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TABLE OF CONTENTS

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Poster Session

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ECONOMICS I

Symposium: INTERNATIONAL ISSUES FACING THE PEANUT SECTOR

PRODUCTION TECHNOLOGY I

GRADUATE STUDENT COMPETITION

PHYSIOLOGY AND SEED TECHNOLOGY/ PROCESSING AND UTILIZATION

PRODUCTION TECHNOLOGY II

Symposium: GENETIC RESOURCES FOR THE THIRD MILLENNIUM

PLANT PATHOLOGY AND NEMATOLOGY I

EXTENSION TECHNIQUES and TECHNOLOGY/EDUCATION FOR EXCELLENCE

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PLANT PATHOLOGY AND NEMATOLOGY II

BREEDING, BIOTECHNOLOGY and GENETICS I

ECONOMICS II

BREEDING, BIOTECHNOLOGY and GENETICS II

POSTER SESSION

Photoperiod Effects on Growth and Pod Maturity of Bayo Grand Peanut. K.T. INGRAM*, Department of Crop and Soil Sciences, University of Georgia, Griffin, GA 30223-1797, and R. PITTMAN, USDA-ARS, Griffin, GA 30223-1797.

Bayo Grand is a variety from Bolivia that may be an important source of pest and disease resistance for the U.S. peanut industry. Bayo Grand however, is not well adapted to the growing season of the U.S. Growth chamber research was conducted to establish whether appropriate photoperiod would hasten seed maturity of Bayo Grand with the ultimate goal to determine whether growth regulators might be used to induce flowering and pod set at a time appropriate to U.S. climate conditions. Plants were grown in 20-L containers under three photoperiods, 9, 12, and 15 hr. To minimize effects of light amount, all treatments received 9 hr of maximum light (about 1400 μmol PAR m^{-2} s^{-1}). For the 12- and 15-hr treatments, daylength was increased using low light intensity (about 300 μmol PAR m^{-2} s^{-1}) before and after the 9-hr period of maximum light. All plants were grown with day/night temperatures of 30/23 °C. Plants in the 15-hr photoperiod treatment flowered about 2 d earlier than those in the 12-hr photoperiod and 3 d earlier than those in the 9-hr photoperiod. Total leaf area was about 63% greater in plants grown under 15-hr photoperiod than the other two treatments and total leaf dry weight about 50% greater in the 15-hr treatment than the other two treatments. Pod dry weight of the 15-hr treatment, on the other hand, was about one-half that in the 12- and 9-hr treatments. Furthermore, when harvested at 120 days after germination, no pods in any treatment were mature according to their hull scrape color. Thus, it does not appear likely that photoperiod response mechanisms can be used to make Bayo Grand mature within a U.S. growing season.

Transcriptional Changes in Peanut Following Water Stress. Ashok K. Jain* and S. M. Basha, Division of Agricultural Sciences, Plant Biotechnology Program, Florida A&M University, Tallahassee, FL 32307, USA.

Peanuts have excellent potential as a food protein source because of their high protein content and world wide cultivation. However, late season drought and elevated soil temperature lead to pre harvest aflatoxin contamination in non-irrigated peanuts. Due to high carcinogenic nature of aflatoxins, the U.S. Food and Drug Administration does not permit food products containing more than 24-ppb aflatoxin for human consumption. In order to identify messenger RNA transcripts differentially expressed under irrigated and water stress conditions in peanut, we have used a reverse transcriptase polymerase chain reaction procedure (Differential Display). Using this method we have identified several mRNA transcripts that are up- or down-regulated following water stress. A total of 1235 differential display products were observed in irrigated samples, compared to 950 differential display products in stressed samples. Comparison of differential display products of stressed and irrigated samples demonstrated qualitative and quantitative differences in the gene expression. Several newly expressed transcripts were also observed. The differentially expressed transcripts were collectively named PTRD (Peanut Transcripts Responsive to Drought). We identified a total of 43 PTRD that are significantly altered due to water stress. Slot blot analysis of 16 PTRD indicated that 12 of these completely suppressed due to prolonged drought, two down regulated, and the other two induced under drought stress conditions. These results might be helpful in determining the plant response to water stress and the role of up and/or down regulated genes in drought-induced aflatoxin contamination of peanut.

Arachis hypogaea Germplasm Characterization using SSR Generated Markers. M.L. NEWMAN*, R.E. DEAN, M.S. HOPKINS, and R.N. PITTMAN. Plant Genetic Resources Conservation Unit and USDA, ARS, Georgia Experiment Station, Griffin, Ga. 30223-1797.

Conservation and evaluation of *Arachis* germplasm is necessary in order to maintain the genetic variation of the species and ensure the crop's future. The cultivated peanut, *Arachis hypogaea*, displays a wide range of variation in morphological traits and resistance to various diseases and insects, but demonstration of genetic variability through the use of molecular markers has been limited. Recently, seven simple sequence repeat (SSR) markers were identified and found to be successful in detecting genetic variation in the cultivated peanut. The purpose of the present study was to use these seven SSR markers to evaluate the within accession variation in a selected group of cultivated peanut accessions and to determine the ability of the seven SSR markers to separate cultivars at the varietal level of classification as proposed by Krapovickas and Gregory. Accessions chosen for the study include 25 from *Arachis hypogaea* var. *hirsuta*, 12 from var. *peruviana*, and two from each variety of *hypogaea, vulgaris, fastigiata,* and *aequatoriana*. The phenogram derived from the SSR data seems to indicate that the accessions cluster together better according to geographical location rather than botanical variety. This suggests that more genetic variability may be found by selecting from different geographic areas rather than basing selection on botanical variety. Many accessions had very low within accession variation based on the SSR data generated. This result is desired since it demonstrates that the homogeneity of an accession is high. There were some accessions, however, that were not genetically homogenous and may represent mixed seed. The fact that the cultivated peanut is a tetraploid makes data analysis challenging as most software programs are designed for diploid species. Work is currently underway to overcome the problem by utilizing different alternatives in the data analysis and by sequencing the SSR fragments to aid in the analysis. It is imperative for peanut curation that more SSR markers be discovered in order to maximize the discerning power of the marker set thus improving the core collection.

Peanut Selection Program at The University of Chapingo. III. Pod and Seed Yield during a Three-Year Trial of Virginia Type Peanuts. S. SANCHEZ-DOMINGUEZ* and D. SANCHEZ-DOMINGUEZ. Departamento de Fitotecnia, Universidad Autónoma Chapingo, Chapingo Méx., Centro de Bachillerato Tecnológico Agropecuario #9, Xoxocotla Mor., México.

Southern México is the main rain-fed peanut growing area in the country (States of Morelos, Puebla, Guerreo, Oaxaca and Ciapas, 80,000 acres), with relatively low pod yield (1.3 tons/ha), except in Oaxaca where pod yields average 2.0 ton/ha. Factors like poor soils, low rain (160-240 in.) and landrace genotypes, among others, are responsible for the low yields. In the summer of 1996 a preliminary test of 49 Virginia-type peanut genotypes was established at San Marcos Cuauchi, Morelos (800 m over sea level; 600-800 mm rain). Thirty-six materials were selected on the basis of disease resistance, pod size, number and distribution, as well as yield. Further evaluations of these genotypes were carried out in the same locality but in different soil types during the period of 1997-1999. Manfredi #2 was the best pod-yielding cultivar, with 364.8 g/10 plants (p), but did not differ statistically from other genotypes; 283.9 g/10 p was the average yield for all materials. The following year there was a pod-yield average of 324.3 g/10 p, ranging from 506 g/10 p in cv. C. 23 Pue to 196.5 g/10 p in C. 24 Gro., with statistically significant differences among genotypes. In 1999, a mean of 540 g/10 p was recorded, with the highest pod-yield by the variety C. 45 Mor. (726.7 g/10 p), and the lowest by cv C. 24 Gro (363.3 g/10 p), with no statistical differences among treatments. The highest yields in 1999 were a consequence of better rains than in the previous years. Variety GP-NC-343, from USA, which ranked among the ten best materials, showed good stability among the three growing seasons. In relation to seed production, statistical differences were not detected in the 3-yrs. Nevertheless, C. 23 Pue yielded the highest, with 233.7 and 293.7 g/10 p in 1997-1998, respectively, and C.-1230-SSD-DEW in 1999 with 406.8 g/10 p. These data suggest a genotype X environment interaction for the parameters considered. However, a trend was not clear among varieties on seed and pod production, with the exception of C. 23 Pue, which performed better than expected. The local control Criollo de Ahuehuetzingo behaved near or below average on seed and pod dry weight.

A Field Survey for Tospoviruses in Georgia Peanut. M.L. WELLS*, A.K. CULBREATH, H.R. PAPPU, AND J.W. TODD. Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

Tomato spotted wilt virus (TSWV) is a major disease affecting peanut, tobacco, and vegetable crops in Georgia. During the 1998 growing season, *Impatiens necrotic spot virus* (INSV) was detected in Georgia peanut fields as well. A late-season survey of growers' fields from fifteen counties in Georgia was undertaken from 23 August-30 August 1999. Root samples from twelve plants exhibiting tospovirus-like symptoms (chlorosis, wilting, necrotic internal taproot, and crown) were taken from each field. Plants were bagged separately and placed in a cooler on ice for transport back to the laboratory at the University of Georgia Coastal Plain Experiment Station. Root samples were tested for TSWV and INSV using enzyme-linked immunosorbant assay (ELISA). Of 504 total peanut plants sampled, 86% tested positive for TSWV and no plants tested positive for INSV. The highest percentages of plants testing positive for TSWV were collected from fields in the southwestern corner of Georgia. Although no INSV positive plants were discovered during this survey, continued monitoring is important to the proper management of spotted wilt in peanut.

Evaluation of Economic Thresholds for Control of Leafhoppers in Peanut S.L. BROWN*, and J.W. TODD. Department of Entomology, University of Georgia, Tifton, GA 31793

Several different species of leafhopper (Cicadellidae sp.) feed on peanuts in Georgia, the most common of which is the potato leafhopper, *Empoasca fabae*. Feeding results in a characteristic pattern of leaf yellowing known as "hopper burn". Leafhoppers can be found in most Georgia peanut fields, but the extent of injury is highly variable among fields and from year to year. The impact of leafhopper feeding on peanut yield is poorly documented, but in cases of severe yellowing, many growers chose to apply foliar insecticides. An experiment was conducted in 1999 to test various thresholds for insecticide treatments, including at-plant treatments and foliar treatments applied at first occurrence of immature leafhoppers, first occurrence of hopper burn and 30% of leaflets showing hopper burn. Phorate was applied in-furrow and acephate was applied as a hopper box treatment. Acephate and lamda-cyhalothrin were used for foliar treatments. Peanuts were planted on April 21, the first immature potato leafhoppers were found on June 1 and the first hopperburn was noted on June 8. Thirty percent leaflet damage occurred on July 1 in previously untreated plots and on August 11 in plots that were treated at first occurrence of hopperburn. The percentage of leaflets showing hopper burn was recorded on July 1, July 21 and August 10. All treatments reduced final severity of hopper burn compared to the untreated check. At-plant treatments of phorate and acephate both significantly increased yields, but yields from plots receiving foliar sprays, regardless of time of application, were not significantly different from the untreated check.

Tillage and Chlorpyrifos Treatment Effects on Peanut Arthropods - An Incidence of Severe Burrower Bug Injury. J.W. CHAPIN*, J.S. THOMAS and P.H. JOOST. Department of Entomology, Clemson University, Edisto Res. & Ed. Center, Blackville, SC 29817.

A 2-yr study was conducted on the effects of tillage and soil insecticide (chlorpyrifos) treatment on pest and beneficial arthropods of peanut. A 3x2 split-plot experiment with five replicates was subjected to factorial ANOVA. Main plot treatments consisted of three tillage systems: conventional moldboard plow, strip-tillage into a killed wheat cover crop, and strip-tillage into corn stubble residue. Subplot insecticide treatments were granular chlorpyrifos applied at early pegging (growth stage R2) and untreated. Red imported fire ant, *Solenopsis invicta* (Hubner), was the dominant predator and fire ants were less abundant in conventional tillage. Chlorpyrifos virtually eliminated fire ants in all systems. Populations of lesser cornstalk borer, *Elasmopalpus lignosellus* (Zeller); granulate cutworm, *Agrotis subterranea* (Fabricius); and corn earworm, *Helicoverpa zea* (Boddie), were lower in strip-tillage systems. Chlorpyrifos applications caused corn earworm and granulate cutworm outbreaks in all tillage systems, but these applications were more disruptive in strip-tillage. Elaterid adults were more abundant in conventional tillage; but there was no consistent tillage effect on wireworm levels, and pod damage was not affected by tillage. Chlorpyrifos suppressed elaterids and pod damage in all systems. Threecornered alfalfa hopper, *Spissistilus festinus* (Say), damage was higher in wheat residue. Chlorpyrifos treatment reduced threecornered alfalfa hopper damage in all systems. Spider mite injury was not affected by tillage, but chlorpyrifos caused mite outbreaks in all tillage systems. Burrower bug, *Pangaeus sp.*, injury to peanut kernels was higher in the strip-tillage systems in 1999 and this injury was suppressed by chlorpyrifos treatment. Yield was not affected by tillage in either year, and chlorpyrifos had no effect on yield in 1998. However, in 1999 chlorpyrifos increased yield in both strip-tillage systems. Neither tillage nor insecticide treatment affected grade (%TMK) in 1998, but in 1999 grade was highest in conventional tillage and grade was improved by chlorpyrifos treatment in strip-tillage systems. Crop value losses of $101/ac and $157/ac in untreated corn and wheat residue strip-tillage systems, respectively were attributed to burrower bug injury in 1999. This injury may have been an anomaly of extreme drought conditions, but given the economic impact, burrower bug merits further study in conservation tillage peanut.

Southern Corn Rootworm Management in Peanut: A Review of Progress, Problems and Possibilities. D.A. HERBERT, Jr.* and R.L. BRANDENBURG. Tidewater Agric. Res. & Ext. Ctr., Virginia Polytechnic Institute and State University, Suffolk, VA 23851 and Department of Entomology, North Carolina State University, Raleigh, NC 27695.

The southern corn rootworm (SCR), *Diabrotica undecimpunctata howardi* Barber, is a primary pest of peanut in the United States. Larvae feed on developing pods causing direct yield loss, or causing indirect loss by allowing entry of secondary pathogens. Current management is based on preventive application of soil insecticides against larval populations. The development of alternative management strategies has been difficult as SCR undergoes several overlapping generations each year, adults feed on hundreds of different host plant species, and larvae, which feed underground, are difficult to detect. Evaluating control options (1988-1990) showed that earlier application of insecticides (at-flowering versus traditional at-pegging time) provided larval control with less damage to vines during application. Adult trapping experiments (1993-1994) showed that two adult peaks occurred during the season (16 to 23 June and 21 to 28 July). The second peak preceded the period of peak pod damage by 2 to 2 ½ weeks. Traps baited with the sex pheromone, 10-methyl-2-tridecanone, caught more adults, but trap catch was poorly related to pod damage. TIC (1,2,4-trimethoxybenzene, indole, and trans-cinnamaldehyde) or trans-cinnamaldehyde baited traps caught more females but failed to detect the second adult peak. Efforts to control adults (1992-1994) using bait formulations (corncob grit impregnated with TIC, cucurbitacins, and carbaryl as a toxicant) had poor efficacy and failed to reduce pod damage. Field cage studies (1989-1991) showed a significant relationship of soil texture and drainage class to level of pod damage, with damage increasing as loam content increased and as drainage decreased. A risk index was developed (1997) to help determine the need for insecticide treatments by predicting relative level of pod damage. It uses factors that affect SCR survival and its ability to inflict pod damage including soil texture, soil drainage class, variety, planting date, and field history of crop damage. A total of 198 index validations in producers' fields from 1989-1999 showed that the index was accurate in estimating relative level of pod damage in 55% of the cases, rarely (only 4% of the cases) underestimated pod damage, but overestimated in 41% of the cases. Discussion of possible solutions will be presented.

Weed Control in Texas Peanut with Strongarm and Dual Magnum Combinations. T.A. BAUGHMAN*, P.A. DOTRAY, W.J. GRICHAR, J.W. KEELING, R.G. LEMON, E.P. PROSTKO, B.L. PORTER, B.A. BESLER, K.D. BREWER, V.B. LANGSTON, and R.B. LASSITER. Texas Agricultural Extension Service, Vernon, Lubbock, and College Station; T.A.E.S., Yoakum and Lubbock; University of Georgia, Tifton and Dow Agro Sciences, The Woodlands, TX, and Little Rock, AR

There is considerable grower interest in Texas for the potential use of Strongarm (diclosulam) as part of an overall weed management program. Trials were established in Central, North, South, and West Texas to evaluate crop tolerance and yellow nutsedge (Cyperus esculentus) efficacy. Strongarm was applied preemergence alone or followed by a postemergence application of Dual Magnum (metolachlor). Entireleaf morningglory (Ipomoea hederacea var. integriuscula) control was evaluated at a second location in Central Texas. Prior to the POST applications, peanut injury was less than 10% at all locations. Injury was less than 10% mid-season at all locations with the exception of Strongarm applied at 0.45 oz/A in West Texas. However, this injury was no longer visible late season. With the exception of North Texas and Strongarm at 0.15 oz/A in South Texas, yellow nutsedge control was greater than 80% prior to the POST applications. Yellow nutsedge control was less than 75% with Dual Magnum POST alone at all locations except late season in Central Texas (1.0 and 1.33 pt/A). Cadre (imazapic) resulted in 95, 95, and 70% late season yellow nutsedge control in Central, North, and West Texas. Mid-season yellow nutsedge control was at least 75% with Strongarm applied at 0.45 oz/A alone at all locations. Late season control was less than 75% with Strongarm applied alone except in Central Texas with the 0.3 and 0.45 oz/A rates. Increased late season yellow nutsedge control occurred at all locations when 0.15 oz/A of Strongarm was followed by 1.33 pt/A of Dual Magnum. When Strongarm at 0.3 oz/A was followed by 1.0 or 1.33 pt/A of Dual Magnum control was also increased in North, South, and West Texas. Entireleaf morningglory control was greater than 90% when Strongarm was applied alone at 0.30 or 0.45 oz/A, which was similar to the standard Cadre application. Control was less than 70% with all Dual Magnum POST applications applied alone.

Performance of diclosulam in Texas Peanut. P. A. DOTRAY*, B. L. PORTER, J. W. KEELING, T. A. BAUGHMAN, W. J. GRICHAR, E. P. PROSTKO, and R. G. LEMON. Texas Tech University, Lubbock, TX 79409-2122; Texas Agricultural Extension Service, College Station, Lubbock, Stephenville, and Vernon; and the Texas Agricultural Experiment Station, Lubbock and Yoakum.

Field studies were conducted near Lamesa, Lubbock, Olton, Plains, Stephenville, Wellington, and Yoakum, Texas to determine diclosulam efficacy on a variety of weeds in peanut. At Lubbock, Palmer amaranth (*Amaranthus palmeri*) and devil's-claw (*Proboscidea louisianica*) was controlled 81 to 95% following diclosulam at 0.024 lb ai/A applied PPI or PRE. At Olton and Plains, diclosulam applied PRE controlled Palmer amaranth 75%, and 100%, respectively. Diclosulam applied 90 days before planting controlled Palmer amaranth 85% and devil's-claw 99%. In most field experiments in 1999, peanut injury (10-20%) was observed following most diclosulam applications in 1999, but injury was not observed at the end of the season and was not reflected in yield. At Plains, diclosulam applied PRE controlled common sunflower (*Helianthus annuus*) 100% and at Wellington, diclosulam controlled smooth pigweed (*Amaranthus hybridus*) and large crabgrass (*Digitaria sanguinalis*) 95% and 18 to 63%, respectively. Large crabgrass control was improved when ethafluralin was applied PPI fb diclosulam PRE. At Stephenville, diclosulam controlled Hophornbeam copperleaf (*Acalypha ostryifolia*) 78% and 38% when applied PPI and PRE, respectively. Ethafluralin applied PPI fb diclosulam PRE controlled Hophornbeam copperleaf 81%. At Yoakum, ethafluralin plus diclosulam controlled yellow nutsedge (*Cyperus esculentus*) 53 to 73%, pitted morningglory (*Ipomoea lacunosa*) 73%, and Texas panicum (*Panicum texanum*) 78%. These tests illustrate that diclosulam has a broad spectrum of weed activity in Texas.

Sulfentrazone Use in Texas Peanut. W. J. GRICHAR*, P. A. DOTRAY, B. A. BESLER, and K. D. BREWER. Texas Agricultural Experiment Station, and Texas Agricultural Extension Service, Yoakum, TX 77995 and Lubbock, TX

Field studies were conducted in south and west Texas with sulfentrazone (F6285) during the 1997 and 1999 growing seasons for weed control and peanut response. In 1997 at one location in Frio County, sulfentrazone rates of 0.25 to 0.375 lb ai/A resulted in 18-86% peanut stunt and up to 92% yield reduction when compared with Sonalan (ethalfluralin) alone. Sand content of the soil was > 80%. Cultivar response to sulfentrazon was studied in Lavaca County where sand content of the soil was > 90%. When GK-7 and Tamrun 96 were sprayed with sulfentrazone at rates of 0.2 to 0.375 lb ai/A, GK-7 stunting ranged from 41 to 80% while stunting of Tamrun 96 ranged from 50 to 82%, 6 weeks after treatment. In 1999, sulfentrazone at rates of 0.05 to 0.2 lb ai/A applied PPI and PRE were investigated in south and west Texas. Peanut injury ranged from 0 to 72% depending on soil type. The most significant peanut injury was observed near Lorenzo on a Pullman clay loam soil (< 1% OM and pH > 8) planted to Spanish. Less than 15% peanut injury has been noted when sand content ranged from 70 to 80% and pH of 7.3. Palmer amaranth (*Amaranthus palmeri* S. Wats.), pitted morningglory (*Ipomoea lacunosa* L.), and ivyleaf morningglory (*Ipomoea hederacea* L.) control has been greater than 80% with sulfentrazone at rates as low as 0.05 lb ai/A; however, morningglory control was more consistent at Lorenzo following the 0.1 lb ai/A sulfentrazone rate. Yellow (*Cyperus esculentus* L.) and purple (*Cyperus rotundus* L.) nutsedge control have been > 90%. Annual grass control with sulfentrazone has been poor.

Effect of emergence and herbicide application timing on Florida beggarweed (*Desmodium tortuosum*) competition in peanut (*Arachis hypogoea*). T.L. GREY* and D.C. BRIDGES. Dept. of Crop and Soil Sci., The University of Georgia, Georgia Station, 1109 Experiment St., Griffin, GA 30223.
Florida beggarweed is one of the most common and troublesome peanut weeds in the Southeastern United States. Several herbicides control beggarweed in the early part of the season but mid and late-season control can be more challenging. Farmers have often complained that they cannot consistently control beggarweed with postemergence (POST) applications of chlorimuron, which because of label restrictions, cannot be applied until 60 days after peanut emergence (DAE). Depending on the efficacy of at-plant and early-postemergence (EPOT) treatments by 60 DAE, beggarweed are often taller than the 25-cm height limit set forth on the Classic label. Research was conducted to determine the effect of herbicide application timing and the date of beggarweed emergence on its competition with peanut. Experiments included comparison of beggarweed control with systems that included paraquat + bentazon, applied alone 21 DAE, or preceding application of chlorimuron at 63 DAE. Florida beggarweed emerged either on the same day as peanut or at 21 DAE. This was accomplished by rearing beggarweed seedlings in the glasshouse, which were transplanted as newly-emerged plants into the peanut field either the same day that peanuts emerged or 21 DAE. Florida beggarweed that emerged 21 DAE proved much easier to control with chlorimuron at 63 DAE than did those emerging with peanut. This is important because excellent control of emerged beggarweed is often achieved with the use of paraquat or paraquat + bentazon applied 15 to 20 DAE. Therefore, beggarweed that emerge after this initial herbicide application are easier to control with chlorimuron. Florida beggarweed that emerged with the peanut or at 21 DAE reduced peanut yield by approximately 33%. Peanut yield reductions were approximately 15 and 25% when chlorimuron was applied alone at 49 and 63 DAE, respectively. No significant yield reduction occurred when chlorimuron was applied following an EPOT application of paraquat + bentazon. Mowing beggarweed proved as effective as chlorimuron applied at either 49 or 63 DAE. Excellent Florida beggarweed control can be achieved with chlorimuron applied at 63 DAE if the treatment is targeted towards the control of plants that emerge after the initial flush is controlled using a herbicide like paraquat. Likewise, Florida beggarweed control can be improved by applying chlorimuron at 49 DAE versus 63 DAE.

Preemergence Applications of Prowl and Sonalan in Peanut. **E. P. PROSTKO* and W. C. JOHNSON, III. Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793 and USDA/ARS, Tifton, GA.**
The foundation of peanut weed management programs has focused around the use of preplant incorporated applications (PPI) of the dinitroaniline herbicides such as Prowl (pendimethalin) and Sonalan (ethalfluralin). Recent label changes of these products permit their use as premergence (PRE) applications when followed by irrigation or rainfall within 48 hours after application. Research was conducted in south Georgia from 1997-1999 to compare the effectiveness of traditional PPI applications of Prowl or Sonalan to PRE applications incorporated with irrigation systems. Results indicated that PRE applications followed by irrigation were equally as effective as PPI applications in controlling Texas panicum (*Panicum texanum*), southern crabgrass (*Digitaria cilaris*), and crowfootgrass (*Dacyloctenium aegyptium*). No significant differences in peanut yield were observed between PPI or PRE applications of either herbicide.

HARVESTING, CURING, SHELLING, STORING, AND HANDLING/MYCOTOXINS

High Moisture Farmer Stock Grading. P.D. BLANKENSHIP[1]*, M.C. LAMB[1], C.L. BUTTS[1], E J. WILLIAMS[2], and T.B. WHITAKER[3]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; [2]UGA Cooperative Extension Service, Tifton, GA 31793; and [3]USDA, ARS, Market Quality and Handling Research Unit, NC State Univ., Raleigh, NC 27695-7625.

Farmers in the U.S. are required to market peanuts in lot identity preserved lots under 10.5 % moisture content. This marketing requirement limits drying and inventory control options for buying points. A comparison of grading peanuts at high moisture content (HMC) versus moisture content at farmer marketing (LMC) was conducted at 14 buying points in crop year '98 and 20 in '99. The buying points were located in all three US peanut producing areas. Randomly selected lots of runner, Virginia, and spanish type peanuts were weighed and unofficially graded prior to curing by FSIS personnel with standard procedures. After curing, the lots were graded officially for marketing. During the experiment, 686 lots averaging 6.2 t at high moisture grading and 5.5 t at farmer marketing were graded. HMC's averaged 16.3 % ranging from 11 to 45 %. LMC's averaged 8.8 % ranging from 5 to 11 %. Comparisons of HMC and LMC grade factors indicated that sound mature kernels (SMK) averaged 3.6 % higher in the HMC grades (P=0.0001). Splits (SS) averaged 2.0 %, other kernels 1.2 %, and hulls 0.6 % lower in the HMC grades (P=0.0001). SMK+SS were 1.6 % and total kernels 0.4 % higher in the HMC grades (P=0.0001). Means for loose shelled kernels, foreign material, and damage were not significantly different for HMC and LMC grades. HMC lot value averaged $ 203.24/t higher than LMC (P=0.0001). Linear prediction equations were derived for lot weight (LW) and lot value (LV) from all data combined. The equation for LW had an R^2 = 0.989. R^2 for the LV equation = 0.992. Data from the experiment indicate that LMC lot weight and value can be accurately predicted. High moisture grading offers a possible alternative for current peanut grading procedures.

End Products Are Potential Cause for the Increase in IgE-Binding of Roasted Peanuts.

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End products such as advanced glycation end products (AGE), N^{ϵ}-(carboxymethyl)lysine (CML), malondialedehyde (MDA) and 4-hydroxyenoate (HNE) were examined in terms of their levels and effects on the IgE-binding of raw/roasted peanuts. AGE and CML are formed as a result of the Maillard reaction between proteins and sugars. MDA and HNE are produced due to lipid oxidation and crosslink with proteins. These protein-bound products were chosen because of their known reactivity with the immune system. Heat facilitates their formation and crosslinking with proteins. Recently, we have shown that roasted peanuts have a higher level of IgE-binding than raw peanuts. We hypothesized in this study that this increase in IgE-binding of roasted peanuts is due to an increase in level of protein-bound end products, and that these products are thus potentially allergenic. To support our hypothesis, we produced polyclonal antibodies against the end products, determined their levels in raw/roasted peanuts in immunoassays (ELISA), and analyzed the allergenic potential of end products and raw/roasted peanuts, using a serum from a pool of patients with peanut anaphylaxis. Results showed that AGE, CML, MDA and HNE were all present in raw and roasted peanuts. Of the four, AGE and MDA were the most predominant. When tested with the patient serum (containing IgE antibodies) in ELISA, AGE and MDA were shown to bind to IgE antibodies, suggesting that they are potentially allergenic. Roasted peanuts exhibited more AGE and MDA than the raw. On this basis, we concluded that there was an association between end products and the increase in IgE-binding of roasted peanuts.

Computerized Color Classification of Peanut Pods. D. BOLDOR and T.H. SANDERS*. Department of Food Science and USDA-ARS Market Quality and Handling Research Unit, North Carolina State University, 120 Schaub Hall, Raleigh, NC 27695-7624

Maturity determination of peanut pods is very important in maximizing profits of a farm industry valued at more than $1 billion a year. The method currently used is based on manual classification of peanut pods in color classes and subclasses, and it is subject to variability due to lighting conditions, fatigue, and inherent differences among people. The computer-assisted classification system described here uses machine vision and image processing which are fast, insensitive to variability factors, and inexpensive. Images of peanut pods were acquired using a machine vision camera, mounted on a stand constructed to respect design criteria for constant illumination of a planar surface. The use of a digital camera and a web camera was also investigated. The manual classification of pods in color classes and subclasses was performed based on mesocarp color of the peanut hull. The color recognition software was trained using images of manually sorted pods, then the references created were used to automate classification of pods. Image processing was also used in automating pod size measurements. The computer-assisted classification had a correlation coefficient of 99% for the same sample in different alignments and of 95% for different size samples from the same population. These results open a new window of opportunity for remote peanut maturity determination. Using the image acquisition on site, images may be transferred through the Internet to a central location where the classification is performed. Data collection at a central location would allow tracking of maturity progression in a given field or an overall estimate of maturity for a specified region. These data may then be used as an estimation of overall quality potential. Further, machine vision and image processing provide new opportunities to investigate the relationship of various color data manipulations (red, green and blue values), on maturity determination and harvest date prediction.

A Method for Estimating Heat Distribution in Semi-trailers and Large Drying Bins. E.J. WILLIAMS Biological and Agricultural Engineering, University of Georgia Cooperative Extension Service, Tifton, GA 31793-1209

A method was developed for estimating the uniformity of heat distribution in large curing containers, and was tested in semi-trailers, as well as 21 ft and 28 ft drying units. Semi-trailers are new to the humid Southeast peanut production region, and are cause for concern because uniformity of drying throughout the load is essential. The method consisted of probing the trailer with a device constructed from ½" CPVC pipe in which thermocouples were threaded through the center and terminated on the outside. Semi-trailers and other conventional trailers were allowed to heat 4 hr and 2 hr, respectively, before measuring. The thermostat was disabled and gas pressure adjusted for a constant 20 F temperature rise above ambient, so that the burner did not cycle. Trailers were probed in a uniform grid consisting of 3 longitudinal rows and 5 to 7 lateral rows, depending on the length. Probe locations were selected randomly, and temperatures were measured for five depths with a hand-held, digital thermocouple reader. Contour plots of the temperature rise above ambient were constructed for each depth, and the results used as a measure of the uniformity of heating for a given depth. Results are described for front-air-draw semi-trailers, 28' side-air-draw trailers, and 21' side- and rear-air-draw trailers. For semi-trailers, the heat distribution for a given depth was generally within 5 F or less, and was considered to have good uniformity compared to conventional trailer designs. Of those tested, the rear-air-draw trailers generally had more uniform heating than the side-air-draw.

Effect of Application of Nontoxigenic Strains of *Aspergillus flavus* and *A. parasiticus* on Subsequent Aflatoxin Contamination of Peanuts in Storage. J.W. DORNER* and R.J. COLE. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Experiments were conducted to determine the potential for biological control of aflatoxin contamination of peanuts during storage. In 1998, Florunner peanuts (0.6 ha) were treated in the field by applying competitive, nontoxigenic strains of *Aspergillus flavus* (NRRL 21882) and *A. parasiticus* (NRRL 21369) at 76 days after planting (DAP). An equivalent 0.6 ha were not treated and served as preharvest controls. After harvest, half the peanuts from each of the two groups was sprayed with an aqueous spore suspension containing the nontoxigenic strains; the other half of the peanuts from each group was not sprayed. The peanuts were then placed in separate compartments of a mini-warehouse. Therefore, storage treatments consisted of peanuts that were a) treated in the field and prior to storage; b) field-treated only; c) treated prior to storage only; and d) not treated at all. Peanuts were stored for approximately five months under high temperature and relative humidity conditions designed to promote aflatoxin contamination. After storage, four random 30 kg samples were collected from each compartment and analyzed for aflatoxin. The study was repeated in crop year 1999. In 1998, peanuts were not contaminated with aflatoxin prior to storage. After storage, peanuts that were treated in the field and prior to storage contained an average of 0.8 ppb of aflatoxin. Peanuts treated in the field only contained 1.4 ppb of the toxin. Peanuts not treated in the field but receiving the spray treatment before storage contained 48.8 ppb after the storage period. Peanuts that were not treated with the competitive fungi at all contained an average of 78.1 ppb. In 1999, peanuts suffered from late-season drought and were contaminated with aflatoxin at harvest, with controls averaging 516.8 ppb compared with 54.1 ppb in treated peanuts. After storage, non-field treated peanuts averaged 9145.1 ppb compared with 374.2 ppb for peanuts that had been field-treated, a 95.9 % reduction. Spraying of pods with the nontoxigenic strains prior to storage provided no additional protection against aflatoxin contamination in storage. Results demonstrated that field application of the nontoxigenic strains had a carry-over effect, reducing aflatoxin contamination that occurred in storage.

Conidial Movement of Nontoxigenic *Aspergillus flavus* and *A. parasiticus* following Application to Soil. B. W. HORN*, R. L. GREENE, R. B. SORENSEN, P. D. BLANKENSHIP and J. W DORNER. National Peanut Research Laboratory, USDA, ARS, Dawson, GA 31742-0509.

The use of nontoxigenic strains of *A. flavus* and *A. parasiticus* in biological control effectively reduces aflatoxin in peanuts when conidium-producing inoculum is applied to the soil surface. In this study, the movement of conidia in soil was examined following natural rainfall and controlled precipitation from a sprinkler irrigation system. Conidia of nontoxigenic *A. flavus* and *A. parasiticus* remained near the soil surface despite repeated rainfall and varying amounts of applied water from irrigation. In addition, rainfall washed the conidia along the peanut furrows for up to 100 meters downstream from the experimental plot boundary. The dispersal gradient was otherwise very steep upstream along the furrows and in directions perpendicular to the peanut rows. The retention of biocontrol conidia to the upper soil layers is likely important in reducing aflatoxin contamination of peanuts and aerial crops such as corn and cottonseed.

A Crop Modelling Approach to Define Optimum Maturity for Drought and Aflatoxin Avoiding Varieties. G.C. WRIGHT* and NAGESWARA RAO RACHAPUTI. Queensland Department of Primary Industries, Farming Systems Institute, Kingaroy, Qld, 4610, Australia.

Drought incidence in peanut production regions of north and south Queensland often result in erratic yields and high aflatoxin contamination. With major payment penalties now being imposed on positive aflatoxin product, the growing of peanuts in dryland regions has become a very risky option for farmers. It is well known that end-of-season drought predisposes the peanut crop to aflatoxin contamination, as well as reducing yield accumulation during the pod-filling period. The matching of crop phenology to the most likely drought stress pattern in a production environment is therefore one of the most effective ways of avoiding these constraints. A crop simulation approach using historical climate records can be a powerful tool to assess the optimal phenology, in a probabilistic framework, required for specific production regions. A desktop study was conducted using the peanut crop model, APSIM Peanut, to define the optimum maturity for peanut varieties in the major peanut production regions of Queensland. The major criterion for the optimisation was the need to avoid end-of-season drought and hence maximise yield accumulation and reduce aflatoxin contamination. The study showed that in the Burnett region of south Queensland, a variety of around 110 days maturity (as compared to the existing varieties of around 145 days) would have substantially higher yield, lower aflatoxin and higher gross returns in 7 out of 10 of years. Field testing to verify this hypothesis over a number of sites has confirmed this hypothesis, with aflatoxin incidence in an early maturing spanish cultivar being very low (<8 ppb), compared to later maturing varieties such as NC-7 with values greater than 500 ppb. The role of the Southern Oscillation Index (SOI) in forecasting the likelihood of above or below average seasonal rainfall is also being investigated as a tool to enable growers to select the most appropriate varietal mix to maximise yield and avoid aflatoxin contamination.

"Streeton" – An Aflatoxin Tolerant Peanut Cultivar for the Australian Peanut Industry. A. L. CRUICKSHANK, G.C. WRIGHT*, and NAGESWARA RAO RACHAPUTI. Queensland Department of Primary Industries, Farming Systems Institute, Kingaroy, Qld, 4610, Australia.

Aflatoxin contamination is a major issue for dryland peanut growers throughout Queensland. Major penalty payments (up to $450 AUD/tonne) for positive product are now being imposed by buyers, thus urgent varietal and management solutions to minimise contamination 'on-farm' are needed. The Queensland Department of Primary Industries peanut breeding program released the variety Streeton in 1993 for its excellent yield and grade stability under drought. Over the next five seasons, Streeton has also demonstrated a high level of tolerance to aflatoxin contamination compared to other commercially grown varieties such as NC-7. The major shelling company (Peanut Company of Australia, PCA) has provided statistics that demonstrate, over large tonnages, that Streeton has up to 40% lower aflatoxin during years of high aflatoxin incidence. Physiological studies have shown that the lower aflatoxin incidence is associated with a number of mechanisms. These include the maintenance of crop water status during severe end-of-season associated with better root water uptake, and rapid and even drying of pods and kernels in the windrow which minimises the risk of growth of the aflatoxin producing fungus, *Aspergillus flavus*. Measurements of single kernel moisture under controlled post-harvest drying conditions (72 h at 30°C) showed that Streeton had only 20% of kernels above 15% moisture, compared to over 70% of kernels for NC-7. Further comparative physiological studies to determine the basis of the observed aflatoxin tolerance in Streeton are underway. By the completion of the project, we expect to have developed a number of easily measured traits for the indirect selection of aflatoxin tolerance in large scale breeding programs.

ECONOMICS I

An Evaluation of At-Plant Insecticides and Net Returns. S. M. FLETCHER*, Department of Agricultural and Applied Economics; A. S. LUKE, Department of Agricultural and Applied Economics; and J. W. TODD, Department of Entomology. University of Georgia, and National Center for Peanut Competitiveness.

Given increasing production costs and the financial detriment from TSWV for the peanut industry, a study was carried out to evaluate the effect of various at-plant insecticides with an effort to decrease production costs while maintaining yield and reducing TSWV incidence levels. The study combined three varieties (C99R, GA Green and MDR 98), single and twin row patterns, and five different insecticide treatments at one location (Midville, GA). Net returns to management were calculated incorporating yield, grade, insecticide treatments, land and quota rent, and a multi-tier pricing model with quota, additionals, and fall transfers. The five insecticide treatments were Orthene, Thimet 1.0, Thimet 0.5, an Orthene and Thimet combination, and an untreated control. The net returns for the various treatments were compared. When averaged across all varieties and row patterns, the combination treatment produced the highest net returns ($395/acre) which was also statistically different from the Orthene treatment ($330/acre). The Orthene treatment was also significantly different from the Thimet 0.5 treatment ($392/acre). No other differences were significant for the various insecticide treatments--Thimet 1.0 ($385/acre) and non-treated control ($361/acre). With twin row patterns, there is no difference for the various insecticide treatments across all varieties. For single rows, across all varieties, the only insecticide differences were between Orthene ($261/acre) and the two Thimet treatments ($373/acre and $374/acre). When considering varieties, for C99R across both row patterns, the only insecticide treatment difference is between Orthene and Thimet 0.5. For MDR 98 and GA Green there was no difference between insecticide treatments across row patterns. One conclusion from this study is that factors other than insecticide have a significant impact on net returns. For example, C99R across all row patterns and insecticide treatments produced significantly higher net returns than GA Green or MDR 98. Another significant factor exemplified in this test is row pattern. Across all varieties and insecticide treatments, net returns from twin rows ($415/acre) were significantly higher than from single rows ($330/acre). For insecticide treatment there is no conclusive answer from this test. The main differences from insecticide treatments are variations in cash flow needs only.

A Regional Planting Date Study: Georgia Green and TSWV - More Than Yield Management. A. S. LUKE*[1], S. M. FLETCHER[1], J. W. TODD[1], J. A. BALDWIN[1], D.W. GORBET[2], J.R. WEEKS[3], A. K. CULBREATH[1], S. L. BROWN[1]; National Center for Peanut Competitiveness and University of Georgia[1], University of Florida[2] and Auburn University[3].

As Tomato Spotted Wilt Virus (TSWV) continues to be a financially devastating virus to the peanut industry, research efforts also continue to help producers deal with this problem. In 1999 tests were conducted with the Georgia Green variety planted at four locations, across three states, at three different planting dates with treatments for tillage methods, row patterns, and at-plant insecticide to examine four of the UGA TSWV Risk-Index components in a regional study. Yields, grades, and final TSWV incidence levels were collected and net returns to land, quota, and management were calculated using a budget-generator incorporating a multi-tier pricing model. Comparisons can be made for both net returns and final severity ratings for the various components of the index. When comparing the planting dates, early (April 7-8) and mid (May 5-6), the net returns to land, quota and management across all locations and treatments were not statistically different from one another at $384/acre and $345/acre. However, both planting dates were significantly different from the late planting date (June 2-3) at $198/acre. For tillage method there is an inverse relationship between net returns and TSWV final incidence. Conventional tillage produced $104/acre higher net returns than strip-till (not significant), but strip-till had a final TSWV incidence of 9.9% compared to 17.6% for conventional tillage. A third component of the index is row pattern with twin rows expected to provide greater resistance to TSWV. Final incidence level for twin rows was 10.4% with net returns of $364/acre compared to 17.1% with $253/acre for single rows, with the difference in net returns statistically significant. One final area considered in this test was at-plant insecticide. The effect of phorate 20 G is compared to no at-plant insecticide. Net returns were $326/acre for treated versus $292/acre for non-treated (significant at $p=0.01$) and TSWV incidence levels were 15.6% and 11.8% respectively. One conclusion from this study is that even within a three-state area, subregional differences do occur and influence results. For instance, the "optimal" planting date may vary across the southeast depending on subregion. The study also shows that the index components, with exception of tillage method, not only maximize yield but also net returns. It also points out that the potential labor savings, enhanced land conservation and lower TSWV incidence from strip-till do not necessarily offset the lower net returns.

Can We Talk? Economic Considerations of Why Peanut People Often Disagree. F.D. MILLS, JR. Department of Agriculture and Environment, Abilene Christian University, Abilene, TX 79699-7986.

Unprecedented changes are occurring in U.S. agriculture and specifically in the peanut industry. Many scholars refer to this transformation as the industrialization of agriculture. Other scientists suggest that U.S. agriculture has reached a post-industrial age. Regardless, rapid change often leads to uncertainty and heightens anxiety among market participants. If history holds true, tensions will rise among the peanut sectors as deliberation over domestic farm policy and international trade agreements accelerate in the near future. So, is there a means to reduce some of this stress? Is it possible that establishing why the sectors see issues differently could encourage better understanding among market participants? Could communication be improved and more positive results facilitated? If so, what prompts these different views? It has much to do with market structure. The basic economic concept of industrial organization (i.e., the structure-conduct-performance model) helps identify the characteristics of a business entity, how it functions in the marketplace and how price is established. The four market structures, pure competition, monopolistic competition, oligopoly and monopoly are distinguished from one another by the number of participants in the market, the degree of product differentiation and the ease of entry and/or exit from the market. It is the unique combination of these factors that influences the way a firm conducts business. The various peanut sectors approach business decisions differently because they exist in different market structures. This directly effects their conduct. Therefore, understanding these differences and referencing/acknowledging them in sector discussions could be beneficial to the industry.

Can New Generation Cooperatives Be a Feasible Solution for Georgia Peanut Marketing? S.J. HANCOCK*, T. RAY, S.M. FLETCHER, and W.A. THOMAS, National Center for Peanut Competitiveness and Department of Agricultural and Applied Economic, University of Georgia, Griffin, GA 30223-1797.

The recent search by producers and researchers for peanut marketing alternatives in Georgia has been driven by three main factors. First, farm income for peanut producers has declined steadily over the last three years. Second, there is a possibility that the current peanut program will be dismantled in the near future. Third, the first buyer market has become continually concentrated over the last decade, giving the individual producer little or no market power. A survey of all Georgia peanut farmers was conducted in November and December 1999 in order to investigate what the producers' perceptions for the future of peanut farming were as well as get feedback for possible solutions. Producers were asked to rate the current availability of price information, marketing strategies, and the current number of buyers. The farmers were also asked to give their input on the idea of either using an existing cooperative or forming a new value-added cooperative to gain more market power. They were also asked what types of services they would want a cooperative to provide and questions on how they would be willing to help finance the cooperative. Several questions were included on other forms of marketing alternatives such as a Federal Marketing Order. Finally, operational questions were asked to find out how many peanuts these farmers would be willing to market through the cooperative and the amount of land they farmed. Results revealed that 75% of the responding farmers felt that under the current program a new cooperative should be created, however the percentage increased to 87% if the current program ceased to exist. 39% of respondents were dissatisfied with the current price information available and 47% were dissatisfied with information on marketing strategies available to farmers. 67% of farmers returning the survey were dissatisfied with the current number of buyers currently available. Many farmers returning the survey do not feel they can continue to farm peanuts if the current peanut program is abolished. However, they feel that the current program, if continued, must be restructured to better meet the needs of peanut farmers.

Peanut Products Purchase: Effects of Nutrition Consideration and Household Characteristics. A. RIMAL* and S. M. FLETCHER, National Center for Peanut Competitiveness, Department of Agricultural and Applied Economics, University of Georgia, Griffin, Georgia 30223-1797.

The study examines the effects of nutrition consideration and lifestyles on snack peanuts and peanut butter purchase. Telephone interviews of 2880 users and non-users of peanut products among a random sample of U.S. households were conducted in December 1996 by the Gallup Organization. A double hurdle model was used to address the difference between participation and purchase frequency decisions. The results show that the decision of whether to participate in the market for peanut products was separate from that of how much to purchase. The variables influencing participation decisions were geographic location of the households, kids in the households, household income, ethnic background and gender of a household meal planner. Although nutrition consideration in food purchase did not affect participation decisions for snack peanuts, it played an important role for peanut butter. Those household meal planners who were overly concerned about desirable nutrition such as vitamins and minerals were likely to be a buyer or a potential buyer of peanut butter. Exercise habit of household meal planners, nutrition consideration in food purchase decisions, ethnic background, age, geographic locations, family size, kids in the household, and gender were the variables significantly affecting purchase intensity for snack peanuts and peanut butter. The results suggest that those household meal planners who were already participating in the snack peanut market and were overly concerned about undesirable nutrition factors such as fat and cholesterol tended to decrease their purchase of snack peanuts. Those who were concerned about desirable nutrition factors, however, tended to increase the purchase of snack peanuts. Interestingly, nutrition consideration did not have significant impact at the purchase level decision for peanut butter. Promotion of peanut butter emphasizing the desirable nutrition contents is likely to convert non-users of peanut butter into users. Similarly, those buyers who already buy snack peanuts are likely to increase their purchase frequency if desirable nutrition factors in peanut products are highlighted through promotion.

Factors Influencing the Consumption of Peanut and Peanut Products. C. M. JOLLY, Department of Agricultural Economics, Auburn University, Auburn, AL 36849. M. J. HINDS, Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078. P. LINDO, Consultant Data Analyst, Department of Agricultural Economics, Auburn University, Auburn, AL 36849. H. WEISS*, Department of Statistics and Epidemiology, University of Alabama in Birmingham, Birmingham, AL 35294.

Today's consumers are becoming more health conscious about the products they consume. This phenomenon influences the number of times they consume certain products, such as peanuts, and their expenditure on these food items. Since frequency of consumption denotes consumers' choice, it is important for producers and processors of peanuts to be aware of factors that influence consumers' purchase of peanut and peanut products. Using survey data collected from 606 consumers from Auburn and North Carolina A&T State Universities, we developed logistic models to determine the factors that influence households' consumption of roasted peanuts, peanut butter, and products containing peanuts. The ages of the respondents ranged from 15 to over 61, with 80 percent being between 18 and 35 years. Most (89%) of the individuals, because they were predominantly college students, were from either single or two individual member households. Approximately 30 percent of the individuals belonged to households with less than $10,000 annual income, 40 percent had incomes between $10,000 and $55,000, while 30 percent were from households with incomes above $55,000. The logistic model showed that the likelihood of eating roasted peanuts was positively influenced ($p>0.05$) by occasions such as parties, holidays, breakfast time, and ball games, but not by age and gender. The likelihood ratio for this model was 0.90. Peanut butter consumption was influenced ($p>0.05$) by whether the product was a snack food, a dessert, or breakfast item, and by the age, gender, and race of the consumer, with the likelihood for consumption increasing if the individual was male and black, but decreasing with age. The likelihood ratio for this model was 0.73. Frequency of consumption of products containing peanuts was increased if the product was a snack food, party food, dessert item, or available at ball games. Females were less likely to consume products containing peanuts.

SYMPOSIUM: INTERNATIONAL ISSUES FACING THE PEANUT SECTOR

Increasing Demand. D. ZIMET*. NREC, University of Florida, Quincy.

For the vast majority of the world's peanut producers peanuts are a commodity. Within types, except for broad quality standards, one peanut or ton of peanuts is pretty much the same as any other. Generally, unless there is active pursuit of marketing alternatives through the development of new products or the promotion of specific existing product forms that are under utilized in specific markets, the market situation will remain the same. There are very few producers who somehow address unique market conditions or have been able to create such conditions. The differences among markets and among production areas give some clues as to how to try to promote demand. For example, Argentina exports about 95% of its crop. What can be done to increase its domestic consumption? In comparison, US production is mostly consumed domestically and most of the consumption is by the confectionary industry (including peanut butter). What can be done to increase oil consumption in the US? Globally, much more product is consumed as oil than other product forms. What constraints prevent increased confectionary consumption? Given the improvement of world economic conditions over the past 10 - 20 years, is the time right for increased consumption of peanut snacks?

U.S. Competitiveness Program. S.M. FLETCHER*. Department of Agricultural and Applied Economics, University of Georgia.

Short and long-term outlook for U.S. peanut producers clearly indicates increasing competition in the world and domestic peanut markets. Peanut production practices in the United States will need to be adjusted to meet the global competition. In fact, peanut production areas may alter some with some areas decreasing peanut production while other areas increase in order to maintain a competitive domestic production market. Why is this happening? Recent trade agreements and domestic farm policy are the main reasons. Upcoming trade agreements and farm policy may make current changes seem minor. NAFTA's tariff for shelled edible peanuts is 93% for the calendar year 2000 and will go to ZERO in 2008. While the current WTO tariff is higher, it could be reduced significantly in the current round of WTO negotiations. What does this mean? Based on data collected from Argentina and China, their cost of production seems to be less than $300 per ton FSP. If this is true, future tariff reductions will not provide any safeguard to U.S. domestic peanut producers. U.S. research and extension effort needs to intensify their efforts on economic efficiency, which will lead, to improved competitiveness. Several million dollars are spent each year in the U.S. on peanut research and extension efforts. Yet, the endeavors are basically single production issue driven and not system developed nor an incorporation of a true economic component. This must change if U.S. peanut producers are going to survive. This environment that is laid out is the reason for the development of the National Center for Peanut Competitiveness. The mission of the Center is to enhance the competitiveness of U.S. peanut producers through product development, economics and production research. Two examples of research are given. The economics from twin row planting clearly indicate the improved profit from using that production practice. However, the economics from strip-till versus conventional tillage was not evident. In fact, profits decreased with strip-till even though it reduced the level of TSWV. In summary, teamwork across university and USDA research and extension disciplines, administrators, and the total industry will be needed to meet the challenges that lay before the U.S. peanut producer.

Plant Introductions through the Peanut CRSP and the Use of Introductions by the Bolivian Project.

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Sustained crop yields in peanuts are dependent primarily upon the identification of new sources of resistance for diseases and pests while still maintaining or increasing yield. The Bolivian Peanut CRSP was developed with the objectives to identify new peanut germplasm in Bolivia, identify U.S. germplasm which might be useful in Bolivia, develop hybrid populations to select from, and to help develop local markets and uses for peanuts. Germplasm in Bolivia was identified from site visits to farmer fields which had little or no pests or disease. While U.S. germplasm, came from the University of Florida breeding program. The first visit lead to the identification of a local Bolivian cultivar called Bayo Grande (BG); which was followed by the identification of BG like material in the U.S. peanut collection. Various crosses with BG and BG like material have been made with the most advanced lines. The Peanut CRSP aids the U.S. peanut breeding programs by identifying new sources for yield and for disease and pest resistance.

PRODUCTION TECHNOLOGY I

How to Obtain Maximum Returns Using IRRIGATOR PRO, an Expert System for Managing Peanut Irrigation. J. I. DAVIDSON, JR.*, M. C. LAMB, D. A. STERNITZKE, and C. L. BUTTS, USDA, ARS, National Peanut Research Laboratory, Dawson, GA, 31742.

IRRIGATOR PRO is an excellent management tool for managing the irrigation of peanuts. The benefits depend upon compliance and knowledge of the specific field and weather forecast, and how it relates to the irrigation and pest control strategies used by IRRIGATIOR PRO. Validation tests have shown that on the average, every 1% increase in compliance will result in an increase in $3 to $7 per acre increase in net returns depending upon whether it is a wet or dry year. By using knowledge of the irrigation and pest control strategies used by IRRIGATOR PRO and knowledge of the specific field and weather forecast the user can be more proactive in managing the production practices in each field. Proactive management not only leads to better compliance with IRRIGATOR PRO decisions, but often leads to refinement or change in IRRIGATOR PRO recommendations that results in much higher returns than the average. Several examples are given including the use of IRRIGATOR PRO maximum and minimum soil temperature and water graphs along with the field pest history and weather forecast to refine and expand IRRIGATOR PRO decisions.

Impact of Plant Population on Replant Decision-Making for Non-Irrigated Peanuts. D.A. STERNITZKE*, M.C. LAMB, J.I. DAVIDSON, JR. and C. T. BENNET. USDA-ARS-National Peanut Research Laboratory, Dawson, GA 31742

In 1997 and 1998 field experiments were conducted in Terrell County, GA to determine the effect of plant population on peanut pod mass, yield, and replant decision-making. The choice to replant is frequently encountered by growers because of poor seed vigor and emergence. Conventional tillage practices prepared plots for growing non-irrigated peanuts in sandy (Americus) soil. To simulate the detrimental impact of poor emergence non-control plot peanuts emerging on 0.91 m beds planted at 4.80 cm/seed were hand-thinned to average intrarow spacings (AIS) of 22.9, 30.5, 38.1, 48.3, and 61.0 cm/plant. Four replicates per treatment generated data used to regress pod mass and yield with AIS. Pod mass per plant logarithmically increased with AIS. In contrast, pod yield decreased 26.5 kg/ha-cm for 9≤ AIS ≤60 cm/plant. Replant economic benefit can be estimated by this relationship if market price and replant cost are known or can be estimated.

Effect of Land Preparation and Cotton Stalk Residue Management on Peanut Yield in a Sandy Field with a History of High Pest Pressure. C. L. BUTTS*[1], J. I. DAVIDSON, JR.[1], D.A. STERNITZKE[1], M. C. LAMB[1], P. TIMPER[2], C. R. HOBBS[3], J. F. MCGILL[4], R. B. MOSS[5]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742-0509, [2]USDA, ARS, Coastal Plains Experiment Station, Tifton, GA 31793, [3]Carl Hobbs AG Consulting, Ashburn, GA 31714, [4]Consultant, Tifton, GA 31793, [5]Consultant, Plains, GA 31780.

On-farm trials were conducted during the 1999 CY in Bainbridge, GA to test the effect of tillage methods, cotton stalk residue management on depth to hardpan, disease incidence, and subsequent peanut yield. The field trials were conducted in a field with historically high incidence of nematode pressure, shallow hardpan, and disease pressure. Six land preparation treatments used were, fall paratill (FPT), spring paratill (SPT), fall straight shank (FSS), spring straight shank (SSS), spring conventional with a rye cover crop (SCR), spring conventional with no rye cover crop (SNR). Two treatments for managing cotton stalk residue were shredding with a mower or pulling. Eight replications of each tillage treatment were used in a randomized complete block design for a total of 96 plots. Certified Georgia Green seed were planted in a twin-row pattern on 20 Apr 2000. Sensors to record the soil temperature 5 cm below the soil surface were installed in the row in two replicates of each tillage treatment and cotton stalk treatment. A tipping bucket rain gauge was used to record the timing and amount of rainfall and irrigation events. All plots were irrigated according to the schedule recommended by the expert system, Irrigator Pro, formerly known as EXNUT. Peanut yield from plots where cotton stalks were shredded averaged 3733 kg/ha compared to 3648 kg/ha where cottton stalks were pulled. Peanut yield (kg/ha) by land preparation treatment averaged 3655 (SCR), 3711 (SCN), 3954 (FPT), 3544 (SPT), 3636 (FSS), and 3653 (SSS). No significant differences (P=0.05) in yield due to land preparation were noted except for SCN-FPT, SCN-SPT, and SCN-FSS. Yield was not affected by cotton stalk mangement technique. Data for plant stand, depth to hardpan, disease ratings, nematode populations, and cost of production will be presented.

Soil pH and Large-Seeded Virginia-Type Peanut Production. N. L. POWELL* and R.W. MOZINGO. Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437-9588.

Soil pH determines the availability of some nutrients to plants and therefore has an effect on crop production. A high soil pH (greater than 6.2) can have a detrimental effect on the production of the large-seeded virginia-type peanut. Research was conducted during 1995 and the 1997 through 1999 growing seasons to determine the response of the peanut crop to soil pH. Using the peanut cultivator NC-7, peanut were grown on soils with the pH averaging between 5.8 to 6.1 (low soil pH) and 6.4 to 6.5 (high soil pH). The various treatments replicated four times were arranged in a randomized complete block design during each year of the study. When the soil pH was 5.8 (low) or 6.1 (high) in 1995 there were no differences in peanut yield, grade and crop value. However in 1997 through 1999 when the soil pH averaged 5.8 to 6.2 (low) and 6.4 to 6.5 (high) the yield of peanut produced on the high pH soil was 7 to 12% less than the peanuts produced on the low pH soils. The peanuts also had a lower market grade and crop value when produced on the high pH soils when compared with the lower pH soils. The same amount of calcium was found in the peanut kernel produced at either soil pH. The average crop value increased by 0.5 to 1 cent per lb on the low pH soil. Results of this study show the importance of maintaining the proper soil pH for optimum peanut production in the coastal plains of Virginia and North Carolina.

Valencia Peanut Yield Response to Subsurface Drip vs. Center Pivot Irrigation Systems

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Agricultural production in the semi-arid Roosevelt and Curry counties of New Mexico are heavily dependant on groundwater for agriculture production. Depletion from the Ogallala Aquifer, and increasing energy costs for pumping, emphasize the need for conservation and efficient use of ground water. Subsurface drip irrigation (SDI) can conserve water while maintaining or increasing crop yield. The main objectives were to compare SDI and center pivot (CP) irrigation systems on peanut yield, grade, and total water applied. Two field experiments were conducted using a randomized complete block design with three replications during the 1999 growing season. Three Valencia peanut varieties (Valencia-A, Valencia-C and Sunland) were planted and two rates of gypsum (0 and 500 kg ha^{-1}) were applied to both SDI and CP irrigation systems. Pod yield, Farmer Stock Grade (FSG), and water applied to the SDI system were compared with that of the CP irrigation system. SDI received 533 mm of water compared with 610 mm applied through the CP system or about 13% less water. Pod yields with the SDI system averaged 4398 kg ha^{-1} or a 117% increase over CP pod yield. SDI peanut had an average FSG of 73% while the CP had an average FSG of 67%. There was no significant yield difference between variety or the rate of gypsum applied. High pH and inherent calcium rich soil may be a couple of reasons for not seeing a gypsum response. Overall, SDI resulted in better pod yield, better FS grade, and consequently higher gross returns ($3075) compared with CP system ($1332). Overall, during the first year of this research, SDI saved 77 mm of ground water, had higher pod yields, higher FS grade and 131% higher monetary returns. More research will be needed to confirm these findings for the long term.

and medium outturn were associated with shelling overs lots while decreases in number is

A groundnut sheller for home shelling. C. J. SWANEVELDER. Agricultural Research Council, Grain Crops Institute, Potchefstroom, South Africa.

In rural areas groundnuts are shelled by small or subsistance farmers and locals by hand. This is labourers and tiredsome and therefore a small hand operated sheller has been developed. It consists of a round disc attached to a handle with a short axle supported by the frame in a stable position. A screen is attached to a cover plate on which the hopper is mounted to feed the pods through a slot in the screen into the shelling cavity. By rotating the disc in turning the handle the pods move from the hopper, being shelled between the disc and the screen and released through the slots in the screen. Between 30 to 50 kg of pods can be shelled per hour, depending on the input by the operator. In a separate action the peanut seeds are separated from the broken hulls.

Influence of Prohexadione Calcium on Yield Components of the Cultivar NC 12C. J.B. BEAM*, D.L. JORDAN, T.G. ISLEIB, J.E. BAILEY, and A.C. YORK. Departments of Crop Science and Plant Pathology, North Carolina State University, Raleigh, NC 27695-7620.

Research suggests that the plant growth regulator prohexadione calcium increases row visibility, decreases main stem height, and in some instances increases pod yield and enhances market characteristics. Predicting when a positive yield response to prohexadione calcium will occur has proven difficult, although response of the cultivar NC 12C often occurs. The mechanism of increased pod yield has not been determined, although enhanced earliness and pod retention are suspected as contributing factors. Research was conducted at two locations in North Carolina in 1999 to evaluate interactions of prohexadione calcium (0 and 0.14 kg ai/ha applied sequentially at row closure followed by a second application 3 weeks later), lifting (none or one lifting operation after digging), and digging date (two dates spaced approximately two weeks apart). Row visibility, main stem height, machine-harvested pod yield, pods remaining on the soil surface and within the top 4 inches of soil, and pod number and pod weight per plant following digging and lifting were determined. Theoretical maximum pod yield (sum of machine-harvested pod yield and yield of pods recovered on the soil surface and within soil), the percentage of pod loss from digging and lifting operations (fraction of theoretical pod yield actually harvested by the combine), market grade characteristics, and gross economic value also were determined. Interactions of digging date and lifting occurred at both locations, and differences most likely can be explained by soil conditions during digging and lifting operations. Prohexadione calcium did not interact with digging date or lifting. However, the main affect of prohexadione calcium was significant for machine-harvested pod yield and the percentage of yield loss based on theoretical maximum pod yield . Maximum yield, market grade, and gross value were not affected by prohexadione calcium. When pooled over locations, digging dates, and lifting treatment, machine-harvested pod yield increased by approximately 200 kg/ha when prohexadione calcium was applied. Additionally, the number of pods per plant and weight of pods per plant increased when prohexadione calcium was applied. The percentage of yield loss was 3% lower when prohexadione calcium was applied. These data suggest that positive yield response to prohexadione calcium may be partially attributed to decreased pod loss that occurs during digging.

Genotype Evaluation for Productivity and Quality of Peanut in West Texas. B.D. HOWELL*, D.R. KRIEG, Plant and Soil Science Department, Texas Tech University, Lubbock, Texas 79409 and D.W. GORBET, Department of Agronomy, University of Florida, Marianna, Florida. 32446.

Peanut (*Arachis hypogeae* L.) acreage has rapidly increased on the Texas Southern High Plains. In 1995 there were 44,000 acres planted and by 1998 there were approximately 190,000 acres planted. Yields have been greater than both state and national levels averaging approximately 3300 lbs/acre. The production area is characterized as semi-arid with rainfall averaging 18 inches per year. However, all peanut production is accomplished using supplemental irrigation. The relatively high elevation (approximately 3,000 feet) results in cool night temperatures in late September and October, which delay maturity and are reported to be responsible for the "off-flavor". This research was designed to evaluate a wide range of genetic types for yield, maturity, oil quantity, and oil quality. The genetic material (35 entries in 1998 and 46 entries in 1999) was grown in Terry County, Texas, southwest of Lubbock, Texas. In 1998 center pivot irrigation was used to provide the equivalent of 0.22" per day on a five-day frequency. In 1999, subsurface drip irrigation was used to provide 0.35" per day. Plots were 2 rows wide by 20 feet long with 3 replications in 1998 and 2 rows wide by 40 feet long with four replications in 1999 with 32" row spacing in both years. Maturity was estimated using the Hull Scrape Method beginning at 85% of the "long term average" heat unit accumulation for the area and continued at 90%, 95% and 100% intervals. Yield was determined by harvesting the two rows with a commercial digger and threshing with a stationary small plot thresher. Oil quantity and quality were determined for each sample. Oil quality was defined as the fatty acid composition of the oil. After all evaluations, genotypes were placed in order of rank and percentile for each parameter of the research. Several genotypes were consistently in the top 25% for these parameters while others were consistently in the bottom 25%. Oleic/linoleic ratios for high-oleic genotypes were also consistent and ranged from 1 to 20. Genotypic variation was apparent in both yield and quality, such that selections could be made for West Texas production.

Water Deficit and High Light Intensity Effects on Peanut Grown Under High Temperature Conditions. G. F. PATEÑA* and K. T. INGRAM. Department of Crop and Soil Sciences, University of Georgia, Griffin, GA 30223.

Drought is usually accompanied with high temperatures and light intensities. High temperatures reduce vegetative and reproductive growth. Water deficit increase risk of preharvest aflatoxin contamination. We conducted a growth chamber experiment on peanut root and shoot growth, and on growth of the fungus *Aspergillus flavus* at 35°C with two genotypes, two water treatments, and two light intensities. Fungal growth was monitored by observing fluorescence in minirhizotrons. Two genotypes used were Florunner (PI565448), which is moderately drought tolerant, and ID47-10 (PI196744), which is drought susceptible. Both genotypes have large root mass and long roots. The well-watered treatment was irrigated twice weekly until drainage occurred. The water stress treatment was imposed by withholding water for 12 days starting 21 days after first flowering. Light intensities were high, about 1200 μ mol PAR m^{-2} s^{-1}, and medium, about 600 μ mol PAR m^{-2} s^{-1}. Root length density was initially greater in ID47-10 than Florunner before water stress treatment, and became larger in Florunner than in ID47-10 after treatment and at harvest. By visual stress rating, Florunner tolerated water stress better than ID47-10. There were significant effects of water stress treatments while no significant effects of light intensities or genotypes on pod weight. Growth of *A. flavus* was highest under water deficit conditions.

The Effect of Fatty Acid Profiles on Peanut Seed Germination at Low Soil Temperatures. B.S. JUNGMAN* and A.M. SCHUBERT. Texas A&M University System, Texas Agricultural Experiment Station, Lubbock, TX 79403-9757.

An experiment was set up to determine if altering the fatty acid composition would affect the germination of the peanut seed in cooler environments. Nine breeding lines of Dr. Olin Smith (deceased) were selected based on the oleic to linoleic acid (O/L) ratio. The lines (entries) were selected to give a range of oleic to linoleic (O/L) content that was classified as low (<3), medium (3-10), and high (>10), with Tamspan 90, a low O/L line, used as a control variety in the study. Germination percentages of entries were evaluated based on the O/L ratio, as well as the unsaturated to saturated (U/S) ratio. The unsaturated to saturated ratio was calculated by dividing the sum of oleic and linoleic acids by the sum of palmitic and stearic acids. These were not isogenic lines, so there may be other genetic traits, besides the fatty acid content, that were involved with germination differences. The lines were all of the spanish type, which is well adapted to the West Texas growing area. Fatty acid composition of the seed oil was measured on each of the selected lines by forming methyl esters of the oil and analyzing them by gas chromatography. Seeds were germinated at five different temperatures: an alternating 30 C for eight hours and 20 C for sixteen hours, and constant temperatures of 20 C, 18 C, 16 C, and 14 C. Germination counts were taken at 4, 10, and 12 days based on AOSA germination procedures for spanish peanuts. Germination decreased as O/L and U/S ratios increased, especially at lower (16 C and 14 C) temperatures. This trend was not solely a factor of the O/L ratio, but also appeared to be related to the U/S ratio. When all of the entries were grouped together, without regard to O/L class, temperature treatments, or time treatments, significant differences were found in germination percentages. All three entries that were classified as having a high O/L, had the lowest germination percentage and all were significantly different from the low and medium O/L lines. Significant differences were also found in germination percentages based on temperature treatments, with no regard to entries or time treatments. All entries germinated well under the alternating 30-20 C treatment, with decreases in germination percentage as temperatures decreased. The most striking decrease came between 16 C and 14 C.

Yellow Nutsedge (*Cyperus esculentus* L.) Management with Metolachlor Herbicide Timings in Texas High Plains Peanut. B. L. PORTER*, P. A. DOTRAY, J. W. KEELING, and T. A. BAUGHMAN. Texas Tech University, Texas Agricultural Experiment Station, Lubbock, and Texas Agricultural Extension Service, Vernon.

Field experiments were conducted in 1999 to evaluate yellow nutsedge (*Cyperus esculentus* L.) control with metolachlor applied preemergence (PRE), at ground crack (GC), and early postemergence (POST); to compare metolachlor alone to metolachlor combinations that included diclosulam PRE; and to determine the added benefit of pyridate and bentazon applied POST with the above combinations. Metolachlor PRE controlled yellow nutsedge at least 80% at all rating dates. Diclosulam PRE provided similar control. Metolachlor GC and POST were less effective at all rating dates. The metolachlor timing/diclosulam PRE combinations controlled yellow nutsedge at least 85% at all rating dates. Yellow nutsedge control was not improved when POST treatments were added to the metolachlor timing/diclosulam PRE combinations. Pyridate POST improved yellow nutsedge control following metolachlor GC from 69% (metolachlor GC alone) to 90% 51 DAP, and improved yellow nutsedge control from 8% (metolachlor POST alone) to 75% (pyridate POST + metolachlor POST) 39 DAP. Bentazon POST improved control following metolachlor GC both 39 and 51 DAP. Bentazon POST + metolachlor POST did not improve yellow nutsedge control over metolachlor POST alone 39 DAP. At 51 DAP, bentazon POST + metolachlor POST did improve yellow nutsedge control (70%) over metolachlor POST alone (42%). No injury was observed from any metolachlor treatment. Stunting was observed in all diclosulam treated plots, and ranged from 10% to 15%.

Control of Southern Stem Rot of Peanut Using Weather-Based Spray Advisories. S. L. RIDEOUT* and T. B. BRENNEMAN. Department of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31794.

Severity of southern stem rot in peanut (caused by *Sclerotium rolfsii*) is effected greatly by environmental conditions making control by currently recommended calendar-based fungicide applications sometimes inadequate. Spray schedules based upon favorable conditions for the disease should provide more consistent control than calendar-based applications. Several sets of spray advisories were created to model environmental and host conditions that favor disease development. One set of advisories was based upon soil temperature, rainfall, and host growth stage. A second set of advisories was based solely upon the environmental parameters of soil temperature and rainfall. A third advisory was examined where fungicide applications were made according to the AUPNUT leafspot advisory. Nontreated controls and calendar-based applications were also included in all trials. Tests were conducted in 1999 at four locations to evaluate these advisories. Environmental and host measurements were taken throughout the growing season at each location. Abound 2.08F (1.15 pt/A) was applied for all stem rot treatments and chlorothalonil coversprayed to control leaf spot. The different advisories produced a range of initial application dates ranging from 36 to 79 days after planting. Disease incidence ratings were taken throughout the growing season and yields were recorded at harvest. Disease ratings showed superior disease control in plots receiving fungicide applications based on advisories containing both environmental and host parameters (53.5% incidence) when compared with those based solely on environmental conditions (61.9 % incidence). Yield data also reflected this trend. Plots sprayed on advisories containing a host parameter yielded on average 3,681 lb/A, while those relying solely on environmental conditions only yielded 3,158 lb/A. Plots receiving fungicide applications based on AUPNUT or the calendar-based program produced disease control (55.8% and 55.6% disease incidence, respectively) and yields (3,791 lb/A and 3737 lb/A, respectively) similar to the advisories containing both environmental and host parameters. Due to the variability of southern stem rot epidemics across growing seasons, advisories need to be tested for several years in order to validate these trends.

Peanut Susceptibility to an Undescribed Root-knot Nematode. C.B. MEADOR* , T.A. LEE, JR., and J.A. WELLS. Department Plant Pathology & Microbiology, Texas A&M University, Stephenville,TX 76401. C.E. SIMPSON Department of Soil & Crop Sciences(Plant Breeding),Texas A&M University, Stephenville, TX 76401. J.L. STARR. Department of Plant Pathology & Microbiology, Texas A&M University, College Station, TX 77843.

Nematodes cause significant yields reductions in peanut. A survey was conducted in Collinsworth Co., TX to determine areas infested with an undescribed *Meloidogyne spp.* Soil samples were taken from fields at 1.6 km intervals in the areas of peanut production in the county. Nematodes were distributed uniformly over the sampling area. In addition to the survey, plots were established in one Collinsworth Co. field infested with the undescribed species and another in Comanche Co. TX infested with *M. javanica*. Yield response to Temik® of four *M. arenaria*-resistant genotpes (COAN, TP301-1-8, TP293-3-3, TP296-4-4) and two susceptible cultivars Florunner and Tamrun 96 were compared. Yield responses to Temik at the Collinsworth Co. site ranged from 3 - 42 % with the susceptible cultivars having a greater response than the *M. arenaria*-resistant lines. Yield responses to Temik at the Comanche Co. site ranged from 1 - 79%, with the susceptible cultivars having a much greater response than the *M. arenaria*-resistant genotypes. At both sites, the final nematode population densities were lower with the resistant genotypes than with the susceptible cultivars. These data indicate that the undescribed *Meloidogyne* spp. is less damaging than *M. javanica*. Additionally, resistance to *M. arenaria* also suppressed populations of the undescribed species.

Field Incidence of Cylindrocladium Black Rot of Peanut as a Result of Seed Transmission of *Cylindrocladium parasiticum* in Virginia. D.L. GLENN*[1], P.M. PHIPPS[2], and R.J. STIPES[1]. [1]Dept. Plant Pathol., Physiol. & Weed Sci., VPI&SU, Blacksburg, VA 24061, [2]Tidewater Agr. Res. & Ext. Ctr., VPI&SU, Suffolk, VA 23437.

Cylindrocladium parasiticum, cause of Cylindrocladium black rot (CBR) of peanut, infects all underground plant parts, including peanut seed. The testae of infected seed has a speckled appearance. The current study was designed to determine the importance of speckled seed in disease spread and losses of yield. Commercial seed was collected and assayed on a selective medium for *C. parasiticum*. The fungus was isolated at frequencies of 0% from normal seed and 68, 4, and 4% from speckled seed of VA-C 92R, NC 7, and VA 93B, respectively. All three cultivars are equally susceptible to CBR. Speckled and normal seed of each cultivar were mixed at increasing percentages of speckled seed (w/w) and planted in plots on May 11. Plots consisted of two, 9.1-m rows spaced 0.9 m apart. Soil was fumigated with metam sodium at 7.5 gal/A on Apr 21 and 23, and seed was treated with Vitavax PC at 4 oz/cwt. A split-plot design was used with four randomized complete blocks. Main plots were seed mixtures, and subplots were cultivars. CBR was first observed on Jun 29, but incidence was low in all cultivars through Aug 23. Disease incidence in VA-C 92R on Sep 12, Sep 24 and Oct 12 was correlated (r^2=0.78, 0.77, 0.73) with increasing percentages of speckled seed. Plots of NC 7 and VA 93B continued to show low levels of CBR incidence through Oct 12. A split-plot analysis indicated that cultivar and seed mixture were significant, and there was a significant cultivar-by-seed mixture interaction. The number of symptomatic and/or dead plants on Oct 12 in plots planted to seed mixtures having 0, 5, 10, 20, 40, 60, and 90% speckled seed, respectively, was 0.3, 3, 8.8, 13, 32, 22, and 40.8 in VA-C 92R. Plots of NC 7 and VA 93B had counts ranging from1.3 to 3.5 symptomatic plants per plot and showed no significant differences as a result of the percentage of speckled seed planted. Biopsies of tap roots confirmed that *C. parasiticum* was responsible for disease. Yield was reduced significantly when the percentage of speckled seed of VA-C 92R was 20% or higher. No significant yield reductions occurred with NC 7 and VA 93B. Recent samples showed levels of speckled seed ranged up to 3.6% in 18 commercial seed lots after standard sorting and sizing procedures. These levels of speckled seed did not result in significant yield losses in the current study, but still provide a mechanism for disease spread.

Evaluation of Four Types of *Sclerotinia minor* Inocula to Differentiate the Reaction of Peanut Genotypes to Sclerotinia Blight. T. R. FASKE*[1], H. A. MELOUK[2], and M. E. PAYTON.[3] [1]Department of Entomology and Plant Pathology, [2]USDA-ARS, [3]Department of Statistics, Oklahoma State University, Stillwater, OK 74078.

Greenhouse inoculation experiments were conducted with five runner peanut genotypes (Okrun, Southwest runner, TX 901338-2, TX 961738, TX 961678) using four types of inocula of *Sclerotinia minor* to determine their efficacy in differentiating disease response. Five- to six-week-old plants grown in 10-cm pots were used throughout the study. All but the terminal leaves were removed leaving about 1-cm of each petiole on the main stem. The four inocula consisted of germinating sclerotia produced on peanut stem, 3-day-old dried mycelia, granules of perlite (2-3 mm) impregnated with fresh mycelial fragments, and mycelial plugs (5-mm diameter) taken from the periphery of a 2-day-old culture growing on potato dextrose agar containing 100 μm/ml streptomycin sulfate. Each inoculum was consistently placed between the stem and a petiole in the middle of a main stem. Inoculated plants were placed in polyethylene chambers (Peanut Sci. 19:58-62) on a greenhouse bench where day and night temperatures were 24°C ± 2°C and 19°C ± 2°C, respectively. Relative humidity was maintained at 95-100% by lining the bottom of the chamber with a wet towel and misting the sides with water. Length of lesion was recorded daily starting on the third day through day six, after inoculation. Length of lesion on the 6th day after inoculation for each inoculum type was useful in separating Okrun, a *S. minor-su*sceptible genotype, from the moderately resistant runner genotypes. Rates of lesion expansion using germinating sclerotia, perlite inoculum and dried mycelia, over genotypes, were significantly ($P = 0.05$) less than that of the mycelial agar plug, and were 10.3, 11.0, 10.1, and 15.2 for germinating sclerotia, dry mycelium, perlite inoculum, and mycelial plug, respectively.

PHYSIOLOGY AND SEED TECHNOLOGY/ PROCESSING AND UTILIZATION

Timing of Initial Application of Baseline Plant Growth Regulator on Single and Twin Row Spaced Peanuts. J. P. BEASLEY, JR.*, C. K. KVIEN and S. RUSHING. Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793.

Baseline is a plant growth regulator being developed and tested for use on peanut. Baseline, common name, prohexadione calcium, is a product of BASF Corp. and a label for use on peanut could be approved as soon as the 2001 growing season. Baseline inhibits gibberillic acid production, thus reducing internode length. The result is a more compact plant. In early testing of Baseline, the recommendation was to make the initial application at 50% row closure (RC), or when approximately one-half of the row middles had canopy coverage. The twin-row pattern has gained in popularity in Georgia as a row spacing option in planting peanut. When planted in the twin-row arrangement, 50% RC may occur as much as three weeks earlier than peanuts planted in the single row pattern. Tests were conducted in 1998 and 1999 to determine the affect of timing of the initial Baseline application on growth habit, yield, and grade of peanut. Tests were conducted at Tifton, GA on a Tifton fine, sandy loam soil and at Plains, GA on a Greenville sandy clay loam soil. Both locations were irrigated as needed. In 1998, 'Southern Runner' cultivar planted in single and twin-row spacings were treated with an initial application of Baseline at 50% RC of single rows and 50% RC of twin rows. In 1999, 'Georgia Green' and 'Florida MDR 98' cultivars planted in single and twin-row spacings were treated with an initial application of Baseline at 50% RC of single rows and 50% RC of twin row spacings. In 1999, there was also an untreated check on both cultivars at each row spacing. There was not a significant difference in yield ($p \leq 0.05$) between the two initial application timings in 1998 or 1999. The two application timings significantly reduced main stem height compared to the untreated check in 1999.

Deficit Irrigation of Runner Peanut in the Texas Southern High Plains: Five Years of Research. A.M. SCHUBERT*, D.O. PORTER, J.P. BORDOVSKY, and W.M. LYLE (retired), Texas A&M University Agricultural Research & Extension Center, Lubbock, TX 79403.

Responses of peanuts to irrigation application methods and quantity were measured in large field experiments conducted during the 1995 through 1999 crop years. Irrigation was by a center-pivot system with drop nozzles on a circular planting pattern. All irrigation applications prior to 60-70 days after planting (DAP) were equal and in the Low Elevation Spray Application (LESA) mode. Application of different irrigation quantities and methods began at 60-70 DAP and continued until early- to mid-September. Irrigation frequency was 2.5 or 3.5 days during the experimental period in each crop year. Irrigation levels were those needed to replace 1.25, 1.00, 0.75, 0.50, and 0.25 times calculated cotton evapotranspiration (ET) in 1995 and 1996; 1.00, 0.75, and 0.50 ET in 1997; 0.75 and 0.50 ET in 1998; and 0.75 ET in 1999. Application methods compared were Low Energy Precision Application (LEPA) mode (using drag socks) in alternate furrows (LEPA-AF), LEPA mode in every furrow (LEPA-EF), and LESA mode in alternate furrows. Yields have varied from less than 2,000 to more than 6,000 kg/ha, depending on irrigation treatment and crop year. In 1999, 0.75 ET levels were applied as LEPA-AF, LEPA-EF, and LESA on single row (SR), double row (DR), and ultra narrow row (UNR) planting patterns. Conclusions: (1) High-frequency, LEPA-AF application of irrigation water (using drag tubes) supplied adequate water and maintained adequate pod-zone moisture during the July-mid Sept period with circular-row planting on a relatively level field site with sandy loam soil. (2) Calculated cotton ET served as a reliable guide for irrigation water quantities. (3) During most crop years, 75% ET replacement during the pod development period appears to be adequate, if the soil profile is full at the beginning of that period of time. (4) LEPA-AF tended to come closer to fulfilling plant needs when water application rates were inadequate--50% and 25% ET replacement as compared to LESA. Alternate-furrow irrigation reduces the wetted soil area and, therefore, reduces evaporation losses. (5) LEPA-AF did not work as well on UNR or DR as on SR in 1999, indicating that the narrow pod development zone found in West Texas, relative to traditional growing regions, is involved in the success experienced with LEPA-AF.

Effects of Peanut Flour and Peanut Butter on Texture of Muffins. M. J. HINDS. Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078.

Consumers are demanding convenient and health improving meal items. Studies have shown that frequent consumption of peanuts can decrease risk of coronary heart disease by up to 50%. One way to increase utilization of peanuts is to develop new value-added peanut products that would be appropriate meal items. Previous studies in which peanut flour was used to replace wheat flour in baked goods indicated adverse effects on their texture. The aim of this study was to evaluate texture of muffins containing high levels of various forms of processed peanuts. The control was a standard muffin formulation in which the fat was replaced by peanut oil, and topping-size ground peanuts (12%) were added. Response Surface Methodology (RSM) was used to evaluate the effects of replacing wheat flour (WF) by partially-defatted (12% fat, d.b.) peanut flour (PF, at 0, 40, 80%) and the addition of peanut butter (PB, at 0, 14, 28%, wt. basis) on texture (shear force, Food Technology Corporation TextureGage fitted with a Kramer cell) of the muffins. Replacement of wheat flour by peanut flour or addition of peanut butter significantly ($p>0.05$) increased the tenderness of the muffins. The control muffins were significantly ($p>0.05$) tougher (133.0 $\pm$ 3.6 lb shear force) than commercial banana-walnut (BW) muffins (80-111 lb shear force), and all other experimental muffins which contained PF and/or PB (69.3$\pm$2.1 to 110.7$\pm$1.5 lb shear force). Muffins containing 100% WF and 14-28% PB, and muffins containing either 40% or 80% PF with 0% PB were all similar in texture to commercial muffins. RSM indicated that the following muffin formulations would be similar in texture to commercial BW muffins: 100% WF with 11-28% PB, 20% PF with 1-20% PB, 40% PF with 0-14% PB, 60% PF with 0-5% PB, and 80% PF with 0-5% PB Muffins containing 40% PF and $\geq$15% PB or 80% PF and $\geq$6% PB would be more tender than commercial banana-walnut muffins, but may be similar in texture to some commercial chocolate chip muffins. Results indicate that muffins with textural quality similar to commercial banana-walnut muffins could be obtained by using formulations containing 37-41% (by wt) of combinations of processed peanuts (peanut flour, peanut butter, peanut oil, peanut toppings). The peanut muffins developed in this study would provide consumers with a convenient peanut-rich meal item.

Characteristics of Roast Color Development with Kernels Grown in Virginia, Texas, and Oklahoma. D.A. SMYTH* and F.W. SORNOZA. NABISCO, Planters Research and Development, East Hanover, New Jersey 07936.

Kernels of *Arachis hyopaea* L. are roasted under controlled conditions to produce a food product with optimal flavor, appearance, and texture. Kernel size, or grade, is an important attribute used by commercial operators to set roast temperatures and times. In this study, Virginia Extra Large grade kernels from Virginia, Texas, and Oklahoma were roasted in a laboratory oil fryer to determine whether growing region influenced final food quality. The kernels were purchased from the 1998 Texas and Oklahoma harvests, whereas Virginia kernels were tested from both the 1998 and 1999 harvests. The kernel testa was removed prior to oil roasting. The blanched kernels were roasted at constant temperature for variable amounts of time. At indicated times, the surface roast color and moisture content of the kernels were measured. Texas and Oklahoma kernels from the 1998 harvest developed optimal surface roast color more quickly than either the 1998 or 1999 Virginia kernels. The Virginia kernels took approximately twice the roast time to reach an equivalent HunterLab L* value. Preliminary sensory evaluations of the eating quality of these kernels suggested that these Southwest kernels made acceptable roasted product with less total heat energy applied. Kernel sucrose content was measured, and may be a surrogate marker for the other soluble metabolites that actually cause the differences in roast color development and flavor generation observed here. The Texas and Oklahoma kernels had approximately 5% sucrose content, which was more than the 3-4% found in the Virginia kernels. Differences in roasting characteristics like those reported here suggest that kernel growing region can be an important consideration for a commercial operation wanting to make a food product with consistent quality. Furthermore, understanding how kernels with such differences in roasting performance are formed might give some new directions for cultivar development or agronomic technique.

Vanillin Content in Boiled Peanuts. V.S. SOBOLEV. National Peanut Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Dawson, Georgia 31742.

Vanillin (3-methoxy-4-hydroxybenzaldehyde) is widely used as a flavoring agent with pleasant aromatic "vanilla" odor and taste in confectionery, beverages, and foods as well as in perfumery. It occurs naturally in several plants mainly as a glucoside. Its content in peanuts has not been reported. A high performance liquid chromatographic method (HPLC) for determination of free vanillin in peanuts has been developed. Free vanillin has been found in two commercial brands of boiled peanuts at ppb levels. Both the kernels and the hulls contained vanillin. At the same time vanillin was not found in fresh peanut kernels or hulls. After hydrolysis at 70°C under acidic conditions they showed significantly high free vanillin concentration. Apparently, prolonged boiling, or acidic hydrolysis of green peanuts caused the release of free vanillin from its conjugated form. Vanillin may be considered as one of the major ingredients that determine the flavor of boiled peanuts.

Comparing the Peanut Allergens Before and After Roasting S.J. MALEKI*, E.T. CHAMPAGNE, T.H. SANDERS. USDA-ARS, Southern Regional Research Center, 1100 Robert E. Lee Blvd., New Orleans, LA 70124, USDA, North Carolina State University, Raleigh, NC 27695

The effects of thermal processing (roasting) on the allergenic properties of peanut proteins have not been fully addressed. Our previous findings indicated that roasting may alter the structural characteristics of the major peanut allergens. An *in vitro* model system that is thought to mimic roasting was established. In this model system, purified peanut proteins that were isolated from raw peanuts were shown to complex with various naturally occurring sugars to become more immunogenic and resistant to digestive enzymes. In the current study, we have isolated the major peanut allergens from actual roasted peanut extracts and employed them to confirm the data obtained from our studies utilizing the model system. In addition, biophysical and immunological differences in the characteristics of the whole peanut extracts, as well as the purified allergens, Ara h 1 and Ara h 2, from raw and roasted samples have been compared. These studies may help us gain a better understanding of the allergenic proteins at the molecular level, which in turn may assist in the development of processing methods to reduce the allergenicity of peanut products.

PRODUCTION TECHNOLOGY II

Response of VA 98R Peanut to Twin versus Single Row Planting Patterns. R. W. MOZINGO* and C. W. SWANN. Tidewater Agricultural Research and Extension Center; Virginia Polytechnic Institute and State University, Suffolk, Virginia 23437.

A study was conducted in 1999 at the Tidewater Research Farm in Suffolk, Virginia to determine the response of VA 98R peanut to single and twin row planting patterns. The test site was on an Eunola loamy fine sand soil which had been planted to corn in 1998 and cotton in 1997. Field plots were two 40ft long rows, spaced 36 inches apart and replicated five times in a randomized complete block design. The planting date was 11 May. Single rows were centered on the 36-inch row spacing. Twin rows were spaced 9 inches apart with each of the twin rows spaced 4.5 inches to each side of the 36-inch row center. Cultural practices were as recommended by Virginia Cooperative Extension for the production of high yielding peanuts. Three treatments were used: 1. single row – 3.1 inch intrarow seed spacing (110 lb seed/A), 2. twin rows – 6.2 inch intrarow seed spacing in each of the twin rows (110 lb seed/A), and 3. twin rows – 4.5 intrarow seed spacing in each of the twin rows (150 lb seed/A). Yields for the three treatments were 4608 lb/A for the single row (110 lb/A seeding rate), 4903 lb/A for the twin row (110 lb/A seeding rate), and 5032 lb/A for the twin row (150 lb/A seeding rate). On-farm tests were also conducted at four sites in the Virginia production area (two in Southampton County and two in Sussex County) in cooperation with growers using single and twin row planting patterns in alternating strips across individual fields. Peanuts were harvested by row pattern, dried, and weighed for yield determination. Cultural practices for all tests were again as recommended by Virginia Cooperative Extension. Yield increases (ranging from 236 to 628 lb/A) were obtained at the four on-farm test for the twin rows compared to the single row planting pattern. The respective mean yield, value, percentage of extra large kernels and total kernel content for twin row planting was 407 lb/A, $138/A, 1%, and 1% higher than that of the single row planting pattern. These 1999 results indicate that the VA 98R cultivar had a positive economic as well as yield advantage for the twin row planting pattern.

Peanut Response to Seeding Rate, Row Pattern, and Prohexadione Calcium. D.L. JORDAN*, J.B. BEAM, and P.D. JOHNSON. Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

Seeding rate and row pattern can have a dramatic affect on peanut yield, market grade, and gross economic value. High seeding rates and twin row planting patterns, however, can reduce row visibility and can make digging peanut more difficult. Research suggests that prohexadione calcium, a growth regulator similar to daminozide, increases row visibility, decreases main stem height, and in some instances increases pod yield and enhances market grade characteristics. Seven experiments were conducted from 1997 through 1999 to evaluate interactions of seeding rate (125 kg/ha in single rows and 145 or 190 kg/ha in twin rows spaced 20 cm apart on the center of beds with spacings of 91 to 102 cm) and prohexadione calcium (0 and 0.14 kg ai/ha applied sequentially at row closure followed by a second application 3 weeks later). The cultivar NC-V 11 was evaluated in 5 experiments and the cultivar NC 12C was evaluated in 2 experiments. Row visibility, main stem height, machine-harvested pod yield, market grade characteristics, and gross economic value were determined. Prohexadione calcium increased row visibility and decreased main stem height independently of seeding rate in most experiments. The interaction of prohexadione calcium and seeding rate was not significant for pod yield, market grade, or gross value. However, main affects of seeding rate and the interaction of seeding rate by experiment were significant for these parameters. Seeding peanut in twin rows at 190 kg/ha offered no advantage over seeding at 145 kg/ha. In 3 of 7 experiments, pod yield was higher when peanut was seeded in twin rows at 145 kg/ha compared with seeding in single rows at 125 kg/ha. The percentage of total sound mature kernels (TSMK) was higher in single row seedings compared with twin row seedings regardless of seeding rate while the percentage of extra large kernels (ELK) was not affected by seeding rate. When pooled over experiments and seeding rates, pod yield, the percentage of ELK, and gross economic value increased 160 kg/ha, 3%, and 96 $/ha, respectively.

Effects of Narrow and Twin Row Systems on Peanut Production in Texas. R.G. LEMON*, W.J. GRICHAR, B.A. BESLER, D.J. PIGG, and K.D. BREWER. Texas Agricultural Extension Service, College Station, TX 77843-2474, and Texas Agricultural Experiment Station, Yoakum, TX 77995.

Twin row peanut culture was investigated to a limited extent in the 1970's in the Southwest using spanish market types. In general, results from these studies indicated that yields were 8 to 12% higher in the twin row configuration. Recent reports from the Southeast demonstrate that twin rows possess yield and grade advantages over conventional rows and lower incidence of TSWV compared to standard row spacings. Studies were installed at two sites in south Texas (Yoakum Experiment Station and Frio County) to evaluate twin, and narrow row production systems. Row spacings included conventional 36-inch, 15-inch (narrow), and twin rows spaced 10 inches apart. Study sites were prepared with a power tiller prior to planting and all row spacings were planted on a flat seedbed. Experimental factors included two runner varieties (Georgia Green and Tamrun 96) planted at two seeding rates (60 and 90 lbs/acre) across all row spacing configurations. Studies were planted with a Monosem vacuum planter. A conventional two-row digger was used to dig all row spacing treatments. Results from each location showed similar results/trends; however, yields from the Frio County site were significantly higher than the Yoakum location, and the following discussion will be based on the Frio County site. The study was planted June 2, 1999 and dug October 11, 1999, 131 days after planting. Yields from the conventional, narrow and twin row configurations yielded 4,234, 4,762, and 5,173 lbs/acre, respectively. This represented a yield advantage of 13% for the narrow row, and 22% for the twin row over the 36-inch row spacing. Grades were not significantly affected by row spacing. Plant densities within the conventional, narrow and twin row systems were 3.3, 3.1, and 6.2 plants/row ft., respectively. No significant interactions among variety, row spacing, or seeding rate factors were observed.

Effect of Seeding Rate on Yield and Grade of Georgia Green Peanut When Planted in Twin Row Patterns. J. A. BALDWIN*, D. E. MCGRIFF, T. B. TANKERSLEY, A. S. LUKE, and S. M. FLETCHER. Dept of Crop and Soil Sciences, University of Georgia Cooperative Extension Service, Tifton, and Bainbridge, GA 31793, and Dept of Agr and Appl Econ, University of Georgia, Griffin, and National Center for Peanut Competitiveness, University of Georgia, Tifton, GA 31793.

Yield and grade of peanut (*Arachis hypogaea* L.) has been improved when planted to twin row (7-9 inch) patterns in Georgia. The twin row pattern has resulted in significant yield and grade increases and significant reductions in Tomato Spotted Wilt Virus (TSWV) when compared to 36-inch single row patterns. These results were obtained at seeding rates of three seed/foot of row for twins compared to six seed/foot of row for singles. During 1999, this Georgia Green cultivar was planted at 2, 3 or 4 seed per foot of row on nine-inch twin row patterns at four locations in Georgia. The three seed per foot of row resulted in significantly higher yield (4130 vs. 3840 lb) more other kernels (OK) (4 vs. 3) and less TSWV (12% vs. 18%) when compared to two seed/foot of row. There was no difference in yield, grade, TSWV, or OK when three seed were compared to four seed per foot of row for the Georgia Green cultivar. Net returns per acre for 2, 3, or 4 seed/foot of row were $133.00, $177.00, and $107.00 per acre respectively.

Reduced Tillage for Continuous Peanuts and in Rotation with Cotton. D.L. HARTZOG* and J.F. ADAMS, Agronomy and Soil Department. Auburn University, AL. 36849.

Farmers have traditionally used a moldboard plow and disk to reduce disease pressure from plant residue, for herbicide incorporation and seedbed preparation. Experiments were conducted at the Wiregrass substation from 1995 to 1999 to compare cotton rotation and continuous peanuts with alternative tillage systems using two fungicide regimes. Whole plots were cotton rotation and continuous peanuts with subplots as tillage treatments consisting of moldboard plow, disk, chisel, Ro-till, ripper-bedder and moldboard plow plus chiselvator. Sub-subplot treatments were two applications of Bravo, followed by four applications of folicur, followed by a Bravo application, or seven applications of Bravo alone. There were no differences in yield or TSMK for the tillage treatments in 1995, 1996, and 1998 but yields were lower for the disk treatment in 1997. Limited rainfall in 1997 with reduced rooting depth may have accounted for lower yields. There were no yield decreases due to tillage in any year in the cotton rotation. Folicur treatments had higher yields in all tillage experiments except in 1997 where there were no differences in yield. For the cotton rotation yield was not improved in any year by folicur. The lack of moisture in 1997 eliminated any added benefit of one fungicide over another. On the other hand folicur did reduce whitemold and leafspot to a greater extent than Bravo, but it was not reflected in yield. TSMK were unaffected by fungicide treatment in 1995, 1996, 1997 and 1998. Limited moisture in 1997 exacerbated the effect of tillage on yield in continuous peanuts but had no effect in rotated peanuts. Rotation maintained yields with all tillage treatments and eliminated differences due to fungicide treatments. Conservation tillage practices can be adopted without yield reduction or increased disease pressures if moisture is not a limiting factor.

Soil Temperature In The Peanut Pod Zone Using Subsurface Drip Irrigation. R. B. SORENSEN* and F. S. WRIGHT. USDA-ARS-National Peanut Research Laboratory, P.O. Box 509: 1011 Forrester Dr. SE, Dawson, GA 31742

Maintaining soil temperatures at specified levels (below 29 °C) in peanut (*Arachis hypogaea* L.) are vital to crop growth and development while reducing the risk of *Aspergillus flavus* invasion, aflatoxin contamination, and insect damage. Subsurface drip irrigation (SDI) systems are not designed to wet the soil surface. Possible lack of moisture in the pod zone could result in elevated soil temperatures that could be detrimental to the peanut crop. The objective of this study was to document the response of soil temperature under peanut crop canopies when irrigated with a SDI system. Thermocouple sensors were inserted at 5 cm soil depth in the crop row and at specified distances from the crop row. Sensors were replicated 2 to 4 times in SDI and nonirrigated (NI) treatments. Maximum hourly and daily soil temperature data were at three locations, one in VA and two in GA. The maximum daily soil temperature decreased as plant canopy increased. During the first 50 days after planting (DAP), the average maximum soil temperature was 1 to 2 °C cooler than the average maximum air temperature for both the SDI and NI treatments. From 50 DAP to harvest, the average maximum soil temperature for SDI and NI treatments were 6 °C cooler than the average maximum air temperature. During pod filling and maturation, the average maximum soil temperature was about 5 °C (27 °C) cooler for SDI treatments than the maximum air temperature. Soil temperature in the NI treatments did exceed 29 °C during periods of drought but decreased to values similar to SDI treatments immediately following a rainfall event. Overall, SDI maintained maximum soil temperatures below critical values during peanut fruit initiation to crop harvest.

SYMPOSIUM: GENETIC RESOURCES FOR THE THIRD MILLENNIUM

History of *Arachis* Including Evidence of *A. hypogaea* L. Progenitors. A. KRAPOVICKAS, J.F.M. VALLS, and C.E. SIMPSON*. IBONE, Corrientes, Argentina, EMBRAPA/CENARGEN, Brasilia, Brazil, and TAES/TAMU, Stephenville, TX, USA.

The genus *Arachis* probably originated as a geocarpic form of *Stylosanthes* on the old Brazilian Shield in what is now southwestern Mato Grosso do Sul, Brazil or northeastern Paraguay. Several mid-tertiary uplifts followed, raising the penaplain and the ancient *Arachis* with it. We still find the two ancient species in the area today, *A. guaranitica* and *A. tuberosa*, comprising the taxonomic section *Trierectoides*. From this beginning the other species and sections evolved. The more advanced materials, but still quite ancient, are the sections *Extranervosae*, *Triseminatae*, *Heteranthae*, and *Erectoides*. The distribution of these species was a slow process because of the geocarpic fruit, which limited movement to an estimated one meter per year. Flowing water obviously played a large part in the distribution of the *Arachis* species. From the early materials evolved the more advanced sections/species: *Caulorrhizae*, *Procumbentes*, and *Rhizomatosae*. The evolution of the most advanced section *Arachis*, which includes the cultivated peanut, has overlapped the other sections, and the distribution of some members of this section has been strongly affected by man. Development of the cultivated species, *A. hypogaea*, did not occur in the wild. Convincing evidence has been found in archaeological digs to show that the hunter/gatherers in what is now Argentina and Peru were growing wild *Arachis* in their fields (gardens) about 1800 to 1500 BC. The wild peanut shells in these digs are very similar to *A. magna/A. ipaensis/A. monticola*. In the same digs, in later generations cultivated peanut shells, which closely resemble the peanuts growing in both regions even today, were found. The peanut probably did not spread as quickly as corn in its early history. Extensive data now exist on two other cultivated *Arachis* species still grown in Brazil for food and medicinal uses. *Arachis villosulicarpa*, found in the western Mato Grosso and *A. stenosperma* which man has spread from the eastern Mato Grosso to northern Tocantines and western Mato Grosso and all the way to the littoral of the southeast coast of Brazil. Cultivated peanut (*A. hypogaea*) samples very likely moved to Africa and China with ancient mariners, well before the time of Columbus. After discovery of the Western Hemisphere, and the Conquests, *A. hypogaea* in many forms spread to Africa and Asia. Later the cultivated peanut was used in feeding slaves being transported from Africa into the southeastern United States, Central America, and northeast South America, thus returning modified germplasm to the Americas. No evidence has been found that native Americans brought the peanut, along with corn, to the East Coast of North America in pre-Columbian times.

Advances in the Taxonomy of the Genus *Arachis*. A. KRAPOVICKAS* and G. LAVIA. IBONE, Corrientes, Argentina.

In a recent thesis (Lavia ined.) the new chromosome numbers of 17 species and the caryotypes of 15, are reported. At present only 4 species remain, of which the chromosome numbers are still unknown. These results confirm the genus structure proposed in the monograph, but show also that some rearrangements are needed. *A. vallsii* (sect. Procumbentes) and *A. benensis* (sect. *Arachis*) are two species with exomorphology and caryotype so different that merit two new independent sections. *A. chiquitana* was included in the section Procumbentes but the presence of chromosomes "A", proves that it belongs to the section *Arachis*, fact demonstrated by Stalker with the hybrids *A. duranensis* x *A. chiquitana* obtained. *A. williamsii* from the Beni, Bolivia, should be included in the group of species involved in the origin of *A. hypogaea*. The finding of a new chromosome number (x=9, 2n=18) in three species of the section *Arachis*, is not enough to merit a new section because of the slight exomorphological differences with the other annual species of this section. Probably this reduction of the chromosome number is a new event in the evolution of the genus *Arachis*.

Recent advances in the characterization of wild *Arachis* germplasm in Brazil. JOSÉ F. M. VALLS. Embrapa Genetic Resources and Biotechnology (Cenargen). Brasília, C.P. 02372 - CEP 71505-270, DF, Brazil

Brazil holds most of the wild *Arachis* species, with representatives of all nine taxonomic sections, four of which are exclusive to the country. Brazilian scientists have taken the official responsibility, with fundamental international support, to rescue, conserve and characterize the genetic resources of the native species, also helping to manage germplasm of the four neighbor countries having wild species of the genus (Bolivia, Paraguay, Argentina and Uruguay). Since 1980, a concentrated effort is being conducted in this direction, under the leadership of Embrapa Genetic Resources and Biotechnology (Cenargen) and the Agronomic Institute of São Paulo State (IAC), with intensive collaboration of state universities, such as UNESP/Botucatu and UERJ. Over 20 graduate student dissertations and theses, as well as research of a temporary team of scientists hired out of national and international grants, have expanded the knowledge on the wild species, especially as concerns those in section *Arachis*, and those with a high potential as forage plants in the *Caulorrhizae*. Research has progressed in fields such as taxonomy, phytogeography, morphological characterization, *in vitro* conservation, cytogenetics, floral biology, mode of reproduction, cross-compatibility of interspecific and intersectional hybrids, segregation of fertile hybrids, disease and nematode resistances, as well as genetic characterization based on seed proteins, isozymes, RAPD, RFLP, AFLP and SSR. RAPD markers have been used for assorted species of all nine sections, and, with a few exceptions, they tend to confirm the accession and species associations, as established in the 1994 generic Monograph. In cooperation with IBONE, Argentina, cytogenetic data have been obtained from representatives of all sections, unveiling the existence of three Brazilian diploids with 2n=18. The novel Brazilian germplasm contains eight new species. A new tetraploid was found in the *Rhizomatosae*, and one of the new taxa of the *Arachis* section has the small A chromosome pair. Crosses of *Caulorrhizae* X *Procumbentes* or *Erectoides* showed the dominance of the stoloniferous habit in F1, yielding new plant types that, although sterile, can be easily propagated by cuttings in cultivated pastures. The species most intensively investigated are *A. pintoi* (135 accessions) and *A. stenosperma* (40 accessions).

Use of Wild *Arachis* species/Introgression of Genes into *A. hypogaea*. C.E. SIMPSON. Texas Agric. Exp. Station, Texas A&M University. Stephenville, TX 76401

The use of wild *Arachis* in variety improvement programs has been considered an option for variety development for more than 50 years. Both Krapovickas and Gregory, independently, made interspecific hybridizations in the 1940's. However, only three varieties have been released as a result of interspecific hybridizations, and only one of those has a clearly identifiable genetic component from the wild species. Hammons released Spancross in 1970 from an interspecific cross (*hypogaea* X *monticola)* and Simpson and Smith released Tamnut 74 from a similar cross in 1974. Simpson and Starr released COAN in 1999 that has genes for root-knot nematode (*Meloidogyne arenaria* and *javanica*) resistance transferred from a wild species. Several breeding lines have been reported and some germplasm releases are documented from Texas, North Carolina, and ICRISAT. At least four potential options exist for transferring genes from wild *Arachis* to the cultigen. 1)The hexaploid pathway consists of crossing a diploid wild directly with *hypogaea*, doubling the chromosome number to the hexaploid level, then backcrossing for several generations to restore the tetraploid condition. Several options are possible in this pathway involving various crossing schemes prior to crossing a diploid hybrid with *hypogaea*. 2) The diploid/tetraploid pathway has been the most successful to date. This pathway involves crossing diploid species (two to several), doubling the chromosome number of the hybrid, then crossing to *hypogaea* and backcrossing with selection for the desired character. This pathway is most successful when both A and B genome species are involved. 3) Another diploid/tetraploid pathway could be to double diploid species chromosome numbers and cross the amphiploids directly with *A. hypogaea*. Several attempts have been made with this technique, but no success has been reported. The sterility factor is simply too great to overcome when both A and B genomes are not included in the hybrid mix. Some of the sections/species of wild *Arachis* are so greatly isolated from *A. hypogaea* that biotechnology will be the only way we will introduce genes from them into the cultigen. 4) Molecular methods of "inserting" genes into peanut that have been mentioned, include use of *Agrobacterium* sp., electroporation, and direct DNA delivery techniques such as the gene gun, whiskers, and sonication. Some of these techniques are under experiment, but to date no one has been successful in producing a GM variety of peanut.

Molecular Genetics of *Arachis* and Marker Assisted Selection. H. T. STALKER, Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

Many agronomic traits are difficult to select in *Arachis hypogaea* by conventional selection techniques, and marker-assisted selection offers an additional tool for obtaining improved germplasm lines. Also, if alien genes are associated with molecular markers, they may be more easily be incorporated into *A. hypogaea* while at the same time eliminating undesirable traits. The cultivated peanut has been analyzed by several marker systems, including RFLPs, RAPDs, AFLPs, SSRs, and microsatellites. Variation is observed among accessions in approximately 5% of the markers when a number of diverse accessions are analyzed. However, molecular variation is very difficult to detect between pairs of *A. hypogaea* lines. Conversely, a large amount of variation exists among *Arachis* species. Molecular maps have been constructed independently in two laboratories by utilizing diploid species and by using a complex amphiploid interspecific hybrid. However, a map of the cultivated peanut will be very difficult and costly to produce because of little detectable molecular variation between individual lines. Other studies have shown that RFLP and RAPD markers are mostly collinear. In advanced-generation interspecific hybrids derived from an *A. hypogaea* × *A. cardenasii* cross, it has been shown that *A. cardenasii* genes were incorporated into 10 of 11 linkage groups. If the cultivated peanut is truly an allotetraploid in the classical sense, then genes from the A-genome species *A. cardenasii* should have been introgressed into only ½ of the *A. hypogaea* linkage groups. Additional studies have identified *A. duranensis* and *A. ipaensis* as likely progenitor species of *A. hypogaea*. Researchers in several laboratories associated molecular markers with genes conditioning disease and insect resistances, and these investigations are beginning to productive for selecting improved breeding lines and cultivars of peanut.

Geographical Distribution of Genetic Diversity in *Arachis hypogaea*. C.C. HOLBROOK, USDA-ARS, Coastal Plain Exp. Stn. Tifton, GA 31793.

The U.S. maintains a large (>7,000 accessions) and genetically diverse collection of peanut germplasm. It is very costly to screen all accessions within this collection for traits which could be useful in cultivar development. The objective of this research was to attempt to identify countries of origin which are rich sources of resistance to the important peanut diseases. This would allow peanut breeders to focus their screening efforts on smaller subsets of the germplasm collection. Accessions in the peanut core collection were evaluated for resistance to late and early leaf spot, *Tomato spotted wilt virus*(TSWV), the peanut root-knot nematode (PRN), and cylindrocladium black rot (CBR). These data were then examined to determine if genes for resistance show any type of geographical clustering. Several geographical areas that appear to be rich sources for disease resistant genes were identified. China had a relatively large number of accessions with resistance to the PRN. Peru appears to be a rich source of resistance to CBR. Resistance to late leaf spot was more frequent than expected in Bolivia and Ecuador. Bolivia was also a valuable source of resistance to early leaf spot. Early leaf spot was also more prevalent than expected in Nigeria and Sudan. Argentina, Brazil, India, Israel, Sudan, and Zambia were valuable origins for material with resistance to TSWV. Accessions with multiple disease resistances were most common in India and Zambia. This information should enable plant breeders to more efficiently utilize the genes for disease resistance that are available in the U.S. germplasm collection.

Use of *A. hypogaea* Plant Introductions in Cultivar Development. T.G. ISLEIB*, C.C. HOLBROOK, and D.W. GORBET; Dept. of Crop Science, N.C. State University, Raleigh, NC 27695-7629; USDA-ARS-SAA, P.O. Box 748, Tifton, GA 31793; N. Florida Research and Extension Ctr., 3925 Hwy. 71, Marianna, FL 32446-7906.

The genetic base of peanut in the United States has at times been extremely narrow, particularly in specific production areas where a single cultivar may be grown in near-monoculture. Because peanut is not a native North American species, all US cultivars necessarily trace to plant introductions (PIs), but most of the genetic base of current cultivars rests on selections from farmer-stock peanuts. Different PIs were used as parents in different early breeding programs. In Georgia W.R. Beattie used Gambian line 'Basse' as a parent in the GA 207 cross that gave rise to selections used in Georgia, Florida, and North Carolina as the basis of further improvement. PI 121067 was one of the seven parents used by W.C. Gregory to initiate the program at NCSU. A different set of PIs including PI 121070, PI 161317, PI 268661 and *A. monticola* were used in the Texas and Oklahoma programs. Recycling of lines as parents and exchange of germplasm among breeding programs proliferated these PIs in the pedigrees of cultivars released since 1960. Over the past 20 years, there have been concerted efforts to incorporate additional germplasm into US breeding populations, usually with the purpose of improving resistance to diseases or insect pests, but also with the objective of broadening the genetic base. These PIs feature resistance to leafspots, nematodes, TSWV, toxigenic *Aspergillus* spp., and other diseases. Use of PIs as parents has been facilitated by the efforts of the USDA-ARS in augmenting and evaluating the US national collection, and in making the information available through the Germplasm Resource Information Network (GRIN). Although there have been numerous public releases of runner and virginia germplasm with 50% or more PI ancestry, most have not been successful as cultivars in the US. There are several examples of successful cultivars with up to 25% PI ancestry, including Georgia Green and NC-V 11, which dominate their respective market types. In the spanish class, most successful cultivars have derived 50% or more of their ancestry from PIs. Several recent or impending releases incorporate PI germplasm but have not yet been proven in the US seed market.

Progress and Status of the U.S. Peanut Collection.

R.N. PITTMAN*. USDA, ARS, Plant Genetic Resources Conservation Unit, Georgia Experiment Station, Griffin, Ga. 30223.

Much of the potential valuable peanut germplasm is rapidly disappearing as rural development, urbanization and implementation of modern agricultural methods, including the supplanting of cultivars by improved germ plasm, destroy native habitats and plant populations. The objectives of the peanut germplasm in project in Griffin, Georgia are to acquire, conserve, and distribute seed and/or vegetative stock of *Arachis* species; encourage the broad diversity of germplasm by evaluating germplasm for specific disease and pests traits; disseminate information through the Germplasm Resource Information Network (GRIN) database; and conduct research that enhances project effectiveness. A set of peanut descriptors was approved by the Peanut Crop Germ Plasm Committee and published in 1995 which is used to describe plant, pod, and seed traits, and disease/pest ratings. In 1993, a core collection was developed for cultivated peanuts to aid in the evaluation of peanuts. In the year 2000, the number of cultivated peanuts in the collection was 8,720 an increase of 500 from 1996. Wilds or others have increased 100 from 580 in 1996. During the last 5 - 6 years, an extensive effort has been made to regenerate the cultivate peanuts. About 95% of the material has been regenerated. But during this time, little attention has been given to wild peanuts and no significant regeneration has been made. Approximately, 3,000 cultivated accessions have 80% or more of the descriptor information. Descriptors for the core collection is complete and not available on GRIN. The peanut core collection has been used to identify sources of resistance for late leafspot and tomato spotted wilt virus. During 1999, 24 scientists requested 1,190 accessions from the PGRCU. The use of the core collection has aided in the selection and identification of country areas where material of interest might be found. While the cultivated collection is in good shape, improved and new efforts need to be directed toward the maintenance of wild germ plasm as this material is being used to develop new cultivars with the genes for resistance present.

Status of the *Arachis* Germplasm Collection at ICRISAT. H. D. UPADHYAYA, M. E. FERGUSON*, and P. J. BRAMEL. Genetic Resources and Enhancement Program, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502 324, Andrah Pradesh, India.

ICRISAT maintains a substantial *Arachis* germplasm collection of 14723 accessions, comprising 14310 accessions of cultivated peanut (*Arachis hypogaea* L.) from 92 countries and 413 accessions of wild species representing 43 taxa. All germplasm is freely available for distribution. Forty-five percent of the cultivated peanut collection is of var. *hypogaea*, followed by 35.7% var. *vulgaris* and 16.1% var. *fastigiata*. Varieties *hirsuta* and *aequatoriana* are represented by 20 and 15 accessions respectively. All passport and characterization data is accessible through the inter-net. In order to enhance the utilization of the collection and understand the diversity it contains, efforts have focused on characterization and documentation of the collection and the formation of a core of 1704 *A. hypogaea* accessions. These are representative of the genetic diversity in the entire collection. The core provides an entry point into the collection and is currently being evaluated for maturity, biotic and abiotic stress resistance and quality parameters, including aflatoxin contamination. A sub-set of the core is used in pre-screening for polymorphic molecular markers. Evaluation of the wild *Arachis* collection to major abiotic stresses is a continuing process. Future efforts in both the wild and cultivated collections will focus on germplasm exchange and acquisition, and specific regions for future collections are identified. The development of molecular markers for diversity assessments in all *Arachis* taxa, and alternative strategies for utilization of the wild species are also important areas of research.

New Directions for Collecting and Conserving Cultivated Peanut Diversity. DAVID E. WILLIAMS*. IPGRI Regional Office for the Americas, Cali, Colombia.

Existing strategies for collecting and conserving cultivated peanut diversity need to be reassessed and updated in light of recent collecting efforts and the new political climate affecting international germplasm access and exchange. In the Americas, important geographical gaps in the ex situ germplasm collections still need to be filled before the full extent of peanut genetic diversity from the crop's continent of origin is known. Moreover, reports of genetic erosion in secondary centers of peanut diversity such as Asia and Africa need to be investigated and addressed. The global trend to implement national legislation regulating access to genetic resources presents new challenges for organizing and conducting foreign plant explorations, making international partnerships more important than ever. Innovative new tools and methods for assessing, locating, and conserving crop genetic diversity, such as GIS and on-farm conservation, are proposed as integral elements of a new strategy. These new approaches will help ensure that the unfinished work of collecting and conserving cultivated peanut diversity may be successfully continued into the 21st Century.

Tissue Culture for In Vitro Germplasm Conservation of *Arachis* spp. L. MROGINSKI*, H. REY, and L. VIDOZ. Instituto de Botánica del Nordeste, C.C. 209, 3400 - Corrientes, Argentina.

In vitro tissue culture offer procedures of overcoming various problems in conservation of crop genetic resources. The development of methods for the storage of in vitro cultures may resolve the problems, which normally occur in the germplasm conservation of certain vegetatively propagated species of *Arachis* and those producing few seeds. One method for short and medium term storage is based in inducing slow growth of the cultures. Both, Meristems or nodal segments of *A. pintoi* (2n=2x=20 and 2n=3x=30) were cultured on MS medium and incubated for 8 month in 4°C. High frequency of plant survival were obtained Cryopreservation for long term storage of *Arachis* spp. requires further research and development. Techniques based on using somatic embryos of *A. pintoi* and *A. glabrata* are in progress.

Evolving Political Issues Affecting International Exchange of Arachis Genetic Resources. K.A. WILLIAMS* and D.E. WILLIAMS. USDA-ARS National Germplasm Resources Laboratory, Beltsville, MD 20705 USA; IPGRI-Americas, c/o CIAT, Cali, COLOMBIA.

While plant genetic resources continue to be essential for world food security, the exchange of these resources between countries has become increasingly encumbered in recent years. The free and open access to genetic resources that previously were considered the "common heritage of Mankind" has been fundamentally changed by international multilateral agreements that recognize national sovereignty over genetic resources. Since the entry into force of the Convention on Biological Diversity in 1993, many countries have implemented laws regulating access to their genetic resources. The development of such legislation in several of the countries comprising the primary areas of origin and diversity of *Arachis* makes the issues associated with germplasm exchange particularly relevant to peanut breeders worldwide. This paper describes some recent USDA experiences with obtaining access in Latin American countries harboring peanut genetic resources. Also discussed are the implications and prospects for future international germplasm exchange, including aspects of collaborative research and benefit sharing with germplasm donor countries. Within this new political climate, the establishment of mutually beneficial precedents for accessing foreign genetic resources will be crucial for ensuring the continued exchange, conservation and use of *Arachis* germplasm in the future.

Genetic Engineering of *Arachis*. P. OZIAS-AKINS*. Department of Horticulture, The University of Georgia Coastal Plain Experiment Station, Tifton, GA 31793-0748

Genetic engineering is a tool for crop improvement that extends our access to beneficial traits beyond sexually compatible crosses. Genes from virtually any organism can be cloned and introduced into peanut. Gene function can be influenced by the regulatory elements used to control expression as well as the genome context of the integration site(s) where one or multiple copies of the transgenes are inserted. Methods for the production of transgenic peanut (*Arachis hypogaea* L.) that are based on biological or physical DNA transfer have been developed over the last decade. The most reliable method for the introduction of foreign DNA is microprojectile bombardment of embryogenic tissue cultures. With the use of a selectable marker gene for hygromycin resistance, transgenic plants can be recovered in 12-14 months. Transgenic peanuts resistant to the lesser cornstalk borer have been produced with the objective of reducing aflatoxin contamination by reducing insect damage to developing pods. The future application of this tool to increase pest resistance and enhance quality traits in peanut has enormous potential, but will largely depend on consumer acceptance of genetically engineered crops.

Potential Use of Genetic Resources to Address Issues of Concern for the Peanut Industry. H.E. VALENTINE, The Peanut Foundation, Alexandria, VA 22314

The history of peanuts covers many millenniums with their origins in South America. Their movement from South America to Africa, China, and the United States has created a market in the Four Corners of the earth. We continue to be astounded by new discovers each year as we continue to fill in the gaps of our knowledge. We have new cooperative efforts in Brazil, Bolivia, Paraguay, Argentina, and Uruguay. We expand the opportunities to discover and introduce new traits with the core collection systems recently developed as well as innovative new methods to improve disease resistance, insect resistance and broaden the genetic base of cultivated peanuts. Another system, genetic engineering, shows much promise but many technical and consumer barriers still exist. The use of molecular markers may be advanced through a better understanding of the peanut genome and gives us a method to use genetic markers to quickly advance plants containing new traits. Through all these changes we must continue to maintain and expand our germplasm collections the basis for all future work. Additionally we must continue our efforts to expand and improve the lines of communication between all segments involved in new cultivar development. The tools to bring new varieties to market faster must be developed. The variety development system must address the needs of all segments of the peanut industry and most importantly anticipate the consumers needs for peanuts around the world.

Control of Sclerotinia Blight of Peanuts with Fungicides. J.A. WELLS*, T.A. LEE, JR., C.B. MEADOR. Department of Plant Pathology, Texas Agriculture Extension Service, Stephenville, Texas 76401.

On 12 May, a field with a history of Sclerotinia blight was planted to Florunner peanut in Motley County, Texas. The field had been in cotton in 1998 and peanut in 1997. Plots were replicated in three randomized complete blocks and each consisted of 2, 30-foot rows spaced 36 inches apart. With the exception of fungicide applications, standard practices for management of fertility, weeds, nematodes and insects were utilized. Fungicide sprays were applied with a CO_2 pressurized sprayer calibrated to deliver 20 gal/A at 26 psi using one 8002 flat fan nozzle per row. Visual disease ratings were observed on 22 September, and actual diseased plants were rated when dug on 3 October. Diseased plants per 60 row feet ranged from a low of 3 up to 12 in the check. Yields were assessed at harvest (6 October) by drying and weighing peanuts from each plot. Grades were taken according to standard procedure and value per acre figured from a Peanut Loan Schedule - 1999 Crop. Disease pressure at the sight was very light at the middle of the season because of the hot, dry conditions in Texas. Sclerotinia was first observed on 24 August. On 22 September, Sclerotinia was very evident. By 3 October, plants were deteriorating rapidly and the decision to dig was made. Peanuts were somewhat immature. There were significant differences in disease incidences and yields as well as dollar value per acre. All fungicide treatments increased value per acre over the check from $5 to $259. Only treatment No. 6 (Botran 75WP@ 2 lbs/A) fell below the check in yield, and ranged from 1900 lbs/A up to 2753 lbs/A.

Using Peanut Leaflet Inoculations to Screen for *Sclerotinia minor*. J.E. HOLLOWELL* and B.B. SHEW. Department of Plant Pathology, N.C. State University, Raleigh, NC 27695-7616.

Partial resistance to *Sclerotinia minor* has been reported in peanut (*Arachis hypogaea*), but field performance is not always correlated with laboratory or greenhouse evaluations of resistance. More efficient screening methods and better understanding of the mechanisms contributing to Sclerotinia blight resistance are needed to produce more cultivar options for growers to economically manage this disease. A collection of *S. minor* isolates and peanut entries were screened to aid in the selection of more resistant cultivars. Detached leaflets of 12 greenhouse grown peanut entries were incubated in the dark at 20 C in Nalgene utility boxes with moistened sand. Leaflets were inoculated on the adaxial surface with a 4 mm diameter agar plug of a single isolate of *S. minor* to assess resistance to lesion expansion. Day 3 lesion lengths ranged from 11 to 24 mm with a mean of 19 mm. Lengths differed significantly among the entries, with NC-GP WS 12, an advanced breeding line derived from a cross of NC 6 x [NC 3033 x NC-GP WS 1]-15 being the most resistant. Similarly, 48 isolates of *S. minor* were inoculated on leaflets of a susceptible cultivar (NC 7) and aggressiveness was assessed by measuring lesion expansion. Day 3 lesion lengths differed among the 48 isolates and ranged from 2 to 24 mm with a mean of 15 mm. Then, a subset of isolates ranging in aggressiveness was inoculated on leaflets of a subset of peanut entries representing a range of resistance/susceptibility. A split-split plot experimental design was used with isolates as whole plots, source of plant material (9 wk greenhouse or field) as subplots, and peanut entries as sub-subplots. Lesion expansion was measured on peanut leaflets and was used to analyze entry x isolate interactions. There were highly significant main effects of isolates and entries. The entry x source interaction was significant. The most resistant peanut entry (NC-GP WS 12) responded so against all isolates.

Evaluation of Detached Shoot and Leaflet Inoculation Techniques to Screen Peanut Genotypes for Resistance to Rhizoctonia Limb Rot. M.D. FRANKE* and T.B. BRENNEMAN. J.Leek Associates, Brownfield, TX 79316 and Department of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

Identifying peanut genotypes with resistance to Rhizoctonia limb rot in the field is a slow and costly process. The objectives of this study were to compare detached leaflet and shoot inoculations as methods of screening for resistance. Eleven core selections from the U. S. germplasm collection and four commercial cultivars exhibiting a range of susceptibility to limb rot in previous field experiments were evaluated. Detached lower reproductive limbs were suspended in Hoagland's solution and inoculated with a mixture of soil and oat seeds infested with *Rhizoctonia solani*. Detached leaflets on moistened filter paper in petri dishes were inoculated with hyphal plugs. The temperature for both tests was 23 C and humidity was maintained at 95-100%. Incidence of leaflet infections ranged from 30-100% (LSD=38) among genotypes. Georgia Green had the highest severity of leaflet infection (73.1%) with other genotypes having as little as 1.6% (LSD=21.8). In the detached shoot inoculation study, overall disease levels were higher than in previous field experiments, and symptoms were typical of those seen in the field. Lesion numbers per stem ranged from 0.6 to 2.6 (LSD=0.9) with Georgia Green having 0.7. There were few differences in lesion length. Results indicate differential susceptibility of leaves and stems in some genotypes including Georgia Green. Neither leaflet or stem inoculation results were correlated with limb rot susceptibility in field trials, indicating that disease levels in the field may result from the combined susceptibility of leaves and stems. The detached shoot inoculation technique could be used to evaluate other factors such as relative fungicide performance, or effects of environment on disease, but it may not be the best indicator of limb rot resistance in the field.

Persistence of Flutolanil, Tebuconazole, and Azoxystrobin on Peanut Under Field Conditions and Post-infection Activity on Southern Stem Rot. T. B. BRENNEMAN*, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

Flutolanil, tebuconazole and azoxystrobin are the three fungicides used for stem rot of peanut in Georgia. The comparative level of residual control was evaluated on Georgia Green in field microplots from 1997-1999. Each 36-inch-diameter microplot contained three plants which were sprayed and inoculated in August after a full canopy had developed. Inoculum consisted of PDA plugs 0.4-inch-diameter with actively growing mycelium of *Sclerotium rolfsii*. Plots were watered for three consecutive days after inoculation. Flutolanil was applied as Bravo/Moncut (2.1 pt/A), tebuconazole as Folicur 3.6F (7.2 fl oz/A), and azoxystrobin as Abound 2SC (9.2 fl oz/A). Rates applied were 25% of the total active ingredient normally applied per season for each fungicide. One set of plants was sprayed with flutolanil, tebuconazole or azoxystrobin at day 0 and then inoculated with *S. rolfsii* at day 0, 7 and 14. Treatments gave 72-87% disease control at day 0 which decreased to 42-45% at day 14. Yields were increased by 139-167% at day 0 and only 48-82% at day 14. The post-infection activity of the three fungicides was compared by inoculating plants at day 0 and then applying fungicides at day 0, 4, 7 and 11. The greatest decrease in disease control was from 0 to 4 days where disease control fell to 30-45%, and it declined more gradually from there to 25-34% at day 11. All three fungicides significantly increased yields at all application timings, and sprays at day 11 gave increases of 83-90%. In both trials, there were few differences among the three treatments at any single date. The data best fit a logarithmic function, and azoxysrobin gave the best residual control of stem rot while tebuconazole tended to have the best post-infection activity.

Association of Two Communities of Soilborne Fungi with Three Cultivars of Peanut in Florida.

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In a survey of multiple commercial fields in Florida during 1995 and 1996, two communities of soilborne fungi were identified in association with roots, hypocotyls, pods, and pegs of peanut plants. A general fungal community progressed through foundational, secondary, and tertiary stages of development. Stages were related to seedling growth, vegetative and early reproductive growth, and later reproductive growth of the peanut host, respectively. A second, smaller community also emerged during later reproductive growth stages of peanut and was associated specifically with the pegs of the plant. In field trials conducted during 1998 and 1999 at Quincy, Florida, severity of soilborne disease was lower in the cultivar Florida MDR 98 than in the cultivar Florunner. Disease severity was lower in Georgia Green than in Florunner in 1998, but not in 1999. Incidences of 14 soilborne fungi were evaluated in each cultivar on eight biweekly sampling dates. Development of fungal communities was similar among the three cultivars grown in Quincy, despite differences in yield and disease severity. Based on correspondence analysis, *Lasiodiplodia theobromae* was more closely associated with the pegs of the plant in Florida MDR 98 and Georgia Green than in Florunner. There was less distinction between the foundational and secondary stages of the general fungal community at Quincy than there was in the surveys of 1995 and 1996. *Aspergillus niger* and *Trichoderma* spp. were grouped with the foundational stage of community development in the general survey, but were placed in the secondary stage at Quincy. In the general survey, *Sclerotium rolfsii* was placed in the peg community, but this pathogen was grouped with the tertiary stage of the general community at Quincy. Cultivar selection had little effect on the development of communities of soilborne fungi; however, composition of the stages in the development of the fungal communities in a single field varied slightly from descriptions based on multiple fields in 1995 and 1996.

Evaluation of Peanut Fungicides for Control of Southern Blight in South Texas. B. A. BESLER*, W. J. GRICHAR AND A. J. JAKS. Texas Agricultural Experiment Station, Yoakum, Texas 77995.

Several peanut fungicides were evaluated in 1997 and 1998 in South Texas at the Texas Agricultural Experiment Station near Yoakum, Texas to determine efficacy for control of southern blight caused by *Sclerotium rolfsii*. Fungicides evaluated included, Abound, Folicur, Flint, Moncut, RH-0753 and various tank-mix combinations of these fungicides. These fungicides were applied either season long or 2 to 4 times throughout the growing season on the variety GK-7. Bravo Weatherstik was applied throughout the growing season to control leaf spot. Fungicides were applied using a CO_2 backpack sprayer with hand held boom delivering 20 gpa at 50 psi. Nozzles consisted of D_2 tips, #13 core and slotted strainers. Test plots were designed in a randomized complete block with 4 replications. Plot size was 2-36 in rows by 25 ft long. Southern blight disease incidence was assessed immediately after inversion of plots. Data was subjected to analysis of variance and means separated using Least Significant Difference (P=0.05). In both 1997 and 1998, Abound 2.08 SC applied 61 and 89 days after planting (DAP) and 60 and 88 DAP respectively at 24.6 fl oz/A had the largest significant reduction in southern blight disease incidence over the untreated check. All fungicide treatments in 1997 significantly reduced disease incidence over the untreated check. Most fungicide treatments enhanced yields as much as 48% in 1997 and 30% in 1998. In 1997, RH-0753 at 25.6 fl oz/A applied only once throughout the growing season provided the largest increase in yield over the untreated check. Abound at 12.3 fl oz/A applied 4 times throughout the growing season provided the largest increase in yield in 1998. Fungicide treatments in 1997 and 1998 did not significantly improve grades over the untreated check.

Control of Peanut Diseases with Full Term Strobilurin Derivative Sprays in Texas. A. J. JAKS*, W. J. GRICHAR and B. A. BESLER, Texas Agricultural Experiment Station, Yoakum, TX 77995. Three strobilurin derivative fungicides were compared with a chlorothalonil and tebuconazole block spray and a chlorothalonil treatment alone, sprayed season long for control of peanut foliar and soilborne diseases in 1999. The primary purpose of the test was to determine effectiveness of these products when used alone. Abound (Zeneca Ag. Prod.) at the respective rates/A of 0.58 pt, 0.77 pt, 1.15 pt, and 1.54 pt; Flint (Novartis Crop Protection) at 0.18 lb and 0.25 lb; and BAS 500 (BASF) at 6.12 fl oz; 9.19 fl oz and 12.25 fl oz were sprayed seven times on a 14-day schedule with the exception of BAS 500 treatments which were applied sprays 2-7. The comparison block spray treatment used Bravo Weather Stik (1.5 pt) at sprays 1,2,7 and Folicur 3.6F (7.2 fl oz) at sprays 3-6. Bravo Weather Stik (1.5 pt/A) was also used alone for seven sprays. Plots were two rows, each 20 ft long. At 100 days after planting (DAP) there was an equal observed mix of early leaf spot (*Cercospora arachidicola*) and late leaf spot (*Cercosporidium personatum*) with an average rating of 5.1 in untreated plots using the Florida 1-10 scale. At the final leaf spot rating (134 DAP) early leaf spot (95%) was predominant with late leaf spot (5%) present. Untreated plots averaged an 8.1 rating at this time. Rust (*Puccinia arachidis*) was present over the test with an average rating of 4.6 in untreated plots using the I.C.R.I.S.A.T. 1-9 Scale. Soilborne disease pressure was moderate with *S. rolfsii* (70%) and Rhizoctonia pod rot (30%) observed at harvest rating. At the final leaf spot rating (134 DAP) all treatments provided significant control over the untreated check and BAS 500 provided significantly better control over all other treatments. All treatments provided excellent rust control under moderate pressure with no rust observed in plots with the two higher rates of BAS 500. All treatments provided good control of soilborne disease with the exception of the Flint and Bravo WS treatments which were not different from the untreated control. Fungicides increased yield by 34 to 103% over that of the untreated check. BAS 500 had the greatest effect on yield with yields over 4000 lb/A. Bravo WS, Flint, and Abound at 0.58 and 1.54 pt/A had the least effect on yield as compared to the untreated check. The greater impact of BAS 500 on peanut yield is probably due to overall better disease control than other fungicides.

EXTENSION TECHNIQUES AND TECHNOLOGY/ EDUCATION FOR EXCELLENCE

Impact of Hurricanes on the 1999 North Carolina Peanut Crop. J. PEARCE*, S. UZZELL, B. GRIFFIN, A. WHITEHEAD, C. ELLISON, A. COCHRAN, C. TYSON, F. WINSLOW, P. SMITH, L. SMITH, M. WILLIAMS, M. SHAW, B. SIMONDS, J. BAILEY, J. SPEARS, G. ROBERSON, G. NADERMAN, D. JORDAN, T. ISLEIB, and B. SUTTER. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh, NC 27695-7620 and North Carolina Peanut Growers Association, Inc., Nashville, NC 27855.

In early September of 1999 United States Department of Agriculture, North Carolina Department of Agriculture and Consumer Services, and North Carolina Cooperative Extension Service personnel estimated that the 1999 peanut crop had the potential to rival the 1998 crop which yielded 3,500 kg/ha (3,150 lb/acre). However, hurricanes Dennis, Floyd, and Irene, coupled with several relatively minor but untimely normal rainfall events, devastated the crop in certain parts of the state. Final state yield was 2,690 kg/ha (2,400 lb/acre). Edgecombe county was hardest hit with floods causing a complete loss of 10% of planted acres (11,564 acres planted). Only a fraction of the remaining acreage was harvestable with estimated yields of less than 1,680 kg/ha (1,500 lb/acre). The combined economic loss in Edgecombe county alone was in excess of 7 million dollars. Statewide, 5% of the crop was not harvested because of poor harvesting conditions or flooding. Major concerns after Hurricane Floyd included the extent of contamination of peanut crop from flood waters, crop maturity and yield loss estimates, economical justification of harvesting damaged crops, survival of peanuts remaining under flood water for extended periods of time, impact of damage on seed quality for the 2000 crop, requirements to harvest in order to receive crop insurance payments, and harvest principles under adverse weather conditions. County personnel were involved in many aspects of the community in addition to their traditional roles as Cooperative Extension Service field faculty.

Research and Extension Efforts Designed to Define the Utility of Reduced Tillage Systems in Peanut in North Carolina. M. WILLIAMS*, P. SMITH, A. COCHRAN, J. PEARCE, A. WHITEHEAD, C. ELLISON, D. JOHNSON, S. BARNES, C. BOGLE, G. NADERMAN, and G. ROBERSON. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh, NC 27695 and North Carolina Department of Agriculture and Consumer Services, Raleigh, NC 27611.

Many growers in North Carolina would like to adopt reduced tillage systems in peanuts if yield and quality can be maintained. Results from research efforts as well as grower attempts to produce peanut in reduced tillage have been inconsistent, and general statements about adoption of reduced tillage practices are difficult to make. A variety of trials have been conducted in North Carolina to evaluate peanut response to the intensity of tillage, cover crop selection, fertilization and pest management practices. Much of this research has been conducted with a single variety and one digging date. Evaluating the influence of variety selection and digging date on peanut response to tillage systems may increase our understanding of why inconsistent responses have been observed. Research was conducted in 1999 at three locations to evaluate interactions of tillage systems (conventional and reduced tillage), cultivar selection (NC 10C, NC-V 11, NC 12C, Perry, Georgia Green, and VA 98R), and digging date (two digging dates spaced approximately 2 weeks apart). At an additional location, conventional and reduced tillage systems were compared with only one digging date. Results from these studies suggests that while cultivar selection and digging date had a major impact on peanut yield and quality, these factors did not interact with tillage systems. In 3 of 4 studies, tillage system did not affect peanut yield. A slight decrease in yield was noted at one location. Additional research is needed to further define the factors that affect peanut response to tillage. Weather conditions were poor during digging and combining in North Carolina in 1999, and response under more typical growing conditions is needed. These studies were conducted on good peanut soils and additional research is needed on soils which are marginal for peanut production.

Yield Response of Several Peanut Cultivars when Planted in Single and Twin Row Patterns During 1997-99. D. E. MCGRIFF*, J. E. HUDGINS, and J. A. BALDWIN. Cooperative Extension Service, University of Georgia, Bainbridge, GA 31718, and Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793.

Research was conducted in Georgia from 1990-96 comparing the response of runner type peanut (*Arachis hypogaea*) cultivars in single and twin row patterns. There was a positive, yet non-significant yield response to twin rows in most trials. Since 1996 several new cultivar with tomato spotted wilt virus (TSWV) resistance had been released and not evaluated in twin rot patterns. Nine cultivars were evaluated comparing 36 inch row patterns to twin row of 9.5 inches on a 72 inch bed in 1997. The demonstrations were continued utilizing a slightly closer row pattern on the twin rows of 9 inches comparing six cultivars in 1998 and five cultivars in 1999. Twin row patterns had a 639 lb/acre yield increase; a 1.5% higher TSMK (total sound mature kernels); and 6.5% reduction in TSWV compared to single rows over all nine cultivars in 1997. Twin row patterns in 1998 had a 300 lb/acre yield increase; a 1% higher TSMK; and 9% reduction in TSWV over six cultivars compared to single row patterns. Twin row patterns in 1999 had a 481 lb/acre increase; a 1.5% higher TSMK; and 14% reduction in TSWV compared to single rows over five cultivars. Twin row patterns had a 473 lb/acre yield increase; 1.33% higher TSMK; and a 9.8% reduction in TSWV compared to single row patterns in 1997-99.

Effects of Simulated Defoliating Worm Damage on Peanut Yield. J. S. Russell* and R. Havlak. Texas A&M Agricultural Extension Service, Pearsall, TX. 78061.

A runner peanut variety, Georgia Green, was planted in the eastern portion of Frio county on June 14, 1999. Seed was planted in 36 inch rows at a rate of 90 lbs./ acre and test plots consisted of 2 rows x 12 feet with 3 replicates. Preselected levels of foliage were removed from the plants at 40, 80, and 120 days after crack (DAC), or emergence of the seedling. Zero (control), 33%, 66%, and 99% of the foliage, based on plant height, was hand removed from individual plots at each time interval. The plots were harvested at maturity and yield and grade were obtained from samples corresponding to each treatment. No significant differences in yields were observed for all treatments applied at the 40 DAC and 120 DAC time intervals. However, significant differences in yield were observed at the 80 DAC time interval. Significant reductions in yield were observed when comparing the 33% and 66% defoliation treatments to the control, but they were not significantly different from each other. A significant reduction in yield was also observed when comparing the 99% defoliation treatment to all treatments at 80 DAC. Grades for all treatments across the test ranged from 74 to 78. Based on the data, peanut plants appear to be susceptible to the loss of foliage during the mid-stages of their development.

Simplicity - Key To Profit in Peanuts. C. W. TANKERSLEY* and P. TORRANCE Univ. of Georgia, Cooperative Extension Service, Swainsboro, GA 30401.

Emanuel County, Georgia produces 3500 acres of peanuts annually by 100 producers. The county has many small acreage producers, but is an integral part of a diversified cropping system. Our major educational efforts addressed problems of digging too early, short rotations, and inadequate leafspot control. Our hull scrape clinics for determining peanut maturity have been a great success with over ninety percent of our peanut growers relying on our clinics for determining optimum peanut maturity. Our county yields have increased by 300 pounds/acre over the past three years and resulted in 1,500,000 extra pounds with a value of over $450,000.00 due to improving our harvest maturity. Over the past twelve years, our rotations have improved from having one to two years between peanut crops and including soybeans in the rotation which resulted in more insect and disease problems. A majority of our producers are now on three to four year rotations including crops like cotton, corn, or bahiagrass. Our educational programs have also targeted timeliness of a good leafspot control program. Also, educating growers on the benefits on new fungicides for soil-borne disease control. Other production practices such as obtaining pegging zone tests for calcium nutrition and selection of improved varieties have also contributed to improved yields and quality of peanuts produced by Emanuel County growers.

Extension Efforts for Quality Peanut Production in Dinwiddie County, Virginia. M. J. PARRISH*, Dinwiddie County Cooperative Extension, Dinwiddie, VA 23841.

Providing quality Extension programming is based on timely research-based information. Current Dinwiddie Extension programs impact over 3,500 acres of producer-grown peanuts. Our program starts each year with two winter crop management meetings. The first program concentrates on production economics and peanut programs and policy news. Our second program is a traditional production meeting built on University Peanut Specialist Research data. The spring planting season starts with equipment calibration clinics for both fumigant and insecticide. During the growing season, field plots are established for an Area Field Day and we conduct timely IPM programs for local producers as problems arise. One of the most widely used crop management programs is the Peanut Advisory which includes the peanut leafspot and sclerotinia advisory along with an insect update and a frost warning program. These can be obtained through a hotline, the Internet and the county Extension newsletter. The advisory information is collected through three blacklight traps, two EnviroCasters, and two NOAA weather stations. This helps to provide accurate and timely data for growers to make educated management decisions. In addition to our advisory programs, on-farm research plot work has become a vital source of information. Dinwiddie farm plots include peanut variety, tillage, insect, and nematode tests. Our most intensive program would be the Peanut Maturity Clinics. Due to seasonal weather, such as hurricanes and drought, the timing of harvest is critical. Over the past four years, we have conducted an average of four Maturity Clinics each year during which we pod blast approximately 60 samples during each program. Each clinic on average involves 25 producers and represents two to three thousand acres of Virginia peanuts with six to eight varieties represented. This program has assisted growers from three additional peanut counties and enabled peanut growers to determine the optimum digging date. The mentioned programs are promoted on a timely basis and the agent works closely with growers during the entire production year.

Penetration and colonization of groundnut seeds by *Aspergillus flavus* and *A. parasiticus*. P. S. VAN WYK and C. J. SWANEVELDER*. ARC-Grain Crops Institute, Private Bag X1251, Potchefstroom, 2520 South Africa.

The basic process of infection and preliminary colonization was studied in plants aseptically produced from groundnut embryos on artificial media. Here, penetration of stems was direct and no infection structures were observed. A few cell layers are colonized and the organism then remains localized. Similarly, in the soil environment, pegs and pods are penetrated and locally colonized by soilborne inoculum of the aflatoxigenic *Aspergillus* spp. This primary colonization was independent of cultivar resistance and/or soil conditions. However, only under conditions of drought stress are pods further invaded where the fungus moves through the funiculus and the gap between the embryo and cotyledons and finally colonizes the intercotyledenous space. Alternatively the fungus is released into the space between seeds and pod inner walls following disintegration of the funiculus resulting in seed testae being colonized. The latter scenario is strictly limited to certain lines with specific types of funiculi. These patterns of disease development are closely linked to primigenic dominance resulting from the podset habit of the plant and its ability to handle conditions of drought stress.

Integrating Plant Growth Stage into Weather-Based Advisories Improves the Efficiency of Fungicide Applications for Control of Early Leaf Spot of Peanut. P. M. PHIPPS, Tidewater Agr. Res. & Ext. Ctr., Virginia Polytechnic Institute & State University, Suffolk, VA. 23437

Field trials in 1998 and 1999 were designed to compare fungicide-spray programs with starting and ending dates determined according to the growth stage of peanuts. Growth stages included beginning bloom (R1), beginning peg (R2), beginning pod (R3), full pod (R4), beginning seed (R5), and beginning maturity (R7). After the first application of fungicide, subsequent sprays were applied according to the Virginia Peanut Leaf Spot Advisory Program until the designated growth stage for ending the program. Bravo 720 at 1.5 pt/A was evaluated at one location in 1998. Using the same criteria in 1999, the performance of Bravo alone was compared to a program of Folicur 3.6F at 7.2 fl oz/A plus Induce (8 fl oz/100 gal) before August 15, and thereafter only Bravo. Tests in 1999 were conducted at two locations. Plots consisted of four, 35-ft rows spaced 3 ft apart and treatments were replicated in four, randomized complete blocks. Untreated plots showed >98% of leaflets with disease at harvest in both years, and defoliation averaged 68% in untreated plots in 1998 and 91% in 1999. Results demonstrated that applications of Bravo or Folicur from R1 to R4 offered little or no benefit in disease management. The efficiency of fungicide applications was greatest when the spray program began at R4 and ended at R7. No significant differences were apparent in leaf spot incidence or defoliation where Folicur was used in place of Bravo prior to August 15. Yields of plots treated in 1998 with Bravo alone from R1 to R7 and R4 to R7 averaged 3625 and 3982 lb/A, respectively. Untreated plots produced 3267 lb/A. Yields in 1999 with Bravo alone compared to a Folicur program that ended with Bravo averaged 4353 and 4782 lb/A, respectively, when applications were made from R1 to R7. Bravo alone applied from R4 to R7 yielded an average of 4502 lb/A whereas the Folicur program yielded an average of 4781 lb/A. Untreated plots in these trials averaged 3111 lb/A. Currently, fungicide sprays are applied from R1 to R7. This approach required an average of 4.7 applications and resulted in excellent disease control. However, it was not significantly better than three sprays from R4 to R7. The results of this research suggest that integrating plant growth stage into the Virginia Leaf Spot Advisory Program could eliminate an average of 1.7 sprays of either Bravo or Folicur. The total savings in variable costs could range from $22.10/A for Bravo to $32.86/A for Folicur.

Effect of Fluazinam on Frost Injury of Peanut. V. L. CURTIS* and J.E. BAILEY.
Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.
A test to evaluate fungicides on Sclerotinia blight of peanuts was planted on May 22, 1999, with 16 cultivars: 5 Virginia types, and 11 runner types. Treatments consisted of Omega 500F (fluazinam @4.17 lbs. ai/gal) at three rates: 15.2 fl.oz./acre, 30.4 fl.oz./acre, and 60.9 fl.oz./acre.; 32.0 fl.oz. Rovral (iprodione @ 4 lbs. ai/gal) + 7.7 fl. oz. Nufilm (adjuvant)/acre; and an untreated control. Applications were made, on 7-20-99 and 8-19-99, using a tractor-mounted sprayer, with 3 hollow-cone nozzles per row at 40 psi, and 15 gal water/acre. Plots consisted of two treatment rows 36 inches apart and 25 feet long. Two unsprayed border rows were between plots. Disease incidence was rated on 10-5-99 as hits per plot; hits = number of feet of row with symptoms. Frost occurred on 10-25-99. Disease incidence and frost ratings were collected on 11-02-99. Frost Rating Index: 1 < 5% green leaves, 4 > 50% green leaves; values between 1 and 4 were scaled from 5 to 50%. Stems were not rated, and varied from brown, to black, to bright green. Plants with symptoms of Sclerotinia blight were not rated for frost injury. Peanuts were dug on 11-10-99, and harvested on 11-15-99. Moisture samples were taken from untreated plots of each variety. Yields were adjusted to 9% moisture. Statistics were run using SAS. The high rate of fluazinam significantly reduced frost injury and Sclerotinia blight on peanut cultivars compared to other treatments. Cultivars varied in their resistance to frost and disease injury. Fluazinam at the highest tested rate protected plants from frost. Some cultivars were higher yielding than others. Yields were significantly higher with fluazinam, and probably resulted from less frost injury. Frost protection was unrelated to disease control. There was a 67-day lapse between the last treatment application and the frost event, and an 88-day lapse between that treatment and harvest. It is unlikely that significant active compound was still present as its half-life is approximately 24 hours in inundated soils. Record rains occurred in this field during the intervening period creating extended periods of very wet conditions. Therefore, it is likely that the frost protection was a systemic physiological response to the compound rather than a direct effect on ice crystal formation. It appears that fluazinam reduced frost injury and effected a corresponding yield increase. Research is needed to repeat these results and to assess potential frost protection on other crop species.

Nematode and Tomato Spotted Wilt Resistance in Interspecific Peanut Breeding Lines. P. TIMPER*, C. C. HOLBROOK, USDA-ARS, P. O. Box 748, Tifton, GA 31794, and H. Q. XUE, Department of Crop Science, North Carolina State University, Raleigh, NC, 27695.
The peanut root-knot nematode, *Meloidogyne arenaria*, and *Tomato spotted wilt virus* (TSWV) can severely reduce peanut yields in the southeastern U.S. In preliminary tests, several families of *Arachis hypogaea* arising from a cross between Marc I and an interspecific genotype containing nematode-resistance genes introgressed from *A. cardinasii* showed resistance to both TSWV and *M. arenaria*. Our objective was to evaluate selected progeny from this cross for nematode resistance in the greenhouse and field. In the greenhouse, nematode eggs were extracted from the roots of peanut genotypes 40 days after inoculation with *M. arenaria*. There were eight replicate pots per genotype. Egg production on seven of the genotypes was 1/3rd to 1/10th that of the susceptible genotype. In the field, the average root-gall index from ten plants per plot was determined at digging (135 DAP). There were three replicate plots per genotype. Gall indices on 11 of the genotypes averaged < 2 on a scale of 1-5. These results are promising because several of the genotypes with good resistance to *M. arenaria* were also resistant to TSWV.

High Levels of Field Resistance to TSWV in Peanut Breeding Lines. A. K. CULBREATH*, J. W. TODD, D. W. GORBET, and C. C. HOLBROOK. Coastal Plain Expt. Station, Tifton, GA 31793, and North Florida Res. and Ed. Center, Marianna, FL 32446.

Field tests were conducted in Tifton, GA and Marianna, FL in 1998 and 1999 to determine the effects of medium and late maturity peanut (*Arachis hypogaea*) breeding lines on intensity of spotted wilt, caused by tomato spotted wilt tospovirus (TSWV). Spotted wilt intensity was monitored in replicated field plots of several medium and late maturing lines for comparison to susceptible check cultivars, Georgia Runner in 1997 and GK-7 in 1998 and a moderately resistant standard, Georgia Green. April planting dates and 12.3 seed/m of row were used to increase spotted wilt pressure. Across all tests, final spotted wilt intensity (FI) ratings (percent row length severely affected by spotted wilt) among the best late maturing lines evaluated were 22.3% for F 84x47-10-1-1-2-b2-B, 24.8% for F 86x43-1-1-1-1-1-b2-B, and 12.8% for C-11-2-39 compared to 84.2% for the susceptible check and 54.2% for Georgia Green. Corresponding pod yields were 5762 kg/ha for F 84x47-10-1-1-2-b2-B, 4773 kg/ha for F 86x43-1-1-1-1-1-b2-B, and 4460 kg/ha for C-11-2-39 compared to 2121 kg/ha for the susceptible check and 3512 kg/ha for Georgia Green. Among the best of the medium maturing lines, FI ratings were 41.2% for F90x7-1-5, 37.1% for F88xOL3-HO6, and 17.9% for F90x7-3-5-1 compared to 80.32% for the susceptible check and 57.3% for Georgia Green. Pod yields were 4139 kg/ha for F90x7-1-5, 3674 kg/ha for F88xOL3-HO6 and 5033 kg/ha for F90x7-3-5-1 compared to 2427 kg/ha for the susceptible check and 2990 kg/ha for Georgia Green. Performance of these lines indicates that there is great potential for improving the level of field resistance to TSWV in production cultivars.

Southwest Texas Peanut Survey for *Tomato spotted wilt virus* and *Impatiens necrotic spot virus*. M.C. BLACK*, R.D. HAVLAK, and J.S. RUSSELL, Texas Agricultural Extension Service, Texas A&M University, Uvalde 78802-1849 and 400 S. Pecan, Pearsall 78061.

Peanut plants with spotted wilt disease symptoms were collected July through October 1999 in Frio and Atascosa Counties, TX in 14 commercial irrigated fields of cultivars Tamrun 96, ViruGard, and Georgia Green. In most cases we collected three symptomatic plants from each of four quadrants plus one asymptomatic plant per field. Taproot plus crown tissue was shipped overnight for serology tests (ELISA) for *Tomato spotted wilt virus* (TSWV) and *Impatiens necrotic spot virus* (INSV) by the Texas Plant Disease Diagnostic Laboratory, TAMU, College Station, TX with supplies from Agdia, Inc., Elkhart, IN. Season long, positive reactions from symptomatic plants were: ViruGard (N=87) 90% TSWV and 2% INSV; Tamrun 96 (N=171) 93% TSWV and 9% INSV; and Georgia Green (N=210) 83% TSWV and 14% INSV. Positive reactions from asymptomatic plants were: ViruGard (N=5) 20% TSWV and 0% INSV; Tamrun 96 (N=11) 18% TSWV and 0% INSV; and INSV Georgia Green (N=15) 20% TSWV and 13% INSV. Samples averaged by the month in which they were collected from all cultivars had these positive reactions: July (N=47) 85% TSWV and 13% INSV; August (N=141) 88% TSWV and 3% INSV; September (N=193) 94% TSWV and 21% INSV; and October (N=96) 77% TSWV and 1% INSV. Additional symptomatic samples in Frio County, not part of the main survey, had these positive reactions: Tamrun 88 INSV spreader rows in two peanut breeding line screening nurseries (N=30) 97% TSWV and 13%; and one Georgia Green commercial field with large areas of late season plant death (N=9) 89% TSWV and 56% INSV. Plants positive for INSV were almost always TSWV positive. Greater variability for INSV detection over time compared to TSWV may be due to greater titer fluctuations or greater instability of some virus particle component. Some TSWV-resistant cultivars may have potential for INSV damage. Screening breeding lines under field conditions with both viruses present may allow development of resistance to both.

Peanut Seed Treatment Fungicides: Use and Economic Assessment. D. T. SMITH, W. J. GRICHAR*, M. C. BLACK, AND A. J. JAKS. Texas Agricultural Experiment Station and Texas Agricultural Extension Service, College Station, Yoakum, and Uvalde, Texas. 77843-2474.

The use of fungicide seed treatments in 1997 in the southwestern U.S. was documented in a survey of all shellers in the three-state region (TX, OK, and NM) and an economic assessment was completed on the impact of these pesticides in the peanut industry. In 1997, nearly 20,000 kg of five active ingredients were applied to 26 million kg of seed peanut; 100% of the seed received one, and most commonly, two or more fungicides. Captan made up nearly 50% of all protectant fungicide use (9,380 kg) and was applied to 90% of the seed. PCNB was 20% of the total (3,760 kg) and was used with 92% of the seed. Thiophanate methyl made up 16% of all fungicides (3,080 kg). Carboxin and thiram were important but were used in lesser quantities. In evaluating decision-making processes, shellers were the key people in selecting fungicides. Fungicidal effectiveness and assurance for a good stand for growers were the two major factors in their selections; chemical cost was not a significant factor since fungicides and application only made up 4% of the total cost of planting seed. Both captan and thiophanate methyl are listed as a Priority I chemicals for review under the 1996 Food Quality Protection Act. For an assessment of usefulness, seed treatment studies from 12 years of field trials (1982 to 1995) at Yoakum were evaluated. Compared to untreated seed, captan-treated seed resulted in consistently higher emergence, seedling stands, and pod yields every year. Sheller estimates of fungicide and application costs and Extension Peanut Enterprise Budgets were utilized in a comparative economic analysis. Treated seed produced a net return (above variable costs) of $730/ha, compared to $398/ha for untreated seed. Net returns over the 12-year period were $331/ha higher with treated seed, which made the difference between profitable and unprofitable returns for growers. For example, use of untreated seed resulted in negative returns for 7 out of the 12 years while fungicide-protected seed resulted in positive returns in 10 of the 12 years. The biological and economic assessments in this study document why seed treatments are so essential and 100% of the planting seed is treated with a protective fungicide. The assurance of a vigorous crop stand is vital in all subsequent weed, insect, and disease IPM programs during the year. Seed protectant fungicides made up less than 4% of all pesticide use in peanut production in the three-state region, based on an earlier survey of grower uses.

BREEDING, BIOTECHNOLOGY, AND GENETICS I

Possible Cause of Abnormal Kernels Observed in Peanut Varieties. C.E. SIMPSON*, M.A.BARING, Y. LOPEZ, WM. HIGGINS, AND J.M. CASON. Texas Agric. Exp. Station, Stephenville, TX 76401 and Soil and Crop Sci. Dept. College Station, TX 77834.

Abnormal kernels occur in almost every cultivar grown in the USA, and they also occur in most breeding lines and germplasm materials. Abnormal kernels are generally characterized by one cotyledon growing larger than the other(s) and wrapping around the smaller structure(s). This wrapping will cause the cotyledons to not separate into two equal halves when the peanut seed is split. The wrapping often causes small pieces to break from one or both cotyledons upon splitting. These "pieces" often fall through cleaning screens and become oil stock, resulting in a shrink in the overall weight of the TSMK fraction. Occasionally there appears to be more than two cotyledons and as many as five cotyledon or cotyledon-like pieces have been recorded. We have been observing and studying this phenomenon for more than thirty years. Our findings have been that the abnormal kernels are often associated with a form of apomixis that is not described in the literature. One of the world's foremost authorities on apomixis was invited to examine the slides and data and his conclusion was the same as ours: "It is apomixis, no doubt, but not like any form that I know or have read about." The abnormal kernels can be associated with twin (or multiple) embryos in one seed, the cytological analyses reveal "active" nucellar cells, and frequent formation of multiple embryo sacs in ovules in which the sexual apparatus is present and active or has degenerated. The character is expressed variably in different environments, which have not been finitely defined. Stress such as heat and/or dry usually result in higher levels of abnormal kernels and apomicitc embryo sacs. Preventing pollination or pollination with incompatible pollen also stimulates apomictic embryo sacs in some materials. Some germplasm materials (and varieties) have a higher tendency than others do and several of the wild *Arachis* species have very high levels of apomictic embryo sacs. The character can be selected against in segregating populations, but this selection needs to be done in successive generations and still may not be highly successful in completely eliminating the character from a breeding line.

Genetic Factors Influencing High Oleic Acid Content in Spanish-type Peanut Cultivars. Y. LOPEZ,* O.D. SMITH, S.A. SENSEMAN, C.E. SIMPSON and W.L. ROONEY Department of Soil and Crop Sciences, College of Agriculture and Life Sciences, Texas A&M University, 2474 TAMU, College Station, TX 77843-2474.

Increasing the ratio of oleic to linoleic acid (O/L) in peanut (*Arachis hypogaea* L.) significantly improves the nutritional and quality attributes of the crop. In currently grown cultivars, the O/L ratio ranges between 0.8:1 to 2.5:1. Variation in peanut for O/L ratio has been characterized and the O/L ratio is digenically inherited at two loci designated as Ol_1 and Ol_2. All of this research has been conducted in virginia and runner-type peanut. However, there have been no reports regarding the inheritance and allele frequency at these loci in spanish-type peanut. The objectives of this study were to determine if the inheritance of the high oleate trait in spanish-type peanut is similar to that previously reported and to determine the allelic composition of spanish-type peanut at Ol_1 and Ol_2. Six different spanish-type peanut cultivars (low oleate) were hybridized with F435 (high oleate) and segregation F_2 and BC_1F_1 progenies were evaluated for the O/L ratio. Segregation patterns indicated that high oleic acid content is digenically inherited in spanish-type peanut, but there seems to be more allelic variation both within and among these cultivars. In addition, variation within the high and low oleate ratio classes indicated that other factors may be involved in determining the precise O/L ratio.

Identification of US-224 as the Source of Resistance to Tomato Spotted Wilt Virus in Tamrun 96. M.R. BARING*, M.A. BLACK, and C.E. SIMPSON. Soil and Crop Sciences Dept. Texas A&M Univ., College Station, TX 77843, Texas Agric. Extension Service, Uvalde, TX 78801,Texas Agric. Exp. Station, Stephenville, TX 76401.

'Tamrun 96' was released by the Texas Agricultural Experiment Station in 1996 because of its high yields, resistance to tomato spotted wilt virus (TSWV) and its tolerance to the soil borne diseases, southern blight (*Sclerotium rolfsii* Sass.) and pod rot (*Pythium myrotylum* Drechs). Tamrun 96 was derived from a cross of 'Florunner' X US 224 (PI 475871), and the second generation progenies from that hybridization crossed with 'Langley,' an early maturing runner variety. Langley was derived from a cross of Florunner X PI 109839. The germplasm line, US 224 was collected in northwest Brazil in 1979 and has been used extensively in the Texas peanut breeding program because of its putative tolerance to several plant pathogens. At the time of collection, we suspected that US 224 would have some tolerance to soil borne plant pathogens because it was collected from an area of very high rainfall and soil conditions not condusive to good drainage. During the development of a pod rot resistant line which later became Tamrun 96, it became apparent that the line Tx896100 had a very good level of tolerance/ resistance to the TSWV organism. At the time of release of Tamrun 96 it was not certain as to what was the source of the resistance to the several organisms, although US 224 was strong suspect because the other parents in the cross did not have such resistances. We began a program of parental testing in 1998 and repeated the tests in 1999 and there is little doubt that the resistance to the TSWV organism came from US 224, as did the tolerance to southern blight and sclerotinia blight. Supporting data will be presented.

Effect of Genotype on Organogenesis in Peanut. K. CHENGALRAYAN[1]*, S. HAZRA[2], M. GALLO-MEAGHER[1] and D.W. GORBET[3]. [1]Agronomy Department, University of Florida, Gainesville, Florida 32611-0300; [2]Plant Tissue Culture Division, National Chemical Laboratory, Pune 411008, India; [3]North Florida Research and Education Center, 3925 Highway 71, Marianna FL 32446.

Reliable regeneration systems that culminate in the formation of plants are necessary for successful utilization of most biotechnological methods in the genetic improvement of crops. Before embarking upon a program of peanut improvement using *in vitro* techniques, it is of utmost importance to screen the available cultivars for their morphogenic potential. Therefore, initially, a protocol for regeneration of plants via organogenesis was developed for a single genotype (JL 24) and later extended to 30 different genotypes. The primary objective was to evaluate the 30 genotypes for their morphogenic ability *in vitro* and the second objective was to determine the reliability of the protocol standardized for caulogenesis in JL 24. Various factors affecting regeneration such as explant type, basal medium and growth regulators were evaluated. Results indicated that MS basal medium supplemented with 4 mg/l NAA, 5 mg/l BAP and 2% (w/v) sucrose was optimum for inducing caulogenesis from 97% of the mature zygotic embryo-derived leaflets of JL 24 with an average of 16 buds per explant. *In vitro* regeneration of plants is genotype dependent. Comparison of organogenic response with embryogenic response shows that there is no correlation between these two types of responses for a given genotype.

Genetic Relationships Among Peanut Cultivars and Breeding Lines in Shandong Province, PRC. H.Q. XUE and T.G. ISLEIB*, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629.

Shandong Province is the leading peanut-producing province in China which in turn is the leading peanut-producing country in the world. Shandong's annual area under peanut and production are 23% and 31% of the total for China, respectively. Shandong Peanut Research Institute (SPRI), an institute of the Shandong Academy of Agricultural Science, has had an ongoing breeding program for over 40 years. SPRI is the source of the peanut cultivars that dominate production in Shandong Province and northern China. About 75 peanut cultivars and breeding lines have been released in Shandong by SPRI and other institutions, among these, Fu Hua Sheng, Hua 17, Hua 28, Hua 37, Xuzhou 68-4, Baisha 1016, Hai Hua 1, 8130 and Lu Hua 14 are the most important. The objective of this study was: 1) to determine the genetic contribution of main ancestors to the genetic base of Shandong peanut cultivars; and 2) to study the genetic relationships among peanut cultivars and breeding lines in Shandong Province. This information will be used as a guide for peanut breeders in choosing parents and avoiding genetic vulnerability to pests. Twenty-eight ancestors were identified in the pedigrees of 75 lines, 24 ancestors of Chinese origin contributed 96.8% of the Shandong peanut genetic base, and 4 exotic introductions contributed only 3.2%. The three most important ancestors based on average coancestry with the 75 lines are Fu Hua Sheng (PI 436545), Shi Tou Qi (PI 430227 and 461435) and Jianggezhuang Ban Man (PI 433351) from which 74, 34 and 28 lines were derived, respectively. Among the 13 dominant varieties of Shandong Province, Lu Hua 14 has the lowest average coancestry with the others which means it has the high genetic variance. In contrast, Fu Hua Sheng, Xuzhou 68-4 and Lu Hua 9 were closely related to the other cultivars. The results suggest that the genetic base of Shandong peanut cultivars is narrow. Parents with low coefficients of coancestry for the new cross combinations should be chosen in order to enlarge the gene pool of the new cultivars.

Conserving Groundnut Genetic Diversity in West Africa. A. H. MAYEUX[1] and B. R. NTARE[2] [1] CIRAD-Dakar, BP 6478 Dakar-Etolle, Senegal, and [2] ICRSAT-Bamako, BP 320 Bamako, Mall.

West Africa produced about 12% of the world groundnut output in 1992. However, this does not reflect its potential, which is much higher, as the yields obtained are less than half of those obtained in India and China and a quarter of those obtained in the U.S. Availability of adequate quantities of planting material is basic to improvement of groundnut productivity in Africa. A project called the Groundnut Germplasm Project (GGP) was initiated in June 1996 and is implemented by the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) in partnership with Centre de Cooperation Internationale en Recherche Agronomique pour le Development (CIRAD) and Institut Senegalais de Recherches Agricoles (ISRA). GGP aims to assist National Agricultural Research Systems (NARS) by providing genetic resources, producing and distributing seed of improved varieties for multiplication by national seed services. The project has five major components, which include germplasm assembly, maintenance and conservation; characterization and multiplication, evaluation of germplasm for traits of economic importance, seed production, information dissemination and training. About 5445 accessions have been assembled and evaluated for characters of economic importance such as yield, maturity, reaction to major biotic (foliar and viral diseases and aflatoxin contamination), abiotic stresses (drought) and quality parameters (edible groundnuts). Stable sources for resistance to some of the stresses have been identified. A regional gene bank for groundnuts has been established.

Mutation Breeding for Peanut Improvement. W.D. BRANCH. Dept. of Crop and Soil Sciences, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-0748

Peanut (*Arachis hypogaea* L.) mutation breeding initially began several decades ago, but it has not been widely used in the U. S. in recent years. However in mid-1980, the Georgia Peanut Breeding Program started a mutation breeding study to induce agronomically desirable peanut genotypes. Seed of two Georgia cultivars (Georgia Runner and Georgia Browne) were exposed to 200 Gy=20 kRad of gamma-irradiation from a cobalt-60 source. Pedigree selection was practiced within the M_2, M_3, M_4, and M_5 populations for various plant, pod, and seed characteristics. Numerous deleterious mutant phenotypes were readily observed in the early segregating generations. Most of these point mutations appeared to involve recessively inherited genes controlling such plant traits as dwarf, flop, lupinus, rusty, cup, etc. Of particular interest was the identification and selection of a high oleic to low linoleic fatty acid ratio mutant breeding line within the Georgia Runner genetic background. Allelism testcrosses showed no difference among this mutant and other high oleic runner-type cultivars which have previously been shown to be also controlled by two recessive genes. Pod and seed size mutants were also found and breeding lines developed from both Georgia Runner and Georgia Browne. Among the mutant breeding lines included smaller runner pod and seed size of Georgia Runner and larger pod and seed size of Georgia Browne. Performance evaluation of several advanced Georgia Browne mutant breeding lines were conducted at the University of Georgia, Coastal Plain Experiment Station. Data from these replicated field tests showed that some mutant breeding lines were significantly higher and lower than Georgia Browne in total disease incidence, yield, grade, dollar value, pod weight, seed weight, and seed size distribution. These results demonstrate the still beneficial use of mutation breeding for peanut improvement.

ECONOMICS II

Field Adaptive Research Models (FARM): A Budgeting Analysis at the Enterprise Level. N. R. MARTIN*[1], A. S. LUKE[3], K. BALKCOM[2], D. L. HARTZOG[2], S. M. FLETCHER[3]; National Center for Peanut Competitiveness and Departments of Agricultural Economics & Rural Sociology[1] and Agronomy & Soils,[2] Auburn University; and Agricultural & Applied Economics,[3] University of Georgia.

High production costs are a serious problem affecting competitiveness of U.S. peanut farmers. Finding and demonstrating means of lowering production cost is the objective of a three-year multiple-site project initiated in the 1999 crop year at the Wiregrass Substation in Headland, AL. Field Adaptive Research Models (FARM) were implemented on three sites having both peanuts and cotton research ranging in size from 1.5 to 7 acres for each commodity. Results from the FARM project offers opportunities to compare alternative production practices, incorporating best management practices and expert decision models, in an attempt to reduce production cost without sacrificing yield and quality. The project incorporates expert systems including AU-Pnut and MOISTNUT in the decision making process. Detailed records are kept for each field so the actual cost of production can be compared for the various production practices and to standard extension budgets. Enterprise level budgeting was done to reflect typical sizes of peanut and cotton enterprises on farms in the Wiregrass area. Results from the 1999 test at the Wiregrass Substation showed a range of cost savings and net returns for the various production systems. For example, at one site peanut input cost differences ranged from an additional $2.02 per acre on herbicides to a savings of $46.75 per acre on insecticides when compared to the standard Alabama budget. Net returns to land, quota, and management ranged from $28.28 per acre to $202.21 per acre for peanuts. A breakdown of variable cost of peanuts indicated that 19% was spent on fungicides, 17% on drying and cleaning, and 16% on seed. For cotton, 27% of the total variable cost was spent on hauling, ginning, and warehousing. Variable cost differences for cotton ranged from an additional cost of $14.47 per acre to a saving of $8.94 per acre compared to the standard budget. This project is in cooperation with the National Center for Peanut Competitiveness and is being implemented on a multiple state, discipline, and commodity basis. As the research sites extend into other states, the goal is to not duplicate research but to have each area contribute different yet vital components of the information needed to increase U.S. peanut competitiveness.

Whole Farm Budgeting Using FARM PLANNER 2000. W. M. McCOLLUM[1], N. R. MARTIN[1], A. S. LUKE[3], K. BALKCOM[2], D. L. HARTZOG[2], S. M. FLETCHER[3]; National Center for Peanut Competitiveness and Departments of Agricultural Economics & Rural Sociology[1] and Agronomy & Soils,[2] Auburn University; and Agricultural & Applied Economics,[3] University of Georgia.

Peanut farmers in all peanut regions of the United States are experiencing low net returns and declining financial strength due to lower quota prices under the 1996 Farm Bill. Additionally, when the current Farm Bill expires in 2002, expectations are for even lower gross receipts from a given level of peanut production. Much analysis is ongoing to discover ways to reduce production cost at the peanut and related crop enterprise level. However, farm success cannot be completely measured or projected at the enterprise level. Whole farm budgeting is the necessary tool to fully analyze the livelihood and sustainability of a farming business. FARM PLANNER 2000 was developed to track production practices in peanuts and related crops, and uses measures of farm financial strength and profitability to determine short- and long-term viability. Data from the Field Adaptive Research Models (FARM) conducted on the Wiregrass Substation in the 1999 crop year are used to demonstrate FARM PLANNER 2000. Through FARM PLANNER 2000, these FARM results are evaluated on a whole farm basis. To accomplish the purposes of this project, a representative Wiregrass peanut farm was developed from survey data taken before the 1999 crop year and enterprise budgets developed by the Alabama Cooperative Extension Service. From the survey, the representative farm would consist of 351 acres of peanuts, 566 acres of cotton, 250 acres of pasture, and 265 acres of farmland, roads, and woodland. The farm would have $1,783,521 in assets and $1,308,979 in net worth. Although the financial strength of the farm would be good, the profitability determined by the current Extension budgets would not be competitive. Net income from operations would be negative almost $20,000 and return to equity would be negative three percent. Through the cost saving practices reflected in the 1999 FARM results, the financial strength of the representative farm could be maintained by bringing net income from operations out of the "red", and realizing a positive return on both assets and equity. Whole farm budgeting of various enterprise levels and combinations will also be produced and used to guide the ongoing FARM project on the Wiregrass Substation and other locations. This project is in cooperation with the National Center for Peanut Competitiveness and is being implemented on a multiple state basis.

Impact of Crop Price on Southeast Peanut Farm Income and Risk. M. C. LAMB*[1] and M. M. MASTERS[1,2]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA. 31742 and [2]Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, AL 36848.

The 1990's have been characterized as a period of depressed crop prices and farm incomes. In 1995, the last year of the previous farm bill, crop prices for corn, cotton, soybeans, and quota peanuts (runner-type) were $3.00 per bushel, $0.75 per pound, $6.25 per bushel, and $684 per ton, respectively. In 1996, the Federal Agricultural Improvement Reform (FAIR) act was enacted with significant changes in agricultural policy. In 1999 crop prices for corn, cotton, soybeans, and quota peanuts were $2.32 per bushel, $0.60 per pound, $4.50 per bushel, and $615 per ton, respectively. These decreases had significant impacts on farm income, cash flow, and risk. Farm Suite, a whole farm planning system, was utilized to address the impact of variability in crop price on farm income, cash flow, and risk. Analyses were conducted for three different farm structures: 100% owned, 50% owned:50% rented, and 100% rented. With no inflationary changes in production cost or changes in crop yield, crop year 1999 farm incomes were compared to 1995 farm incomes. The price changes significantly reduced farm incomes in all farm structure categories. Random draws from historical crop price distributions were utilized to generate data on farm income, cash flows, and risk for each farm structure.

Appropriate Bid Prices for Peanut Growers Participating in Southwest Georgia Irrigation Buyout Programs. M. H. MASTERS*[1,2] and M. C. LAMB[1]. [1]USDA, ARS, National Peanut Research Laboratory, Dawson, GA. 31742 and [2]Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, AL 36848.

In addition to poor commodity prices, producers in Southwest Georgia are facing increased occurrence of drought. To offset these conditions many growers turn to the use of irrigation. As water use in the Flint River basin increases both from the agricultural community and large municipalities upstream, concern for the stoppage of stream flows during drought conditions on the Flint River and its tributaries has been raised. In early march, both bodies of the Georgia Legislature passed the Flint River Drought Protection Act. Pursuant to this new law, a fund of $10 million can be drawn upon to reimburse farmers for not irrigating in the event of declared drought conditions. The Environmental Protection Division will solicit bids from growers for per acre reimbursement amounts. Using Farm Suite, a whole farm planning system, analyses of peanuts, corn, cotton, and soybeans were conducted on an irrigated vs. non-irrigated basis. Specific attention was paid to yield, price, crop insurance cost, risk, and net income data for the different crops grown under irrigated and non-irrigated conditions. This information can be used to formulate an appropriate break-even bid price. Further, this information is valuable in deciding if entry into the program is in the producer's best interest.

Economic Analysis of Best Management Practices in Peanut Production Using An Adaptive Research Farm Approach At The Southwest Georgia Branch Experiment Station. W.D. SHURLEY[*1], J.P. BEASLEY[2], and J.N. RAGAN[3]. [1]Department of Agricultural and Applied Economics, University of Georgia, Tifton, GA 31793; [2]Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; and [3]Southwest Georgia Branch Experiment Station, Plains, GA 31780.

The peanut price support is frozen at $610 per ton national average through the 2002 crop year. In recent years, contract prices for quota peanuts have generally remained in the range of $625 per ton or less compared to mostly $700 per ton immediately prior to new legislation beginning in 1996. Production expenses including quota lease rates, however, have not declined. Peanut farmers, therefore, continue under pressure to reduce cost of production per ton. To search for ways to reduce cost per ton, research was initiated in 1999 at the SW Branch Station at Plains to compare "routine" or commonly used production practices with the latest practices and management decision aids. All peanuts (Georgia Green variety) were planted on May 12, 1999 at a rate of 107 pounds per acre. Adaptive Research Farm (ARF) peanuts were produced following University of Georgia recommendations and expert systems XNUT for irrigation scheduling, AUPNUT for leafspot control, and HERB for grass/weed control. All other peanuts were produced independently of ARF and Station staff allowed to make all decisions. The ARF peanuts and other peanuts were produced in the same field and on the same soil type. All peanuts were dug on September 15 and picked on September 18. Yield, grade, income, cost, and net return were calculated for each production system. ARF peanuts yielded 3,168 pounds per acre compared to 3,317 for the other peanuts. ARF peanuts received no fertilizer. ARF peanuts graded 69.5 TSMK compared to 71.5 for other peanuts. ARF peanuts were irrigated 7 times (6.7 inches) versus 10 times (8.0 inches) for other peanuts. ARF peanuts received only 5 fungicide sprays compared to 7 sprays for other peanuts. Herbicide expenses were $15 per acre higher for ARF peanuts. The average price per ton for the ARF peanuts was $578 per ton compared to $599 per ton for all other peanuts. Peanut income was $915 per acre for the ARF peanuts and $993 per acre for other peanuts. Net return, however, was $39 per acre higher for the ARF peanuts. Although other or non-ARF peanuts yielded higher, higher yield did not result in higher profit during this first year of the study.

Reliability of the 1.33 Factor to Convert Pounds of Peanut Kernels to Farmer Stock Pounds. K.M. ROBISON*. Tobacco and Peanuts Division, Farm Service Agency, United States Department of Agriculture, Washington, D.C.20250-0514

The 1.33 factor has traditionally been used to convert peanuts from shelled weight to farmer stock weight. The reliability of the 1.33 factor is being questioned. Inspection data from the 1997, 1998, and 1999 crops indicate an average factor of 1.31 reflects current average shelling rates. The Federal Agriculture Improvement and Reform Act of 1996 among other things mandates that the peanut price support program be operated at no cost to the taxpayer. Continuing to use the 1.33 factor for program purposes, estimating domestic edible use and setting the national marketing quota, adds about 23 pounds of kernels to each ton of quota or inflates the national quota about one percent. These hidden pounds could lead to price support program losses. Any price support program losses are recovered by assessing producers.

Identification of Resistance Gene Analogs (RGAs) in Peanut. M. D. BUROW*, S. SCHULZE, J. BALLESTER-VALVENY, and A. H. PATERSON. Department of Crop and Soil Science, University of Georgia, Athens, GA 30605.

Resistance genes cloned from a variety of plants fall into several groups, each group consisting of genes with shared structural motifs. Cloning of resistance genes will contribute to the understanding of mechanisms of resistance, and may allow future classification of accessions in germplasm collections according to allelic differences in potential resistance gene sequences. We have amplified and sequenced 27 resistance gene analogs from the peanut cultivar Florunner in an initial attempt to identify putative peanut resistance genes. Sequenced RGAs demonstrated a high frequency of clones containing nucleotide binding site and leucine-rich repeat (NBS-LRR) motifs characteristic of many resistance genes. Many clones possessed strong homology to *Glycine*, *Vigna*, or *Oryza* analogs. RGAs are currently being mapped to identify possible resistance gene clusters, using the RFLP marker map of tetraploid peanut derived from the TxAG-6 *x* Florunner cross. Map data will be compared with resistance gene locus information being gathered in a collaborative AB-QTL project, to identify whether any of the RGAs identified in Florunner are allelic to resistance genes transferred to *A. hypogaea* from the interspecific hybrid TxAG-6.

Production of Transgenic Peanut Plants Containing Anti-fungal Genes. K. D. CHENAULT*, J. A. BURNS°, and H. A. MELOUK. USDA-ARS, Stillwater, OK 74075, °Monsanto Co., Inc., St. Louis, MO.

Two anti-fungal genes, a rice chitinase and/or an alfalfa glucanase, were used to produce transgenic peanut (*Arachis hypogaea* L. cv. Okrun) by microprojectile bombardment of embryonic cultures. Independent transformation events resulted in the production of over 500 different transgenic peanut lines. Molecular analysis of 32 fertile regenerated lines through the T_3 generation have demonstrated stable inheritance patterns for the transgene(s) as well as increased chitinase/glucanase activity ranging from 0-75% above background levels. Greenhouse evaluations in which the transgenic peanut plants were inoculated with *Sclerotinia minor*, the causal agent of Sclerotinia blight, have indicated that several of these lines exhibited resistance levels equal to or exceeding those of *S. minor*-resistant cultivars currently being grown in commerce.

Genetic Engineering Approaches to Improve Resistance to Sclerotinia Blight in Peanut. T. BOLUARTE-MEDINA*, C.E. HEGEMAN, O.F. MCMEANS, A. MCCARTHY, P. M. PHIPPS, E.A. GRABAU. Department of Plant Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, VA 24061 and Tidewater Agricultural Experiment Station, Suffolk, VA 23437

Plant diseases for which there are limited methods of pathogen control are compelling candidates for the development of novel resistance strategies. We are exploring a genetic engineering approach to controlling the effects of *Sclerotinia minor*, the causative agent of Sclerotinia blight in peanut. It has previously been demonstrated that the introduction and expression of a gene for oxalate oxidase into soybeans provides improved resistance to white mold, caused by *Sclerotinia sclerotiorum*. Oxalate oxidase breaks down oxalic acid, which is a pathogenicity factor produced by many fungi, to yield carbon dioxide and hydrogen peroxide. Oxalate oxidase is produced naturally in wheat and barley and is elevated in response to fungal infection. To date we have cloned the barley oxalate oxidase gene via RT-PCR amplification and inserted the cDNA into a transformation vector containing a hygromycin resistance cassette. The oxalate oxidase plasmid has been used to bombard plant material, including peanut embryogenic cultures. Incubation of the bombarded material with the substrate, oxalic acid, and subsequent histological staining has demonstrated that the cDNA construct for oxalate oxidase can be transiently expressed in peanut embryos. We have established cultures of several Virginia-type peanut cultivars and are currently selecting bombarded material for stable integration of the oxalate oxidase construct. We have demonstrated production of oxalic acid by *Sclerotinia minor*. Future plans include regenerating peanut plants expressing oxalate oxidase and testing for disease resistance.

Genetic Enhancement of Drought Resistance in Australian Peanuts. NAGESWARA RAO RACHAPUTI, G.C. WRIGHT* and A.L. CRUICKSHANK. Queensland Department of Primary Industries, Farming Systems Institute, Kingaroy, Qld, 4610, Australia.

The majority of Australian peanuts are produced under dryland farming systems where droughts of unpredictable timing and duration severely limit pod yields and quality. Crop modelling simulations for the rainfed peanut growing regions in Queensland have shown that in over 70% of years, pod yield potential is severely limited by water deficits, especially those which occur in the final 4-6 weeks of the season. The development of high yielding drought tolerant cultivars is therefore a priority for the peanut industry in Australia. It has also been shown that improvements in drought resistance can have positive impacts on aflatoxin contamination, which is an emerging issue for dryland peanut production. In recent years significant progress has been made at the QDPI in developing simple and economical selection tools to identify genotypes. Desirable drought resistance traits such as transpired water (T), transpiration efficiency (TE) and kernel harvest index (HI) have been shown to contribute to superior genotypic performance under drought conditions. An analysis of yield, in the framework of the water resource model (Yield = T x TE x HI) for selected genotypes over a wide range of environments, has revealed novel pathways for yield improvement by concurrent indirect selection for the above traits using a selection index. A current research project is implementing the novel selection approach in a large scale-breeding program to assess the potential utility of indirect, compared to empirical, selection for the identification of drought resistant peanut genotypes.

Parent Selection for Roasted Peanut Flavor Improvement Using Best Linear Unbiased Predictors (BLUPs). . H.E. PATTEE*, T.G. ISLEIB, F.G. GIESBRECHT, D.W. GORBET, and Z. CUI. USDA-ARS, Crop Science and Statistics Dept., North Carolina State University, Raleigh, NC 27695-7625; North Florida Research & Education Center, Marianna, FL 32446.

Roasted peanut flavor is an important characteristic influencing consumer acceptance. Certain sensory attributes of flavor have been shown to be heritable; therefore it is important to use care in selecting parents to avoid degradation of flavor quality while improving agronomic performance or pest resistance. Using a database of sensory attributes on 250 peanut cultivars and breeding lines, best linear unbiased prediction (BLUP) procedures were used to predict breeding values of parents for the roasted peanut, sweet, and bitter attributes of peanuts. The range of predicted breeding values for roasted peanut attribute was -0.51 to +0.45 flavor intensity units (fiu), approximately twice the range of flavor intensity detectable to the palate. The range for sweet attribute was -0.65 to +0.68 fiu and for bitter attribute -0.41 to +0.40 fiu. These values indicate that there is genetic potential to improve flavor quality through breeding. Correlation between predicted and observed roasted peanut values was 0.79. However there was substantial variation among progeny in a hybrid population whose mean was well predicted. Parents with superior predicted breeding values for flavor quality included (1) Sunrunner and its high-oleic backcross derivatives, (2) Florunner, its component lines and progeny, and (3) the Spanish-type germplasm line Pearl. Parents with inferior predicted breeding values included: (1) Cylindrocladium-resistant lines, (2) ancestral line Jenkins Jumbo and its close relatives including Florigiant, and (3) ancestral line Improved Spanish 2B. The implications of these findings on flavor quality in current cultivars and breeding populations will be used to illustrate the importance of flavor attributes as criteria in parent selection. Of particular interest are the deleterious effects of Jenkins Jumbo and Improved Spanish 2B in Virginia-type populations and the beneficial effect of Florunner in runner populations.

Best Linear Unbiased Predictors of Breeding Value for Resistance to *Sclerotinia minor*. T.G. ISLEIB, R.W. MOZINGO*, J.E. BAILEY, AND V.L. CURTIS; Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629; Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629.

Over the past five years, Sclerotinia blight (SB) caused by *S. minor* Jagger has surpassed Cylindrocladium black rot (CBR, *C. parasiticum* Crous, Wingefield, & Alfenas) as the disease of greatest concern to peanut growers in North Carolina as well as being economically important in Virginia, north Texas, and Oklahoma. Short (up to three-year) rotations are ineffective in controlling SB, the chemical protectants used for SB control are expensive, and the level of resistance available in existing virginia-type cultivars is slight. Breeding for resistance to Sclerotinia blight has become a high priority in the NCSU breeding program. Because some low-yielding germplasm used as parents in our CBR-resistance breeding program were found to also be resistant to SB, numbers of CBR-resistant breeding lines have been screened for SB resistance. Although high levels of resistance have been found among the lines screened, the most resistant lines have low-yield or poor grade characteristics. The objective of this study was to apply best linear unbiased prediction to field data collected on SB resistance, CBR resistance, yield, and agronomic traits of 133 lines to estimate breeding values for the various characteristics and use the information to choose parents for use in crossing. The additive genetic variance-covariance matrix was computed as twice the coancestry matrix. Estimates of breeding values were insensitive to changes in the heritability estimate used in the computation of the BLUPs. Resistance to SB and CBR in the population was found to trace largely to registered line NC 3033. Two advanced breeding lines, N96076L and N98121CSm, had the best combination of breeding values for SB, CBR, yield and grade factors. The average of the breeding values of parents or grandparents proved to be slightly superior to midparent value in predicting the mean for crosses represented among the 133 lines.

Evaluation of Different Selection Methods for Updating the Peanut Core Collection. C.C. HOLBROOK[1*], H. Q. XUE[1], and R. N. PITTMAN[2]. [1]USDA-ARS, Coastal Plain Exp. Stn., Tifton, GA 31793. [2]USDA-ARS, Griffin, GA 30223.

A core collection for the U.S. germplasm collection of *A. hypogaea* was developed in the early 90's to enhance the utilization of peanut germplasm. This core collection has been shown to improve the efficiency of identifying genes in the germplasm collection and has resulted in a great increase in peanut germplasm evaluation work. A core collection should be dynamic. Since the initial peanut core collection was selected, 821 accessions have been added to the U.S. germplasm collection of peanut. The objective of this work was to evaluate various selection methods that could be used to select representative genotypes from these accessions to add to the peanut core collection. Twenty selection methods were used to generate various core subsets. These included simple random sampling, sampling after stratification by country of origin, sampling after stratification by country of origin and botanical variety, sampling after multivariate clustering, and sampling after multivariate clustering after stratification by country of origin. These selection methods were evaluated based on their ability to identify sources of resistance to *Tomato spotted wilt virus* and the peanut root-knot nematode in the 821 accessions. Multivariate clustering after stratifying by country of origin was superior to the other core collection selection methods in improving the success rate of identifying sources of resistance to these pathogens. These results will be used to update the peanut core collection to reflect changes in the entire germplasm collection. These results also clearly demonstrate the improvements in efficiency that can be achieved using a core collection approach for evaluating germplasm.

Shade Avoidance Response in Peanut Cultivars Interferes with Pod Setting. I.S. WALLERSTEIN*, S. KAHN, I. WALLERSTEIN[1], G. WHITLAM[2] and H. SMITH[2]. Department of Field Crops and Natural Resources, [1]Department of Ornamental Horticulture, Agricultural Research Organization the Volcani Center, P.O.B. 6, Bet Dagan, 50 250 Israel. [2]Department of Botany, University of Leicester, Leicester, LE1 7RH, UK.

Commercial peanut cultivars have indeterminate shoot growth and long reproductive periods, but under contemporary high-density cultivation practices the period of pod set is restricted to the beginning of the reproductive period. This restriction has long been attributed to the effect of growth density on photosynthesis, but our results indicate that shade avoidance reactions are responsible. Investigations of the responses of peanut cultivars to low red:far-red ratios (R:FR) in the laboratory have revealed considerable between-cultivar variation. Some cultivars exhibit a high sensitivity to R:FR, while others show low sensitivity that manifests itself as a negative response to low R:FR at early stages of growth. The variation between cultivars in shade avoidance response was found to correlate with pod-setting responses of those cultivars to planting density in field experiments (carried out in Israel). The characteristics of peanut growth can clarify this correlation. After pollination a gynophore starts to elongate from the axillary flower toward the soil. It will set pod only after penetration into the soil. The gynophore has a limited elongation period and therefore the distance between the flower and the soil is important for pod setting. High density conditions in the field cause erect growth and elongated internodes in both the "runner" and the "bunch" types of cultivars. In both types of cultivars, higher shade avoidance response under controlled conditions was correlated with shorter reproductive periods at high density in the field, but also with a high rate of gynophore production. These results demonstrate the potential for breeding for high or low sensitivity to R:FR as a means of improving crop plant performance. The data also suggest that lower density planting regimes might result in improved peanut yields using appropriate cultivars. At the fundamental level, the demonstrated high variation in shade avoidance response between cultivars within a single species is intriguing from the standpoint of functional adaptation and plasticity.

Minutes of the APRES Board of Directors Meeting
Grand Marriott
Point Clear, Alabama
July 11, 2000

The meeting was called to order by President Robert Lynch at 7:00 p.m. Those present were: Robert Lynch, Ron Sholar, Austin Hagan, Tom Stalker, Philip Utley, Stanley Fletcher, Tim Brenneman, Doug Smyth, Carroll Johnson, Jim Davidson, John Beasley, Alex Csinos, Mark Black, Pat Phipps, Walt Mozingo, Jeannette Anderson, Chip Lee, Chris Butts, Ron Weeks, Randy Griggs, Max Grice, John Damicone, Mike Schubert and Charles Swann.

President Lynch opened the meeting with a welcome and general comments.

President Lynch called on Executive Officer, Ron Sholar, to read the minutes of the last Board of Directors meeting held in Savannah, Georgia. The minutes were approved as published in the 1999 Proceedings.

The following reports were made and approved by the Board of Directors:

(Editor's Note: Some of the oral reports given during the Board of Director's Meeting are identical to the official written report for the Proceedings. Where this is the case, the oral report is not presented in the minutes below. For the complete report, see the written report of the committee in the committee reports).

Executive Officer Report – Ron Sholar

Dr. Sholar reports that our society is in excellent condition financially. We are changing as the industry changes.

American Society of Agronomy Liaison Report – Tom Stalker

See written report.

Southern Agricultural Experiment Station Directors – Philip Utley

See written report.

Council for Agricultural Science and Technology – Stan Fletcher

CAST has been very proactive in acting on agricultural issues important to APRES. Stan has been subsidizing his CAST travel out of his own budget. CAST is starting a Biotechnology Science Communications program and is seeking funding for a coordinator position, someone to help relate the technical portion of their committee. Financial assistance, in any amount, would be appreciated and the commitment could be annually or a one time only contribution. Randy Griggs made a motion to support this initiative with a one time contribution of $1,000. The motion was seconded by Mike Schubert and the motion passed.

Finance Committee – Tim Brenneman

The committee has met and reviewed the budget with the Executive Officer and we find the society in very sound condition.

A balanced budget for the year 2000-01 of $72,700 is being proposed. This would include a 3% raise for Irene Nickels, Administrative Assistant and a 6-7% raise for Peggy Brantley Administrative Assistant for Peanut Science. The budget for Peanut Science was not increased in 1999 so this is a catchup for two years.

John Beasley, Peanut Research editor, requested funds of $2,000 to pay his assistant for the Peanut Research newsletter since she is putting in a lot of her time on the newsletter. The committee recommended an amount of $1,200 for this purpose. All other amounts are close to last year's funding. A motion was made by Ron Weeks to accept the budget as presented by the committee, seconded by Max Grice. The motion carried.

Nominating Committee – Charles Swann

The committee met this afternoon, those in attendance were, Charles Swann, Tom Isleib, Larry Hawf and Tom Kucharek. Nominations were made and are as follows:

President-elect – John Damicone, Oklahoma State University, Stillwater, Oklahoma
State Employee Representative-S.W. area – Robert Lemon, Texas A&M University, College Station, Texas
Industry Representative-Production – Mark Braxton, Monsanto, Marianna, Florida

All have accepted their willingness to serve. The floor will be opened for additional nominations during the business meeting. The report was accepted.

Publications and Editorial Committee – Carroll Johnson

The committee met this afternoon and those in attendance were Carroll Johnson, Foy Mills and 3 guests but the committee did not have a quorum and could not vote on any issues.

We are concerned with the decline in submissions of manuscripts to Peanut Science and wonder if it is because of the delay in publications, just a lack of interest to be published, or due to competition from other journals. The majority of articles submitted to Peanut Science are either from Weed Science or Plant Pathology. Submissions from Plant Breeding, Nematology, Entomology, Molecular Biology, and general production are all down.

Discussion was as follows: time frame to submit manuscripts and the length of time it takes to get them published, of setting up a web site for manuscript submissions, the problem with the style issue and an electronic newsletter.

There is an interest in putting information such as the newsletter, abstracts, annual meeting and registration information on the web. These issues need to be researched completely before a decision can be made. Also the question was brought up as to whether to consider review papers for publication.

We challenge all board members to encourage members to submit papers to be published in the Peanut Science Journal. The committee agreed that Associate Editors and Publications Committee members will seek submissions from specific authors. They will also attempt to speed up the review process and have a 3 month turnaround on reviews.

Peanut Quality Committee – Doug Smyth

See written report

Public Relations Committee – Jim Davidson

The committee met March 13, 2000 in Tifton, Georgia by e-mail and also today. We have a desire to create more interest in our society and are seeking ways to bring this about.

Three possible ways to promote interest may be: Internet use, a broad range of people are now using the internet, promote more interest on the university level, and give industry updates by inviting industry representatives to be guest speakers.

Three requests were made by the committee:
We request the Chair of each Awards committee furnish us with a short written document describing the award and the works of the winner to be used in publications such as newspapers and newsletters.

Bobby Walls is no longer an APRES member due to a job change and will need to be replaced on our committee. Cecil Yancy was complimented for his work and the committee requested that he be added to the Public Relation Committee.

It is recommended that the by-laws be changed to allow for a vice-chair to be elected to each committee to assure continuity.

Dr. Clyde Young passed away on February 1, 2000 and a resolution honoring his life and contributions is being prepared.

Bailey Award Committee – John Beasley

See written report.

Fellows Award Committee – Mark Black

The committee met and all but two members were present. The selections were reviewed and the correct procedure was followed. Five nominees were presented to the Board, the two unsuccessful nominees papers will be returned to the nominators and we will request they update and re-submit them next year.

Plaques have been prepared to present to all former Fellow award winners and will be mailed this fall.

Site Selection Committee – Austin Hagan

Members met today at 1:00 p.m. and discussed the 2001, 2002 and 2003 meeting locations and dates. The 2001 meeting is in Oklahoma City, OK, July 16-20, at the Renaissance Hotel and accommodations are secured. The 2002 meeting will be held at the Sheraton Imperial Hotel in Research Triangle Park, Raleigh-Durham, NC, July 15-19. The 2003 meeting location is still being explored and they are considering going back to Orlando, FL. They are open to ideas for alternative sites.

See complete report as published.

Coyt T. Wilson Distinguished Service Award Committee – Pat Phipps

See complete report as published.

Joe Sugg Graduate Student Award Committee – Alex Csinos

The committee has met by fax and email. They went over the terms of acceptance and made changes to the guidelines. Currently 15 points are allotted to scientific merits and they feel the total should be 25 points. Ten points allowed for presentation. The visual portion is judged equally regardless of using slides or Power Point.

A formal report will be given at the end of the meeting and awards presented.

Dow AgroSciences Award Committee – Walt Mozingo

The committee met this afternoon and all but one member was present. Vernon Langston has replaced Lance Peterson as the Dow representative and we thank Lance for his dedication and service. We received five nominations and selected three winners. We would like to encourage the nominators to resubmit their names next year.

We would like to recognize Barbara Shew and Chris Butts for being on the committee and thank them for their work.

Program Committee – Austin Hagan

We received 125 papers and have instituted an industry session. We suggest that we continue with requiring slides instead of power point presentation due to the time frame of switching back and forth.

See complete report as published.

Other Business

A. Stan Fletcher – brought forth the idea of possibly combining forces, in the future, with the National Peanut Board. APRES is a core foundation, having all scientists represented from research and extension and a large portion attend all meetings. The merger could bring about several things:

1. The possibility of those receiving grants giving a report at the APRES meeting,
2. more growers may attend our meeting and see how their money is being spent, and
3. they could hold their meeting after our breakfast meeting.

Stan suggested we either seek a partnership with the National Peanut Board or just inform them of our annual meeting and let them know they are welcome to attend. Many on the NPB did not know about APRES. The NPB will have up to $2 million to support research to help growers stay competitive.

Significant discussion ensued as to whether a formal relationship/partnership with the NPB would be desirable. It was eventually decided to keep the relationship simple and to merely inform the National Peanut Board of our meeting dates and location. They will be welcome to conduct any meetings they wish in conjunction with APRES meetings.

B. Tim Williams – has developed a software program to allow abstracts to be submitted on our web site. The papers would be typed directly on the computer and sent to the Technical Chair who would then review and once accepted and assigned a session it would immediately be Proceedings ready.

There was significant positive and negative comments as to going to this system. This will need to be looked at by the Program Chair and see if it is an option they wish to consider for their acceptance of receiving abstracts.

The meeting was adjourned by President Lynch.

OPENING REMARKS BY THE PRESIDENT AT THE 2000 APRES AWARDS AND BUSINESS MEETING

July 14, 2000

From the Mule to the Moon and into the 21st Century

Robert E. Lynch

It is a pleasure to welcome APRES members, families, and guests to the Awards Presentation and Business Meeting of the 2000 American Peanut Research and Education Society Annual Meeting. First, I would like to recognize the hard work and planning that have led to such a successful Thirty-Second annual meeting of APRES. It would not have happened without the diligent work of President-elect Austin Hagan, Local Arrangements Chair Randy Griggs, and Technical Program Chair Kira Bowen and their fellow committee members. Their committees have done an excellent job and are to be commended for making our meeting so successful. Likewise, the management and staff of the Grand Hotel have done an excellent job to ensure our successful meeting and stay at Point Clear, AL.

It has truly been an honor and pleasure to serve as your APRES President for 1999-2000. The support and guidance of Past-president Charles Swann and Executive Officer Ron Sholar have been exemplary and greatly appreciated. Likewise, the willingness of APRES members to serve on the various committees and carry out the important duties of these committees is greatly appreciated. These are the people that make APRES one of the greatest scientific organizations with which I have been associated. Thank you to each and every one of you for your dedicated service to our society.

The Presidential Address for the Thirty-second Annual Meeting of APRES was dedicated to Mr. J. Frank McGill, Extension Agronomist for the University of Georgia from 1951 to 1982. Frank grew up on a farm in South Georgia and relates many of his experiences as a farm boy, extension peanut specialist, and agronomist for industry in his book From the Mule to the Moon. As the first extension peanut specialist with the University of Georgia, Frank led the industry during a time when there was an explosion in peanut research and applied this research in a package approach to peanut production that was recommended to growers by County Extension Agents.

As we move into the 21st century, there are new and exciting things on the horizon that will dramatically affect peanuts and peanut production. The spread of tomato spotted wilt virus throughout the peanut growing regions of the South has resulted in the development and release of new peanut varieties with resistance to this devastating disease. The tomato spotted wilt index was

developed to minimize the effects of this disease by incorporating peanut variety, planting date, plant population, preplant insecticide, and other ecological and environmental variables that influence the disease. New chemistry fungicides and herbicides are now available to help manage diseases and weeds. Twin rows, irrigation scheduling, tomato spotted wilt resistant and leafspot resistant peanut varieties, and high-oleic peanut varieties are changing peanut production throughout the U.S.

The changes on the horizon for peanut and peanut production are even more fascinating. Biotechnology is becoming an important tool in agriculture. Genetically modified crops such as Roundup-Ready soybean and cotton, and Bt cotton and corn with resistance to lepidopterous insects are commercially available and play a big part in the management of weeds and insects in these crops. These biotech crops were first planted in the U.S. only 4 years ago and were readily accepted by both the American farmer and consumer. Biotech crops were grown on 100 million acres in 1999, an increase of over 44% from the previous year, making biotech agriculture the most rapidly adopted technology in the history of agriculture. These biotech crops were aimed at improving traits involving single genes. We are now testing crops with multiple gene insertions, and this trend will be limited only by the rate with which new genes are characterized. However, in many countries around the world the extent to which the potential of transgenic research will be utilized will depend on public acceptance.

The promise of agricultural biotechnology is immense. Advances in this technology will result in crops with a wide range of desirable traits that will directly benefit farmers, consumers, and the environment and will increase global food quality and production. New discoveries such as beta-carotine enriched rice, rice with a 35% increase in yield, resistance in corn to stored-product insects, and bioengineered insect control which uses a homozygous, dominant, repressible, female-specific lethal genetic system are only a few of the potential modifications that will change agriculture.

Where are we in the realm of genetically modified peanut? Peggy Ozias-Akins, University of Georgia, and other scientists have developed a stable transformation system for peanut using microprojectile bombardment to transfer genetic material to peanut callus tissue. This system uses a hygromycin-resistance selectable marker to identify those cells in which genetic material has been incorporated. Research is underway to insert a *cryIA(c)* gene, i.e., Bt peanut, a tomato spotted wilt virus neucleocapsid protein gene for resistance, a gene for aflatoxin resistance, and a gene for herbicide resistance into peanut. Thus, we are on the verge of seeing major breakthroughs in peanut due to application of this new biotechnology. This is an exciting time in peanut research. Without doubt, the next major breakthrough in agriculture will come as the result of this new biotechnology. But, as Bill Gates says, "The best is yet to come."

BUSINESS MEETING AND AWARDS CEREMONY
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
GRAND MARRIOTT HOTEL
POINT CLEAR, ALABAMA
July 14, 2000

The meeting was called to order by President Robert Lynch. The following items of business were conducted.

1. President's Report - Robert Lynch

2. Reports were given and awards were made by the following people. Detailed reports are presented in the PROCEEDINGS.

    a. Coyt T. Wilson Distinguished Service Award - Patrick Phipps
    b. Fellows Award - Mark Black
    c. Bailey Award - John Beasley
    d. Joe Sugg Graduate Student Competition - Alex Csinos
    e. Dow AgroSciences Awards for Research and Education - R. W. Mozingo
    f. Past President's Award - Robert Lynch
    g. Peanut Science Associate Editors - Tom Stalker

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

    a. Executive Officer Report and Reading of Minutes of 1999 Meeting - Ron Sholar
    b. Nominating Committee - Charles Swann
    c. Finance Committee Report - Tim Brenneman
    d. Public Relations Committee Report - Jim Davidson
    e. Site Selection Committee - Austin Hagan
    f. Publications and Editorial Committee - Carroll Johnson
    g. Program Committee Report - Austin Hagan

4. Robert Lynch turned the meeting over to the new President, Austin Hagan of Alabama, who then adjourned the meeting.

FINANCE COMMITTEE REPORT

The APRES Finance Committee met on Tuesday, July 11, with the following members present: Richard Rudolph, Marshall Lamb, Justin Tuggle and Tim Brenneman. Ron Sholar attended as ex-officio and John Beasley as a visitor. The committee voted unanimously to submit a budget of $72,700 for the coming year. Last years budget was $68,000. The increase included a 3% raise for Irene Nickels and a 7% raise for the Peanut Science secretary (she received no raise the previous year). The committee also voted to recommend providing $1,200 per year to pay an assistant for the editor of Peanut Research.

Overall the society is in excellent financial health. Our total assets rose from about $173,000 last year to $179,000 this year. The generous support of our corporate sponsors has contributed to this and has strengthened our society in many ways. Hopefully this support can continue in spite of numerous corporate mergers and budget restrictions.

Respectfully submitted,

Tim Brenneman, Chair
Justin Tuggle
Ken Noegel
Marshall Lamb
Dudley Smith
John Wilcut
Ron Sholar, ex-officio

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BUDGET 2000-01

RECEIPTS

Annual Meeting Registration	$21,000
Membership Dues	18,000
Special Contributions	10,000
Other Income (Spouses program)	0
Differential Postage	1,300
Peanut Science & Technology	500
Quality Methods	0
Proceedings and Reprint Sales	0
Peanut Science	13,900
Interest	6,000
Advances in Peanut Science	2,000
Other Income (PR sales)	0
Other Income (misc)	0
TOTAL RECEIPTS	**$72,700**

EXPENDITURES

Annual Meeting (Breakfast, program, equip)	$11,000
Spouse Program	1,000
Coyt T. Wilson Awards	1,000
Dow AgroSciences Awards	2,000
Sugg, Bailey, Other Awards	750
CAST Travel	1,000
CAST Membership	500
Office Supplies	1,500
Secretarial Services	15,000
Postage	4,000
Travel	1,000
Bayer – Expense reimbursement	0
Legal Fees (Tax preparation)	400
Proceedings	4,000
Peanut Science	26,800
Peanut Science & Technology	0
Peanut Research	1,750
Quality Methods	0
Bank Charges	200
Miscellaneous	0
Advances in Peanut Science	0
Corporation Registration	350
OK Sales Tax	0
Reserve	450
TOTAL EXPENDITURES	**$72,700**
Excess receipts over expenditures	0

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BALANCE SHEET FOR FY 1999-00

ASSETS	June 30, 1999	June 30, 2000
Petty Cash Fund	$ 197.92	$ 652.81
Checking Account	21,308.93	29,990.36
Certificate of Deposit #1	25,928.16	27,132.88
Certificate of Deposit #2	16,240.32	16,988.09
Certificate of Deposit #3	14,819.19	9,497.67
Certificate of Deposit #4	11,137.60	12,399.10
Certificate of Deposit #5	15,443.28	16,176.91
Certificate of Deposit #6	12,511.81	13,106.17
Certificate of Deposit #7	10,580.18	11,130.34
Certificate of Deposit #8	0.00	5,000.00
Money Market Account	1,763.99	1,799.88
Savings Account (Wallace Bailey)	1,066.40	1,087.98
Bayer Account	12,045.60	8,395.96
Computer and printer	2,387.15	1,817.34
Peanut Science Account (Wachovia Bank)	3,191.80	1,453.60
Inventory of PEANUT SCIENCE AND TECHNOLOGY Books	4,120.00	3,820.00
Inventory of ADVANCES IN PEANUT SCIENCE Books	19,974.88	19,031.68
TOTAL ASSETS	**$172,717.21**	**$179,480.77**
LIABILITIES		
No Liabilities	0.00	0.00
TOTAL FUND BALANCE	**$172,717.21**	**$179,480.77**

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

	June 30, 1999	June 30, 2000
RECEIPTS		
Advances in Peanut Science Book	$ 1,595.00	$ 2,124.54
Annual Meeting Registration	19,040.00	22,634.00
Contributions	16,352.00	11,850.00
Differential Postage	2,150.00	1,375.00
Dues	14,671.50	16,995.00
Interest	3,177.77	7,226.36
Peanut Research	48.00	32.00
Peanut Science	496.00	76.00
Peanut Science Page Charges	15,546.36	17,953.50
Peanut Science and Technology Book	475.00	380.86
Proceedings	26.00	80.72
Quality Methods	0.00	40.00
Spouse Registration	750.00	4,037.00
Miscellaneous Income (overpymts)	51.71	31.50
Other Income (redeposit reg desk petty cash)	0.00	400.00
CD Transfer	0.00	0.00
TOTAL RECEIPTS	**$74,379.34**	**$85,236.48**
EXPENDITURES		
Advances in Peanut Science Book	$ 0.00	$ 0.00
Annual Meeting	10,433.06	15,888.92
Bank Charges	118.00	98.00
CAST Membership	500.00	510.00
Corporation Registration	215.00	115.00
Federal Withholding	936.00	996.00
FICA	1,603.20	1,651.00
Legal Fees	400.00	425.00
Medicare	375.12	386.12
Miscellaneous	9.69	0.00
Office Expenses	3,991.27	1,027.67
Oklahoma Withholding	169.54	235.00
Peanut Research	300.00	260.50
Peanut Science	21,096.53	25,050.88
Peanut Science and Technology Book	0.00	0.00
Postage	3,735.76	4,008.80
Proceedings	3,040.04	4,634.83
Sales Tax	1.17	35.00
Secretarial Services	10,828.85	11,108.98
Spouse Program Expenses	1,880.00	2,489.00
Refund	55.00	75.00
Travel – Officers	892.32	1,994.70
Travel – CAST representative	0.00	155.58
Bayer – Reimb. expenses to Ext Agents	0.00	3,775.73
TOTAL EXPENDITURES	**$60,580.55**	**$74,921.71**
EXCESS RECEIPTS OVER EXPENDITURES	**$13,798.79**	**$10,314.77**

PEANUT SCIENCE BUDGET
2000-01

INCOME

Page and reprint charges	$13,200.00
Journal orders	700.00
Foreign mailings	1,500.00
APRES member subscriptions	10,300.00
Library subscriptions	1,100.00
TOTAL INCOME	**$26,800.00**

EXPENDITURES

Printing and reprint costs	$10,500.00
Editorial assistance	15,000.00
Office supplies	100.00
Postage	1,200.00
TOTAL EXPENDITURES	**$26,800.00**

ADVANCES IN PEANUT SCIENCE
SALES REPORT AND INVENTORY ADJUSTMENT
1999-00

	Books Sold	Remaining Inventory
Beginning Inventory		953
1st Quarter	11	942
2nd Quarter	8	934
3rd Quarter	3	931
4th Quarter	23	908
TOTAL	**45**	

45 books sold x $20.96 = $943.20 decrease in value of book inventory.

908 remaining books x $20.96 (book value) = $19,031.68 total value of remaining book inventory.

Fiscal Year	Books Sold
1995-96	261
1996-97	99
1997-98	66
1998-99	34
1999-00	45

PEANUT SCIENCE AND TECHNOLOGY
SALES REPORT AND INVENTORY ADJUSTMENT
1999-00

	Books Sold	Remaining Inventory
Beginning Inventory		412
1st Quarter	8	404
2nd Quarter	2	402
3rd Quarter	3	399
4th Quarter	17	382
TOTAL	**30**	

30 books sold x $10.00 = $300.00 decrease in value of book inventory.

382 remaining books x $10.00 (book value) = $3,820.00 total value of remaining book inventory.

Fiscal Year	Books Sold
1985-86	102
1986-87	77
1987-88	204
1988-89	136
1989-90	112
1990-91	70
1991-92	119
1992-93	187
1993-94	85
1994-95	91
1995-96	50
1996-97	33
1997-98	49
1998-99	37
1999-00	30

PUBLIC RELATIONS COMMITTEE REPORT

The committee met in Tifton on March 13, 2000, and on July 11 prior to the 2000 APRES meeting. The committee has also visited via E-Mail. Most of our efforts have been directed toward creating more interest in the Society via the internet, symposiums, and increased participation by industry and universities. Robert Lynch, President of ARPES, participated in the Tifton meeting and agreed to work with Craig Kvien and Ron Sholar toward developing recommendations to the Board of Directors for improving the ARPES web site. Those improvements would advertise the benefits of membership and annual meetings and to transmit information such as technical programs to members and potential members and attendees. Consideration should be given to establishing a web advisory committee. The main purpose of this committee would be to better inform the members of APRES via internet and to coordinate web information. Alex Csinos, Past Chairman of the Public Relations Committee, participated in the Tifton and Mobile meetings and together with Richard Rudolph of Bayer organized an "Industry Update" for the 2000 meeting. This meeting is scheduled for Thursday, July 13, 1:15 – 2:45 p.m. in Salon C. The committee hopes that this segment of the program will be perpetuated for future meetings. In addition the committee recommends that consideration be given to increase the scope of the Industry Update by inviting special guest speakers on:

1) the internet and e-business opportunities,
2) public policy and its influence on EPA registration decisions, and
3) the potential effect of reduced student enrollment in all plant science programs as well as downsized university programs and their effects on the peanut industry.

Cecil Yancy, editor for grower magazines, also attended the Tifton meeting and agreed to work with the committee in publishing news about awards, honors, and annual meetings. Cecil Yancy has performed well and the committee hopes he will continue this effort next year. We recommend that Cecil be appointed to the Public Relations Committee on a semi-permanent basis. Six letters were written to state young farmer groups and crop consultants were contacted to inform them of the annual meetings and benefits of membership in APRES. Efforts to develop symposiums and invite speakers that would renew interest in scientific disciplines such as plant nutrition and new fields such as food allergy and nutrition should be continued, especially those disciplines identified by the Peanut Foundation and Peanut Institute as being especially important to the Peanut Industry.

The Public Relations Committee requests that the chair of each awards committee furnish us with a short written document describing the work and the award for each recipient. This will be used for publication in newspapers and other media.

Also included is a necrology report on Clyde T. Young. We understand that Bobby Walls is not active in the Society because of changes in the industry. A replacement for Bobby is recommended.

Finally the committee recommends that the by-laws be changed to allow a vice-chairman be selected each year to insure continuity of committee activities.

Respectfully submitted,

Jim Davidson, Chair
Gary Gascho
Chip Graham
Curtis Jolly
Craig Kvien
David Rogers
Bobby Walls

Dr. Clyde T. Young

Wheras Dr. Clyde T. Young, retired North Carolina State University Food Science Professor, was a leader in food science research, and

Whereas Dr. Young often called "the peanut doctor" is recognized both nationally and internationally for his pioneering work with peanut flavor, peanut quality, and food processing, and

Whereas Dr. Young was an Associate Editor of Peanut Science; co-editor of the peanut textbook "Peanut Science and Technology"; author of more than 250 scientific papers and was honored by Virginia-Carolina Peanut Promotions for 12 years of peanut processing presentations, and

Whereas Dr. Young was honored by APRES as a Research Fellow and was recipient of the American Peanut Research Society's Coyt T. Wilson Distinguished Service Award, and

Whereas Dr. Young passed away on February 1, 2000,

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

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT

Foy Mills and Carroll Johnson were present at the meeting held July 11, 2000. There was not a quorum present. Guests present were John Beasley, Charles Simpson and Tom Stalker. Since a quorum was not present, no policy changes were made. However, several items were discussed.

The declining number of manuscripts submitted to PEANUT SCIENCE is of utmost concern. Based on carryover discussion from Associate Editors meeting, possible reasons are:

1) Lengthy delays in publication,
2) more journals competing for manuscripts, and
3) potential authors not publishing data.

Weed science and plant pathology currently account for most of the manuscripts. Plant breeding, entomology, nematology, molecular biology and general agronomy are groups whose numbers of publications have radically dropped in recent years.

In response to this trend, the Associate Editors and Publications Committee will actively recruit papers from scientists and will strive to speed up the review process.

John Beasley, editor of the newsletter, requested that APRES begin using electronic publication of the newsletter, with paper copies being available if desired. This will greatly reduce publication and postage costs.

Charles Simpson requested that the style policy be rescinded that requires spanish, virginia and valencia peanut descriptive terms be upper case, not lower case. Since a quorum was not present, the committee could not vote on a recommendation. If the Board of Directors desires, the membership can be surveyed at the business meeting. If the survey indicates the desire for a change, the Publications and Editorial Committee will be prepared to address this issue at the APRES meeting in 2001.

Respectfully submitted,

Wiley C. Johnson, III, Chair
Foy Mills
Ray Smith
Gerald Harrison
Ames Herbert
James Sutton

PEANUT SCIENCE EDITOR'S REPORT

Volume 26 of *Peanut Science* will have 22 manuscripts totaling 114 pages. Galley proofs were forwarded to all authors for issue 2, and manuscripts have been returned to the printer. There are only nine manuscripts in this issue, and the membership should receive their copies within the coming month.

During each of the past two years, which run from July 1 to June 30, only 24 manuscripts were submitted to *Peanut Science*. During previous years this number ranged from 35 to 45. To be financially solvent, we need to publish 12 or more manuscripts in the journal, but we have decreased the number for the fall issue of vol. 26 to nine. The spring issue of volume 27 will also have nine manuscripts. The number of pages for volume 26 is also down from 135 or more in previous volumes. There is a major problem with issues of the journal being late because of the low submission rate as well as slow turn-around for some reviews. Last year's budget has been itemized and a proposed budget for the coming year has been completed. Both budgets can be found in these *Proceedings.*

Dr. Gary Kochert has resigned from the editorial staff because he recently retired. Dr. Kochert served for four years as an Associate Editor of *Peanut Science.* Drs. John P. Damicone, Ames Herbert, W. Carroll Johnson, and Peggy Ozias-Akins have completed six-year terms as Associate Editors of the journal. Sincere thanks is expressed to each of the five Associate Editors for service to the journal and to APRES.

Respectfully submitted,

H. Thomas Stalker
Editor, *Peanut Science*

NOMINATING COMMITTEE REPORT

Members of the Nominating Committee included Charles Swann, Chair, Dr. Thomas G. Isleib, Dr. Larry Hawf and Dr. Thomas Kucharek. Prior to the annual meeting committee members had been polled by telephone, e-mail and correspondence regarding nominations for APRES Board of Directors positions. Nominations presented to the Board of Directors are as follows:

President-Elect (Oklahoma)
Dr. John Damicone
Oklahoma State University
Stillwater, OK

State Employee Representative – SW Area
Dr. Robert G. Lemon
Texas A&M University
College Station, TX

Industry Representative – Production
Dr. W. Mark Braxton
Monsanto-Life Sciences Company
Marianna, FL

Respectfully submitted,

Charles W. Swann, Chair
Thomas Isleib
Larry Hawf
Thomas Kucharek

FELLOWS COMMITTEE REPORT

Five nominations for recognition as American Peanut Research and Education Society Fellow were received and validated. The committee evaluated the nominations according to guidelines published in the 1999 Proceedings of the American Peanut Research and Education Society 31:96-100. Committee members participating in the review were Mark Black (Chair), Dan Gorbet, G. M. "Max" Grice, Charles Simpson, John Baldwin, and Hassan Melouk. The committee recommended to the Board of Directors that three of the nominees be named Fellows in the Society.

The Fellows Committee met at 1:00 p.m. July 11, 2000 during the APRES annual meeting at the Grand Hotel, Point Clear, AL to review work completed in 1999-2000 and responsibilities for 2000-2001. Fellow Awards were presented during the APRES Awards Ceremony on Friday, July 14, 2000 to Gale A. Buchanan, Thomas A. (Chip) Lee, Jr., and Frederick M. Shokes.

Respectfully submitted,
Mark Black, Chair
Dan Gorbet
Charles Simpson
Max Grice
John Baldwin
Hassan Melouk

BIOGRAPHICAL SUMMARIES OF FELLOWS

Dr. Gale A. Buchanan is Dean and Director of the College of Agricultural and Environmental Sciences, University of Georgia, Athens, Georgia. He received the B.S. (1959) and M.S. (1962) degrees from the University of Florida, and the Ph.D. (1965) degree from Iowa State University.

Dr. Buchanan established himself early in his career as a leader in the field of weed science related to peanuts and peanut rotation crops. His work with herbicides, cultural practices, and pesticide interactions had tremendous impact on both peanut production and on the understanding of weed ecology.

In addition to his research, he has served in three major administrative capacities. In all of these, he has provided strong leadership for peanut research and/or extension programs in some of the most intensive peanut production areas in the world. He served as Dean and Director of the Alabama Agricultural Experiment Station, Associate Director of Georgia Agricultural Experiment Stations and Resident Director of the University of Georgia Coastal Plain Experiment Station at Tifton, and more recently, Dean and Director of the College of Agricultural and Environmental Sciences at the University of Georgia. During his extensive career in administration, he has worked diligently to sustain support and obtain new support for agricultural research, extension and teaching in all areas.

Dr. Buchanan has been active in the American Peanut Research and Education Society, serving as President in 1984 and on various committees. He has served as the APRES Liaison to the Southern Regional Association, State Agricultural Experiment Station Directors since 1986.

He served as president of the Council for Agricultural Science and Technology (CAST) in 1991-92.

Dr. Buchanan's expertise in weed control of peanuts is evidenced by his many publications including refereed journal articles, book chapters, abstracts, proceedings, and experiment station publications and bulletins.

Dr. Buchanan's many awards include the Golden Peanut Research Award, the Research and Education Award from the Georgia Peanut Commission, Southern Weed Science Society Distinguished Service Award, Fellow of the Weed Science Society of America, and Fellow of the American Association for the Advancement of Science, and "Man of the Year" for Georgia Agriculture by the *Progressive Farmer* magazine.

Dr. Buchanan is a perpetual proponent of agriculture with his outstanding support in promoting agriculture in general, as well as research, extension and teaching aspects of the land grant mission.

Dr. Thomas A. (Chip) Lee, Jr. is Professor and Extension Plant Pathologist, Department of Plant Pathology & Microbiology, Texas A&M University Agricultural Research and Extension Center, Stephenville. Dr. Lee received the B.S. (1968), M.S. (1970) and Ph.D. (1973) degrees from Texas A&M University at College Station.

Dr. Lee has had a significant impact on central and west Texas peanut growers as he guided producers through numerous changes. As a result, West Texas has grown into the state's major peanut production area. Dr. Lee has an extensive fungicide and nematicide evaluation program, especially with respect to important soilborne pathogens of peanut. Most recently, Dr. Lee has been an integral member of the research team that developed and in 1999 released the first peanut cultivar (COAN) with resistance to root-knot nematodes.

Dr. Lee has been a producer's friend and counselor, while at the same time providing valuable leadership to the peanut industry. He has advanced the science of plant pathology through mentoring of several students and young scientists.

During the course of his career, Dr. Lee has published nearly 200 Extension publications and popular press articles relating to management of diseases of melon, pecan, and especially peanut. His Peanut Disease Atlas and the web-based Peanut Production Training sites are in high demand from all sectors of Texas peanut production. His expertise in peanut production and disease management have also been acknowledged internationally, as Dr. Lee has traveled to South America, China and Australia to advise producers.

Dr. Lee has provided valuable leadership to the American Peanut Research and Education Society, serving in many capacities and most recently as President for 1997-1998. He provides key leadership roles in the Texas Peanut Producers' Board, interactions with peanut scientists in Texas, and with the National Peanut Council through service on the Technical Review and the Research & Education Committees.

Dr. Lee was co-recipient of the APRES Bailey Award in 1998.

The strong and still expanding Texas peanut industry is a testament to the quality of Dr. Lee's communication skills and effectiveness of his extension programs.

Dr. Frederick M. Shokes is Center Director and Professor of Plant Pathology, Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, Virginia. Dr. Shokes received the B.S. (1974) and M.S. (1975) degrees from Texas A&M University at College Station, and the Ph.D. from the University of Georgia.

Dr. Shokes is an outstanding research scientist, teacher and Extension educator. Throughout his early career working with diseases of field crops in north Florida, Dr. Shokes conducted a strong research program to manage and control diseases that affect peanut production. He played an important role in a multidisciplinary interstate collaborative effort to develop strategies for control of *Tomato spotted wilt virus* in peanut. Dr. Shokes cooperated with peanut breeders in Florida to develop and release Southern Runner, Florida MDR-98 and C-99R peanut cultivars with multiple disease resistance to early and late leaf spot, southern stem rot, and spotted wilt.

Dr. Shokes had administration responsibilities in Florida and now leads the VPI&SU Tidewater Agricultural Research and Extension Center at Suffolk.

Dr. Shokes also has broad experience in international consultation on peanut research, review and production with over 17 trips to 12 countries.

Dr. Shokes is the author of numerous refereed journal publications, abstracts, and book chapters relating to diseases of peanut and other crops, disease management, and economics relating to disease management. He has also published extensively in *Biological and Cultural Tests for Control of Plant Diseases* and *Fungicide and Nematicide Tests.*

Dr. Shokes has been very active in the American Peanut Research and Education Society with service as President in 1996, numerous committees and Associate Editor of the journal *Peanut Science.*

He has twice been co-recipient of the Bailey Award. Dr. Shokes was awarded the Societies Dow AgroSciences Award for Excellence in Research in 1995.

Dr. Shokes' communication skills make his research findings have an immediate impact on the peanut production process. His outstanding contributions continue to benefit the peanut industry and the larger agricultural industry both in the U.S. and internationally.

Guidelines for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY FELLOW ELECTIONS

Fellows

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

Eligibility of Nominators

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

Eligibility of Nominees

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

The nominee should have made outstanding contributions in an area of specialization whether in research, extension or administration and whether in public, commercial or private service activities. Members of the Fellows Committee and voting members of 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 (minimum of three but not more than five). The copies are to be mailed to the chairman of the Fellows Committee.

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

Basis of Evaluation

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

Processing of Nominations

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

Recognition

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

Distribution of Guidelines

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

Format for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY FELLOW NOMINATIONS

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

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

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

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

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

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

I. PERSONAL ACHIEVEMENTS AND RECOGNITION (10 points)

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

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

A. Research

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

B. Extension

Ability (a) to communicate ideas clearly, (b) to influence client attitudes, (c) to motivate change in client action. Evaluate the quality, number and effectiveness of publications for the audience intended. Attach a chronological list of publications.

C. Service to Industry

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

D. Administration or Business

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

III. SERVICE TO THE PROFESSION (30 points)

A. Service to APRES

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

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

B. Service to the profession outside the Society

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

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

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

SUPPORTING LETTERS: A minimum of three (3) but not more than five (5) supporting letters are to be included for the nominee. Two of the three required supporting letters must be from active members of the Society. The letters are solicited by, and are addressed to, the nominator, and should not be dated. Please urge those writing supporting letters not to repeat factual information that will obviously be given by the nominator, but rather to evaluate the significance of the nominee's achievements. Attach one copy of each of the three letters to each of the six copies of the nomination. Members of the Fellows Committee, the APRES Board of Directors, and the nominator are not eligible to write supporting letters.

BAILEY AWARD COMMITTEE REPORT

The Bailey Award Committee met on Tuesday, July 11, 2000, in Salon C of the Grand Hotel at Point Clear, Alabama. Members present were Kelly Chenault, Ken Jackson (incoming chair) and John Beasley (outgoing chair). The committee discussed the revised Bailey Award guidelines that were approved at last year's APRES meeting and agreed they worked well.

The majority of the Bailey Award Committee's work is done during the winter and spring months in evaluating manuscripts submitted by nominees from the previous year's meeting.

There were 13 presentations nominated for the Bailey Award at the 1999 APRES meeting in Savannah, Georgia. Eight manuscripts were received by the January 20, 2000 deadline. These eight manuscripts were evaluated and ranked by the committee and the Bailey Award winner was determined. The winner of the Bailey Award for 1999-2000 is "RFLP Markers for Identification of Resistance Genotype in Peanut". G.T. Church, C.E. Simpson, and J.L. Starr, Texas A&M University.

Respectfully submitted,

John Beasley, Chair
Ken Jackson
Kurt Warnken
Robert Lemon
Kelly Chenault
Rick Brandenburg

Guidelines for

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY BAILEY AWARD

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

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

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

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

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

1. Well organized.

2. Clearly stated.

3. Scientifically sound.

4. Original research or new concepts in extension or education.

5. Presented within the time allowed.

A copy of these criteria will be distributed to each session chair and judge prior to the paper session.

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

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

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

2. Originality of concept and methodology.

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

4. Contribution to peanut scientific knowledge.

The Bailey Award chair for the current year's meeting will complete the following:

a) notify session moderators for the upcoming meeting of their responsibilities in relation to judging oral presentations as set in the guidelines in APRES PROCEEDINGS,
b) meet with committee at APRES meeting,
c) collect names of nominees from session moderators by Friday a.m. of Annual Meeting,
d) provide Executive Officer and Bailey Award committee members the name of Bailey Award nominees,
e) notify nominees within two months of meeting,
f) set deadline in late Fall or early winter for receipt of manuscripts by Bailey Award chair,
g) distribute manuscripts to committee members,
h) provide Executive Officer with Bailey Award winner and paper title no later than May 15, and
i) Bailey Award chair's responsibilities are completed when the Executive Officer receives Bailey Award recipient's name and paper title.

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

JOE SUGG GRADUATE STUDENT AWARD REPORT

First Place Winner:
Debra L. Glenn presenting the paper entitle: "Field Incidence of Cylindroclodium Black Rot of Peanut as a Result of Seed Transmission of Cylindroclodium parasiticum in Virginia," authored by D.L. Glenn, P.M. Phipps and R.J. Stipes, Virginia Tech, Blacksburg, VA.

Second Place Winner:
S.L. Rideout and T.R. Faske were tied for second place. The committee attempted to break the tie by using various means of ranking the speakers but each time both were too close to separate.

The committee made the decision to award second place to both Steven L. Rideout and Travis R. Faske. The papers presented were: "Control of Southern Stem Rot of Peanuts Using Weather Based Spray Advisories", authored by S.L. Rideout and T.B. Brenneman, University of Georgia and "Evaluation of four types of Sclerotinia minor Incula to Differentiate the Reaction of Peanut Genotypes to Sclerotinia Blight" authored by T.R. Faske, H.A. Melouk and M.E. Payton, Oklahoma State University.

Respectfully submitted,

Alex S. Csinos, Chair
Kira Bowen
Joe Dorner
Hassan A. Melouk
Robert Lemon

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT

The Coyt T. Wilson Distinguished Service Award recognizes a person who has contributed two or more years of distinguished service to the American Peanut Research and Education Society. The award was established in honor of Dr. Coyt T. Wilson who provided leadership in the formative years of the Society.

The 2000 Award Committee consisted of Patrick Phipps (chair), Richard Rudolph, Charles Simpson, Thomas Whitaker, and Mike Schubert. A "Call for Nominations" was sent on 6 December 1999 to department heads, extension specialists and research leaders who are active in APRES. Three nominations were received and all arrived prior to the 1 March 2000 deadline. The nomination packages were sent to members of the committee on 5 March 2000 with a request for ranking of nominees on or before March 31. The award committee presented its findings on 18 April 2000 to Dr. Robert Lynch, President of APRES, Dr. Austin Hagan, President-elect, and Dr. Ron Scholar, Executive Officer.

The award committee recommended that the 2000 Coyt T. Wilson Distinguished Service Award be presented to R. Walton Mozingo, Professor of Crop, Soil and Environmental Sciences at the Tidewater Agricultural Research and Extension Center, Virginia Tech, Suffolk, VA. With the unanimous approval of the Board of Directors, the award was presented to Mr. Mozingo at the Awards Breakfast on 14 July 2000 in Point Clear, Alabama. Mr. Mozingo was recognized for his many contributions over the last 34 years to the American Peanut Research and Education Society. He has served as president of the society, a member of the board of directors, president-elect, past president, program chair, associate editor of *Peanut Science*, and chair of major committees. In addition, Mr. Mozingo has a long and distinguished record as an active participant in annual meetings through his presentations of research on peanut variety and quality characteristics.

To help ensure that nominations of such high caliber and quality continue to be submitted for this award each year, the committee recommends the following actions be continued:

1. Encourage nominators to update nominations and re-nominate candidates who were not selected for the 2000 award,
2. Email a "call for nominations" to research leaders, department chairs and extension specialists who are members of APRES.

These actions are needed in November or early December to allow adequate time for preparing nominations and securing supportive letters from qualified persons.

Respectfully submitted,

Patrick Phipps, Chair
Richard Rudolph
Robert Lynch
Charles Simpson
Thomas Whitaker
Mike Schubert

BIOGRAPHICAL SUMMARY OF COYT T. WILSON DISTINGUISHED SERVICE AWARD RECIPIENT

Mr. R. Walton Mozingo is Professor of Crop and Soil Environmental Sciences at Virginia Polytechnic Institute and State University, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia. He received his Bachelor of Science (1963) and Master of Science (1968) degrees in Crop Science from North Carolina State University. He has served on the faculty of Virginia Tech since 1968.

Mr. Mozingo is recognized for his service, with distinction, to the Society since it organization in 1969. He has participated in all of the Society's annual meetings. Prior to his service to the Society he was a member and active supporter of the Peanut Improvement Working Group, the parent organization for the American Peanut Research and Education Society, Inc.

Mr. Mozingo has served as President of the Society and three years on the Board of Directors, as President-elect and Program Chairman, President, and Past President and Chairman of the Nominating Committee.

Mr. Mozingo has been very active in Society affairs. In addition to his assignments on the Board of Directors, he has spent 34 years on major committee assignments including 9 years as chairman of major committees (Coyt T. Wilson Distinguished Service Award, Finance, Local Arrangements, Nominating, Program, and Site Selection).

Mr. Mozingo proposed the idea (at the annual meeting in 1988) and was primarily responsible for the development and implementation of the Coyt T. Wilson Distinguished Service Award offered by the Society to recognize an individual who has contributed two or more years of distinguished service to the Society. Mr. Mozingo was appointed chairman of the ad-hoc committee to develop the rules and procedures for presenting the award. As a result of this effort the first award was presented in 1990 and has been given annually since. This award is considered to be the second highest honor that can be bestowed upon one of the Society members.

The success of *Peanut Science*, the refereed journal of the Society, depends on loyal and dedicated associate editors. Mr. Mozingo has contributed to the success of *Peanut Science* through his committed service as associate editor (now serving in the fifth year of his second 6 year term). In addition Mr. Mozingo gave 11 years of dedicated and loyal service as associate editor of *Quality Methods*, a manual sponsored and published by the Society.

Mr. Mozingo has participated in the annual meetings through the presentations of original research on the technical program. He has made technical presentations at 23 of the 30 annual meetings as senior author of the paper and has contributed to many other presentations as co-author. In addition, Mr. Mozingo has served as a technical session moderator at many of the annual meetings.

Mr. Mozingo's distinguished service to the Society has been recognized with the highest award that the Society can bestow upon one of its members, that of being named a Fellow in the Society in 1990. He has also been awarded the prestigious National Peanut Council Research and Education Award (1989) and the Society's Dow AgroSciences Award for Excellence in Research (1996).

Mr. Mozingo has developed a research program that is nationally and internationally recognized. As coordinator of the Virginia – North Carolina Peanut Variety and Quality Evaluation research program, Mr. Mozingo has been responsible for the evaluation of more than 340 peanut cultivars and advanced peanut breeding lines since 1968. Of these, 22 cultivars and 8 germplasm lines have been released for commercial production and research.

Mr. Mozingo is a thoughtful, innovative, intelligent, and fine person. He pursues excellence in everything that he undertakes. He is an outstanding representative of Virginia Tech, the State of Virginia, the Society, the peanut industry and the Nation. He has set very high standards for service to the Society.

Guidelines for

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

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

Eligibility of Nominators

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

Eligibility of Nominees

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

Nomination Procedures

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

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

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

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

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

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

Qualifications of Nominee

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

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

III. Supporting letters:

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

Award and Presentation

The award shall consist of a $1,000 cash award and a bronze and wood plaque both provided by the Society and presented at the annual meeting.

DOW AGROSCIENCES AWARDS COMMITTEE REPORT

The Dow AgroSciences Awards Committee consisted of seven members in 1999-2000. They were as follows:

Walt Mozingo, Chair (2001)	Chris Butts (2000)
B. B. Shew (2000)	James Grichar (2001)
Joe Funderburk (2002)	Peggy Ozias-Akins (2002)
Vernon Langston (Dow AgroSciences representative)	

Nominations were received and found to meet all the guidelines for acceptance. Copies of each nomination packet were mailed to all committee members for review and voting. Each committee member voted for the Awards by ranking the nominees from first to last. These rankings were sent to the Chair who tabulated the scores. The winners were the nominees with the lowest scores where 1 equaled first place.

The winner of the 2000 Dow AgroSciences Award for Excellence in Research is Dr. Timothy B. Brenneman, Plant Pathologist from the University of Georgia located at the Coastal Plain Experiment Station in Tifton, Georgia. The winner of the Dow AgroSciences Award for Excellence in Education is Dr. H. Thomas Stalker, Geneticist and Department Head in Crop Science from North Carolina State University in Raleigh, North Carolina. Biographical summaries for each winner is published in the ARPES Proceedings and available as press releases.

The committee would like to encourage nomination of qualified APRES members for these prestigious awards.

Respectively submitted,

Walton Mozingo, Chair

BIOGRAPHICAL SUMMARY OF DOW AGROSCIENCES AWARD FOR EXCELLENCE IN RESEARCH RECIPIENT

Dr. Timothy B. Brenneman is a plant pathologist at The University of Georgia in the Department of Plant Pathology and is located at the Coastal Plain Experiment Station (CPES), Tifton, Georgia. Dr. Brenneman earned the B.A. at Goshen College, Goshen, Indiana and the Ph.D. at Virginia Polytechnic Institute and State University, Blacksburg, Virginia. Since that time Tim has been at the CPES and was promoted to his current rank of Professor in 1998.

Dr. Brenneman has a broad-based research program that has addressed numerous problems facing peanut producers in the southeastern United States. His program has resulted in over 60 refereed journal articles, 110 abstracts or proceedings, plus numerous other scientific publications such as Fungicide and Nematicide Reports and Experiment Station publications. He has successfully competed for over $1 million in grants and has been a cooperator for an additional $160,000.

Dr. Brenneman has an extensive program with Dr. Albert Culbreath in partnership with the agricultural chemical industry that has identified promising new fungicides and developed appropriate management strategies for their effective use. Dr. Brenneman has also been intricately involved in the identification and development of germplasm and cultivars with resistance to stem rot, limb rot and Cylindrocladium black rot.

The contributions of Tim to plant pathology has been well recognized by his peers in APRES and elsewhere. Tim has twice won the Bailey Award. He has received the Tifton Chapter of Sigma Xi Creative Research Award twice, was a co-recipient of the Georgia Research and Education Award from the Georgia Peanut Commission, and received the Jr. Faculty Award in Research from The University of Georgia Chapter of Gamma Sigma Delta. Tim's mentoring has also been recognized by his serving on M.S. or Ph.D. of nine students.

Dr. Brenneman is often called upon to share his findings with growers, extension personnel, and industry professionals. He helped temporarily fill a void in the extension program at UGA for a three year period, and continues to provide support in extension programming on peanuts. The research Tim has conducted has helped shape peanut production and disease management practices for the southeastern United States, and provided a firm foundation for continued work to make peanut production profitable by effective disease management.

DOW AGROSCIENCES AWARD FOR EXCELLENCE IN EDUCATION RECIPIENT

Dr. H. Thomas Stalker is Professor and Head, Crop Sciences Department in the College of Agricultural and Life Sciences at North Carolina State University, Raleigh, NC. Dr. Stalker earned his BS degree in 1972 and his MS degree in 1973 from the University of Arizona, and his Ph.D. from the University of Illinois in 1977. He began his professional career at North Carolina State University in 1977 as a Research Associate and obtained the rank of Professor in 1989. In 1999 he became the Head of the Crop Science Department.

Dr. Stalker has specialized in cytogenetics and interspecific hybridization with peanut, and he has been a teacher and educator for more than 20 years at North Carolina State University. Because of his international reputation as a scientist, he has attracted many highly qualified graduate students into his genetics and breeding program. He has chaired 15 graduate committees, and more than half of his scientific publications are co-authored by his students. One of his Ph.D. students received the outstanding dissertation award in the College of Agriculture and Life Sciences in 1997, and in 1999 another MS students received the Joe Sugg Award at the APRES meetings.

He initiated a summer internship program in 1993 for honor students to give them hands-on experiences in peanut research programs and nearly 25% of these 17 students have entered graduate programs involving peanut breeding or plant pathology. To bring pertinent information to students and researches working with peanut, Dr. Stalker has chaired several symposia at APRES meetings, organized international training workshops on germplasm management, chaired international plant breeding symposia, helped establish and chaired a multi-state peanut molecular biology information exchange group, and presented information at numerous peanut field days to farmers and extension agents. As the editor of *Peanut Science* since 1994 he has worked with hundreds of authors to publish manuscripts, he was the co-editor of *Advances in Peanut Science*, and has edited three additional books. In APRES, he has been active on the Joe Sugg Graduate Student Award and the Bailey Award committees, which promote excellence in education.

As a classroom teacher, he took a leadership position to initiate new classes and revise curricula at N. C. State University. Dr. Stalker has taught courses in Crop Plant Evolution and Cell and Tissue Techniques in Plant Breeding and has consistently been rated as an excellent instructor by students. Dr. Stalker also guest lectures and regularly makes presentations at grade schools about peanut products. His academic leadership was recognized in 1997 when he served as President of the NCSU chapter of Gamma Sigma Delta and he currently is Vice President of the NCSU chapter of Sigma Xi. Dr. Stalker was formerly recognized as a Fellow of APRES in 1996, Fellow of the American Society of Agronomy in 1998, and Fellow of the Crop Science Society of America in 1998. He received the Bailey Award in 1996, the American Peanut Council Peanut Research and Education Award in 1999, and the Gamma Sigma Delta Award of Merit in 2000.

Guidelines for

DOW AGROSCIENCES AWARDS FOR EXCELLENCE IN RESEARCH AND EDUCATION

I. Dow AgroSciences Award for Excellence in *Research*

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

Eligibility of Nominees

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

II. Dow AgroSciences Award for Excellence in *Education*

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

Eligibility of Nominees

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

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

Eligibility of Nominators

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

Nomination Procedures

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

Dow AgroSciences Awards Committee

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

NOMINATION FORM FOR DOW AGROSCIENCES AWARDS

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

****

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

___ Dow AgroSciences Award for Excellence in Education

___ Dow AgroSciences Award for Excellence in Research

****

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

Nominee(s):

_____

Address

_____

Title _____ Tel No. _____

II. Nominator:

Name _____ Signature _____

Address

_____

Title _____ Tel No. _____

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

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

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

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

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

PEANUT QUALITY COMMITTEE REPORT

The Peanut Quality Committee and interested APRES members discussed 3 topics during the meeting.

Under old business, the issue of illegal pesticide usage in peanuts was brought up for comments. Last year the committee had agreed to a statement on proper pesticide stewardship as part of the larger effort to curtail MSMA applications. There was little to add today, so apparently government agencies, peanut researchers, and the farming community have reduced the potential for abuse in this area.

Two topics were discussed under new business. The first subject was the status of the high oleic acid trait in new peanut variety development. The high oleic trait provides enhanced oil stability and the potential health benefits of a high monounsaturated oil source without observed negative characteristics. The University of Florida owns the U.S. Patent for this trait in peanut oil and seed and has a third patent pending for use in finished products. Both Agratech and Mycogen had earlier patents issued on specific high oleic germplasms selected by alternative methods. Collaboration between Florida and other states will be critical for widespread development of U.S. cultivars.

The second discussion topic was aflatoxin levels in U.S. peanuts for export. Aflatoxin content in peanuts can likely be reduced by several different strategies currently in development. Longer term, peanut breeding efforts have identified peanuts with resistance to aflatoxin accumulation. Efforts to reduce the population of aflatoxin-producing *Aspergillus* by atoxigenic strains also appears to have potential to reduce peanut aflatoxin levels.

The U.S. peanut industry has succeeded in getting the European Union to accept aflatoxin testing at origin. In practice, this means that both raw and finished product must meet the 4 ppm maximum for aflatoxin in finished product. This ruling reflects confidence in past practices of the U.S. peanut industry.

Respectfully submitted,

Doug Smyth, Chair
Doyle Welch
Don Sternitzke
Carroll Johnson
R. W. Mozingo
Timothy Sanders
Brent Besler

PROGRAM COMMITTEE REPORT

The program committee, which was chaired by Austin Hagan, also consisted of Kira Bowen (Technical Program), H. Randy Griggs (Local Arrangement), and Teresa Roper (Spouse's Program). The opening session featured the Honorable Adrain Jones, Probate Judge for Baldwin Co., Alabama; Pat Kearney, Program Director for the Peanut Institute; William Lateulere, Executive Director of the Alabama Chapter of the March of Dimes; and Dr. Luther Waters, Dean of the College of Agriculture, Auburn University, Alabama. A total of 6 posters, 9 graduate student papers, 10 industry presentations and 100 technical papers are planned. Symposia included International Issues Facing the Peanut Sector and Genetic Resources for the Third Millennium. In addition, several fellowship functions are planned which should greatly add to the enjoyment of everyone at this meeting.

Respectively submitted,

Austin Hagan, Chair

Contributors to 2000 APRES Meetings

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

Special Activities
American Cyanamid Company
Aventis
BASF Corporation
Bayer Corporation, Agriculture Division
Dow AgroSciences
Novartis
Valent USA Corporation
Zeneca Agricultural Products

Regular Activities
Griffin L.L.C.
Gowan
Uniroyal Chemical
Lipha Tech
Birdsong Peanuts

Spouses Activities
March of Dimes

Products
Alabama Peanut Producers Association
Florida Peanut Producers Association
Georgia Peanut Commission
Georgia Peanut Producers Association
North Carolina Peanut Producers Association
South Carolina Peanut Producers Board
Southern Peanut Farmers Federation
Texas Peanut Producers Board
Virginia Peanut Growers Association
Western Peanut Producers Association

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Joann Hartzog

Program Highlights

Tuesday, July 11

Committee, Board, and Other Meetings

8:00-12:00	Crops Germplasm Committee	Salon B
12:00-8:00	APRES Registration	Grand Ballroom Foyer
1:00-5:00	Spouses' Hospitality	Card Room
1:00-2:00	Associate Editors, Peanut Science	Salon A
1:00-2:00	Site Selection Committee	Salon B
1:00-2:00	Fellows Committee	Salon C
1:00-2:00	Coyt T. Wilson Distinguished Service Award	Salon DEF
2:00-3:00	Publications and Editorials Committee	Salon A
2:00-3:00	Public Relations Committee	Salon B
2:00-3:00	Bailey Award Committee	Salon C
2:00-3:00	Dow AgroSciences Awards Committee	Salon DEF
3:00-4:00	Nominating Committee	Salon A
3:00-4:00	Joe Sugg Graduate Student Award Committee	Salon B
3:00-4:00	Peanut Quality Committee	Salon C
3:00-4:00	ARS Meeting	Salon DEF
4:00-5:00	Finance Committee	Salon A
7:00-11:00	Board of Directors	Salon B
7:00-9:00	**Ice Cream Social Aventis**	**Grand Ballroom Patio**

Wednesday, July 12

8:00-4:00	APRES Registration	Grand Ballroom Foyer
8:00-5:00	Spouses' Hospitality	Card Room
8:00-9:45	General Session	Grand Ballroom South
9:45-10:00	**Break**	**Novartis**
9:45-5:00	Poster Session	
10:00-12:00	Entomology/Weed Science	Salon A
10:00-12:00	Harvesting, Curing, Shelling, Storing, and Handling/Mycotoxins	Salon B
10:15-11:45	Economics I	Salon C

1:00-3:00	Symposium: International Issues Facing the Peanut Sector	Salon A+B
1:15-2:30	Production Technology I	Salon C
2:45-3:00	**Break**	**Novartis**
3:00-5:00	Graduate Student Competition	Salon A+B
6:00-9:00	**Reception /Evening Meal** **Zeneca Agricultural Products**	**Julep Point**

Thursday, July 13

8:00-12:00	APRES Registration	Grand Ballroom Foyer
8:00-5:00	Spouses' Hospitality	Card Room
8:00-9:45	Physiology and Seed Technology/ Processing and Utilization	Salon A
8:15-9:45	Production Technology	Salon B
8:00-9:45	Symposium: Genetic Resources For the Third Millennium	Salon C
9:45-10:15	**Break**	**Novartis**
10:00-12:00	Plant Pathology and Nematology I	Salon A
10:00-11:30	Extension Techniques and Technology/Education for Excellence	Salon B
10:00-12:00	Symposium: Genetic Resources For the Third Millennium, continued	Salon C
1:15-2:45	Plant Pathology and Nematology II	Salon A
1:15-3:00	Breeding, Biotechnology and Genetics I	Salon B
1:15-3:00	Industry Update	Salon C
2:45-3:15	**Break**	**Novartis**
3:00-4:30	Economics II	Salon A
3:00-4:45	Breeding, Biotechnology, and Genetics I	Salon B
6:00-9:00	**Reception /Evening Meal** **Bayer/BASF/Amer. Cyanamid**	**Battleship Park**

Friday, July 14

7:00-8:00	**Awards Breakfast** **Dow AgroSciences/Valent**	**Grand Ballroom South**
8:00-10:00	**APRES Awards Ceremony and Business Meeting**	**Grand Ballroom South**
10:00-12:00	Peanut CRSP Project	Jubilee Room

GENERAL SESSION

Wednesday, July 12
Grand Ballroom South

8:00	Call to Order	**Dr. Austin K. Hagan** APRES President
8:05	Welcome to Alabama	**Albert Lipscomb** Senate Ag Committee, Alabama House of Representative, Baldwin County, AL
8:15	Peanut Nutrition – On the Cutting Edge	**Ms. Pat Kearney, MEd, RD** Program Director, Peanut Institute, Alexandria, VA
8:40	Presentation Partnership: Peanuts and the March of Dimes	William Lateulere Executive Director of the March of Dimes
9:35	Announcements	

TECHNICAL SESSIONS
Wednesday, July 12

9:45 - 5:00 **Poster Session**
(Authors present 2:45 to 3:15)

Coordinator: K.L. Bowen, Auburn University, Auburn, AL

1) Photoperiod Effects on Growth and Pod Maturity of Bayo Grand Peanut. **K.T. Ingram* and R. Pittman**. University of Georgia, Griffin, GA.

2) Transcriptional Changes in Peanut Following Water Stress. **A.K. Jain* and S.M. Basha**. Florida A&M University, Tallahassee, FL.

3) Withdrawn

4) *Arachis hypogaea* Germplasm Characterization using SSR Generated Markers. **M.S. Hopkins, M.L. Newman*, R.E. Dean, and R.N. Pittman.** USDA-ARS, Griffin, GA.

5) Withdrawn

6) Peanut Selection Program at the University of Chapingo. III. Pod and Seed Yield during a Three-year Trial of Virginia-type Peanuts. **S. Sanchez-Dominguez* and D. Sanchez-Dominguez.** Universidad Autónoma Chapingo, Chapingo, México.

7) A Field Survey for Tospoviruses in Georgia Peanut. **M.L. Wells*, A.K. Culbreath, H.R. Pappu, and J.W. Todd.** University of Georgia, Tifton, GA.

Wednesday, July 12, morning

ENTOMOLOGY/WEED SCIENCE
Salon A

Moderator: J.R. Weeks, Auburn University, Headland, AL

10:00 (8) Evaluation of Economic Thresholds for Control of Leafhoppers in Peanut. **S.L. Brown* and J.W. Todd.** University of Georgia, Tifton, GA.

10:15 (9) Tillage and Chlorpyrifos Treatment Effects on Peanut Arthropods - An Incidence of Severe Burrower Bug Injury. **J.W. Chapin*, J.S. Thomas, and P.H. Joost.** Clemson Univ., Blackville, SC.

10:30 (10) Southern Corn Rootworm Management in Peanut: A Review of Progress, Problems and Possibilities. **D.A. Herbert, Jr.* and R.L. Brandenburg.** Virginia Tech, Tidewater AREC, Suffolk, VA.

10:45 (11) Weed Control in Texas Peanut with Strongarm and Dual Magnum Combinations. **T.A. Baughman*, P.A. Dotray, W.J. Grichar, J.W. Keeling, R.G. Lemon, E.P. Prostko, B.L. Porter, B.A. Besler, K.D. Brewer, V. B. Langston and R. B. Lassiter.** Texas Agric. Extension Service, Vernon, TX.

11:00 (12) Performance of Diclosulam in Texas Peanut. **P.A. Dotray*, B.L. Porter, J.W. Keeling, T.A. Baughman, W.J. Grichar, E.P. Prostko and R.G. Lemon.** Texas Tech University, Lubbock, TX.

11:15 (13) Sulfentrazone Use in Texas Peanut. **W.J. Grichar*, P.A. Dotray, B.A. Besler, and K.D. Brewer.** Texas Agricultural Experiment Station, Yoakum, TX.

11:30 (14) Effect of Emergence and Herbicide Application Timing on Florida Beggarweed (*Desmodium tortuosum*) Competition in Peanut (*Arachis hypogoea*). **T.L. Grey* and D.C. Bridges.** University of Georgia, Griffin, GA.

11:45 (15) Preemergence Applications of Prowl and Sonalan in Peanut. **E.P. Prostko* and W.C. Johnson, III.** University of Georgia and USDA-ARS, Tifton, GA.

Wednesday, July 12, morning

HARVESTING, CURING, SHELLING, STORING, and HANDLING/MYCOTOXINS
Salon B

Moderator: J.W. Dorner, USDA-ARS, NPRL, Dawson, GA

10:00 (16) High Moisture Farmer Stock Grading. **P.D. Blankenship*, M.C. Lamb, C.L. Butts, E.J. Williams, and T.B. Whitaker.** USDA-ARS, NPRL, Dawson, GA.

10:15 (17) End Products are Potential Cause for the Increase in IgE-binding of Roasted Peanuts. **S.Y. Chung* and E.T. Champagne.** USDA-ARS, SRRC, New Orleans, LA.

10:30 (18) Computerized Color Classification of Peanut Pods. **D. Boldor and T.H. Sanders*.** USDA-ARS, MQHRU, Raleigh, NC.

10:45 (19) A Method for Estimating Heat Distribution in Semi-trailers and Large Drying Bins. **E.J. Williams*.** University of Georgia, Coop. Extension Service, Tifton, GA.

11:00 (20) Effect of Application of Nontoxigenic Strains of *Aspergillus flavus* and *A. parasiticus* on Subsequent Aflatoxin Contamination of Peanuts in Storage. **J.W. Dorner* and R.J. Cole.** USDA-ARS, NPRL, Dawson, GA.

11:15 (21) Conidial Movement of Nontoxigenic *Aspergillus flavus* and *A. parasiticus* following application to soil. **B.W. Horn*, R.L. Greene, R.B. Sorensen, P.D. Blankenship and J.W. Dorner.** USDA-ARS, NPRL, Dawson, GA.

11:30 (22) A Crop Modelling Approach to Define Optimum Maturity for Drought and Aflatoxin Avoiding Varieties. **G.C. Wright* and N. Rao Rachaputi.** Farming Systems Institute, Kingaroy, Queensland, Australia.

11:45 (23) "Streeton"–An Aflatoxin Tolerant Peanut Cultivar for the Australian Peanut Industry. **A.L. Cruickshank, G.C. Wright* and N. Rao Rachaputi.** Farming Systems Institute, Kingaroy, Queensland, Australia.

Wednesday, July 12, morning

ECONOMICS I
Salon C

Moderator: Tim Hewitt, University of Florida, Marianna, FL

10:15 (24) An Evaluation of At-Plant Insecticides and Net Returns. **S.M. Fletcher*, A.S. Luke and J.W. Todd.** University of Georgia, Griffin, GA.

10:30 (25) A Regional Planting Date Study: Georgia Green and TSWV--More than Yield Management. **A.S. Luke*, S.M. Fletcher, J.W. Todd, J.A. Baldwin, D.W. Gorbet, J.R. Weeks, A.K. Culbreath and S.L. Brown.** National Ctr for Peanut Competitiveness, Tifton, GA

10:45 (26) Can We Talk? Economic Considerations of Why Peanut People Often Disagree. **F.D. Mills, Jr.** Abilene Christian University, Abilene, TX

11:00 (27) Can New Generation Cooperatives be a Feasible Solution for Georgia Peanut Marketing? **S.J. Hancock*, T. Ray, S.M. Fletcher, and W.A. Thomas.** University of Georgia, Athens, GA.

11:15 (28) Peanut Products Purchase: Effects of Nutrition Consideration and Household Characteristics. **A. Rimal* and S.M. Fletcher.** University of Georgia, Griffin, GA.

11:30 (29) Factors Influencing the Consumption of Peanut and Peanut Products. **C.M. Jolly, M.J. Hinds, P. Lindo and H. Weiss*.** University of Alabama, Birmingham, AL.

Wednesday, July 12, afternoon

Symposium: INTERNATIONAL ISSUES FACING THE PEANUT SECTOR
Salon A + B

Organizer: David Zimet, University of Florida
Moderator: J.H. "Tim" Williams, Dir. Peanut CRSP

1:00 Introductions

1:10 (30) Withdrawn

1:30 (31) Increasing Demand. **David Zimet.** University of Florida, Quincy, FL

1:50 (32) U.S. Competitiveness Program. **S.M. Fletcher.** Director, National Center for Peanut Competitiveness, University of Georgia, Griffin, GA

2:10 (33) Withdrawn

2:30 (34) Plant Iintroductions Through the Peanut CRSP and the Use of Introductions by the Bolivian Project. **R.N. Pittman, D.W. Gorget D.J. Zimet, J.W. Todd and D.E. Montenegro.** USDA-ARS Plant Genetic Resources Conservation Unit, Griffin, GA.

PRODUCTION TECHNOLOGY I
Salon C

Moderator: John Baldwin, University of Georgia, Tifton, GA.

1:15 (35) How to Obtain Maximum Returns Using IRRIGATOR PRO, an Expert System for Managing Peanut Irrigation. **J.I. Davidson, Jr.*, M.C. Lamb, D.A. Sternitzke and C. L. Butts.** USDA-ARS, NPRL, Dawson, GA.

1:30 (36) Impact of Plant Population on Replant Decision-Making for Non-irrigated Peanuts. **D.A. Sternitzke*, M.C. Lamb, J.I. Davidson, Jr. and C.T. Bennet.** USDA-ARS, NPRL, Dawson, GA.

1:45 (37) Effect of Land Preparation and Cotton Stalk Residue Management on Peanut Yield in a Sandy Field with a History of High Pest Pressure. **C.L. Butts*, J.I. Davidson, Jr., D.A. Sternitzke, M.C. Lamb, P. Timper, C.R. Hobbs, J.F. McGill and R.B. Moss.** USDA-ARS, NPRL, Dawson,GA.

2:00 (38) Soil pH and Large-Seeded Virginia-type Peanut Production. **N.L. Powell* and R.W. Mozingo.** Virginia Tech, Tidewater AREC, Suffolk, VA.

2:15 (39) Valencia Peanut Yield Response to Subsurface Drip vs. Center Pivot Irrigation Systems. **N. Puppala*, R.D. Baker and R.B. Sorensen.** New Mexico State University, Clovis, NM.

2:30 A groundnut sheller for home shelling. **C.J. Swanevelder.** ARC-Grain Crops Institute, South Africa

Wednesday, July 12, afternoon

GRADUATE STUDENT COMPETITION
Salon A + B

Moderator: J. Touchton, Auburn University, Auburn, AL

3:00 (40) Influence of Prohexadione Calcium on Yield Components of the Cultivar NC 12C. **J.B. Beam*, D.L. Jordan, T.G. Isleib, J.E. Bailey, and A.C. York.** North Carolina State Univ., Raleigh, NC.

3:15 (41) Genotype Evaluation for Productivity and Quality of Peanut in West Texas. **B.D. Howell*, D.R. Krieg, and D.W. Gorbet.** Texas Tech University, Lubbock, TX.

3:30 (42) Water Deficit and High Light Intensity Effects on Peanut Grown Under High Temperature Conditions. **G.F. Pateña* and K.T. Ingram.** University of Georgia, Griffin, GA.

3:45 (43) The Effect of Fatty Acid Profiles on Peanut Seed Germination at Low Soil Temperatures. **B.S. Jungman* and A.M. Schubert.** Texas Agricultural Experiment Station, Lubbock, TX.

4:00 (44) Yellow Nutsedge (*Cyperus esculentus* L.) Managment with Metolachlor Herbicide Timings in Texas High Plains Peanut. **B.L. Porter*, P.A. Dotray, J.W. Keeling and T.A. Baughman.** Texas Agricultural Experiment Station, Lubbock, TX.

4:15 (45) Control of Southern Stem Rot of Peanut Using Weather-Based Spray Advisories. **S.L. Rideout* and T.B. Brenneman.** University of Georgia, Tifton, GA.

4:30 (46) Peanut Susceptibility to an Undescribed Root-knot Nematode. **C.B. Meador*, T.A. Lee, Jr. and J.A. Wells.** Texas Agricultural Extension Service, Stephenville, TX.

4:45 (47) Field Incidence of Cylindrocladium Black Rot of Peanut as a Result of Seed Transmission of *Cylindrocladium parasiticum* in Virginia. **D.L. Glenn*, P.M. Phipps and R.J. Stipes.** Virginia Tech, Blacksburg, VA.

5:00 (48) Evaluation of Four Types of *Sclerotinia minor* Inocula to Differentiate the Reaction of Peanut Genotypes to Sclerotinia Blight. **T.R. Faske*, H.A. Melouk and M.E. Payton.** Oklahoma State University, Stillwater, OK.

Thursday, 13 July, morning

PHYSIOLOGY and SEED TECHNOLOGY / PROCESSING and UTILIZATION
Salon A

Moderator: J.P. Beasley, Jr., University of Georgia, Tifton, GA

8:15 (49) Timing of Initial Application of Baseline Plant Growth Regulator on Single and Twin Row Spaced Peanuts. **J.P. Beasley, Jr.*, C.K. Kvien and S. Rushing.** University of Georgia, Tifton, GA.

8:30 (50) Deficit Irrigation of Runner Peanut in the Texas Southern High Plains: Five Years of Research. **A.M. Schubert*, D.O. Porter, J.P. Bordovsky and W.M. Lyle.** Texas Agric. Res. & Exten. Ctr, Lubbock, TX.

8:45 (52) Effects of Peanut Flour and Peanut Butter on Texture of Muffins. **M.J. Hinds.** Oklahoma State University, Stillwater, OK.

9:00 (53) Characteristics of Roast Color Development with Kernels Grown in Virginia, Texas, and Oklahoma. **D.A. Smyth* and F.W. Sornoza.** NABISCO, East Hanover, NJ.

9:15 (54) Vanillin Content in Boiled Peanuts. **V.S. Sobolev.** USDA-ARS, NPRL, Dawson, GA.

9:30 (55) Comparing the Peanut Allergens Before and After Roasting. **S.J. Maleki*, E.T. Champagne and T.H. Sanders.** USDA-ARS, SRRC, New Orleans, LA.

Thursday, July 13, morning

PRODUCTION TECHNOLOGY II
Salon B

Moderator: J.F. Adams, Auburn University, Auburn, AL

8:15 (56) Response of VA 98R Peanut to Twin verus Single Row Planting Patterns. **R.W. Mozingo* and C.W. Swann.** Tidewater AREC, Virginia Tech, Suffolk, VA.

8:30 (57) Peanut Response to Seeding Rate, Row Pattern, and Prohexadione Calcium. **D.L. Jordan*, J.B. Beam and P.D. Johnson.** N.C. State University, Raleigh, NC.

8:45 (58) Effects of Narrow and Twin Row Systems on Peanut Production in Texas. **R.G. Lemon*, W.J. Grichar, B.A. Besler, D.J. Pigg and K.D. Brewer.** Texas A&M University, College Station, TX.

9:00 (59) Effect of Seeding Rate on Yield and Grade of Georgia Peanut when Planted in Twin Row Patterns. **J.A. Baldwin*, D.E. McGriff, T.B. Tankersley, A.S. Luke and S.M. Fletcher.** University of Georgia, Tifton, GA.

9:15 (60) Reduced Tillage for Continuous Peanuts and in Rotation with Cotton. **D.L. Hartzog* and J.F. Adams.** Auburn University, Headland, AL.

9:30 (61) Soil Temperature in the Peanut Pod Zone Using Subsurface Drip Irrigation. **R.B. Sorensen* and F.S. Wright.** USDA-ARS, NPRL, Dawson, GA.

Thursday, July 13, morning

Symposium: GENETIC RESOURCES FOR THE THIRD MILLENNIUM
Salon C

Organizer: Corley Holbrook, USDA-ARS, Tifton, GA.
Moderator: David Williams

8:05 Welcome and Introductions

8:15 (62) History of *Arachis* including Evidence of *A. hypogaea* Progenitors. **A. Krapovickas*, J.F.M. Valls and C.E. Simpson.** INTA, Argentina.

8:30 (63) Advances in the Taxonomy of the Genus *Arachis*. **A. Krapovickas* and G. Lavia.** INTA, Argentina.

8:45 (64) Recent Advances in the Characterization of Wild *Arachis* Germplasm in Brazil. **J.F.M. Valls.** CENARGEN, Brazil.

9:00 (65) Use of Wild *Arachis* / Introgression of Genes from Wild *Arachis* into *A. hypogaea*. **C.E. Simpson.** Texas A&M University, Stephenville, TX.

9:15 (66) Molecular Genetics of *Arachis* and Marker Assisted Selection. **H.T. Stalker.** North Carolina State University, Raleigh, NC.

9:30 (67) Geographical Distribution of Genetic Diversity of *A. hypogaea*. **C.C. Holbrook.** USDA-ARS, Coastal Plain Experiment Station, Tifton, GA.

9:45 Break

10:00 (68) Use of *A. hypogaea* Plant Introductions in Cultivar Development. **T.G. Isleib*, D.W. Gorbet and C.C. Holbrook.** North Carolina State University, Raleigh, NC.

10:15 (69) Progress and Status of the U.S. Peanut Collection. **R.N. Pittman.** Georgia Experiment Station, Griffin, GA.

10:30 (70) Status of the *Arachis* Germplasm Collection at ICRISAT. **N.D. Upadhyaya, M.E. Ferguson*, and P. J. Bramel.** ICRISAT, India.

10:45 (71) New Directions for Collecting and Conserving Cultivated Peanut Diversity. **D.E. Williams*.** IPGRI, Cali, Colombia.

11:00 (72) Tissue Culture for In Vitro Conservation of *Arachis* spp. **L. Mroginski*, H. Rey, and L. Vidoz.** INTA, Argentina.

11:15 (73) Evolfing Political Issues Affecting International Exchange of *Arachis* Genetic Resources. **K.A. Williams* and D.E. Williams.** USDA-ARS, Beltsville, MD.

11:30 (74) Genetic Engineering of *Arachis*. **P. Ozias-Akins*.** University of Georgia, Tifton, GA.

11:45 (75) Potential Use of Genetic Resources to Address Issues of Concern for the Peanut Industry. **H. Valentine*.** American Peanut Council, Alexandria, VA.

Thursday, July 13, morning

PLANT PATHOLOGY AND NEMATOLOGY I
Salon A

Moderator: Tim Brenneman, University of Georgia, Tifton, GA.

10:00 (76) Control of Sclerotinia Blight of Peanuts with Fungicides. **J.A. Wells*, T.A. Lee, Jr., and C.B. Meador.** Texas Agricultural Extension Service, Stephenville, TX.

10:15 (77) Using Peanut Leaflet Inoculations to Screen for *Sclerotinia minor*. **J.E. Hollowell* and B.B. Shew.** N.C. State University, Raleigh, NC.

10:30 (78) Evaluation of Detached Shoot and Leaflet Inoculation Techniques to Screen Peanut Genotypes for Resistance to Rhizoctonia Limb Rot. **M.D. Franke* and T.B. Brenneman.** J. Leek Assoc., Brownfield, TX.

10:45 (79) Persistence of Flutolanil, Tebuconazole, and Azoxystrobin on Peanut Under Field Conditions and Post-Infection Activity on Southern Stem Rot. **T.B. Brenneman*.** University of Georgia, Tifton, GA.

11:00 (80) Association of Two Communities of Soilborne Fungi with Three Cultivars of Peanut in Florida. **R.C. Kemerait, Jr.* and T.A. Kucharek.** Univerity of Georgia, Tifton, GA.

11:15 (81) Evaluation of Peanut Fungicides for Control of Southern Blight in South Texas. **B.A. Besler*, W.J. Grichar and A.J. Jaks.** Texas Agricultural Experiment Station, Yoakum, TX.

11:30 (82) Control of Peanut Diseases with Full Term Strobilurin Derivative Sprays in Texas. **A.J. Jaks*, W.J. Grichar and B.A. Besler.** Texas Agricultural Experiment Station, Yoakum, TX.

Thursday, July 13, morning

EXTENSION TECHNIQUES and TECHNOLOGY/EDUCATION FOR EXCELLENCE
Salon B

Moderator: D. Hunt, Bayer Corp., Opelika, AL

10:00 (83) Impact of Hurricanes on the 1999 North Carolina Peanut Crop. **J. Pearce*, S. Uzzell, B. Griffin, A. Whitehead, C. Ellison, A. Cochran, C. Tyson, F. Winslow, P. Smith, L. Smith, M. Williams, M. Shaw, B. Simonds, J. Bailey, J. Spears, G. Roberson, G. Naderman, D. Jordan, T. Isleib and B. Sutter.** NC Coop. Exten. Service, NCSU, Raleigh, NC.

10:15 (84) §Research and Extension Efforts Designed to Define the Utility of Reduced Tillage Systems in Peanut in North Carolina. **M. Williams*, P. Smith, A. Cochran, J. Pearce, A. Whitehead, C. Ellison, D. Johnson, S. Barnes, C. Bogle, G. Naderman and G. Roberson.** NC Coop. Exten. Service, NCSU, Raleigh, NC.

10:30 (85) Yield Response of Several Peanut Cultivars when Planted in Single and Twin Row Patterns During 1997-99. **D.E. McGriff*, J.E. Hudgins and J.A. Baldwin.** Decatur Co. Exten. Service, University of Georgia, Bainbridge, GA.

10:45 (86) §Effects of Simulated Defoliating Worm Damage on Peanut Yield. **J.S. Russell* and R. Havlak.** Texas A&M Agricultural Extension Service, Pearsall, TX.

11:00 (87) §Simplicity-Key to Profit in Peanuts. **C.W. Tankersly* and P. Torrance.** Coop. Exten. Service, University of Georgia, Swainsboro, GA.

11:15 (88) §Extension Efforts for Quality Peanut Production in Dinwiddie County Virginia. **M.J. Parrish.** VA.

§ Indicates presentation in the "Excellence in Education" Program.

Thursday, July 13, afternoon

PLANT PATHOLOGY AND NEMATOLOGY II
Salon A

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

1:15 Penetration and colonization of groundnut seeds by *Aspergillus flavus* and *A. parasiticus.* **P.S. Wyk and C.J. Swanevelder*.** ARC-Grain Drops Institute, South Africa.

(89) Withdrawn

1:30 (90) Integrating Plant Growth Stage into Weather-based Advisories Improves the Efficiency of Fungicide Applications for Control of Early Leaf Spot of Peanut. **P.M. Phipps.** Tidewater Agric. Res. & Exten. Ctr., VPI, Suffolk, VA.

1:45 (91) Effect of Fluazinam on Frost Injury of Peanut. **V.L. Curtis* and J.E. Bailey.** North Carolina State Univ., Raleigh, NC.

2:00 (92) Nematode and Tomato Spotted Wilt Resistance in Interspecific Peanut Breeding Lines. **P. Timper*, C.C. Holbrook and H.Q. Xue.** USDA-ARS, Tifton, GA.

2:15 (93) High Levels of Field Resistance to TSWV in Peanut Breeding Lines. **A.K. Culbreath*, J.W. Todd, D.W. Gorbet and C.C. Holbrook.** University of Georgia, Tifton, GA.

2:30 (94) Southwest Texas Peanut Survey for *Tomato spotted wilt virus* and *Impatiens necrotic spot virus.* **M.C. Black*, R.D. Havlak, and J.S. Russell.** Texas Agricultural Extension Service, Texas A&M University, Uvalde, TX.

2:45 Peanut Seed Treatment Fungicides: Use and Economic Assessment. **D.T. Smith, W.J. Grichar*, M.C. Black and A.J. Jaks.** Texas Agricultural Experiment Station and Texas Agricultural Extension Service, College Station, Yoakum, and Uvalde, Texas.

Thursday, July 13, afternoon

BREEDING, BIOTECHNOLOGY, and GENETICS I
Salon B

Moderator: William D. Branch, University of Georgia, Tifton, GA.

1:15 (95) Possible Cause of Abnormal Kernels Observed in Peanut Varieties. **C.E. Simpson*, M.A. Baring, Y. Lopez, W. Higgins and J.M. Cason.** Texas Agricultural Experiment Station, Stephenville, TX.

1:30 (96) Genetic Factors Influencing High Oleic Acid Content in Spanish-type Peanut Cultivars. **Y. Lopez*, O.D. Smith, S.A. Senseman, C.E. Simpson and W.L. Rooney.** Texas A&M University, College Station, TX.

1:45 (97) Identification of US-224 (PI475871) as the Source of Resistance to Tomato Spotted Wilt Virus in Tamrun 96. **M.R. Baring*, M.A. Black, and C.E. Simpson.** Texas A&M University, College Station, TX.

2:00 (98) Effect of Genotype on Organogenesis in Peanut. **K. Chengalrayan*, S. Hazra, M. Gallo-Meagher and D.W. Gorbet.** University of Florida, Gainesville, FL.

2:15 (99) Genetic Relationships Among Peanut Cultivars and Breeding Lines in Shandong Province, PRC. **H.Q. Xue and T.G. Isleib*.** North Carolina State University, Raleigh, NC.

2:30 (100) Conserving Groundnut Genetic Diversity in W. Africa. **A.H. Mayeux* and B.R. Ntare.** CIRAD-Dakar, Dakar-Etolle, Senegal.

2:45 (101) Mutation Breeding for Peanut Improvement. **W.D. Branch.** University of Georgia, Tifton, GA.

Thursday, July 13, afternoon

INDUSTRY UPDATE
Salon C

Moderator: Alex Csinos, University of Georgia, Tifton, GA.

1:15 (102) New peanut opportunities from Valent. **J. Altom.** Valent USA Corp, Gainesville, FL.

1:25 (103) New Abound uses in peanuts. **S. Newell.** Zeneca Ag Products, Statesboro, GA.

1:35 (104) Strongarm use in peanuts. **T.W. Weiss.** Dow AgroSciences, Cary, NC.

1:45 (105) An alternative Folicur application method for CBR. **H. Young.** Bayer Corp., Tifton, GA.

1:55 (106) BASF product update 2000. **T. McKemie.** BASF Corporation, Durham, NC.

2:05 (107) Crop protection chemicals for peanut from Griffin LLC. **D. Guy.** Griffin, LLC, Fuquay-Varina, NC.

2:15 (108) The peanut product line from American Cyanamid. **C. Youmans.** American Cyanamid, Perry, GA.

2:25 (109) Positioning Stratego in peanut. **G. Cloud.** Novartis, Tallahassee, FL.

2:35 (110) Temik update on peanuts. **M. Rosemond.** Aventis, Tifton, GA.

2:45 (111) Moncut/Botran update. **G. Major.** Gowan, Yuma, AZ.

Thursday, July 13, afternoon

ECONOMICS II
Salon A

Moderator: Nathan Smith, University of Georgia,

3:00 (112) Field Adaptive Research Models (FARM): A Budgeting Analysis at the Enterprise Level. **N.R. Martin*, A.S. Luke, K. Balkcom, D.L. Hartzog, and S.F. Fletcher.** Auburn University, Auburn, AL.

3:15 (113) Whole Farm Budgeting Using FARM PLANNER 2000. **W.M. McCollum*, N.R. Martin, A.S. Luke, K. Balkcom, D.L. Hartzog, and S.F. Fletcher.** Auburn University, Auburn, AL.

3:30 (114) Impact of Crop Price on Southeast Peanut Farm Income and Risk. **M.C. Lamb* and M.H. Masters.** NPRL, USDA-ARS, Dawson, GA.

3:45 (115) Appropriate Bid Prices for Peanut Growers Participating in Southwest Georgia Irrigation Buyout Programs. **M.H. Masters* and M.C. Lamb.** NPRL, USDA-ARS, Dawson, GA.

4:00 (116) Economic Analysis of Best Management Practices in Peanut Production Using an Adaptive Research Farm Approach at the Southwest Georgia Branch Experiment Station. **W.D. Shurley*, J.P. Beasley and J.N. Ragan.** University of Georgia, Tifton, GA.

4:15 (117) Reliability of the 1.33 Factor to Convert Pounds of Peanut Kernels to Farmer Stock Pounds. **K.M. Robison.** Farm Service Agency, USDA, Washington, DC.

Thursday, July 13, afternoon

BREEDING, BIOTECHNOLOGY, and GENETICS II
Salon B

Moderator: William D. Branch, University of Georgia, Tifton, GA.

3:00 (118) Identification of Resistance Gene Analogs (RGAs) in Peanut. **M.D. Burow*, S. Schulze, J. Ballester-Valveny and A.H. Paterson.** University of Georgia, Athens, GA.

3:15 (119) Production of Transgenic Peanut Plants Containing Anti-Fungal Genes. **K.D. Chenault*, J.A. Burns and H.A. Melouk.** USDA-ARS, Stillwater, OK.

3:30 (120) Genetic Engineering Approaches to Improve Resistance to Sclerotinia Blight in Peanut. **T. Boluarte-Medina*, C.E. Hegeman, O.F. McMeans, A. McCarthy, P.M. Phipps and E.A. Grabau.** Virginia Tech, Blacksburg, VA.

3:45 (121) Genetic Enhancement of Drought Resistance in Australian Peanuts. **N.R. Rachaputi, G.C. Wright* and A.L. Cruickshank.** Farming Systems Institute, Kingaroy, Queensland, Australia.

4:00 (122) Parent Selection for Roasted Peanut Flavor Improvement Using Best Linear Unbiased Predictors (BLUPs). **H.E. Pattee*, T.G. Isleib, F.G. Giesbrecht, D.W. Gorbet, and Z. Cui.** North Carolina State University, Raleigh, NC.

4:15 (123) Best Linear Unbiased Predictors of Breeding Value for Resistance to *Sclerotinia minor*. **T.G. Isleib.** North Carolina State University, Raleigh, NC.

4:30 (124) Evaluation of Different Selection Methods for Updating the Peanut Core Collection. **C.C. Holbrook*, H.Q. Xue and R.N. Pittman.** USDA-ARS, Tifton, GA.

4:45 (125) Shade Avoidance Response in Peanut Cultivars Interferes with Pod Setting. **I.S. Wallerstein*, S. Kahn, I. Wallerstein, G. Whitlam and H. Smith.** Agricultural Research Organization of the Volcani Center, Bet Dagan, Israel.

SITE SELECTION COMMITTEE

Members Present: Kira Bowen, Hassan Melouk, David Jordan, Ron Sholar, Austin.

Absent: Maria Gallo-Meagher, Ben Whitty, Bob Sutter

On July 11, 2000, at 1:00 P.M., the Site Selection Committee met to:

1. Review the preparations for the 2001 APRES annual meeting in Oklahoma City, Oklahoma.
2. Review the proposal for the 2002 APRES annual meeting in North Carolina.
3. Consider sites for the 2003 APRES annual meeting in Florida
4. Other issues pertaining to the APRES annual meeting.

Dr. Ron Sholar reports that preparations for the 2001 APRES annual meeting in Oklahoma City, OK are on schedule.

Dr. David Jordan discussed the proposal to hold the 2002 APRES annual meeting from July 15 to July 19 at the Sheraton Imperial Hotel in Research Triangle Park, NC. The committee approved the motion that the Sheraton Imperial Hotel be the site for the 2002 meeting and authorized executive officer to continue negotiations with hotel personnel on July 15 through July 19, 2002.

Prior to the Site Selection Committee Dr. Ben Whitty and Dr. Austin Hagan briefly discussed a potential location for the 2003 APRES annual meeting in Florida. Dr. Whitty mentioned that the members of the Site Selection Committee from Florida proposed that a hotel along Universal Drive in Orlando, FL be the site of the 2003 APRES annual meeting. Dr. Austin Hagan discussed the possibility of holding this meeting in Panama City in conjunction with the Tri-States Peanut Growers Meeting. No decision was reached concerning the proposed location of the 2003 APRES annual meeting.

Dr. Austin Hagan discussed the possibility of loosing one or more sponsors of activities of future ARPES annual meetings. The upcoming merger of Novartis and Zeneca Ag Chem may greatly reduce funding available for the support of either a dinner activity or the breaks between paper sessions. Also, the purchase of American Cyanamid by BASF may also have a detrimental impact on funding of activities at future APRES meetings. The executive officer and president-elect will discuss the funding of activities with APRES corporate sponsors.

Attendance at the Friday Awards Breakfast and Business Meeting has often fallen well below counts made at the registration desk. As a result, APRES is wasting considerable funds on uneaten meals. There was some discussion concerning the possibility of eliminating the Friday breakfast and holding an Award and Business Meeting on Thursday. However, it was noted that members were likely to leave early if the Award and Business Meeting were held on Thursday. Adding $10 to the registration fee of each member electing to attend the Friday Award Breakfast and Business meeting was discussed.

Respectfully submitted,

Austin Hagan, Chair

AMERICAN SOCIETY OF AGRONOMY LIAISON REPRESENTATIVE REPORT

The annual meetings of the joint American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America were held in Salt Lake City, Utah, from October 31 to November 4, 1999. More than 3,100 scientific presentations were made of which 10 were devoted to peanut research. Twelve members of APRES authored or co-authored presentations, including one symposium presentation. Tom Stalker will become chair-elect for the C1 (plant breeding) division of the Crop Science Society of America at the next annual meetings. The next annual meeting will be held in Minneapolis, Minnesota from November 5-9, 2000.

Respectfully submitted,

H. Thomas Stalker, Chair

CAST REPORT

The CAST Board met in Phoenix, fall 1999 and in Washington, D.C., spring 2000. David Knauft, University of Georgia, is president. Harold Coble, North Carolina State University, is president-elect. Stanley Fletcher, University of Georgia, is vice-chairperson of the National Concerns Committee and is Chair of the Plant and Soil Science Work Group.

CAST continues to provide the public, scientific societies, the news media and legislative bodies with science-based information on agricultural and environmental issues. Examples are:

- CAST published an issue paper, Invasive Plant Species, and was released in conjunction with National Invasive Weed Awareness Week. CAST sponsored Congressional, White House and media briefings.
- CAST released an issue paper, Applications of Biotechnology to Crops: Benefits and Risks, at the WTO meetings in Seattle.
- CAST submitted comments to the U.S. Food and Drug Administration on Docket 99N-4282, "Biotechnology in the Year 2000 and Beyond."
- CAST submitted comments on "Environmental Science and Engineering for the 21st Century: The Role of the National Science Foundation," interim report of the National Science Board Task Force on the Environment.
- CAST provided testimony at a hearing of the Subcommittee on Production and Price Competitiveness of the U.S. Senate Committee on Agriculture, Nutrition and Forestry on carbon cycle research and the role of agriculture in reducing climate change.
- CAST sponsored a series of briefings before the White House, Congress and media on the importance of ecological and genetic diversity for future agricultural production.

Due to the misinformation on biotechnology, CAST has begun a biotechnology communications effort to bring the scientific knowledge of biotechnology for better understanding by the media and the public.

The Conversations on Change program continues to evolve. The fifth workshop was held in San Diego with a theme of "Taking the Conversations Home." This CAST initiative was to provide professional societies with the support necessary to survive and grow in the future The program has been very successful and evolved into a new program in cooperation with the Institute for Conservation Leadership. This program will be developing a leadership program for scientific societies and sustainable agriculture organizations.

CAST has formed a strategic planning committee with plans for a document by the end of 2000.

CAST core membership is 38 scientific societies that represent over 180,000 member scientists. Further details are available on their own web site at www.cast-science.org. One can also sign up for the CAST News email list by sending a message to the address castnews-request@lists.cast-science.org with the word "subscribe" on the first line of the message.

Respectfully submitted,

Stanley M. Fletcher

CSRES REPORT TO APRES

Peanut Research programs continue to be a major research emphasis in the Southern region of the CSRES. In 1999-2000 reporting period approximately 400 CRIS reports were submitted that referenced peanuts in some way.

The new reporting system put into place by CSRES to improve the accountability of Federal funds provided to cooperating states requires that approximately one-half of the appropriations be used for regional and multi-discipline projects. The various peanut work groups across the Southern region have a history of this type of cooperative work and we certainly want to encourage you to continue.

Respectfully submitted,

Phil Utley

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

ARTICLE I. NAME

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

ARTICLE II. PURPOSE

Section 1. The purpose of this Society shall be to instruct and educate the public on the properties, production, and use of the peanut through the organization and promotion of public discussion groups, forums, lectures, and other programs or presentation to the interested public and to promote scientific research on the properties, production, and use of the peanut by providing forums, treatises, magazines, and other forms of educational material for the publication of scientific information and research papers on the peanut and the dissemination of such information to the interested public.

ARTICLE III. MEMBERSHIP

Section 1. The several classes of membership which shall be recognized are as follows:

a. Individual memberships: Individuals who pay dues at the full rate as fixed by the Board of Directors.

b. Institutional memberships: Libraries of industrial and educational groups or institutions and others that pay dues as fixed by the Board of Directors to receive the publications of the Society. Institutional members are not granted individual member rights.

c. Organizational memberships: Industrial or educational groups that pay dues as fixed by the Board of Directors. Organizational members may designate one representative who shall have individual member rights.

d. Sustaining memberships: Industrial organizations and others that pay dues as fixed by the Board of Directors. Sustaining members are those who wish to support this Society financially to an extent beyond minimum requirements as set forth in Section 1c, Article III.

Sustaining members may designate one representative who shall have individual member rights. Also, any organization may hold sustaining memberships for any or all of its divisions or sections with individual member rights accorded each sustaining membership.

e. Student memberships: Full-time students who pay dues at a special rate as fixed by the Board of Directors. Persons presently enrolled as full-time students at any recognized college, university, or technical school are eligible for student membership. Post-doctoral students, employed persons taking 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 such member, participant, or representative upon appropriate written notice filed with the president or committee chairperson evidencing such designation or selection.

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

ARTICLE IV. DUES AND FEES

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

a.	Individual memberships:	$ 40.00
b.	Institutional memberships:	40.00
c.	Organizational memberships:	50.00
d.	Sustaining memberships:	150.00
e.	Student memberships:	10.00

(Dues were set at 1999 Annual Meeting, Savannah, Georgia)

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

Section 3. A registration fee approved by the Board of Directors will be assessed at all regular meetings of the Society.

ARTICLE V. MEETINGS

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

Section 2. Additional meetings may be called by the Board of Directors by two-thirds vote, or upon request of one-fourth of the members. The time and place shall be fixed by the Board of Directors.

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

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

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

ARTICLE VI. QUORUM

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

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

ARTICLE VII. OFFICERS

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

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

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

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

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

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

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

ARTICLE VIII. BOARD OF DIRECTORS

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

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

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

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

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

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

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

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

ARTICLE IX. COMMITTEES

Section 1. Members of the committees of the Society shall be appointed by the president and shall serve three-year terms unless otherwise stipulated. The president shall appoint a chairperson of each committee from among the incumbent committee members. The Board of Directors may, by a two-thirds vote, reject committee appointees. Appointments made to fill unexpected vacancies by incapacity of any committee member shall be only for the unexpired term of the incapacitated committee member. Unless otherwise specified in these By-Laws, any committee member may be re-appointed to succeed him/herself, and may serve on two or more committees concurrently but shall not chair more than one committee. Initially, one-third of the members of each committee will serve one-year terms, as designated by the president. The president shall announce the committees immediately upon assuming the office at the annual business meeting. The new appointments take effect immediately upon announcement.

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

a. Finance Committee: This committee shall consist of six members, three representing State employees, one representing USDA, and two representing Private Business segments of the peanut industry. Appointments in all categories shall rotate among the three U.S. peanut production areas. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendations as they deem necessary or as requested or directed by the Board of Directors. The term of the chairperson shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given on the work of the Finance Committee under his/her leadership, whichever is later.

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

c. Publications and Editorial Committee: This committee shall consist of six members appointed to three-year terms, three representing State, one USDA, and two Private Business segments of the peanut industry with membership representing the three U.S. production areas. The members may be appointed to two consecutive three-year terms. This committee shall be responsible for the publication of Society-sponsored publications as authorized by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

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

e. Public Relations Committee: This committee shall consist of seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from the host state who will serve a one-year term to coincide with the term of the president-elect. The primary purpose of this person will be to publicize the meeting and make photographic records of important events at the meeting. This committee shall provide leadership and direction for the Society in the following areas:

(1) Membership: Development and implementation of mechanisms to create interest in the Society and increase its membership. These shall include, but not be limited to, preparing news releases for the home-town media of persons recognized at the meeting for significant achievements.
(2) Cooperation: Advise the Board of Directors relative to the extent and type of cooperation and/or affiliation this Society should pursue and/or support with other organizations.
(3) Necrology: Proper recognition of deceased members.
(4) Resolutions: Proper recognition of special services provided by members and friends of the Society.

f. Bailey Award Committee: This committee shall consist of six members, with two new appointments each year, serving three-year terms. This committee shall be responsible for judging papers which are selected from each subject matter area. Initial screening for the award will be made by judges, selected in advance and having expertise in that particular area, who will listen to all papers in that subject matter area. This initial selection will be made on the basis of quality of presentation and content. Manuscripts of

selected papers will be submitted to the committee by the author(s) and final selection will be made by the committee, based on the technical quality of the paper. The president, president-elect and executive officer shall be notified of the Award recipient at least sixty days prior to the annual meeting following the one at which the paper was presented. The president shall make the award at the annual meeting.

g. Fellows Committee: This committee shall consist of six members, two representing each of the three major geographic areas of U.S. peanut production with balance among State, USDA, and Private Business. Terms of office shall be for three years. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. From nominations received, the committee shall select qualified nominees for approval by majority vote of the Board of Directors.

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

i. Coyt T. Wilson Distinguished Service Award Committee: This committee shall consist of six members, with two new appointments each year, serving three-year terms. Two committee members will be selected from each of the three main U.S. peanut producing areas. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. This committee shall review and rank nominations and submit these rankings to the committee chairperson. The nominee with the highest ranking shall be the recipient of the award. In the event of a tie, the committee will vote again, considering only the two tied individuals. Guidelines for nomination procedures and nominee qualifications shall be published in the Proceedings of the annual meeting. The president, president-elect, and executive officer shall be notified of the award recipient at least sixty days prior to the annual meeting. The president shall make the award at the annual meeting.

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

ARTICLE X. DIVISIONS

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

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

Section 3. Division may make By-Laws for their own government, provided they are consistent with the rules and regulations of the Society, but no dues may be assessed. Divisions and Subdivisions may elect officers (chairperson, vice-chairperson, and a secretary) and appoint committees, provided the efforts thereof do not overlap or conflict with those of the officers and committees of the main body of the Society.

ARTICLE XI. AMENDMENTS

Section 1. These By-Laws may be amended consistent with the provision of the Articles of Incorporation by a two-thirds vote of all the eligible voting members present at any regular business meeting, provided such amendments shall be submitted in writing to each member of the Board of Directors at least thirty days before the meeting at which the action is to be taken.

Section 2. A By-Law or amendment to a By-Law shall take effect immediately upon its adoption, except that the Board of Directors may establish a transition schedule when it considers that the change may best be effected over a period of time. The amendment and transition schedule, if any, shall be published in the "Proceedings of APRES".

Amended at the Annual Meeting of the
American Peanut Research and Education Society
July 16, 1999, Savannah, Georgia

APRES MEMBERSHIP
1975-2000

	Individuals	Institutional	Organizational	Student	Sustaining	Total
1975	419	--	40	--	21	480
1976	363	45	45	--	30	483
1977	386	45	48	14	29	522
1978	383	54	50	21	32	540
1979	406	72	53	27	32	590
1980	386	63	58	27	33	567
1981	478	73	66	31	39	687
1982	470	81	65	24	36	676
1983	419	66	53	30	30	598
1984	421	58	52	33	31	595
1985	513	95	65	40	29	742
1986	455	102	66	27	27	677
1987	475	110	62	34	26	707
1988	455	93	59	35	27	669
1989	415	92	54	28	24	613
1990	416	85	47	29	21	598
1991	398	67	50	26	20	561
1992	399	71	40	28	17	555
1993	400	74	38	31	18	561
1994	377	76	43	25	14	535
1995	363	72	26	35	18	514
1996	336	69	24	25	18	472
1997	364	74	24	28	18	508
1998	367	62	27	26	14	496
1999	380	59	33	23	12	507
2000	334	52	28	23	11	448

2000-01
MEMBERSHIP ROSTER

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