible Tamrun 88 between every family row to elevate disease levels and increase disease uniformity throughout the nursery.

Field and Microplot Investigation of Surface Plant Debris and Incidence of Three Soil-Borne Pathogens. L.M. FERGUSON*, M.K. BEUTE, G. NADERMAN, and J. HOLLOWELL. North Carolina State University, Raleigh NC 27695-7616.

Microplot tests were used to evaluate occurrence of disease in relation to surface debris. Soil in each 0.5 m^2 plot was infested with one of three fungal pathogens: *Cylindrocladium crotalariae*, *Sclerotium rolfsii*, or *Sclerotinia minor*. Two inoculum densities of each pathogen were established. Comparisons were made between two peanut cultivars, NC 7 and NC 10C. Wheat straw was applied to selected microplots, simulating 85-90% soil surface coverage. Disease incidence data were collected bi-weekly for each microplot. Field studies were also conducted at two different locations using cultivars NC 7 and Florigiant. Five basic tillage factors: no-till, sub-soiling, ro-till, discing, mold-board plow, were combined into seven different tillage treatments in order to study the influence of tillage practices and surface debris on the incidence of these three diseases. Numbers of dead and dying plants with each disease were counted for each plot. In the microplot studies Sclerotinia blight was reduced by the addition of wheat straw particularly at high inoculum densities of *S. minor*. Debris influence on stem rot was not as clear. Data suggest minimal influence of debris on *S. rolfsii* at both high and low inoculum densities in NC 10C. With NC 7, the data indicated enhancement of stem rot by debris at both inoculum levels. We were unable to determine any effect on *C. crotalariae* specifically related to surface debris. Due to variability in the data from field plots, we were unable to draw conclusions about relationships of tillage to incidence of *C. crotalariae*, *S. rolfsii*, and *S. minor*. However, differences in yields and in quality of the crop appeared to be a function of disease onset and/or severity when comparing conventional tillage to reduced tillage in preliminary tests.

PLANT PATHOLOGY/MYCOTOXINS

Relationship between the Lesser Cornstalk Borer and *Aspergillus flavus* Invasion of Peanut Seed K.L. BOWEN* and T.P. MACK. Auburn University, AL 36489-5409.

Trials were conducted in 1990, 1991 and 1992, to evaluate the occurrence of lesser cornstalk borer (LCB) larvae and infection of peanut seed with *Aspergillus flavus*. Data from 1990 indicated a clear relationship between pod scarification by LCB and seed invasion with aflatoxigenic fungi. Therefore the risk of aflatoxin-contamination of peanut can be assessed based on damage from LCB. Control of LCB can be timed based on an environmental variable called 'LCBDays', which can be used to aid in scouting decisions. It is the sum of hot, dry days minus the number of cool, wet (< 35 C and $\geq$0.1 inch rain) days from planting. When LCBDays is positive, it is likely that a damaging population of LCB is present. Since LCB have been linked to seed invasion by *A. flavus*, LCBDays may also forecast potential aflatoxin problems. During August of 1990, LCBDays became increasingly positive as did the incidence of developing peanut pods found to be infected with aflatoxigenic fungi. In 1991 and 1992, LCBDays remained negative during most of the growing season and less than 12% of peanut seed were infected with aflatoxigenic fungi.

Effect of Inoculation with a Mixture of *Aspergillus flavus* and *A. parasiticus* on Peanut Seed Germination. D. M. WILSON*, D. K. BELL, B. D. EVANS, and C. C. HOLBROOK, UGA, Plant Pathology, USDA-ARS, Agronomy, Coastal Plain Station, Tifton, GA

Seed from forty-seven peanut genotypes were germinated at 30 C with and without A. flavus/A. parasiticus inoculation. The genotypes represented the range from potentially resistant to very susceptible to aflatoxin contamination, based on the literature or on previous observation. Six separate experiments were conducted in October, 1992, using seed produced in 1991. All seed were dusted with 15% active ingredient 2,6-dichloro-4-nitroaniline (about 250 mg per 50 seed) to control many fungi. The 2,6-dichloro-4-nitroaniline did not seem to affect the growth or sporulation of members of the A. flavus group. Twenty-five uninoculated seed of each genotype were germinated at 30 C using standard germination procedures and twenty-five seed of each genotype were individually wounded and inoculated with an aqueous mixture of A. flavus and A. parasiticus before germination. Each germination-paper roll contained five seed and the germination chambers were kept at 30 C for seven days before observation. After seven days, data on hypocotyl length, root length, normal germination, abnormal germination, and dead seed, as well as incidence of A. flavus group, A. niger group and other fungi were obtained by visual examination of the germinated seedlings. Inoculation with the A. flavus/A. parasiticus mixture did not affect hypocotyl length or root length. Nor did it affect the incidence of normal and abnormal germination. The only effect we observed in these experiments was the increased incidence of the A. flavus group. When seed were inoculated almost all had A. flavus sporulation at the site of the wound even though most seedlings appeared healthy. The growth of A. flavus in the cotyledon had little apparent effect on germination and plant vigor when seed were germinated at 30 C.

Molecular characterization and conservation of *verA*, a gene involved in aflatoxin production. J. KANTZ[1], T. H. ADAMS[2], N. P. KELLER*[1]. [1]Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843; [2]Department of Biology, Texas A&M University, College Station, TX 77843.

Aflatoxin (AF) and sterigmatocystin (ST) are the end products of a lengthy biosynthetic pathway found in *Aspergillus flavus, A. nidulans* and *A. parasiticus*. Both of these compounds are carcinogenic mycotoxins commonly found contaminating peanuts. Because these mycotoxins, especially AF, have been implicated as an etiological agent of human cancer, there is a great need to control AF/ST production. Rational control strategies can be best designed by understanding the molecular mechanisms regulating production of AF/ST in the causal fungi. Towards this end, we have identified a putative AF/ST gene cluster in *A. nidulans* and have characterized a gene, *verA*, proposed to encode an NADPH dependent ketoreductase involved in the conversion of versicolorinA to ST in the AF biosynthetic pathway. *Aspergillus nidulans verA* shares greater than 83% amino acid identity to the *A. parasiticus* homolog, *ver-1*, and is on a cosmid containing regions of similarity to two other putative genes in the ST/AF pathway. This high degree of genetic similarity between AF/ST genes in *A. nidulans* and *A. parasiticus* suggests that *A. nidulans*, a genetically accessible fungus, serves as an excellent *A. spp.* to study AF/ST regulation.

A Rapid Assay for Monitoring the Regulation of Aflatoxin Biosynthesis Using NOR Mutants. M. N. BEREMAND*, J. E. FAJARDO, and N. P. KELLER. Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843

A rapid assay for assessing the activity of the aflatoxin biosynthetic pathway in *Aspergillus* species is being developed to facilitate studies of associated control factors and mechanisms. This assay uses the production of the orange pigmented anthraquinone norsolorinic acid (NOR) by mutants blocked in aflatoxin biosynthesis. Since NOR is the earliest identified intermediate in the aflatoxin biosynthetic pathway, its production reflects the activity of regulatory controls that occur at or before the beginning of the aflatoxin pathway. Accumulation of NOR serves as an easy visual indicator to qualitatively identify compounds and environmental conditions that effect aflatoxin production. A simple one step extraction method can also be utilized to quantitatively measure NOR levels spectrophotometrically. These assays have many applications. The usefulness of these assays for determining the ability of different peanut genotypes to reduce or prevent aflatoxin production is being investigated.

PRODUCTION TECHNOLOGY

The Influence of Furrow Diking on Yields, Disease and Soil Moisture.

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A study was conducted in Georgia in 1992 evaluating the effectiveness of furrow diking under different irrigation nozzle types on a center pivot irrigation system. Furrow diking is an interrow tillage technique which forms small dikes in the furrow approximately every five feet. The small dikes restrict rainfall or irrigation water from flowing to a different location in the field. They were conventional low angle impact type sprinklers, low pressure spray nozzles on drops at truss rod height, and low pressure spray nozzles on drops at about 18 inches above ground. Nozzle configuration and furrow diking was replicated three times in the study. The soil moisture of each plot was monitored throughout the growing season with Water marks, one was placed at a depth of 8 inches and another at 16 inches. On the average the soil was drier in the diked plots than the non-diked plots. There may have been more water demand in the diked plots than the non-diked plots. There were some differences in yield between sprinkler types, but they are not statistically different at the .05 percent level. The differences in peanut yields between diking and not diking was not statistically different. However, the average yield increase due to diking of 180 pounds indicates that diking may be beneficial. The possibility of increased disease pressure due to soil movement when making dikes was another concern. The average number of White mold hits per 100 feet of row increased by 1.3. The average percentage of rhizoctonia limb rot increased by 2.8 %. Another study of the effects of diking on peanut yield was conducted at six different locations in Terrell county. Each field except one had three replications. Each replication consisted of 24 rows half of which were diked in every middle. The middle four rows of each plot were harvested to compare yields. The average plot yields for the diked and not diked plots was 3957 and 3836 pounds per acre. No statistical differences in yield occurred between the diked and not diked plots.

Soil Amendments for Peanut Production on Acid Soils of Burkina Faso, West Africa.

P. SANKARA*, O.D. SMITH, L.P. WILDING, L.R. HOSSNER, A.S. JUO, and M. OUEDRAOGO.

Peanut CRSP, University of Ouagadougou, and TropSoils, collaboration in Burkina Faso was initiated in 1991. Inventory of soil characteristics was conducted at six peanut experimental sites. Soil data base and classification has been completed. Subsoil (below 20 cm) acidity (pH 4.8) and/or Ca and P deficiencies were identified as possible production constraints at the Farakoba Station near Bobo-Dioulasso. Soil at the experimental site was classified as Ultisol (Typic Khanhapustults, clayey, kaolinitic, hyperthermic). A long-term collaborative experiment was initiated to evaluate several management options at the Farakoba site. The experiment includes five management treatments (gypsum, P, gypsum + P, ash, and control) and three peanut genotypes. First year results indicate that peanut seed yields were increased for two of three genotypes by application of ash. No significant yield responses were obtained from the application of phosphorus or gypsum. Plant analysis indicated that ash significantly increased the K and decreased the manganese concentration of peanut plants. Ash would also be expected to increase soil pH and provide trace elements that might be limiting.

Relation of Peanut Yield, Grade, Value, and Seed Germination to Placement, Timing, and Particle Size of Limestone. G. J. GASCHO* and W. R. GUERKE.

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Maintenance of adequate Ca in the pegging zone during pod development is an important aspect of producing a quality peanut crop in the sandy soils of the Southern Coastal Plain. Production of seed with acceptable germination is also well related to good Ca nutrition. Field research with cv. Florunner was conducted in four experiments in 1991 and 1992 to compare the effects of limestone turned down by a moldboard plow with incorporations in the upper 8 cm of soil prior to and following planting. Both finely divided and standard agricultural grade dolomitic limestones were incorporated as main plot treatments. Main plots were split by 'bloom gypsum' and 'no gypsum' subplots. The sites had Mehlich 1 extractable soil Ca levels from 35 to 143 mg/kg and soil pH levels from 4.9 to 5.9 prior to any limestone application. Limestone turned down was of no measured value to the peanut crop; as yield, grade, and seed germination were equal to where no Ca was applied. Preplant incorporated limestone increased yield, above values for no lime-no gypsum, in experiments with initial soil test Ca levels of 35, 36, and 65 mg/kg, but not where the original soil test was 143 mg Ca/kg. Grade, value, and germination percentage were increased by limestone incorporation in all experiments. Post plant incorporation of limestone (approximately 2 weeks following planting) resulted in yield, grade, and seed germination equal to incorporation just prior to planting. Finely divided incorporated limestone resulted in yield, grade, value and seed germination statistically equal to agricultural grade limestone. Application of bloom gypsum was always necessary for the greatest germination of seed produced, regardless of limestone application. Incorporation of limestone increased germination by 11% when no bloom gypsum was applied, but bloom gypsum application increased germination of seed produced by an additional 10% where limestone had been incorporated and by 20% where limestone was not applied.

Development of New Concepts for Cover Crops, Land Preparation, and Tillage for Peanuts.

JAMES I. DAVIDSON, JR.*, E. JAY WILLIAMS, MARSHALL C. LAMB, and CHRISTOPHER L. BUTTS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

During crop years 1980-1987, research studies demonstrated that a deep (1-1.2 m) healthy root system was very important to have the potential for making high yields, high quality peanuts and high economic returns. Conventional cover crops, moldboard plowing, excessive harrowing, heavy farm machinery, certain traffic patterns, and soil types often promoted shallow and unhealthy root systems. During crop years 1988-1992, several research studies were conducted to develop new concepts to solve those problems. Northern (Dakotas) dwarf rye varieties were introduced in the Southeast that solved problems with excessive rye litter and provided excellent root channels through the plowpan. These rye varieties (Dacold and Rymin) had much less vegetative growth but essentially the same root growth as the Southern adapted rye varieties. A penetrometer rod was developed that indicated when there was a need for subsoiling. A paratill implement (angled subsoiler) was found to be an excellent tool for minimizing erosion and for preparing deep root channels and a seed bed for conservation till. The paratill implement was also found to be the best tool for breaking the plowpan and diverting water to the root system on deep sandy type soils (Group I). A slit plow implement (thin, straight shank subsoiler) was found to be an excellent tool for medium to heavy type soils (Groups II, III and IV) in providing a deep lateral root system, reducing runoff, reducing the risk of drowning the root system, and in keeping the soil surface dry near the crown of the peanut root to minimize the risk of white mold and other soilborne diseases. In cooperation with personnel of the Georgia Cooperative Extension Service, U.S. Soil Conservation Service, a retired soil scientist and several expert farmers, a knowledge base was developed for TILNUT, an expert system for managing land preparation and tillage for peanuts. These new concepts and validation data will be discussed to promote cooperation and further research for improving peanut cover crops, land preparation, tillage, and economic returns.

Peanut Production Using Modified Conservational Tillage Methods in Virginia. F. S. WRIGHT* and D. M. PORTER. USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.

The yield and grade of peanuts (*Arachis hypogaea* L.) produced under conservational tillage practices were evaluated with changes in production operations. Past studies have shown peanuts produced in wheat residue yielded 16 to 20% less than peanuts produced conventionally. This study, conducted for three years, included adding to conservational tillage a cultivation 40 to 50 days after planting or doubling the rate of landplaster at pegging to improve peanut yield. Yield results between years were inconsistent. A trend indicated that cultivation or a 2x rate of landplaster may influence yield. During one year of the three-year study, yield of peanuts produced conservationally was comparable to the yield of peanuts produced conventionally. Results during the other two years could have been influenced by environmental conditions and heavy infestation of Sclerotinia blight, caused by *Sclerotinia minor* and Cylindrocladium black rot, caused by *Cylindrocladium crotalariae*.

Relationships Between Heat Units and Number of Growing Days with Peanut Yield and Market Grades. T. A. COFFELT* and R. W. MOZINGO. USDA-ARS and Virginia Polytechnic Institute and State University, Tidewater Agricultural Experiment Station, Suffolk, Virginia 23437.

Determining the optimum digging date is one of the most difficult decisions in peanut (*Arachis hypogaea* L.) production. The heat unit method has been one of the most widely used in Virginia. The objectives of this experiment were to determine if heat units and number of growing days were correlated with yield and grade factors of four cultivars. A 3-year field study was conducted at Suffolk, Virginia, using four planting dates and five digging dates in a randomized complete block split-split plot design with three replications. Cultivars were the split-split plots, planting dates the split-plots, and digging dates the whole plots. Cultivars were planted at four 10-day intervals beginning about 23 April and dug at five 10-day intervals beginning about 12 September. Optimum harvest date varied with cultivar. Heat units varied from about 2,000 to 2,900 with growing season, cultivar, and to a lesser extent planting date. Maximum yields occurred at 2600, 2650, 2700, and 2700 heat units for VA 81B, NC 9, NC 7, and Florigiant, respectively. VA 81B was the earliest maturing cultivar, NC 9 intermediate, and NC 7 and Florigiant the latest maturing cultivars. Results from this study indicate heat units are better than growing days for estimating digging date. However, we also observed that yields reached a maximum and declined in one of the years when heat units did not reach 2600. This indicates that other methods for determining effective heat units or other factors (i.e. soil temperature and/or rainfall) might be used with heat units in determining optimum harvest dates.

Peanut Cultivar Response to Planting Date and Harvest Date. J. P. BEASLEY, JR.*, E. J. WILLIAMS and J. A. BALDWIN. Dept. of Crop and Soil Sciences, The University of Georgia, Tifton, GA; USDA-ARS, NPRL, Dawson, GA and Dept. of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793.

Peanut yield can be greatly influenced by planting date and/or harvest date. Peanut seed are sensitive to soil temperature and soil moisture resulting in slowed germination and emergence when soil temperature at the 10 cm depth drops below 18°C. Lower quality seed are more susceptible to reduced germination and emergence when soil temperature is less than desirable. Pod maturity is slowed by cooler night temperatures, therefore late planting (after May 25th) of runner-type peanut is discouraged. Tests were conducted in crop years 1991 and 1992 evaluating new runner cultivars that matured earlier or later than 'Florunner' for response to different planting dates and harvest dates. One cultivar tested, 'Southern Runner' is slower in germinating and emerging, has less vigorous early season growth and is more susceptible to cool soil temperatures. In 1992, Florunner and Southern Runner were compared at three planting dates, April 6, May 5 and June 5. The test was conducted at the Sunbelt Agricultural Exposition Farm in Colquitt County, GA on a Stilson complex soil. Yield for both cultivars were highest at the May 5th planting. Southern Runner yield was significantly ($P=0.05$) less than Florunner at the June 5th planting. In a separate test at the Southwest Georgia Branch Experiment Station near Plains on a Greenville sandy clay loam, Florunner was compared to 'AT 127' and 'MARC I', two early maturing cultivars, for response to three harvest dates. Harvest dates were based on the hull-scrape method and designated as "Florunner Optimum", "10 days earlier than Florunner" and "20 days earlier than Florunner". In 1991 there was one planting date and in 1992 there were two planting dates. Previous observations were that AT 127 did not mature as early (7-10 days earlier than Florunner) as indicated in its initial release. Based on hull-scrape samples and yield response from tests in 1991 and 1992, AT 127 matured approximately the same as Florunner while MARC I was about 10 days earlier.

Comparison of Peanut Tillage Practices in Oklahoma. J.R. SHOLAR*, J.P. DAMICONE, B.S. LANDGRAF, J.L. BAKER, and J.S. KIRBY. Dept. of Agronomy and Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078 and Noble Foundation, Ardmore, OK 73402.

Field experiments were conducted from 1990 to 1992 to investigate the effects of three tillage treatments on peanut (*Arachis hypogaea* L.) pod yield, grade, and disease reaction for a spanish cultivar (Spanco) and a runner cultivar (Okrun). The experiment was conducted on a Minco fine sandy loam soil. The tillage treatments used were 1) conventional tillage, 2) minimum tillage, and 3) no tillage. A rye cover crop was established on the entire experimental area in October, 1989. This practice was repeated following peanut harvest in each subsequent fall of the experiment. Approximately 2 weeks prior to peanut planting, the rye crop was swathed, baled, and removed from the field. Glyphosate herbicide was applied to eliminate rye regrowth. Commercially available field implements were used to perform tillage operations. Conventional tillage plots were prepared using a moldboard plow followed by disking to prepare a smooth seedbed. Minimum tillage plots were prepared using a Lilliston Ro-Till® machine. No-tillage plots were established by planting directly into rye stubble. Cultivar by treatment interactions were observed for pod yield. For Spanco, minimum tillage plots produced yields equal to conventional tillage; however, no-tillage plots yielded 18% less than conventional tillage plots. There were no differences in grade due to tillage treatments. Gross returns followed the same trend as pod yields. Severity of early leafspot caused by *Cercospora arachidicola* was significantly higher in minimum tillage and no tillage treatments compared to conventional tillage. For Okrun, pod yields were 20% and 14% lower for no tillage and minimum tillage, respectively, compared to conventional tillage. Tillage treatments did not affect grade or early leafspot severity in the Okrun cultivar and gross returns followed the same trend as pod yields.

WEED SCIENCE

Experiences in Peanut Weed Control Utilizing Cadre Herbicide in Florida. D. L. COLVIN* and B. J. BRECKE. Agronomy Department, University of Florida, Gainesville, FL 32611-0500 and Agriculture and Research Center, Jay, FL.

Studies with Cadre herbicide have been conducted in Florida since early 1987 when AC-263222 was introduced as a material for Rubus control along highway rights of way. AC-263222 was included in initial peanut screening work in 1987 and showed extreme promise for Florida beggarweed, sicklepod, and hairy indigo. From initial studies during 1987, further screening work and subsequently more intense investigation with the use of this compound in peanuts has occurred. Studies conducted at the Jay Research Center in Jay, FL and in Gainesville, FL over the past four years have revealed that Cadre has exceptional residual activity on previously mentioned broadleaves, as well as both yellow and purple nutsedge. Rates of Cadre investigated included 1,2,3 and 4 ounces of product per acre. All plots in all studies received pendimenthalin at 1.1 kg/ha as a pre-plant incorporated treatment, with Cadre applied either at cracking, early-post (2 weeks after cracking), or late-post (4 weeks after cracking). Data shows that Cadre provides best weed control in peanuts when applied at cracking to early-post (weeds 2-4 inches). The best rate to obtain adequate weed control with Cadre is 4 ounces per acre. With rates lower than 4 ounces per acre, control of Florida beggarweed is diminished. However, 3 ounces of Cadre per acre does quite well on both nutsedges but is somewhat variable on hairy indigo and sicklepod. Research from both locations has been used in the 1993 season to back a Section 18 emergency exemption filed with the EPA for the state of Florida for the use of Cadre as a replacement for alachlor. Information from these studies has shown that Cadre fills the void left with the removal of alachlor in Florida. Treatments utilizing paraquat at cracking followed by Cadre at lower rates have shown good results and work will continue in this area during 1993.

Evaluation of Plant Growth Regulators for Peanuts (Arachis hypogaea). W. E. MITCHEM*, A. C. YORK. Crop Science Department, North Carolina State Univ., Raleigh, North Carolina 27695-7620.

Experiments were conducted on sandy loam soils at Lewiston and Rocky Mount, North Carolina in 1992 to evaluate vine growth suppression and canopy modification of peanuts (Arachis hypogaea) under above-average moisture conditions by compound X (confidentiality agreement) and chlorimuron (Classic). Compound X was applied at a rate of .125, .250, or .500 lb ai/A at pegging or at row closure. Split applications of compound X at a rate of .125 or .250 lb/A applied at pegging and again at row closure also were included. Compound X applied at row closure suppressed main stem length up to 27% and cotyledonary lateral branch length up to 29% relative to the untreated check when vine measurements were taken prior to harvest. Row closure applications of compound X provided greater row visibility at harvest and enhanced peanut pod maturity. Rate and timing of the compound X applications had a direct effect on yield at one location. Row closure applications of compound X produced yields that were higher than the pegging applications at that site. The percentage of extra large kernels increased when compound X was applied at row closure. Chlorimuron was applied at a rate of .125 oz ae/A either as a single treatment or in several combinations of sequential treatments at 60, 75, 90, or 105 days after emergence. Chlorimuron suppressed main stem length up to 34% and suppressed cotyledonary lateral branch length up to 25% relative to the untreated check when measurements were taken prior to harvest. The percentage of fancy pods and extra large kernels were reduced when half or more of the total rate of chlorimuron was applied at 60 days after emergence.

Peanut Weed Control Systems with Zorial and Dual. H.S. MCLEAN*, J.W. WILCUT, and J.S. RICHBERG. Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793

Preemergence herbicide systems of Zorial and Dual were evaluated for crop tolerance and efficacy in a replicated field study. The interaction of Basagran + Starfire + 2,4DB at three weeks after cracking with the preemergence treatments was investigated. Dual at 2.0 pounds ai/acre, Zorial at 1.2, and the tankmix of Zorial and Dual (1.2+2.0) did not result in significant crop injury at 36 days after planting. The level of injury with the postemergence treatment was increased by the combination of Zorial and Dual, but was not significantly different from the postemergence treatment alone. Postemergence herbicide application had the greatest impact on sicklepod control, but a preemergence application of Dual, Zorial or Zorial + Dual tended to improve seasonal control. Zorial was significantly more efficacious on coffee senna than Dual. The postemergence application tended to improve seasonal control of coffee senna, but did not significantly improve the control obtained with Zorial or Zorial + Dual. Smallflower morningglory was controlled by all the preemergence treatments. However, Zorial and Zorial + Dual tended to provide better control of small flower morningglory compared to Dual alone. Dual and Zorial + Dual were much more efficacious on yellow nutsedge compared to Zorial alone. The postemergence herbicides improved the control of yellow nutsedge obtained by all preemergence treatments. Zorial and Zorial + Dual were significantly more efficacious on Florida beggarweed than Dual. The yields produced with Zorial and Zorial + Dual were significantly greater than Dual alone or no preemergence treatment. The postemergence treatment significantly improved peanut yield of the no preemergence treatment and Dual alone. The yields produced by Zorial and Zorial + Dual tended to be improved by postemergence treatment, but were not significantly improved.

Potential for Fluometuron Carryover to Peanuts. A.C. YORK, Crop Science Dept., North Carolina State Univ., Raleigh, NC 27695.

Effective broadleaf weed control in cotton requires both preemergence and postemergence-directed herbicide applications. Fluometuron (Cotoran, Meturon) is applied preemergence to all cotton planted in North Carolina. With methazole (Probe) no longer available, fluometuron also is recommended for early postemergence-directed application to cotton. An experiment was conducted at four locations during 1990 to 1992 to determine the potential for fluometuron applied to cotton to carryover to peanuts planted the year following cotton. The experiment was conducted on loamy sand and sandy loam soils typical of the peanut-producing region of North Carolina. Cotton was planted in the first year of the experiment and received fluometuron at 1.0 and 2.0 lb ai/A applied preemergence as a broadcast spray or as a 12-inch band. Each preemergence application was followed by 0, 1, or 2 postemergence-directed applications of fluometuron at 1.0 lb/A plus MSMA at 2.0 lb ai/A in a 12-inch band. Peanuts were planted the following year and grown with standard production practices. Data collected included cotton yield and fiber quality, visual estimates of peanut injury, peanut yield, and peanut grade and value. None of the fluometuron treatments adversely affected cotton yield (average of 2270 lb/A of seed cotton) or grade. No symptoms of fluometuron injury were noted on peanuts planted the year following cotton at any of the four locations. Additionally, no effect of previous fluometuron treatments were noted on peanut yield (average of 4890 lb/A), grade, or value per pound.

Systems for Reduced Input Weed Control in Peanut. B.J. BRECKE* and D.L. COLVIN. University of Florida, Ag. Res. and Ed. Cent., Jay and Agronomy Dept., Gainesville, FL.

Weed management systems with various levels of input were evaluated in peanut at University of Florida facilities near Jay and Gainesville, FL during 1990-92. Different levels of initial herbicide application both with and without cultivation were followed by either a predetermined herbicide treatment or application(s) based on the weed situation. Initial herbicide treatments ranged from none to a high input level of preplant followed by at-cracking plus additional postemergence applications. The experimental areas were infested with both annual grass and broadleaf weed species. Cultivation significantly improved weed control for all except the most intensive herbicide program (benifin preplant plus metolachlor + paraquat at-cracking followed by 2,4-DB postemergence). A moderate level of herbicide (metolachlor + paraquat at-cracking) plus cultivation eliminated the need for additional chemical control in some instances. Even with cultivation, however, a postemergence herbicide applicatication was often required to achieve an adequate level of control. Treatments such as benefin preplant alone, paraquat at-cracking alone, or benefin preplant followed by paraquat at-cracking usually required additional herbicide regardless of whether cultivation was utilized. The need for late-season applications varied with moisture conditions. In situations of above normal rainfall, additional herbicide input was often necessary.

Cadre Systems for Florida Beggarweed Control in Georgia Peanut. J. W. WILCUT*, J. S. RICHBURG, III, AND G. WILEY. Dep. of Crop and Soil Sciences, Coastal Plain Experiment Station, Univ. of Georgia, Tifton, GA 31793-0748, and American Cyanamid Co., Tifton, GA 31794.

Field studies conducted in 1992 in Georgia evaluated Cadre, Cadre tank mixtures, and Basagran+Starfire and Cadre systems for Florida beggarweed (Desmodium tortuosum) control, peanut tolerance and yield. In Experiment I, Cadre was evaluated at 3, 3.5, 4, 5, 6, and 8 fl. oz/ac on 1", 2", 3-4", and 5-6" tall Florida beggarweed. Florida beggarweed control generally improved with increased rate of Cadre application. Control was not affected by size of Florida beggarweed except control was less overall with the 5-6" tall weeds. Yield followed the same trends as efficacy data. In Experiment II, Cadre was evaluated at 2, 3, 3.5, and 4 fl. oz./ac applied EPOST, POST, tank mixed with Starfire at 0.125 lb/ac + Basagran at 0.25 lb/ac applied EPOST or POST, or Cadre was applied at the same rates mentioned earlier EPOST followed by Basagran+Starfire POST, or Basagran+Starfire EPOST followed by Cadre rates POST. Florida beggarweed control improved with increased rate of Cadre application when Cadre was applied alone and control with EPOST and POST applications was similar. Florida beggarweed control was 67% or less for these treatments. For tank mixtures of Cadre+Basagran+Starfire control was 80 to 96% and was equivalent for EPOST and POST applications. Cadre EPOST followed by Basagran+Starfire POST controlled Florida beggarweed 50 to 73%. Basagran+Starfire EPOST followed by Cadre POST controlled Florida beggarweed at least 95%. Peanut yields followed the same trend as seen with the efficacy data. Florida beggarweed control and peanut yield were improved when Basagran+Starfire was included as a tank mixture with Cadre or when the three herbicides were used in a systems approach.

Influence of Timing and Rate of Application of Cadre on Sicklepod and Nutsedge Control in Peanuts. D.T. GOODEN* and M.B. WIXSON. Clemson University, Pee Dee Research and Education Center, Florence SC 29501 and American Cyanamid Company, Columbia SC 29212.

Experiments were conducted in 1991 and 1992 at the Pee Dee Research and Education Center at Florence, South Carolina to evaluate the effects of Cadre on yellow nutsedge (Cyperus esculentus CYPES) plus purple nutsedge (Cyperus rotundus CYPRO) and on sicklepod (1991 only) (Cassia obtusifolia CASOB) control in peanuts. Cadre was applied at cracking and early post in all tests with several rates, ranging from .016 to .125 lb ai/acre with some split applications. All treatments received Prowl preplant. Starfire plus Basagran was used as a standard in the CASOB study, while Vernam was used in the CYPRO-CYPES plots. At 10 weeks, Cadre gave equal or better control of CASOB than did the standard at all but the .016 rate applied at cracking. The .048 and .063 rates appeared to give best control. All yields were superior to the Prowl check, except .016 at cracking and .024 split. In both CYPRO-CYPES studies, all uses of Cadre were superior to the standard at midseason. In 1992, all early post and the at cracking (.055 ai) rate resulted in significantly higher yields than the Prowl check. In 1992, on light sandy soil with an extended early season dry period, some stunting resulted with the at cracking treatments.

Response of Five Runner Cultivars to Dinitroaniline Herbicides. W. J. GRICHAR* and A. E. COLBURN. Texas Agricultural Experiment Station, Yoakum, TX 77995 and Texas Agricultural Extension Service, College Station, TX 77843.

Five runner peanut (Arachis hypogaea L.) cultivars were evaluated with four dinitroaniline herbicides (benefin, ethalfluralin, pendimethalin, and trifluralin) and a postemergence herbicide treatment (sethoxydim + acifluorfen) for effect on peanut pod and yield grade (percentage SMK+SS) over a three year period. Analysis of data pooled over years indicated that the year by cultivar and year by herbicide interactions were significant for yield and percentage SMK+SS. No cultivar by herbicide or year by cultivar by herbicide interaction was observed. No significant differences in yield from the dinitroaniline herbicide treatments were noted. Sethoxydim + acifluorfen produced significantly lower yields in one year of the study but this was due to extremely wet field conditions which prevented entry into the field to spray postemergence herbicides at the proper weed growth stage. In one of three years, Southern Runner and GK-7 were significantly higher in yield. Okrun and Tamrun 88 were significantly lower in yield, while Florunner was intermediate in yield. Grades (% SMK+SS) were significantly lower with pendimethalin in each year of the test, while grades of benefin, ethalfluralin, and trifluralin varied from year to year. Southern Runner produced a significantly lower grade in two of three years, while Tamrun 88 resulted in significant higher yield for each year of the test.

Management Strategies for Florida Beggarweed (*Desmodium tortuosum*) Control in Peanuts.

S.M. BROWN. University of Georgia, Tifton GA 31793.

Researchers have estimated a weed-free maintenance requirement of 4 weeks after emergence to prevent peanut yield losses from Florida beggarweed interference. They have also documented increased incidence of Florida beggarweed emergence in response to the initial rainfall following cultivation. These observations imply the importance of control during the first 5 to 6 weeks after planting with some modification for environmental conditions. Theoretically, an ideal treatment for Florida beggarweed might be: a) a preemergence herbicide which is activated by rainfall sufficient for Florida beggarweed germination and which provides residual control for about 6 weeks, b) a postemergence herbicide which eliminates weeds up to 8 inches tall, or c) a herbicide which has both residual and postemergence activity, offering control of weeds up to 4 inches in height and subsequent preemergence control for 2 to 3 weeks. Given the present management options, effective season long control requires coordinated use of several tools, among them Starfire (paraquat), Tough (pyridate), Dual (metolachlor), mechanical cultivation, and Classic (chlorimuron). At-cracking or early postemergence applications of Starfire tank mixtures routinely provide excellent contact control of Florida beggarweed at about 2 weeks after peanut emergence. Opportunities for enhancing the overall effectiveness of existing control programs include: (1) follow-up application of Starfire treatments 21 to 28 days after peanut emergence, (2) follow-up application of Tough before weeds exceed 2.5 inches tall, (3) application of Dual, possibly with Starfire tank mixtures, 3 to 4 weeks after crop emergence, and (4) mechanical cultivation 4 to 5 weeks after crop emergence. The significant contribution of these options is rendering the crop weed-free at the critical period of about 4 or 5 weeks after emergence. Cadre (AC 263,222), an imidazolinone herbicide recently submitted for registration in peanuts, offers both postemergence and residual control of Florida beggarweed. Early postemergence applications of Cadre have provided season long control in some trials but not in others. In limited observations, sequential programs of Starfire combinations followed later by Cadre have compared favorably with Cadre alone early postemergence. The residual efficacy of later applications of Cadre, particularly the activity extended to 4 weeks after crop emergence, may improve the consistency of Florida beggarweed control.

Alternative Cultural Practices for Weed Management in Peanut: Stale Seedbed Techniques.

W. C. JOHNSON, III* and B. G. MULLINIX, Jr. USDA-ARS and University of Georgia, Tifton, GA 31793.

Studies were conducted in Georgia in 1991 and 1992 to determine the effectiveness of alternative cultural weed control methodologies in peanut production. The alternative cultural weed control methodologies involve the use of tillage or nonselective herbicides on stale seedbeds prior to planting. A split plot design was used. Main plots were four levels of stale seedbed management; deep turn and plant the same day, deep turn 6 wk earlier and till at 2 wk intervals prior to planting, deep turn 6 wk earlier and spray a nonselective herbicide 1 wk prior to planting, and deep turn 6 wk earlier and remain nontreated prior to planting. Subplots were three levels of weed management in peanut; intensive, basic, and cultivation alone. Peanut yield was greater in plots where either stale seedbeds were tilled at 2 wk intervals or sprayed with a nonselective herbicide prior to planting. Populations of Florida beggarweed, Southern crabgrass, and yellow nutsedge in peanut were reduced where stale seedbeds were tilled at 2 wk intervals. Texas panicum populations were reduced where glyphosate (1.1 kg ai ha^{-1}) was applied to stale seedbeds. There was little difference in weed populations or yield between intensive and basic weed management systems used once peanut was planted. There were no interactions between stale seedbed techniques and weed management systems for any of the parameters measured. These results indicate that the use of either tillage or nonselective herbicides on stale seedbeds can reduce weed populations and increase peanut yield. Upon further refinement, these alternative cultural weed management methodologies can potentially improve returns from herbicide inputs or reduce the need for herbicides.

The Effect of Cadre™ and Pursuit® Herbicides on Nutsedge (Cyperus sp.) Control and Tuber Viability in Peanut. M. B. WIXSON* and D. T. GOODEN, American Cyanamid Company, Princeton, NJ 08543, and Clemson University, Clemson, SC.

Experiments were conducted at the Clemson Pee Dee Research and Education Center in Florence, SC from 1991 to 1993 to evaluate the effect of CADRE and PURSUIT herbicides on nutsedge control and tuber viability in peanut. The experiment contained both a field phase to assess nutsedge control, and a greenhouse phase in which tubers were transplanted from the field to determine viability. In the field phase, CADRE was applied at .063 lb ai/A either at crack (AC) or early postemergence (EPOE). PURSUIT was applied at the same rate preplant incorporated (PPI), AC or EPOE. Standard treatments for comparison included 2.7 lb/A Vernam (vernolate) applied PPI and an EPOE tank-mix of Starfire (paraquat) at .125 lb/A plus Basagran (bentazon) at .25 lb/A. Applications made AC were to weeds 1 to 2 inches in height and those made EPOE were to weeds 2 to 4 inches tall. The experimental area possessed a population of approximately 50% yellow nutsedge (Cyperus esculentus) and 50% purple nutsedge (Cyperus rotundus). In the greenhouse phase, 1.0 cubic meter of soil was removed from plots and tubers were removed from the soil by sifting through wire screen. These tubers were then separated by species, counted, and planted into flats containing a mixture of potting soil and sand to determine percent germination and viability. In the field, CADRE at .063 provided season long control of more than 90% whether applied AC or EPOE. PURSUIT applications provided 80 to 90% control if applied PPI or AC. EPOE applications of PURSUIT resulted in control of 70 to 75% and a tank-mix of PURSUIT plus Starfire at .125 lb/A did not increase this control. Both CADRE applied AC or EPOE and PURSUIT applied PPI or AC resulted in better control than standard treatments of Vernam PPI or Starfire plus Basagran applied EPOE. Peanut injury was less than 10% for all treatments at 4 WAT. Crop yields were better for CADRE at all timings or PURSUIT applied PPI and AC than standard treatments or the untreated check. Greenhouse experiments revealed that CADRE and PURSUIT treatments had fewer tubers than both the standard applications of Vernam and Starfire plus Basagran or the untreated check. CADRE and PURSUIT treatments also had 50 to 70% less tuber germination than either the standards or the check. In plots rated one year after treatment, CADRE applications resulted in 80 to 85% fewer nutsedge plants than the untreated check. PURSUIT treatments also reduced tuber populations from 70 to 75%. Plots treated with either Vernam or Starfire plus Basagran had nutsedge populations similar to the untreated areas.

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AFLATOXIN ELIMINATION IN PEANUTS AND PEANUT PRODUCTS SYMPOSIUM

Can We Develop Peanut Cultivars with Resistance to Pre-harvest Aflatoxin Contamination? C. CORLEY HOLBROOK, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.
Pre-harvest aflatoxin contamination (PAC) is one of the most significant challenges facing the U.S. peanut industry. The development of peanut cultivars with resistance to PAC would be a valuable tool in reducing the problem. There are two requirements for developing cultivars with resistance to PAC. First there must be genes for resistance to PAC. Second, there must be a reliable and efficient screening technique which can be used to identify material which contains these genes. The U.S. peanut germplasm collection contains a large amount of genetic diversity and may contain genes for resistance to PAC. Identification of these genes has been hampered by the lack of a reliable technique which can be used to screen a large number of genotypes. Reliable and efficient screening techniques which can be used with a large number of genotypes have recently been devleoped. We have used these techniques to screen a core collection of the U.S. germplasm collection for resistance to PAC. This work has resulted in the identification of accessions which contain genes for resistance to PAC. A separate study was conducted to examine the aflatoxin contamination in peanut genotypes with drought tolerance. Results indicate that drought tolerance, or avoidance, can be a valuable trait for reducing aflatoxin contamination in peanut.

Potentially Important Sources of Resistance to Prevention of Preharvest Aflatoxin Contamination in Peanuts. R. J. COLE*, V. S. SOBOLEV and J. W. DORNER. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
The development of absolute resistance to preharvest *Aspergillus flavus/A. parasiticus* invasion and aflatoxin contamination may not be possible using conventional breeding approaches. There are recent indications that selected germplasm has some degree of resistance to preharvest aflatoxin contamination. Screening studies have shown differences in susceptibility and resistance. Other studies have shown a correlation between phytoalexin-producing ability and preharvest contamination. A possible basis of this resistance is discussed in detail. Data from a comparative study between the Florunner and Southern Runner cultivars is presented that correlates differences in drought tolerance with observed resistance. Breeding for drought tolerant germplasm may be an effective approach to selecting for aflatoxin-resistant germplasm as well. Other mechanisms for explaining preharvest aflatoxin resistance are apparently not known. However,it should be noted that inherent preharvest aflatoxin resistance will never be totally effective at controlling preharvest aflatoxin contamination in peanuts until insect damage can be effectively controlled or eliminated, since this problem contributes to a significant amount of the preharvest aflatoxin contamination that occurs.

Preharvest Aflatoxin Prevention Through Biological Control. J. W. DORNER*, R. J. COLE, AND P. D. BLANKENSHIP. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.
Studies conducted at the National Peanut Research Laboratory in 1987-1989 demonstrated great potential for biological control of preharvest aflatoxin contamination of peanuts through the use of biocompetitive agents. Inoculation of peanut soil with natural and UV-induced mutant strains of *Aspergillus parasiticus* resulted in approximately 10-100 fold decreases in aflatoxin contamination of edible-category peanuts compared to nontreated controls. Studies conducted in 1992 showed that maximum control might be achieved when a combination of nontoxigenic strains of *A. flavus* and *A. parasiticus* are used as biocompetitive agents. When nontoxigenic *A. flavus* and *A. parasiticus* were used alone, aflatoxin concentrations in edible peanuts ranged from 9.7 to 76.4 ppb, respectively, compared with nontreated controls ranging from 137.1 to 278.7 ppb. However, edible peanuts from soil treated with nontoxigenic strains of both *A. flavus* and *A. parasiticus* contained only 0.8 ppb aflatoxin compared to 75.1 ppb for controls. Refinement of this strategy could produce a dramatic reduction in preharvest aflatoxin contamination of peanuts.

Aflatoxin in Peanuts: The Role of Insects in Enhancing Contamination.
R. E. LYNCH*, D. M. WILSON, A. P. OUEDRAOGO, and I. O. DICKO. Insect Biology Laboratory, USDA-ARS, and Plant Pathology Department, University of Georgia, Coastal Plain Experiment Station, Tifton, GA; University of Ouagadougou, Ouagadougou, Burkina Faso.
Collaborative research among scientists at the USDA, Insect Biology Laboratory, University of Georgia, Mycotoxin Laboratory, and the University of Ouagadougou, Burkina Faso, West Africa, has been conducted to determine the relationship between insect damage to peanut and aflatoxin contamination. In the U.S., the lesser cornstalk borer (LCB) (Elasmopalpus lignosellus Zeller) and in Burkina Faso, termites (Odontotermes spp.) were selected as the test insect. Research conducted in the laboratory showed that the LCB was an excellent vector of an Aspergillus parasiticus color mutant to all stages of peanut pods and that contamination of seed was directly related to the extent of pod injury. In field research, LCB larvae collected from the field were contaminated with species of the A. flavus group. Seeds from peanut pods with only external scarification due to LCB feeding had a significantly higher percentage of A. flavus group infection and aflatoxin than seeds from undamaged pods. Research in Burkina Faso has shown that termite damage to peanut pods is one of the primary variables associated with aflatoxin contamination of the seed. Termite damage to peanut is very similar to damage caused by LCB larvae in that pods may be scarified and/or penetrated. Termite damage to pods increases rapidly during the latter portion of the growing season and is directly associated with a decrease in soil moisture. Evaluation of peanut genotypes in Burkina Faso for resistance showed that several lines, notably NCAc 343, have resistance to both plant and pod damage due to termites.

Aflatoxin Elimination Through Genetic Engineering of Peanut.

A. K. WEISSINGER[1] and P. OZIAS-AKINS[2]. [1] Dept. of Crop Science, N.C. State University, Raleigh, NC 27695, and [2] Dept. of Horticulture, Coastal Plain Experiment Station, Tifton, GA 31793.

Reducing the probability of aflatoxin contamination in peanuts requires application of sound management practices, and the use of peanut varieties which are resistant to Aspergillus spp. Transformation of peanut with foreign genes whose products either impede fungal growth or disrupt aflatoxin synthesis could augment efforts to develop resistant varieties by conventional methods. Our laboratories are collaborating to implement such a strategy. We have developed a reliable protocol for peanut transformation in which transforming DNA is introduced into embryogenic cultures by microprojectile bombardment. Transformed plants are then regenerated from these cultures following a period of antibiotic selection to eliminate untransformed tissue. This technology is being used to introduce genes encoding chitinase, glucanase, osmotin-like proteins, thionin, and other antifungal products into elite peanut varieties. Some of these gene products are likely to reduce growth of Aspergillus, although this effect is difficult to predict in the absence of experimental data. Further, it is likely that transgenic plants will exhibit more general resistance to an array of other pathogenic fungi. Transformation of peanut with other genes whose products prevent either synthesis or accumulation of aflatoxin would probably be useful to reduce further the probability of aflatoxin contamination of peanuts. While such an approach is included in our overall strategy, no such genes have yet become available.

Molecular Genetics of Aflatoxin Formation. G.A. PAYNE
Dept. Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.

Aflatoxins are extremely potent carcinogens produced by *Aspergillus flavus* and *A. parasiticus*. The long term goal of our research is to understand the regulation of aflatoxin biosynthesis in these fungi and to use this information to devise effective control strategies for the prevention of preharvest aflatoxin contamination. Aflatoxin biosynthesis appears to be under regulatory control in plants as extensive colonization by the fungi does not necessarily lead to significant aflatoxin accumulation. We have isolated a gene from *A. flavus* that is involved in the regulation of aflatoxin biosynthesis. The gene, *afl-2*, regulates aflatoxin biosynthesis before the first stable intermediate in the aflatoxin pathway. It also regulates other enzymatic steps of aflatoxin biosynthesis. Thus, *afl-2* appears to play a pivotal role in aflatoxin biosynthesis. We have shown that the *afl-2* gene resides within a 1.8 kb piece of DNA and we have identified a 1029 bp cDNA that corresponds to the *afl-2* transcript. A comparison of the cDNA and peptide sequences did not reveal significant homology; therefore, this gene appears to be different from previously described genes. A homologous gene does appear to be present in *A. parasiticus*; thus, information derived from our research on *afl-2* will have implications in *A. parasiticus*, as well as *A. flavus*. We have begun studies to characterize the promoter region of this gene and to determine those factors responsible for its expression. Because *afl-2* regulates aflatoxin biosynthesis, studies on its regulation may provide clues for the development of strategies to disrupt aflatoxin biosynthesis in the fungus, and ultimately may lead to the engineering of plants resistant to aflatoxin accumulation.

Expert Systems and Modeling for Managing the Preharvest Aflatoxin Problem. P.D. BLANKENSHIP*[1], B.W. MITCHELL[2], R.J. COLE[1], J.W. DORNER[1]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson GA. 31742; [2]USDA, ARS, Southeast Poultry Research Laboratory, Athens, GA 30604.

Preharvest aflatoxin contamination of peanuts has been shown to be associated with certain environmental conditions including prolonged drought periods and accompanying soil time/temperature relationships. Two types of electronic, aflatoxin prediction systems have been developed utilizing this knowledge base to assist with late season cultural decisions in peanut production. Both prediction systems utilize electronic sensors to monitor environmental conditions. One system uses an expert system to predict low (1-15 ppb), medium (16-50 ppb) and high (> 50 ppb) levels of expected aflatoxin contamination. The second system utilizes a mathematical model to predict specific values of expected aflatoxin. Both prediction systems were evaluated at the NPRL Environmental Control Plot Facility during production of aflatoxin contaminated peanuts. Peanuts were periodically sampled and actual aflatoxin values were compared to predictions from both type systems. Although neither system was completely accurate, with some refinement both offer promise in managing late season peanut production during crop years with potentially dangerous environmental conditions.

Post Harvest Management of Aflatoxin Contamination in Peanut. R. J. Henning[1*], R. J. Cole[2], and J. W. Dorner[2]. [1]Tristate America, Albany, GA 31707; [2]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Prolonged drought during the fruiting period of peanut (Arachis hypogaea L.) may result in aflatoxin contamination. Industry objectives are to economically reduce aflatoxin contamination to meet customer expectations while preserving the available supply to meet demand. A study was conducted using peanut farmer stock from crop year 1990, a serious drought year in the Southeast, to determine current technology capability in aflatoxin removal. Segregation I farmer stock peanuts containing 217 ppb aflatoxin were used in the study. The farmer stock peanuts were processed using belt screening pre-shelling, color sorting and gravity separation during shelling and blanching/color sorting post-shelling. Due to quantity limitations, only medium grade shelled peanuts were used in the shelling and post-shelling study. Decrease in aflatoxin contamination and weight shrink were measured at each step of the process. Cleaning the farmer stock over a 24/64 belt cleaner reduced aflatoxin contamination in farmer stock by 35% to 140 ppb in the pods riding the cleaner while concentrating 529 ppb in the fall thrus. Sizing the shelled kernels into the runner medium grade [(-) 21/64 (+) 18/64 X 3/4" slotted screen]reduced aflatoxin contamination to 100 ppb (29%). Removal of contaminated kernels through color sorting reduced aflatoxin to 30 ppb (70%)and rejected 2.7% of the kernel weight. In contrast, gravity separation rejected 11.3% of the kernel weight while reducing aflatoxin contamination by only 5 ppb to 25 ppb. Post-shelling blanching and color sorting were required to reduce contamination to acceptable levels of < 3 ppb. This study indicates that current technology is capable of reducing aflatoxin in highly contaminated lots to acceptable levels.

Economic Feasibility of Recovering Edible Peanuts from Aflatoxin Contaminated Lots: The Aflatoxin Management Study. M. C. Lamb[1*], R. J. Cole[1], R. J. Henning[2], J. W. Dorner[1], and J. I. Davidson, Jr.[1] [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; [2]Tri-State America, Albany, GA 31707.

Aflatoxin in peanut (*Arachis hypogaea* L.) imposes economic loss and risk to every segment of the peanut industry. The Aflatoxin Management Study was conducted using technology currently available in the industry to determine the feasibility of recovering edible peanuts from highly contaminated peanut lots. Approximately 40 tons of farmers stock peanuts (Florunner variety) produced in the Southeast during crop year 1990 with farmers stock grade greater than 62 (SMK+SS) were analyzed. The analysis was performed separately for Segregation I and Segregation III lots. Milling processes, which consisted of belt screening prior to shelling, color sorting, gravity separation, and kernel size separation, were conducted at the USDA, ARS, National Peanut Research Laboratory pilot shelling plant. In the Segregation I lots, the average aflatoxin (ppb) in the medium kernels (ride 18/64 x 3/4" slotted screen) was 99.9. Color sorting rejected 2.7% of the kernels by weight, reducing aflatoxin to 30.0 ppb. Gravity separation removed 11.3% by weight, reducing aflatoxin to 25.2 ppb. Whole kernel blanching and split kernel blanching were performed by a cooperating commercial blancher. Material loss in whole nut blanching was 17.4% (9.7% reject; 7.7% shrink) and aflatoxin was reduced to 2.2 ppb. Split nut blanching resulted in 15.9% material loss (7.7% reject; 8.2% shrink) and reduced aflatoxin to 7.9 ppb. Re-pick of the split nut blanch rejected 2.5% of the material resulting in aflatoxin reduction to 1.6 ppb. Cost estimates at each phase and shelled stock peanut prices provided data for economic analysis. Analysis indicated that it is economically feasible to recover contaminated peanuts. The recovery of contaminated peanut lots to acceptable aflatoxin levels proposes a method to minimize economic losses during years of limited peanut production (e.g. CY 1990). Analysis of the Segregation III lots will also be discussed.

Eliminating Aflatoxin By The Year 2000 - An Industry Perspective. K. J. CUTCHINS. National Peanut Council, Alexandria, VA 22314.

The National Peanut Council and the National Peanut Foundation have established the elimination of aflatoxin as its number one research priority. This research is sponsored through several avenues congressional funding, USDA funding, contributions to the NPF, corporate sponsorship. Research efforts are underway on several fronts: 1. Ecological Relationships and Agronomic Practices - Relationship of fungal growth and toxin formation to such factors as insects (as vectors and damage to the crop); weather, including temperature and moisture; and planting, cultivation and harvest practices; 2. Biological Control - Control methods based on living organisms; 3. Delineation and Control of the Pathway of Toxin Formation - Toxin formation, identification and isolation of enzymes and genes responsible for synthesis of aflatoxins; 4. Breeding for Resistance - Identification of resistant germplasm and movement into production lines; 5. Any other creative research ideas which will contribute significantly to the elimination as well as the prevention of the occurrence of aflatoxin. Our goal is to eliminate aflatoxin by the year 2000.

POSTERS

In Vitro Culture of Embryonic Axes from Arachis Species for Germplasm Recovery. K.B. DUNBAR*, Dalton College, 213 North College Dr., Dalton, GA 30720. R.N. PITTMAN, and J.B. MORRIS, USDA, ARS, SAA, Reg. Pl. Intro. Stn., 1109 Experiment Street, Griffin, GA 30223.

Germination of seeds from *Arachis* species is low after 20 yr in storage. This study was conducted to develop procedures to recover germplasm from deteriorated seeds. Embryonic axes from deteriorated seed of *Arachis* species were cultured on a medium containing MS salts, Gamborg's B5 vitamins, 30 g/L sucrose, and solidified with 8 g/L agar. Six to 8-week-old plants regenerated from embryonic axes were transplanted to Jiffy pots in the greenhouse. Nineteen samples of deteriorated seed between 20 and 31 years old were evaluated, and shoots were recovered from 31% by *in vitro* rescue of embryonic axes and from 2.4% by germination in the greenhouse. Plants were recovered from 15 to 31-year-old deteriorated seed of *A. burkartii*, *A. glabrata*, *A. hagenbeckii*, *A. monticola*, *A. pusilla*, *A. rigonii*, *A. villosa*, and *A. villosulicarpa* by *in vitro* rescue of embryonic axes, while no plants were recovered from seed of the same 12 seed lots germinated in the greenhouse. The *in vitro* rescue of embryonic axes can significantly increase the recovery of germplasm from deteriorated seed of *Arachis* species.

Peanut Foliar Disease Management with Predictive Technology. A. J. JAKS. Texas Agricultural Experiment Station, Yoakum, TX 77995-0755.

In 1991 and 1992 field trials, the Neogen EnviroCaster was used to collect data on conditions of canopy temperature, leaf wetness, relative humidity and precipitation. The instrument processed this data in its software program models for early and late leafspot of peanut to advise fungicide applications. Tests at Yoakum, Texas in 1991 and 1992 evaluated fungicide applications of Bravo 720 and Folicur 3.6F based on EnviroCaster predictions versus applications made on a standard 14 day schedule for control of early and late leafspot and rust. In 1991, eight sprays were applied on the 14 day schedule starting at 30 days after planting (DAP). Six sprays were advised by the early leafspot model beginning 23 DAP. Four sprays were advised by the late leafspot model beginning 30 DAP. Advisories were also issued by separate early and late leafspot models where either model could advise the spray. This early/late system advised six sprays initiated 23 DAP. In 1992 eight sprays were applied on the 14 day schedule initiated 30 DAP. Five, three, and five sprays were advised by the early leafspot, late leafspot and early/late models, respectively. Initiation of sprays were advised at 24, 28 and 24 DAP respectively. In both years, disease pressure was excellent with early leafspot and rust, while late leafspot pressure was moderate. Prior to harvest, standard 14 day sprays with Bravo 720 and Folicur 3.6F had statistically less leafspot infection than advised sprays each year. In both years, plots which received the least number of advised sprays (four and three, respectively, for 1991 and 1992) of Bravo 720 did not have statistically different levels of rust than plots which received eight sprays or other advisory Bravo plots. In 1991, plots which received four advised sprays of Folicur 3.6F had statistically higher levels of rust than other plots sprayed with this fungicide. Folicur 3.6F plots sprayed in 1992, according to the early/late leafspot model, had significantly less rust than the standard or other advised sprays with Folicur. Although data from these two years show differences in infection between plots sprayed on standard schedule and those sprayed by advisory, there was no statistical difference in yield among the treatments. This data implies that timing of sprays is critical in managing foliar diseases.

Soil Amendments and Biocontrol Agents to Reduce Viable Sclerotial Populations of *Sclerotinia minor* in Peanut Culture. K. E. WOODARD. Texas Agricultural Experiment Station, Stephenville TX 76401.

Hyphae of *Sclerotinia minor* Jagger isolates from diseased peanut (*Arachis hypogaea* L.) tissue grew at the rate of 0.8 mm/hr on potato dextrose agar (PDA) at 26 C. The same isolates of *S. minor* under the same conditions grew at less than half that rate on a cornmeal or a sucrose-based medium. Average production of sclerotia in 9-cm petri dishes at 26 C was 450, 30, and 150 for PDA, cornmeal, and sucrose, respectively. In 1992, cornmeal and sucrose were used as soil amendments in a peanut field severely infested with Sclerotinia blight of peanut (Stephenville, TX) along with three potential biocontrol agents (J-9, SK-15, HS 23-7), iprodione (chemical standard) and an untreated control. HS 23-7 is a *Trichoderma* sp. isolated from a necrotic sclerotium of *S. minor* in a controlled environment at 30 C. Each treatment was two 7.6-m rows with five replications and planted with 'Florunner' peanuts. Cornmeal and sucrose, both at the rate of 651 kg/ha (two applications), showed early disease retardation with low 60- and 90-day disease ratings compared to the control. The 90-day disease rating was 5.6, 7.8, 7.2, and 13.2 infection sites/plot for cornmeal, sucrose, iprodione, and the control, respectively. There were no significant ($P > 0.05$) differences among the treatments for the final disease rating. Viable sclerotia at harvest ranged from 0.7 to 3.6/100 g soil for cornmeal and J-9, respectively. J-9 had significantly more sclerotia than any of the other treatments. Viable sclerotia from a soil assay taken 90 days after harvest ranged from 0 for HS 23-7 to 2.0 for sucrose. Cornmeal was 0.4, the control 0.8, SK-15 0.9, iprodione 1.2, and J-9 1.3 viable sclerotia/100 g soil. HS 23-7 and cornmeal were effective in reducing the number of viable sclerotia in this test, especially in fallow soil after harvest.

V-53482 and Zorial Systems for Weed Control in Georgia Peanut. E. F. EASTIN*, J. W. WILCUT, J. S. RICHBURG, III, and T. V. HICKS. Dep. of Crop and Soil Sciences, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793-0748, and Valent USA, Snellville, GA 30278.

Field studies in 1990 and 1991 evaluated three PRE options of V-53482 (0.078 lb/ac), Zorial (1.2 lb/ac), and Lasso (3.0 lb/ac) following Prowl PPI at 1.0 lb/ac at four locations in Georgia for weed control, peanut tolerance and peanut yield. These PRE options were in a factorial arrangement with two early postemergence (EPOST) options of 1) none and 2) Starfire (0.125 lb/ac) + Basagran (0.25 lb/ac) and three POST options of 1) none, 2) Starfire + Basagran + (0.5 lb/ac) + Butyrac (0.25 lb/ac), and 3) Butyrac. All EPOST and POST options were applied with a nonionic surfactant at 0.25% (v/v). Weed species evaluated included smallflower morningglory (Jacquemontia tamnifolia IAQTA), Florida beggarweed (Desmodium tortuosum DEDTO), sicklepod (Cassia obtusifolia CASOB), Ipomoea morningglory species (IPOZZ), coffee senna (Cassia occidentalis CASOC), prickly sida (Sida spinosa SIDSP) and yellow nutsedge (Cyperus esculentus CYPES). Lasso controlled DEDTO 40%, CYPES 66%, IAQTA 13%, SIDSP 15%, IPOZZ 17%, CASOB 35%, and CASOC 0%. V-53482 controlled DEDTO 97%, CYPES 0%, IAQTA 100%, SIDSP 96%, IPOZZ 91%, CASOB 31%, and CASOC 85%. Zorial controlled DEDTO 58%, CYPES 57%, IAQTA 76%, SIDSP 71%, IPOZZ 49%, CASOB 69%, and CASOC 77%. Yields followed the same trends as efficacy data.

A Seed Culture System for Evaluating Aflatoxin Resistance of Peanut Genotypes. **S. M. BASHA and R.J. COLE, Florida A&M University, Tallahassee, FL 32307; National Peanut Laboratory, USDA/ARS, Dawson, GA**

A seed culture system was established to grow peanut seed of different maturities viz; white, yellow, orange, brown and black. The growth medium was a modified Obendorf medium containing sucrose as a carbon source and glutamine as the nitrogen source. Under this system peanut seed of yellow, orange, brown and black maturity categories grew to maturity as measured by increase in their size and germinability. For aflatoxin and phytoalexin induction, the seed cultures were established by culturing the seed of different maturities for one week in basal media. Water stress was imposed in the seed cultures by transferring them to a media containing various concentrations of mannitol (0 to 2 M) and polyethylene-glycol 8000 (0 to 30%). After one week the stressed seeds were inoculated with Aspergillus flavus. The infected seed was analyzed for phytoalexins and aflatoxins. The results showed that the water stressed seed showed heavy fungal colonization compared to the unstressed controls. In addition , seeds exposed to increasing concentrations of mannitol showed increasing aflatoxin contamination and decreasing phytoalexin production, suggesting a negative correlation between phytoalexin and aflatoxin production.

A Survey of *Sclerotium rolfsii* isolates for genetic variability and fungicide resistance.
F. A. NALIM*[1], M.-Y SHIM[1], N. P. KELLER[1], J. L. STARR[1], K. WOODARD[2]. [1]Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843; [2]Texas Experiment Station, Stephenville, TX.

Concern has arisen over reports of resistance to PCNB in *Sclerotium rolfsii* populations (causal agent of Southern Blight of peanuts). Resistance to PCNB in *S. rolfsii* was detected in a Texas peanut field in 1985. To further investigate this problem, the field from which the PCNB-resistant isolates were detected and another field without known PCNB-resistant isolates of the fungus were intensively sampled in 1992. Two-hundred and sixty-three hyphal tipped isolates were assessed for PCNB sensitivity and genetic variability using anastomosis grouping. Eight *Sclerotium rolfsii* isolates with decreased sensitivity to PCNB were found in the field from which resistance to the fungicide was first detected and six from the other field. All isolates from the two fields could be placed into 5 and 3 anastomosis groups, respectively. The eight isolates with reduced sensitivity to PCNB from the previously diagnosed field were placed into two different anastomosis groups. These studies will provide knowledge concerning the nature of fungicide resistance in *S. rolfsii.*

Polyketide biosynthesis in *Aspergillus spp.* as a developmental response to lipid substrate and stress. R. BUTCHKO*[1], W. SATTERFIELD[1], N. P. KELLER[1]. [1]Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843.

Aspergillus spp. produce mycotoxigenic secondary metabolites including the polyketides, norsorolinic acid (NOR), sterigmatocystin (ST) and aflatoxin (AF). NOR is an intermediate in the ST/AF biosynthetic pathway of *Aspergillus flavus, A. nidulans* and *A. parasiticus* and ST and AF are similarly structured end products. These polyketide mycotoxins are produced when seed crops which have high oil content are subjected to environmental stress. *In vitro*, polyketide production is also regulated by carbon source and invoked as a stress response. Under ambient conditions, NOR/AF is (1) consistently produced in sucrose medium, (2) consistently produced in varying amounts in lipid media and (3) not produced in peptone medium. The variation in polyketide production in lipid medium is associated with the oxidation state of the lipid substrate. Polyketide biosynthesis is induced in otherwise non-inducing environments under stress conditions such as heat shock or the addition of ethanol. Additionally, fungal development (e.g. sporulation) is necessary for polyketide production on solid surfaces but the converse is not true. Collectively these data show that a change in either lipid type or availability or subjection to environmental stress (sans host plant) can affect polyketide production.

Timing and Duration of Vector Management in Relation to Spotted Wilt Disease Incidence in Peanut. J. W. TODD*, J. R. CHAMBERLIN, A. K. CULBREATH, and J. W. DEMSKI. Departments of Entomology and Plant Pathology, University of Georgia, Tifton, GA 31793 and Griffin, GA 30223.

Spotted wilt disease, caused by tomato spotted wilt virus (TSWV), poses a continuing and serious threat to peanut and solanaceous crops in the southeastern U.S. This virus is vectored only by certain species of thrips adults after acquisition of the virus by the larval stages. The tobacco thrips, *Frankliniella fusca* (Hinds) and the western flower thrips, *Frankliniella occidentalis* (Pergande) are the predominate species infesting peanut from emergence throughout the growing season. Populations of *F. fusca* peak at 4 to 5 weeks after planting. Larvae are responsible for most seedling damage and adults congregate in blooms after the onset of anthesis. Most thrips reproduction in Georgia peanut is attributable to *F. fusca*. Systemic insecticides applied in-furrow at planting or insecticidal sprays timed to control larvae feeding in the terminal buds are effective for minimizing plant injury. This study employed six insecticide treatment regimes to investigate thrips immigration and TSWV infection in four commercial peanut fields (ca. 60-200 acres) in southwest Georgia. Treatments and timing of application were designed to give differential control of larval and adult *F. fusca* and *F. occidentalis*, which served as a basis for characterization of primary infection and secondary spread of TSWV in peanut. Abundance of adult tobacco thrips was reduced by 75 to 95% in aldicarb treated plots 7 to 10 days after emergence and first generation larvae were reduced 64 to 96%. Within 10 days after anthesis, adult tobacco thrips were equally or more numerous in aldicarb treated plots than in nontreated peanut. Acephate foliar sprays reduced the abundance of adult tobacco thrips and thrips larvae by 57-100% and 10-99% respectively. Western flower thrips were more numerous in blooms from acephate treated plots than the nontreated areas. TSWV incidence in aldicarb treated and nontreated peanut were not significantly different. Acephate applications (weekly, season-long) reduced virus incidence, but the differences were significant in only one of four fields. It seems unlikely that significant amounts of secondary spread occurred since immature thrips were effectively controlled by several treatments and there remained few significant differences in TSWV incidence.

Efficiency and Performance of Peanut Culture Methods. S. D. UTOMO*, A. K WEISSINGER, H. T. STALKER, and T. G. ISLEIB. Crop Science Dept., N. C. State University, Raleigh, NC 27695-7629.

Regeneration efficiency was measured for immature embryo culture (IEC), embryo axis culture (EAC), imbibed leaflet culture (ILC), and nonimbibed leaflet culture (NLC). Somatic embryos (SE) were produced from immature embryos (IE) by the protocol of Ozias-Akins (1989, 1992) in which the embryonic axis and cotyledons, removed from surface-disinfected immature pods, were cultured on an MS-based medium containing 3 mg/l picloram and 1 g/l glutamine and incubated (28 C, dark). Ninety-four percent of IE culture produced SE as late as 6 wk after plating; 5.5 primary SE were regenerated/IE. Shoots were formed by subsequent culture of SE on three regeneration media (4 wk/medium, 28 C, light). Each cultured SE averaged 0.57 shoot (3.14 shoots/IE). To regenerate plants from EAC, embryo axes (EA) were manually excised from nonimbibed seeds and embryonic leaflets were removed from EA. EA were disinfected, rinsed, placed on hormone-free MS-based medium containing 2% agar, and incubated (28 C, light) for 3-4 wk. Each EA averaged 0.83 shoot. To regenerate shoots from ILC, seeds were disinfected, rinsed, and imbibed for 1 or 4 d. Embryonic leaflets (EL) were then excised, placed on MS-based medium containing 4 mg/l BAP and 2 mg/l NAA, and incubated (28 C, light) for 6-8 wk. With 1 d of imbibition, 2.96 shoots were regenerated/seed; and with 4 d of imbibition, 0.48 shoot/seed. To regenerate shoots from NLC, EL were excised from nonimbibed seed, disinfected, and treated on the same medium and environment as ILC. Each leaflet averaged 4.24 shoots/seed. Based on time required to regenerate shoots, EAC appeared to be the most efficient method and IEC the least efficient method. Based on number of shoots produced, NLC appeared to be the most efficient. Because primary somatic embryos can be cultured continuously, the theoretical number of shoots produced can be infinite. In the greenhouse, IEC-derived R_0 plants flowered later and tended to have a more erect growth habit and a higher number of branches than ILC, EAC, and sexually derived plants.

Minutes of the APRES Board of Directors Meeting
Huntsville Hilton Hotel
Huntsville, Alabama
July 13, 1993

The 25th (Silver Anniversary) annual APRES Board of Directors meeting was called to order at 7:05 p.m. on July 13, 1993. Members present were: Ken Boote, Gale Buchanan, Kim Cutchins, David Dougherty, Dan Gorbet, Dallas Hartzog, David Knauft, Hassan Melouk, Walt Mozingo, Harold Pattee, Norris Powell, Mike Schubert, Ron Sholar, Charles Simpson, Olin Smith, Tom Stalker, Gene Sullivan, Leland Tripp, Ron Weeks, Tom Whitaker, and Scott Wright.

President Mozingo presented a wood-carved peanut and an APRES flag, both made to commemorate the 25th anniversary of the American Peanut Research and Education Society. These will be displayed at the registration table and at the business meeting at future annual meetings.

Approval of 1992 Minutes of the APRES Board of Directors

Minutes of the 1992 Board of Directors meeting were approved as published in the 1992 PROCEEDINGS.

Executive Officer Report - Ron Sholar

The Executive Officer reported that the Society currently has slightly over 600 members. It is anticipated that membership will increase slightly after this annual meeting. The finances will be discussed in detail by the Finance Committee Chair. Dr. Sholar announced that he is serving on the National Peanut Council Board of Directors as an ex-officio member.

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 were held in Minneapolis, Minnesota, on November 1-6, 1992. Approximately 5350 papers were presented. Of these, 21 were devoted to research with peanut and 19 members of APRES authored or co-authored presentations.

The next annual meetings will be held in Cincinnati, Ohio, on November 7-12, 1993.

Southern Association of Agricultural Experiment Station Directors Report - Gale Buchanan

Dr. Buchanan commended the work of Johnny Wynne as a strong member of the Southern Directors. Dr. Buchanan expressed appreciation for Dan Gorbet's good contributions to the CAST Board.

The Experiment Station Directors annual meeting was in San Juan, Puerto Rico, April 12-15, 1993. Three Experiment Station Directors and Associate Directors are no longer in that role.

This is the year for the quadrennial update of the national ESCOP research plan, and Dr. Buchanan expects there to be more careful planning because of the decrease in financial support. Researchers are encouraged to submit proposals for the peanut category of the Southern Region IPM program.

CAST Report - Dan Gorbet

The CAST Board of Directors met in Kansas City on August 29-30, 1992, and in Washington, DC, on February 27, 28, and March 1, 1993. Dr. Richard E. Stuckey was introduced as the Executive Vice-President. Dr. Gale Buchanan served as CAST President through the Washington, DC, meeting and he still serves on the Board of Directors. Dr. Deion D. Stuthman assumed the job of president at the end of the Washington meeting and will serve for 1993-94.

Recent and forthcoming CAST publications will be listed in the CAST Report of the 1993 APRES PROCEEDINGS.

New Book Ad-Hoc Committee Report - Tom Whitaker

The Ad-Hoc Committee met on July 13, 1993, with co-editors Harold Pattee and Tom Stalker and with the authors and co-authors who will prepare chapters for the new book ADVANCES IN PEANUT SCIENCE. Seventeen chapter titles have been identified by the editors and to date, 7 of the 17 chapters have been submitted. The editors plan to distribute the new book by the 1995 APRES meeting. The editors indicated the exact price of the book should be set before July 1994 if possible.

A motion was made and seconded that a contract be signed with Pierce Printing, Inc., of Ahoskie, North Carolina, as the printer of ADVANCES IN PEANUT SCIENCE. Motion passed.

After much discussion on the price of the new book, ADVANCES IN PEANUT SCIENCE, it was moved and seconded that the price of ADVANCES IN PEANUT SCIENCE be approximately double the production cost. Motion passed.

The Board discussed promotion and sales efforts for the new book. It was moved and seconded that the Publication and Editorial Committee, working in consultation with Kim Cutchins and the National Peanut Council, work on promotion and sales of the new book. Motion passed.

Joe Sugg Graduate Student Award Committee Report - Hassan Melouk

The committee consists of Hassan Melouk, Tom Stalker, John Wilcut, David Knauft, and James Gricher and its charge was to study and make recommendations on the Joe Sugg Graduate Student Award. After lengthy discussion, the following recommendations were approved by the Board:

1) The student papers in the competition should be also eligible for the Bailey Award if all the requirements for the Bailey Award are met.

2) Establish a standing Joe Sugg Graduate Student Award Committee, with members serving a three-year rotating term.

3) The chair of the Joe Sugg Graduate Student Award Committee will select five judges, which may include three of the committee members in consultation with members present. A judge cannot be a co-author on a paper in the graduate student competition session.

4) Papers in the graduate student competition should be distributed among the technical sessions but with the discretion of the technical program committee chair.

5) Papers in the graduate student competition should be properly identified in the printed program to denote the Joe Sugg Award competition.

By-Laws Ad-Hoc Committee Report - Norris Powell

Norris Powell presented changes that his committee is suggesting for the By-Laws. Most changes were language changes but one major change is to delete the National Peanut Council Research and Education Award Committee since APRES is no longer involved with that. One addition to the By-Laws was made in Article IX Committees, where it was recommended that the Joe Sugg Graduate Student Award Committee be made a standing committee. Other additions to Article IX Committees, Section 2, include:

Finance Committee - add the sentence "Appointments in all categories shall rotate among the three U.S. peanut production areas."

Fellows Committee - add the sentence "Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS OF APRES."

Coyt T. Wilson Distinguished Service Award Committee - add the sentence "Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS OF APRES."

A motion was made that the changes to the By-Laws be approved as rewritten with the exception that the proposed section on the Joe Sugg Graduate Student Award Committee be stricken. It was agreed that more work was needed on the Joe Sugg Graduate Student Award and that this be deferred to a future time. Motion passed.

Nominating Committee Report - Charles Simpson

After having consulted with numerous members and having discussed a willingness to serve the Society with the nominees, the Nominating Committee submitted the following slate of representatives to the Board for 1993-94:

President Elect	Dr. William C. Odle
State Employee Rep from SE	Dr. David Knauft
Industry Manufacturing	Dr. Wilbur A. Parker

This slate will be presented to the membership during the 1993 business meeting for their approval.

Finance Committee Report - Scott Wright

As of June 30, 1993, the year's receipts were $71,358.95 and expenditures were $69,779.83, giving an excess of receipts over expenses of $1,579.12. The total fund balance as of June 30, 1993, is $137,925.28.

The proposed budget for 1993-94 is $72,075. The Finance Committee recommended that the PEANUT SCIENCE AND TECHNOLOGY books be revalued downward from $22.96 to $10.00. APRES is currently selling the book for $15 for individual copies and $10 per book if purchased in volume. This will show as a big decrease in book inventory value but will reflect a more accurate picture of the actual book value. Ron Sholar explained this book devaluation and also explained contributions made to APRES for the annual meetings.

There was a motion and second that the Finance Committee Report be accepted with the 1993-94 proposed budget of $72,075 and the PEANUT SCIENCE & TECHNOLOGY book devalued to $10.00. Motion carried.

Fellows Committee Report - Olin Smith

Dr. Olin Smith reported that four nominations had been received for Fellowship in APRES. Evaluations were made and submitted to the Board of Directors for selection of two recipients who will be announced at the 1993 business meeting.

National Peanut Council Education Award - Leland Tripp

Four nominations were received from the National Peanut Council for evaluation. After committee members had evaluated them, the team of Dale Carley and Stanley Fletcher was selected and they were presented the award at the NPC meeting.

Kim Cutchins expressed her appreciation for the good job APRES has done in selecting the NPC Education Award winner. This 1993 award will be the last year that APRES will be involved in this process. The National Peanut Council will handle all aspects of the award process and APRES will no longer make recommendations on award nominations.

Bailey Award Committee - Ken Boote

The winners of the Bailey Award from the 1992 presentations were A. K. Culbreath, J.W. Todd, and J. W. Demski for the paper "Comparison of hidden and apparent spotted wilt epidemics in peanut". Eight nominations from the 1992 eligible papers were judged by the six Committee members.

Dr. Boote, with the assistance of Tom Stalker and the Committee, proposed new criteria for approval of the Board:

1) The presenter of a nominated paper, whether first or second author, should 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 other criteria for eligibility, such as membership.

3) The presenter of the paper will be awarded the bookends with the other authors appropriately recognized.

There was a motion that these recommendations be approved and the full set of guidelines be published in the next issue of our PROCEEDINGS. Motion carried.

Coyt T. Wilson Distinguished Service Award Committee Report - David Dougherty

The Coyt T. Wilson Award Committee met by letter and telephone this spring and selected the fourth recipient to received this award. The recipient will be announced at the business meeting. After discussing a deadline for nominations, it was moved and seconded that March 1 be the deadline date for nominations. Motion carried.

DowElanco Award Committee Report - David Knauft

The DowElanco Awards Committee updated the guidelines for both the research award and extension award. This year nominations were received for both awards and were voted on by committee members. The winners will be announced at the 1993 business meeting. This committee will remain an ad hoc committee and will not become a standing committee.

Public Relations Committee - Dan Gorbet

Dr. Gorbet distributed copies of an updated APRES brochure that the Committee has been working on. The new brochure will be available by the 1994 APRES meeting.

The Public Relations Committee sent out a press release prior to the 1993 APRES meeting. It is the committee's desire to have pictures available from each meeting to compile in a scrapbook for members to browse through. A couple of people are lined up to be photographers at this year's meeting.

Dr. Gorbet reported two deaths this past year--Leonard Cobb and Keith Middleton. Resolutions on these men will be read at the business meeting.

Peanut Quality Committee - Gene Sullivan

Dr. Sullivan announced that Tim Sanders has taken responsibility to follow up on the Quality Methods handbook to see if we can get some additional methods verified and published.

The committee expressed concern that we do not have a good definition of quality that is satisfactory for all the groups involved in marketing peanuts and providing quality to the consumer. It was suggested that we have a quality symposium in 1994, scheduled at a time when everyone would be available to attend. After lengthy discussion, it was moved and seconded that the 1994 APRES meeting in Oklahoma include a Peanut Quality Symposium and that there be no concurrent sessions during this symposium. Motion carried.

Site Selection Committee Report - Ron Weeks

Members present at the Site Selection Committee meeting on July 13 were: Ron Weeks, John Damicone, Tom Isleib, Jerry Bennett, and Danny Colvin.

Dr. Weeks reported that next year's meeting will be held at the Mariott (previously Sheraton-Kensington Hotel) in Tulsa, July 12-15, with rates at $55 for single/double and $65 for triple/quad. The 1995 meeting will be held in Charlotte, North Carolina, July 11-14. There was a motion and a second that a contract be made with the Adams Mark Hotel for the 1995 APRES meeting in Charlotte. Motion carried.

For the 1996 meeting, the committee recommended meeting in Orlando at the Omni Hotel with rates set at $75. This hotel will be built in the near future and if it is not completed when we need it, the Clarion Plaza, which has the same owner as the new Omni will be the meeting site. The Board instructed the Site Selection Committee to proceed with getting a formal proposal with the Omni Hotel.

Publications and Editorial Committee Report - Mike Schubert

Members present at the Committee meeting were Walt Mozingo, Dave Hogg, Austin Hagan, Marvin Beute, Tim Brenneman, Harold Pattee, Corley Holbrook, and Mike Schubert. This committee recommended that short parenthetical references could be included in the abstracts in the PROCEEDINGS if they refer to methods or some kind of critical information that couldn't be reasonably spelled out in that short document and otherwise fit the style for the abstracts. The committee suggested that this not be added to the guidelines but let the Program Committee know it could be done.

Dr. Schubert reported that about half the current manuscripts to PEANUT SCIENCE are submitted on diskette now and there have been no problems with this. The Institute for Scientific Information has been sent two copies of PEANUT SCIENCE for their consideration of including it in CURRENT CONTENTS.

PEANUT SCIENCE operated at a profit last year with 38 manuscripts submitted since the 1992 APRES meeting. It was moved and seconded that the Board approve the following replacements on the Editorial Board (if the proposed individuals agree to serve): Gary Gascho to replace Floyd Adamsen; Mike Schubert to replace Craig Kvien, Pat Phipps to replace Fred Shokes, and Corley Holbrook to replace Charles Simpson. Motion passed.

PEANUT RESEARCH editor Corley Holbrook requested that award committees get their guidelines to him quickly after this annual meeting for inclusion in the July-September issue of PEANUT RESEARCH. Craig Kvien has asked to be replaced as co-editor and Marie Griffin will be asked to assume his position if she will join APRES. If she decides not to join APRES, she will be asked to be reference section author of PEANUT RESEARCH.

After 18 years of serving as editor for PEANUT SCIENCE, Dr. Harold Pattee will be stepping down as of July 1994. The Publication and Editorial Committee will begin the search for a new editor with the deadline being January 1, 1994. Dr. Pattee will assist the new editor until December 1994 to help with the transition period.

Program Committee Report - Dallas Hartzog

Mr. Hartzog welcomed everyone to Alabama for the 1993 APRES meeting. He reported there are 133 papers to be presented and social events for everyone.

With no further business the meeting adjourned.

Respectfully submitted,

James R. Sholar, Executive Officer

Opening Remarks by the President at the 1993 (Silver Anniversary) Business Meeting of APRES

July 10, 1993

R. Walton Mozingo

Good morning and welcome ladies and gentlemen to the Awards Presentation and Annual Business Meeting of the American Peanut Research and Education Society (APRES). As you know, we have been celebrating the Silver Anniversary of our Society this week here in Huntsville, Alabama. To commemorate this occassion, we had an APRES flag and super-large, hand carved peanut made and presented to the Society at the Board of Directors meeting Tuesday night. They are before me this morning at the podium and will become a part of our Society for display at future meetings.

Many thanks are in order for making our Silver Anniversary a huge success. On behalf of the Society and as your President, I say "thank you" to all those from the host state of Alabama who have worked long hours to make our stay both an entertaining and learning experience. Special thanks are due Dallas Hartzog and his committees for planning and organizing our Silver Anniversary Meeting. Dallas, thanks for a super job and please stand and be recognized. I would like to recognize Ron Weeks and Greg Gregory for their leadership of the Local Arrangements Committee. Ron, would you, Greg, and the other members of the committee please stand and be recognized? The Technical Program Committee, under the leadership of Austin Hagan, put together a tremendous program, fitting 130 papers and posters into a limited time frame. Would Austin and his committee please stand and be recognized? Thanks are also due the Spouses' Program Committee, chaired by Teresa Smallwood, for the tour of Huntsville's Historic District and a day of outlet shopping in Boaz. I would ask Teresa and her committee to please stand and be recognized. The names of all committee members are listed in your program. Please take time to thank these people for their efforts in making our Silver Anniversary Meeting successful.

We also express our sincere appreciation to the companies that supported special events. Rhône-Poulenc sponsored the Ice Cream Social on Tuesday evening, ISK Biotech gave the Reception at the Space and Rocket Center on Wednesday evening, American Cyanamid hosted the Silver Anniversary Celebration on Thursday evening, and DowElanco and Valent co-sponsored the Awards Breakfast this morning. The Society says "thank you" to all these companies and their representatives for their wholehearted support. APRES is also indebted to the many contributors listed in the program. We appreciate their financial and product contributions for breaks and regular events.

On a personal note, I would like to thank Ron Sholar, our Executive Officer, for his usual super job during the year and for assisting me throughout my term as President. His guidance and assistance have made my job much easier. Also, thanks to Ron's wife, Linda, for her help with registration at the meeting. The Society is also fortunate to have a talented person such as Pam Gillen for secretarial assistance. She has been a tremendous help to me during the year and for that I am grateful. I would be remiss if I did not publicly thank Carolyn Crowder, my secretary back in Virginia, for her patience and loyalty during the year. Her sincerity and dedication to my work as President are appreciated.

I would like to express my appreciation to all committee chairs and their members for their service during the past year. I don't recall asking a single person to assist in any duty in which they declined. This speaks well for our members and their dedication to the work of the Society. Many hours of work went into determining seven award winners, writing and editing preliminary chapters of ADVANCES IN PEANUT SCIENCE, revising the bylaws, and performing the normal duties of the standing committees. To each of you, I say "thanks for a job well done", as APRES has again been successful in this its 25th year.

Now, I would like to make a few comments as your 25th President. Dramatic changes have taken place during the past 25 years in the peanut industry as well as our nation and the world. Man has walked on the moon, Communist Russia has become a free nation, our economy at home has slipped considerably, and a college education no longer guarantees one a job.

In comparing my expenses from our first meeting in Atlanta in 1969 to today's prices, I find that the prices for meals increased 4.6 times, lodging increased 8 times, and traveling by air during the same time frame increased 8.9 times. How does that compare to the price of peanuts received by our growers? In 1969, the farm price of peanuts was approximately $14/cwt compared to $33.60/cwt this year. The 1993 price is 2.4 times the 1969 price, which does not compare favorably with the 4.6, 8, and 8.9 times increase for meals, lodging, and air travel, respectively.

One might ask how our peanut growers could continue to exist given these figures. I think the answer is right here in this room with APRES members who are researchers, extension personnel, and peanut industry representatives. You have made major contributions toward yield increases during this period.

In 1969, the Southeast and Southwest were growing runner and spanish types with yields around 1800 lb/A. Today, most of the acreage is in runner-type varieties, with yields recorded as high as 3350 lb/A for an entire state average. During the past 25 years in the Virginia-Carolina production area, we have seen yields increase from the 2325 lb/A average in 1969 to a 3200 lb/A average for an entire state.

Many factors contributed to these dramatic increases, but two come to my mind rather quickly. First, the release of varieties with high-yield potential has made a major contribution. The Florunner variety changed peanut production in both the Southeast and the Southwest production areas. New varieties such as NC 7 helped increase the yields in the V-C production area. The second factor has been the ability to control the disease leafspot. Here is a case of industry providing better pesticides, and research and extension refining application systems and delivering this message to the growers. So, we see an example of the total peanut industry involved in increasing yield potential, just as they are also involved in the work of this Society.

Of course, many other factors have also contributed to the yield increases during the past 25 years. Modern machines, such as precision planters, more efficient irrigation systems, inverter diggers, and improved combines, have been tremendous assets. Computer-aided production has come on the scene as we now have models to assist with input decisions. Disease advisories and assays have resulted in reduced pesticide usage. Better chemistry from industry has resulted in pesticides that are safer and provide better weed, disease, and insect control, while reducing the rates applied to the crop compared to previously used pesticides.

The quality of USA peanuts is the envy of the world. We produce the best flavor of any peanut grown with the longest shelf life and desired texture. It is a real tribute to our industry to be able to supply the world with this wholesome product, while not receiving significant income increases compared to other segments of the economy.

Even with our wealth of knowledge and experience, we are still humbled by mother nature occasionally. Following the 1980 and 1990 droughts, we obtained average yields that were below the 1969 level. We have, however, solved many problems and have had new challenges to come before us, as is the case with diseases such as Sclerotinia blight, tomato spotted wilt virus, and CBR, to name a few which we must strive to find adequate control.

As we have been successful in our work, we have also grown in number in this Society. In 1969, we had a total membership of 183 and grew to a high of 742. With slightly fewer members today, we still have every opportunity to continue solving the problems before us in the peanut industry, whether they are in production, shelling, manufacturing, or marketing.

You, the members of APRES, have been extremely productive as a Society. Since our beginning in 1969, the journal "Peanut Science" has become a reality. We have published two books and are in the process of writing and editing ADVANCES IN PEANUT SCIENCE which will be published in 1995. Our budget has grown from $1,119.34, transferred from our previous organization Peanut Improvement Working Group (PIWG), to our current assets of over $137,000. This is over a 123-fold increase, so we have prospered even more than the airline industry which I mentioned earlier had increased airfare by 8.9 fold.

My challenge to you, as we begin our next 25 years and work toward our Golden Anniversary Celebration in 2018, is to strive to meet the challenges and opportunities before us in the peanut industry. By meeting these challenges, we can continue to supply the world with the best quality peanut at a competitive price.

It has been an honor and pleasure to have been your 25th President. Thanks for the joys and opportunities of the past year and I intend to continue my service to you in the future.

Technology in Agriculture -- The Next 25 Years

G. A. Buchanan
The University of Georgia Coastal Plain Experiment Station
Tifton, Georgia

You've given me quite a challenge, but a great opportunity to share a few thoughts about where I think agriculture is going in the immediate future. While some of my remarks are of a general nature, I would like to direct most of my presentation towards technology as it pertains to peanuts.

First, I'd like to share a couple of famous quotes:

"Everything that can be invented has been invented."
C. Duell, Director, US Patent Office, 1899

"There is no likelihood man can ever tap the power of the atom."
Robert Milliken, Nobel Prize Physics, 1920

Obviously, the authors of these quotes didn't anticipate evolving technology. What are the things that have happened in your lifetime that you thought impossible? I can certainly think of one. I can still remember how miserable one could feel while "hoeing" crabgrass out of peanuts in the early 1950s. "Hoeing" is in quotes simply because you know, as well as I, that it took the thumb and forefinger to get most crabgrass out of peanuts -- certainly not a hoe.

Now, think for a minute: What are the things impacting on peanuts that you think impossible for the next 25 years? Please think for just a moment. Of course, I don't know what you're thinking, but I'll bet some of your "impossibilities" will become reality. That, in essence, is what I see as technology in agriculture in the next 25 years. Certainly, there are many incremental changes in technology, but I strongly suspect there will be a few major technology shifts.

In a consideration of technology as it impacts on peanuts, it is imperative that we recognize the pitfalls in trying to envision the future. This is especially true with a crop that by its nature led to the title of a book, "The Peanut -- The Unpredictable Legume." Also, peanuts have, in this country, become inextricably intertwined with governmental farm programs since the 1930s. Some would say that the future of any farm program that costs money is bleak. The situation is further complicated by the fact that peanuts are grown widely throughout the temperate climates of the world, with major production on five continents. At this point, you are probably skeptical about anything that I might have to say about the future of technology and its impact on peanuts.

At the outset, let's recognize a few pertinent positive facts about peanuts. First, peanuts have many highly desirable traits that contribute to their usefulness as a food source. They are highly nutritious, as well as quite tasty, and are an integral part of American culture. Who could imagine no more peanut butter and jelly sandwiches or a baseball game without roasted peanuts? Another pertinent fact is that we can grow peanuts in much of the southern United States. It's also important to recognize that peanuts have responded remarkably well to research, with ready adaption to new technology. Consequently, there is little doubt that new developments in agricultural technology will be quickly accepted by the peanut industry.

On the down side is the fact that peanut production in the U.S. today is highly affected by farm commodity programs. While this issue is of great concern and must be factored in the future of peanuts, I don't believe it alone will decide the future of peanut production in the United States. Indeed, farm programs will play a crucial role in the profitability of peanuts in the short run, while ultimately the future of peanuts will be determined by the ability of the entire peanut industry to work together and meet the demands of a changing market. The effectiveness of our research and education programs and ready acceptance of new technology will play a key role in meeting these demands.

In the final analysis, the future of peanuts will be highly dependent upon the receptivity of all involved to new technology. Certainly, the grower has a precarious balancing act just to survive with a Program, and an even greater challenge without a Program. But I would like to spend my time this morning in visualizing emerging agricultural technology and how research and education can contribute to the ultimate success of peanuts as a crop in this country.

GENETICS AND BREEDING

When we think of emerging technology, one of the first things that comes to mind is "biotechnology." Genetics, breeding, and related areas of science are important to the future of peanuts. While traditional breeding programs have had a major impact on peanuts over the past half century, there is little doubt that they will contribute even more in the future. Goals remain essentially unchanged. They embrace developing high yielding cultivars, increased pest resistance, resistance to aflatoxin formation, more nutritious and flavorful peanuts, as well as longer shelf life of nuts, increased shell-out, and milling efficiency. If this is not enough, there is urgent need for greater uniformity and better blanching qualities of peanuts.

Tools of biotechnology will be an important means in assisting the breeder in meeting these goals. Recently developed techniques for transferring foreign genes to peanut tissues in culture and for regeneration of whole plants from these transformed plants are, indeed, very powerful tools. This will enable more rapid and effective incorporation of certain desirable traits into useful existing or completely new cultivars. For example, introduction of fungal resistance genes that can inhibit fungal invasions and growth during the preharvest phase of production could be an effective means of reducing the problem of aflatoxin in peanuts. Aflatoxin-free peanuts is perhaps one of your "impossibilities"; but I doubt it will remain an impossibility in the foreseeable future.

Success in the genetic and breeding arena will demand an exceedingly high level of cooperation among scientists. Following gene isolation, transformation, and regeneration, transgenic plants resulting from biotechnology research will also need to be incorporated as quickly as possible into current mainstream breeding programs. Such elaborate transfer techniques should be ideal for a few major genes. However, inherent somaclonal variations and modifying effects will then have to be differentiated in much the same way as breeding programs begin handling segregating cross populations. Consequently, for such qualitative traits, in addition to quantitative traits such as yield, peanut breeding programs will continue to be absolutely necessary in the actual utilization of all material through hybridization, selection, and evaluation in the development of superior cultivars for the 21st Century.

It is quite apparent that the future of peanuts is tied closely to genetics, breeding, and related programs. Collection, preservation, and systematic screening of the world germplasm resources will also be absolutely essential in the identification of valuable pest and stress resistance genes. Once these desirable genes are identified, it will be challenging to incorporate them into useful germplasms. But it will be done. While the job certainly won't be complete in the next 25 years, both you and I will be amazed at how much progress will be made during that time.

During the next 25 years you'll see peanut cultivars that possess many of these highly desirable aforementioned traits. In addition, such cultivars will lend themselves to more efficient harvesting and processing.

CULTURAL PRACTICES

Production of high quality peanuts with fewer inputs will continue to be a prime consideration for success of peanuts in the future. Production parameters, including fertility, irrigation, planting, cultivation, rotation, and harvesting, are rather routine, but I believe there are great opportunities for improved technology that will contribute to a brighter future for peanuts.

Improving efficiency of production demands that inputs be as efficiently used as possible. We must use existing data, where available, or develop new data so that lime and fertilizer materials are used precisely in the amount and manner that are most efficient for maximum productivity and acceptable quality of harvested peanuts. I know we are making progress in this area because for the first time in the history of the Georgia/Florida/Alabama peanut production area, fertility recommendations will be similar throughout this geographical production area. That is no small accomplishment in light of the situation where, a few years ago, we couldn't even agree on the lime recommendation in Georgia alone. But this is only the beginning. Emerging technology such as rapid tissue analysis and quick non-destructive tissue tests will make providing proper soil fertility even more of a science than it is today.

Supplemental irrigation is a requirement for much of the U.S. Both production and quality are impacted by moisture or, especially, by the lack of moisture. Opportunities for improving tolerance to stress through breeding, as well as developing more efficient means of irrigation, hold great promise. The fact is that moisture will be a concern for the foreseeable future. The challenge is to minimize the cost of supplemental irrigation, as well as the impact of drought on the peanut.

It is a relatively safe assumption to expect real progress in the development of cultivars that have greater tolerance for various levels of moisture. Cultivars will be developed that are more determinate and more readily adapted for irrigated peanuts, whereas more indeterminate behavior for non-irrigated plantings.

There are great opportunities for a major improvement in water delivery technology, particularly in precision scheduling of sprinkler irrigation and use of high efficiency drip irrigation systems. This is, indeed, an area that begs for more attention.

Production systems that include various rotation sequences have not received adequate research emphasis. Most such studies reveal more questions that are unanswered than are answered. The obvious conclusion is that there are tremendous opportunities for enhanced productivity through developing rotation sequences for production. I'm convinced there will be some major breakthroughs in technology in more effectively designing production systems for peanuts that will ensure higher levels of productivity. I'm not sure what those rotation crops are, but I'm confident there are more efficient systems for dealing with pest problems such as nematodes.

Production systems that employ innovative tillage practices must be more thoroughly explored. It is apparent that the future of peanuts will require that we be willing to look at all cultural practices in a creative and more innovative fashion. The opportunities are there if we will only be vigilant in our research and communication endeavors.

One of the greatest opportunities for enhanced technology is development of "system science" as it pertains to peanuts. As more definitive models are developed for various aspects of peanut production and processing, there will be greater opportunities for development of comprehensive production and processing practices. Such information can be reduced to programs that can be processed by powerful personal computers that will be in the pickup with the grower. Every input that goes into a crop will be entered into the system plan to get a projected impact. While one should not expect complete answers, such information will certainly aid in the decision making process.

PESTS

One of the major areas in agriculture that is poised for a major leap in technology is in mitigating the effects of plant pests. Disease, nematodes, weeds, and insects are all important and must be dealt with in the most expeditious manner. "Managing" rather than "controlling" will be the operative term for dealing with pests in the future. It goes almost without saying that constraints on "how" pests are managed will become more and more severe.

Environmental issues and food safety concerns are here to stay, and future management strategies will factor in such parameters. The bottom line is that we must become smarter in our approach to dealing with pests. Simply put, pests management treatments must (1) be employed only when the economics justify, (2) be used in the most effective manner, and (3) be employed at the most opportune time.

The aforementioned points of consideration are quite simple, yet to be addressed adequately requires a particularly high level of technology. Skilled and highly innovative management will become increasingly necessary in implementing such technology.

When Should Control Measure be Implemented?

Establishing economic thresholds for pests under virtually an infinite and continually changing set of circumstances is, indeed, a challenge. But, while progress has been made, much, much more research must be done. Threshold research is complex because not only must short-term impact of pests be assessed -- long-term impact on subsequent pest populations is also an important factor to be considered.

A great deal of research remains to be done in this area, but data regarding the quantitative effect of pests can be incorporated into overall crop production system models. In the next 25 years we will see the technology develop to the point that knowing when to implement control practices will be established on a purely scientific and defensible basis.

How Should Control Measures be Employed?

The question of "how" pest control measures, particularly pesticides, should be employed is a challenge, but lends itself to emerging technology. Some of the most dramatic new technologies will be in the area of pesticide formulation; but don't be surprised by innovative breakthroughs in spray application technologies. Electrostatic sprayers is just one example of innovative spray technologies. "Closed system" sprayers will be developed such that they will become the norm when agricultural chemicals are applied.

Time of Application of Control Measures

Timeliness of use of pest management strategies is a necessary component of successful pest management. This is one area where we all might be surprised at how far technology might go in 25 years. Progress has been made in some areas, such as the correlation of fungicide application with certain environmental parameters. However, much more definitive research is needed to refine such techniques for full implementation. Such refinement will obviously include automated soil, crop, and weather monitoring and computer programs so that a farmer can easily evaluate his particular situation using the computer program to come up with specific courses of action.

The future of dealing with pests will require a greater knowledge and understanding of pesticides. The loss of secondary butyldinitrophenol (dinoseb) a few years ago illustrates the important concern about the use of pesticides and their loss in controlling pests.

Evaluation of pesticides for human and animal toxicity and for other environmental effects will become more automated and definitive as analytical methods in laboratories improve. This will lead to release of new, safer pesticides that target the pest more specifically. Continued increase of efficacy will undoubtedly occur, resulting in less pesticide released into the environment. We can expect to see some pests effectively managed by specifically targeted biological agents.

ECONOMICS AND MARKETING

Future success of peanuts is obviously highly correlated to success in marketing. It makes little difference how successful peanut production might be; if not marketed effectively, the outcome will not be desirable.

Peanuts are consumed either directly or after minimum processing. Consequently, taste, wholesomeness, uniformity, shelf life, nutrition, and other quality parameters are of great importance. The future of peanuts will be highly contingent upon how successful the industry is in meeting these expectations of the consuming public.

Quality, or even perceived quality, simply cannot be over-emphasized. We cannot lose sight of the fact that agriculture is in the business of producing food, not in engineering social attitudes and changes. If the public demands no aflatoxin, we simply have no choice but to develop the technology that will enable us to produce peanuts without aflatoxin and put them on the market for the consumer. If the market demands some organically grown peanuts, somebody should be gearing up to put organically grown peanuts on the market.

There are two particularly relevant points regarding marketing: first, we must have unbiased market opportunities. Agriculture is truly global in nature, and, therefore, we must be vigilant in assuring that our national leaders provide a level playing field -- or, rather, marketing field for U.S. peanuts as well as for peanuts grown abroad. Second, all facets of the industry must recognize that they have a stake in marketing. Consequently, it is critically important that we understand and appreciate the profit motive of each segment of the industry, but yet, at the same time, be willing to submerse our individual concerns for the common good of the total industry. The opportunity for enhanced technology in these areas is obvious. We simply will see, within the next 25 years, almost instant communications with every peanut and marketing area of the world. The trick for us in this country is to figure out how to use such technology more effectively than do our competitors.

The few points I have made reflect not only some of my thoughts, but also the thoughts of several scientists at the UGA Coastal Plain Experiment Station. We might not be completely right on all of our thoughts for the future, but I am firmly convinced that we are going to see tremendous strides in enhanced technology as it affects agriculture and, certainly, peanuts in the future. Another particularly important question is, "Who is going to develop this new technology?" The answer is obvious: "You!" This industry has a lot riding on this issue. To be successful and compete globally will require that we develop the technology that will give us the competitive edge.

Perhaps the greatest opportunity in meeting the technological challenges in the next 25 years lies in the arena of communication. Each segment of the peanut industry must -- indeed, it is imperative -- be knowledgeable and remain flexible about technological developments in other segments of the industry. If a new cultivar is developed that has specifically desirable traits, ways must be found to process it! Industry also must be willing to compensate for such desirable traits.

We must not lose sight of the fact that we are in a highly competitive business. There are many peanut producing areas that want our market share -- and they will get it, unless all facets of the industry work together. Based on past experiences, I would expect the peanut industry to be at the forefront in accepting such new technology.

Acknowledgement

This is to gratefully acknowledge the contributions of Drs. Bill Branch, Peggy Ozias-Akins, James Todd, Albert Culbreath, Jim Hook, Craig Kvien, Gary Gascho, John Wilcut, and Carroll Johnson for suggestions, ideas, and a critical review of this manuscript.

Business Meeting and Awards Ceremony
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Hilton Hotel
Huntsville, Alabama
July 16, 1993

The meeting was called to order at 8:35 a.m. by President R. Walton Mozingo. The following items of business were conducted:

1. President's Report - Walt Mozingo

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

   a. Fellows - Olin Smith

   b. NPC Research and Education Award - Leland Tripp

   c. Bailey Award - Ken Boote

   d. Graduate Student Competition (Joe Sugg Award) - Hassan Melouk and Fleet Sugg

   e. DowElanco Awards for Research and Education - Johnny Wynne and Dennis Hale

   f. Coyt T. Wilson Distinguished Service Award - David Dougherty

   g. Past President's Award - Walt Mozingo

   h. Peanut Science Associate Editors - Harold Pattee

   i. 1993 Golf Tournament - Eddie Ingram

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 - Ron Sholar

   b. Ad Hoc Committee Reports

      1) New Book - Tom Whitaker

2) Changes to By-Laws - Norris Powell

Several changes to the By-Laws were discussed and approved by the Board of Directors. Most changes were language changes but one major change is to delete the National Peanut Council Research and Education Award Committee since APRES is no longer involved with that. Other changes occurred in Article IX Committees, Section 2. Members voted to approve the revised By-Laws. The revised By-Laws will be printed in the 1993 PROCEEDINGS.

c. Nominating Committee - Charles Simpson

d. Finance Committee - Scott Wright

e. Public Relations Committee - Dan Gorbet

f. Peanut Quality Committee - Gene Sullivan

g. Site Selection Committee - Ron Weeks

h. Publications and Editorial Committee - Mike Schubert

i. Program Committee - Dallas Hartzog

4. Mr. Mozingo turned the meeting over to the new President, Dallas Hartzog of Alabama, who then adjourned the meeting.

FINANCE COMMITTEE REPORT

The Finance Committee met at 4:00 p.m. on July 13, 1993, in Huntsville, Alabama. Committee members present were: W. C. Odle, Fred Cox, Ron Sholar (ex-officio), and Scott Wright. Others present included Harold Pattee and Walton Mozingo.

The Committee reviewed and approved the financial report presented by Executive Office, Ron Sholar. For the year, the Society received a total of $71,358.95 and expended $69,779.83 for an excess of receipts over expenditures of $1,579.12.

The June 30, 1993, assets totalled $137,925.28, which is a $2,714.40 decrease over the June 30, 1992, balance of $140,639.68. Assets included (in round numbers) $88,700 in savings, $29,000 in checking, and $20,300 in book inventory.

The financial statement for PEANUT SCIENCE was presented by Harold Pattee, Editor. Income exceeded expenditures of $22,980.77 by approximately $3000.00.

The Committee discussed a total budget for Fiscal Year 1993-94 for APRES.

Two recommendations were presented and approved by the Board:

1) The PEANUT SCIENCE AND TECHNOLOGY books in inventory be valued at $10.00 each instead of the current value of $22.96 each.

2) A proposed total budget for APRES of $72,075 for Fiscal Year 1993-94 be accepted. A copy of the budget will be published in the PROCEEDINGS.

The meeting adjourned at 5:30 p.m.

Respectfully submitted,

F. Scott Wright, Chair

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BUDGET 1993-94

RECEIPTS

Annual Meeting Registration	$15,000
Membership Dues	15,425
Special Contributions	16,000
Differential Postage	2,500
Peanut Science & Technology	1,000
Quality Methods	50
Proceedings and Reprint Sales	100
Peanut Science Page Charges & Reprints	17,000
Interest	5,000
TOTAL RECEIPTS	**$72,075**

EXPENDITURES

Annual Meeting	$22,000
CAST Membership	1,000
Office Supplies	1,500
Secretarial Services	11,000
Postage	2,500
Travel - Officers	1,200
Legal Fees	500
Proceedings	2,800
Peanut Science	25,475
Peanut Science and Technology	100
Peanut Research	1,500
Quality Methods	100
Bank charges	150
Miscellaneous	250
On-line Computer Search Capability	2,000
TOTAL EXPENDITURES	**$72,075**

Excess Receipts over Expenditures	0

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BALANCE SHEET FOR FY 1992-93

ASSETS	June 30, 1993	June 30, 1992
Petty Cash Fund	$ 429.01	$ 345.84
Checking Account	28,536.76	30,673.39
Certificate of Deposit #1	19,245.35	18,468.41
Certificate of Deposit #2	12,327.64	11,853.13
Certificate of Deposit #3	11,531.51	11,106.64
Certificate of Deposit #4	30,197.09	28,882.74
Certificate of Deposit #5	11,426.61	10,795.21
Money Market Account	2,746.06	2,662.25
Savings Account (Wallace Bailey)	1,188.61	1,261.91
Inventory of Books	20,296.64	24,590.16
TOTAL ASSETS	**$137,925.28**	**$140,639.68**
LIABILITIES		
No Liabilities	0.00	0.00
TOTAL FUND BALANCE	**$137,925.28**	**$140,639.68**

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

RECEIPTS	June 30, 1993	June 30, 1992
Annual Meeting Registration	$16,667.00	$15,015.00
Award Income	300.00	0.00
Contributions	9,750.00	28,827.00
Differential Postage	2,686.50	2,193.00
Dues	17,334.00	14,984.00
Interest	4,428.12	5,361.77
Peanut Research	40.00	0.00
Peanut Science	958.00	15,369.50
Peanut Science Page Charges	15,696.33	-
Peanut Science and Technology	2,090.00	1,475.50
Proceedings	59.00	143.00
Quality Methods	0.00	55.00
Spouse Registration	1,310.00	1,918.00
Other Income	40.00	0.00
TOTAL RECEIPTS	**$71,358.95**	**$85,341.77**
EXPENDITURES		
Annual Meeting	$19,127.58	$19,155.52
Bank Charges	130.25	131.00
CAST Membership	520.00	30.00
Corporation Registration	270.00	55.00
Federal Withholding	343.00	0.00
FICA	636.84	0.00
Legal Fees	250.00	270.00
Medicare	148.92	0.00
Miscellaneous	110.00	-
Office Expenses	2,955.52	1,527.61
Oklahoma Withholding	128.79	0.00
Peanut Research	2,988.86	3,638.24
Peanut Science	24,073.49	23,571.93
Peanut Science and Technology	0.00	118.18
Postage	2,798.80	1,558.74
Proceedings	2,630.30	3,265.12
Quality Methods	0.00	0.00
Sales Tax	44.70	35.12
Secretarial Services	9,685.70	10,340.00
Spouse Program Expenses	1,573.93	-
Travel - Officers	1,137.15	365.85
Other Expenses	226.00	-
TOTAL EXPENDITURES	**$69,779.83**	**$64,062.31**
RECEIPTS OVER EXPENDITURES	**$ 1,579.12**	**$21,279.46**

PEANUT SCIENCE BUDGET
1993-94

Income	
Page and reprint charges	$17,000.00
Foreign mailings	1,100.00
APRES member subscriptions (522 x $13.00)	6,786.00
Library subscriptions (82 x $15.00)	1,230.00
TOTAL INCOME	**$26,116.00**
Expenditures	
Printing and reprint costs	$16,200.00
Editorial assistance (750 hours)	6,750.00
Miscellaneous	500.00
Computer usage	200.00
Office supplies	50.00
Postage, domestic	675.00
Postage, foreign	1,100.00
TOTAL EXPENDITURES	**$25,475.00**

PEANUT SCIENCE AND TECHNOLOGY
SALES REPORT AND INVENTORY ADJUSTMENT
1992-93

	Books Sold	Remaining Inventory
Beginning Inventory		1071
1st Quarter	122	949
2nd Quarter	32	917
3rd Quarter	25	892
4th Quarter	8	884
TOTAL	187	

187 books sold x $22.96 = $4,293.52 decrease in value of book inventory.

884 remaining books x $22.96 (book value) = $20,296.64 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

PUBLIC RELATIONS COMMITTEE REPORT

The Public Relations Committee met on Tuesday, July 13, 1993, at the Hilton Hotel in Huntsville, Alabama. Five members of the committee and one guest were present. Items discussed included the following:

1) New Brochure - Corrections are being made on the new APRES brochure that was circulated to committee members earlier this year. Dr. Ron Sholar will arrange for printing/publication and copies should be available for distribution early in 1994. This publication will provide information on the history, organization, purpose, activities, etc. of APRES.

2) Meeting Publicity - There was a brief discussion of publicity for the 1993 meeting including a press release distributed in June to all major peanut producing states. This press release was sent to selected individuals and press to publicize the 1993 APRES meetings. There was some discussion on photos and publicity during and following the 1993 meetings.

3) Two deaths were reported to the Public Relations Committee. Mr. Leonard Cobb, a well-known and prominent Florida County Extension Agent, passed away in Williston, Florida, on January 13, 1993, at the age of 66. Mr. Keith Middleton, an internationally known peanut plant pathologist from Australia, passed away suddenly of illness to Toowoomba, Queensland on January 14, 1993. Resolutions honoring their lives and contributions to the peanut industry will follow.

After a brief discussion the meeting was adjourned.

Respectfully submitted,

D. W. Gorbet, Chair

RESOLUTIONS

Whereas Mr. Leonard C. Cobb, retired County Extension Agent with the University of Florida Extension Service, was a leader in the peanut industry and made major contributions to Florida peanut growers and other segments of the industry, and

Whereas Mr. Cobb served Florida growers for over 34 years with special emphasis on enhancing peanut production, and

Whereas Mr. Cobb's career efforts contributed toward increased peanut yields, better pest control, improved quality, and other improved practices for peanut production, especially in Jackson and Levy Counties, Florida, where a national *county average yield of 4485 pounds per acre was established in 1974, and*

Whereas Mr. Cobb was active in numerous agricultural and civic organizations, receiving numerous awards and serving as President, Vice-President, Secretary, Treasurer, and Director of the Florida Association of County Agricultural Agents, and

Whereas Mr. Cobb was a long term, active member of APRES, attending numerous annual meetings and participating in discussions and other activities, and

Whereas Leonard was a devoted Christian, husband, father, and friend, and

Whereas Mr. Leonard Cobb passed away in Williston, Florida, on January 13, 1993,

Be it resolved that Mr. Leonard Cobb's life and contribution to the peanut industry and APRES are honored by the American Peanut Research and Education Society.

Whereas Mr. Keith Middleton, Queensland Department of Primary Industries Regional Field Crops manager, was a leader in peanut disease identification and control for 18 years and his work included many international consultancies and trips with delegations to China, USA, and Indonesia, and

Whereas Mr. Middleton's work provided Australian peanut growers with effective strategies to control leafspot and rust, and

Whereas Mr. Middleton's recommendation that more organic matter be retained between peanut crops greatly lessened the economic impact of the soil borne disease, Sclerotium rolfsii, which has caused industry losses of over several million dollars, and

Whereas Mr. Middleton was also instrumental in introducing strategies to manage aflatoxin in Australian peanut crops, and

Whereas one of his more recent outstanding achievements was the development of a biological control approach of Peanut Stripe disease as part of a joint Australian-Indonesian peanut research project, and

Whereas Keith was a dedicated and compassionate member of several community and church service groups and very highly regarded by the Australian peanut industry for his honesty and integrity and high professional standards, and

Whereas Mr. Keith Middleton died suddenly of illness in Toowoomba, Queensland, on January 14, 1993,

Be it resolved that Mr. Keith Middleton's life and contributions to APRES and the international peanut industry are honored by the American Peanut Research and Education Society.

Whereas Dr. Bharat Singh was a leader in peanut research and education in the area of food science and technology, and

Whereas Dr. Singh worked internationally to improve human nutrition through the development of peanut foods that are palatable and acceptable in regions of Africa and the Caribbean, and

Whereas Dr. Singh was associated with the Peanut Collaborative Support Program since 1980 and served as a Principal Investigator and Technical Committee member until his death, and

Whereas Dr. Singh authored more than 85 technical publications, and guided 40 M.S. and one Ph.D. student in completion of their degrees, and

Whereas Dr. Singh initiated action to organize the Department of Food Science and Animal Industries, Alabama A&M University to obtain and maintain Institute of Food Technologists accreditation, and

Whereas Dr. Singh served actively in several professional organizations including APRES, and

Whereas Dr. Singh passed away on October 11, 1992,

It is resolved that Dr. Singh's life and contributions to the peanut industry are recognized and honored by the American Peanut Research and Education Society.

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT

The Publications and Editorial Committee of the American Peanut Research and Education Society met July 13, 1993, at Huntsville, Alabama. Members present were Bill Branch, Joe Dorner, Marvin Beute, Austin Hagan, Tim Brenneman, David Hogg, and Mike Schubert. Harold Pattee, Tom Whitaker, Corley Holbrook, Charles Simpson, and Walton Mozingo were also present.

Old Business:

FOR THE RECORD - In response to a question raised since last year's meeting, the committee decided (by mail, fax and phone) that references could be included in abstracts in the APRES PROCEEDINGS under certain conditions. The references must be short, be enclosed in parentheses in the text, otherwise conform to the abstract style, and refer to methods or other critical information which cannot be reasonably narrated in the short abstract. This practice is not encouraged, but will be allowed where appropriate. References are not allowed in PEANUT SCIENCE abstracts.

The committee followed up on last year's action allowing submission of PEANUT SCIENCE manuscripts on computer diskettes on a voluntary basis. Harold Pattee reported that about one-half of manuscripts for the July-December 1993 journal were submitted in their final form on diskette. To date, the publisher has handled Microsoft Word (Macintosh and DOS) and WordPerfect 5.1 (DOS) with no problems.

In response to concerns expressed last year that PEANUT SCIENCE was not listed and reviewed in CURRENT CONTENTS, the chair reported that arrangements had been made to supply PEANUT SCIENCE to the Institute for Scientific Information for their consideration.

Reports:

Tom Whitaker reported on the new book. (See the New Book Ad-Hoc Committee Report in these PROCEEDINGS.)

The committee received Harold Pattee's Editorial Committee Report. PEANUT SCIENCE operated with a profit again this year. There were 38 manuscripts submitted from July 1, 1992, to June 30, 1993. Sixteen articles (69 pages) and a 4-page index were printed in the July-December 1993 issue; and 17 articles (70 pages) were printed in the January-June 1993 issue for a total of 33 papers published. Twenty-two articles are in review and eight articles have been accepted for the 1993-94 issues. The proposed budget for PEANUT SCIENCE for 1993-94 estimates a profit based on an estimated 143 pages at a $90 cost per page.

Retiring from the PEANUT SCIENCE Editorial Board after six years of service are: Floyd J. Adamsen, Soils and Water; Craig K. Kvien, Crop Physiology; Fred M. Shokes, Plant Pathology; and Charles E. Simpson, Breeding and Genetics. Darold L. Ketring, Crop Physiology, submitted his resignation as Associate Editor on the occasion of his retirement. Replacements approved, pending acceptance by the nominee, are: Pat Phipps, Plant Pathology; Corley Holbrook, Breeding and Genetics; Gary Gascho, Soils and Water; and Mike Schubert, Crop Physiology. (Note: All nominees have since agreed to accept these positions.) The retiring editors will be publicly recognized at the annual business meeting.

Corley Holbrook reported on PEANUT RESEARCH. Craig Kvien has asked to be replaced as co-editor. Dr. Kvien's recent contribution has been the reference section. The committee accepted the proposal that Marie Griffin, who has been working with Dr. Kvien on the reference section, be named to succeed him. If Ms. Griffin elects to join APRES, she will become co-editor. If not, she will be recognized as reference section author. Dr. Holbrook requested that all awards committees be reminded to get their guidelines to him soon after the annual meetings so that they can be included in the quarterly newsletter in a timely manner.

PEANUT SCIENCE Editor:

Harold Pattee announced that he plans to step down as editor of PEANUT SCIENCE in July, 1994. Dr. Pattee will have been editor for 18 years at that time. Dr. Pattee will assist the new editor until December, 1994, to help with the transition.

The Publication and Editorial Committee will begin a search for a new editor. A formal solicitation for applicants will be made in the fall issue of PEANUT RESEARCH with a deadline of January 1, 1994, or until a suitable candidate is found. The committee will formulate a description of duties with Dr. Pattee's help and a format for the application materials. The committee requests that an announcement of the search be made in both the opening session and the business meeting of this APRES meeting.

When a suitable candidate is found, the Publication and Editorial Committee will make its recommendation to the APRES Board of Directors. A replacement should be found well before next year's APRES meeting.

Respectfully submitted,

Mike Schubert, Chair

NOMINATING COMMITTEE REPORT

The 1993 Nominating Committee met at 3:00 p.m. Tuesday, July 13, 1993, in the Mill Town Room of the Hilton Hotel, Huntsville, Alabama. Having consulted with numerous members and having discussed a willingness to serve the Society with the nominees, the Committee agreed to submit the following slate of Representatives to the APRES Board of Directors for 1993-94:

President-Elect	Dr. William C. Odle
State Employee (southeast)	Dr. David A. Knauft
Industry (manufacturing)	Mr. Wilbur A. Parker

Respectfully submitted,

Charles E. Simpson, Chair

FELLOWS COMMITTEE REPORT

Nominations were received by the Fellows Committee and evaluated on the point basis as published in the guidelines. The committee evaluations were tabulated and presented by the Chairman to the president on May 14, and the following were elected by the Board of Directors to Fellowship in APRES:

Dr. Marvin K. Beute
Dr. Terry A. Coffelt

Both honorees were notified of their selection prior to the annual meeting.

Respectfully submitted,

Olin Smith, Acting Chair

Dr. Marvin K. Beute is a professor in the Plant Pathology Department at North Carolina State University. He has worked with peanuts since 1968 and is a recognized authority in disease epidemiology. His research has been directed toward understanding basic biological and epidemiological principles, and applying this knowledge to minimize plant diseases in production agriculture. He has worked with *Cylindrocladium crotalariae, Sclerotium rolfsii, Sclerotinia minor, Cercospora arachidicola, Cercosporidium personatum, Aspergillus spp.*, nematodes and tomato spotted wilt virus. Dr. Beute has evaluated thousands of *A. hypogaea* and wild peanut lines which has led to germplasm releases, and to the release of two cultivars resistant to *Cylindrocladium* black rot. He has published more than 100 scientific articles or book chapters and more than 60 abstracts.

At NCSU, Dr. Beute has chaired 25 graduate committees and has served on numerous others. Several individuals whom he supervised are now working as research and/or extension pathologists in the three major U.S. peanut production areas. He has taught undergraduate and graduate level classes in plant pathology since 1970 and is an outstanding instructor. Dr. Beute has had extensive international involvement in peanut research through participation in international workshops and symposia, and as a principal investigator in the Peanut CRSP Program in Thailand and the Philippines.

Dr. Beute has served APRES as member and chairman of the Finance Committee, member and chairman of the Technical Program Committee, member and chairman of the Bailey Award Committee, and a member of other committees, including the Nominating, New Book, Publication and Editorial, and Ad Hoc Committee to Study the Composition of the Board of Directors. Dr. Beute has judged papers for the Joe Sugg Award. He was an Associate Editor of PEANUT SCIENCE from 1983 to 1989 and has been a member of the Peanut Crop Advisory Committee since 1981. He also has served as Associate Editor for PHYTOPATHOLOGY and for PLANT DISEASE.

Dr. M. K. Beute is one of the premier peanut plant pathologists in the USA and world. He has demonstrated excellence in developing a broad-based research program, and he continues to lead cooperative efforts to identify germplasm sources resistant to several peanut pathogens. His work has benefitted the entire peanut industry through cultivar development, training, and service to state and national organizations.

Dr. Terry A. Coffelt is a Research Geneticist with the U.S. Department of Agriculture at the Tidewater Agricultural Experiment Station, Suffolk, Virginia, and an Adjunct Professor of Crop and Soil Environmental Sciences at Virginia Polytechnic Institute and State University. He has been active in peanut breeding and genetics research for 22 years and has authored or co-authored more than 145 publications. He is recognized as a leader in developing peanut germplasm lines with multiple pest resistance to diseases and insects. Dr. Coffelt and co-workers have evaluated over 1,000 peanut germplasm lines for resistance to diseases and insects. As the lead scientist he and co-workers have registered eight germplasm lines with multiple pest resistance, and an additional line is scheduled for registration in 1993. Dr. Coffelt has been the lead scientist for the development and registration of two peanut cultivars with resistance to Sclerotinia blight (VA 81B and VA 93B) and a cooperating scientist for two additional registered cultivars (NC 11 and VA-C 92R). These large-seeded virginia-type peanut cultivars have high yield potential and earlier maturity than the previously popular cultivar Florigiant. These developments have contributed greatly to the economic success of the Virginia and North Carolina peanut industry.

Dr. Coffelt has contributed to APRES by serving as chairman of the Technical Program, Publication and Editorial, and Finance Committees, and has served as a member of several other committees. He served as an Associate Editor of PEANUT SCIENCE for six years and was a co-organizer of the Peanut Breeding Symposium held during the 1980 annual meeting of the Society. He was the co-editor of the PROCEEDINGS which continues to serve as a valuable reference for peanut breeders throughout the world. Dr. Coffelt has participated in 21 annual meetings of the Society presenting 18 contributed papers and serving as co-author of 15 additional contributed papers.

Dr. Coffelt has contributed to the advancement in science and status of peanut research and education through his activities and assignments in the American Society of Agronomy, Association of Official Seed Certifying Agencies, Crop Science Society of America, National Plant Germplasm System, and National Uniform Peanut Performance Tests. He has served internationally through special assignments to Pakistan and India. In his research program, Dr. Coffelt has evaluated peanut plant introductions from at least seven foreign countries and has distributed peanut germplasm lines from his research program to peanut breeding programs in Africa, Australia, China, India, and the Philippines.

Dr. Coffelt is a leader in the agricultural community in the Virginia-North Carolina peanut production area, in the United States, and internationally. As part of a research team in Virginia and North Carolina, he and fellow researchers have developed unique peanut cultivars that satisfy all segments of the peanut industry including consumers. As conditions change, Dr. Coffelt and his colleagues continue to listen to the peanut industry and develop cultivars for the future.

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

The Bailey Committee met from 2:00 - 3:00 p.m. on July 13, 1993, to discuss the establishment and publishing of specific criteria for the Bailey Award. All committee members were present and voted 6-0 to approve the attached criteria for the Bailey Award as written up by Tom Stalker.

We were strongly in agreement that Joe Sugg Graduate Student competition sessions should be eligible for the Bailey Award.

The presenter of the paper will be awarded the bookends and other authors appropriately recognized. The presenter can be senior or junior author, but must be an APRES member to be eligible for the Bailey Award.

One reason for recognizing the presenter is the emphasis on oral presentation. We also want to emphasize scientific excellence and publication so we are not ready to give up the present two-tier selection system.

Respectfully submitted,

K. J. Boote, Chair

NOMINATIONS FOR BAILEY AWARD 1993

1. Plant regeneration from short- and long-term embryogenic cultures of *Arachis hypogaea*. P. Ozias-Akins and W. F. Anderson.

2. Spray-tank-mix compatibility of manganese, boron, and fungicide. I. Wet chemistry. N. L. Powell.

3. Wireworms as pests of peanuts in Georgia. S. L. Brown.

4. Comparison of hidden and apparent spotted wilt epidemics in peanut. A. K. Culbreath, J. W. Todd and J. W. Demski.

5. Interactions of Butyrac and Tough with postemergence graminicides. A. C. York, J. W. Wilcut, and W. J. Grichar.

6. Leafspot resistance of genotypes derived from crosses of wild *Arachis* species and Virginia peanut. B. B. Shew, H. T. Stalker and M. K. Beute.

7. Relationship of kernel moisture content to aflatoxin contamination in Florunner and Southern Runner peanuts. J. W. Dorner, R. J. Cole and P. D. Blankenship.

8. Diamond shaped seeding of six peanut cultivars. R. W. Mozingo and F. S. Wright.

Nominated but not submitted:

1. Pursuit and cadre mixtures for weed control in Georgia peanuts. J. W. Wilcut and J. S. Richburg, III.

2. Effects of irrigation on yield and rhizoctonia limb rot in Southern Runner peanut at two harvest dates. T. B. Brenneman.

3. An examination of federal crop insurance as a risk management tool in southeast peanut production. W. D. Shurley.

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

Fourteen papers were presented in the session. Five judges scored the papers based on clarity of presentation, quality of visual aides, originality and contribution to science, overall quality and clarity of abstract, and handling of questions and discussion. The competition among the students was keen and all had done a commendable job presenting their research.

The five judges for the 1993 graduate student competition were: Hassan Melouk (chair), Pat Phipps, Danny Colvin, Terry Coffelt, and Floyd Dowell.

The first place award went to P. D. Brune of the Department of Plant Pathology at North Carolina State University, Raleigh, for presenting a paper titled "Root growth dynamics as a factor in resistance of peanut to Cylindrocladium root rot". The paper was co-authored by M. K. Beute.

The second place award went to J. C. Jacobi of the Department of Plant Pathology, Auburn University, Auburn, Alabama, for presenting a paper title "AU-Pnuts leaf spot advisory: Modification of the rule-based system for a partially resistant peanut cultivar". The paper was co-authored by P. A. Backman.

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

Respectfully submitted,

H. A. Melouk, Chair

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT

The Coyt T. Wilson Distinguished Service Award was established to recognize those persons within the American Peanut Research and Education Society who have provided outstanding service to the Society for a long period of time and deserve special recognition.

The Award was named to pay tribute to one of our founding members--Dr. Coyt T. Wilson--who spent many years and much time in nurturing our/their young Society so it could become what it is today. Dr. Wilson was a shining example of the type of leadership which future leaders should emulate.

The Coyt T. Wilson Distinguished Service Award Committee met and selected Dr. J. Ronald Sholar to be the 1993 award recipient. Dr. Sholar is indeed the type of leader deserving of this award.

Dr. Sholar has been an APRES member since 1981 and has attended every meeting between 1982 and the present. He became Executive Officer of APRES and a member of the Board of Directors in 1983 and has served both positions since 1983. As Executive Officer he has been an ex-officio member of the Finance Committee and the Site Selection Committee. He served from 1978 through 1988 on the Local Arrangements Committee. Last year Dr. Sholar was the recipient of the DowElanco Award for Excellence in Extension. The basis for recognizing Dr. Sholar with the Coyt T. Wilson Distinguished Service Award was his dedication, superior service, and promotion of APRES through the last decade.

Although the Award Committee did not have a quorum at this meeting, because our primary task of selecting an award recipient had been completed months before, the Board of Directors acted at this meeting to add a March 1 deadline to the Guidelines for the Coyt T. Wilson Distinguished Service Award. The guidelines remain otherwise unchanged.

Respectfully submitted,

David E. Dougherty, Chair

BIOGRAPHICAL SUMMARY OF COYT T. WILSON DISTINGUISHED SERVICE AWARD RECIPIENT

Dr. James Ronald Sholar received a B.S. degree from the University of Tennessee at Martin and the M.S. and Ph.D. degrees from Oklahoma State University in Stillwater. He is a Professor of Agronomy and Extension Agronomist at Oklahoma State University.

He has actively participated in APRES functions for over 11 years. His greatest service to the Society has been through his position as Society Executive Officer for the past 10 years. As Executive Officer, he supervises the day-to-day affairs of the Society that includes correspondence, membership services, and maintenance of Society publications and historical records. He provides supervision to the Society's administrative assistant. In 1988, Dr. Sholar assumed editorship of the PROCEEDINGS of the annual meeting.

Dr. Sholar served as the first APRES representative on the CAST Board of Directors and served on the CAST editorial board. He has served as a reviewer for PEANUT SCIENCE articles and was selected as senior author for a chapter in the new APRES book, ADVANCES IN PEANUT SCIENCE.

Dr. Sholar was also cited for developing a close partnership with peanut industry personnel and providing superior leadership to producer groups in helping bring decisive responsiveness to changes in their industry. As an Extension Agronomist, he has provided leadership in the discovery, transfer, and adoption of new management strategies which increased profits at the farm level and improved the quality of the product being delivered to the consumer. He has provided decisive leadership to the peanut industry by participating in national and international activities. He has participated in international work in Switzerland, England, and the Netherlands. He led an international delegation on a tour to study the peanut industry in China and he collected unique germplasm that may be incorporated into U.S. breeding programs.

The results of Dr. Sholar's extension education/applied research program were recognized when he was selected to receive the first DowElanco Award for Excellence in Extension awarded by APRES.

Guidelines for

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

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

Eligibility of Nominators

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

Eligibility of Nominees

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

Nomination Procedures

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

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

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

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

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

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

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 AWARDS COMMITTEE REPORT

The committee updated the guidelines for the DowElanco Research and Extension Awards and forwarded them to PEANUT RESEARCH for publication and publicity. Five nominations were received for the Research & Extension Awards.

The committee selected Dr. Hassan Melouk for the Research Award and Dr. A. Edwin Colburn for the Extension Award. The awards were presented at the 25th annual meeting in Huntsville, Alabama.

Respectfully submitted,

Johnny Wynne, Chair

BIOGRAPHICAL SUMMARY OF DOWELANCO AWARD FOR EXCELLENCE IN EXTENSION

Dr. A. Edwin Colburn received a B.S. degree from Sam Houston State University, an M.S. from Louisiana State University, and a Ph.D. in Soil Science from West Virginia University. He is an Extension Agronomist at Texas A&M located at College Station, Texas.

Dr. Colburn has made significant contributions to the peanut industry at the county, state, and national levels. At the county or producer level, Ed has conducted a superior applied research/demonstration program on the use of inoculants, seeding rates, varieties, weed control, soil and foliar fertilization, LEPA irrigation and peanut expert systems. Results from these tests have been utilized very effectively to train producers as to the importance of all of these inputs in producing quality peanuts and maximum profitability, while enhancing the reputation of southwestern grown peanuts. The major emphasis has always been on quality improvement so that southwestern grown peanuts could command a greater share of the domestic market, and ultimately, world markets.

Ed's influence has gone far beyond the producer level. He has worked hard to bring together both peanut producers and processors to explore the best varieties and production practices needed to better meet market demands. At the same time, he has not lost sight of consumer demands for food safety.

Dr. Colburn's close working relationship with statewide grower organizations, such as the Texas Peanut Producers' Board and the Western Peanut Growers Association, has given him a valuable voice in peanut production programs in Texas. Working through the National Peanut Council has allowed Ed to further exert his leadership on a national level and has helped the Texas peanut industry emerge as a national leader.

Dr. Colburn believes in the team approach to solving problems. Therefore, he consistently seeks interdisciplinary involvement of fellow specialists or industry leaders when needed to accomplish a task. In all respects, he possesses the traits which exemplify the Extension professional--dedication, integrity, and the pursuit of excellence.

BIOGRAPHICAL SUMMARY OF DOWELANCO AWARD FOR EXCELLENCE IN RESEARCH

Dr. Hassan Melouk received a B.S. from Alexandria University in Egypt and M.S. and Ph.D. degrees in Plant Pathology from Oregon State University, Corvallis.

He is a research Plant Pathologist with the USDA-ARS and Professor (Adjunct) at Oklahoma State University. He has conducted research on peanuts since 1976 and has authored or co-authored more than 120 publications. (Because of his outstanding accomplishments, he was selected to edit a book entitled PEANUT HEALTH MANAGEMENT.)

Dr. Melouk has worked diligently and productively to reduce the yield and quality limiting effects of disease on peanuts. His research program provides peanut growers with a number of options to control economically important peanut diseases.

His assignment is to work as part of a national program to improve peanut productivity and quality through germplasm enhancement. His research has focused on: 1) developing effective procedures for evaluating the reaction of peanut germplasm against important pathogens; 2) identifying disease resistant sources in peanut germplasm in both the cultivated and wild species; 3) investigating biological and cultural controls and disease resistance for managing economically important peanut diseases; 4) working with plant breeders in developing peanut cultivars with resistance to peanut diseases; and 5) investigating modes of pathogen dissemination.

Dr. Melouk's research has produced numerous significant findings that have contributed directly to the benefit of the entire peanut industry. His research has shown that resistance to the early leafspot fungus, peanut mottle virus, and peanut stripe virus exists in wild peanut species in the Arachis section, the same botanical section of the cultivated peanut. He is demonstrating that this resistance can be transferred to cultivated peanut by conventional methods or by utilizing new gene manipulation technology. Dr. Melouk has developed the practical information that can be used by integrated pest management specialists to formulate economically sound and environmentally compatible disease control strategies.

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.

NATIONAL PEANUT COUNCIL
RESEARCH AND EDUCATION AWARD COMMITTEE REPORT

Four nominees were received from the National Peanut Council. They were voted on and evaluated using the new method suggested by the NPC Committee.

The team of Dale Carley and Stanley Fletcher, University of Georgia, Griffin, were declared the winners and were presented the award at the National Peanut Council meeting in April.

Other members considered for the award were: Ron Sholar, Paul Blankenship, and Ernest Harvey.

Respectfully submitted,

Leland Tripp, Chair

PEANUT QUALITY COMMITTEE REPORT

The purpose of the Peanut Quality Committee is to promote quality improvement in the industry. The committee took the following action:

1) Tim Sanders will follow up on the Quality Methods handbook to see if additional methods can be verified and published.

2) The committee expressed concern that we do not have a good definition of quality that is satisfactory for all the groups involved in marketing peanuts and providing quality to the consumer. The committee will suggest to the Board of Directors that APRES have a Quality Symposium in 1994, scheduled at a time when everyone would be available to attend.

Respectfully submitted,

Gene Sullivan, Chair

PROGRAM COMMITTEE REPORT

The 25th annual meeting of the American Peanut Research and Education Society was held at the Hilton Hotel in Huntsville, Alabama, on July 13-16, 1993. The working committees were chaired by Ms. Teresa Smallwood (Spouses Program), Dr. James R. Weeks (Local Arrangements), and Dr. Austin Hagan (Technical Program). The complete listing of all committee members is included in the program section of these PROCEEDINGS.

A total of 133 papers were presented. Those included 100 volunteer papers, 9 poster papers, 14 graduate student papers judged for the Joe Sugg Award, and 2 symposia where 10 presentations were made.

Tremendous industry support was obtained for the 1993 meeting. Five major contributors (American Cyanamid Company, DowElanco, ISK Biotech Corporation, Rhone-Poulenc Company, and Valent U.S.A. Corporation) supported 4 special events. An additional 19 organizations gave financial assistance and 10 organizations supplied peanut products for the breaks. A complete list of these organizations is in the program section of these PROCEEDINGS.

Approximately 545 people registered for the meetings. These included 335 members and 210 spouses and children. The spouse tour included 44 people who visited historic downtown Huntsville and 35 who went on the famous Boaz shopping tour.

The spouses hospitality suite was maintained from Tuesday noon until Thursday at 5:00 p.m.

Cedar Chemical Company also sponsored a hospitality room for the children that was enjoyed by 25 youngsters.

A special thank you to all 1993 APRES meeting committees for a job well done!

Respectfully submitted,

Dallas L. Hartzog, Chair

1993 PROGRAM

BOARD OF DIRECTORS
1992-93

President	R. Walton Mozingo
President-Elect	Dallas Hartzog
Past President	Charles Simpson
Executive Officer	J. Ron Sholar
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Southwest	Edwin Colburn
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USDA Representative	Thomas Whitaker
Industry Representatives:	
Production	Clifton L. Stacy
Shelling, Marketing, Storage	Doyle Welch
Manufactured Products	John Haney
National Peanut Council President	Kim Cutchins

PROGRAM COMMITTEE

Local Arrangements	Technical Program	Spouses' Program
J. R. Weeks, Co-Chair	*A. K. Hagan, Chair*	Teresa Smallwood, Chair
W. W. Gregory, Co-Chair	P. A. Backman	Joann Hartzog
J. N. Lunsford	J. Bostic	Maggie Miller
R. Griggs	K. L. Bowen	Bobbie Ivey
H. W. Ivey	T. P. Mack	Farrie Murphy
J. C. Anderson	A. Miller	Brenda Weeks
J. E. Mobley	C. Ogburn	Suzanne Anderson
M. Braxton	J. Touchton	Susan Hagan
G. Robertson	T. Tyson	
J. E. Marion		

PROGRAM HIGHLIGHTS

Monday, July 12

1:00- 6:00	Golf Tournament	Hampton Cove

Tuesday, July 13

Committee, Board, and Other Meetings

7:00- 2:00	Golf Tournament	Hampton Cove
8:00-12:00	Peanut CAC Meeting	Von Braun
12:00- 8:00	APRES Registration	Main Lobby
1:00- 5:00	Spouses' Registration	Twickenham
	Spouses' Hospitality	Twickenham
1:00- 2:00	New Book Committee	Von Braun
	Site Selection Committee	Mill Town
	Fellows Committee	Hunt
	Coyt T. Wilson Award Committee	Azalea
2:00- 3:00	Associate Editors, Peanut Science	Von Braun
	Public Relations Committee	Mill Town
	Meeting Survey Committee	Hunt
	Bailey Award Committee	Azalea
3:00- 4:00	Publications and Editorial Committee	Von Braun
	Nominating Committee	Mill Town
	Graduate Student Competition Ad Hoc Committee	Hunt
	Peanut Quality Committee	Azalea
4:00- 6:00	Finance Committee	Mill Town
	Peanut System Workshop	Hunt
7:00-11:00	Board of Directors	Von Braun
8:00-10:00	RHONE POULENC ICE CREAM SOCIAL	Heritage Ballroom

Wednesday, July 14

8:00- 4:00	APRES Registration	Lobby
	Spouses' Registration	Twickenham
	Spouses' Hospitality	Twickenham
	Preview Room	Hunt
8:00- 5:00	Industry Exhibits	Azalea
	Press Room	Mill Town
8:00- 9:45	General Session	Grand Salon
10:00- 4:00	Poster Session I	Azalea
10:00-12:00	Economics	Heritage 1-2
	Breeding and Biotechnology I	Heritage 3

10:00-12:00	Extension Technology/Plant Pathology I	Grand Salon B
1:00- 3:00	Plant Pathology II	Heritage 1-2
	Physiology and Curing	Heritage 3
	Production Technology	Grand Salon B
3:30- 4:45	Plant Pathology III	Heritage 1-2
	Physiology/Processing/Seed Technology	Heritage 3
	Entomology	Grand Salon B
6:30-10:00	ISK BIOTECH SPACE AND ROCKET CENTER RECEPTION	Space Center

Thursday, July 15

8:00-12:00	APRES Registration	Lobby
8:00- 4:00	Spouses' Hospitality	Twickenham
	Poster Session II	Azalea
	Industry Exhibits	Azalea
	Preview Room	Hunt
	Press Room	Mill Town
8:00-10:00	Graduate Student Competition	Heritage 1
	Breeding and Biotechnology	Heritage 2-3
	Aflatoxin Elimination Symposium	Grand Salon B
10:30-12:00	Graduate Student Competition	Heritage 1
	Breeding and Biotechnology	Heritage 2-3
	Aflatoxin Elimination Symposium	Grand Salon B
1:00- 3:00	Plant Pathology IV	Heritage 1
	Weed Science I	Heritage 2-3
3:00- 4:45	Plant Pathology V/Mycotoxins	Heritage 1
	Weed Science II	Heritage 2-3
6:30- 9:00	AMERICAN CYANAMID SILVER ANNIVERSARY CELEBRATION	Grand Salon

Friday, July 16

7:30- 8:30	DOW ELANCO/VALENT AWARDS BREAKFAST	Grand Salon
8:30-10:00	APRES Awards Ceremony and Business Meeting	Grand Salon

GENERAL SESSION

Wednesday, July 14

8:00- 9:30 a.m. . . . . Grand Ballroom

8:00 Call to Order . . . . APRES President Walt Mozingo

8:10 Welcome . . . . Huntsville Mayor Steve Hettinger

8:20 Silver Anniversary of APRES . . . . Leland Tripp

8:40 Technology in Agriculture, The Next
25 Years . . . . Gale Buchanan

9:00 Introducing Peanut Butter to the Russians--An update
for the Special Russian Task Force . . . . . . Randy Griggs

9:20 Announcements:
Technical Program . . . . Austin Hagan
Local Arrangements . . . . . Ron Weeks and Greg Gregory

SPECIAL EVENTS

Tuesday, July 13

8:00 -10:00 ICE CREAM SOCIAL . . . . Heritage Ballroom
Rhone Poulenc

Wednesday, July 14

6:30-10:00 SPACE AND ROCKET CENTER
RECEPTION - ISK Biotech . . . . Space Center

Thursday, July 15

6:30- 9:00 SILVER ANNIVERSARY CELEBRATION
BANQUET - American Cyanamid . . . . Grand Salon

Friday, July 16

7:30- 8:30 AWARDS BREAKFAST . . . . Grand Salon
Dow Elanco and Valent

TECHNICAL SESSIONS

Wednesday, July 14

Poster Session I (10:00 - 4:30) .... **Azalea Room**

Authors Present 2:30-3:30

(1) In Vitro Culture of Embryonic Axes from *Arachis* Species For Germplasm Recovery. **K. B. Dunbar*, R. N. Pittman and J. B. Morris**, Dalton College, Dalton, GA; and USDA, ARS, SAA, Regional Plant Introduction Station, Griffin, GA.

(2) Peanut Foliar Disease Management with Predictive Technology. **A. J. Jaks**, Texas Agricultural Experiment Station, Yoakum, TX.

(3) Soil Amendments and Biocontrol Agents to Reduce Viable Sclerotial Populations of *Sclerotinia minor* in Peanut Culture. **K. E. Woodard**, Texas Agricultural Experiment Station, Stephenville, TX.

(4) V-53482 and Zorial Systems for Weed Control in Georgia Peanut. **E. F. Eastin*, J. W. Wilcut, J. S. Richburg, III and T. V. Hicks**, Dept. of Crop & Soil Science, University of Georgia, Tifton, GA; and Valent USA, Snellville, GA.

Economics .... **Heritage 1-2**

Moderator: A. Miller

10:00 (5) A Comparison of International Peanut Production Costs: U.S. versus China. **P. Zhang*, S. M. Fletcher and D. H. Carley**, Dept. of Agricultural and Applied Economics, University of Georgia, Griffin, GA.

10:15 (6) An Economic Analysis of Japan's Peanut Imports: Implications to U.S. Exports. **S. M. Fletcher*, P. Zhang and D. H. Carley**, Dept. of Agricultural and Applied Economics, University of Georgia, Griffin, GA.

10:30 (7) Relationship of Retail Prices for Peanut Products to Changes in Peanut Policies. **D. H. Carley*, S. M. Fletcher and P. Zhang**, Dept. of Agricultural and Applied Economics, University of Georgia, Griffin, GA.

10:45 (8) Economic Performance Characteristics of the Irrigated and Nonirrigated Production of Continuous Peanuts and a Peanut-Corn Rotation. **A. Miller**, Extension Agricultural Economics, Auburn University, Headland, AL.

11:00 (9) MNUT: An Expert System That Uses Peanut Supply and Price Prediction Models to Reduce Marketing Risk. **M. C. Lamb*, J. I. Davidson, Jr. and M. S. Singletary**, USDA, ARS, National Peanut Research Lab., Dawson, GA; and Albany, GA.

11:15 (10) A Review of the General Accounting Office Report on the Peanut Program. **R. H. Miller**, Director, Tobacco & Peanuts Analysis Div., ASCS-USDA, Washington, DC.

11:30 (11) Understanding Economic and Financial Concepts in Peanut Production With Emphasis on Cost of Production and Profitability. **W. D. Shurley**, Agricultural and Applied Economics, The University of Georgia, Tifton, GA.

11:45 Discussion

Breeding I .... **Heritage 3**

Moderator: W. D. Branch

10:00 (12) Forage Potential of Cultivated Peanut (*Arachis hypogaea* L.). **D. W. Gorbet*, R. L. Stanley, Jr. and D. A. Knauft**, University of Florida, North Florida Research and Education Center (NFREC), Marianna, FL; NFREC, Quincy, FL; and Agronomy Dept., Gainesville, FL.

10:15 (13) Use of a Core Collection to Enhance Utilization of the U. S. Peanut Germplasm Collection. **C. C. Holbrook*, W. F. Anderson and R. N. Pittman**, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA; USDA-ARS, Griffin, GA.

10:30 (14) Use of Mass Selection for Developing Leafspot-Resistant Peanut Lines. **D. A. Knauft*, C. C. Holbrook and D. W. Gorbet**, Dept. of Agronomy, University of Florida, Gainesville, FL; USDA-ARS, Tifton, GA; and Dept. of Agronomy, University of Florida, Marianna, FL.

10:45 (15) Progress in Breeding Sclerotinia Blight Runner-type Peanuts With TxAG-5 as the Source of Resistance. **O. D. Smith*, C. E. Simpson and H. A. Melouk**, Texas Agricultural Experiment Station, College Station, TX; and Stephenville, TX; and USDA-ARS, Stillwater, OK.

11:00 (16) Utility of Late-Generation Selections Within Peanut Breeding Programs. **W. D. Branch***, Dept. of Crop and Soil Sciences, University of Georgia, Coastal Plain Experiment Station, Tifton, GA.

11:15 (17) Pre-harvest Aflatoxin Screening of Peanut Germplasm. **W. F. Anderson*, C. C. Holbrook, D. M. Wilson and M. E. Matheron**, USDA-ARS, University of Georgia, Coastal Plain Experiment Station, Tifton, GA; and University of Arizona, Somerton, AZ.

11:30 (18) Development of a Large-Scale Field Screening System Which Can be Used to Examine Peanut Germplasm for Resistance to Pre-harvest Aflatoxin Contamination. **M. E. Matheron, C. C. Holbrook, D. W. Wilson, W. F. Anderson and M. E. Will**, University of Arizona, Somerton, AZ; USDA-ARS, Coastal Plain Experiment Station, Tifton, GA; University of Georgia, Coastal Plain Experiment Station, Tifton, GA.

11:45 Discussion

Extension Technology/Plant Pathology I .... Grand Salon B

Moderator: B. Padgett

10:00 (19) Development and Evaluation of a Frost Advisory Program for Peanut in Virginia. **D. R. Walker* and P. M. Phipps**, Tidewater Agriculture Experiment Station, Virginia Polytechnic Institute & State University, (VPI&SU), Suffolk, VA.

10:15 (20) Scheduling Peanut Irrigation in Southeast Alabama. **T. W. Tyson* and L. M. Curtis**, Auburn University, Alabama Cooperative Extension Service, Auburn University, AL.

10:30 (21) Yield and Economic Return of Florunner and Southern Runner Peanut in Response to Different Pest Management Inputs. **S. L. Brown, J. A. Baldwin*, J. P. Beasley, Jr., S. M. Brown and W. D. Shurley**, University of Georgia Cooperative Extension Service, Tifton, GA.

10:45 (22) A Weather-Monitoring Network for Improved Peanut Disease Management. **P. M. Phipps**, Tidewater Agricutural Experiment Station, Virginia Polytechnic Institute and State University, Suffolk, VA.

11:00 (23) Utilization of Environmental Thresholds to Minimize Fungicide Applications for Control of Sclerotinia Blight of Peanut. **J. E. Bailey*, P. M. Phipps, T. A. Lee, Jr. and J. P. Damicone,** Dept. of Plant Pathology, North Carolina State University, Raleigh, NC; Dept. of Plant Pathology, Tidewater Agricultural Experiment Station, Virginia Polytechnic Institute & State University, Suffolk, VA; Texas Agricultural Extension Service, Stephenville, TX; and Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK.

11:15 (24) SM-9 and Control of Southern Stem Rot of Peanut. **A. K. Hagan* and J. R. Weeks,**.Auburn University, AL.

11:30 (25) Effects of Application Method and Rate on Control of Sclerotinia Blight of Peanut with Iprodione. **J. P. Damicone* and K. E. Jackson,** Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK.

11:45 (26) Effectiveness of Fosthiazate and SM-9 for Control of Nematodes, Thrips and Southern Stem Rot of Peanut. **N. A. Minton* and T. B. Brenneman,** USDA-ARS and Plant Pathology Dept., University of Georgia, Coastal Plain Experiment Station, Tifton, GA.

Plant Pathology II .... Heritage 1-2

Moderator: A. K. Culbreath

1:00 (27) Tank Mix Applications of Cyproconazole and Tebuconazole with Chlorothalonil for Control of Peanut Leaf Spot. **A. K. Culbreath* and T. B. Brenneman,** Dept. of Plant Pathology, The University of Georgia, Tifton, GA.

1:15 (28) A Climatological Test of Peanut Leafspot Spray Schedules in South Carolina. **D. E. Linvill* and C. E. Drye,** Agric. Weather Office, and Edisto Research and Education Center, Clemson University, Clemson, SC.

1:30 (29) Botrytis Leafspot of Peanuts and Potential for Control by *Gliocladium*. **D. M. Porter*, R. A. Taber and H. L. Warren,** USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA: LaVale, MD; and Virginia Polytechnic Institute and State University, Blacksburg, VA.

1:45 (30) Tilt Use in Southwest Peanut Health Program. **A. McMahon*, B. W. Minton, H. R. Smith and C. A. Pearson,** CIBA Plant Protection, Greensboro, NC.

2:00 (31) Utilizing a Sterol Demethylation Inhibiting Fungicide in a Predictive Spray Schedule to Manage Foliar and Soilborne Diseases of Southern Runner Peanut. **T. B. Brenneman* and A. K. Culbreath**, Dept. of Plant Pathology, Coastal Plain Experiment Station, Tifton, GA.

2:15 (32) Tilt: Disease Control in Southeastern Peanuts. **J. M. Hammond*, P. C. Kennedy and C. A. Pearson**, CIBA Plant Protection, Greensboro, NC.

2:30 (33) Evaluation of Groundnut Foliar Diseases in Yield Loss in Guinea. **N. B. Tounkara*, S. Dopavogui and M. R. Camara**. Centre de Recherche Agronomique, Republique de Guinee.

2:45 (34) Relationship Between Field Incidence of Sclerotinia Blight and Seed Infection of Peanut with *Sclerotinia minor*. **H. A. Melouk*, J. P. Damicone, K. E. Jackson, J. R. Sholar and M. E. Payton**, USDA-ARS, Dept. of Plant Pathology, Dept. of Agronomy, Statistics Dept., Oklahoma State University, Stillwater, OK.

3:00 Break

Physiology and Curing I .... Heritage 3

Moderator: T. H. Sanders

1:00 (35) Peptides as Indicators of Peanut Maturity and Protein Changes. **S. Y. Chung*, H. J. Ullah and T. H. Sanders**, USDA-ARS, Southern Regional Research Center, New Orleans, LA.

1:15 (36) Reducing the Costs and Risks of Overdrying Farmers Stock Peanuts. **C. L. Butts**, USDA, ARS, National Peanut Research Laboratory, Dawson, GA.

1:30 (37) Automated Controls for Mechanically Ventilated Farmers Stock Peanut Storages. **J. S. Smith, Jr.**, USDA, ARS, National Peanut Research Laboratory, Dawson, GA.

1:45 (38) The Development of Peanut Flavor Potential During Curing. **K. L. Bett*, B. T. Vinyard and T. H. Sanders**, USDA-ARS, Southern Regional Research Center, New Orleans, LA; and USDA-ARS Market Quality and Handling Research, North Carolina State University, Raleigh, NC.

2:00 (39) Development of Rotary Screen Sizer to Grade Farmers Stock and Milled Peanuts. **T. B. Whitaker*, A. B. Slate and J. W. Dickens**, USDA-ARS, Market Quality and Handling Research, Biological and Agricultural Engineering Dept., North Carolina State University, Raleigh, NC.

2:15 (40) Effect of Harvest Date on Maturity, Maturity Distribution and Flavor of Florunner Peanuts. **T. H. Sanders* and K. L. Bett**, USDA, ARS, MQHRU, Dept. of Food Science, North Carolina State University, Raleigh, NC; and USDA, ARS, FFQ, Southern Regional Research Center, New Orleans, LA.

2:30 (41) Minimum Temperatures and Groundnut Yield. **C. J. Swanevelder*, G. DeBeer and W. Jansen**, Grain Crops Institute, Agricultural Research Council, Republic of South Africa.

2:45 Discussion

3:00 Break

Production Technology .... Grand Salon B

Moderator: J. Adams

1:00 (42) The Influence of Furrow Diking on Yields, Disease and Soil Moisture. **M. J. Bader*, J. Baldwin, and J. Beasley**, University of Georgia Extension Service, Tifton, GA.

1:15 (43) Soil Amendments for Peanut Production on Acid Soils of Burkina Faso, West Africa. **P. Sankara*, O. D. Smith, L. J. Wilding, L. R. Hossner and A. S. Juo**, Soil & Crop Sciences, Texas A & M University, College Station, TX.

1:30 (44) Relation of Peanut Yield, Grade, Value, and Seed Germination to Placement, Timing, and Particle Size of Limestone. **G. J. Gascho* and W. R. Guerke**, Crop and Soil Sciences Department, Coastal Plain Experiment Station, University of Georgia, and Seed Laboratory, Georgia Department of Agriculture, Tifton, GA.

1:45 (45) Development of New Concepts for Cover Crops, Land Preparation, and Tillage for Peanuts. **J. I. Davidson, Jr.*, E. J. Williams, M. C. Lamb and C. L. Butts**, USDA, ARS, National Peanut Research Laboratory, Dawson, GA.

2:00 (46) Peanut Production Using Modified Conservational Tillage Methods in Virginia. **F. S. Wright* and D. M. Porter,** USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA.

2:15 (47) Relationships Between Heat Units and Number of Growing Days with Peanut Yield and Market Grades. **T. A. Coffelt* and R. W. Mozingo**, USDA-ARS and Virginia Polytechnic Institute and State University, Tidewater Agricultural Experiment Station, Suffolk, VA.

2:30 (48) Peanut Cultivar Response to Planting Date and Harvest Date. **J. P. Beasley, Jr.*, E. J. Williams and J. A. Baldwin**, Dept. Crop and Soil Sciences, The University of Georgia, Tifton, GA; USDA-ARS, NPRL, Dawson, GA; and Dept. of Crop and Soil Sciences, The University of Georgia, Tifton, GA.

2:45 (49) Comparison of Peanut Tillage Practices in Oklahoma. **J. R. Sholar*, J. P. Damicone, B. S. Landgraf, J. L. Baker and J. S. Kirby**, Dept. of Agronomy and Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK; and Noble Foundation, Ardmore, OK.

3:00 Break

Plant Pathology III .... Heritage 1-2

Moderator: P. Backman

3:30 (50) Resistance to Southern Stem Rot in Selected Peanut Genotypes and Yield Effects. **F. M. Shokes*, D. W. Gorbet and D. A. Knauft**, North Florida Research and Education Center (NFREC), Quincy, FL; NFREC, Marianna, FL; and University of Florida, Gainesville, FL.

3:45 (51) Peanut Serendipity--A Case for Genetic Diversity. **J. S. Kirby*, H. A. Melouk, T. E. Stevens, Jr., K. E. Jackson, J. R. Sholar and J. P. Damicone**, Dept. of Agronomy, USDA-ARS, and Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK.

4:00 (52) Moncut - A New Fungicide for Control of *Sclerotium rolfsii* and *Rhizoctonia solani* in Peanuts. **S. K. Lehman*, J. D. Land, T. L. Smith and W. K. Taylor**, NOR-AM Chemical Company, Wilminghton, DE.

4:15 (53) Vertical Distribution of Sclerotia of *Sclerotinia minor* Before and After Moldboard Plowing in a Soil Planted to Peanut. **K. E. Jackson* and H. A. Melouk**, Dept. of Plant Pathology and USDA-ARS, Oklahoma State University, Stillwater, OK.

4:30 (54) Beneficial Effect of Bahia Grass on the Yield of Florunner Peanut Grown in Soil Infested with *Rhizoctonia solani* AG-4. **D. K. Bell* and D. R. Sumner**, Dept. of Plant Pathology, Coastal Plain Experiment Station, Tifton, GA.

4:45 (55) Relationship Between Symptoms on Testae of Peanut (*Arachis hypogaea*) and Isolation of *Cylindrocladium crotalariae* from Seed and Plants. **B. L. Randall-Schadel*, J. E. Bailey, M. K. Beute and F. E. Dowell**, North Carolina Dept. Agriculture, Raleigh, NC; North Carolina State University, Raleigh, NC; and USDA-ARS, Dawson, GA.

Physiology/Processing/Seed Technology .... Heritage 3

Moderator: J. C. Anderson

3:30 (56) An Automated Grading System for Farmers' Stock Peanuts. **F. E. Dowell**, USDA, ARS, National Peanut Research Laboratory, Dawson, GA.

3:45 (57) Palm Oil (Unhydrogenated) as a Stabilizer for Peanut Butter. **M. J. Hinds*, M. S. Chinnan and L. R. Beuchat**, Center for Food Safety & Quality Enhancement, Dept. of Food Science and Technology, University of Georgia Experiment Station, Griffin, GA.

4:00 (58) Maximization of Variant Roasted Peanut Attribute Values Resulting from Aberrant CIELAB L* and Fruity Attribute Values. **H. E. Pattee* and F. G. Giesbrecht**, USDA-ARS, South Atlantic Area and Dept. of Statistics, North Carolina State University, Raleigh, NC.

4:15 (59) The Relationship of Hull Mesocarp Color to Peanut Seed Maturity. **J. M. Ferguson**, Dept. of Crop Science, North Carolina State University, Raleigh, NC.

4:30 (60) Leaf and Canopy Assimilation in Relation to Growth and Dry Matter Accumulation of Peanut. **K. J. Boote*, G. Bourgeois, N. B. Pickering and J. M. Bennett**, Agronomy Dept., University of Florida, Gainesville, FL; and Agriculture Canada, St.-Jean-sur-Richelieu, Quebec, Canada.

Entomology .... **Heritage 1**

Moderator: T. P. Mack

3:30 (61) Are There Any Patterns in Ten Years of Pheromone Trap Data for the Lesser Cornstalk Borer? **T. P. Mack**, Dept. of Entomology, Auburn University, AL.

3:45 (62) Chlorpyrifos Effects on Pod Damage, Disease Incidence, and Yield in Standard (Chlorothalonil) and Development (Tebuconazole) Peanut Fungicide Programs. **J. W. Chapin* and J. S. Thomas**, Dept. of Entomology, Edisto Research and Education Center, Clemson University, Blackville, SC.

4:00 (63) Evaluation of Insecticides for Control of Lesser Cornstalk Borer on Peanuts. **S. P. Wolf*, Z. C. D. Delamar and T. P. Mack**, Dept. of Entomology, Auburn University, AL.

4:15 (64) Effects of Insecticides on Sweetpotato Whitefly Mortality and Distribution on Peanut Leaves. **S. L. Brown**, Dept. of Entomology, University of Georgia, Tifton, GA.

4:30 (65) Peanut Maturity and Yield Responses to Tobacco Thrips and Herbicide Injury. **D. A. Herbert, Jr.* and C. W. Swann**, Dept. of Entomology and Dept. of Crop Soil Environmental Sciences, Virginia Polytechnic Institute and State University, Tidewater Agriculture Experiment Station, Suffolk, VA.

4:45 (66) Management of Peanut Insect Pests. **E. P. Cadapan* and T. A. De La Rosa**, Dept. of Entomology, University of the Philippines at Los Banos, College, Laguna, Philippines.

Thursday, July 15

Poster Session II (8:00 - 4:00) .... **Azalea Room**

Authors Present 2:30-3:30

(67) A Seed Culture System for Evaluating Aflatoxin Resistance of Peanut Genotypes. **S. M. Basha and R. J. Cole***, Florida A&M University, Tallahassee, FL; and National Peanut Laboratory, USDA/ARS, Dawson, GA.

(68) A Survey of *Sclerotium rolfsii* Isolates for Genetic Variability and Fungicide Resistance. **F. A. Nalim*, M.-Y Shim, N. P. Keller, J. L. Starr and K. Woodard**, Dept. of Plant Pathology and Microbiology, Texas A&M University, College Station, TX; and Texas Agricultural Experiment Station, Stephenville, TX.

(69) Polyketide Biosynthesis in *Aspergillus* spp. as a Developmental Response to Lipid Substrate and Stress. **R. Butchko*, W. Satterfield and N. P. Keller**, Dept. of Plant Pathology and Microbiology, Texas A&M University, College Station, TX.

(70) Timing and Duration of Vector Management in Relation to Spotted Wilt Disease Incidence in Peanut. **J. W. Todd*, J. R. Chamberlin, A. K. Culbreath and J. W. Demski**, Depts. of Entomology and Plant Pathology, University of Georgia, Tifton, GA; and Griffin, GA.

(71) Regeneration Efficiency of Four Peanut Culture Methods. **S. D. Utomo*, A. K. Weissinger and T. G. Isleib**, Crop Science Dept., North Carolina State University, Raleigh, NC.

Breeding II .... **Heritage 2-3**

Moderator: W. F. Anderson

8:00 (72) Genetic Transformation of Valencia-type Peanut via *Agrobacterium tumefaciens*. **M. Cheng*, D. C. H. Hsi, and G. C. Phillips**, Dept. of Agronomy and Horticulture, New Mexico State University, Las Cruces, NM; and Agricultural Science Center, Los Lunus, NM.

8:15 (73) *Agrobacterium*-Mediated Transformation of Somatic Embryos in Peanut (*Arachis hypogaea* L). **R. Gill* and P. Ozias-Akins**, Dept. of Horticulture, University of Georgia, Coastal Plain Experiment Station, Tifton, GA.

8:30 (74) A Rapid and Efficient Method for Direct Multiple Shoot Regeneration in vitro from Hypocotyl Explants of Peanuts. **K. Matand*, A. P. Dessai and C. S. Prakash**, Plant Molecular and Cellular Genetics Lab, School of Agriculture and Home Economics, Milbank Hall, Tuskegee University, Tuskegee, AL.

8:45 (75) Random Amplified Polymorphic DNA in Peanut: Molecular Analysis of Intra and Inter-Specific Lines. **M. Ouedraogo*, A. H. Paterson, C. E. Simpson and O. D. Smith**, Dept. of Soil & Crop Sciences, Texas A&M University, College Station, TX; and Texas Agricultural Experiment Station, Stephenville, TX.

9:00 (76) Pistil Characteristics and Pollination, Seed Production of *Arachis*. **J. Lu* and B. Pickersgill**, Department of Agricultural Botany, University of Reading, Reading, U.K.; Division of Agriculture, Florida A&M University, Tallahassee, FL.

9:15 (77) Fixed-Effect Genetic Analysis of Diallel and Factorial Mating Designs in Peanut. **T. G. Isleib**, Crop Science Dept., North Carolina State University, Raleigh, NC.

9:30 (78) Variation in *Arachis duranensis*, a Possible Progenitor of *A. hypogaea*. **G. D. Kochert, H. T. Stalker and J. S. Dhesi**, Dept. of Botany, University of Georgia, Athens, GA; and Crop Science Dept., North Carolina State University, Raleigh, NC.

9:45 (79) Origin and Dispersal of *Arachis stenosperma* Krap. et Greg. in Brazil. **C. E. Simpson*, J. F. M. Valls, R. N. Pittman and D. E. Williams**, Texas Agricultural Experiment Station, Stephenville, TX; CENARGEN/EMBRAPA Brazilia, Brazil; USDA, ARS, Griffin, GA; and USDA, ARS, Beltsville, MD.

10:00 Break

Graduate Student Competition .... Heritage 1

Moderator: G. L. Wiley

8:00 (80) Survival Mechanisms of *Ditylenchus destructor* (Nematoda) in Peanut Seed and Hull Stubble. **C. Venter, G. Van Aswegen, H. Fourie and C. J. Swanevelder***, Grain Crops Institute, Potchefstroom; Dept. of Anatomy, PU for CHE, Potchefstroom, RSA.

8:15 (81) Effects of Pre-Inoculation and Post-Inoculation Application of Fluazinam on *Sclerotinia minor* Using Three Peanut Genotypes. **T. M. Butzler*, J. E. Bailey and M. K. Beute**, North Carolina State Univeristy, Raleigh, NC.

8:30 (82) Root Growth Dynamics as a Factor in Resistance of Peanut to Cylindrocladium Root Rot. **P. D. Brune* and M. K. Beute**, Dept. of Plant Pathology, North Carolina State University, Raleigh, NC.

8:45 (83) AU-Pnuts Leaf Spot Advisory: Modification of the Rule-Based System for a Partially Resistant Peanut Cultivar. **J. C. Jacobi* and P. A. Backman**, Dept. of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL.

9:00 (84) Cadre and Pursuit Mixtures for Weed Control in Georgia Peanuts. **J. S. Richburg, III*, J. W. Wilcut and G. Wiley**, Dept. of Crop & Soil Sciences, Coastal Plain Experiment Station, University of Georgia, Tifton, GA; and American Cyanamid Co., Tifton, GA.

9:15 (85) V-53482 Systems for Weed Control in Georgia Peanut. **C. J. Zorn*, J. W. Wilcut, J. S. Richburg, III and M. G. Patterson,** Dept. of Crop & Soil Sciences, University of Georgia, Coastal Plain Experiment Station, University of Georgia, Tifton, GA; and Agronomy and Soils Dept., Auburn University, AL.

9:30 (86) Effect of Seed Size and Maturity on Peanut Yield and Growth. **K. S. Rucker* and C. K. Kvien,** University of Georgia, Coastal Plain Experiment Station, Dept. of Crop Science, Tifton, GA.

9:45 (87) Peanut Cultivar Variation in Chilling Tolerance. **M. J. Bell*, R. C. Roy, T. E. Michaels and M. Tollenaar,** Crop Science Dept., University of Guelph and Agriculture Canada, Delhi Research Station, Ontario, Canada.

10:00 Break

10:30 (88) Acetaldehyde and Ethanol Formation in Peanuts During High Temperature Curing. **G. S. Osborn* and J. H. Young,** Dept. of Biology and Agricultural Engineering, North Carolina State University, Raleigh, NC.

10:45 (89) Restriction Fragment Length Polymorphism (RFLP) Analysis to Monitor Alien Germplasm Introgression in Peanut (*Arachis hypogea* L.). **T. P. Shyamalrau*, H. T. Stalker and G. Kochert.** Crop Science Dept., North Carolina State University, Raleigh, NC; and Dept. of Botany, University of Georgia, Athens, GA.

11:00 (90) Identification of Molecular Markers Associated to Disease and Insect Resistance Genes in an Interspecific Hybrid Population. **G. M. Garcia*, G. D. Kochert and H. T. Stalker.** Crop Science Dept., North Carolina State University, Raleigh, NC; and Dept. of Botany, University of Georgia, Athens, GA.

11:15 (91) Comparison of Leafspot Advisory Systems for Managing Early Leafspot of Peanuts in Oklahoma. **L. J. Wu*, J. P. Damicone and K. E. Jackson,** Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK.

11:30 (92) Development of Bioassays to Evaluate Fungicide Distribution, Tenacity and/or Longevity on Peanut Plants and Soil. **K. W. Seebold* and P. A. Backman,** Dept. of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, Auburn, AL.

11:45 (93) The Effect of Air Flow Rate on Drying Times and Costs in a Solar-Assisted Partial Air Recirculation Peanut Drying Facility. **J. H. Young and L. Chai***, Dept. of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC.

Aflatoxin Elimination in Peanuts and Peanut Products Symposium I . . . . Salon B

Moderator: R. J. Cole

8:30 (94) Preharvest Aflatoxin Prevention Through Inherent Genetic Resistance. **C. C. Holbrook**, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA.

8:45 (95) Potentially Important Sources of Resistance to Prevention of Preharvest Aflatoxin Contamination in Peanuts. **R. J. Cole*, V. S. Sobolev and J. W. Dorner**, USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

9:00 (96) Preharvest Aflatoxin Prevention Through Biological Control. **J. W. Dorner*, R. J. Cole and P. D. Blankenship**, USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

9:15 (97) Aflatoxin in Peanuts: The Role of Insects in Enhancing Contamination. **R. E. Lynch*, D. M. Wilson, A. P. Ouedraogo and I. O. Dicko**, Insect Biology Laboratory, USDA-ARS, and Plant Pathology Dept., University of Georgia, Coastal Plain Experiment Station, Tifton, GA; University of Ouagadougou, Ouagadougou, Burkina Faso.

9:30 (98) Aflatoxin Through Genetic Engineering of the Peanut Plant. **A. K. Weissinger and P. Ozias-Akins**, Crop Science Dept., North Carolina State University and Dept. of Horticulture, Coastal Plain Experiment Station, Tifton, GA.

9:45 (99) Molecular Genetics of Aflatoxin Formation. **G. A. Payne***, Dept. of Plant Pathology, North Carolina State University, Raleigh, NC.

10:00 Break

Aflatoxin Elimination in Peanuts and Peanut Products Symposium II . . . . Grand Ballroom B

Moderator: R. J. Cole

10:30 (100) Expert Systems and Modeling for Managing the Preharvest Aflatoxin Problem. **P. D. Blankenship*, B. W. Mitchell, R. J. Cole and J. W. Dorner**, USDA-ARS, National Peanut Research Laboratory, Dawson, GA; USDA-ARS, Southeast Poultry Research Laboratory, Athens, GA.

10:45 (101) Prevention and Control of Aflatoxin During Post-Harvest Chemical Testing, Storage, Shelling, and Processing. **R. J. Henning**, Colquitt, GA.

11:00 (102) Economic Feasibility of Recovering Edible Peanuts from Aflatoxin Contaminated Lots: The Aflatoxin Management Study. **M. C. Lamb*, R. J. Cole, R. J. Henning, J. W. Dorner and J. I. Davidson, Jr.**, USDA-ARS, National Peanut Research Laboratory, Dawson, GA; Tri-State America, Albany, GA.

11:15 (103) Industry Perspective. **K. J. Cutchins**, National Peanut Council, Alexandria, VA.

11:30 Discussion

Breeding and Biotechnology III . . . . Heritage 2-3

Moderator: D. W. Gorbet

10:15 (104) Promising Peanut Lines Developed at the Institute of Plant Breeding in the Philippines. **R. Miranda-Abilay**, Institute of Plant Breeding, UPLB, College, Laguna, Philippines.

10:30 (105) Origin and Evolution of Peanut from Archaeological Evidence. **D. J. Banks*, T. Pozorski, S. Pozorski and C. B. Donnan**, Stillwater, OK; Dept. of Psychology, University of Texas Pan American, Edinberg, TX; and Museum of Cultural History, University of California, Los Angeles, CA.

10:45 (106) BARD-699: A New Peanut Variety of Pakistan. **A. Rehman*, F. W. Smith, S. B. Walls and S. Malik**, BARD Project, NARC, Islamabad, Pakistan.

11:00 (107) Results of a Recent Plant Exploration in Mexico to Collect the Hirsuta Peanut. **S. Sanchez-Dominguez and D. E. Williams***, Depto. de Fitotechnia, Universidad Autonoma Chapingo, Chapingo, Mexico; and USDA-ARS, National Germplasm Resources Laboratory, Beltsville, MD.

11:15 (108) Characterization of a Shriveled Seed Mutant in Peanut. **L. R. Jakkula, D. A. Knauft* and D. W. Gorbet**, Dept. of Agronomy, University of Florida, Gainesville, FL; and Marianna, FL.

11:30 (109) Differential Expression of Peanut Genes. **W. L. Zeile*, R. L. Smith and D. A. Knauft**, Dept. of Agronomy, University of Florida, Gainesville, FL.

11:45 Discussion

Weed Science I .... Heritage 2-3

Moderator: G. Wehtje

1:00 (110) Experiences in Peanut Weed Control Utilizing Cadre Herbicide in Florida. **D. L. Colvin* and B. J. Brecke**, Agronomy Dept., University of Florida, Gainesville, FL; and Agriculture Research and Education Center, Jay, FL.

1:15 (111) Evaluation of Plant Growth Regulators for Peanuts (*Arachis hypogaea*). **W. E. Mitchem* and A. C. York**, Crop Science Department, North Carolina State University, Raleigh, NC.

1:30 (112) Peanut Weed Control Systems with Zorial and Dual. **H. S. McLean*, J. W. Wilcut and J. S. Richberg**, Coastal Plain Experiment Station, University of Georgia, Tifton, GA.

1:45 (113) Potential for Fluometuron Carryover to Peanuts. **A. C. York**, Crop Science Dept., North Carolina State University, Raleigh, NC.

2:00 (114) Systems for Reduced Input Weed Control in Peanut. **B. J. Brecke* and D. L. Colvin**, University of Florida, Agriculture Research and Education Center, Jay, FL; and Agronomy Dept., University of Florida, Gainesville, FL.

2:15 (115) Cadre Systems for Florida Beggarweed Control in Georgia Peanut. **J. W. Wilcut*, J. S. Richburg III, and G. Wiley**, Dept. of Crop and Soil Sciences, Coastal Plain Experiment Station, University of Georgia, Tifton, GA; and American Cyanamid Company, Tifton, GA.

2:30 (116) Influence of Timing and Rate of Application of Cadre on Sicklepod and Nutsedge Control in Peanuts. **D. T. Gooden* and M. B. Wixson**, Clemson University, Pee Dee Research and Education Center, Florence, SC; and American Cyanamid Company, Columbia, SC.

2:45 (117) Response of Five Runner Cultivars to Dinitroaniline Herbicides. **W. J. Grichar* and A. E. Colburn**, Texas Agricultural Experiment Station, Yoakum, TX; and Texas Agrricultural Extension Service, College Station, TX.

3:00 Break

Plant Pathology IV .... Heritage 1

Moderator: T. A. Lee

1:00 (118) Parasitism of Peanut by *Meloidogyne javanica* in Egypt. **J. L. Starr*, M. A. M. Khalil, A. R. A. El Deeb and E. K. Tomaszewski**, Dept. Plant Pathology and Microbiology, Texas A&M University, College Station, TX; and Onion and Oil Crops Section, Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt.

1:15 (119) Microplot Evaluations of Resistance to *Meloidogyne arenaria* in *Arachis hypogaea, A. cardenasii, A. chacoense* and Genotypes Derived from a Cross of *A. hypogaea x A. cardenasii*. **B. B. Shew*, H. T. Stalker and M. K. Beute**, Dept. of Crop Science and Plant Pathology, North Carolina State University, Raleigh, NC.

1:30 (120) Fall Application of 1,3-D for Control of Root-knot Nematode. **P. S. King*, R. Rodriguez-Kabana, D. G. Robertson, and L. W. Wells**, Department of Plant Pathology, Auburn University, Alabama Agricultural Experiment Station, Auburn, AL.

1:45 (121) Velvetbean for the Management of Root-knot in Peanut. **C. F. Weaver*, R. Rodriguez-Kabana, D. G. Robertson and L. W. Wells**, Dept. of Plant Pathology, Auburn University, Alabama Agricultural Experiment Station, Auburn, AL.

2:00 (122) Soybean-Peanut Rotations for the Management of Nematode Problems in Peanut. **D. G. Robertson*, R. Rodriguez-Kabana and L. W. Wells**, Dept. of Plant Pathology, Auburn University, Alabama Agricultural Experiment Station, Auburn, AL.

2:15 (123) Primary Spread of Tomato Spotted Wilt Virus on South Texas Peanut. **V. K. Lowry*, J. W. Smith, Jr. and F. L. Mitchell**, Dept. of Entomology, Texas A&M University, College Station, TX; and Texas Agricultural Experiment Station, Stephenville, TX.

2:30 (124) Interplot Interference in Field Experiments with Spotted Wilt Disease of Peanut. **M. C. Black*, T. D. Andrews and O. D. Smith**, Dept. of Plant Pathology and Microbiology, Texas A&M University, Uvalde, TX; Atascosa County Extension Office, Jourdanton, TX; and Dept. of Soil and Crop Sciences, College Station, TX.

2:45 (125) Field and Microplot Investigation of Surface Plant Debris and Incidence of Three Soil-borne Pathogens. **L. M. Ferguson*, M. K. Beute, G. Naderman and J. Hollowell**, North Carolina State University, Raleigh, NC.

3:00 Break

Weed Science II .... Heritage 2-3

Moderator: J. W. Everest

3:30 (126) Management Strategies for Florida Beggarweed (*Desmodium tortuosum*) Control in Peanuts. **S. M. Brown**, University of Georgia, Tifton, GA.

3:45 (127) Alternative Cultural Practices for Weed Management in Peanut: Stale Seedbed Techniques. **W. C. Johnson, III* and B. G. Mullinix, Jr.**, USDA-ARS and University of Georgia, Tifton, GA.

4:00 (128) The Effect of Cadre and Pursuit Herbicides on Nutsedge (*Cyperus* sp.) Control and Tuber Viability in Peanut. **M. B. Wixson* and D. T. Gooden**, American Cyanamid Company, Princeton, NJ; and Clemson University, Clemson, SC.

4:15 (129) Influence of Timing and Rate of Application of Cadre on Sicklepod and Nutsedge Control in Peanuts. **D. T. Gooden* and M. B. Mixson**, Clemson University, Pee Dee Research and Education Center, Florence, SC; and American Cyanamid Company, Columbia, SC.

4:15 Discussion

Plant Pathology V/Mycotoxins .... Heritage 1

Moderator: K. L. Bowen

3:30 (130) Relationship Between The Lesser Cornstalk Borer and *Aspergillus flavus* Invasion of Peanut Seed. **K. L. Bowen* and T. P. Mack**, Auburn University, AL.

3:45 (131) Effect of Inoculation with a Mixture of *Aspergillus flavus* and *A. parasiticus* on Peanut Seed Germination. **D. M. Wilson*, D. K. Bell, B. D. Evans and C. C. Holbrook**, University of Georgia, Plant Pathology, USDA-ARS, Agronomy, Coastal Plain Experiment Station, Tifton, GA.

4:00 (132) Molecular Characterization and Conservation of *verA*, a Gene Involved in Aflatoxin Production. **J. Kantz, T. H. Adams and N. P. Keller**, Dept. of Plant Pathology and Microbiology, Texas A&M University, College Station, TX; Dept. of Biology, Texas A&M University, College Station, TX.

4:15 (133) A Rapid Assay for Monitoring the Regulation of Aflatoxin Biosynthesis Using NOR Mutants. **M. N. Beremand*, J. E. Fajardo and N. P. Keller**, Dept. of Plant Pathology and Microbiology, Texas A&M University, College Station, TX.

4:30 Discussion

Contributors to the 1993 APRES Meetings

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

<u>Contributors for Special Events</u>

American Cyanamid Company
Dow-Elanco
ISK Biotech Corporation
Rhone-Poulenc Ag Company
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Terra International, Inc.
UAP/Ga. Ag. Chemical, Inc.
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SITE SELECTION COMMITTEE REPORT

The 1994 annual meeting of APRES is July 12-15, in Tulsa, Oklahoma, at the Mariott (formerly Sheraton Kensington Hotel), and room rates will be $55 for single or double and $65 for triple or quad.

A recommendation was made by the two members from North Carolina and agreed upon by the committee for final contract negotiations with the Adam's Mark Hotel in Charlotte for July 11-14, 1995. Room rates are $70 single, double, triple, or quad.

The committee discussed the 1996 meeting in Florida. Danny Colvin and Jerry Bennett recommended Orlando as the city for the 1996 APRES meeting. The Omni Hotel on International Drive offered $75 per night for the room rate. Since the hotel will not open until 1995, concerns were discussed by the committee. The committee recommended that assurances be given in the contract for an alternative hotel site should the hotel not open on time for our meeting. A faxed letter from Omni Hotel ownership was sent on Monday during the meeting that agreed to provide an alternate hotel should the Omni not open as scheduled. The Site Selection Committee recommended that a contract be negotiated and sent to Executive Officer Ron Sholar.

Respectfully submitted,

Ron Weeks, 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 were held at its annual meeting in Minneapolis, Minnesota, on November 1-6, 1992. Approximately 5350 papers were presented. Of these, 21 were devoted to research with peanut and 19 members of APRES authored or co-authored presentations.

Dennis R. Keeney was installed as President and Calvin O. Qualset as President-Elect of the American Society of Agronomy. Charles W. Stuber was installed as President and Vernon B. Caldwell as President-Elect of the Crop Science Society of America. Darrell W. Nelson was installed as President and Larry P. Wildy as President-Elect of the Soil Science Society of America.

The next annual meeting will be held in Cincinnati, Ohio, on November 7-12, 1993.

Respectfully submitted,

H. Thomas Stalker

CAST REPORT

The Council for Agricultural Sciences and Technology (CAST) is a consortium of 31 scientific/professional societies in food and agriculture which compiles and publishes reports on public issues related to food, agriculture, the environment, and related issues. CAST was chartered in the State of Iowa in 1972, with its headquarters located in Ames, Iowa. CAST has over 3,600 individual and numerous corporate members. Scientists, most of whom are members of the various member professional societies, volunteer their time and expertise to develop CAST reports, news CAST articles, and various other publications and comments on relative issues.

The Board of Directors of CAST met in Kansas City on August 29-30, 1992, and in Washington, DC, on February 27, 28, and March 1, 1993. Numerous topics were presented, discussed, and reported on by the various committees. At the Kansas City meeting Dr. Richard E. Stuckey was introduced as the Executive Vice-President of CAST, effective September 1, 1992. Dr. Stuckey is an Ohio native with M.S. and Ph.D. degrees in plant pathology from Michigan State University. Dr. Stuckey had experience in foreign agriculture (Uruguay, The Netherlands), University of Kentucky, Professor of Plant Pathology (Extension, 1975-1989), and as Director of National Association of Wheat Growers Foundation (1989-1992). Dr. Stuckey has been involved in national and international activities.

Dr. Gale Buchanan served as CAST President through the Washington, DC, meeting. Dr. Dean D. Stuthman, University of Minnesota, assumed the job of President at the end of the Washington meeting to serve in 1993-94. Dr. Buchanan will remain on the CAST Executive Committee as Past President.

Dr. Fergus M. Clydesdale received the Charles A. Black Award at the Washington, DC, meeting. Dr. Clydesdale is Chair of the Department of Food Science, University of Massachusetts at Amherst.

The following are recent and forthcoming publications from CAST. Numerous other topics are in various stages of development.

Recent Publications of CAST:

1) Pesticides: Minor Uses/Major Issues
2) Preparing U.S. Agriculture for Global Climate Change
3) Food Safety: The Interpretation of Risk
4) Water Quality: Agriculture's Role

Forthcoming CAST Publications:

1) Risks Associated with Foodborne Pathogens
2) U.S. Agriculture and the North American Free Trade Agreement
3) Waste Management and Utilization in Food Production and Processing

4) Quality of U.S. Agriculture Products
5) Guidelines on What Constitutes Scientific Evidence
6) Public Land Grazing
7) Wetlands: Impact and Regulation

Respectfully submitted,

D. W. Gorbet, Chair

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

The spring meeting of the Southern Association of Agricultural Experiment Station Directors was held in San Juan, Puerto Rico, on April 12-15, 1993. The Puerto Rico Agricultural Experiment Station served as host for the meeting which included tours of some of the tropical agriculture in Puerto Rico.

ESCOP begins its quadrennial update of the research planning process with the first meeting of the national committee scheduled for July 15-16, 1993. Major work of the planning committee will be accomplished during the week of August 23. A great deal of work has already been done, including solicitations of input from a broad sector of organization, industry, and individuals who have an interest in agricultural research. A "Futuring Conference", held in Washington, D.C., during June, served to set the stage for the National Research Planning Effort.

The Southern Association continues its research planning effort. The research plan developed from this exercise was published earlier in the year. It is apparent that as budgets become tighter in most states, the need for more effective research planning becomes more essential. Each of your Stations has received bulk copies of this southern plan as well as copies of the national plan.

The Southern Region IPM program still includes peanuts as one of the commodities that can be addressed in the Southern Region. Projects have been awarded for various IPM programs in peanuts during the past year.

The Southern Association of Agricultural Experiment Station Directors continues to have a special interest in APRES and the role it plays in research and education in peanuts and that lead to enhancing the peanut industry.

Respectfully submitted,

Gale A. Buchanan

NEW BOOK AD-HOC COMMITTEE REPORT

Members of the New Book Ad-Hoc Committee, chaired by Tom Whitaker, met with the editors Harold Pattee and Tom Stalker and chapter authors of the new peanut book, ADVANCES IN PEANUT SCIENCE, on July 13, 1993.

Seventeen (17) chapter titles and authors have been identified by the editors. The proposed schedule to produce the new book is on target with one exception--only seven of 17 chapters have been submitted to date. Most others are nearing completion. The editors plan to distribute the new book by the 1995 APRES meeting.

The Ad-Hoc Committee made the following recommendations to the Board of Directors last Tuesday:

1) The new book be published by Pierce Printing, Inc. Pierce published the last APRES book and presently publishes the APRES journal, PEANUT SCIENCE. Their price was competitive with several other companies.

2) The selling price of the new book be approximately twice the production cost. Production costs including printing, binding, art work, and indexing are estimated to be $16 per book.

3) An individual or group be identified to promote publicity and sales of the new book.

Respectfully submitted,

Tom Whitaker, Chair

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.

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 16, 1993, Huntsville, Alabama

APRES MEMBERSHIP (1975 - 1993)

MEMBERS	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Individual	419	363	386	383	406	386	478	470	419	421	513	455	475	455	415	416	398	399	400
Sustaining	21	30	29	32	32	33	39	36	30	31	29	27	26	27	24	21	20	17	18
Organizational	40	45	48	50	53	58	66	65	53	52	65	66	62	59	54	47	50	40	38
Student	--	--	14	21	27	27	31	24	30	33	40	27	34	35	28	29	26	28	31
Institutional	--	45	45	54	72	63	73	81	66	58	95	102	110	93	92	85	67	71	74
TOTAL	480	483	522	540	590	567	687	676	598	595	742	677	707	669	613	598	561	555	561

1993-94
MEMBERSHIP ROSTER

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