1989 PROCEEDINGS

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GRADUATE STUDENT PAPERS

A New Advisory Model for Fungicide Application to Control Early Leafspot of Peanut in Virginia. R. M. CU*, P. M. PHIPPS, and R. J. STIPES. Tidewater Agr. Exp. Sta., VPI&SU, Suffolk, VA 23437.

A new approach to development of spray advisories for control of early leafspot of peanut was tested with Florigiant peanut in 1988. Starting June 1, the number of hours with RH≥95% and ambient temperature ≥16 C and ≤30 C was recorded. Chlorothalonil at 1.26 kg/ha (Bravo 720 1.5 pt/A) was applied with crop oil (SoyOil 937) at 0.5% of spray volume when the number of hours reached action thresholds of either 36, 48, 60, 72 or 96 hrs. With each application, 10 days of protection against disease was assumed before restarting counts. Three sprays were applied according to action thresholds of 36 and 48 hrs, whereas only two sprays were made with thresholds of 60, 72 and 96 hrs. Reference standard treatments included seven sprays on a 14-day schedule, and three sprays according to the original leafspot advisory program (P. M. Phipps and N. L. Powell, 1984. Phytopathology 74:1189-1193). Sprays (140 L/ha) were applied at 345 kPa with a CO_2 pressurized sprayer having three, $D_2$13 (disk-core) nozzles per row. Plots consisted of four 12.2-m rows, spaced 0.9-m apart. Treatments were replicated in four randomized complete blocks. Plots sprayed on a 14-day schedule and according to the original leafspot advisory exhibited 1.0 and 17% leafspot (% leaflets symptomatic), and 0.8 and 3.8% defoliation at harvest, respectively. Untreated plots exhibited 96% leafspot and 67% defoliation. Treatments according to the new advisory model with action thresholds of 36 and 48 hrs resulted in leafspot control and yields that were similar to a 14-day program, and significantly better than the original advisory program as well as the untreated check. In a separate test, the performance of several fungicides was compared when used according to the new advisory and action thresholds of 48, 72, 96 and 120 hrs. Chlorothalonil plus crop oil, diniconazole at 0.14 kg/ha (Spotless 25W) plus crop oil, and terbutrazole at 0.126 kg/ha (Folicur 1.2EC) were highly effective for leafspot control when applied at the 48 hr threshold. Chlorothalonil continued to provide good disease suppression with 72 and 96 hr thresholds, whereas terbutrazole was the only treatment to provide good control at all four thresholds. All treatments improved yield, however, diniconazole with the 48 and 72 hr spray models resulted in the most significant increases (1464 and 1522 kg/ha, respectively) over the untreated check. Because of the superior performance of the 48 hr threshold model in 1988 as well as 1987 tests, this model will be used to develop spray advisories for growers in 1989.

Simulation of the Temporal Spread of Leafspot and Its Effects on the Growth and Yield of Peanuts. S. E. NOKES*, J. H. YOUNG. Biological and Agricultural Engineering Dept., North Carolina State University, Raleigh, NC 27695.

A general epidemiological model was adapted to describe the temporal spread of leafspot under field conditions. The leafspot progress is modelled using underlying mechanisms of the disease, such as spore production as a function of the environmental conditions, spore dispersal and effectiveness of the infectious units. Leafspot is assumed to affect the peanuts by reducing the photosynthetically active leaf mass. The amount of tissue lost to the disease is calculated on a daily time scale, and the value input to an existing growth model. Daily calculation of the reduced leaf mass allows the effect of leafspot to be predicted as a function of peanut growth stage. The simulated percent infection, percent defoliation, growth and yield is compared to actual field data.

Relationship between Components of Resistance and Disease Progress of Late Leafspot on Peanut. V. M. AQUINO*, F. M. SHOKES, D. W. GORBET and R. D. BERGER. North Florida Research and Education Center, Quincy, FL 32351; Agricultural Research and Education Center, Marianna, FL 32446; Department of Plant Pathology, University of Florida, Gainesville, FL 32611.

Components of partial resistance to late leafspot (Cercosporidium personatum) were quantified and disease severity and defoliation were monitored on 14 peanut (Arachis hypogaea) genotypes in a field test in Marianna, Florida. Incubation period, latent period, percent sporulating lesions, lesion size, number of lesions per leaf and percent necrotic leaf area were determined on inoculated target leaves. Genotypes include a resistant line, UF 81206, moderately resistant cultivar Southern runner, susceptible cultivar Florunner and eleven breeding lines with various levels of resistance. For most genotypes, disease progress was best described by either the logistic or Gompertz model. Lowest AUDPC (area under disease progress curve), rate of disease progress and final level of disease were observed on genotypes UF 81206, PI 261893, US 29-b3-B and US 202-b2. Rate of increase and AUDPC for both disease severity and defoliation were more highly correlated with percent sporulating lesions and latent period than with lesion size, lesion number and percent necrotic leaf area. Percent sporulating lesions and latent period were the resistance components that contributed most towards reducing disease progress in the field.

Effect of Defoliation on the Growth and Development of Peanuts. J.B. Endan* and J.H. Young. Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695-7625.

Three growth chamber studies were conducted to evaluate the effect of defoliation on the growth and development of peanuts. In the first study, Florigiant peanuts were planted in 25 cm diameter pots at a density of 8.3 plants/m^2 and grown in two chambers identically set at 30/20 C day/night temperatures and 15 hours of photosynthetically active radiation at 680 $\mu E\ m^{-2}s^{-1}$. Plants were defoliated uniformly at 25%, 50%, 75%, or 100% on day 70 or day 91 of growth. Flower counts, leaf area, and dry weights of leaves, stems, roots, pegs, and pods were taken weekly until day 119 of growth. In the second study, Florigiant peanuts were planted in plastic trays measuring 50cmX35cmX10cm at 2 plants per tray and a density of 2.7 plants/m^2. For this study, 25% or 75% of the young leaves were removed on day 35 or day 70 of growth. Leaf area and dry weights of leaves, stems, roots, pegs, and pods were taken weekly for 2 weeks for the plants defoliated on day 35 and once every two weeks for 8 weeks for the plants defoliated on day 70 of growth. In the third study, Florigiant peanuts were similarly planted in trays as in the seccond study but in this study eggs and newly hatched *Heliothis zea* larvae were dropped on the plants once on day 29 and four times between day 64 and day 93. Results of the first study showed that leaf dry weights, leaf number, and leaf area of the defoliated plants were lower than the control for about 5 weeks after defoliation. All the defoliated plants survived and produced new shoots. On some of the plants that were defoliated at the 100% level there were flowers on the day after defoliation and on subsequent days. In the second study, leaf dry weights, leaf number, leaf area, peg number, peg dry weights, pod number, and pod dry weights of the defoliated plants were lower than the control for about 5 weeks after defoliation. Results of the third study showed that the peg numbers, and peg weights of the defoliated plants were lower than the control. This was possibly due to the larvae feeding on the flowers.

<u>Assessment of Resistance to Iprodione in Sclerotial Populations of *Sclerotinia minor* from Fungicide-treated Peanuts.</u> F. D. SMITH*, P. M. PHIPPS and R. J. STIPES. Tidewater Agricultural Experiment Station, VPI & SU, Suffolk, VA 23437.

Sclerotia of *Sclerotinia minor* were collected in 1987 from untreated plots of Florigiant peanut and plots treated seven times with either benomyl (0.28 kg/ha) plus sulfur (3.36 kg/ha), chlorothalonil (1.26 kg/ha), or diniconazole (0.14 kg/ha) plus soyoil (0.5%) on a 14-day schedule for control of Cercospora leafspot. Sclerotia from a separate test were collected from untreated plots and plots treated three times with iprodione (1.12 kg/ha) for control of Sclerotinia blight. Chlorothalonil (1.26 kg/ha) was applied four times to this test for leafspot control according to the Virginia peanut leafspot advisory program. From each treatment, four replications of 25 sclerotia were surface-disinfested with 1.0% NaClO for 10 min and plated on glucose yeast extract agar (GYEA) with or without iprodione at 2.0 µg/ml. Recovery of *S. minor* from sclerotia on unamended GYEA and iprodione-amended GYEA averaged 82 and 76%, respectively. Isolates of *S. minor* plated on GYEA were allowed to form sclerotia and individual sclerotia were subsequently transferred to iprodione-amended GYEA for evaluation. Colonies larger than 3 cm in dia. after 2 wk incubation were classified as resistant to iprodione. This procedure detected resistance to iprodione in 4.0, 4.7, 9.6 and 4.0% of the sclerotia from plots treated with benomyl plus sulfur, chlorothalonil, diniconazole, and untreated plots, respectively. When sclerotia were plated directly on iprodione-amended GYEA, resistance to the fungicide was likewise 7.6, 11.3, 3.6 and 6.5%, respectively. The percentage of sclerotia from iprodione-treated and untreated plots having resistance to iprodione after germination on unamended GYEA was 7.9 and 4.3%, respectively. Direct assays of field collected sclerotia yielded resistant isolates from 6.5 and 4.7% of the sclerotia from iprodione-treated and untreated plots, respectively. No significant (P=0.05) differences in frequency of resistance to iprodione were detected between field fungicide treatments in either test. When 23 isolates of *S. minor* from unamended GYEA were matched to their iprodione-resistant subcultures, all 23 subcultures were more resistant to iprodione than the original isolates. These results indicated that some or possibly all resistance developed *in-vitro*. Only one field isolate exhibited resistance to iprodione at a high level (100 µg/ml) out of 455 originating from sclerotia collected from test plots. More surveys will be necessary to determine the effect of fungicide programs on resistance to iprodione as well as the impact of resistance on control of Sclerotinia blight of peanut.

<u>Rapid Detection of Aflatoxins in Peanut with the SAM Assay</u>. *A. B. SARR* and T. D. PHILLIPS. Dept. of Veterinary Public Health, College of Veterinary Medicine, Texas A&M University, College Station, TX 77843.*

A new method for the rapid detection of aflatoxins (i.e., SAM) was compared with a method of high pressure liquid chromatography (HPLC). A total of fifty (50) peanut samples were analyzed in this study. For the SAM method, peanut samples (40g) were ground and extracted with methanol:water (80:20). Aliquots (5 ml) of the methanolic phases were added to 5 ml of water and then partitioned with 3 ml of toluene. Aliquots (0.5 ml) of the toluene phases were added to the top of SAM detectors. Following elution with toluene:chloroform:acetone (95:20:5) all samples were analyzed for aflatoxins with long wavelength U.V. light (365 nm). Peanut samples (20 g) were ground for HPLC analysis and extracted with acetone:water (75:25). Fats were removed with hexane, and the aflatoxins were extracted with chloroform and analyzed by normal phase HPLC. No difference was observed between the two methods. All samples positive by HPLC were positive by SAM, and all samples negative by HPLC were negative by SAM. The percent recovery and the stability of aflatoxin B_1 (AfB_1) in the toluene phase in the SAM assay were determined. Aliquots (5 ml) of the extraction solvent were "spiked" with AfB_1 at levels of 5500, 550, 220, and 55 ng. AfB_1 was partitioned with the toluene phase (and analyzed by HPLC). The percent recovery of AfB_1 was 70% (a recovery of 90% is routinely attained when chloroform is used to extract the methanolic phase). A correction factor was determined for standards of AfB_1 in toluene. AfB_1 was found to be extremely stable in the toluene phase of SAM. Simple and rapid screening tests such as SAM for the detection of aflatoxins in peanuts may greatly facilitate prevention through effective monitoring programs that allow for the diversion of contaminated crops and animal feeds (This work was supported by USAID CRSP Project 02-50305-2 and Texas Agricultural Experiment Station Project H6215).

Biology, Population Dynamics and Natural Enemies of the Groundnut Leaf Miner, Aproaerema modicella (Lep.: Gelechiidae) in Peninsular India. T.G. SHANOWER*, J.A. WIGHTMAN, and A.P. GUTIERREZ. Division of Biological Control, Univ. of Cal., Berkeley, 94720; ICRISAT Patancheru P.O., Andhra Pradesh, 502 324, India; Division of Biological Control, Univ. of Cal., Berkeley, 94720.

Aproaerema modicella, the groundnut leaf miner (GLM), is considered a key pest of peanut in south and southeast Asia. Data from laboratory and field studies carried out in peninsular India are presented here. Temperature dependent growth rates were calculated for eggs, larvae and pupae at five temperatures. The effect of temperature on fecundity and adult longevity was also studied. Three or four generations per season are typical in southern India. Outbreak levels of A. modicella were recorded in the 1987 rainy season when peak populations were in excess of 125 larvae per plant. Leaf biomass was reduced 25% and stem biomass 30% compared to insecticide protected plots. In addition, GLM-free plants produced pods from a higher proportion of their flowers and had nearly twice the pod yield of unprotected plants. Haulm yields were also significantly reduced by GLM attack. In three subsequent seasons leaf miner populations were low. The natural enemy community consists of at least 15 primary and secondary parasitoids, 3 disease agents and 1 documented generalist predator. GLM parasitization rates can exceed 53% and disease levels 35% in some seasons. In the 1988 post-rainy season the proportion of larvae reaching the adult stage declined from 42% in the first generation to approximately 11% in the fourth generation.

Yield and Stability of Seven Short Season Peanut Genotypes in Zimbabwe. Z. A. Chiteka.* Crop Breeding Institute, Department of Research and Specialist Services, Box 8100, Causeway, Harare, Zimbabwe.

High yield and stability are major objectives in peanut breeding programs. The performance of peanut cultivars differs markedly from season to season and with changing altitude in Zimbabwe. This complicates the task of selecting genotypes with high yield as well as stability over a wide range of environments. Seven short season peanut genotypes were grown at five locations without supplementary irrigation over three seasons in Zimbabwe. The locations ranged in altitude from 433 m. a. s. l. to 1506 m. a. s. l. Pod yields varied from 1080 to 5050 kg ha^{-1}. There were significant differences in yield ($P<0.05$) at all sites in all seasons. Genotype x location interactions ($P<0.05$) were observed in all seasons. Among the test varieties, 31/6/13 showed the highest yield and stability over environments (range 2060 to 5050 kg ha^{-1}, mean 3570 kg ha^{-1}). Yield was poorly correlated with altitude for all genotypes.

Influence of Soil Water Deficits on Peanut Pod Formation. P. J. SEXTON*, K. J. BOOTE, and J. M. BENNETT. Dept. of Agronomy, University of Florida, Gainesville, FL 32611.

The effect of a dry pegging zone on pod formation of Florunner peanut (Arachis hypogaea L.) was studied in field and greenhouse experiments. Treatments imposed in a greenhouse study included: wet pegging zone/wet rooting zone, wet pegging zone/dry rooting zone, dry pegging zone/wet rooting zone, and dry pegging zone/dry rooting zone. Pegs were tagged as they entered the soil and pegging zone soil moisture was monitored during pod formation and development. In a field study, pegs were tagged as they entered the soil over a four week period. After two weeks, the pegging zone became dry and continued to dry further until rainfall occurred six weeks after tagging began. As gravimetric soil water declined below 4%, peg penetration and pod expansion ceased; however, those pods that had begun expansion (reached or exceeded the R3 stage) before the pegging zone dried attained a higher weight per seed and per cent dry matter than those in the fully-irrigated treatment. Results from the greenhouse study were less definitive, but indicated that peg depth and perhaps pod expansion were reduced by a dry pegging zone, especially when combined with limited soil water in the rooting zone.

PHYSIOLOGY AND SEED TECHNOLOGY

Use of PNUTGRO to Evaluate Effects of Weather on Peanut Yields in the Southeast during 1984-1987. K. J. BOOTE*, G. HOOGENBOOM, J. W. JONES, and J. M. BENNETT. University of Florida, Gainesville, FL 32611.

Peanut yields in 1987 were reportedly not as good as expected by the industry. Weather was suggested to be a contributing cause. In order to evaluate this possibility, weather data for 40+ sites in the Southeastern peanut growing region were obtained from Rodger R. Getz, NOAA, at Auburn University. The PNUTGRO model was run for 1984-1987 at 15 sites under irrigated versus rainfed conditions. Results for each year and site were averaged over May 1, May 15, and May 30 planting dates, and over five typical soils. Predicted pod yields without irrigation were 5022, 4966, 3788, and 3970 kg/ha for 1984, 1985, 1986, and 1987, respectively. With irrigation, predicted yields were 5982, 5325, 5467, and 5198 kg/ha in 1984, 1985, 1986, and 1987, respectively. Water deficit obviously was a major cause of yield reduction in 1986 and 1987. Nevertheless, under full irrigation, the predicted yield was lowest in 1987. The 1986 and 1987 seasons had a 1.2 degree C higher maximum temperature during pod fill than did 1984 and 1985 (32.6 versus 31.4 C). This higher temperature caused PNUTGRO to simulate earlier maturity, shorter podfill, lower yield, lower shelling percentage, and lower harvest index (but greater vegetative growth) consistent with industry's impressions of vegetative and pod growth in 1987. The average temperature for the 1986 and 1987 seasons was 1.0 C higher than during the 1984 and 1985 seasons. This 1.0 C increase in temperature was estimated to cause a 9.4 % decrease in yield independent of the effect of water deficit. High temperature appears to have major detrimental effects on yield, but further verification is needed from field and controlled environment research. We plan to further evaluate this by obtaining long term yield records from crop reporting districts, and comparing to simulated yields (using regional weather records).

Relation of Internal Tissue Water Balance of Peanut to Soil Moisture. P. I. ERICKSON, D. L. KETRING*, and J. F. STONE. USDA-ARS, Plant Science Research Laboratory, Southern Plains Area, and Agronomy Dept., Oklahoma State Univ., Stillwater, OK 74075.

Field data describing peanut (*Arachis hypogaea* L.) internal water balance responses to soil water availability are lacking. Primary reasons for this are uncertainty in proper measuring parameters for internal water balance and an unclear definition of soil water availability. In the present study, available soil water content is defined as water content minus -1.5 MPa water divided by -0.01 MPa water minus -1.5 MPa water. This essentially normalizes water content to fraction available. It is analogous to leaf relative water content (LRWC) and expressed as soil relative water content (SRWC). The objectives of this research were to (1) define the relationship between SRWC and LRWC of two peanut genotypes (Comet and Florunner) grown under rainfed and irrigated conditions, and (2) use SRWC to predict limiting levels of soil water relative to crop water status. Plants were grown on a Teller loam soil (fine, mixed, thermic Udic Argiustoll) under rainfed conditions in 1982-84 and irrigation in 1983-84. Weekly midday (1130 to 1300 AST) measurements of LRWC were made between 40 and 100 days after planting (DAP). Weekly SRWC values were interpolated to correspond to LRWC measurement days. Above 50% SRWC, the mean LRWC of Florunner and Comet was about 85%, and appeared to be affected more by evaporative demand than by SRWC. Below 50% SRWC, genotype LRWC was highly correlated with SRWC. The predicted SRWC at which soil water was restricted for internal tissue water balance was about 45%, then turgor pressure potentials approached zero. This SRWC threshold occurred under rainfed conditions about 59, 56, and 64 DAP in 1982, 1983, and 1984, respectively, when flowering and pod formation occur. It is concluded that SRWC may be useful for predicting limiting levels of soil moisture and that limiting levels of soil water may occur well above the classically defined lower limit of soil water availability.

A Root Tube - Pegging Pan Technique for Determining the Effects of Soil Water in the Pegging and Rooting Zone On Peanut Pod Formation. J. M. BENNETT*, P. J. SEXTON, and K. J. BOOTE. Dept. of Agronomy, University of Florida, Gainesville, FL 32611.

A root tube - pegging pan system was constructed to examine the independent effects of soil water in the pegging and rooting zones on the initiation and development of peanut (*Arachis hypogaea* L.) fruits. The system provides a technique which allows soil water in the rooting zone to be independently controlled from the soil water in the pegging zone. Root tubes (1.6 m long and 0.15 m dia.) were constructed of plastic tubing. The bottom of the tube was covered with wire mesh to prevent loss of soil and capped. At distances of one-third and two-thirds from the top of the tube watering access tubes were inserted so that water could be added to different depths of the root system. The top of the root tube was closed with a convex cap. In the top of the convex cap two 5-cm holes were drilled. A peanut plant was allowed to grow through the central hole while a watering tube was inserted into the other hole. A pegging pan (0.50 m wide x 0.35 m long x 0.20 m deep) was fitted around the upper portion of the root tube. Roots of the plants developed into the root tubes while pegs which formed entered the soil in the pegging pans. The system provides a mechanism for imposing plant water deficits in the rooting zone 1) by allowing the plant to gradually deplete soil water in the root tube or 2) by watering only through the access tubes deeper in the rooting zone. Similarly, the soil in the pegging zone can be kept moist or dry. By varying the soil water in either the rooting or pegging zone, independent effects of soil water in both zones can be evaluated.

Ecological Attribute of Groundnut Nitrogen Fixation. Jiang RONGWEN*, Hu XIAOJIA, Jiang MOULAN, and Zhang XUEJIANG. Oil Crops Research Institute, Chinese Academy of Agricultural Sciences. Wuhan, Hubei, 430062, P. R. China.

Two groundnut germplasms, i.e. a local Chinese cultivar "Qianjiang" and a cultivar "Bao 17-17", which come from Bulgaria, have been tested with liquid nutrient pot methods in greenhouse by combining/inoculating with two Bradyrhizobium strains, i.e. a Chinese origin strain 009 and Israel strain 5a/70 respectively. The nodule numbers per plant and total nitrogen contents of the shoots of each treatment were determined at 42 days after planting, pure fixed nitrogen of each treatment of germplasm - strain combination was calculated in the following formula: PFN=STN(IN)-STN(UN), where: PFN means the pure fixed nitrogen of specific germplasm-strain combination; STN(IN) and STN(UN) refer to the total nitrogen contents of the shoots of specific germplasm-strain combination treatment and the relative germplasm uninoculated control. Chinese germplasm with its same origin Bradyrhizobium strain showed a favorable symbiotic response but not with that of Israel and vice versa. It may suggest that the geographical factors or the ecological attribute strongly influence the groundnut nitrogen fixation.

Response of Peanut Dry Matter Allocation to Genetic Selection for Yield in North Carolina T. BI, R. WELLS* AND J. C. WYNNE, Department of Crop Science, North Carolina Sate University. Thirteen genotypes representing the major releases or advanced breeding lines from the North Carolina State breeding program were grown in a field study in 1988. The major objective was to further clarify earlier reports concerning physiological alterations in response to genetic selection for greater seed yield. A randomized complete block design with five replications was completed with six growth harvests starting at 42 days after planting (DAP) and continuing until 135 DAP. Greatest alterations to growth were found in the proportion of dry matter allocated to fruit versus vegetative portions. At 135 DAP the main stem length, vegetative dry matter, LAI and harvest index were significantly correlated with years of cultivar release, displaying correlation coefficients of -0.70**, -0.49**, -0.32** and 0.54**, respectively. Cultivars released prior to 1965 exhibited mean main stem lengths and node numbers which were 26 and 9% greater, respectively than more recent cultivars. Concurrently, the harvest index for cultivars released prior to 1965 was 0.82 at 135 DAP compared to 1.02 for more recent cultivars. The data indicate that alterations in dry matter allocation have occurred in response to cultivar improvement.

Protein as an Indicator of Peanut Seed Maturity. S. M. BASHA, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307

Peanut pods were collected between 110 and 140 days after planting and divided into different maturity categories by the Hull-scrape method and also based on the pericarp and testa color. The seeds from these two groups were dried, ground into a meal and defatted. The protein composition of the defatted meal was determined by HPLC. The HPLC resolved peanut seed proteins into eight (I through VIII) peaks. The Mature seed contained highest amount of peak II (arachin) protein than the Immature seed. Likewise peak V protein was also present in higher amounts in the Mature seed. In contrast, peak IV protein decreased with increasing maturity and remained unchanged after 'orange' stage. This decrease was consistent during seed maturation suggesting that the peak IV protein may be useful as an indicator of peanut seed maturity status. In addition, examination of protein profiles of various peanut cultivars indicated that this protein is widely distributed in the Genus Arachis. Since peak IV protein is found in similar amounts in Mature seeds of all the cultivars and exhibit similar developmental changes, peak IV protein would serve as a potential indicator of peanut seed maturity. Because of its possible value as an indicator of seed maturity the peak IV protein is tentatively named as "Maturin". Supported by USDA/SEA/CSRS.

Seed Quality of Runner Peanuts as Affected by Topdressing Gypsum on Calcium-Sufficient Soils. J. F. ADAMS and D. L. HARTZOG*. Dept. of Agronomy and Soils Auburn University, Auburn, Alabama 36849.

Because there is only weak evidence that supplemental soil Ca may be beneficial beyond its obvious effects on yield and sound mature kernel (SMK) of runner peanuts (*Arachis hypogea* L.), a study was initiated to determine the minimum seed-Ca concentration required for maximum germination and seedling vigor of runner peanuts and to determine the effect of applied Ca on seed Ca, seed germination, and seedling vigor. Ten on-farm experiments with replicated gypsum and no-gypsum treatments were established on high-Ca soils. Yields and SMKs were generally unaffected by the gypsum topdressing, but there were effects on seed concentrations of Ca, Mg, and K. Although only one site showed a highly significant increase in germination and seedling vigor from the gypsum application, the limed soils as a group (soil Ca $\geq$ 400 mg kg^{-1}) produced seed with better germination and vigor than the unlimed soils (soil Ca $\leq$ 280 mg kg^{-1}). The minimum seed Ca needed for maximum germination was 282 mg kg^{-1}; the minimum needed for maximum seedling survival was 309 mg kg^{-1}. The data suggest that a higher level of available soil Ca is needed for maximum seed quality that is needed for maximum yield or SMK.

Crop Nutrition Investigation of an On-farm Problem with Peanut in Columbia County, Florida in 1988. G. R. STOCKS*, R. N. GALLAHER and E. B. WHITTY. Agronomy Dept., Inst. of Food and Agricultural Science, Univ. of Florida, Gainesville, FL.

Peanut (*Arachis hypogaea* L.) is sensitive to nutrient imbalances. Zinc is an essential micronutrient but can be toxic to peanuts in any but small quantities. Zinc toxicity is usually not a problem when proper pH and nutrient balances are maintained in the soil, however, when Zn does accumulate in high levels the result is severe necrosis and stunting with devastating yield loss and even death of plants. Problem areas were identified in a grower's field that had symptoms resembling zinc toxicity. The stem tissue was split at the base of the plant and plants were necrotic and severely stunted. The affected areas were small and elliptical in shape with an abrupt change from stunted to healthy plants over a 1 m distance. Whole plant samples were taken from stunted plants and healthy plants near the affected areas. The whole plant samples were partitioned into stem, leaf, root, and seed parts. Also, leaves were picked from the top of the plant (youngest mature leaf), middle of the plant, and base of the plant. Soil samples were taken from the sample rows at depths of 0-15 cm and 16-30 cm. All plant tissue and soil samples were analyzed for macro- and micronutrients for evaluation of any imbalances. From the soil it was found that the stunted plant areas had lower concentrations of N, P, K, Mg, Ca, and Mn. The stunted areas had appreciably higher levels of Fe and Zn. The soil Zn was above the critical level for toxicity. The plant tissue mineral analysis revealed that although the healthy plants did not have optimum concentrations of all nutrients, the levels were more balanced than those for the stunted plant tissue. The stunted plant leaf tissue from the whole plant samples had a Zn concentration of 255 mg kg^{-1} which was well above the critical range for toxicity. Most of the nutrient levels for the stunted plant tissue were out of the sufficiency range. From the data compiled and analyzed it was concluded that this field problem was Zn toxicity caused by an imbalance of the other nutrients in the soils of the affected areas.

PLANT PATHOLOGY

Development and Validation of a Weather-Based, Late Leafspot Spray Advisory.

F. W. NUTTER, JR.* and T. B. BRENNEMAN. Depts. of Plant Pathology, University of Georgia, Athens 30602 and Tifton 31793 GA, respectively.

The purpose of this study was to field test a weather-based, late leafspot (Cercosporidium personatum) forecasting system that was developed at the Univ. of GA and to compare this system with the recommended calendar spray schedule for late leafspot control and yield. Experiments were conducted in Tifton, Plains, and Athens, GA. A split-plot, randomized complete block design with four replications was used. Treatments consisted of forecasting-timed applications using either Bravo 720 F (chlorothalonil), Folicur 1.2 EC (ethyltrianol), or Tilt 3.6 EC (propiconazole), the currently recommended calendar schedule using chlorothalonil and a nonsprayed check. Hours of leaf wetness and canopy temperatures were monitored in each field to identify periods favorable for late leafspot. Disease incidence, and % defoliation were determined weekly throughout the season at each location. Disease assessments (Y) were plotted versus time (X) to obtain disease progress curves for each treatment. Areas under the disease progress curves (AUDPC) were then calculated and used to compare treatment effects on disease control. Mean separations for AUDPC data and pod yields were determined by ANOVA and Duncan's Multiple Range Test ($P \leq 0.05$). Disease control and pod yields were not significantly different at Athens and Tifton when 3 or 4 chlorothalonil or ethyltrianol forecasting-timed sprays were used compared to 8 calendar sprays. Disease ratings were not significantly different using 3 forecasting-timed sprays at Plains until just prior to digging, and pod yields were equivalent to the grower's schedule. Significantly higher levels of disease occurred in plots treated with Propiconazole at all 3 locations. This indicates that this fungicide may not be effective when used in conjunction with a late leafspot spray advisory. Nonsprayed plots at all 3 locations were 80-90% defoliated by the time of digging and pod yields were reduced 40-60%. This indicates that 3-4 well timed fungicide applications were required to prevent losses due to C. personatum at these locations in 1988. Reduced fungicide inputs to control late leafspot will lower the cost of producing peanuts as well as result in less fungicide being introduced into the farm environment.

Progress in the Use of Leafspot Advisories in North Carolina. J. E. Bailey*, R. Hitzig, and G.L. Johnson, first and third authors Dept. of Plant Pathology and Horticultural Science, respectively, North Carolina State University, Raleigh, N.C.; second author, Dept. of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, N.C.

Minimum daily temperature and hours of high (94%) relative humidity for each 24 hour period can be used to determine when peanut leafspot will occur (Phytopahology 49:975-978, and Plant Dis. Rep. 50:810-814). Warnings of disease conducive weather, called leafspot advisories, are used by many North Carolina Agricultural Extension Agents to aid growers in determining need for peanut leafspot fungicide sprays. Introduced in 1983, this program relies on farmer volunteers who monitor temperature and humidity and phone in this information to county offices. County staff use these data to calculate spray advisories and make the information available to all farmers in the county on a telephone recorder. In 1988, forecast weather information was made available to the county offices so that advisories could be estimated three days in advance, thus giving growers some advanced warning of disease favorable weather, and adding continuity over weekends and holidays when the system is not operational. University agricultural meteorologists distribute forecasts for minimum daily temperature and hours of leaf wetness through electronic mail to counties. A survey was conducted in Northampton county, N.C. to determine the extent to which the leafspot advisories were being used as as method of making management decisions. Results showed that 71% of the growers had heard of peanut leafspot advisories and 51% of the growers were using this service. Growers surveyed estimated that they saved 2.4 sprays /year using the advisory system. In another survey of peanut growers in five northeastern North Carolina counties 64% said they used peanut leafspot advisories to schedule chemical applications. One hundred percent of all growers using a spray advisory service found three-day forecasts of anticipated conditions useful in planning spray operations.

Application of chlorothalonil via ground sprays, a center pivot irrigation system or an underslung boom for peanut disease control. T. B. BRENNEMAN* and D. R. SUMNER. Dept. of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793.

Seven applications of chlorothalonil (1255 g/ha) were applied to Florunner peanut via ground sprays, center pivot irrigation (chemigation), or a pivot-mounted underslung boom. These systems applied 0.12, 17.8 and 1.7 Kl water/ha, respectively. Chemigated plots were either trafficked or not trafficked with a tractor. With foliar residue analysis, we found that chlorothalonil deposition from ground sprays was 9.63, 7.51 and 2.67 $\mu g/cm^2$ in the top, middle and bottom canopy layers, respectively. Residues from the underslung boom applications were 2.56, 1.70 and 1.44 $\mu g/cm^2$, and from chemigation applications 0.47, 0.44 and 0.46 $\mu g/cm^2$, respectively, for the top, middle and bottom layers. Ground sprays gave the best late leafspot (Cercosporidium personatum) control both years followed by the underslung boom and chemigation applications, respectively. Disease pressure was heavier in 1987 than in 1988 with defoliation of nonsprayed plants being 96% and 68%, respectively. In 1987, plots treated by the underslung boom or chemigation yielded significantly lower than ground-sprayed plots due to defoliation from leafspot. With less disease pressure in 1988, pod yields in chemigated plots were equal to ground-sprayed plots and both were lower than plots treated by the underslung boom. Rhizoctonia limb rot (Rhizoctonia solani AG-4) was not controlled by chlorothalonil and tended to be more severe where plots were trafficked.

Disease Management of 'Southern Runner' and 'Florunner' Peanuts. J. C. JACOBI* and P. A. BACKMAN. Department of Plant Pathology, Alabama Agricultural Experiment Station. Auburn University, AL 36849-5409.

Disease severity and yield of two peanut cultivars 'Florunner' and Southern Runner' grown under 4 leaf spot management programs were assessed in field plots in 1987 and 1988. Three of the programs were conventional 7 spray schedules and consisted of (1) chlorothalonil at a full rate (1.753 l/ha), (2) chlorothalonil at a half rate (0.877 l/ha), (3) mancozeb at a full rate (1.68 l/ha). An additional spray program was chlorothalonil at a full rate (1.753 l/ha) on a 4 spray schedule. Disease severity of leaf spot (Cercosporidium personatum (Berk. and Curt.) Deighton) was assessed 5-6 times per season as percent of leaflets showing symptoms and as percent of leaflets defoliated. Areas under the defoliation and infection disease progress curves (AUDPC's) were used to compare spray programs and cultivars. There were no differences (P=0.05) in AUDPC's for infection or defoliation between cultivars under the same management program. The mancozeb spray program had significantly greater AUDPC's for both infection and defoliation than any of the chlorothalonil programs. Southern Runner was more tolerant to high AUDPC values producing optimal yield of 3028 kg/ha for mancozeb (1.68 kg/ha), which was equal to the optimal yield of chlorothalonil (1.753 l/ha) of 2952 kg/ha. Florunner produced optimal yields of 2948 kg/ha for chlorothalonil (1.753 l/ha) and 2535 kg/ha for mancozeb, indicating that Southern Runner is more tolerant than Florunner to higher levels of disease caused by late leaf spot. There were also differences between the cultivars in susceptibility to southern stem rot (Sclerotium rolfsii Sacc.). Southern Runner plots had significantly (P=0.05) fewer stem rot loci than Florunner plots. No differences in severity of limb rot (Rhizoctonia solani Kuehn) were found. Disease management strategies may differ between these two cultivars.

A Comparison of Peg Strength and Pod Loss on Florunner and Southern Runner Peanut. F. M. SHOKES*, I. D. TEARE, and D. W. GORBET, North Florida Research and Education Center, Quincy, FL 32351; Agricultural Research and Education Center, Marianna, FL 32446

Arachis hypogaea cultivars Florunner and Southern Runner were grown in individual tests at the Agricultural Research and Education Center, Marianna, FL. Tests were arranged in an RCB split-plot design with four replications. Main plot treatments were the foliar fungicides chlorothalonil (protectant) and diniconazole (systemic), and subplot treatments were three schedules; seven sprays at 14-day intervals, four sprays at 21-day intervals, and no fungicide. Peg strength was measured five times; at 107, 114, 120, 128, and 135 days after planting (DAP) on Florunner and at 107, 120, 126, 135, and 146 DAP on Southern Runner. Peg strength was measured with a Hunter spring force gauge on 20 randomly selected pegs within 10 cm of the taproot on three plants from each of four replicate plots. Pod loss was measured by sifting the top 10 cm of soil from a 2 m^2 area in each plot. Peg strength was generally greater on plants that were treated with diniconazole than for those treated with chlorothalonil. Peg strength was only slightly greater for the peanuts receiving seven sprays than for those receiving only four sprays. There were no significant differences ($\leq$ 0.05) in peg strength between cultivars. Fluctuations in peg strength were noted between sample dates was probably related to the physiological age of plants. Pod loss ranged from 575 - 2733 kg/ha for Florunner and 260 - 1022 kg/ha for Southern Runner depending on foliar treatment. Pod loss was 16% and 8% with chlorothalonil treatments on Florunner and Southern Runner, respectively. Pod loss was less with diniconazole treatment, 8% and 4% for Florunner and Southern Runner, respectively.

Effects of Foliage and Soil Applied Fungicides on Peanut Quality.

P. A. BACKMAN*, K. L. BOWEN, AND L. J. CARTER. Department of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL 36849-5409.

Peanuts treated with flutolanil, diniconazole, and terbutrazole for control of southern stem rot (*Sclerotium rolfsii*) and limb and pod rot (*Rhizoctonia solani*) were evaluated for the effects of these fungicides on peanut pod quality, value per ton, and value per acre. All treatments received full season programs of chlorothalonil for leafspot control and were compared to a control treatment that did not receive any fungicides for control of soilborne fungi. In tests conducted in 1987 and 1988 all three fungicides improved value per ton by 12-15%, while value per acre was often increased 30-40%. The SMK value for graded lots varied only 3-5%, with value being affected most by weight of kernels in the 'damage' category. Optimal treatment dates for highest seed quality were during the pegging and pod fill growth stages.

Fungicidal Control of Southern Stem Rot of Peanuts.

A. K. HAGAN* and J. R. WEEKS, Dept. of Plant Pathology and Dept. of Entomology, respectively, Auburn University, AL 36849.

Peanuts cv. Florunner were sown in five fields with a history of southern stem rot (*Sclerotium rolfsii*) in late April to early May. Recommended production and pest control practices were followed. A split-plot design with fields as whole plots and treatments as subplots was used. Subplots, randomized in four complete blocks, were two rows (0.9 m) wide by 19.8 m in length. PCNB 10G was applied over the row about 90 days after planting (DAP) on a 10 cm (narrow) and 25 cm (standard) band at 5.6 and 11.2 kg a.i./ha, respectively. Foliar fungicides were applied about 70 and 90 DAP. Diniconazole 25W (0.28 kg a.i./ha), terbutrazole 1.2E (0.25 kg a.i./ha), and flutolanil 50W (1.1 kg a.i./ha) were banded with a single D4-25 nozzle at a spray volume of 94 l/ha, while propiconazol 3.6E (0.25 kg a.i./ha), hexaconazole 1.0E (0.28 kg a.i./ha), and a second flutolanil 50W (1.1 kg a.i./ha) treatment were broadcast with three D2-25 nozzles per row at a spray volume of 140 l/ha. The adjuvant X-77 (0.25%) was tank-mixed with diniconazole and propiconazol. Disease loci counts were made after the plots were dug. Stem rot counts were significantly cut by all fungicides below the levels seen in the control plots. Except propiconazol, which gave the poorest disease control, stem rot counts differed little among the fungicide treatments. All fungicide treated plots except those sprayed with propiconazol significantly outyielded the control. Diniconazole, terbutrazole, and the broadcast treatment of flutolanil increased yields above those of the standard PCNB treatment, while hexaconazole and the banded flutolanil treatment did not. Despite similar disease control, plots treated with PCNB on a 10 cm band yielded significantly better than those receiving the 25 cm band width treatment. Broadcast sprays of flutolanil yielded higher than banded treatments of the same fungicide.

Resistance to Meloidogyne arenaria in complex hybrids of Arachis hypogaea and wild Arachis spp. J.L. Starr*, C. E. Simpson, and G. L. Schuster. Dept. Plant Pathology and Microbiology, Texas Agricultural Experiment Station, College Station, TX 77843; Texas Agricultural Experiment Station, Stephenville, TX 76401; Texas Agricultural Experiment Station, College Station, TX 77843.

Complex hybrid lines TP-129 and TP-135 are resistant to M. arenaria, supporting little or no nematode reproduction. When seedlings of these two lines and the susceptible cultivar 'Tamnut 74' were inoculated with freshly-hatched juveniles of M. arenaria and incubated at 24-28 C, no difference in the root penetration by the nematodes was observed at three days after inoculation. Young, adult females were detected in roots of Tamnut 74 at 14 days after inoculation, and mature females with eggs were observed at 21 days after inoculation. In contrast, no nematode was observed to have developed beyond the second juvenile stage at 21 days in roots of TP-135. No nematode development beyond the fourth juvenile stage was detected in roots of TP-129 at 21 days after inoculation. These data are evidence that resistance to M. arenaria in TP-129 and TP-135 is due to a reduced rate of nematode development. Twenty-one advanced generation breeding lines, derived from TP-135 without selection for nematode resistance, were examined for nematode resistance in two field tests. No line was resistant to reproduction of M. arenaria relative to the susceptible standard Tamnut 74.

Meloidogyne arenaria and a Pod Rotting Disease Complex on Peanut in Florida. D. W. DICKSON* and T. E. HEWLETT. Department of Entomology and Nematology, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

Fumigant and nonfumigant nematicides were evaluated for control of Meloidogyne arenaria race 1 on Florunner peanut in two separate tests in a field in Suwannee County, Florida. In the nonfumigant test all treatments that included aldicarb alone or a combination of aldicarb at plant and at pegging increased vine widths at early flowering ($P \leq 0.05$). Of 14 treatments in the nonfumigant test, all but three had a lower soil population density of M. arenaria at midseason than the control ($P \leq 0.05$). At harvest nematode population densities were very high in both tests, ranging from 976-2,593 juveniles/250 cm^3 soil. Consequently, at harvest most pegs, pods, and roots in all plots were heavily galled by the nematode. No treatment in either test increased yields over the controls. A surprisingly large number of plants were infected in each plot with a complex of soil-borne fungi that included Cylindrocladium sp., Rhizoctonia sp., Macrophomina sp., and Pythium sp. There was an average of 10 hits/row (range = 3.2-17.8).

Response of Resistant and Susceptible Peanut Genotypes to Fumigation with Metam Sodium for Control of Cylindrocladium Black Rot.

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Three peanut (*Arachis hypogaea*) genotypes, Cylindrocladium black rot (CBR) susceptible cultivar NC 7, and moderately resistant cultivars NC 8C and NC 10C were planted in *Cylindrocladium crotalariae* infested fields in Martin and Bertie counties, North Carolina in plots receiving 0, 5, 10 and 20 gal/A of Vapam (Metam sodium) in randomized complete block experiments in 1987 and 1988. In both years, final CBR incidence in NC 8C was less than that of either NC 7 or NC 10C in untreated plots. Performance of NC 10C in 1987 was similar to that of NC 8C for both disease incidence and yield in plots receiving Vapam at 5 gal/A or greater, but was no better than that of NC 7 in plots receiving no fumigant. In NC 7, 10 gal/A of Vapam was required to achieve control similar to that obtained with 5 gal/A in NC 10C or NC 8C. In 1988, performance of both NC 8C and NC 10C was better than that of NC 7 in untreated plots. Response of NC 10C to Vapam was similar to that of NC 8C although in 1988, disease incidence in NC 10C was slightly higher than that of NC 8C for all fumigation rates. In 1988, CBR incidence in NC 7 was higher than that of NC 8C and NC 10C at all levels of fumigation.

Response of peanut cultivars to soil fumigation for control of *Cylindrocladium* black rot (CBR) of peanut.

P. M. PHIPPS*, AND T. A. COFFELT, Tidewater Agr. Exp. Sta., VPI&SU and USDA ARS, Suffolk, VA 23437.

Metam sodium at 36 kg/ha (Vapam 10 gal/A) was evaluated for control of CBR in several commercial cultivars of virginia-type peanut from 1986 to 1988. Each test was in a Kenansville loamy sand having a corn/peanut rotation and history of moderate to severe CBR. The experimental design was a randomized complete block with four replications. Plots consisted of two 12.2-m rows, spaced 0.9-m apart. Metam sodium was applied 19 to 30 days pre-plant with a gravity flow applicator and chisel shanks mounted at the front of a Ferguson Tilrovator. Applicator shanks deposited the chemical ca 15- to 20-cm deep on 0.9-m centers to coincide with row spacing. The Tilrovator was operated at a depth of 5- to 7.5-cm to produce beds (10-cm high and 61-cm wide) for marking treated rows, and sealing the fumigant in soil. Overall, metam sodium suppressed disease incidence 83% and improved yields 1153 kg/ha. NC 6 and NC 7 incurred the heaviest incidence of disease without treatment. The CBR-resistant cultivars, NC 8C and NC 10C, exhibited low levels of CBR incidence at harvest in both untreated and treated plots. NC 8C appeared to be more resistant to CBR than NC 10C on the basis of above ground symptoms and yield without treatment. However, the yield of NC 10C averaged higher than all cultivars with the metam sodium treatment. The greatest yield responses to metam sodium were obtained with NC 6 (1359 kg/ha) and NC 7 (1634 kg/ha), whereas NC 8C gave the lowest yield response (608 kg/ha). All cultivars (including NC 9, Florigiant, and VA 81B) produced excellent yields (4669 to 5040 kg/ha) with metam sodium treatment. These results indicate that soil fumigation with metam sodium would be profitable for CBR control in both resistant and susceptible cultivars, where fields have a history of moderate to severe disease pressure.

The Effects of Storage Time and Seed Protectants on Infection of Seed of Four Peanut Cultivars with Cylindrocladium Crotalariae.

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This study was undertaken to determine the possible role of seed transmission in the spread of Cylindrocladium crotalariae, the causal agent of cylindrocladium black rot (CBR) of peanut (Arachis hypogaea L.). Cylindrocladium crotalariae was isolated at a much higher frequency from nontreated peanut seed (seed riding a 6.4 x 25.4 mm screen) shortly after harvest than from nontreated seed following storage for six months. In one study using 3500 seed, the isolation frequency of C. crotalariae from Florigiant, VA 81B, and NC 6 peanut seed was 15.4, 23.4, and 21.8% before storage and 1.6, 4.0, and 5.6%, respectively, following storage for six months in an unheated building. Under similar field disease severity conditions, seed of NC 8C, a cultivar with resistance to CBR, was colonized less frequently by C. crotalariae than seed of Florigiant, VA 81B, and NC 6. Seed of NC 6 were colonized at a greater frequency than seed from Florigiant and VA 81B. The isolation frequency of C. crotalariae was less from seed stored in a nonheated building (outside ambient temperatures ranging from -8 to 31°C during the storage period) than seed stored at a constant temperature of 5°C. Cylindrocladium crotalariae was not isolated from peanut seed treated with five different seed protectants and stored for two weeks. In the early stages of infection by C. crotalariae, the fungus is limited to hyphal ramification between the Malpighian cells of the testa. In later stages of colonization (seed characterized by discolored testa), the fungus invades the cotyledonary tissues and proliferates between the two cotyledons.

Reappearance in Georgia of Concealed Damage in Peanut Seed Caused by Infection with Diplodia gossypina.

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An old and long quiescent disease of peanut seed in the U.S., concealed damage (CD) caused by Diplodia gossypina, has reoccurred naturally in field research plots on the UGA Coastal Plain Experiment Station in 1986. Differential susceptibility was originally noted, among the 17 cultivars and breeding lines. With intact testae, CD caused by D. gossypina may not be seen until the testae are removed or the cotyledons separated. Diseased cotyledons are light-to-dark brown, frequently with the most intense discoloration around the micropyle, and decreasing slightly to moderately toward the distal end of the seed. On first opening a container of CD-seed, a strong sweet-sour odor is noticed. The fungus has no characteristic odor in pure culture. There is a singular feature with this CD caused by D. gossypina that we have not observed or seen reported with any other form of CD. In many CD-seed the slight cavities between the cotyledonary interfaces are partially to completely filled with hyaline fungal mycelium. In all cases, transfers of surface disinfested (70% ethanol, 1 min.) mycelium to potato-dextrose agar, with 0.5 g/L each of yeast extract and casein hydrolysate (PDYCA), and incubated at 27 ± 1°C and 90 µEs-1,m-2 cool-white fluorescent light for 10 days have produced abundant pycnidia and conidia typical of D. gossypina Cooke. The pathogenicity of the fungus, symptoms of the disease and signs of the fungus were confirmed in two pathogenicity tests conducted in 0.4 m^3 microplots of soil infested with the pathogen in a greenhouse. Subsequent occurence and identification of the fungus was monitored by plating surface disinfested mycelium from between cotyledons on PDYCA during 1987 and 1988.

Phenolic Compounds in Peanut Shells at Different Growth Stages.

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Fourteen genotypes of peanut with varying degrees of resistance to growth and colonization of Aspergillus sp. were analyzed for phenolic compounds at four different growth stages. Ground pods were analyzed for free and bound phenolic acids using high pressure liquid chromatography (HPLC) while free and bound phenolic compounds using Folin-Ciocalteu assay. More free phenolic compounds (FPC) were observed at the very immature pod stage (I) with values ranging from 7.8-15.5 mg/g. Levels of FPC remained constant from stages II (before harvest) to IV (curing or storing) at a range of 1.9-5.8 mg/g. More bound phenolic compounds (BPC) were also present at stage I with values ranging from 11.8-13.9 mg/g and at stage IV ranging from 9.6-16.3 mg/g. Amounts of BPC were from 6.2-8.6 mg/g for stages II and III (at harvest).

Isozyme variations in peanut cotyledons during early stages of infection by *Aspergillus flavus* and *A. parasiticus*. J. B. SZERSZEN* and R. E. PETTIT. Dept. of Plant Pathology and Microbiology, Agricultural Experiment Station, Texas A&M University, College Station, Texas 77843-2132.

Isozymes present in *Aspergillus*-infected and non-infected isolated peanut cotyledons of TX 798736, J-11, SN 55-437, Toalson, Starr, and Florunner, were assayed electrophoretically. The cotyledons were inoculated with a water suspension of *A. flavus* (Fl 102) or *A. parasiticus* (NRRL 2999) conidia. Inoculated and water check cotyledons were incubated in the dark, at 32 C, 95% RH, and sampled every 6 h during the first 48 h of incubation. Following incubation, the cotyledons and hyphae collected from surfaces of the cotyledons were subjected to microprocessor-controlled electrophoretic separations (IEF-PAGE, pH 3-9; native-PAGE, gradient 8-25%). Qualitative and quantitative changes were recorded in the activities of alcohol dehydrogenase, acid phosphatase, esterase, leucine aminopeptidase, and peroxidase in inoculated cotyledons compared to the water checks. Inter-genotypic isozyme patterns of uninoculated cotyledons were very similar. Both aspergilli caused a rapid decrease of activity of alcohol dehydrogenase and acid phosphatase, and no bands were recorded 12 and 24 h after inoculation, respectively. *Aspergillus parasiticus* and *A. flavus* caused the depletion of 2 and the appearance of 1 new peroxidase isozymes and an increase in the activities of the isozymes in the cathodal regions of gels after 18 and 24 h, respectively. Thirty hours after inoculation both fungi caused qualitative and quantitative changes in the activity of esterase. Inoculation with *A. parasiticus* resulted in a decrease of leucine aminopeptidase activity (2 isozymes) and formation of a new isozyme 48 h after inoculation. Catalase and B-glucosidase were the only isozymes whose activity remained unchanged after inoculation. *Aspergillus flavus* caused more changes in isozyme patterns than *A. parasiticus*. All genotypes tested and inoculated with the aspergilli exhibited minor inter-genotypic variations in the patterns within 48 h.

HARVESTING AND HANDLING

Effect of Stacked Windrow on Peanut Quality Parameters. J. L. BUTLER*, E. J. WILLIAMS, J. M. TROEGER, K. L. CRIPPEN, N. LOVEGREN, and J. R. VERCELLOTTI, ARS-USDA, SAA, Crop Systems Research Unit, Tifton, Georgia 31794 and ARS-USDA Southern Regional Research Center, New Orleans, LA 70179.

In a continuing effort to improve the curing environment for windrowed peanuts, two experiments were conducted at Tifton in 1988. Florunner peanuts were grown on Tifton loamy sand soil with supplemental irrigation. Two plantings were made and each planting was dug at optimum maturity based on the maturity profile. Following digging, one-half of the peanut beds in the test were "stacked" in a randomized test with four replications of each treatment. The stacked windrows were formed by taking one half of the inverted windrow and stacking the plants on top of the inverted windrow. The plants were placed on the inverted windrow with the pods down so that most of the peanuts were shaded and all pods were off the ground. Thermocouples were placed in the center of the basal seed in four separate locations in each of the windrows. These thermocouples and sensors to measure solar radiation, wind movement, rainfall, relative humidity, ambient temperature, black globe temperature, and soil temperature were recorded by a Campbell weather station. The peanuts were combined at 18-25% M.C. and cured at recommended conditions. Following this operation, the peanuts were graded, shelled, sized and evaluated for quality by both GLC and organoleptic methods. These evaluations showed that the immature peanuts are more susceptable to quality loss and that the quality of the peanuts in the stacked windrow may be higher.

Shaded Windrow for Peanut Curing in Virginia. F. S. WRIGHT*, D. M. PORTER, USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437; K. L. CRIPPEN, N. V. LOVEGREN, and J. R. VERCELLOTTI, USDA-ARS, Southern Regional Research Center, P. O. Box 19687, New Orleans, LA 70179

A study was initiated in 1988 to determine if peanut quality could be improved by placing peanuts in a shaded windrow as compared to a conventional (inverted) windrow. The shaded windrow may provide protection from daytime high temperatures or extremely low nighttime temperatures (frost) during windrow curing. Florigiant and NC 6 peanuts were dug with a conventional digger-inverter. Shaded windrows were hand formed by placing a mass of peanuts on top of the inverted windrow so that the peanuts were between the inverted vine mass and the vine mass exposed to the sky. Individual peanut temperatures were monitored in both windrow types along with the ambient environment. The peanuts were mechanically harvested, dried on a sample dryer using heated air not exceeding 6° WB depression, and shelled and screened into No. 1, medium, and jumbo size kernels. Peanut temperatures in the inverted windrow were higher in the daytime and lower at night than the peanut temperatures in the shaded windrow or the ambient air temperature. The peanut moisture content at harvest (6 days after digging) was about 8% higher in the shaded windrow as compared to the inverted windrow. The results on peanut quality evaluations will be presented by scientists from the Southern Regional Research Center.

Comparison of Drying Rates and Alcohol Meter Readings for Stacked and Conventional Windrows in North Carolina. J. H. YOUNG*. Biological and Agricultural Engineering Department, North Carolina State University, Raleigh, NC 27695-7625.

During the 1988 harvest season, peanuts from each of three varieties (NC6, NC7, and Florigiant) were dug on three dates (10/7, 10/11, and 10/18) and placed in either standard inverted windrows or "stacked" windrows. Samples were hand-picked from the windrows and moisture contents and alcohol meter readings determined daily until the peanuts were combined after seven to ten days. The peanuts in "stacked" windrows dried more slowly than those in standard windrows. Kernel moisture contents ranged from 5 to 6% wet basis higher in "stacked" windrows at the time of combining. Alcohol meter readings were not significantly different for the two windrow types during the first and third harvests. However, for the second harvest when freezing temperatures were encountered, the peanuts in standard windrows developed much higher alcohol concentrations which are typical of off-flavors.

Descriptive Sensory Analysis of Peanuts from 1987 and 1988 Peanut Crop Windrow Drying Studies. K.L. CRIPPEN, J.R. VERCELLOTTI*, J.L. BUTLER, E.J. WILLIAMS, B. CLARY, F.S. WRIGHT and D.M. PORTER. USDA-ARS-SRRC, New Orleans, LA 70124; USDA-ARS-SAA-CSRU, Coastal Plain Experiment Station, Tifton, GA 31793; Oklahoma State University, Stillwater, OK 74078; USDA-ARS, Suffolk, VA 23437

Comparisons were made between the conventional windrow method of drying freshly dug peanuts and a variation of the windrow method. The windrow variation consists of stacking the adjacent windrow on top which results in shading of the two windrows by the leaves of the top windrow. This experiment was replicated at Tifton, GA; Stillwater, OK; and Suffolk, VA with peanut varieties normally grown in those areas. The peanuts were separated into jumbo, medium and #1 commercial sieve sizes. Generally, the peanuts from the shaded windrows tended to have higher intensities for roasted peanutty flavor and lower intensities for off-flavors, where the conventional windrow method resulted in lower roasted peanutty flavor and higher off-flavors such as fruity/fermented. These relationships were generally true for #1 size peanuts more so than the medium and jumbo sizes. Florunner peanuts grown near Tifton, GA in 1987 and 1988, Okrun peanuts grown near Stillwater, OK in 1987 and 1988, and Florigiants and NC 6 peanuts grown near Suffolk, VA in 1988 tended to follow similar patterns. Peanuts in Georgia and Virginia that were exposed to freezing temperatures after digging received less freeze damage in shaded windrows than conventional windrows. The shaded windrow method preserved the potential for the development of roasted peanutty flavor and decreased the potential for off-flavor development more than conventional windrow methods.

Gas Chromatographic Analysis of Peanuts Produced by Different Methods of Windrow Drying. N.V. LOVEGREN*, J.R. VERCELLOTTI, K.L. CRIPPEN, J.L. BUTLER, E.J. WILLIAMS, B. CLARY, F.S. WRIGHT, AND D.M. PORTER. USDA-ARS-SRRC, New Orleans, LA 70124; USDA-ARS-SAA-CSRU, Coastal Plain Experiment Station, Tifton, Georgia 31793; Oklahoma State University, Stillwater, OK 74078; and USDA-ARS, Suffolk, VA 23437.

Peanuts collected from a windrow drying study were analyzed for volatiles by gas chromatography (GC) before and after roasting. Florunner, 1987 and 1988; Tifton, GA; Okrun, 1987 and 1988; Stillwater, OK; and Virginia peanuts, 1988; Florigiant and NC6; Suffolk, VA; from shaded and inverted windrows were screened into jumbo, medium, and # 1 sizes and analyzed for volatiles. GC of the raw inverted # 1's in the 1987 and earlier 1988 GA harvest showed increased amounts of ethanol, methyl butanol, and hexanal when compared with the shaded whereas medium and jumbo samples showed little difference. The later 1988 GA inverted samples (all sizes) were exposed to frost and excessive amounts of one or more characteristic freeze damage markers ethanol, methyl butanol, hexanal/2,3-butanediol as a double peak, and total volatiles were noted in all samples. According to the GC volatiles shaded # 1's from the GA 1988 samples were partly protected from frost while medium and jumbo shaded samples were completely protected. The VA samples were comparable to the GA except that more severe cold caused the conventional samples to be severely freeze damaged while all the shaded sizes were only partially damaged. OK peanuts were not exposed to frost either year and followed the same trends as the earlier GA windrow samples. From this comparison of peanuts from windrow studies by GC, it was concluded that #1 peanuts are more susceptible to flavor deterioration in the conventional, inverted windrow drying, and shaded windrow drying protects peanuts from frost damage.

Gas Chromatography of Roasted Peanut Flavor Volatiles at Moderate Temperature by Dynamic Headspace Sampling with Simultaneous Flame Ionization and Photometric Detection. J.R. VERCELLOTTI*, K.L. CRIPPEN, A.L. PISCIOTTA, AND N.V. LOVEGREN. USDA-ARS-SRRC, New Orleans, LA 70179.

This paper reports the application of an improved gas chromatographic (GC) method which allows roasted peanut flavor volatiles perceived by human sensory panelists to be profiled more closely. A closed loop device with an injection valve was made to concentrate the peanut volatiles at moderate temperatures. Peanut butter on the walls of a screwtop conical test tube placed within a regulated heating block was purged at 50° C. to 60° C. with nitrogen carrier gas through a connector and a sparging tee with heated transfer line and valve onto a Tenax GC-8% PMPE column, where the volatiles were concentrated at ambient temperature. After temperature programming, a combined flame ionization (FID) and flame photometric detector (FPD) permitted simultaneous detection of typical FID active flavor volatiles (as in SRRC method) and the FPD, sulfur containing compounds. Some 18 FID active compounds (alcohols, lipid oxidation products, Strecker aldehydes, pyrazines, etc.) and 14 FPD peaks (mercaptans, mono- and disulfides, hydrogen sulfide, and carbonyl sulfide) were routinely monitored. This mixture of peanut butter flavor volatiles differs somewhat from those purged at 125°, both qualitatively and quantitatively. Volatiles in the FID extended from methanol to substituted pyrazines and benzeneacetaldehyde but did not include compounds such as vinyl phenol and the decadienals. The method was applied to assessing degree of roast (e.g., several roasts of the same peanut lot with Hunter L values ranging from 60 to 40). Descriptive sensory panel analysis defined intensity trends for character notes that typify changes in degree of roast (e.g., roasted peanutty, sweet aromatic, dark roast, raw beany, bitter) while the GC tracked production of key marker compounds as roasting heat exposure was varied. This improved GC method has potential not only in assessing postharvest peanut quality but also in sensory research and peanut product evaluation.

Flavor in Runner-Type Peanuts as Affected by Headspace Volatile Concentration and Marketing Grades. W. H. YOKOYAMA*, H. E. PATTEE, and M. F. COLLINS. Beatrice/Hunt-Wesson, 1645 West Valencia Drive, Fullerton, CA 92633-3899; USDA-ARS, Department of Botany, North Carolina State University, Raleigh, NC 27596-7625; Beatrice/Hunt-Wesson, 1645 West Valencia Drive, Fullerton, CA 92633-3899.

The general quality of the peanut crop within a given year is not static, but is dynamic and changes in response to climatic variations and harvesting and handling variations. The Headspace Volatile Concentration (HSVC) Test was used to monitor quality during the 1987 peanut crop marketing season in southwest Georgia. Five preselected HSVC ranges and five Southeastern Peanut Association grades for shelled runner peanuts within each HSVC range were evaluated for intensity of selected sensory attributes of roasted peanut paste made from each of the 25 individual samples. The roasted peanut intensity is quantitatively related to the HSVC and market grade of the sample. The desirable roasted peanut flavor attribute is shown to have an inverse linear relationship with the undesirable fruity flavor attribute. A two unit increase in the fruity attribute results in an approximate one unit decrease in the roasted peanut attribute. The HSVC measurement on farmers stock peanuts can be done as a compatible part of the Federal-State Inspection Service grading procedure and is a simple, rapid method of predicting roasted peanut quality.

Comparison of Dryer Control Strategies. C. L. BUTTS*[1] and W. E. DYKES[2]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; [2]Peerless Manufacturing Company, Shellman, GA 31786.

Florunner peanuts were dried using two dryer control strategies. The first control strategy followed what was considered relatively harsh drying conditions. Plenum temperature was maintained at 38 C. The second control algorithm required manually changing the dryer thermostat setting so that the maximum temperature of the plenum did not exceed 38 C or relative humidity of air entering the peanuts did not fall below 50%. In the event that ambient air temperature and relative humidity were outside the desired range, ambient air was used. Air temperature in the ambient air, plenum and in the peanuts was recorded as well as ambient relative humidity. Electricity and LP gas consumption were recorded. Official grades at the time of purchase and the amount of split and bald kernels at the time of shelling were used to evaluate changes in quality as a result of drying strategies.

Milling Quality in Peanut Curing. J.M. TROEGER. USDA-ARS, Crop Systems Research Unit, Coastal Plain Exp. Sta., Tifton, GA 31793.
Past research has shown that peanuts dried or cured with temperature above 35C or with relative humidity (RH) below 40-50% may have a poor milling quality as indicated by an excessive percentage of split kernels. The Federal-State grading procedure allows up to 4% sound splits without penalty. A computer model (PNUTDRY) was developed to simulate bulk drying of peanuts in a bin or wagon. Primary outputs of the model are drying time and energy use. Effects of drying on milling quality in the model were determined by accumulation of RH below 45%. To verify this approach and to quantify the relationship between cumulative low RH and split kernels, experiments were conducted in the fall of 1988. In six tests using four dryers, the results showed a correlation between low RH cumulation and split kernels. The results also showed that conditions during drying in the windrow will affect the percentage of split kernels. Quality of peanuts going through the drying process can only be maintained, it cannot be improved.

Postharvest Handling Operations for Peanut Farmers in the Caribbean Basin. M. S. CHINNAN. Department of Food Science and Technology, University of Georgia Experiment Station, Griffin, GA 30223-1797.

A peanut thresher, sheller, and inexpensive burner arrangement for a peanut dryer were designed and fabricated or modified at the Georgia Station for use on small peanut farms in the Caribbean basin. The sheller was designed to operate with pedal-power. Preliminary testing was done at Georgia, field testing is undergoing on location in the Caribbean. The basic design concept of shelling was taken from a hand-operated reciprocating type sheller; that concept was modified and a pedal-operated sheller was designed, fabricated and tested. A small Japanese thresher was modified to be operated with a tractor P.T.O. shaft or gasoline engine, and to be transported on 3-point hitch of tractor or rolled in the field with human power. An inexpensive liquid fuel burner commonly used in citrus orchards during freezing weather was adapted to serve as a heat source for a batch peanut dryer. The burner arrangement designed was tested for its performance and efficiency.

Sampling Error Associated with Probe Patterns for the Pneumatic Sampler. J. W. DICKENS*, T. B. WHITAKER, and A. B. SLATE. USDA-ARS, North Carolina State University, Box 7625, Raleigh, NC 27595-7625.

The value of farmers stock peanuts is usually determined by taking a 5-probe or 8-probe sample from a dryer-trailer load of peanuts, subdividing the sample to approximately 1800 g with a riffle-type divider and grading the subsample. The purpose of this study was to determine the variation in lot value related to the twelve 5-probe patterns and the ten 8-probe patterns presently employed by the Federal-State Inspection Service to sample farmers stock peanuts. Twenty dryer-trailer loads of runner-type farmers stock peanuts received directly from the farm were used in the study. Among the 20 loads, the load with the highest variation in value among probe patterns had a coefficient of variation (CV) of 0.85% among the twelve 5-probe patterns and a CV of 0.52% among the ten 8-probe patterns. When averaged across the 20 loads used in this study, the average CV among the 5-probe patterns was 0.45% and the average CV among the 8-probe patterns was 0.29%. An averaged CV of 2.2% in lot value related to variability among 1800-g subsamples has previously been reported. This study indicates that the variation among 1800-g subsamples is the major source of error in determining the value of farmers stock peanuts.

Dust Control in Peanut Grading Rooms. FLOYD DOWELL*. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Federal and State Inspection Service concerns for the health of peanut graders has prompted research to reduce dust levels in grading rooms. A system was developed to reduce respirable, inhalable and total dust concentrations to acceptable levels in peanut grading rooms. A laser particle counter and a high volume air sampler were used to estimate the dust levels during the 1988 peanut season in eight grading rooms. Grading rooms were monitored for at least six days, three days with a selected filter and air flow rate and three days with no filtering system. Tolerance dust levels were established based on the response of graders at test sites. When 0.5 micron dust counts were below 90,000 particles, graders noticed an appreciable difference in air quality. Total dust and 5.0 micron values were used to compare the relative effectiveness of the dust filtering systems. Based on the filters and flow rates tested in this research, a system was designed to maintain dust particles below the established threshold. The system uses a 90% efficient filter with an arrestance of 95%. The air in the room is filtered every two minutes. These recommendations are based on systems tested at specific grading rooms. The number of loads graded and the environment in which the grading room is located will change. Therefore, modifications to these recommendations may be needed.

Roof Coatings for Reducing Warehouse Condensation Potential. J. S. SMITH, JR.* USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Three types of paint applied as roof coatings on peanut warehouses were evaluated for theoretical effectiveness in reducing condensation potential. Squares of galvanized sheet metal, 2 feet by 2 feet, were painted top and bottom, top only and bottom only. An unpainted square was used as a check. Squares were mounted on a frame inclined at a 45 degree angle facing due south. Thermocouples were attached to the bottom surface of the squares and temperatures were recorded at hourly intervals. Ambient relative humidity and temperature were recorded as well as ambient conditions within the confines of the test frame. Potential for condensation occurring on the various surfaces was determined from a psychrometric chart using the surface temperatures with ambient relative humidity and temperature. This information will be useful in determining the influence of these coatings for reducing condensation potential in peanut warehouses.

Visual Method to Determine Seed Maturity in Shelled-Stock Peanuts. C. S. KVIEN*, K. CALHOUN, and J. K. SHARPE, Dept. of Agronomy, Univ. of Georgia Coastal Plain Experiment Station, Tifton, GA 31793, and Farmers Fertilizer and Milling, Colquitt, GA 31737.

Peanut compositional characteristics that influence flavor, shelf life and texture change with maturity. Recent developments like the Hull-Scrape Technique have helped growers dig a more mature crop. However, most peanut product manufacturers buy shelled stock peanut. To help determine the maturity of a shelled stock load we use a simplified version of the physiological maturity index based on testa surface color and texture changes. Like the Hull-Scrape Technique, this technique will give a maturity distribution profile of the peanut lot. The technique will improve seed analysis by eliminating seed maturity as a confounding factor. Mechanical separation of these groups will be difficult. Possible separation methods include density, and optical characteristics of the seed.

Percentage Nut-Fill: a Possible Maturity Index for Peanuts (NC2 Cultivar) Grown in Eastern Caribbean. M.J. HINDS*, G.M. SAMMY, B. SINGH. Dept. of Chemical Engineering, University of West Indies, St Augustine, Trinidad; Dept. of Food Science, Alabama A & M University, Normal, AL 35762.

Percentage Nut-Fill (NF) of green peanuts was investigated as a possible maturity index. NF is the percentage volume of seeds to pods using a measuring cylinder. Peanuts were collected periodically over 3 seasons between 99 to 141 days after planting (DAP) from 2 soil types using a Random Complete Block Design. The NF of the composite pods and individual maturity categories from each treatment was determined and data analysed using IBM SAS program. The results were correlated with optimum reaping time (ORT) established from 'Shellout' tests . ORT differed with season and soil type and ranged from 120 to 141 DAP. Rate of Nut-Fill also varied with season and soil type. Values of NF for mature pods (41.5 +/- 1.2) and for composite pods at ORT (38.5 +/- 0.4) were consistently significant and were independent of pod size, climatic variables, season, soil type and farmers' practices. Thus a % Nut-Fill of 38.5 +/- 0.4 appears to be an objective indicator of optimum reaping time for these peanuts.

MYCOTOXINS

Tissue Sampling for Detecting Low Aflatoxin Levels in Peanut Kernels. K. L. BOWEN* and P. A. BACKMAN. Department of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL 36849-5409.

Fungal species that produce aflatoxins (Aspergillus flavus and A. parasiticus) are common in field soils, and invasion of peanut kernels by these fungi frequently takes place during pod development. In environments where conditions are suboptimal, entire kernels may not become invaded by these fungi, however, some colonization of testa and outer layers of cotyledon may occur. If mycotoxin producing fungi become established in these external kernel layers, aflatoxin is most likely concentrated in the same areas. A technique was developed for sampling only the testa and outer cotyledonary tissue of raw peanuts. This involved abrading kernels of up to 4% of their external tissue. Fungi established in this tissue could be assessed by plating peanut particles on selective media plates. Aflatoxin levels were measured in abraded particles and chopped whole kernels from the same peanut samples. Toxin levels in whole kernels samples were 9.2% of levels measured in particles abraded from external kernel tissue. When aflatoxin concentration was less than 5 ppb in whole kernels, it was often found to be as high as 50 ppb in external tissue of the kernels. This technique allows measurement of low aflatoxin levels in peanut lots.

Comparison of Two ELISA Screening Tests with HPLC for the Determination of Aflatoxins in Raw Peanuts. J. W. DORNER* and R. J. COLE. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Two enzyme-linked immunosorbent assay (ELISA) rapid screening tests were compared to high performance liquid chromatographic (HPLC) analyses of 100 raw peanut extracts for the determination of aflatoxins. Identical extracts, all contaminated between 0 and 70 ppb, were analyzed in duplicate by the Afla-10 cup test, the EZ-Screen quick card test, and an HPLC method. The screening tests had detection thresholds of 10 ppb and 20 ppb, respectively. Both assays were accurate compared to HPLC when samples were negative for aflatoxins or contained aflatoxins above their respective detection thresholds. Errors that did occur were associated with samples that contained aflatoxins at concentrations just below their detection thresholds. The cup test identified as $\geq$10 ppb 9% of samples that were in the 5-10 ppb range as determined by HPLC. The card test identified as $\geq$20 ppb 53% of samples that fell in the 10-20 ppb range by HPLC. Of the samples that were outside the range of 5-10 ppb, the cup test was accurate with both replications compared to HPLC 97% of the time. Similarly, the card test results (both replications) were comparable to HPLC in 91% of samples outside the 10-20 ppb range.

Studies on Peanut Phytoalexins: Induction, Characterization and Genetic Variation. B. MOHANTY*, M. MUSINGO and S. M. BASHA, Division of Agricultural Sciences Florida A&M University, Tallahassee, FL 32307 and DORNER, J. W. and R. J. Cole. National Peanut Research Lab, USDA/ARS, Dawson, GA 31742

Phytoalexins are antibiotic secondary metabolites produced by the plants in response to injury and invasion by certain pathogens and appear to be involved in disease resistance. Peanut kernels also produce phytoalexins when exposed to their native microflora. Phytoalexins in peanut kernels were induced by slicing and incubating the seeds at 25°C for 4 days in the dark. The samples were dried and the phytoalexins from the slices were extracted and fractionated by HPLC. The data showed them to be composed of six to seven compounds in varying amounts. Phytoalexin accumulation began within 24 h of wounding and reached maximum by 8 days. The phytoalexin content and composition changed during the 10 day incubation period. Phytoalexin production was maximum at pH 2 and 8, and also pH was found to alter phytoalexin composition. Phytoalexin production decreased significantly at water activity levels below 0.94. Phytoalexin production was 50-to 60-fold more in the younger seed than the mature seed. Peanut kernels also showed genetic variation in their phytoalexin producing ability. Supported by USDA/ SEA-CSRS.

A Comparison of Various Quality Factors Between Stack-Cured and Conventional Windrowed/Artificially Dried Peanuts. R. J. COLE*[1], J. W. KIRKSEY[1], J. W. DORNER[1], T. H. SANDERS[1], K. L. CRIPPEN[2], N. V. LOVEGREN[2] and J. R. VERCELLOTTI[2]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; [2]USDA, ARS, Southern Regional Research Center, New Orleans, LA 70179.

Several quality factors, including aflatoxin, U.S. grade, milling quality, flavor, flavor potential, germination and mycoflora, were compared from peanuts cured in the classical stack with those from the conventional windrow/artificially dried peanuts from the same location in an irrigated peanut field. The environment within the stack was characterized by temperature maximum lower than ambient, temperature minimum higher than ambient and relative humidities higher than ambient until the peanuts within the stack had dried to relatively low moisture. The general trend on quality was that stack cured peanuts were of better all-around quality than the conventional windrowed/artificially dried peanuts.

PRODUCTION TECHNOLOGY

Impact of Changes in Federal Peanut Programs on Peanut Farmers. D. H. CARLEY* and S. M. FLETCHER, Dept. of Agricultural Economics, University of Georgia, Griffin, GA 30223-1797.

In discussions of forthcoming farm programs for the 1990s, new approaches are surfacing that could have a substantial impact on the production and marketing of U.S. peanuts. The impact on peanut farmers of decoupling production decisions from government payments, total abandonment of the price support and quota program, and elimination of Section 22 import quotas were compared with the returns to farmers under the current program. Under all three alternatives, prices for farmers' stock peanuts would be expected to decrease toward world prices for peanuts. Owners of peanut quotas who rented quotas out would lose the rental income, but those renting in quotas would have a decrease in production costs. Under decoupling the impact of the lower market price on farmer income would be lessened by providing decreasing equity payments to quota owners over time. Elimination of import quotas would reduce farm income rather drastically if totally eliminated in one year. However, an increase in peanut import quotas could be accomplished in conjunction with a decoupling program so that the industry could adjust to the changing conditions over a transition period. Compared with income under the current program, a typical Georgia peanut farm would have an estimated 45% decrease in income under decoupling and 75% less income under total deregulation.

The Peanut Industry in China. J.R. SHOLAR. Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74078

China is the third largest country in the world following only the U.S.S.R. and Canada but it is the most populous with about one-fifth of the world's people. Despite its huge land mass, only about 13 percent of China's land area is fit for cultivation. Frequent disastrous weather conditions, over-taxed soils, lack of modern technology, and political changes have limited China's success in improving agricultural production and living standards. Peanuts have long been one of the agricultural mainstays in China with annual production of six to seven million tons on about six million acres. Peanuts have traditionally been used primarily for cooking oil, but in recent years they have become an important export commodity and contributor to China's economy. Economic concerns may motivate the Chinese to export a larger portion of their future crops resulting in a negative impact on the world market potential for U.S. produced peanuts. China produces peanuts of the Virginia bunch type and a very large-seeded spanish type known in the commercial trade as "Hsuji". Because of its large size, this type is highly favored in the European market. There is no exact U.S. equivalent for this type. Runner types are not produced commercially in China. Many varieties are available from which to choose but short shelf-life is a problem with all varieties grown. Extreme competition for land limits plantings by individual farmers and area allocations range from 0.04 to 0.06 hectares per family. Grower yields range from 1700 to 2200 kg/ha.

Peanut Production Systems in the Commonwealth Caribbean. B.R. COOPER*, B.K. RAI, J. GRANT, G. MULLER and M.M. RAO. Caribbean Agricultural Research and Development Institute, Box 766, St. John's, Antigua, W.I.

Peanut production in the Commonwealth Caribbean is restricted to small farm units of frequently less than 1 ha. Levels of technology are low with high labour inputs and minimum use of agrochemicals. Traditional varieties such as Tennesse Red produce yields of approximately 1000 kg/ha under these low inputs and rain fed conditions. Efforts to increase production and on-farm income have focused on introduction and testing of improved disease resistant varieties, reduction of labour inputs and improvements to drying and storage systems. Under the Peanut Collaborative Research Support Program, CARDI, in association with the University of Georgia, has screened over 100 peanut germplasm accessions and several cultivars have been selected for their adaptation to conditions in different countries. Efforts are also in progress to design and evaluate small capacity threshers, shellers and dryers. Additional work on monitoring and improving on-farm drying and storage practices is also in progress and is detailed in the paper.

Climatic Conditions Affecting Peanut Production in Suffolk, Virginia. N. L. POWELL, Tidewater Agricultural Experiment Station, Virginia Polytechnic Institute and State University, Suffolk, Virginia 23437.

Weather data has been collected continuously at the Tidewater Agricultural Experiment Station since March 1933. Data collected during the 56 year period includes daily maximum and minimum temperatures, total daily precipitation, estimate of wind direction, and sky conditions at the time of observations. From April 1 through October 31 daily readings also include pan evaporation, wind run, and maximum and minimum water temperature. This information is useful for calculating heat units during the growing season, determining irrigation scheduling, evaluating peanut drying and curing conditions, and predicting length of frost free growing season. The 56 year mean annual rainfall is 48.18 inches. Total rainfall for 1988 was 40.45 inches. Extreme rainfall conditions were a high of 63.79 inches in 1949 and a low of 33.40 inches in 1980. The highest mean monthly temperature normally occurs in July and is 77.5 degrees F. For 1988 this occurred in August with a mean monthly temperature of 79.2 degrees F. Very few days had a maximum temperature exceeding 100 degrees F (high of 7 days in 1952) during the year. Frost free growing days for the last 10 years had a high of 235 days in 1985 (first fall frost was December 3) and a low of 175 days in 1988 (first fall frost was October 9). Earliest killing frost occurred during the first week of October over the 56 year period. During the 10 year period of 1979 through 1988 the May through September precipitation had a high of 31.22 inches in 1979 and a low of 8.44 inches in 1980. Highest rainfall for this 5 month period was 42.21 inches in 1949.

Development of Models to Predict Yield and Quality of Georgia Peanuts. J. I. DAVIDSON*[1], M. C. LAMB[2], MARVIN SINGLETARY[3], T. E. ALLEN[4] and C. L. BUTTS[1].
[1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; [2]Dept. of Agricultural Economics, University of Georgia, Athens, GA 30602; [3]Blakely Peanut Company, Blakely, GA 31723; [4]Route 1, Box 10, Shellman, GA 31786.

Peanut farmers and shellers encounter extremely high risk in marketing peanuts because of a lack of information on the potential yield and quality of the crop before the contract deadline (July 31). Based upon historical and field data, several empirical models were developed to predict yield and market quality of Georgia peanuts. Models were classified as historical (HM) and field (FM). The HM were based upon historical weather, yield, grade and aflatoxin data. The FM were based upon geocarposphere soil temperature (GST), water (rainfall and irrigation) and pod count per unit of land area. Based upon predictions made during CY 1987 and 1988, the FM were much more accurate than the HM. The best FM was based upon GST and water. Based upon the success of this research, this model is being expanded to include other major USA growing areas. A cooperative research project with the University of Georgia has been initiated to develop pricing and demand models to complement the supply models and to provide a basis for developing an integrated marketing model. This research was partially supported by the Georgia Agricultural Commodity Commission for Peanuts.

QUOTAVALUE: A Computer Spreadsheet to Analyze the Buying and Selling of Peanut Quota. F. D. MILLS, JR.* and C. W. DANGERFIELD, Jr.
Extension Agricultural Economics Department. The University of Georgia, Rural Development Center, Tifton, GA 31793.

The replacement of peanut allotments with the quota poundage system in 1982 altered the transfer mechanism of peanut production "rights." The quota poundage system, established on a per pound rather than per acre basis, effectively separated the value of land and peanut quota. Thus, the quota owner possessed a potentially profitable asset (i.e. quota poundage) not tied to land. The conveyance of this asset through purchase, rental or sale should be based on economic logic. Due to the time value of money, a buyer or seller of peanut quota poundage should consider: (1) the annual returns from producing peanuts, (2) the expected life of the peanut program and (3) the cost of borrowed capital. Therefore, a computer spreadsheet, QUOTAVALUE, was developed to allow calculation of the potential transfer price under these three economic considerations. An example was included to illustrate the capabilities of QUOTAVALUE.

Bradyhizobium Strains Influence Iron Content of Peanut Foliage, Nodules and Seeds. R. K.Howell, ARS-USDA, Beltsville, MD 20705

Bradyrhizobium strains influence N levels in legume tissues. Leghemoglobin is an important part of the N_2 fixation process. Iron is an essential moiety of leghemoglobin. Are Fe contents of plant tissues influenced by *Bradyrhizobium* strains? A field experiment with cultivars Florunner and NC7, four *Bradyrhizobium* strains and a no-inoculum treatment were established in an Evesboro sandy loam soil in 1986 and 1987. Cultivars represented whole plots and strains were sub-plots. Each plot had four 6.2 m rows and was replicated 4 times. Three harvests were made each year and plants were separated into roots, nodules, seeds and foliage. Foliage from non-inoculated plants contained significantly less Fe (106 ppm) than foliage from plants treated with strain 8A64 (113 ppm). Nodules occurring on non-inoculated plants were too few in number for analysis. Nodules from plants treated with 8A64 had significantly higher (571 ppm), concentrations of Fe than 8A57, 32H1 or 176A34 that had 491, 434, or 516 ppm, respectively. Seeds of plants treated with strain 8A64 had significantly less Fe than seeds from plants not treated with *Bradyrhizobium* (65 vs. 42 ppm). Significantly higher N concentrations were present in foliage, nodules, and seeds of plants treated with strain 8A64 than were in plant parts from plants treated with the other strains. The data indicates that *Bradyrhizobium* strains do influence Fe, as well as N, concentrations in host tissues. The results also suggest that nodules induced by certain stains may act as sinks and prevent Fe from being translocated to seeds.

Effects of Tillage Practices and Runner Cultivars on Peanut Production. W. J. GRICHAR* and O. D. SMITH. Texas Agricultural Experiment Station, Yoakum, TX 77995, and Dept. of Soil and Crop Sci., Texas A&M University, College Station, TX 77843-2474.

Four runner genotypes, which have previously shown some resistance to soil-borne pathogens, plus Florunner were evaluated in no-tillage, minimum tillage, and full tillage cultural systems from 1985-1987 in south central Texas. Full tillage plots produced yields which were 700 kg/ha more than minimum tillage and 500 kg/ha more than no-tillage plots when averaged over the 3-year period. TX 835820 yielded 550 kg/ha less than Florunner while TX 835841, TX 833841, and TX 833843 produced yield comparable with Florunner when averaged over all tillage systems. Peanut grade (SMK+SS) was 3.6% less for the no-tillage system as compared with full tillage. TX 833843 produced a 9.7% lower grade than Florunner while TX 833841 resulted in a similar grade as Florunner. Infection site counts and pod disease ratings indicated that southern blight (*Sclerotium rolfsii*) was not a problem under the no-tillage system. No significant differences between cultural systems were noted for these two disease assessments. TX 833843 resulted in 47% less infection sites than Florunner while all genotypes produced significantly less pod disease than Florunner over the 3-year average.

Effects of Water Management, Intercropping, and Harvest Date on Yield and Water-Use Efficiency of Southern Runner Peanut. M. OMOKO, L. C. HAMMOND*, K. NZEZA, and J.M. BENNETT. Departments of Soil Science and Agronomy, University of Florida, Gainesville, FL 32611.

Irrigation scheduling strategies are critical for peanuts because of limited yield response and the risk of yield depression from over irrigation. A study was conducted in 1987 in Gainesville, FL to determine water-use efficiencies of Southern Runner peanut (sole crop and intercropped with sorghum) grown on well-drained Millhopper fine sand (loamy, hyperthermic Grossarenic Paleudult). The experimental layout was a four replication, randomized block, split-plot design with four water management treatments as main plots and four subplots: sole crops of peanuts, sorghum, corn and intercropped peanuts and sorghum. Water management treatments were: (1) rainfed, (2) irrigation after two days of visible wilt on peanuts, or (3) on sorghum, and (4) optimum irrigation for corn. Seasonal irrigation amounts were 0, 18.0, 24.6, and 38.0 cm of water for the respective treatments. Peanuts were harvested at 160 and 203 days after planting. Pod yields were increased linearly by irrigation only up to 24.6 cm. Slopes of irrigation production functions increased from 58 to 89 kg ha^{-1} cm^{-1} for sole crop and from 48 to 81 for intercropped peanuts, for the respective harvest dates. When these slopes were compared with the companion slopes of the evapotranspiration functions, a measure of irrigation water-use efficiency, the respective ratios were 0.27, 0.34, 0.59 and 0.47. Delayed harvest resulted in significant pod yield increases in the respective treatments 1 through 4: 3589 to 5152, 5561 to 8504, 5770 to 8268, and 5188 to 8490 kg ha^{-1} for sole crop, and 1010 to 1540, 1710 to 4470, 2140 to 4730, and 2820 to 4510 for intercrop. Southern Runner peanut responds well to irrigation under drought, and a longer growing season for this variety appears to be very beneficial.

On-Farm Test of Diagnostic Methods for Recommending Calcium Application to Peanuts. J.A. Baldwin* and S.C. Hodges. Dept. of Agronomy, University of Georgia, Tifton 31793-1209.

Soil Calcium (Ca) deficiency in the pegging zone has been shown to negatively affect yield and quality of peanuts. Gypsum is recommended for all large seeded "Virginia" type peanuts at a rate of 320-400 lbs/Acre Ca. The Georgia Cooperative Extension Service recommends supplemental Ca as gypsum for runner-type peanuts when the Mehlich I extractable Ca is less than 500 lb/acre or the Ca:K ratio is less than 3:1 in a sample taken from the upper 3 inches of soil at 10 to 14 days after planting. During 1988, a randomized complete block design experiment replicated 3 times was conducted at 7 locations in Georgia. Plot size was 2 to 3 acres per replication with treatments being either no gypsum or gypsum (160 lb/acre Ca) applied at early bloom. Only one location showed a yield response to applied gypsum. This was the only location which had a Mehlich I extractable Ca level well below 500 lb/acre. There was a strong relationship between the Ca:K ratio and grade indicating increased grades (TSMK + SS) with increasing Ca:K ratios. The current recommendation of having at least a 3:1 ratio of Ca:K is not strongly documented. Further investigation is required to provide a more definable recommendation to farmers.

Production and Management of "Southern Runner" Peanuts in Georgia. J.P. BEASLEY JR*, J.A. BALDWIN and S.S. THOMPSON. Extension Agronomy Dept., University of Georgia, P. O. Box 1209, Tifton, GA 31793: Extension Agronomy Dept., University of Georgia, P. O. Box 1209, Tifton, GA 31793; Extension Plant Pathology Dept., University of Georgia, P. O. Box 1209, Tifton, GA 31793.

The peanut cultivar 'Southern Runner' has been available to Georgia peanut producers since 1987. Southern Runner was released in 1986 by the Florida Agricultural Experiment Station as a leafspot resistant variety. There are several characteristics of Southern Runner that are different from 'Florunner'. Southern Runner may require different cultural practices than those typically used on other runner varieties in order to obtain optimum yields. In 1987 a series of field tests were established to evaluate the effects of seeding rate, row pattern, fungicide spray schedule, plant growth regulators and harvest dates on Southern Runner in Georgia. Reaction to fungicide spray schedule indicates Southern Runner yields under a reduced, or 21 day spray schedule are comparable, or slightly higher, than yields of Florunner under the normal 14 day spray schedule. The major difference observed between Southern Runner and Florunner was later maturity. Southern Runner was released as 7-10 days later than Florunner, but tests in Georgia indicate maximum yields when harvested two to three weeks later than Florunner.

Effect of Planting and Digging Dates on Yield and Grade of Four Virginia-type Peanut Cultivars. R. W. MOZINGO* and T. A. COFFELT. VPI&SU and USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.
Although several studies have been conducted on the effect of planting and digging dates on peanut (*Arachis hypogaea* L), optimum planting and digging dates have not been established for the large-seeded Virginia-type cultivars NC 9, NC 7, VA 81B, and Florigiant. The objective of this field study was to determine the planting and digging date which would give the maximum yield and grade for each cultivar. Four planting dates (April 23, May 3, May 13, and May 23) and five digging dates (September 12, September 22, October 2, October 12, and October 22) were utilized in this 3-year study (1983, 1984, and 1986) at the Tidewater Agricultural Experiment Station in Suffolk, Virginia. The experimental design used was a randomized complete block split-split plot with digging dates the whole plot, planting dates the split plot and cultivars the split-split plot. Analysis of variance showed all main factors and most first order interactions were highly significant for yield, value, and market grade factors. An average of all cultivars showed later digging dates within each planting date resulted in a higher percentage of extra large kernels, sound mature kernels, and total meat content. These data support the theory that later digging results in more mature peanuts based on grade characteristics. Maximum dollar value for all cultivars occurred with May 3 plantings dug on October 12. In contrast, maximum yields did not occur on the same planting and digging dates for all cultivars. The maximum yield of NC 9 and NC 7 occurred when planted on April 23 and dug on October 2, while maximum yields of VA 81B and Florigiant occurred when planted on May 3 and dug on October 2 and 12, respectively. Of the four cultivars, Florigiant was the least sensitive to planting date with maximum value obtained on October 12 regardless of planting date. NC 7 and VA 81B were the least sensitive to digging date, especially when planted on April 23. VA 81B could be dug the earliest (September 22) without significantly reducing value if planted on April 23. These results indicate that for maximum dollar value, digging date is more critical than planting date for the cultivars studied.

PROCESSING AND UTILIZATION

Maturity Distribution in Commercially Sized Florunner Peanuts. T. H. SANDERS, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Quality, as measured by roast color, flavor and storability, is variable within and among peanut lots of the same commercial size. Because maturity is significantly related to many quality characteristics, the variability in maturity distributions (percent of various maturity classes) within sized peanut lots from a soil temperature study, a harvest date study, an irrigation study, and twenty random samples was examined. Pods from each source were separated into five Hull Scrape maturity classes, dried, shelled, and screened to obtain seed size distributions. Using the weight of each maturity class in each commercial size, the percentage weight contribution of each maturity class in each commercial size category was calculated. Seed size distribution for maturity classes from different treatments in each study varied from each maturity class. Treatments within the studies generally produced significant differences among percentages of individual maturity classes in each size. Large standard deviations and coefficients of variation in all studies indicate the wide variability potential in sized lots. The distributions of maturity within commercial sizes were sufficiently different to suggest that flavor, roast color, storability, and other quality estimators would be affected in final roast products from some of the lots.

Composition and Roasting Quality of Peanuts from 1987 and 1988 Crop Windrow Drying Studies. J.R. VERCELLOTTI*, K.L. CRIPPEN, N.V. LOVEGREN, T.H. SANDERS, J.L. BUTLER, E.J. WILLIAMS, B. CLARY, F.S. WRIGHT, and D.M. PORTER. USDA-ARS-SRRC, New Orleans, LA 70179; USDA-ARS-NPRL, Dawson, GA 31742; USDA-ARS-SAA-CSRU, Coastal Plains Experiment Station, Tifton, Georgia 31793; Oklahoma State University, Stillwater, OK 74078; and USDA-ARS, Suffolk, VA 23437.
This study reports the composition and roasting properties for peanuts dried at ambient temperatures in conventional, inverted windrows, as contrasted to those that had been covered with freshly dug plants whose leaves shaded the entire windrow. Samples received were for shaded vs. inverted treatments of 1987 and 1988 crop years from Tifton, GA (Florunner); 1987 and 1988 crops from Stillwater, OK (Okrun); and 1988 plots from Suffolk, VA (Florigiant and NC 6). Samples, screened into jumbo, medium, and #1 sizes, were examined in both years for equilibrium moisture content; heat input to achieve a medium roast with Hunter L value of ca. 50; total extractable lipid content; Kjeldahl nitrogen value; total soluble sugar; carbonyls; peroxides; and oleic/linoleic acid ratio. Jumbo peanuts had highest lipid content (about 50%) reflecting greater probability of maturity; mediums, about 45% lipid; and #1's, 40 to 43%. Conversely, jumbo peanuts had least amount of soluble sugar (4-5%); mediums, 5 to 6%; and #1's, 6 to 8%. Kjeldahl nitrogens were in the 4 to 5% range for all sizes and treatments of the samples. Equilibrium moistures were highest in #1 peanuts while Oklahoma peanuts had lowest overall moistures. Difficulty was found in roasting to achieve color and flavor of the #1 peanuts. Although differences were found among these samples, the composition and properties were not affected by shading or singly inverting the windrows.

The Effect of Kernel Moisture on the Concentrations of Alkylpyrazines in Roasted Florunner Peanuts. J. A. LANSDEN*[1], T. H. SANDERS[1], J. L. McMEANS[1] and M. B. SHEIK[2]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; [2]Peanut Research Laboratory, Florida A&M University, Tallahassee, FL 32307.

The effect of kernel moisture on the relative concentrations of alkylpyrazines produced by roasting Florunner peanuts was investigated using an external inlet gas chromatographic system. Commercial Florunner peanuts, sized to ride 18/64 and 22/64 slotted screens, were divided into sublots and equilibrated to three different moisture levels. Subsamples of each moisture level were dry roasted over a range of times from 16 to 23 min, blanched and made into peanut pastes. Alkylpyrazines, grouped by total carbon substitution, correlated well with the degree of roast (Hunter L value) within a moisture level. Each moisture level produced differing quantities of alkylpyrazines, but the relative order between moisture levels were different for the two peanut kernel levels.

Airflow Distribution in Multi-Trailer Peanut Dryers. J. S. CUNDIFF*, D. H. VAUGHAN, W. F. WILCKE, and F. S. WRIGHT. Agricultural Engineering Dept., Virginia Polytechnic Institute & State University, Blacksburg, VA 24061, and USDA-ARS, Tidewater/Research Center, Suffolk, VA 23437.

Fan total airflow in 4-, 6-, and 8-trailer dryers was measured in situ by mounting resistance plates, designed to emulate the resistance to airflow of an 8.4 m^2 trailer filled to a depth of 1.3 m, at each port. Pressure drop measured across the resistance plates was referenced to a calibration curve to obtain airflow at each port, and total flow was obtained by summing the port flows. Total flow was found to be within 75 to 100% of the rated flow given by the fan manufacturers; however, flow distribution was poor. In one 8-trailer dryer the flow at the first port immediately downstream from the fan was -40% of balanced flow (equal flow at all ports), -31% at the opposite port and the remaining ports had flows of 8, 7, 12, 16, 13, and 15%. A 6-trailer dryer had a flow distribution ranging from -10 to +7%. Installation of a single V-shaped baffle at the plane of the first 2 ports produced approximately equal flow. Two other 8-trailer dryers had 19% above and 7% below the recommended rate. Four 6-trailer dryers had an average port flow relative to recommended of +53, +20, +12, and -10%, respectively. Trailers have considerable air loss from the plenum beneath the drying floor; consequently, some excess port flow is needed to insure an adequate airflow through the peanuts. If trailer losses could be eliminated, and port airflow reduced to the recommended rate for the 7 dryers tested, heat energy savings would average 18%. When a grower blocks some of the ports, higher airflow results at the open ports. Inlet restrictions (plywood rings placed in front of the fan) were developed for one 6-trailer dryer to reduce flow to the recommended rate at each port, as various ports were closed. Electric energy use was reduced 26% with one port closed, and 36% with 4 ports closed, using these restrictions. Though total electrical energy was reduced, the power required per m^3/s of air delivered increased from 700 $W/m^3/s$ with all ports open to 770 with one port closed; and 885, 1,165, and 1,740, with 2, 3 and 4 ports closed, respectively. Leakage from the dryer plenum was not found to be a signifi cant problem. Repairs to the worst maintained dryers produced a 3 to 7% increase in total airflow measured at the ports.

BREEDING AND GENETICS

Temperature Limitations to Peanut Growth and Pod Production in Israel. I. S. WALLERSTEIN*, S. KAHN and I. WALLERSTEIN. Dept. of Ind. Crops and Dept. of Orn. Hort. Agr. Res. Org., P.O.B. 6, Bet Dagan 50250, Israel.

Limiting effects of temperatures on pod no. of 3 Virginia-type varieties, 'Shosh', 'Shulamit' and 'Hanoch', were studied under field conditions at 3 different locations in Israel (Besor, Galil and Bet Dagan) during 3 years. Some of the correlations found in the field were studied under controlled conditions. The difference in pod numbers was checked for correlation with one of the following criteria; (a) length of growth period; (b) no. of day-degrees (°C above threshold of 15°C); (c) no. of days with max. temp. above 32°C during the first 20 days of flowering; and (d) for the same period as (c) the no. of nights with min. temp. above 18°C. The effect of high temp. during day or night on the no. of pods produced by 'Shulamit' was studied in a phytotron under constant day/night temperatures of 27/17°C or 27/22°C or combinations of the constant temperature with 27/27°C or 32/17°C for 16 days during flowering only. The effect of relatively low temperatures on germination and early development was studied during early planting in the field and under controlled temperatures. During the 3 years pod numbers of the 3 varieties were higher at Besor and Galil than at Bet Dagan for the same length of growing period. Pod production by 'Shosh' was correlative with the no. of day-degrees only ($r=0.9939$), while pod production by 'Shulamit' and 'Hanoch' was correlative only with the no. of nights with min. temp. above 18°C ($r=-0.9678$ and $r=-0.9027$ for 'Shulamit' and 'Hanoch' respectively). The negative influence of high night temp. during growth or flowering only was further proved with 'Shulamit' under phytotron growth conditions. Of the 3 varieties tested for germination and development under relatively low temperatures, 'Shosh' was found to be relatively tolerant to temperatures between 15 and 30°C. Thus, min. night temp. can be used as an indicator for temp. stress and as a tool for selection for better adaptation to the growth region.

Field Screening of Peanut Germplasm for Drought Resistance Traits. A. M. SCHUBERT and O. D. Smith. Texas Agricultural Experiment Station, Yoakum, TX 77995-0755; and Deptartment of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474.

Selected peanut germplasm has been field-screened during a five-year period at TAES-Yoakum and at other sites for traits which might be related to drought resistance and performance under rainfed conditions. Measurements have included soil water use, transpiration rate (TR), diffusive resistance (DR), leaf relative water content (RWC), hydraulic leaf press readings (HL), end-of-row effects, rooting traits, yields, grades, and daily weather data. Some peanut entries have been tested during each of the five years, while others have been added or omitted during the research period. Significant differences have been found among entries for peanut yield, grades, soil water use, TR, DR, RWC, and some root traits during one or more of the test years. The nature of drought stress has varied markedly over the years. In some years there have been extremely dry conditions during the early- and mid-season with wet falls; others have had wet conditions early and late with only mid-season drought; and others have had adequate moisture early with dry conditions during mid- and late-season. Relative yield, grade, and other values have varied with the time and intensity of drought among entries. We have found no single indicator of drought resistance which correlates to performance as indicated by productivity under our rainfed conditions, to date. A combination of plant traits and annual drought type profiles may be constructed over time and location which allow more effective screening of peanut germplasm for drought stress resistance.

<u>Genetic Study of Tan vs Pink Peanut Testa Color</u>. W. D. BRANCH* and C. C. HOLBROOK. Univ. of Georgia and USDA-ARS, Dept. of Agronomy, Coastal Plain Experiment Station, Tifton, GA 31793.

Pink and tan testa color may not be equally important characteristics sought in current peanut breeding programs. So, one hypothetical genetic means to distinguish these two similar colors was by differential F_2 segregation (15:1 *vs* 3:1) upon testcrossing to a homozygously recessive red testa color genotype ($r_2r_2r_3r_3$). Testcrosses were then made between such a red testa parent and five pink or tan seeded genotypes. F_1 and F_2 data showed monogenic differences for each cross combination. These results suggest that several pink and tan cultivars already differ from the recessive red genotypes by only one of the two recessive red testa color genes.

<u>Evaluation of Isozyme Variation Among American Peanut Cultivars</u>. U. GRIESHAMMER* and J. C. WYNNE. Dept. of Crop Science, North Carolina State Univ., Raleigh, NC 27695-7629.

Isozyme polymorphisms have a potential for various applications in plant breeding. In order to screen the peanut for isozyme variation, using starch gel electrophoresis, an attempt was made to establish 55 different enzyme systems. Embryos and cotyledons of seeds, young leaves and flowers were examined using a crude extract of the material (maceration in extraction buffer at $4^{o}C$) as the source of enzymes. Scorable banding patterns were obtained for 25 different enzymes when embryos and cotyledons were used as the source tissue. Adapted and exotic peanut germplasm of three botanical types (4 spanish-, 4 valencia-, and 5 virginia-type peanut varieties) as well as 59 American peanut cultivars were screened for isozyme variation utilizing these 25 systems. Only two enzymes, glutamate oxaloacetate transaminase and isocitrate dehydrogenase, showed polymorphism. Both enzymes displayed two different banding patterns which were well represented among the 59 cultivars and did not conform to the botanical types. The limited amount of variability appears to restrict the applicability of isozymes as genetic markers in peanuts.

<u>Identification of New Sources of Resistance to Meloidogyne arenaria and Cercosporidium personatum</u>. C. C. HOLBROOK*, J. P. NOE, T. B. BRENNEMAN, and W. D. BRANCH. USDA-ARS and Univ. of Georgia, Dept. of Agronomy, Coastal Plain Experiment Station, Tifton, GA 31793.

In order to develop peanut cultivars with resistance to the peanut root-knot nematode (MA) and late leafspot (CP), sources of resistance must first be identified. The objective of this research was to begin screening the U. S. plant inventory (PI) collection for resistance to MA and CP, and to screen the Coastal Plain Experiment Station wild species collection for resistance to MA. Three thousand PI's were screened in the field for resistance to CP and in the greenhouse for resistance to MA. PI's were identified which had high levels of resistance to CP. Although no high levels of resistance to MA were observed, PI's with reduced levels of susceptibility were identified. Immunity to MA was identified in wild species which are cross compatible with the cultivated peanut.

Inheritance of Early and Late Leafspot Resistance and Agronomic Traits in Peanut (Arachis hypogaea L.). S. CHAROENRATH*, J. C. WYNNE, M. K. BEUTE, and H. T. STALKER. Depts. of Crop Science and Plant Pathology, North Carolina State Univ., Raleigh, NC 27695-7629.

Thirty-two crosses in the F_3 and F_4 generations resulting from a 4 x 4 mating design of early leafspot-resistant parents (GP-NC 343, PI 109839, NC 270806, PI 209685) and late leafspot-resistant parents (NC 17133-RF, PI 350680, FESR 5-P2-B1, NC 17090) were evaluated for resistance to early (Cercospora arachidicola) and late (Cercosporidium personatum) leafspots using a detached leaf technique. Agronomic traits for the crosses were also determined through application of fungicides once leaves were detached. Additive effects of genes predominantly controlled resistance to both early and late leafspots. General combining ability effects of parents were inconsistent among components of disease resistance and over generations. Pod length and disease resistance genes were correlated for late leafspot in F_3 generation where progenies with larger fruit had higher leafspot resistance.

Disease Assessment of Peanut Genotypes at Commercial and Breeding Nursery Intrarow Spacings. D. A. KNAUFT* and D. W. GORBET. Dept. of Agronomy, University of Florida, Gainesville 32611-0311 and Marianna 32446-9803.

Sixteen peanut (Arachis hypogaea L.) genotypes were grown for two years without the use of fungicides in two planting arrangements, one an intrarow spacing typically used in commercial production (5 cm between plants) and the other an intrarow spacing frequently used in breeding selection plots (30 cm between plants). At ten day intervals throughout the growing season three parameters were measured; the proportion of leaf necrotic area caused by leafspots (Cercospora arachidicola Hori and Cercosporidium personatum (Berk & Curt.) Deighton), a leafspot disease rating, and the stage of vegetative growth (V stage). Disease rating of spaced plants was significantly correlated with the rating of the same genotype grown in commercial plantings throughout the portion of the growing season when leafspot pressure became adequate to distinguish genotypic differences. There was also no interaction between genotypes and spacing. There were significant correlations between spaced and commercial plantings for percentage necrotic area. However, large experimental error and complex interactions among spacings, genotypes, and time of observation lessened the value of this method of disease assessment. The correlation of V stage in commercial and spaced plantings was relatively low, and differences among genotypes were not consistent in the two spacings.

The Relation of Seed Maturity with Defoliation in Groundnuts in Zimbabwe. Desiree L. Cole. Department of Crop Science, University of Zimbabwe, P.O.Box MP 167, Mount Pleasant, Harare, Zimbabwe.

The percentage of visually mature seeds on three groundnut cultivars, Egret, subspecies hypogaea (Virginia type), Jacana and Valencia R2, subspecies fastigiata (Spanish and Valencia types respectively) was measured at weekly intervals in 35 trials between 1975 and 1988. Foliar diseases, caused by Cercospora arachidicola (early leaf spot) and Phoma arachidicola (web blotch), which were controlled to varying degrees by fungicides did not affect maturity rate although they caused considerable defoliation, especially on plots where the diseases were not contained. Seeds of Jacana and Valencia R2 started maturing c. 90 days after planting and those of Egret c. 135 days, but the rate at which they matured appeared to be determined by the type and season, and was independent of disease and defoliation. There was also a negative relation between the rate at which groundnuts matured each season and the final seed yield.

Plantlet Formation of Peanut by Somatic Embryogenesis and Organogenesis. H. DAIMON and M. MII. Chiba Prefectural Agricultural Experiment Station and Faculty of Horticulture, Chiba University, Chiba, Japan.

Plant regeneration from cell and tissue cultures is an essential component in improvement by unconventional breeding methods such as somatic hybridization and genetic transformation. However, there has been a lack of suitable conditions for peanut morphogenesis *in vitro*. In this paper we describe somatic embryogenesis and organogenesis of peanut tissues using three Japanese cultivars of *Arachis hypogaea* L., Chiba Handachi (Virginia type), Jawa 13 (Spanish type) and Hakuyu 7-3 (Spanish type). Mature embryos were sterilized after dessecting cotyledons and inoculated onto MS medium in one-half strength of inorganic salts (1/2MS) supplemented with 2,4-D, 2,4,5-T, NAA, or picloram at 0.1-20 mg/l singly or in combination with BA at 0.1-5 mg/l. After 30 to 40 days of culture, a number of somatic embryos with abnormal trumpet-shaped structure were formed around the shoot tip. 2,4-D at 5 mg/l gave the best response for embryogenesis. Histological observation showed bipolar structure in these embryos. However, they only showed elongation of hypocotyl and root, and no plantlet was obtained. On the other hand, a number of adventitious buds were formed on the calli induced from the immature primary leaf segments on the medium with NAA, IAA, or IBA at 0.5 mg/l in combination with BA at 1-5 mg/l after 10 to 20 days of culture. The frequency of bud formation varied with the age of the leaf and the cultivars used. One to 2 buds on callus developed into shoots with normal tetrafoliate leaves on B5 medium without hormone. These shoots were successfuly rooted on B5 medium with 1 mg/l IBA. Futher studies are now in progress for the induction and proliferation of normal embryos and the development of adventitious buds.

Pollen Size and Fertility Estimations in Arachis Species and Hybrids Via Electronic Particle Counter Analyses. D. J. BANKS. USDA-ARS, Plant Science Research Laboratory, 1301 N. Western, Stillwater, OK 74075.

Conventional methods of determining pollen sizes and potential fertility in plant species and hybrids involve the use of biological stains and counting procedures using microscopic techniques. The number of pollen preparations analyzable with consistent accuracy is limited because manual counts by human operators are relatively slow and rapidly lead to mental and visual fatigue. Alternatively, electronic particle counters can process a large number of samples with great speed and consistent precision, without tiring. In our laboratory, we have used a Coulter brand particle counter (no advertisement intended), channelizer, serial interface, personal computer, and statistical analysis software to determine pollen sizes and to estimate relative pollen fertility of selected *Arachis* species and hybrids. The method is relatively easy and rapid. Accuracy depends on the preparation of clean, randomly distributed pollen samples. Potential pollen fertility assessments are premised on a correlation of pollen size with pollen viability. Using these techniques, ANOVA tables and frequency distribution graphs are easily obtained.

Systematic Relationships Among Species of Section *Arachis*. H. T. STALKER* and J. H. HAHN. Dept. of Crop Science, North Carolina State Univ., Raleigh, NC 27695-7629.

Taxa of section *Arachis* are found in a large area of South America and occupy many diverse habitats. Both the known distribution and morphological variation in the group have been significantly expanded during the past 10 years. The objective of this investigation was to document diversity in section *Arachis* to better understand systematic relationships of species. Seventy-five wild species accessions were evaluated for 54 traits after which six additional ones were created. Numerical clustering procedures indicated that at least 20 diploid species exist in section *Arachis*. To further characterize the taxa, 29 accessions were crossed with *A. duranensis* (A genome) and *A. batizocoi* (B genome). Analyses of 710 interspecific hybrids indicated that all F_1s with *A. batizocoi* were sterile, while those with *A. duranensis* ranged in fertility from 5 to 84%. Meiotic analyses of 185 F_1 hybrids indicated that most species of the section have an A genome; only *A. batizocoi* has a B genome; a D genome exists for a species represented by accessions 30091, 30098, 30099 and 30100; and possibly two other genomes may be represented by accessions 30011 and 30033. Intraspecific cytological variation was also observed among accessions of *A. batizocoi* and the D-genome species. An evolutionary trend appears to be for symmetrical chromosomes being found in A-genome species, followed by more asymmetrical cytotypes in the B genome of *A. batizocoi* and very asymmetrical chromosomes in the D-genome species. Thus, the A-genome species of section *Arachis* apparently first became widely distributed after which other genomic groups evolved in isolated regions of South America.

Comparative Embryo Sac Organization at Anthesis of Cultivated and Wild Arachis Species. H. E. PATTEE* and H. T. STALKER. USDA-ARS, Department of Botany and Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

Introgression of germplasm from wild to cultivated species of Arachis is severely impeded because abortion processes often occur as a prepeg or postpeg elongation event in hybridization of these species. Differences in embryo sac organization between species may provide information as to the potential causes of prepeg elongation abortion and clues as to how this abortion may be circumvented. Comparative analysis of embryo sac organization between selected species shows A. cardenasii to be at a more advanced stage of development than is typical of the anthesis stage. In A. hypogaea cv. NC 6 and Argentine the embryo sac contains a relative high concentration of starch grains whereas in A. cardenasii, A. duranesis and A. stenosperma only a few starch grains can be observed, and these are generally associated with the polar nuclei. The general organization of the cytoplasmic stranding seems to be common among the observed species, but those species with low starch content appear to have a more distinctive connection between the chalazal zone and the cytoplasmic stranding. In addition, possible variation was observed in egg apparatus organization among species. The above information may enable one to predict which potential hybrid and/or male-female combinations would be subject to prepeg abortion or other incompatibilities.

Rescue of Interspecific Arachis Hybrids for Use in Breeding Disease Resistance.

P. OZIAS-AKINS and W. D. BRANCH. Dept. of Horticulture and Dept. of Agronomy, University of Georgia Coastal Plain Experiment Station, Tifton, GA 31793

Arachis stenosperma Krap. et Greg. *nom. nud*. has previously been determined to possess high levels of resistance to early and late leafspot (*Cercospora arachidicola* and *Cercosporidium personatum*). Cultivars of both subspecies *hypogaea* and *fastigiata* of *Arachis hypogaea* L. have been used as female parents in interspecific crosses with diploid *A. stenosperma*. All crosses attempted thusfar resulted in embryo formation; however, the extent of development was dependent upon the parental cultivar. Pods from crosses with three out of six genotypes contained highly underdeveloped embryos three weeks after the peg had penetrated the soil, and no mature seed developed. However, plantlets have been obtained from these crosses by culturing isolated embryos, shoot meristems, or ovule halves containing attached embryos on Murashige and Skoog medium plus picloram or other growth regulators followed by transfer to basal medium. Such techniques should be useful for increasing the efficiency of production of hybrid plants for use in breeding disease resistance.

WEED SCIENCE

Influence of Planting Date and Control Strategy on Herbicide Costs. H. M. LINKER* and H. D. COBLE. Dept. of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

Tests were conducted for two years (1987-88) to determine the effect of weed control strategies and planting dates on the cost and amount of herbicide used to control weeds. The objective of both weed management strategies was to keep weed levels below economically damaging levels. Two weed management strategies and three planting dates were used. The control approaches were (1) preventative, which duplicated a standard grower program and (2) integrated pest management (IPM). This test was conducted at two locations each year. The first site (near Scotland Neck, NC) had moderate weed pressure and was not irrigated, the second site (Lewiston Experiment Station) had heavy weed pressure and was irrigated. The least expensive approach depended upon the presence of hard to control weeds, weed pressure and planting date. In 1987, the IPM strategy costs at Scotland Neck were $29.80, $36.89 and $58.10 less per hectare than the preventative costs for early, mid and late plantings, respectively. However at Lewiston, only in the late planting was the IPM treatment less than the preventative ($36.11/ha). The early and late planting preventative costs were $36.02 and $13.78 less per hectare, respectively. In 1988, for both sites and each planting date, the IPM approach cost less than the preventative. In all cases the IPM strategy required less active ingredient, reductions ranged from 42.5% to 82.4% kg/ha of active ingredient.

Timing of Gramoxone Applications for Broadleaf Weed Control in Virginia Peanuts. D. N. Horton* and J. W. WILCUT. Tidewater Agricultural Experiment Station, VPI & SU, P. O. Box 7219, Suffolk, VA 23437.

Timing of paraquat applications was evaluated for broadleaf weed control following preplant incorporated (PPI) applications of ethalfluralin or ethalfuralin plus vernolate. Paraquat (0.14 kg ai/ha) was applied at one week after ground cracking (1WGC), 3WGC, 5WGC, 1WGC + 3WGC, or 3WGC + 5WGC in a factorial arrangement with the two PPI treatments. Paraquat plus bentazon (0.28 or 0.56 kg ai/ha) was also evaluated at 3WGC. Paraquat provided its greatest control when applied initially at 1WGC followed by a sequential application at 3WGC. Broadleaf weeds in the test included common ragweed (Ambrosia artemisiifolia), common cocklebur (Xanthium strumarium), morningglory species (Ipomoea sp.), and prickly sida (Sida spinosa). Yield of peanuts for paraquat, averaged across PPI treatments, were 1WGC = 3,620 kg/ha, 3WGC = 1,440 kg/ha, 5WGC = 1,500 kg/ha, 1WGC + 3WGC = 3,920 kg/ha, and 3WGC + 5WGC = 1,780 kg/ha. The standard postemergence system in Virginia (acifluorfen at 0.28 kg ai/ha plus bentazon at 0.56 kg ai/ha) yielded 3,400 kg/ha. The best paraquat plus bentazon (0.56 application) treatment yielded 3,150 kg/ha. The weed check and weed free check yielded 1,010 and 4,090 kg/ha, respectively.

Influence of Timing of Imazethapyr Applications in Peanuts. F. R. WALLS*, Jr., K. R. MUZYK, G. WILEY, American Cyanamid Co., Princeton, NJ 08540

Imazethapyr was evaluated during 1988 in peanuts. Field trials were conducted in Florida, Georgia and North Carolina. Herbicide treatments included imazethapyr rates of .04, .07 and .105 kg ai/ha with applications at preplant incorporated (PPI), preemergence (PE), at cracking (AC) and postemergence (POST) following pendimethalin (1.12 kg/ha PPI) or metolachlor (1.68 kg/ha PPI). All tests were conducted using a randomized complete block design and data were summarized across tests. Imazethapyr controlled or suppressed many of the troublesome weeds common to peanut production [sicklepod (Cassia obtusifolia), Texas panicum (Panicum Texanum), yellow nutsedge (Cyperus esculentus), common ragweed (Ambrosia artemisiifolia), and tall morning-glory (Ipomoea purpurea)]. Common ragweed, tall morning-glory, yellow nutsedge, sicklepod and Texas panicum were controlled by imazethapyr applied at .07 kg/ha plus a grass herbicide at application timings PPI, PRE or at cracking. The sequential treatment of imazethapyr .04 kg/ha plus a grass herbicide PPI followed by imazethapyr .04 kg/ha at cracking enhanced season long efficacy against sicklepod and Texas panicum. The postemergence application of imazethapyr at .07 kg/ha resulted in very good control of yellow nutsedge in these studies. No injury to peanuts resulted from any imazethapyr plus a grass herbicide treatment in these studies.

Differential Tolerance of Peanut Genotypes to Chlorimuron. W. C. JOHNSON, III*, C. C. HOLBROOK, JR., and J. CARDINA. USDA-ARS, Coastal Plain Expt. Stn., Tifton, GA 31793; Dept. of Agronomy, Ohio St. Univ., Wooster, OH 44691.

Chlorimuron (2-{{{(4-Chloro-6-methoxy-2-pyrimidinyl)amino}carbonyl}amino}sulfonyl} benzoic acid) is a selective broadleaf herbicide with excellent activity on many weeds, including Florida beggarweed {Desmodium tortuosum (Sweet) DC}. Chlorimuron will likely be used on peanuts as a salvage treatment for control of Florida beggarweed. Due to its strong growth regulator properties, there is concern that differences in tolerance to chlorimuron may exist among peanut genotypes. Studies were initiated in 1988 to evaluate the response of six genotypes to chlorimuron, each representing a different genetic background. They included Florunner, Tifrun, Tifton-8, GA 207-3-4, New Mexico Valencia A, New Mexico Valencia C, Tamnut 74, and Pronto. Since the primary objective of this study was to identify cultivars and breeding lines that were tolerant or sensitive to chlorimuron, the herbicide was applied earlier than recommended, when the peanuts were more sensitive. Peanut yields and grades were determined. All varieties were adversely affected by such an early application of chlorimuron. The spanish types, Pronto and Tamnut 74, exhibited the greatest yield reduction.

Weed Control and Peanut Response to Enquik Herbicide. S. M. BROWN*, P. A. BANKS, and D. C. COLVIN. Dept. of Extension Agronomy, University of Georgia, Tifton, GA 31793; Dept. of Agronomy, University of Georgia, Athens, GA 30602; Dept. of Agronomy, University of Florida, Gainesville, FL 32611.

Enquik (monocarbamide dihydrogen sulfate) is a contact herbicide with no residual soil activity. Enquik, a product of Unocal, Unocal Chemicals Division, was registered for use in peanuts prior to the 1988 crop season. Application rate is 5 to 8 gallons per acre, therefore, bulk handling equipment is necessary for on-farm use. Field experiments were conducted in Georgia and Florida to evaluate weed control efficacy and crop response to Enquik. Enquik provided good postemergence control of sicklepod and Florida beggarweed in the cotyledon stage. However, due to the lack of residual activity, weed control in mid-season was poor. Tank mixtures of Enquik plus Lasso (alachlor) provided good to excellent season-long control of sicklepod and Florida beggarweed. Broadleaf weed control and peanut yields with Enquik plus Lasso were comparable to Gramoxone (paraquat) plus Lasso. Enquik caused rapid burn on peanuts but crop recovery was evident within a week or so.

Chlorimuron for Weed Control in Southeastern Peanut Production. D. L. COLVIN* and B. J. BRECKE. Dept. of Agronomy, University of Florida, Gainesville, FL 32611, and Agricultural Research and Education Center, University of Florida, Jay, FL 32565.

Field experiments were conducted during 1987 and 1988 at Gainesville and Jay, FL to investigate effects of application time and rate of chlorimuron on Florida beggarweed (Desmodium tortuosum Sw. DC.) control and peanut (Arachis hypogaea L.) injury and yield. The 'Sunrunner' cultivar was used in Gainesville while the 'Florunner' cultivar was used in Jay. Plots were conventionally prepared and seeded at a rate of 112 kg/ha on 76 cm rows at both locations. Rates of chlorimuron applied were 9, 18, and 36 g/ha respectively. Each of these rates were applied 3, 5, 7, and 9 weeks after planting (WAP). A standard treatment of alachlor + paraquat @ 3.36 + 0.140 kg/ai/ha AC; paraquat @ 0.140 kg/ai/ha POT, as well as a hand weeded check were included for weed control and crop injury comparisons. Experimental design allowed all chlorimuron treatments to be applied to weedfree as well as weedy plots to insure accurate measures of degree of chemical damage or weed competition. Crop injury, weed control, peanut yield, and peanut grade data were taken. Data from both years and both locations show that the high rate (36 g/ha) may cause excessive injury if applied early or late season and in most cases was equal to the medium rate (18 g/ha) in Florida beggarweed control. All studies show that peanuts may be severely injured if chlorimuron at any of the three rates is applied at 3 WAP and in some cases injury was quite severe at the 5 WAP application date. Treatments which consisted of chlorimuron at either 8 or 16 g/ha applied 7 to 9 WAP gave adequate Florida beggarweed control, minimal crop injury and peanut yields equivalent to the hand weeded check. Eight grams/ha of chlorimuron is equivalent to one half ounce of Classic per acre. Pending EPA approval this rate will be labeled for use on peanuts 7 to 9 WAP.

Utility of Clomazone Systems for Weed Control in Virginia Peanuts. L. D. FORTNER* and J. W. WILCUT, Tidewater Agric. Exp. Stn., VPI & SU, P. O. Box 7219, Suffolk, VA 23437.

Clomazone applied preplant incorporated at 0.84 kg ai/ha was evaluated alone, with metolachlor (2.2 kg ai/ha), or with ethalfluralin (0.84 kg ai/ha) for weed control, peanut tolerance, and yields in 1988. The above mentioned herbicides were also applied without clomazone for comparative purposes and all treatments were evaluated both with, and without a postemergence (POE) application of acifluorifen (0.28 kg ai/ha) plus bentazon (0.56 kg ai/ha). Clomazone or clomazone tank mixtures were the only incorporated treatments providing full season control (>90) for tropic croton, (Croton glandulosus), common ragweed (Ambrosia artemisiifolia), and prickly sida (Sida spinosa). Systems utilizing a POE application of acifluorfen plus bentazon provided control equivalent to clomazone or clomazone tank mixtures. Clomazone also provided greater than 90% control of fall panicum (Panicum dichotomiflorum), large crabgrass (Digitaria sanguinalis), and common lambsquarters (Chenopodium album). Clomazone resulted in some early season bleaching of peanut foliage, but this was not judged to be excessive. The highest yield came from a system that utilized clomazone plus ethalfluralin (PPI), alachlor 2.2 kg ai/ha (PRE), and a POE application of acifluorfen and bentazon (4,190 kg/ha), which was significantly higher than the weed free check (3,300 kg/ha).

Lactofen Systems for Broadleaf Weed Control in Virginia Peanuts. H. B. HAGWOOD* and J. W. WILCUT. Valent Corp., Oxford, NC 27565 and Tidewater Agricultural Experiment Station, VPI & SU, P. O. Box 7219, Suffolk, VA 23437.

Field experiments were conducted on a grower's field to evaluate lactofen systems with a traditional system which utilized acifluorfen (0.28 kg ai/ha) plus bentazon (0.56 kg/ha) for broadleaf weed control in Virginia peanuts. The experimental area was infested with a heavy natural population of lambsquarters (Chenopodium album), prickly sida (Sida spinosa), and morningglory species (Ipomoea sp.). Paraquat plus alachlor (2.2 kg/ha) applied at ground cracking (GC), lactofen (0.22 kg/ha) applied postemergence (POE), and acifluorfen plus bentazon applied POE provided poor season long control of lambsquarter. Lactofen (0.28 kg ai/ha) applied GC plus lactofen (0.22 kg/ha) applied POE provided 92% control of lambsquarter when rated late season. Lactofen systems, where initial lactofen application was delayed until POE provided poor control of lambsquarter. All lactofen systems provided at least 94% control of prickly sida. The only yields equivalent to the weed free check (3,830 kg/ha) were obtained with systems utilizing lactofen applied GC plus lactofen (POE) (3,180 kg/ha) or lactofen plus alachlor (2.5 kg ai/ha) at GC plus lactofen (POE) (3420 kg/ha). The acifluorfen plus bentazon system yielded 1,930 kg/ha.

Imazethapyr for Broadleaf Weed Control in Virginia Peanuts. J. W. WILCUT* and F. R. WALLS. Tidewater Agricultural Experiment Station, VPI & SU, P. O. Box 7219, Suffolk, VA 23437 and American Cyanamid Corp., Goldsboro, NC 27530.

A field study was conducted in 1988 to evaluate imazethapyr for broadleaf weed control in Virginia peanuts. Pendimethalin was applied preplant incorporated (PPI) at 1.12 kg ai/ha in all plots except the weedy and weed free check. Imazethapyr was applied at three rates (0.036, 0.071, or 0.105 kg ai/ha) in a factorial arrangement with four methods of application; PPI, preemergence (PRE), groundcracking (GC), and postemergence (POE). Several imazethapyr sequential systems and a postemergence broadleaf standard (bentazon at 0.56 kg ai/ha plus acifluorifen at 0.28 kg ai/ha) were also evaluated. Averaged across rates, PPI, PRE, GC, and POE applications of imazethapyr yielded 3,490, 2,990, 2,740, and 2,580 kg/ha, respectively. The best imazethapyr rate for weed control and peanut yield was 0.105 kg/ha applied PPI, PRE, or as a PPI + GC sequential. This rate (0.105 kg/ha) applied PPI, PRE, or as a PPI + GC sequential provided excellent full season control of prickly sida (Sida spinosa), jimsonweed (Datura stramonium), velvetleaf (Abutilon theophrasti), morningglory species (Ipomoea sp.), common cocklebur (Xanthium strumarium), spurred anoda (Anoda cristata), and eclipta (Eclipta alba). Ground cracking or POE applications alone, provided poor to fair control of prickly sida, spurred anoda, and eclipta. Imazethapyr shows excellent promise as a broadleaf herbicide providing residual control for many broadleaf weeds.

Bentazon and Paraquat Tank Mixtures for Lambsquarter Control in Peanuts. C. W. SWANN* and J. W. WILCUT, Tidewater Agric. Exp. Stn., P. O. Box 7219, Suffolk, VA 23437.

Field experiments were initiated in 1988 to investigate the utility of paraquat and bentazon tank mixtures for common lambsquarter (Chenopodium album) control, phytotoxicity on 'Florigiant' peanuts, and peanut yield. Metolachlor was applied preemergence for annual grass control at 2.2 kg ai/ha on all plots except the weedy and weed free check. Paraquat was applied at rates of 0, 0.14, and 0.28 kg ai/ha in a factorial arrangement with bentazon at 0, 0.14, 0.28, 0.56, 0.84, and 1.12 kg ai/ha at two weeks after ground cracking. Peanut yield did not increase with rate of paraquat application while peanut injury increased. Increasing the rate of bentazon applied alone increased lambsquarter control and peanut yield. With all paraquat/bentazon tank mixtures, lambsquarter control was improved relative to bentazon applied alone at rates of 0.56 kg/ha and less. Only treatments consisting of bentazon alone at 0.84 kg/ha or greater; or bentazon/paraquat tank mixtures where bentazon was applied at 0.56 kg/ha or greater provided yields equivalent to the weed free check. The best combination for lambsquarter control, peanut tolerance, and yield was with bentazon (0.56 kg/ha) plus paraquat (0.14 kg/ha).

Alectra vogelii: A Phanerogamic Parasite of Peanut in Africa. P. SUBRAHMANYAM, ICRISAT, Patancheru, Andhra Pradesh, 502 324, India; P. SANKARA, Institut Superieur Polytechnique, Universite de Ouagadougou, B.P. 7021, Ouagadougou, Burkina Faso; J. Ph. BOSC, Laboratoire de pathologie de l'arachide, Institut de Recherches pour les Huiles et Oleagineux (IRHO), B.P. 853, Bobo Dioulasso, Burkina Faso; D. H. SMITH*, Texas A&M Univ., Texas Agr. Expt. Sta., Agr. Res. Sta., P. O. Box 755, Yoakum, TX 77995.

Alectra vogelii Benth., a root parasite of peanut, was observed in two of sixty-four peanut fields in Burkina Faso, West Africa during a 1987 survey. A. vogelii was observed at Banfora and Toussiana in the southern province. The senior author also observed Alectra in Malawi during a 1983 survey. In fields where the root parasite was observed, the incidence ranged from 5 to 90%. A. vogelii is a member of the Scrophulariaceae family. Mature plants are 18-46 cm high, with small yellow flowers, and stems that branch out at the base of the plant. The small flowers are yellow. The connection between Alectra and the peanut root can be observed by carefully excavating the soil in the rhizosphere of a peanut plant. Alectra is usually regarded as a parasitic weed of minor importance in peanut production areas of Africa.

ENTOMOLOGY

Peanut Pest Management Expert System Development for Alabama. D. P. DAVIS*, T. P. MACK, P. A. BACKMAN, and R. RODRIGUEZ-KABANA. Departments of Entomology and Plant Pathology, Auburn University, Auburn Al 36849.

The goal of this expert system is unification of pest management in peanuts. Submodules include nematode, fungal disease, and insect pest. Information is shared among modules and management decisions affecting yield and pest status are updated as the system is used. Nematode species include *Meloidogyne arenaria* and *M. hapla*. The nematode submodule requests inputs of: previous crop, nematode density in previous year, and alternative crops considered in a rotation. Output includes whether or not peanuts should be planted, cost/benefit of nematicide use if peanuts are planted, and estimated profitability of all possible rotations. Fungal diseases include rust caused by *Puccinia arachidis*, stem rot caused by *Sclerotium rolfsii*, *Rhizoctonia* limb rot, and leafspot caused by *Cercospora* and *Cercosporidium* spp. The fungal disease submodule requires additional inputs of weather, variety planted, previous history of white mold, and fungicide costs. Output includes timing of fungicide applications, and predicted losses if applications are not made. Insect pests include lesser cornstalk borer (LCB), *Elasmopalpus lignosellus*, and corn earworm, *Heliothis zea*. For LCB control, additional inputs required include tillage practices, plant growth stage, soil type, insecticides available, and application costs. Outputs include probability of pest occurrence and cost/benefit of pesticide use if recommended. Inputs for corn earworm include % defoliation, and pests density for cost/benefit analysis. Studies are underway to verify each management system.

Optimal Timing of Soil Insecticide Applications to Peanuts. J. W. CHAPIN* and M. J. SULLIVAN. Dept. of Entomology, Clemson University, Edisto Research and Education Center, Blackville, SC 29817.

A series of field experiments, conducted from 1981-88, have been used to establish management guidelines for a soil insect pest complex attacking peanuts: lesser cornstalk borer (LCB), southern corn rootworm (SCRW), wireworms, and cutworms. SCRW treatments based on scouting for damage were not efficacious, even with more soluble pesticides. SCRW was effectively controlled with at-planting, at-bloom, and early pegging treatments using reduced rates of liquid and granular chlorpyrifos, and other insecticides. LCB treatments based on scouting and pest detection were efficacious in reducing damage and increasing yield. At-planting LCB treatments controlled early populations but did not provide adequate residual suppression of this pest. Soil insecticide applications resulted in greater subsequent foliage feeder populations in 43% of sampled fields. Managing the risks of the soil insect complex requires a compromise in making a treatment decision, since several pests can threaten the same field. The best compromise, under South Carolina conditions, is to treat historical risk SCRW fields at early pegging (approximately 25 June-10 July) and to treat for LCB based on field scouting.

Interrelationship Between Soil Insect Damage to Peanut Pods and Aflatoxin in Kernels. R. E. LYNCH*, D. M. WILSON, A. P. OUEDRAOGO, and S. A. SOME. USDA-ARS, Insect Biology and Population Management Research Laboratory, P. O. Box 748, Tifton, GA 31793-0748; Mycotoxin and Tobacco Research, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-0748; ISN-IDR, University of Ouagadougou, B.P. 7020, Ouagadougou, Burkina Faso, West Africa.

The interrelationship among lesser cornstalk borer, Elasmopalpus lignosellus (Zeller), or termite, Microtermes sp., damage to peanut pods and the occurrence of Aspergillus niger, A. flavus, and aflatoxin in peanut kernels was investigated. Laboratory research showed that the lesser cornstalk borer efficiently transported the fungus to contaminate peanut pods with a mutant of A. parasiticus. Aflatoxin in kernels from pods collected in the field that had been damaged by the lesser cornstalk borer was significantly greater when the pods had been penetrated than when the pod had been externally scarified or when the pods were undamaged. Similarly, aflatoxin in kernels increased significantly with an increase in the amount of termite damage to pods. This increase in damage by termites was associated with a delay in harvest at the end of the rainy season.

Cleaning Peanuts Prior to Storage: Effects on Insect Damage, Insect Population Growth and Insecticide Efficacy. F.H. Arthur*. USDA-ARS, Stored-Product Insects Research and Development Laboratory, Savannah, Georgia 31403.

Farmers stock peanuts were either cleaned by reducing loose-shell kernels (LSK) and foreign material or left uncleaned before being treated with distilled water or one of the following insecticides: 25 ppm chlorpyrifos-methyl, 25 ppm chlorpyrifos-methyl + 4 ppm methoprene, or 52 ppm malathion. The treated peanuts were stored and artificially infested with almond moths, Cadra cautella (Walker); Indianmeal moths, Plodia interpunctella (Hübner); and red flour beetles, Tribolium castaneum (Herbst). After 8 and 10 months the percentage of insect-damaged cracked pod kernels was 1.7-3.4 X greater in cleaned treated peanuts than in uncleaned treated peanuts, and there was an inverse relationship between the number of LSK and the percentage of damaged cracked pod kernels. After 8 and 10 months, the percentage of damaged cracked pod kernels in each class of peanuts, cleaned and uncleaned, was 1.6-5.7 X greater in peanuts treated with malathion than in peanuts treated with either chlorpyrifos-methyl or chlorpyrifos-methyl + methoprene. From 4-10 months, the percentage of damaged LSK in uncleaned peanuts treated with malathion, chlorpyrifos-methyl and chlorpyrifos-methyl + methoprene ranged from 22.0-30.9%, 7.5-14.4% and 5.2-21.3%, respectively. The only significant difference in insect populations between cleaned and uncleaned peanuts occurred in untreated peanuts after two months, when almond moth and Indianmeal moth populations were greater in uncleaned peanuts. There were no significant differences in either insect damage or insect populations between chlorpyrifos-methyl and chlorpyrifos-methyl + methoprene.

Performance of LARVIN Brand Thiodicarb Insecticide/Ovicide Against Fall Armyworm, Spodoptera frugiperda, and Corn Earworm, Heliothis zea, on Peanuts. A. R. AYERS*. Rhone-Poulenc Ag Company, P. O. Box 12014, 2 T. W. Alexander Drive, Research Triangle Park, North Carolina 27709.

LARVIN, an oxime carbamate insecticide, has demonstrated excellent performance against several Lepidopterous pests on peanuts. Results from small-plot trials conducted over several years of testing indicate that LARVIN gives effective residual control of corn earworm at 0.25 to 0.40 pounds of active ingredient per acre (lb ai/A) and fall armyworm at 0.40 to 0.75 lbs ai/A. LARVIN is not a restricted use product and when used at recommended rates is not phytotoxic to plants. In addition, LARVIN has minimal effects on non-target organisms. A review of performance data and an update of the current registration status will be discussed in this paper.

POSTER PRESENTATIONS

Physicochemical Property Characterization of Peanut Proteins - Arachin and Conarachin during Heat Treatment. R. Y.-Y. CHIOU. Dept. of Food Processing, National Chiayi Institute of Agriculture, Chiayi, Taiwan 60083, Republic of China.

Crude arachin and conarachin were phosphate buffer (0.2 and 0.05 M, pH 7.9) extracted and ammonium sulfated fractionated at 40 and 60-85% saturation, respectively. Shown on a SDS PAGE gel, they comprised 5 and 1 major subunits, respectively. In comparison of amino acid profiles, methionine, lysine, and cysteine residues in the latter was about 3, 2, and 2 times of those in the former and, however, tyrosine and phenylanine were lower in the latter. During in vivo dry roasting of whole kernels and, in vitro dry roasting of the buffer extracted and lyophilized whole peanut milks, crude arachins and conarachins at 150 C for 60 min, all NSI's of those proteins during roasting were determined and found decreasing with roasting time. Conarachin was observed comparatively less heat resistant. When the buffer extracted whole milks, arachins and conarachins were subjected to boiling water bath cooking, their native protein patterns shown gradient PAGE's varied significantly with time and yet, their subunits shown on SDS PAGE's were not varied in accordance with.

Recurrent Selection Progress in a Population Derived from an Interspecific Peanut Cross. T. M. HALWARD*, J. C. WYNNE, and H. T. STALKER. Dept. of Crop Science, N. C. State Univ., Raleigh, NC 27695-7629.

It has long been advocated that diploid wild species of *Arachis* could be utilized in a breeding program to transfer such traits as disease and insect resistances to the cultivated peanut. More recently, the idea that wild species might also carry favorable genes for the improvement of quantitative traits, such as yield, has come under investigation. Three cycles of recurrent selection for yield were carried out on a population of *Arachis hypogaea* L.-like tetraploid hybrid derivatives selected from among the progeny of a cross between *A. hypogaea* and *A. cardenasii* Krap. et Greg. *nom. nud.*, a diploid species with resistance to late leafspot [*Cercosporidium personatum* (Berk. & Curt.) Deighton]. The 10 highest yielding parents from each of three cycles of recurrent selection were evaluated for 14 agronomic traits in a replicated test at a single location. The two parents used to initiate the interspecific hybrid population (PI 261942-3 and *A. cardenasii*), as well as two adapted cultivars (Florigiant and NC 7), were included as checks. The objectives of the study were to determine the amount of genetic variability remaining in the population after three cycles of recurrent selection in order to predict whether further progress from selection could be expected and to determine the potential for utilizing wild species for the improvement of quantitative traits in peanuts. The results indicated that significant levels of genetic variability remain in the population after three cycles of recurrent selection for all agronomic traits measured, including several components of yield. This suggests that continued progress in population improvement from further cycles of selection should be possible with the additional advantage of enhancing the genetic diversity of the cultivated germplasm.

Early Generation Selection for Early and Late Leafspot Resistance in Peanut. W. F. ANDERSON*, C. C. HOLBROOK and J. C. WYNNE. Dept. of Crop Science, North Carolina State Univ., Raleigh, NC 27695-7629 and USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.

Selections for high and low resistance to early leafspot (*Cercospora arachidicola* Hori) and late leafspot [*Cercosporidium personatum* (Berk. and Curt.) Deighton] were performed on F_2 families in two crosses in 1987. Visual ratings for percent defoliation and percent infection were recorded on individual F_3 plants within F_2 families at Lewiston, NC and Tifton, GA for early and late leafspot, respectively. Two replications were arranged in a randomized complete block design with five plants/plots. The five highest and five lowest F_2 families for each disease were selected based on family means. Selected families were tested in 1988 for both diseases at the same two locations. Means of selection groups were standardized over generations and realized heritability (RH) estimates were calculated using the formula RH = R/S where R = the difference in means of the high and low selections in 1988 and S = the difference in means of high and low selection groups in 1987. Results indicate that significant gains can be achieved from selection in early generation based on family means for late leafspot resistance in both crosses and for early leafspot resistance within one of the two crosses.

SYMPOSIA

ALFATOXIN MANAGEMENT IN EDIBLE PEANUT BY PREVENTION AND REMOVAL

Prevention of Preharvest Aflatoxin Contamination. J. W. DORNER. USDA, ARS, SAA, National Peanut Research Laboratory, 1011 Forrester Drive, S. E., Dawson, GA 31742.

Many years of study have shown that preharvest aflatoxin contamination of peanuts is preventable when peanuts are provided with adequate moisture (through rainfall or irrigation) during the pod maturation period. However, since all peanuts cannot be grown under such conditions, other strategies to prevent contamination are being investigated. Two of those that will be discussed include: (1) prevention of aflatoxigenic fungal invasion by development of varieties resistant to invasion and use of biocompetitive agents to exclude aflatoxin-producing fungi from the soil; and (2) drought-tolerant varieties, enhancement of phytoalexin-based as well as other natural defense mechanisms, and incorporation of resistance characteristics through genetic manipulation.

Effect of Belt Screening on Aflatoxin in Farmers Stock Peanuts. R. J. COLE, J. W. DORNER, and F. E. DOWELL. USDA, ARS, SAA, National Peanut Research Laboratory, 1011 Forrester Drive, S. E., Dawson, GA 31742.

Data from two different belt screening studies have shown that belt screening reduced aflatoxin in all three peanut types. A further reduction was achieved when oil stock and damaged kernels were removed. The amount of reduction for each step depended on the distribution of aflatoxin contamination in a farmers' stock load. When the LSK's contribute a significant amount of the aflatoxin in a farmers' stock load, the belt screen will be very effective at aflatoxin reduction. When the oil stock and damage contribute more of the aflatoxin in a farmers' stock load, the belt screen will be less effective. Ideally, both risk components needs to be removed for efficient aflatoxin reduction.

Aflatoxin Management in the Warehouse. J. S. SMITH, Jr. USDA, ARS, SAA, National Peanut Research Laboratory, 1011 Forrester Drive, S. E., Dawson, GA 31742.

Aflatoxin contamination of peanuts during storage can be controlled by good warehousing practices. The most important factor in preventing aflatoxin development in peanut warehouses is moisture control. Any measure that reduces the risk of rewetting the peanuts will be effective in aflatoxin control. A properly ventilated structure is needed with a good roof, sidewalls, and floor to prevent water entry. Uniform loading of the warehouse will allow excess heat and moisture to escape and reduce areas favorable for insect infestation which cause heat build-up and moisture accumulation. Frequent checks on warehouse conditions and proper operation of the ventilation system will prevent warehouse conditions from becoming favorable for aflatoxin production.

Aflatoxin Removal in the Shelling Plant. R. J. HENNING. Henning Peanut Technical Services, P. O. Box 94, Colquitt, GA 31737.

Research characterizing aflatoxin contamination in farmers" stock peanuts will be discussed. A high percentage of aflatoxin contamination in peanuts is normally associated with field generated loose shelled kernels (LSK's), damaged kernels (DK's) and small, immature kernels commonly known as other kernels (OK's). Also discussed will be a general scheme whereby the shelling plant processes might successfully remove these defects and thereby remove a high percentage of aflatoxin risk.

Aflatoxin Removal by Blanching. W. PARKER. Seabrook Blanching Corporation, Pert Laboratories, P. O. Box 609, Edenton, N.C. 27932.

Removal of the skin or testa from dried peanuts provides a superior color contrast when sorting a white, dried kernel in comparison to redskin or roasted peanuts. The low temperature heat from blanching produces a "bloom" effect on the major and minor damage resulting in a significant increase of the damaged kernels that can be rejected and removed by electronic sorting. Peanut lots designated for blanching by PAC-USDA must not exceed an average of 10 ppb aflatoxin after blanching. Shelf life is not changed as a result of the blanching process.

Aflatoxin Management at the Manufacturing Level. J. M. LEEK. The Procter and Gamble Company, P. O. Box 1579, Lexington, KY 40592.

The role of the manufacturer is to assure that peanut products meet consumer requirements for both product performance and product wholesomeness. Aflatoxin measurements on shelled peanut lots do not correlate well with aflatoxin levels in peanut butter made from those lots. However, removing defects (e.g., LSK's) can reduce aflatoxin levels in peanut butter and improves the correlation between aflatoxin levels in raw peanuts and in peanut butter. Most of the defects identified are best isolated at the farmers' stock and shelling plant levels of the production chains, although manufacturers have influence on many sources of aflatoxin through blanching and related systems.

Potential for Aflatoxin Removal by Density Segregation. J. C. HENDERSON and W. HAGAN. The Procter and Gamble Company, 6071 Center Hill Road, Cincinnati, OH 45224.

A patented process to separate aflatoxin-contaminated peanuts from uncontaminated peanuts will be discussed. Contaminated peanut lots taken through the process, from incoming raw peanuts to peanut butter in the jar, will be analytically profiled by data from three analytical procedures: (1) Aflatest affinity column chromatography, (2) thin-layer chromatography (TLC), and (3) high performance liquid chromatography (HPLC) with post-column iodine derivatization.

The Use of Certain Aluminosilicates to Bind Aflatoxin. D. R. TAYLOR, Engelhard Corporation, 23800 Mercantile Road, Beachwood, OH 44122.

Many inorganic oxides and mixed oxides exhibit a capability to adsorb and bind organic molecules. An extensive series of such sorbents chosen from classes including aluminas, silicas, zeolites and phyllosilicates, were used to evaluate the *in vitro* binding capacity of these materials for aflatoxin B1. From this work, we identified several aluminosilicates which exhibited affinity for binding aflatoxin. Subsequent *in vivo* laboratory studies (chickens/swine) utilizing a selected hydrated sodium calcium aluminosilicate (HSCAS) as a low level ingredient in feed have confirmed its ability to protect the target species against the effects of aflatoxins. The same sorbent material has exhibited capacity to bind aflatoxin B1 in peanut oil. Details of these studies will be described and discussed.

PEANUT PESTICIDE OVERVIEW

A Peanut Industry View of Pesticide Issues. A. RACZYNSKI. Research and Development, The Procter & Gamble Company, Winton Hill Technical Center, Cincinnati, OH 45224.

The ultimate judges of product acceptability are the consumers. If consumers will not buy or use a product, there is absolutely no reason for manufacturers to produce that product. The consumer's concepts of acceptability are generally straightforward and fairly simplified, and neither manufacturers, scientists, nor government have been very successful in resolving a consumer perception of risk by using "science" or "risk assessment", i.e. that a little bit of a carcinogen is acceptable. Consumers are currently sending a strong message to the food industry that they do not want "unsafe pesticides" in their food. Pesticides, however, are an important part of the production of our high-quality food supply. All pesticides are physiologically active, with many of them producing toxic or carcinogenic effects at high enough doses. A major challenge for the future will be to gain consumer acceptance to pesticides in foods, in view of their present attitudes and responses to these important production aids.

Product Performance: Past, Present and Future. B. A. SCHNEIDER, Biological and Economic Analysis Division (H7503C), U.S. Environmental Protection Agency (EPA), Washington, DC 20460.

Product performance encompasses all aspects of a products' effectiveness and usefulness. The purpose of product performance is to assure that pesticide products will control pests listed on the label and that unnecessary pesticide exposure to the applicator and farmworker or unreasonable adverse effects to the environment will not occur. Product performance not only forms the foundation upon which all other data are provided for pesticide decisions but also drives the regulatory decision making process through labeling, benefit and regulator options. The need for product performance data for emergency exemptions, risk/benefit balancing, public interest findings, risk reduction and use under FIFRA '88 will be further explained.

Mechanisms of Ag Chemical Entry into the Seed and Resulting Residue Levels. C. S. KVIEN*, A. R. RACZYNSKI, J. K. SHARPE, and R. A. DEPALMA. Dept. of Agronomy, Univ. of Georgia Coastal Plain Experiment Station, Tifton, GA 31793, and Research and Development, The Procter & Gamble Company, Winton Hill Technical Center, Cincinnati, OH 45224.

Development of the peanut seed underground has both positive and negative aspects when considering agricultural residues in the seed. Positive aspects include protecting the seed from direct sprays. On the other hand, rain and irrigation can wash chemicals off the foliage and into the soil around the developing pod. Agricultural chemical movement inside the plant is dependent on how polar and lipophilic the chemical is, adjuvants used and many other factors. Chemical movement to the seed can be symplastic or apoplastic. The highly lignified endocarp is a barrier to movement into the seed. However, the funiculus aids both symplastic and apoplastic movement through the endocarp to the seed. Environmental and biological stresses to the hull may create cracks in the endocarp, often allowing the seed direct contact with compounds moving with the soil solution. Multiple applications of certain agricultural chemicals made throughout the pod development period increased seed residue levels up to two logs higher than single applications made before pod fill.

Fate of Herbicides in the Peanut Plant. G. WEHTJE. Dept. of Agronomy, Auburn Univ., Auburn University, AL 36849.

Herbicides are applied to crops with the intent that some essential metabolic process will be inhibited in the target weed, but not in the crop. Once applied to the crop, the herbicide will very likely be absorbed, possibly translocated, and in some way metabolized by the peanut plant. The exact scenario depends upon the herbicide in question. The amount and type of residue in the harvested commodity will depend on the particular herbicide, rate, and growth stage at which it is typically applied. Herbicides that are applied during the fruiting period would have a greater propensity to result in detectable residues than one applied at planting.

Fate of Pesticides in Soil, Surface Water, and Ground Water. R. A. LEONARD. Southeast Watershed Research Laboratory, USDA-ARS, Tifton, GA 31793.

The general public is becoming increasingly concerned about pesticide residues in both surface and ground water. Modern instrumentation allows detection of pesticide residues to extremely low levels where their toxicological significance may be difficult to quantify. Nevertheless, the wide spread occurrence of pesticide residues in the environment gives justification for further research on their sources and transport processes. An extensive knowledge base will be required so that agricultural chemicals and production systems can be managed to meet both short-term profit and long-range environmental goals. Amounts of pesticides transported from a treated field in surface runoff range from a very small fraction of the application up to several percent depending on the pesticide, soils, application and tillage methods, and climate. The single most important factor is the occurrence of runoff-producing rainfall soon after pesticide application. Pesticide movement to ground water is complex, affected not only by management and properties of the crop root zone, but also by properties of the underlying geologic material. Systems such as DRASTIC may be used to identify areas of the country most vulnerable to ground water contamination. However, this system is not adequate for making site-specific management decisions. The GLEAMS model (Groundwater Loading Effects of Agricultural Management Systems), a computer model developed at Tifton, Georgia, considers complex pesticide, soil, management, and climate interactions, and provides simulations that are useful in grouping pesticides and soils as to potential ground water affects. The model is also useful in comparing management alternatives for reducing adverse water quality impacts.

How Pesticide Education Can Have a Positive Effect on Ground and Surface Water Quality. PATRICK B. HAGGERTY, Alliance for a Clean Rural Environment, Washington, DC 20005.

Crop protection chemicals play a crucial role in maintaining high productivity and keeping our nation's farmers competitive in a global market. They benefit American consumers by providing adequate, safe and affordable food supplies. The importance of these contributions should always be balanced with health or environmental goals. The Alliance for a Clean Rural Environment (ACRE) recognizes that farmers need both safe water supplies and the economic viability made possible through modern crop protection chemicals. Funded by basic producers of crop protection chemicals, the Alliance is part of an ongoing effort to provide the information necessary to help preserve water quality, and to encourage the safe use of these vital production tools. ACRE supports science-based government regulation of crop protection chemicals and other substances that can appear in groundwater at unacceptable concentrations. The more people know about these subjects, the more likely they are to understand that concentrations of crop protection chemicals in groundwater can be kept at minute, safe levels.

Pesticide Residue Levels - What the Industry is Finding. TIMOTHY H. SANDERS, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

The current level of scientific, regulatory and consumer interest in pesticide/agricultural chemical risk levels and tolerances demands that the peanut industry carefully examine its position and perspectives on providing totally acceptable food products. The NPC Peanut Quality Task Force report (December 1987) identified chemical residues as an item of significant concern and suggested industry pro-activity in assembling a data base for all crop protectants used in peanut production, handling and storage. Industry response to requests for information resulted in variable type responses on a total of 29 different chemicals. The overall response indicated that only levels much lower than tolerances were commonly being found. In the limited survey response, the chemical most reported with noticeable levels was malathion. Although averages were low (up to 0.3 ppm), levels of ca. 2.5 ppm were reported against a tolerance of 8 ppm. Other commonly referenced chemicals reported at low levels were dieldrin, dichlorvos, diaginon, methyl parathion, taxaphene, quintozene and lindane. Current daminozide data were not made available, but without exception all manufacturers who supplied data indicated that peanuts found to have detectable levels of daminozide were rejected.

USE OF SEROLOGY IN PEANUT RESEARCH

Use of Polyclonal Antiserum for Detection of Viruses of Peanut.

J. W.DEMSKI, Department of Plant Pathology, Georgia Experiment Station, Griffin, GA 30223.

Polyclonal antiserum use has been the backbone for serological tests of identity and relationships in plant virology. Generally plant viruses are purified (separated from host contaminants) and whole virus particles injected into an animal that possesses lymphoid cells having receptors that can combine with the virus (antigen). This causes an increase in plasma cells which secrete antibodies against specific parts of the virus. Whole virus particles usually have several to numerous different sites (called determinants) and each can elicit a different antibody type. The antiserum for a specific virus may contain antibodies against several different determinants, thus the term polyclonal. Antibodies are proteins in the group of immunoglobulins (Ig) that bind antigens. Five classes of Ig are identifiable but IgG is the most abundant and used type in polyclonal antiserum. Crude (unaltered) polyclonal antisera has been used in a variety of serological tests such as microprecipitin, ring interface and double gel diffusion. These tests can only be used on samples with a sufficiently high virus titer to give a visible precipitate. Recently different forms of the enzyme linked immunosorbent assay (ELISA) have become popular. One major advantage of ELISA is its sensitivity by detecting very low titer of virus in test samples. Instead of a visible precipitate, positive reactions in ELISA are based on enzymes that induce color changes.

Use of Monoclonal Antibodies for Detection of Viruses of Peanut.

J. L. SHERWOOD. Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078-0285.

Serological techniques using polyclonal antisera and/or monoclonal antibodies have been shown to be useful in the detection of plant viruses. The routine production of highly specific polyclonal antisera to some of the viruses infecting peanut may be difficult. The potyviruses, such as peanut mottle virus (PMV) and peanut stripe virus (PStV) may aggregate during purification. PStV shares several epitopes with other potyviruses, and polyclonal antiserum made to PStV often reacts with other potyviruses. The tomato spotted wilt virus (TSWV) is often difficult to separate from host tissue. The monoclonal antibody technology provides a means to produce a potentially unlimited supply of highly specific uniform antibody. Monoclonal antibodies have been made to PMV (Phytopathology 77:1158-1161), PStV (Plant Disease 72:676-679), and TSWV (Phytopathology 79:61-64). Monoclonal antibodies can be used in dot-immunobinding assays, enzyme linked immunosorbent assay (ELISA) and Western blotting. However, some monoclonal antibodies that work in one serological assay may not work in another assay. Some of the advantages and disadvantages of monoclonal antibodies for the detection of PMV, PStV, and TSWV are discussed.

Comparison of A.O.A.C. 'CB' and 'BF' Methods and Aflatest ™ Method of Analysis on Naturally Contaminated and Aflatoxin Spiked Samples

K.F. DONAHUE * and A.H. SPANDORF, VICAM, 29 Mystic Avenue, Boston, MA 02145

Until recently analytical methods for aflatoxin detection and measurement were based on time consuming classical chemical thin layer chromatograhic methods. Recent developments in antibody technologies have provided new and powerful tools for the analysis of grains, nuts, milk and other foodstuffs. These tools take advantage of the highly selective immuno-chemical properties of monoclonal antibodies developed to specifically recognize aflatoxin and its derivatives. The affinity chromatographic approach makes possible a rapid (5-10 minutes) one-step clean up procedure of sample extracts. Measurement of the separated aflatoxins can then be made by direct fluorometry or by HPLC analysis. The affinity column approach also allows the use of safer and more economical extraction using only methanol and water. In three studies the monoclonal antibody affinity column methods were compared to the established and generally accepted thin layer chromatographic and HPLC methods. In one study identically prepared sets of aflatoxin spiked and naturally contaminated peanut meal and peanut butter samples were prepared. An FDA laboratory analyzed a sample set by the A.O.A.C. approved 'CB' TLC method and the Vicam laboratory analyzed a sample set by the Aflatest ™ monoclonal affinity column methods determinations by both direct fluorometric measurement and by reverse phase HPLC. The analyses proved the affinity column methods to be comparable with the 'CB' TLC method. The correlation coefficients between the TLC method compared to the affinity column methods ranged between 0.97 - 0.999. In the second study the Aflatest ™ affinity column methods were compared to the 'CB' HPLC method of analysis on naturally contaminated peanut butter samples. This study was performed in a peanut butter plant QC lab under simulated on-line production QC procedures. The results were excellent agreement by both methodologies. In the final study sample sets of spiked raw-peanuts were sent to three laboratories for analysis. Two of the laboratories were nut processing plant QC Labs. The third was the Vicam lab. The samples were prepared by the modified 'BF' water slurry method. Portions of the slurry were then analyzed by TLC methods and the affinity column methods. There was excellent agreement for aflatoxin recoveries on all the samples between the three labs using the affinity column methods. The TLC recoveries were good but with high variability. The performance of the faster more economical Aflatest ™ methods demonstrate that they are viable alternatives to the accepted 'CB' and 'BF' methods.

<u>Prevention and Detection of Target Residues in Peanuts</u>. C. L. DILLEY Neogen Corporation, Lansing, MI.

Neogen has developed two new products to prevent and detect aflatoxin in peanuts. The first product is a model to predict preharvest aflatoxin risk using the EnviroCaster™. The EnviroCaster is a microprocessor based miniature weather station with software models available to forecast the onset of peanut early and late leafspot diseases, as well as, the risk of aflatoxin contamination and aflatoxin risk. The EnviroCaster aflatoxin model monitors soil temperature and rainfall and assesses severity of the drought stress on the peanuts. The model then forecasts risk of low, moderate or high aflatoxin contamination. Certain cultural practices may be recommended depending on the risk level, including harvesting the peanuts early to lessen the aflatoxin incidence. The second new product Agri-Screen®, is a rapid, quantitative test for aflatoxin. The Neogen method for analyzing aflatoxin received Interim Official First Action (AOAC) approval for peanut products and corn. Agri-Screen uses the enzyme linked immunoassay antibody technology. The method reports results in parts per billion, it is highly sensitive, quick and cost efficient. Agri-Screen uses a direct competitive method: purified toxin conjugated to an enzyme is mixed with a sample which contains native toxin. A control well with a known concentration is used for comparison. The more color in the well the less toxin present. The EnviroCaster aflatoxin predictive method and the Agri-Screen aflatoxin detection kit are new products designed to help the peanut industry minimize aflatoxin incidence.

SOCIETY BUSINESS

Opening Remarks by the President at the 1989 Business Meeting of APRES

H. A. MELOUK

Good morning ladies and gentlemen and welcome to the business meeting of APRES. First of all, I would like to thank you all for making this meeting a big success.

On behalf of the membership of APRES I would like to extend my sincere appreciation and thanks to the North Carolina and Virginia folks for their efforts in organizing this meeting. Special thanks go to Johnny Wynne for chairing the program; to Gene Sullivan and the rest of his committee for the technical program; Ronnie Valenti and the rest of her committee for the spouse program; and last but not least, the staff at the Stouffer hotel for their cooperation and assistance.

Also, I would like to thank the following organizations: Rhone-Poulenc for sponsoring the ice cream reception; Fermenta ASC Corporation for sponsoring the buffet social; Uniroyal Chemical Corporation for the barbecue; Planters Lifesavers for arranging the square dance and the photographs with Mr. Peanut; Valent U.S.A. Corporation for sponsoring the breakfast at the business meeting.

Because we have a long business agenda this morning I will be very brief in order to conclude this meeting early. Before we get to business, please allow me to say a couple of things about APRES, and reflect on my year as your president. The American Peanut Research and Education Society is a young but solid professional society with more than six hundred members representing about 28 countries, therefore, we are truly an international organization in every way.

Indeed, it has been an honor and privilege to serve as your president during the last year. It has been a rewarding personal and professional experience. Thanks to all for extending your help, when needed, to assist me in carrying out my duties as President. Special thanks go to the committees of APRES; Board of Directors; Ad Hoc Committees; Ron Sholar, our executive officer for his valuable assistance throughout the year and to Brenda Louderback for the fine assistance she provides.

And finally thanks to all members of APRES for their enthusiasm, and participation in the affairs of this young society. I urge all members of APRES to communicate new ideas and concerns with the various officers of the society for our continued strength and success of our society because without you APRES would not exist. Thank you.

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Board of Directors Meeting
Stouffer Hotel, Winston-Salem, North Carolina
July 12, 1989

1. Meeting called to order by President Hassan Melouk at 7:30 p.m. Those present were:
   Hassan Melouk, President, USDA-ARS, Oklahoma State University
   Ron Sholar, Executive Officer, Oklahoma State University
   Johnny Wynne, President-elect, North Carolina State University
   Daniel Gorbet, Past President, University of Florida
   Charles Simpson, Board Member, Texas A&M University
   Benny Rogerson, Board Member, Uniroyal Chemical Company
   Gerry Zekert, Board Member, Planters-Lifesavers
   C. Edward Ashdown, Board Member, National Peanut Council
   Harold Pattee, Editor, Peanut Science, USDA-ARS, North Carolina State University

   Guests -
   Alex Csinos, University of Georgia
   Bill Branch, University of Georgia
   Gale Buchanan, University of Georgia
   Dallas Hartzog, Auburn University
   Max Grice, Birdsong Peanuts
   Tim Sanders, USDA-ARS
   Walton Mozingo, Virginia Tech University
   Gene Sullivan, North Carolina State University
   Don Smith, Texas A&M University

2. Old Business
   a. Minutes of past board meeting - Ron Sholar, Executive Officer
   b. Executive Officer Report - Ron Sholar

      Reported on finances and membership of society

      The Executive officer reported that membership in the society has been dropping slightly. There has been a slight drop in individual membership as well as some loss in institutional members. Ed Ashdown offered the services of the National Peanut Council in recruiting new members. He offered to include an APRES brochure in a NPC mailing. The possibility of the public relations committee developing a new brochure was discussed.

   c. American Society of Agronomy Liaison Report - Bill Branch

      The 80th annual meeting was held Nov. 22-Dec. 2, 1988 in Anaheim, CA. Six peanut poster papers were presented and thirteen peanut presentations were made. The 1989 meeting will be in Las Vegas, NV, October 15-20, 1989.

   d. Southern Agricultural Experiment Station Directors Liaison Report - Gale Buchanan

      APRES responded to the call from this group for research initiatives. Experiment Station Directors are attempting to get peanut quota for research stations reinstituted. Dr. Buchanan reported that agricultural research has fared poorly in competing for research funds at the federal level.

3. New Business

Ad Hoc Committee Reports - A detailed report from each of the ad hoc committees appears later in these proceedings.

a. Ad Hoc Committee on By-law changes - Fred Cox

This committee addressed the selection of fellows in the society. The rules for fellows selection were originally printed in the 1981 Proceedings. The ad hoc committee recommended changes in the guidelines for fellows selection and in the format. Primary changes recommended were:

- reducing the number that could be selected in one year from six to three
- reducing the number that any member could nominate from two to one
- reducing the number of supporting letters required from 5 to 3 and not permit the nominator to write a letter
- delete the paragraph on the fellows committee in the former announcement as the committee is now described in the by-laws
- define the responsibilites of the fellows committee to include assigning points
- putting reference to publications just in the research and extension fields

A discussion was held on how many votes (percent) of the Board of Directors would be required to elect a fellow. The Board of Directors decided that the vote of a simple majority of the Board of Directors would be required to elect a fellow. It was pointed out that the Board of Directors selects fellows.

b. Ad Hoc Committee on Coyt Wilson Service Award - Walton Mozingo

This committee studied the possibility of creating a service award for a member who has provided outstanding service to the society. The award would be in honor of Coyt Wilson, an individual who was an early leader in the peanut industry and the formation of APRES.

The Board of Directors directed the President-elect to appoint an implementation committee for this award. This committee will be charged with developing the guidelines and presenting them to the Board of Directors. This procedure will be conducted by mail to allow presentation of the award at the 1990 annual meeting.

c. Ad Hoc Committee on Board of Directors Composition - Dan Gorbet

The Board of Directors voted to add two members to the board from the area of state employees. This change would better reflect the composition of the current membership.

State - 42% of individual members
USDA - 10% of individual members
Industry - 48%

This change will have to be submitted to the membership not later than 30 days prior to the 1990 annual meeting.

A discussion was conducted on whether the Executive Officer should be a voting member of the board. The by-laws do not permit voting by the Executive Officer and the Board of Directors voted against seeking a change in this area.

d. Ad Hoc Committee on Joe Sugg - Graduate Student Award - Johnny Wynne

The Board of Directors accepted the report of this ad hoc committee and the first award will be for the 1989 meeting.

e. Ad Hoc Committee on Valent-USA Award for an Outstanding Extension Program - Gene Sullivan

The ad hoc committee recommended that this award be available to both researchers and Extension personnel. This award would be alternated with the NPC Research and Education Award. Due to changes within the Valent Company, this award will not be available in 1990. The earliest it could be awarded would be in 1991.

The Board of Directors voted to accept the concept of the award in principle and that it be dropped if not funded within two years.

f. Nominating Committee Report - Dan Gorbet

Officer Nominations for the 1989-90 year are:

President-elect - Dr. Ron Henning - Georgia

Industry Representative (Shelling, Marketing, and Storage) -Mr. Freddie McIntosh (Golden Peanut Co., Florida)

Industry Representative (Manufactured Products) - Dr. John Haney (Westreco, New York)

Executive Officer - Dr. Ron Sholar (Oklahoma State University)

The nominating committee report was accepted.

g. Finance Committee Report - Walton Mozingo

Mr. Walt Mozingo reported that the assets of the society increased in the last year. A full detailed report will be included in the proceedings. The report was accepted.

h. Peanut Quality Committee Report - Dallas Hartzog

The committee report was accepted.

i. Public Relations Committee Report - David Knauft

There were no necrology resolutions for 1988-89. The committee proposed one resolution for contributions to APRES. The resolution expressed appreciation to the National Peanut Council for the attention they have given to the problem of aflatoxin in peanuts. The public relations committee will develop a new brochure for publicizing the society. The committee proposed the study of a "highlight" session at the conclusion of the meeting on Thursday afternoon.

It was pointed out that the Public Relations committee needs to ensure that announcement of the annual meeting is sent to all organizations and news media with a need to know about the meeting. President-elect Johnny Wynne will appoint an individual on the public relations committee to handle this job.

j. National Peanut Council Research and Education Award Report - Gale Buchanan

The winner of this award for the past year was Dr. Walt Mozingo of Virginia Tech University. President Hassan Melouk requested that the NPC inform the Executive Officer of APRES who the winner of this award is at the earliest possible time.

k. Fellows Committee Report - Olin Smith

APRES members named as fellows for 1989 are:

Dr. Morris Porter - USDA-ARS, Virginia Tech University

Dr. Darold Ketring - USDA-ARS, Oklahoma State University

l. Bailey Award Committee Report - Scott Wright

Eleven papers were nominated and nine of the nominees submitted manuscripts for judging. A full report is included in the proceedings.

m. Site Selection Committee Report - Gene Sullivan

The site selection committee reported that the following locations and dates have been selected for the annual meetings:

1990	Evergreen Conference Center, Atlanta, GA July 10-13, 1990
1991	Hilton Palacio Del Rio, San Antonio, TX July 9-12, 1991

The Board of Directors authorized Dr. Charles Simpson to sign a hotel contract for the 1991 meeting. The Board also authorized Dr. Scott Wright to sign a contract with the Omni International Hotel in Richmond, VA for the 1992 meeting. The 1992 meeting will be July 7-10.

n. Publications and Editorial Committee Report - Don Smith

The Board of Directors approved a decrease in the price of Peanut Science and Technology to $15.00 per copy. This price would include state taxes and shipping charges. This price would not include air mail charges to foreign countries.

Dr. Craig Kvien has agreed to serve as indexer for Peanut Science.

o. Program Committee Report - Johnny Wynne

The report was accepted

Meeting was adjourned at 11:20 p.m.

MINUTES OF THE REGULAR BUSINESS MEETING OF THE AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

July 14, 1989

The meeting was called to order at 7:30 a.m. by President Hassan Melouk.

The following reports were presented. Written reports are included in the Proceedings.

Executive Officer - Ron Sholar
Ad Hoc Committees -
- Valent USA Outstanding Program Award - Gene Sullivan
- By-laws changes - Fred Cox
- Coyt Wilson Service Award - Walt Mozingo
- Board of Directors Composition - Dan Gorbet
- Joe Sugg Graduate Student Award - Johnny Wynne

Nominating Committee - Dan Gorbet
Finance Committee - Walt Mozingo
Peanut Quality Committee - Dallas Hartzog
Public Relations Committee - David Knauft
National Peanut Council Research and Education Award - Hassan Melouk
Fellows Committee - Olin Smith
Bailey Award Committee - Scott Wright
Site Selection Committee - Charles Simpson
Publications and Editorial Committee - Don Smith
Program Committee - Johnny Wynne

FINANCE COMMITTEE REPORT

The Finance Committee met at 3:30 PM on July 11, 1989 at the Stouffer Winston Plaza hotel in Winston-Salem, North Carolina with members Walton Mozingo, Charles Simpson and David Dougherty and incoming member Terry Coffelt present.

Executive Officer, Ron Sholar, submitted the financial statement for the 1988-89 fiscal year. It was reviewed and found to be in order. Peanut Science Editor, Harold Pattee, presented a report on the finances of Peanut Science and a proposed budget for 1989-90.

A proposed balanced budget for the Society including the request of Peanut Science was prepared. Charles Simpson moved and David Dougherty seconded a motion to present the proposed budget to the Board of Directors for approval. Motion carried. It was later presented to the Board of Directors and approved.

The Total Assets of APRES increased by $6,013.86 for the year. A $23,000 certificate of deposit was purchased during the year with cash available in the checking account still adequate to conduct the business of the society. APRES has cash assets of $80,157.25 and a book inventory value of $31,501.12, giving the society a present net worth of $111,658.37 for the fiscal year ending June 30, 1989.

Respectfully submitted,

R. W. Mozingo, Chairman
C. E. Simpson
B. J. Brecke
D. E. Dougherty
F. W. Nutter, Jr.

PEANUT SCIENCE BUDGET
1989-1990

Number of Issues - 2 (July-December, 1989; January-June, 1990)

Estimates:
Pages - 115
Cost Per Page - $80.00

Expenditures

Printing and Reprint Costs	$11,800
Editorial Assistance	5,400
Misc. Expenses	525
Office Supplies	500
Postage - Domestic	600
- Foreign	1,200
Total -	$20,025

Income

Page and Reprint Charges	$11,500
Foreign Mailings	1,200
APRES Member Subscription (500 x $13.00)	6,500
Library Subscriptions (95 x $15.00)	1,425
Total -	$20,625

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
1989-1990 Budget

Receipts	89-90 Budget
Registration	$9,000
Membership	16,500
Proceedings and Reprint Sales	100
Special Contributions (coffee break money from host state)	3,000
Peanut Science and Technology	3,000
Peanut Science Page Charges and Reprints	11,500
Differential Postage Assessment - International members	2,000
Interest	4,500
APRES Methods Books	150
TOTAL RECEIPTS	$49,750
Expenditures	
Proceedings - Printing & Reprints	$2,800
Annual meeting	6,500
Secretarial	9,600
Postage	2,500
Office Supplies	1,100
Travel - Officers	1,200
Miscellaneous	775
Peanut Science	20,025
Peanut Science and Technology	250
Bank Charges	150
Peanut Research	2,600
Legal Fees	1,000
APRES Methods Books	500
Membership CAST	750
TOTAL EXPENDITURES	$49,750
Excess Receipts over Expenditures	0
Cash - Beginning of Period	**$80,157.25**
Cash - End of Period	**$80,157.25**

BALANCE SHEET FOR FY 1988-89

ASSETS	June 30, 1989	June 30, 1988
Petty Cash Fund	$ 216.61	$ 234.83
Cash in Checking Account	16,514.69	18,897.64
Certificate of Deposit #1	14,828.38	13,865.11
Certificate of Deposit #2	9,619.11	8,938.14
Certificate of Deposit #3	8,967.41	8,348.62
Certificate of Deposit #4	23,000.00	-----
Money Market Account	5,811.62	19,616.71
Savings Account(Wallace Bailey)	1,199.43	1,119.78
Inventory of Books	31,501.12	34,623.68
TOTAL ASSETS	$111,658.37	$105,644.51
LIABILITIES		
None	$ 0.00	$ 0.00
FUND BALANCE	$111,658.37	$105,644.51
TOTAL LIABILITIES AND FUND BALANCE	$111,658.37	$105,644.51

*Cash adjustment in checking account of +$7.50 for write-off of Check #497 written on January 13, 1988 and never cashed.

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

Statement of Activity for Year Ending

RECEIPTS	June 30, 1989	June 30,1988
Registration	$ 8,549.00	$ 8,626.00
Membership	16,458.00	14,365.00
Special Contributions	5,025.00	4,000.00
Differential Postage	1,823.00	2,357.00
Ladies Activities	1,765.40	0.00
Peanut Science and Technology	3,229.75	5,140.08
Quality Methods	149.25	230.00
Proceedings and Reprint Sales	86.00	195.65
Peanut Science page chg & reprints	11,082.75	8,070.00
Checking Account Interest	1,141.15	1,137.43
Savings Account Interest (W.Bailey)	79.65	66.61
Money Market Account Interest	1,194.91	1,138.11
Certificate of Deposit #1 Interest	963.27	838.00
Certificate of Deposit #2 Interest	680.97	562.50
Certificate of Deposit #3 Interest	618.79	777.42
Certificate of Deposit #4 (New)	23,000.00	------
TOTAL RECEIPTS	$ 75,846.89	$ 47,503.80

EXPENDITURES		
Annual Meeting	$ 6,452.26	$ 5,705.99
Membership	0.00	61.00
Office Supplies	859.43	1,095.62
Secretarial Services	9,030.00	8,600.00
Postage	2,048.80	2,349.41
(minus petty cash fund balance)	(216.61)	(234.83)
Travel-officers	709.94	791.39
Corporation Registration	55.00	50.00
Legal Fees	1,530.00	200.00
Sales Tax	50.50	43.25
Proceedings	1,868.52	2,997.00
Peanut Science	17,500.00	18,000.00
Peanut Science & Technology	57.15	296.75
Peanut Research	2,678.29	1,635.58
Quality Methods	0.00	371.24
Bank charges	143.25	145.75
Money Market Account	15,000.00	0.00
Certificate(s) of Deposit	0.00	0.00
Miscellaneous (incl $8000 from checking to CD#4)	8,716.61	826.96
TOTAL EXPENDITURES	$ 66,483.14	$ 42,935.11
EXCESS RECEIPTS OVER EXPENDITURES	$ 9,363.75	$ 4,568.69

Cash in Checking Account:

July 1, 1987 - $17,946.42 — June 30, 1988 - $18,897.64

July 1, 1988 - $18,897.64 — June 30, 1989 - $16,514.69

PEANUT SCIENCE AND TECHNOLOGY

SALES REPORT AND INVENTORY ADJUSTMENT

1988-89

	# of books sold	Remaining inventory
Beginning inventory 1508		
1st Quarter	87	1421
2nd Quarter	3	1418
3rd Quarter	33	1385
4th Quarter	13	1372
TOTAL BOOKS SOLD	136	

136 books sold x $22.96 = $3,122,56 decrease in value of book inventory.

1372 remaining books x $22.96 (book value) = $31,501.12 total value of remaining book inventory.

Fiscal year	# of books sold
1985-86	102
1986-87	77
1987-88	204
1988-89	136

NOMINATING COMMITTEE REPORT

The following individuals as active members of APRES have agreed to accept nominations and serve if elected as follows:

1) President-elect - Dr. Ron Henning (Georgia)

2) Industry Representative (Shelling, Marketing, and Storage) - Mr. Freddie McIntosh (Golden Peanut - Florida)

3) Industry Representative (Manufactured Products) - Mr. John Haney (Westreco - New York)

4) Executive Officer - Dr. Ron Sholar (Oklahoma State University)

Respectfully submitted,

D. W. Gorbet, Chair
A. M. Schubert
M. K. Beute

PUBLIC RELATIONS COMMITTEE REPORT

The Public Relations Committee is pleased to report that, to our knowledge, no necrology resolutions are necessary this year. We are pleased this was a healthy year for our society.

We have one resolution for contributions to the Society:

Whereas, the National Peanut Council has spearheaded extensive efforts to reduce aflatoxin and, thus, improve the quality of the United States peanut crop, and

Whereas, the Peanut Quality Enhancement Committee and cooperators throughout the peanut industry have spent countless hours addressing the problems of peanut quality.

Be it resolved that the American Peanut Research and Education Society recognize these continuing efforts to work with all members of APRES to provide a better peanut product to the consumer.

The committee discussed ways to improve national publicity for upcoming meetings. The committee also addressed ways to attract new APRES members. We felt the most appropriate target groups for adding new members were among industry representatives, including growers. Suggestions made included:

1) The current and incoming chairs of the Public Relations Committee prepare articles for the regional grower papers highlighting the APRES activities from this meeting that would be useful for growers, shellers, county agents and other peanut workers; and to stress that these peanut workers are also welcome to join APRES.

2) The APRES publicity pamphlet be updated, single copies be made available to the Society membership, and that quantities of this pamphlet be made available to anyone who wishes to promote APRES.

3) In a further attempt to make the APRES meeting and thus, APRES membership more desirable, we recommend to the Program Committee for the 1990 meetings that a session ending the Thursday meetings be a Highlight Session, focusing on information presented at the meetings that could provide those attending the meetings with some "take-home" ideas that could be immediately applicable for attendees. Several formats were suggested for this session, including having authors provide "popular press abstracts" and having several session moderators highlight papers from their sessions they felt would have immediate value to APRES members.

The Public Relations Committee will be pleased to discuss these ideas with the 1990 Program Committee.

Respectfully submitted,

David Knauft, Chair
John Beasley
Edwin Colburn
Daniel Colvin
Dewitt Gooden
Elbert J. Long

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT

R. J. Henning, A. B. Rogerson, J. M. Bennett, T. J. Whitaker, D. L. Ketring, C. S. Kvien, C. C. Holbrook, H. E. Pattee, and D. H. Smith were present. The following reports were read and approved. Peanut Research by C. S. Kvien and C. C. Holbrook; Peanut Science by H. E. Pattee: Proceedings by J. R. Sholar.

The committee submitted the following recommendations for consideration by the Board of Directors:

1) Number the quarterly issues of Peanut Research as issues 1, 2, 3, and 4 during each calendar year.

2) Sell the remaining issues of Peanut Science and Technology for $15.00 per copy.

3) Appoint the following persons as Associate Editors of Peanut Science; T. Brenneman, Plant Pathology; D. L. Ketring, Plant Physiology; D. Knauft, Plant Breeding.

4) Appoint the following persons as Associate Editors of Peanut Science for an additional term of three years; Dallas Hartzog, R. Walton Mozingo, and James H. Young.

5) Appoint C. S. Kvien as indexer for Peanut Science.

Respectfully submitted,

D. Smith, Chair
R. J. Henning
A. B. Rogerson
J. M. Bennett
T. J. Whitaker
D. L. Ketring
C. S. Kvien, Ex-Officio
C. C. Holbrook, Ex-Officio
H. E. Pattee, Ex-Officio
E. M. Ahmed, Ex-Officio

PEANUT QUALITY COMMITTEE REPORT

The Peanut Quality Committee meeting was convened at 3:30 p.m. July 11, 1989. The Committee Chairman made some comments related to the Quality Committee recommendations of 1987 and 1988 that a symposium on The Peanut Quality Enhancement project and Chemical Residues be included as a symposium topic at the 1989 APRES meeting. There was a concensus of the committee that a symposium which addressed critical issues of Peanut Quality should be held at the 1990 APRES annual meeting.

Clyde Young reported that in addition to the main quality problem of aflatoxin, off-flavors are also a real problem. From the 1988 crop he reported finding musky flavors.

Paul Blankenship gave a brief report on The Peanut Quality Enhancement Project and Proposition 65 in California. Alternatives for major manufacturers were discussed as opposed to business as usual.

Bob Pettit commented on a binding material for aflatoxin and the need for more research in this area. Also, he expressed a desire to have an update on the breeding of resistant varieties to aflatoxin contamination, as well as physical and chemical barriers.

Tom Whitaker gave a report on designing a means of testing farmers stock peanuts for aflatoxin and on his work with the Peanut Administrative Committee.

A representative of the USDA lab in New Orleans reported on a peanut quality study conducted on peanuts from foreign origins.

Jim Davidson announced the Peanut Systems Workshop to be held immediately following the APRES meeting.

Max Grice commented on who will finance the improved quality brought on by The Peanut Quality Enhancement Project. He stated, we must level the playing field for all manufacturers, not just Peanut Administrative Committee members. The industry will do some implementing of the results of The Peanut Quality Enhancement Project.

Ron Henning reported on the price of the value added to peanuts when quality is improved. This value added needs to be determined at all levels - farmers, shellers and manufacturers.

Respectfully submitted,

D. L. Hartzog, Chair
J. H. West
M. R. Cobb
T. J. Whitaker
P. Blankenship
J. Grichar
J. Kirby
M. Grice

PROGRAM COMMITTEE REPORT

The 1989 APRES program committee has made arrangements for the 1989 annual meeting at the Stouffer Winston Plaza Hotel, Winston-Salem, North Carolina. The local arrangements committee has successfully secured funds for the meeting. Contributors are listed in the program. They have arranged for an ice cream social sponsored by Rhone-Poulenc for July 11, a social for the evening of July 12 sponsored by Fermenta ASC Corporation, a barbeque on July 13 sponsored by Uniroyal Chemical Corporation, and a square dance also on July 13 sponsored by Planters Lifesavers. In addition, they have arranged for Valent U.S.A Corporation to sponsor the breakfast at our awards and business meeting on July 14.

The technical program committee has organized 99 volunteer papers into 8 sessions including a session involving graduate student competition. An additional 22 papers will be presented during three symposia.

The spouse's program committee has arranged for a spouse's hospitality room that will be open from 12:00 - 8:00 p.m. on July 11, 8:00 a.m. - 5:00 p.m. on July 12, and 8:00 a.m. - 12:00 noon on July 13. They have scheduled a tour of Old Salem and a shopping trip to the Burlington Manufacturing Outlet Center.

Respectively Submitted: J. C. Wynne, Chairman

Local Arrangements

Gene Sullivan, Chairman
Rick Brandenburg
Fred Cox
Douglas Creecy
Janet Ferguson
Henry B. Hagwood
David M. Hogg
R. Walton Mozingo
Norfleet Sugg
Peter C. Valenti
F. Scott Wright
James Young

Technical Program

Marvin Beute, Chairman
Floyd Adamsen
Alan Ayers
Jack Bailey
H. V. Campbell
Terry A. Coffelt
Bill Dickens
P. M. Phipps
H. Thomas Stalker
C. W. Swann
Randy Wells
T. B. Whitaker
Clyde T. Young

Spouse's Program

Ronnie Valenti, Chairperson
Sherlene Beute
Janice Brandenburg
Lessie Creecy
Eva Sugg
Iris Sullivan

1989 PROGRAM

BOARD OF DIRECTORS
1988-1989

President	Hassan A. Melouk
President-Elect	Johnny C. Wynne
Executive Officer	James R. Sholar
Past President	Daniel W. Gorbet
Administrative Advisor (non-voting)	Gale A. Buchanan
State Employee Representative	Charles E. Simpson
USDA Representative	Floyd J. Adamsen
Industry Representatives:	
Production	A. B. Rogerson
Shelling/Marketing/Storage	T. H. Birdsong, III
Manufactured Products	Gerry Zekert
National Peanut Council President	C. E. Ashdown

PROGRAM COMMITTEE
Johnny C. Wynne, Chairman

Local Arrangements

Gene Sullivan, Chairman
Rick Brandenburg
Fred Cox
Douglas Creecy
Janet Ferguson
Henry B. Hagwood
David M. Hogg
R. Walton Mozingo
Norfleet Sugg
Peter C. Valenti
F. Scott Wright
James Young
Clyde T. Young

Technical Program

Marvin Beute, Chairman
Floyd Adamsen
Alan Ayers
Jack Bailey
H. V. Campbell
Terry A. Coffelt
Bill Dickens
P. M. Phipps
H. Thomas Stalker
C. W. Swann
Randy Wells
T. B. Whitaker

SPOUSE'S PROGRAM

Ronnie Valenti, Chairperson
Sherlene Beute
Janice Brandenburg
Lessie Creecy
Eva Sugg
Iris Sullivan

PROGRAM HIGHLIGHTS

Tuesday, July 11

12:00-8:00	APRES Registration	*Upper Lobby*
12:00-8:00	Spouse Registration & Hospitality	*Piedmont*
1:00-5:00	Committee Meetings:	

1:00-2:00	*Associate Editors, Peanut Science*	*Blue Ridge*
	Bailey Award	*Moravian*
	Site Selection	*Wachovia*
2:00-3:00	*Publications & Editorial*	*Blue Ridge*
	Public Relations	*Moravian*
	Valent Award Ad Hoc	*Wachovia*
3:30-5:00	*Finance*	*Blue Ridge*
	Peanut Quality	*Moravian*

7:30-8:30	Board of Directors	*Board Room*
8PM - 10PM	*Rhone-Poulenc* ICE CREAM SOCIAL	*Ballroom A&B*

Wednesday, July 12

8:00-noon	APRES Registration	*Upper Lobby*
8:00-5:00	Spouse Registration & Hospitality	*Piedmont*
8:00-5:00	Industry Exhibits	*Ballroom C&D*
8:15-9:15	General Session	*Ballroom A&B*
9:45-4:45	Paper Presentation Sessions:	

9:45-noon	*Graduate Student Competition Papers*	*Ballroom A*
	Physiology & Seed Technology	*Ballroom B*
1:00-4:45	*Plant Pathology*	*Ballroom A*
	Harvesting & Handling	*Ballroom B*
1:00-3:00	*SYMPOSIUM: Aflatoxin Management in Edible Peanut by Prevention & Removal*	*Bethabara*
3:15-4:15	*Mycotoxin*	*Bethabara*

10:00 AM-3:30	SPOUSE PROGRAM: *Old Salem & Museum of Early Southern Decorative Arts*	*Lobby*
8:00 PM-10:00	Fermenta ASC Corp SOCIAL	*Ballroom A&B*

Thursday, July 13

8:00-noon	APRES Registration	*Upper Lobby*
8:00-noon	Spouse Registration & Hospitality	*Piedmont*
8:00-5:00	Industry Exhibits	*Ballroom C&D*
8:00-2:45	Paper Presentation Sessions:	

8:00-12:15	*Production Technology; Processing & Utilization*	*Ballroom A*
8:00-11:30	*Breeding & Genetics*	*Ballroom B*
8:00-12:15	*Weed Science; Entomology*	*Bethabara*
1:30-2:45	*SYMPOSIUM: Peanut Pesticide Overview*	*Ballroom A*
1:30-2:45	*SYMPOSIUM: Serology in Peanut Research* ...	*Ballroom B*

9:00-3:00	SPOUSE PROGRAM: *Burlington Manufacturing Outlet Center*	*Lobby*
1:30-3:00	Poster Presentations	*Bethabara*
5:00-9:00	*Uniroyal Chemical Planters LifeSavers* BARBECUE/SQUARE DANCE	*Tanglewood Park*

Friday, July 14

7:30-8:30	Breakfast & Awards Ceremony	*Ballroom A&B*
8:30-10:00	Business Meeting	*Ballroom A&B*

GENERAL SESSION

Wednesday, July 12 -- Ballroom A&B

8:15 Call to Order - **Hassan Melouk**, APRES President, presiding
Invocation & Introduction of Mayor - **Fleet Sugg**, Executive Secretary, N. C. Peanut Growers Association

8:20 Welcome - **Mayor Wayne Corpening**

8:30 Opening remarks, **D. F. Bateman**, Dean, College of Agriculture & Life Sciences, N. C. State University

8:40 Announcements - **Gene Sullivan**, Chairman, APRES Local Arrangements Committee

8:45 Address - *"Peanut Quality Efforts in the USA"*,**Paul Blankenship**, National Peanut Research Laboratory

9:00 Address - *"Quality and the Consumer"*, **Peter Valenti**, Director, Nuts/Snacks Development, Planters LifeSavers Co.

9:15 Coffee break

PAPER PRESENTATION SESSIONS

Wednesday, July 12

Graduate Student Papers .... *Ballroom A*

Moderator: H. T. Stalker, N. C. State Univ.

9:45 (1) New Advisory Model for Fungicide Application to Control Early Leafspot of Peanut in Virginia. **R. M. Cu***, **P. M. Phipps** and **R. J. Stipes**, Tidewater Agr. Exp. Sta., VPI&SU, Suffolk, VA 23437.

10:00 (2) Simulation of the Temporal and Spatial Spread of Leafspot and Its Effects on the Growth and Yield of Peanuts. **S. E. Nokes*** and **J. H. Young**, Biological and Agricultural Engineering Dept., North Carolina State University, Raleigh, NC 27695.

10:15 (3) Relationship Between Components of Resistance and Disease Progress of Late Leafspot on Peanut. **V. M. Aquino***, North Florida Research and Education Center, Quincy, FL 32351; **F. M. Shokes**, Agricultural Research and Education Center, Marianna, FL 32446; **D. W. Gorbet** and **R. D. Berger**, Department of Plant Pathology, University of Florida, Gainesville, FL 32611.

10:30 (4) Effect of Defoliation on the Growth and Development of Peanut. **J. B. Endan*** and **J. H. Young**, Dept. of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695-7625.

10:45 (5) Assessment of Resistance to Iprodione in Sclerotial Populations of Sclerotinia minor from Fungicide treated Peanuts. **F. D. Smith***, **P. M. Phipps** and **R. J. Stipes**, Tidewater Agricultural Experiment Station, VPI&SU, Suffolk, VA 23437.

11:00 (6) Rapid Detection of Aflatoxins in Peanut with the SAM Assay. **A. B. Sarr*** and **T. D. Phillips**, Dept. of Veterinary Public Health, College of Veterinary Medicine, Texas A&M University, College Station, TX 77843.

11:15 (7) Biology, Population Dynamics and Natural Enemies of the Groundnut Leaf Miner, Aproaerema modicella (Lep.: Gelechiidae) in Peninsular India. **T. G. Shanower***, Division of Biological Control, Univ. of Cal., Berkeley 94720; **J. A. Wightman**, ICRISAT Patancheru P. O., Andhra Pradesh, 502324, India; and **A. P. Gutierrez**, Division of Biological Control, Univ. of Cal., Berkeley 94720.

11:30 (8) Yield and Stability of Seven Short Season Peanut Genotypes in Zimbabwe. **Z. A. Chiteka**, Crop Breeding Institute, Department of Research and Specialist Services, Box 8100, Causeway, Harare, Zimbabwe.

11:45 (9) Influence of Soil Water Deficits on Peanut Pod Formation. **P. J. Sexton***, **K. J. Boote**, and **J. M. Bennett**, Dept. of Agronomy, University of Florida, Gainesville, FL 32611.

12:00 LUNCH

Physiology and Seed Technology .... *Ballroom B*

Moderator: R. Wells, N. C. State Univ.

9:45 (10) Use of PNUTGRO to Evaluate Effects of Weather on Peanut Yields in the Southeast during 1984-1987. **K. J. Boote*, G. Hoogenboom, J. W. Jones, and J. M. Bennett**, University of Florida, Gainesville, FL 32611.

10:00 (11) Relation of Internal Tissue Water Balance of Peanut to Soil Moisture. **P. I. Erickson, D. L. Ketring*, and J. F. Stone**, USDAARS, Plant Science Research Laboratory, Southern Plains Area, and Agronomy Dept., Oklahoma State Univ., Stillwater, OK 74075.

10:15 (12) A Root Tube Pegging Pan Technique for Determining the Effects of Soil Water in the Pegging and Rooting Zone on Peanut Pod Formation. **J. M. Bennett*, P. J. Sexton, and K. J. Boote**, Dept. of Agronomy, University of Florida, Gainesville, FL 32611.

10:30 (13) Ecological Attribute of Groundnut Nitrogen Fixation. **Jiang Rongwen*, Hu Xiaojia, Jiang Moulan, and Zhang Xuejiang**, Oil Crops Research Institute, Chinese Academy of Agricultural Sciences. Wuhan, Hubei, 430062, P. R. China.

10:45 (14) Response of Peanut Dry Matter Allocation to Genetic Selection for Yield in North Carolina. **T. Bi, R. Wells* and J.C. Wynne**, Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

11:00 (15) Protein as an Indicator of Peanut Seed Maturity. **S. M. Basha**, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307.

11:15 (16) Seed Quality of Runner Peanuts as Affected by Topdressing Gypsum on Calcium-Sufficient Soils. **J. F. Adams and D. L. Hartzog***. Dept. of Agronomy and Soils, Auburn University, Auburn, AL 36849.

11:30 (17) Crop Nutrition Investigation of an On-farm Problem with Peanut in Columbia County, Florida in 1988. **G. R. Stocks*, R. N. Gallaher and E. B. Whitty**, Agronomy Dept., Inst. of Food and Agricultural Science, Univ.of Florida,Gainesville, FL.

12:00 LUNCH

Wednesday, July 12

Plant Pathology .... *Ballroom A*

Moderator: P. M. Phipps, Tidewater Agr. Exp. Sta., VPI&SU

1:00 (18) Development and Validation of a Weather-Based, Late Leafspot Spray Advisory. **F. W. Nutter, Jr.* and T. B. Brenneman**, Depts. of Plant Pathology, University of Georgia, Athens 30602 and Tifton, GA 31793.

1:15 (19) Progress in the Use of Leafspot Advisories in North Carolina. **J. E. Bailey***, Dept. Plant Pathology, N. C. State University, Raleigh, NC; **G. L. Johnson**, Horticultural Science, N. C. State University, Raleigh, NC and **R. Hitzig**, Dept. of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, NC.

1:30 (20) Application of Chlorothalonil via Ground Sprays, a Center Pivot Irrigation System or an Underslung Boom for Peanut Disease Control. **T. B. Brenneman* and D. R. Sumner**, Dept. of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793.

1:45 (21) Disease Management of 'Southern Runner' and 'Florunner' Peanuts. **J.C. Jacobi*** and **P. A.Backman**, Department of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL 36849-5409.

2:00 (22) A Comparison of Peg Strength and Pod Loss on Florunner and Southern Runner Peanut. **F. M.Shokes***,**I. D. Teare** and **D. W. Gorbet**, North Florida Research and Education Center, Quincy, FL 32351; Agricultural Research and Education Center, Marianna, FL 32446.

2:15 (23) Effects of Foliage and Soil Applied Fungicides on Peanut Quality. **P. A. Backman***, **K. L. Bowen** and **L. J. Carter**, Department of Plant Pathology, Alabama Agricultural Experiment Station, Auburn University, AL 36849-5409.

2:30 (24) Fungicidal Control of Southern Stem Rot of Peanuts. **A. K. Hagan***, Dept. of Plant Pathology, Auburn University, AL 368409 and **J. R. Weeks**, Dept. of Entomology, Auburn University, AL 36849.

2:45 (25) Resistance to Meloidogyne arenaria in Complex Hybrids of Arachis hypogaea and Wild Arachis spp. **J. L. Starr***, Dept. Plant Pathology and Microbiology, Texas Agricultural Experiment Station, College Station, TX 77843.

3:00 BREAK

3:15 (26) Meloidogyne arenaria and a Pod Rotting Disease Complex on Peanut in Florida. **D. W. Dickson*** and **T. E. Hewlett**, Department of Entomology and Nematology, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

3:30 (27) Response of Resistant and Susceptible Peanut Genotypes to Fumigation with Metam Sodium for Control of Cylindrocladium Black Rot. **A. K. Culbreath***, Dept. of Plant Pathology, Coastal Plain Experiment Station, Tifton, GA 31793; **J. E. Bailey**, and **M. K. Beute**, Dept. of Plant Pathology, North Carolina State University, Raleigh, NC 27695- 7616.

3:45 (28) Response of Peanut Cultivars to Soil Fumigation for Control of Cylindrocladium Black Rot (CBR) of Peanut. **P. M. Phipps*** and **T. A. Coffelt**, Tidewater Agr. Exp. Sta., VPI&SU and USDA-ARS, Suffolk, VA 23437.

4:00 (29) The Effects of Storage Time and Seed Protectants on Infection of Seed of Four Peanut Cultivars with Cylindro cladium crotalariae. **D. M. Porter***, USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437; **R. A. Taber**, and **D. H. Smith**, Department of Plant Pathology and Microbiology, Texas A&M University, College Station,TX 77843 and Yoakum, TX 77955.

4:15 (30) Reappearance in Georgia of Concealed Damage in Peanut Seed Caused by Infection with Diploida gossypina. **D. K. Bell*** and **W. D. Branch**, Plant Pathology and Agronomy Departments, UGA Coastal Plain Experiment Station, Tifton, GA 31793.

4:30 (31) Phenolic Compounds in Peanut Shells at Different Growth Stages. **J. E. Fajardo***, **R. D. Waniska** and **R. E. Pettit**, Dept. of Plant Pathology and Microbiology and Dept. of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-1232.

4:45 (32) Isozyme Variations in Peanut Cotyledons During Early Stages of Infection by Aspergillus flavus and A. parasiticus. **J. B. Szerszen*** and **R. E. Pettit.** Dept. of Plant Pathology and Microbiology, Agricultural Experiment Station, Texas A&M University, College Station, Texas 77843-2132.

Harvesting and Handling . . . . *Ballroom B*

Moderator: T. B. Whitaker, N. C. State Univ.

1:00 (33) Effect of Stacked Windrow on Peanut Quality Parameters. **J.L. Butler*, E. J. Williams, J. M. Troeger, K. L. Crippen, N. Lovegren,** and **J. R. Vercellotti,** ARS-USDA,SAA,Crop Systems Research Unit, Tifton, Georgia 31793 and ARS-USDA Southern Regional Research Center, New Orleans, LA 70179.

1:15 (34) Shaded Windrow for Peanut Curing in Virginia. **F. S. Wright*, D. M. Porter,** USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437; **K. L. Crippen, N. V. Lovegren,** and **J. R. Vercellotti,** USDA-ARS, Southern Regional Research Center, P. O. Box 19687, New Orleans, LA 70179.

1:30 (35) Comparison of Drying Rates and Alcohol Meter Readings for Stacked and Conventional Windrows in North Carolina. **J. H. Young,** Biological and Agricultural Engineering Department,North Carolina State University, Raleigh, NC 27695-7625.

1:45 (36) Descriptive Sensory Analysis of Peanuts from 1987 and 1988 Peanut Crop Windrow Drying Studies. **K. L. Crippen, J. R. Vercellotti*, J. L. Butler,E. J. Williams, B. L. Clary, F. S. Wright** and **D. M. Porter,**USDA-ARS-SRRC, New Orleans, LA70124; USDA-ARS-SAA-CSRU, Coastal Plain Experiment Station, Tifton, GA 31793; Oklahoma State University, Stillwater, OK 74078; USDA-ARS, Suffolk, VA 23437.

2:00 (37) Gas Chromatographic Analysis of Peanuts Produced by Different Methods of Windrow Drying. **N. V. Lovegren*, J. R. Vercellotti, K. L. Crippen, J. L. Butler, E.J. Williams, B. Clary, F. S. Wright,** and **D. M. Porter.** USDA-ARS-SRRC, New Orleans, LA 70124; USDA-ARS-SAA-CSRU, Coastal Plain Experiment Station, Tifton, Georgia 31793; Oklahoma State University, Stillwater, OK 74078; and USDA-ARS, Suffolk, VA 23437.

2:15 (38) Gas Chromatography of Roasted Peanut Flavor Volatiles at Moderate Temperature by Dynamic Headspace Sampling with Simultaneous Flame Ionization and Photometric Detection. **A. L. Pisciotta, J. R. Vercellotti*, K. L. Crippen,** and **N. V.Lovegren,** USDA-ARS-SRRC, New Orleans, LA 70179.

2:30 (39) Flavor in Runner-Type Peanuts as Affected by Headspace Volatile Concentration and Marketing Grades. **W. H. Yokoyama*,** Beatrice/Hunt-Wesson, 1645 W. Valencia Dr., Fullerton, CA 92633-3899; **H.E. Pattee,** USDA-ARS, Dept. of Botany, North Carolina State University, Raleigh, NC 27596-7625; and **M. F. Collins,** Beatrice/ Hunt-Wesson,1645 W. Valencia Dr., Fullerton, CA 92633-3899.

2:45 (40) Comparison of Dryer Control Strategies. **C. L. Butts*,** USDA-ARS, National Peanut Research Lab., Dawson GA 31742 and **W. E. Dykes,** Peerless Manufacturing Co., Shellman, GA 31786.

3:00 BREAK

3:15 (41) Milling Quality in Peanut Curing. **J. M. Troeger**, USDA-ARS, Crop Systems Research Unit, Coastal Plain Exp. Sta., Tifton, GA 31793.

3:30 (42) Postharvest Handling Operations for Peanut Farmers in the Caribbean Basin. **M. S. Chinnan**, Department of Food Science and Technology, University of Georgia Experiment Station, Griffin, GA 30223-1797.

3:45 (43) Sampling Error Associated with Probe Patterns for the Pneumatic Sampler. **J. W. Dickens***, **T. B. Whitaker**, and **A. B. Slate**, USDA-ARS, North Carolina State University, Box 7625, Raleigh, NC 27695-7625.

4:00 (44) Dust Control in Peanut Grading Rooms. **Floyd Dowell**, USDA, ARS, National Peanut Research Lab., Dawson, GA 31742.

4:15 (45) Roof Coatings for Reducing Warehouse Condensation Potential. **J. S. Smith, Jr.**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

4:30 (46) Visual Method to Determine Seed Maturity in Shelled-Stock Peanuts. **C. S. Kvien**, Dept. of Agronomy, Univ. of Georgia Coastal Plain Expt. Station, Tifton, GA 31793.

4:45 (47) Percentage Nut-Fill: A Possible Maturity Index for Peanuts (NC 2 Cultivar) Grown in Eastern Caribbean. **M. J. Hinds***, **G. M. Sammy** and **B. Singh**, Dept. of Chemical Engineering, University of West Indies, St. Augustine, Trinidad; Dept. of Food Science, Alabama A&M University,Normal,AL 35762.

SYMPOSIUM: Aflatoxin Management in Edible Peanut by Prevention and Removal .... *Bethabara*

Moderator: D. M. Wilson and R. J. Cole, Univ. of Georgia and National Peanut Research Laboratory

1:00 Introduction and Purpose of Symposium. **D. M. Wilson**, Dept. of Plant Pathology, Coastal Plain Experiment Station, Tifton,GA 31793,

1:05 Prevention of Preharvest Aflatoxin Contamination. **J. W. Dorner**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

1:25 Effect of Belt Screening on Aflatoxin Amounts in Farmers Stock Peanuts. **R.J. Cole**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

1:45 Aflatoxin Management in the Warehouse. **J. S. Smith, Jr.**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

2:00 Aflatoxin Removal in the Shelling Plant. **R.J. Henning**, Farmers Fertilizer & Milling Co., P. O. Box 265 Colquitt, GA 31737.

2:15 Aflatoxin Removal by Blanching. **W. Parker**, Seabrook Blanching Corp.,P. O. Box 609, Edenton, NC 27932.

2:30 Aflatoxin Management at the Manufacturing Level. **J. Leek**, The Procter & Gamble Company, Lexington, KY 40592.

2:45 Potential for Aflatoxin Removal by Density Segregation. **B. Hagan** and **J. Henderson**, The Procter & Gamble Company, Cincinnati, OH 45224.

3:00 Possible Uses for High Affinity Aluminosilicate Sorbents in the Peanut Industry. **T. D. Phillips**, Dept. of Veterinary Public Health, College of Veterinary Medicine, Texas A&M University, College Station, TX 77843.

3:15 General Discussion

3:30 BREAK

Moderator: D. M. Wilson, Univ. of Georgia

4:00 (48) Tissue Sampling for Detecting Low Aflatoxin Levels in Peanut Kernels. **K. L. Bowen*** and **P. A. Backman**, Dept. of Plant Pathology, Alabama Agric. Experiment Station, Auburn University, AL 36849-5409.

4:15 (49) Comparison of Two ELISA Screening Tests with HPLC for the Determination of Aflatoxins in Raw Peanuts. **J. W. Dorner*** and **R. J. Cole**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

4:30 (50) Studies on Peanut Phytoalexins: Induction, Characterization and Genetic Variation. **B. Mohanty***, **M. Musingo**, **S. M. Basha**, Div. of Agric. Sciences, Florida A&M University, Tallahassee, FL 32307; **J. W. Dorner** and **R. J. Cole**, National Peanut Research Lab, USDA/ARS, Dawson, GA 31742.

4:45 (51) A Comparison of Various Quality Factors Between Stack-Cured and Conventional Windrowed/Artificially Dried Peanuts.**R. J. Cole***, **J. W. Kirksey**, **J. W. Dorner**, **T. H. Sanders**, USDA- ARS, National Peanut Research Lab., Dawson, GA31742; **K. L. Crippen**, **N. V. Lovegren** and **J. R. Vercellotti**, USDA-ARS, Southern Reg. Res. Center, New Orleans, LA 70179.

Thursday, July 13

Production Technology .... *Ballroom A*

Moderator: F. J. Adamsen, VPI&SU

8:00 (52) Impact of Changes in Federal Peanut Programs on Peanut Farmers. **D. H. Carley*** and **S. M. Fletcher**, Dept. of Agricultural Economics, University of Georgia, Griffin, GA 30223- 1797.

8:15 (53) The Peanut Industry in China. **J. R. Sholar**, Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74078.

8:30 (54) Peanut Production Systems in the Commonwealth Caribbean. **B. R. Cooper***,**B.K. Rai**, **J. Grant**, **G. Muller** and **M. M. Rao**, Caribbean Agricultural Research and Development Institute, Box 766, St. John's, Antigua, W.I.

8:45 (55) Climatic Conditions Affecting Peanut Production in Suffolk, Virginia. **N. L. Powell**, Tidewater Agricultural Experiment Station, VPI&SU, Suffolk, Virginia 23437.

9:00 (56) Development of Models to Predict Yield and Quality of Georgia Peanuts. **J. I. Davidson***, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742; **M. C. Lamb**, Dept. of Agricultural Economics, University of Georgia, Athens, GA 30602; **Marvin Singletary**, Blakely Peanut Co., Blakely, GA 31723; **T. E. Allen**, Route 1, Box 10, Shellman, GA 31786; and **C. L. Butts**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

9:15 (57) Quotavalue: A Computer Spreadsheet to Analyze the Buying and Selling of Peanut Quota. **F. D. Mills, Jr.***, Extension Agricultural Economics Department, The University of Georgia, Rural Development Center, Tifton, GA 31793.

9:30 (58) Bradyhizobium Strains Influence Iron Content of Peanut Foliage, Nodules and Seeds. **R. K. Howell**, ARS-USDA, Beltsville, MD 20705.

9:45 (59) Effects of Tillage Practices and Runner Cultivars on Peanut Production. **W. J. Grichar***, Texas Agricultural Experiment Station, Yoakum, TX 77995; and **O. D. Smith**, Dept. of Soil and Crop Sci., Texas A&M University, College Station, TX 77843-2474.

10:00 BREAK

10:15 (60) Effects of Water Management, Intercropping, and Harvest Date on Yield and Water-Use Efficiency of Southern Runner Peanut. **M. Omoko, L. C. Hammond***, **K. Nzeza**, and **J. M. Bennett**, Departments of Soil Science and Agronomy, University of Florida, Gainesville, FL 32611.

10:30 (61) On-Farm Test of Diagnostic Methods for Recommending Calcium Application to Peanuts. **J. A. Baldwin*** and **S. C. Hodges**, Dept. of Agronomy, University of Georgia, Tifton, GA 31793-1209.

10:45 (62) Production and Management of "Southern Runner" Peanuts in Georgia. **J. P. Beasley, Jr.***, **J. A. Baldwin** and **S. S. Thompson**, Extension Agronomy Dept., University of Georgia, P. O. Box 1209, Tifton, GA 31793.

11:00 (63) Effect of Planting and Digging Dates on Yield and Grade of Four Virginia-type Peanut Cultivars. **R. W. Mozingo*** and **T. A. Coffelt**, VPI&SU and USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437.

Processing and Utilization .... *Ballroom A*

Moderator: F. J. Adamsen, VPI&SU

11:15 (64) Maturity Distribution in Commercially Sized Florunner Peanuts. **T. H. Sanders**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742.

11:30 (65) Composition and Roasting Quality of Peanuts from 1987 and 1988 Crop Windrow Drying Studies. **J. R. Vercellotti***, **K. L. Crippen, N. V. Lovegren, T. H. Sanders, J. L. Butler, E. J. Williams, B. Clary, F. S. Wright** and **D. M. Porter**, USDA- ARS-SRRC, New Orleans, LA 70179; USDA-ARS-NPRL, Dawson, GA 31742; USDA-ARS-SAA-CSRU, Coastal Plains Experiment Station, Tifton, GA 31793; Oklahoma State University, Stillwater, OK 74078; and USDA-ARS, Suffolk, VA 23437.

11:45 (66) The Effect of Kernel Moisture on the Concentrations of Alkylpyrazines in Roasted Florunner Peanuts. **J. A. Lansden***, **T. H. Sanders, J. L. McMeans**, USDA-ARS, National Peanut Research Lab., Dawson, GA 31742; and **M. B. Sheik**, Peanut Laboratory, Florida A&M University, Tallahassee, FL 32307.

12:00 (67) Airflow Distribution in Multi- Trailer Peanut Dryers. **J. S. Cundiff***, **D. H. Vaughan, W. F. Wilcke**, and **F. S. Wright**, Agricultural Engineering Dept., VPI&SU, Blacksburg, VA 24061; and USDA-ARS, Tidewater Research Center, Suffolk, VA 23437.

12:15 LUNCH

Breeding and Genetics .... *Ballroom B*

Moderator: T. A. Coffelt, VPI&SU

8:00 (68) Temperature Limitations to Peanut Growth and Pod Production in Israel. I. **S. Wallerstein***, S. Kahn and I. Wallerstein, Dept. of Ind. Crops and Dept. of Orn. Hort. Agr. Res. Org., P.O.B. 6, Bet Dagan 50250, Israel.

8:15 (69) Field Screening of Peanut Germplasm for Drought Resistance Traits. **A. M. Schubert***, Texas Agric. Experiment Station, Yoakum, TX 77995-0755 and O. D. Smith, Dept. of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474.

8:30 (70) Genetic Study of Tan vs Pink Peanut Testa Color. **W. D. Branch*** and C. C. Holbrook, University of Georgia and USDA-ARS, Dept. of Agronomy, Coastal Plain Experiment Station, Tifton, GA 31793.

8:45 (71) Evaluation of Isozyme Variation Among American Peanut Cultivars. **U. Grieshammer*** and J. C. Wynne, Dept. of Crop Science, North Carolina State Univ., Raleigh, NC 27695-7629.

9:00 (72) Identification of New Sources of Resistance to Meloidogyne arenaria and Cercosporidium personatum. **C. C. Holbrook***, J. P. Noe, T. B. Brenneman, and W. D. Branch, USDA-ARS and Univ. of Georgia, Dept. of Agronomy, Coastal Plain Experiment Station, Tifton, GA 31793.

9:15 (73) Inheritance of Early and Late Leafspot Resistance and Agronomic Traits in Peanut (Arachis hypogaea L.). **S. Charoenrath***, J. C. Wynne, M. K. Beute, and H. T. Stalker, Depts. of Crop Science and Plant Pathology, North Carolina State Univ., Raleigh, NC 27695-7629.

9:30 (74) Disease Assessment of Peanut Genotypes at Commercial and Breeding Nursery Intrarow Spacings. **D. A. Knauft*** and D. W. Gorbet, Dept. of Agronomy, University of Florida, Gainesville 32611-0311 and Marianna 32446-9803.

9:45 (75) The Relation of Seed Maturity with Defoliation in Groundnuts in Zimbabwe. **Desiree L. Cole**, Department of Crop Science, University of Zimbabwe, P. O. Box MP 167, Mount Pleasant, Harare, Zimbabwe.

10:00 BREAK

10:15 (76) Plantlet Formation of Peanut by Somatic Embryogenesis and Organogenesis. **H. Daimon*** and M. Mii, Chiba Prefectural Agric. Experiment Station and Faculty of Horticulture, Chiba University, Chiba, Japan.

10:30 (77) Pollen Size and Fertility Estimations in Arachis Species and Hybrids Via Electronic Particle Counter Analyses. **D. J. Banks**, USDA-ARS, Plant Science Research Lab., 1301 N. Western, Stillwater, OK 74075.

10:45 (78) Systematic Relationships Among Species of Section Arachis. **H. T. Stalker*** and J. H. Hahn, Dept. of Crop Science, North Carolina State Univ., Raleigh, NC 27695-7629.

11:00 (79) Comparative Embryo Sac Organization at Anthesis of Cultivated and Wild Arachis Species. **H. E. Pattee*** and H. T. Stalker, USDA-ARS, Department of Botany and Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

11:15 (80) Rescue of Interspecific Arachis Hybrids for Use in Breeding Disease Resistance. **P. Ozias-Akins*** and **W. D. Branch**, Dept. of Horticulture and Dept. of Agronomy, University of Georgia Coastal Plain Experiment Station, Tifton, GA 31793.

11:30 LUNCH

Weed Science .... *Bethabara*

Moderator: A. R. Ayers, Rhone-Poulenc Ag Co.

8:00 (81) Influence of Planting Date and Control Strategy on Herbicide Costs. **H. M. Linker*** and **H. D. Coble**, Dept. of Crop Science, North Carolina State University, Raleigh, NC 27695- 7620.

8:15 (82) Timing of Gramoxone Applications for Broadleaf Weed Control in Virginia Peanuts. **D. N. Horton*** and **J. W. Wilcut**, Tidewater Agricultural Experiment Station, VPI&SU, P. O. Box 7219, Suffolk, VA 23437.

8:30 (83) Influence of Timing of Imazethapyr Applications in Peanuts. **F. R. Walls, Jr.***, **K. R. Muzyk** and **G. Wiley**, American Cyanamid Co., Princeton, NJ 08540.

8:45 (84) Differential Tolerance of Peanut Genotypes to Chlorimuron. **W. C. Johnson, III***, **C. C. Holbrook, Jr.**, and **J. Cardina**, USDA-ARS, Coastal Plain Expt. Stn., Tifton, GA 31793; Dept. of Agronomy, Ohio St. Univ., Wooster, OH 44691.

9:00 (85) Weed Control and Peanut Response to Enquik Herbicide. **S. M. Brown***, Dept. of Extension Agronomy, University of Georgia, Tifton, GA 31793; **P. A. Banks**, Dept. of Agronomy, University of Georgia, Athens, GA 30602; and **D. C. Colvin**, Dept. of Agronomy, Univ. of Florida, Gainesville, FL 32611.

9:15 (86) Chlorimuron for Weed Control in Southeastern Peanut Production. **D. L. Colvin***, Dept. of Agronomy, Univ. of Florida, Gainesville, FL 32611 and **B. J. Brecke** Agric. Research and Education Center, Univ. of Florida, Jay, FL 32565.

9:30 (87) Utility of Clomazone Systems for Weed Control in Virginia Peanuts. **L. D. Fortner*** and **J. W. Wilcut**, Tidewater Agric. Exp. Stn., VPI&SU, P. O. Box 7219, Suffolk, VA 23437.

9:45 (88) Lactofen Systems for Broadleaf Weed Control in Virginia Peanuts. **H. B. Hagwood***, Valent Corp., Oxford, NC 27565; and **J. W. Wilcut**, Tidewater Agric. Experiment Station, VPI&SU, P. O. Box 7219, Suffolk, VA 23437.

10:00 BREAK

10:15 (89) Imazethapyr for Broadleaf Weed Control in Virginia Peanuts. **J. W. Wilcut***, Tidewater Agric. Experiment Station, VPI&SU, P. O. Box 7219, Suffolk, VA 23437 and **F. R. Walls**, American Cyanamid Corp., Goldsboro, NC 27530.

10:30 (90) Bentazon and Paraquat Tank Mixtures for Lambsquarter Control in Peanuts. **C. W. Swann*** and **J. W. Wilcut**, Tidewater Agric. Exp. Stn., P. O. Box 7219, Suffolk, VA 23437.

10:45 (91) Alectra vogelii: A Phanerogamic Parasite of Peanut in Africa. **P. Subrahmanyam**, ICRISAT, Patancheru, A.P., 502 324, India; **P. Sankara**, Institut Superieur Polytechnique, Universite de Ouagadougou, B. P. 7021, Ouagadougou, Burkina Faso; **J. Ph. Bosc**, Laboratoire de pathologie de l'arachide, Institut de Recherches pour les Huiles et Oleaqineux (IRHO), B.P. 853, Bobo Dioulasso, Burkina Faso and **D. H. Smith***, Texas A&M Univ., Texas Agr. Expt. Sta., Agr. Res. Sta., P. O. Box 755, Yoakum, TX 77995.

Entomology .... *Bethabara*

Moderator: A. R. Ayers, Rhone-Poulenc Ag Co.

11:00 (92) Peanut Pest Management Expert System Development for Alabama. **D. P. Davis***, **T. P. Mack**, **P. A. Backman**, and **R. Rodriguez-Kabana**, Depts. of Entomology and Plant Pathology, Auburn University, Auburn, AL 36849.

11:15 (93) Optimal Timing of Soil Insecticide Applications to Peanuts. **J. W. Chapin*** and **M. J. Sullivan**, Dept. of Entomology, Clemson University, Edisto Research and Education Center, Blacksville, SC 29817.

11:30 (94) Interrelationship Between Soil Insect Damage to Peanut Pods and Aflatoxin in Kernels. **R. E. Lynch***, **D. M. Wilson**, **A. P. Ouedraogo** and **S. A. Some**, USDA-ARS, Insect Biology and Population Management Research Laboratory, P. O. Box 748, Tifton, GA 31793-0748; Mycotoxin and Tobacco Research, Univ. of Georgia, Coastal Plain Expt. Sta., Tifton, GA 31793-0748; ISN-IDR, Univ. of Ouagadougou, B.P. 7020, Ouagadougou, Burkina Faso, W. Afr.

11:45 (95) Cleaning Peanuts Prior to Storage: Effects on Insect Damage, Insect Population Growth and Insecticide Efficacy. **F. H. Arthur***, USDA-ARS, Stored-Product Insects Research and Development Laboratory, Savannah, Georgia 31403.

12:00 (96) Performance of Larvin Brand Thiodicarb Insecticde/Ovicide Against Fall Armyworm, Spodoptera frugiperda and Corn Earworm, Heliothis zea, on Peanuts. **A. R. Ayers***, Rhone- Poulenc Ag Company, P. O. Box 12014, 2 T. W. Alexander Drive, Research Triangle Park, NC 27709.

12:15 LUNCH

SYMPOSIUM: Peanut Pesticide Overview .... *Ballroom A*

Moderator: T. H. Sanders, National Peanut Research Laboratory

1:30 A Peanut Industry View of Pesticide Issues. **Art Raczynski**, The Procter & Gamble Co., Cincinnati, OH 45224.

1:45 Role of EPA, Law 158, FIFRA LITE, and Section 18's. **Bernard Schneider**, U. S. Environ. Protection Agency, Washington, DC 20460.

2:00 Mechanisms of Ag Chemical Entry Into the Seed and Resulting Residue Levels. **Craig Kvien**, Agronomy Dept., Coastal Plain Experiment Station, Tifton, GA 31793.

2:15 Fate of Herbicides in the Peanut Plant. **Glenn Wehjte**, Agronomy Dept., Auburn University, Auburn, AL 36849.

2:30 Fate of Pesticides in the Soil, Ground, and Surface Water. **Ralph Leonard**, USDA-ARS, Coastal Plain Expt. Station, Tifton, GA 31794.

2:45 How Pesticide Education Can Have a Positive Effect on Ground and Surface Water Quality. **Patrick Haggerty**, The Alliance for a Clean Rural Environment, Washington, DC 20005.

3:00 Pesticide Residue Levels - What the Industry is Finding. **Timothy Sanders**, National Peanut Research Lab, 1011 Forrester Dr., S.E., Dawson, GA 31793.

3:15 DISCUSSION

SYMPOSIUM: Use of Serology in Peanut Research *Ballroom B*

Moderator: J. L. Sherwood, Oklahoma State Univ.

1:20 Introduction. **John Sherwood**, Dept. of Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078.

1:30 Use of Polyclonal Antiserum for Detection of Viruses of Peanut. **Jim Demski**, Dept. of Plant Pathology, Georgia Experiment Station, Experiment, GA 30212.

1:45 Use of Monoclonal Antibodies for De tection of Viruses of Peanut. **John Sherwood**, Dept. of Plant Pathology, Oklahoma State Univ., Stillwater OK 74078.

2:00 Serological Detection of Fungal Plant Pathogens. **Richard Lankow**, DNA Plant Technology Corp., 2611 Branch Pike, Cinnaminson, NJ 08077.

2:15 Detection of Aflatoxin by Monoclonal Antibodies. **Aaron Spandorf**, VICAM, 29 Mystic Ave., Sumerville, MA 02145.

2:30 Prevention and Detection of Target Residues in Peanuts. **Catherine Dilley**, Neogen Corp., Lansing, MI 48912.

2:45 DISCUSSION

Poster Presentations .... *Bethabara*

Moderator: Individual Participants

1:30 (97) Physicochemical Property Characterization of Peanut Proteins - Arachin and Conarachin During Heat Treatment. **R. Y.-Y. Chiou**, Dept. of Food Processing, National Chiayi Institute of Agriculture, Chiayi, Taiwan 60083, Republic of China.

1:30 (98) Recurrent Selection Progress in a Population Derived from an Interspecific Peanut Cross. **T. M. Halward***, **J. C. Wynne** and **H. T. Stalker**, Dept. of Crop Science, N. C. State University, Raleigh, NC 27695-7629.

1:30 (99) Early Generation Selection for Early and Late Leafspot Resistance in Peanut. **W. F. Anderson***, **C. C. Holbrook** and **J. C. Wynne**. Dept. of Crop Science, North Carolina State University, Raleigh, NC, 27695-7629 and USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.

***

ACKNOWLEDGMENT

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

American Cyanamid Company
Birdsong Peanuts
Chowan Storage Company, Inc.
CIBA-GEIGY Corporation
Coastal Chemical Corporation
Dow Chemical U.S.A.
Du Pont Agricultural Products
Elanco Products Company
Ferguson Manufacturing Company, Inc.
Fermenta ASC Corporation
Gillam Brothers Peanut Sheller Inc.
Griffin Corporation
Mobay Chemical Corporation
Monsanto Agricultural Company
Neogen Corporation
N. C. Crop Improvement Association, Inc.
N. C. Foundation Seed Producers, Inc.
N. C. Peanut Growers Association, Inc.
O'Connor & Company, Inc.
Peanut Growers Cooperative Marketing Association
Planters LifeSavers Company
Pond Brothers Peanut Company, Inc.
Rhone-Poulenc Ag Company
Seabrook Blanching Corporation
Southern Peanut Company, Inc.
Uniroyal Chemical Company, Inc.
United States Gypsum Company
Valent U.S.A. Corporation
Virginia-Carolina Peanut Association, Inc.
V/C Peanut Farmers Cooperative Association

BAILEY AWARD COMMITTEE REPORT

The Bailey Award Committee met at 1:00 p.m. on July 11, 1989, in Winston-Salem, North Carolina. In attendance were F. M. Shokes, C. S. Kvien, Timothy Brenneman, and F. S. Wright. Activities for the 1988-89 year were discussed. No changes or new recommendations were proposed for 1989-90.

During the 1988 annual meeting in Tulsa, eleven nominees were selected based on their oral presentation (one from each technical paper session). Nominees who met the criteria of senior author and membership in APRES were notified of their selection on December 13, 1988. A manuscript to be judged for scientific merit, originality, clarity, and contribution to peanut science was requested by March 1, 1989. Nine manuscripts were submitted. The names of the authors and titles of these manuscripts will be published in the APRES Proceedings for 1989.

The manuscripts were judged by members of the Bailey Award Committee. The manuscript receiving the highest average score was selected for the 1989 Bailey Award.

The winner for this year's award is:

D. L. Ketring and T. G. Wheless for their paper entitled "Thermal Time Requirements for Phenological Development of Peanut Under Field Conditions."

Respectfully submitted,

F. S. Wright, Chairman
H. W. Spurr, Jr.
F. M. Shokes
C. S. Kvien
J. L. Starr
Timothy Brenneman

NOMINEES FOR BAILEY AWARD 1989

1. Agar Plate, Soil Plate and Field Evaluation of Fungicides for Activity Against Sclerotinia minor. F. D. Smith*, P. M. Phipps, and R. J. Stipes, VPI & SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.

2. Moisture Content and Storage System Effects on Peanut Quality and Milling Parameters. J. S. Smith, Jr.* and T. H. Sanders, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.

3. Postemergence Weed Control Systems without Dinoseb for Peanuts (Arachis hypogaea). J. W. Wilcut*, G. R. Wehtje, T. V. Hicks, and T. A. Cole, VPI & SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437, and Auburn U., AL 36849.

4. Comparative Effects of a Protectant vs. a Sterol Inhibiting Fungicide on Disease Components of Late Leafspot of Peanut. F. W. Nutter, Jr.* and J. L. Labrinos, Dept. of Plant Pathology, U. of Georgia, Athens, GA 30602.

5. Thrips Control Regimes Targeted to Reduce Tomato Spotted Wilt Virus on Peanut. J. R. Weeks*, T. P. Mack, J. C. French, and A. K. Hagan, Depts. of Entomology and Plant Pathology, Auburn U., AL 36849.

6. Sensory Evaluation of a High Oleic Acid Peanut Line. C. T. Young*, Dept. of Food Science, NC State U., Raleigh, NC 27695 and A. J. Norden, Dept. of Agronomy, U. of Florida, Gainesville, FL 32611.

7. Control of Cylindrocladium Black Rot (CBR) of Peanut with Soil Fumigants having Methyl Isothiocyanate as the Active Ingredient for Soilborne Disease Control. P. M. Phipps, VPI & SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.

8. Thermal Time Requirements for Phenological Development of Peanut Under Field Conditions. D. L. Ketring* and T. G. Wheless. USDA-ARS, Dept. of Agronomy, Okla. State U., Stillwater, OK 74078.

9. Variability in Growth Characteristics of Peanut Lines. D. A. Knauft* and D. W. Gorbet, Dept. of Agronomy, U. of Florida, Gainesville, FL 32611 and Marianna, FL 32446.

10. Electrophoretic Comparison of Cotyledonary Proteins from Kernels of Fourteen Peanut Cultivars Colonized by Aspergillus spp. for Different Periods. J. B. Szerszen* and R. E. Pettit, Dept. of Plant Pathology and Microbiology, Texas A&M U., College Station, TX 77843.

11. Effect of Rhizobium Inoculation and Nitrogen Fertilizer on Peanut in Oklahoma. J. R. Sholar* and G. Turpin, Dept. of Agronomy, Okla. State U., Stillwater, OK 74078.

Note: Nos. 6 and 11 did not submit a manuscript.

FELLOWS COMMITTEE REPORT

"Fellow" award nominations were received for two respected APRES colleagues in our society: Dr. Darold Ketring, Plant Physiologist, USDA-ARS, Stillwater, OK; and Dr. Morris Porter, Plant Pathologist, and Research and Location Leader, USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA.

Copies of the nominations and supporting letters were reviewed and scored for the categories specified in the printed instructions. The Fellows Committee was unanimous in their recommendation and strongly encouraged the Board of APRES to honor Dr. Darold Ketring and Dr. Morris Porter as Fellows in the American Peanut Research and Education Society.

Respectfully submitted,

Olin D. Smith, Chairman
Allen Allison
J. W. Dickens
J. Frank McGill
Donald H. Smith
Clyde T. Young

BIOGRAPHICAL SUMMARY OF FELLOWS RECIPIENTS

DR. D. MORRIS PORTER, Research Leader, Location Coordinator, and Supervisory Plant Pathologist, located at the Tidewater Agricultural Experiment Station, Suffolk, Virginia, with the Peanut Production, Diseases, and Harvesting Research Unit, USDA, ARS, has been actively engaged in research on diseases of peanut and peanut pod mycoflora for more than 23 years. He has authored or co-authored more than 127 scientific papers, books, and abstracts. His research has dealt with most phases of host-parasite relationships in peanut diseases and with the occurrence of mycotoxin producing fungi in peanut. Results of Dr. Porter's studies have provided a sound basis for selecting the best cultural practices, crop rotations, non-host crops, tillage methods, resistant varieties, and chemical controls for suppression of diseases in peanut. His scholarly ability is recognized by his professional societies. He was appointed senior editor for the Compendium of Peanut Diseases published by the American Phytopathological Society and designated senior author of the chapter on peanut plant diseases in the book Peanut Science and Technology published by the American Peanut Research and Education Society.

Dr. Porter has served the peanut industry and his profession through activities in the Peanut Improvement Working Group, American Peanut Research and Education Society (APRES), and the American Phytopathological Society. In addition to serving as president-elect (1986) and president (1987) of APRES he has served as chairman and/or member of numerous committees since APRES was organized. He has also served as an associate editor of Peanut Science.

Dr. Porter's work is highly regarded on a national and international basis. He is consulted by industry, producers, and the scientific community on problems related to crop diseases. He gives presentations each year to state, regional, and national groups concerning peanut diseases and their control. He has been invited to discuss peanut disease control and research with visitors from countries including Canada, Japan, West Germany, Australia, Venezuela, Argentina, Egypt, South Africa, Israel, and People's Republic of China. He has presented invitational lectures at an ICRISAT groundnut workshop in India and at the International Congress of Plant Pathology meetings in Japan and Australia. Dr. Porter received a Certificate of Merit from the United States Department of Agriculture for initiating a successful peanut germ plasm exchange with scientists in the People's Republic of China.

Dr. Porter's outstanding accomplishments in peanut research and education along with his leadership abilities, have been recognized by the USDA, ARS with his appointment as Research Leader and Location Coordinator in 1981.

DR. DAROLD L. KETRING has been involved in peanut physiology research for 22 years as a USDA scientist in Texas and Oklahoma. His work and its application has spanned the range from basic understanding of hormonal relationships, growth and development, and stress physiology to applying that knowledge to practical problems of seed germination, selection criteria for stress resistance, and crop growth modeling. He has authored or co-authored 80 publications, including four book chapters, and has made 35 presentations at regional, national, and international meetings.

Dr. Ketring has contributed greatly to the success of the American Peanut Research and Education Society. He has served on the Public Relations Committee, Technical Program Committee, Finance Committee, Fellows Committee, Bailey Award Committee, Local Arrangements Committee, and Publications and Editorial Committee. He has chaired the Ad Hoc Committee on the publication of PEANUT RESEARCH and Finance Committee. He has served as USDA representative to the Board of Directors and on the Ad Hoc committee to Study the Composition of the Board of Directors. He has attended 21 annual meetings of APRES, presenting 19 papers.

The statistics cannot, however, convey the kind of person Darold Ketring is. His quiet efficiency is known to all who have worked with him. He is disciplined and selective in how he obligates his time and gets the job done in an excellent manner. He is a gentleman in the finest sense of the word. To quote his nominators: "He gets more done with less noise and hand-waving than anyone I know." "He is a fine scientist, a considerate man, and personifies all the qualities we look for in individuals we select for this high honor."

SITE SELECTION COMMITTEE REPORT

The 1990 annual meeting will be held July 10-13, 1990 in Stone Mountain, Georgia at the Evergreen Conference Center and Resort. The 1991 annual meeting will be held July 9-12, 1991 in San Antonio, Texas. The 1992 annual meeting will be held in Norfolk, Virginia.

Respectfully submitted,

G. A. Sullivan, Chairman
N. L. Sugg
A. J. Csinos
R. J. Lynch
T. A. Lee
C. E. Simpson
F. S. Wright
B. Birdsong

CAST LIAISON REPRESENTATIVE REPORT

The Board of Directors meeting for the Council for Agricultural Science and Technology (CAST) was held February 21-23, 1989 in Washington, D. C. The Board of Directors approved the formation of several new task forces to address important issues. These task forces will address the following topics:

1. Agriculture and Groundwater Quality
2. Dietary Lipids: Animal and Plant
3. Quality of U. S. Agricultural Products
4. Reregistration of Agricultural Chemicals

CAST has recently released the task force report on "Ionizing Energy in Food Processing and Pest Control: II. Applications". The following task force reports are expected to be released soon:

1. Application of Risk Assessment to Agricultural and Food Issues
2. Ecological Impacts of Federal Conservation and Cropland Reduction Programs
3. Economic and Health Risks Associated with Mycotoxins
4. Risk/Benefit Assessment of Antibiotics Use in Animals

Dr. Virgil Hayes, University of Kentucky, became the new President of CAST. Dr. James Oblinger, North Carolina State University, is the new President-elect.

APRES members are encouraged to submit proposals for task forces or issues that should be brought before the CAST board. Individual membership in CAST ($20.00 annual membership fee) is also encouraged. Through the development of technical reports, CAST is providing the nations decision-makers with unbiased information that is unavailable from other sources.

Respectfully submitted,

J. Ronald Sholar
CAST Representative

AMERICAN SOCIETY OF AGRONOMY
LIAISON REPRESENTATIVE REPORT

The 80th annual meeting of the American Society of Agronomy, Crop Science Society of America, and the Soil Science Society of America was held November 27 to December 2, 1988 in Anaheim, California. About 2,250 papers were presented in approximately 256 divisional sessions. Nearly 45% were again given as posters. Six peanut posters were presented in a breeding session. Members of APRES were authors or co-authors on some 13 total presentations involving various aspects of peanut research.

New officers of the Tri-Societies (ASA, CSSA, and SSSA) are as follows: E. S. A. Runge, president and A. A. Baltonspesger, Pres.-elect of ASA; C. O. Qualset, president and S. A. Eberhart, Pres.-elect of CSSA; and J. J. Mortvadt, president and W. R. Garner, Pres.-elect of SSSA. Las Vegas, Nevada will host the 1989 meetings of these three sister societies from October 15 thru 20.

Respectfully submitted,

William D. Branch

NATIONAL PEANUT COUNCIL
RESEARCH AND EDUCATION AWARD ADVISORY COMMITTEE REPORT

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

The recipient for the 1989 NPC Research and Education Award was identified as Mr. R. Walton Mozingo of Virginia.

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

Respectfully submitted,

Gale A. Buchanan, Chairman
A. H. Allison
J. Frank McGill
Robert K. Howell
Patrick Phipps
Richard Cole

REPORT OF REPRESENTATIVE FROM THE
SOUTHERN AGRICULTURAL EXPERIMENT STATION DIRECTORS

The spring meeting of the Southern Agricultural Experiment Station Directors was held in May of 1989 in Huntsville, Alabama. This year's meeting was hosted by the Alabama Agricultural Experiment Station.

The Southern Agricultural Experiment Station Directors continue to have a special and high level of interest in the American Peanut Research and Education Society. They are concerned about peanut research as well as other facets of the peanut industry.

Of special interest is the concern over the loss of experimental quota for peanuts involved in research. An effort is being made by the Directors to include wording in the next farm bill to provide for such experimental quota. The Experiment Station Directors will be following up on this endeavor. There was also some sentiment for including peanuts as a commodity for consideration in the regional IPM program. However, this matter was defeated, but I will continue to bring this issue up for consideration by the directors.

Respectfully submitted,

Gale A. Buchanan

AD HOC COMMITTEE TO EVALUATE THE BYLAWS REPORT

Members of this committee are Olin Smith, Craig Kvien, James Kirby, Charles Swann, and Fred Cox, chairman. They were charged this year by the president to study the guidelines and format for the selection of Fellows of our society. This was done by correspondence and the members agreed that the following changes should be made:

1. Reducing the maximum number of Fellows that can be elected annually from six to three.

2. Reducing the number a person may nominate from two to one.

3. Reducing the number of supporting letters required from five to three, but not allowing the nominator to write one of them.

4. Deleting the paragraph on the Fellows Committee in the former Announcement as the committee is now described in the Bylaws.

5. Defining the responsibility of the Fellows Committee to include giving a score and a recommendation on each nominee.

6. Including the point system in the Format.

7. Putting reference to publications just in the research and Extension fields.

During the presentation of the report to the Board there was a discussion on the vote of the Board required for election. This was changed by the Board from 3/4 to a simple majority that must vote in favor of a nominee for election to fellowship. With this change, the report was accepted. New "Guidelines for FELLOW ELECTIONS" and "Format for FELLOW NOMINATIONS" will be printed in the PROCEEDINGS. Copies will also be available from the Executive Officer and the chairman of the Fellows Committee. Announcements of where to obtain this information should also be made in PEANUT RESEARCH.

Respectfully submitted,

Fred Cox, Chairman
O. Smith
C. Kvien
J. Kirby
C. Swann

APRES AWARD FOR EXCELLENCE IN EXTENSION AND RESEARCH
SPONSORED BY VALENT U.S.A.

The award will recognize an individual or team for excellence in Extension or research. The award may recognize an individual (team) for career performance or for an outstanding current achievement of significant benefit to the peanut industry. The award will alternate annually between Extension and research nominees. This award will be rotated with the National Peanut Council's Research and Education Award. In the years that the NPC award recognizes a research recipient, the Valent award will recognize an Extension recipient; and vice versa. The recipient will receive a plaque and a $1,000.00 cash award.

Eligibility of Nominees

Nominees must be active members of the American Peanut Research and Education Society and must have been active members for at least five years. The nominee must have made outstanding contributions to the peanut industry through Extension or research programs.

Eligibility of Nominators

Nominators must be active members of the American Peanut Research and Education Society. Members of the selection committee for the Valent award 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 following the same format as the APRES Fellows nominations. A nominator's submittal letter summarizing the significant professional achievements and their impact on the peanut industry may be submitted with the nomination. A maximum of three supporting letters may be submitted with the nomination. Supporting letters may be no more than one page in length. Nominations must be received by the Chairman of the Selection Committee on or before February 1 of each year.

Selection Committee

The APRES President has responsibility for appointing the selection committee. It is recommended that the committee consist of seven members and be appointed to three year terms after the initial appointments. The President will appoint two or three new members each year. If a sponsor representative serves on the selection committee, the sponsor representative can never serve as chairman of the committee.

AD HOC COMMITTEE TO ESTABLISH THE COYT T. WILSON SERVICE AWARD REPORT

This committee was appointed by the President to study and make recommendations concerning establishing a COYT T. WILSON SERVICE AWARD. A request was made to the Board of Directors at the 1988 meeting to establish this award in honor of Dr. Coyt T. Wilson who had contributed so much service to this organization in its formative years. He was a leader and advisor until his retirement in 1976.

Some guidelines for this award were suggested as follows:

1. The COYT T. WILSON SERVICE AWARD shall be presented annually to a member of the American Peanut Research and Education Society who has given of their time freely and contributed outstanding service to the organization.
2. Nominations for this award shall be made by an active American Peanut Research and Education Society member and shall be based on two or more years of outstanding service to the American Peanut Research and Education Society. The nomination must be endorsed by a member of the Board of Directors.
3. A five-member selection committee shall be appointed by the President of the American Peanut Research and Education Society and shall be composed of active American Peanut Research and Education Society members from each of the three production areas representing:

    a. Research and Extension - 3 members
    b. Industry - 2 members

4. The award shall be a bronze and wood plaque. This award, purchased by the American Peanut Research and Education Society, will be presented at the society's annual meeting.

This recommendation and guidelines were presented to the Board of Directors and approved with the suggestions that the President appoint an implementation committee to refine the guidelines for nominations and the selection procedure. The first award will be presented at the 1990 meeting.

Respectfully submitted,

Walton Mozingo, Chairman
Dallas Hartzog
Charles Simpson
John Baldwin

AD HOC COMMITTEE TO STUDY THE COMPOSITION OF THE BOARD OF DIRECTORS REPORT

After studying the current composition of APRES and the current composition of the APRES Board of Directors, this committee suggests that APRES consider adding two positions to the Board of Directors. Both of the positions would be in the area of "state employee representatives," giving three Board positions in this category. The positions could be set-up to be filled on a staggering schedule (one per year), each to serve a three year term, as are other Board positions. This change will need to be submitted to the membership, if the Board approves. This change will bring the composition of the APRES Board of Directors more in line with our membership.

Respectfully submitted,

D. W. Gorbet, Chair
M. K. Beute
W. D. Branch
G. W. Harrison
D. L. Ketring

AD HOC COMMITTEE TO IMPLEMENT THE JOE SUGG AWARD REPORT

The Joe Sugg Award Committee, an ad hoc committee appointed to implement the Joe Sugg Award at the 1989 APRES annual meeting, adapted the attached guidelines for implementation of the award. The call for papers for 1989 included an announcement of a graduate student award to be competed for during 1989. Nine papers were received by the technical committee and have been assigned to a special session for competition during the 1989 meetings.

The recipients of the first annual Joe Sugg Graduate Student Award were:

1st place-- R. M. Cu for this presentation titled "New advisory model for fungicide application to control early leafspot in Virginia"

2nd place-- F. D. Smith for his presentation titled "Assessment of resistance to Iprodione in sclerotial populations of Sclerotinia minor"

The 1st place winner will receive a certificate and a check for $200.00, and the 2nd place winner will receive a certificate and a check for $100.00.

Respectively submitted:

Johnny C. Wynne, Chairman
David Knauft
A. M. Schubert

JOE SUGG GRADUATE STUDENT AWARD

1. The Joe Sugg Award competition at the annual APRES meetings shall be open to graduate students who are senior authors on a paper submitted in response to the Technical Program Committee's call for papers. The award will include certificates for first and second place winners and a check for $200 for the first-place winner and $100 for the second-place winner.

2. A special session for presentation of submitted papers will be organized by the Technical Program Committee. Presentations will include all disciplines and will be scheduled to avoid conflict with regular APRES paper sessions.

3. A five-member committee composed of APRES members shall be appointed by the president of APRES to judge the presentations. No member of the selection committee shall be an author of any of the papers to be presented nor shall a member of the selection committee be a member of the graduate committee of any of the participants. If a conflict exists, the president will appoint an alternative committee member.

4. The Committee will select first- and second-place winners using criteria similar to that used for the Bailey Award except only the abstract and oral presentation will be considered. Selection will occur during the APRES meetings before the APRES business meeting.

5. The winners will be announced and recognized by the president of APRES at the annual business meeting of APRES.

6. The checks and certificates will be mailed to the winners by the executive officer of APRES as soon as possible after the annual meetings.

Guidelines for

FELLOW ELECTIONS

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

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 the APRES Board of Directors are ineligible for nomination.

Nomination Procedures

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

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

Deadline Date. The deadline date for receipt of the nominations by the chairman shall be January 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 a 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

FELLOW NOMINATIONS

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

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 U.S.A.

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 U.S.A. (describe).

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

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

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

Length of Articles Published in Peanut Science

Year	Number of Articles	Number of Pages		
		Mean	Maximum	Minimum
1974	25	3.92	8.00	2.00
1975	22	4.05	8.50	2.00
1976	23	3.98	6.50	2.00
1977	19	3.88	6.00	1.00
1978	28	3.62	9.00	2.00
1979	29	3.80	9.00	2.00
1980	29	3.96	6.75	2.00
1981	35	3.79	8.00	1.50
1982	30	3.29	5.00	2.00
1983	32	3.45	5.25	2.00
1984	32	3.38	6.00	1.50
1985	24	3.86	6.00	1.50
1986	27	3.49	6.50	2.00
1987	26	3.90	5.25	2.25
1988	26	4.02	6.25	1.25

APRES MEMBERSHIP (1975-1988)

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

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

ARTICLE I. NAME

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

ARTICLE II. PURPOSE

Section 1. The purpose of the Society shall be to instruct and educate the public on the properties, production, and use of the peanut through the organization and promotion of public discussion groups, forums, lectures, and other programs or 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 division or sections with individual member rights accorded each sustaining membership.

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

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

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

ARTICLE IV. DUES AND FEES

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

a. Individual memberships	: $ 25.00
b. Institutional memberships	: $ 15.00
c. Organizational memberships	: $ 35.00
d. Sustaining memberships	: $ 125.00
e. Student memberships	: $ 5.00

(Dues were set at 1987 Annual Meeting)

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

Section 3. A registration fee approved by the Board of Directors will be assessed at all regular meetings of the Society. The registration fee for student members shall be one-third that of members.

ARTICLE V. MEETINGS

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

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

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

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

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

ARTICLE VI. QUORUM

Section 1. Forty voting members shall constitute a quorum for the transaction of business at the business meeting held during the annual meeting.

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

ARTICLE VII. OFFICERS

Section 1. The officers of this Society shall consist of the president, the president-elect, the immediate surviving past-president and the executive officer of the Society, who may be appointed secretary and treasurer and given such other title as may be determined by the Board of Directors.

Section 2. The president and president-elect shall serve from the close of the annual general meeting of this Society to the close of the next annual general meeting. The president-elect shall automatically succeed to the presidency at the close of the annual general meeting. If the president-elect should succeed to the presidency to complete an unexpired term, he shall then also serve as president for the following full term. In the event the president or president-elect, or both, should resign or become unable or unavailable to serve during their terms of office, the Board of Directors shall appoint a president, or both president-elect and president, to complete the unexpired terms until the next annual general meeting when one or both offices, if necessary, will be filled by normal elective procedure. The most recent available past president shall serve as president until the Board of Directors can make such appointment.

Section 3. The officers and directors, with the exception of the executive officer, shall be elected by the members in attendance at the annual general meeting from nominees selected by the Nominating Committee or members nominated for this office from the floor. The president, president-elect, and surviving past-president shall serve without monetary compensation. The executive officer shall be appointed by a two-thirds majority vote of the Board of Directors.

Section 4. The executive officer may serve consecutive yearly terms subject to appointment by the Board of Directors. The tenure of the executive officer may be discontinued by a two-thirds majority vote of the Board of Directors who then shall appoint a temporary executive officer to fill the unexpired term.

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

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

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

ARTICLE VIII. BOARD OF DIRECTORS

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

a. The president
b. The most immediate past president able to serve
c. The president-elect
d. State employees' representative - this director is one whose employment is state sponsored and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits.
e. United States Department of Agriculture representative - this director is one whose employment is directly sponsored by the USDA or one of its agencies, and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits.
f. Three Private Peanut Industry representatives - these directors are those whose employment is privately sponsored and whose principal activity with peanuts concerns: (1) the production of farmers' stock peanuts; (2) the shelling, marketing, and storage of raw peanuts; (3) the production or preparation of consumer food-stuffs or manufactured products containing whole or parts of peanuts.
g. The President of the National Peanut Council
h. The Executive Officer - non-voting member of the Board of Directors who may be compensated for his services on a part-time or full-time salary stipulated by the Board of Directors in consultation with the Finance Committee.

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

Section 3. The Board of Directors shall determine the time and place of regular and special meetings and may authorize or direct the president to call special meetings whenever the functions, programs, and operations of the Society shall require special attention. All members of the Board of Directors shall be given at least 10 days advance notice of all meetings; except that in emergency cases, three days advance notice shall be sufficient.

Section 4. The Board of Directors will act as the legal representative of the Society when necessary and, as such, shall administer society property and affairs. The Board of Directors shall be the final authority on these affairs in conformity with the By-Laws.

Section 5. The Board of Directors shall make and submit to this Society such recommendations, suggestions, functions, operations, and programs as may appear necessary, advisable, or worthwhile.

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

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

ARTICLE IX. COMMITTEES

Section 1. Members of the committees of the Society shall be appointed by the president and shall serve three-year terms unless otherwise stipulated. The president shall appoint a chairman of each committee from among the incumbent committeemen. The

Board of Directors may, by a two-thirds vote, reject committee appoints. Appointments made to fill unexpected vacancies by incapacity of any committee member shall be only for the unexpired term of the incapacitated committeeman. Unless otherwise specified in these By-Laws, any committee member may be re-appointed to succeed himself, and may serve on two or more committees concurrently but shall not hold concurrent chairmanships. Initially, one-third of the members of each committee will serve one-year terms, and one-third of the members of each committee shall serve two-year terms, as designated by the president. The president shall announce the committees immediately upon assuming the office at the annual business meeting. The new appointments take effect immediately upon announcement.

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

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

b. Nominating Committee: This committee shall consist of at least three members appointed to one-year terms, one each representing State, USDA, and Private Business segments of the peanut industry. This committee shall nominate individual members to fill the positions as described and in the manner set forth in Articles VII and VIII of these By-Laws and shall convey their nominations to the president of this Society on or before the date of the annual meeting. The committee shall, insofar as possible, make nominations for the president-elect that will provide a balance among the various segments of the industry and a rotation among federal, state, and industry members. The willingness of any nominee to accept the responsibility of the position shall be ascertained by the committee (or members making nominations at general meetings) prior to the election. No person may succeed himself as a member of this committee.

c. Publication and Editorial Committee: This committee shall consist of at least three members for three-year terms, one each representing State, USDA, and Private Business segments of the peanut industry. The members will normally serve two consecutive three-year terms, subject to approval by the Board. Initial election shall alternate from reference years as follows: private business, 1983; USDA, 1984 and State, 1985. This committee shall be responsible for the publication of Society-sponsored publications as authorized by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

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

e. Public Relations Committee: This committee shall include at least seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from the university of the host state who will serve a one-year term to coincide with the term of the president-elect. The primary purpose of this person will be to publicize the meeting and make photographic records of important events at the meting. 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 person recognized at the meeting for significant achievements.

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

(3) Necrology: Proper recognition of deceased members.

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

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

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

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

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

ARTICLE X. DIVISIONS

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

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

Section 3. Divisions may make By-Laws for their own government, provided they are consistent with the rules and regulations of the Society, but no dues may be assessed. Divisions and Subdivisions may elect officers (chairman, vice-chairman to succeed to the chairmanship, and a secretary) and appoint committees, provided 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 Business
Meeting of the American Peanut
Research and Education Society,
July 17, 1987, Orlando, FL

MEMBERSHIP SUMMARY

Individual	415
Student	28
Organization	54
Sustaining	24
Institutional	92
TOTAL	613

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