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Contributors to 2012 APRES Meeting

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

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Bayer CropScience/BASF – Wednesday Dinner **Oak Forest Ballroom**
Dow AgroSciences – Thursday Awards Reception **Oak Forest Ballroom**

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2009	S.R. Milla-Lewis and T.G. Isleib
2008	Y. Chu, L. Ramos, P. Ozias-Akins, C.C. Holbrook
2007	D.E. Partridge, P.M. Phipps, D.L. Coker, E.A. Grabau
2006	J.W. Chapin and J.S. Thomas
2005	J.W. Wilcut, A.J. Price, S.B. Clewis, and J.R. Cranmer
2004	R.W. Mozingo, S.F. O'Keefe, T.H. Sanders and K.W. Hendrix
2003	T.H. Sanders, K.W. Hendrix, T.D. Rausch, T.A. Katz and J.M. Drozd
2002	M. Gallo-Meagher, K. Chengalrayan, J.M. Davis and G.G. MacDonald
2001	J.W. Dorner and R.J. Cole
2000	G.T. Church, C.E. Simpson and J.L. Starr
1998	J.L. Starr, C.E. Simpson and T.A. Lee, Jr.
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1996	H.T. Stalker, B.B. Shew, G.M. Garcia, M.K. Beute, K.R. Barker, C.C. Holbrook, J.P. Noe and G.A. Kochert
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1994	T.B. Brenneman and A.K. Culbreath
1993	A.K. Culbreath, J.W. Todd and J.W. Demski
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1988	A.K. Culbreath and M.K. Beute
1987	J.H. Young and L.J. Rainey
1986	T.B. Brenneman, P.M. Phipps and R.J. Stipes
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1984	C.S. Kvien, R.J. Henning, J.E. Pallas and W.D. Branch
1983	C.S. Kvien, J.E. Pallas, D.W. Maxey and J. Evans
1982	E.J. Williams and J.S. Drexler
1981	N.A. deRivero and S.L. Poe
1980	J.S. Drexler and E.J. Williams
1979	D.A. Nickle and D.W. Hagstrum
1978	J.M. Troeger and J.L. Butler
1977	J.C. Wynne
1976	J.W. Dickens and T.B. Whitaker
1975	R.E. Pettit, F.M. Shokes and R.A. Taber

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2010	A. Olubunmi
2009	G. Place
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2007	J.M. Weeks, Jr.
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2005	D.L. Smith
2004	D.L. Smith
2003	D.C. Yoder
2002	S.C. Troxler
2001	S.L. Rideout
2000	D.L. Glenn
1999	J.H. Lyerly
1998	M.D. Franke
1997	R.E. Butchko
1996	M.D. Franke
1995	P.D. Brune
1994	J.S. Richburg
1993	P.D. Brune
1992	M.J. Bell
1991	T.E. Clemente
1990	R.M. Cu
1989	R.M. Cu

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2006	Dr. Charles E. Simpson
2005	Dr. Thomas B. Whitaker
2004	Dr. Richard Rudolph
2003	Dr. Hassan A. Melouk
2002	Dr. H. Thomas Stalker
2001	Dr. Daniel W. Gorbet
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1999	Dr. Ray O. Hammons
1998	Dr. C. Corley Holbrook
1997	Mr. J. Frank McGill
1996	Dr. Olin D. Smith
1995	Dr. Clyde T. Young
1993	Dr. James Ronald Sholar
1992	Dr. Harold E. Pattee
1991	Dr. Leland Tripp
1990	Dr. D.H. Smith

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2009	Joe W. Dorner
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2003	John W. Wilcut
2002	W. Carroll Johnson, III
2001	Harold E. Pattee and Thomas G. Isleib
2000	Timothy B. Brenneman
1999	Daniel W. Gorbet
1998	Thomas B. Whitaker
1997	W. James Grichar
1996	R. Walton Mozingo
1995	Frederick M. Shokes
1994	Albert Culbreath, James Todd and James Demski
1993	Hassan Melouk
1992	Rodrigo Rodriguez-Kabana
1998	Changed to Dow AgroSciences Award for Excellence in Research

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2007	John P. Damicone
2006	Stanley M. Fletcher
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2002	Kenneth E. Jackson
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1999	Patrick M. Phipps
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1993	A. Edwin Colburn
1992	J. Ronald Sholar

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1997 Changed to DowElanco Award for Excellence in Education
1992-1996 DowElanco Award for Excellence in Extension

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2009	A. Stephens
2008	T.G. Isleib
2007	E. Harvey
2006	D.W. Gorbet
2005	J.A. Baldwin
2004	S.M. Fletcher
2003	W.D. Branch and J. Davidson
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2001	C.E. Simpson and J.L. Starr
2000	P.M. Phipps
1999	H. Thomas Stalker
1998	J.W. Todd, S.L. Brown, A.K. Culbreath and H.R. Pappu
1997	O.D. Smith
1996	P.D. Blankenship
1995	T.H. Sanders
1994	W. Lord
1993	D.H. Carley and S.M. Fletcher
1992	J.C. Wynne
1991	D.J. Banks and J.S. Kirby
1990	G. Sullivan
1989	R.W. Mozingo
1988	R.J. Henning
1987	L.M. Redlinger
1986	A.H. Allison
1985	E.J. Williams and J.S. Drexler
1984	Leland Tripp
1983	R. Cole, T. Sanders, R. Hill and P. Blankenship
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1981	G.A. Buchanan and E.W. Hauser
1980	T.B. Whitaker
1979	J.L. Butler
1978	R.S. Hutchinson
1977	H.E. Pattee
1976	D.A. Emery
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1970	A.L. Harrison
1969	H.C. Harris
1968	C.R. Jackson
1967	R.S. Matlock and M.E. Mason
1966	L.I. Miller
1965	B.C. Langleya
1964	A.M. Altschul
1963	W.A. Carver
1962	J.W. Kickens
1961	W.C. Gregory

2005 Now presented by: Peanut Foundation and renamed – Peanut Research and Education Award
1997 Changed to American Peanut Council Research and Education Award
1989 Changed to National Peanut Council Research and Education Award

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ABSTRACTS

BREEDING, BIOTECHNOLOGY AND GENETICS

Development of High-Yielding, High-Oleic Valencia Peanuts. M. D. BUROW* and J. L. AYERS, Texas AgriLife Research, Texas A&M System, Lubbock, TX 79403, and Texas Tech University, Department of Plant and Soil Science, Lubbock, TX, 79409; A. MUITIA, Department of Plant and Soil Sciences, Texas Tech University, Lubbock, TX 79409; A. M. SCHUBERT † , Y. LÓPEZ, Texas AgriLife Research, Texas A&M System, Lubbock, TX 79403; C. E. SIMPSON, Texas AgriLife Research, Texas A&M System, Stephenville, TX 79403; N. PUPPALA, Agricultural Sciences Center, New Mexico State University, Clovis, NM 88001; and M. R. BARING, Texas AgriLife Research, Texas A&M System, College Station, TX 77843.

We have tested and identified improved high-oleic Valencia peanut lines, with the goal of developing a high oleic Valencia cultivar. Over several years of testing at multiple locations, high-oleic Valencia lines yielding better than or equal to New Mexico Valencia C were identified. Lines were screened for tolerance to *Sclerotinia minor*, and tolerance was confirmed in several lines. Testing for flavor and blanching is underway.

Impact of Crossing Conditions on the Success of Artificial Hybridization of *Arachis hypogaea* L. Y. CHU*, C.L. WU, P. OZIAS-AKINS, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793-; and C. C. HOLBROOK, USDA-ARS, Tifton, GA 31793

In order to protect peanut yield and quality under dynamic farming conditions, pyramiding desirable traits from multiple lines has been the major task for peanut breeders. In addition, dissecting genetic components of heritable traits also relies on the development of large mapping populations. Artificial hybridization is the critical initial step in these processes. Peanut is a self-pollinating crop with a typical yield of less than four seeds per flower; therefore, it requires significant effort to produce sufficient hybrid seeds for subsequent trait selection and/or establishment of mapping populations. A study was conducted to evaluate the effect of multiple factors on the success rate of artificial hybridization assessed by transmission of molecular markers unique to the paternal parent. Six peanut genotypes were crossed with a breeding line homozygous for both high oleic acid and nematode resistance. The impact of operator, pollination time, flower integrity, genotype and environment on hybridization were evaluated. Molecular markers for high oleic acid and nematode resistance were employed to distinguish selfed seeds from hybrids. The data indicate that operator and pollination time significantly affected the success rate of peanut hybridization and the most important factor for attrition of hybrid seeds is fruit loss due to peg damage from wiring or seed decay. Genotype and physical location in the greenhouse also significantly affected crossing success; however, in these two factors were confounded in this study.

Stability Analysis of Tomato Spotted Wilt Tospovirus Incidence in Virginia-Type Peanut Cultivars. W.B. DONG*, T.G. ISLEIB, S.R. MILLA-LEWIS, and S.C. COPELAND, Dep. of Crop Sci., Box 7629, N.C. State Univ., Raleigh, NC 27695-7629, and B. B. SHEW, Dep. of Plant Pathology, Box 7903, N.C. State Univ., Raleigh, NC 27695-7625.

Tomato spotted wilt tospovirus (TSWV) has become an increasingly major pest in peanuts (*Arachis hypogaea* L.) in North Carolina and Virginia over the past two decades. Reactions of 16 peanut genotypes to TSWV were monitored in a set of tests conducted from 1993 to 2011 in North Carolina. Linear regression stability analysis was applied to disease incidence data collected in 57 trials conducted over 17 years to determine if an array of virginia-type cultivars exhibited variation in their reactions to increasing levels of disease intensity compared with the resistant standards for this disease. There was considerable variation for TSWV incidence among both genotypes and environments. In the stability analysis, NC 10C had a slope significantly greater than one, as did Phillips, Wilson, NC 7 and Brantley. The slopes for two

genotypes (Bailey and PI 576636) were significantly ($P<0.05$) less than one and significantly ($P<0.05$) less than the slope of any other genotype. The slope for Georgia Green, the standard TSWV-resistant runner-type cultivar, did not differ from the average of those for all genotypes. Bailey and PI 576636 showed the lowest average incidence of TSWV, however, their coefficients of determination (R^2_i) were very low, indicating that they were responsive to changing environments. The TSWV incidences of Wilson, Sugg, and Gregory were lower than that of Georgia Green, with relatively stable slopes and higher R^2_i, suggesting that they could be used in a breeding program as better sources of TSWV resistance than could Georgia Green.

<u>Speeding Up Release of New Peanut Varieties.</u> D. O'CONNOR, G.C. WRIGHT*, Peanut Company of Australia, Kingaroy, Queensland, Australia, 4610; J.TATNELL, D.FLEISCHFRESSER, AgriSciences Queensland, Department of Employment, Economic Development and Innovation, Kingaroy, Queensland, Australia, 4610., and M.J. DIETERS and D GEORGE, University of Queensland, Queensland, Australia, 4072.

Reducing the time taken from first cross to commercial release of new peanut varieties is a key objective of global peanut breeding programs. While modern gene technologies, such as molecular markers, often purport that breeding can be made more efficient and faster, it is still possible to significantly speed up the breeding process using novel but complementary conventional breeding approaches. We have developed new speed breeding techniques using controlled environmental conditions (CEC), incorporating controlled temperature and continuous light to significantly reduce generation time through accelerated plant development (e.g. 140 to 85 days). The continuous light system, which uses high intensity photosynthetic active radiation lamps, is also thought to select segregating lines for photoperiod insensitivity. A single seed descent breeding strategy was used to fast track the inbreeding process from a cross of a high yielding, rust susceptible parent (Farnsfield) with a highly rust tolerant parent (D147-p3-115). At the same time we used a glasshouse rust screening technique to phenotype segregating lines for rust tolerance/susceptibility in the F2, F3 and F4 generations. A population of Recombinant Inbred Lines (RILs) was developed in this CEC facility and the field, where plants were progressed from F2 to F5 in just over 12 months. A field trial subsequently evaluated these F5 generation RILs, where pod yield and rust tolerance were measured. Results suggest that the speed breeding and rust screening methods proposed in this study could be used within the context of an applied peanut breeding program. This breeding and selection system could potentially allow a time from 'initial cross to commercial release' of new varieties of only 5-6 years.

<u>Expression of Putative *AhMFT* in Peanut Lines with Contrasting Seed Dormancy and Preharvest Sprouting</u>. Z. LIU*, S. FENG, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA; M.L. WANG, USDA-ARS, Plant Genetics Resources Conservation Unit, Griffin, GA; and Baozhu GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Pre-harvest sprouting has been reported to cause up to 20-50% yield loss and reduce seed quality. *MFT*, a homolog of the antagonistic flowering-time regulators *FLOWERING LOCUS T* (*FT*) and *TERMINAL FLOWER 1* (*TFL1*) is a proposed ABA-induced negative regulator of ABA signaling that promotes embryo growth in germinating seeds in *Arabidopsis*. However, in wheat, an *MFT* homolog is more highly expressed under low-temperature seed maturation conditions and acts as a repressor of germination potential. Peanut varieties have wide variability in their seed dormancy. In the present study, we isolated a peanut homolog of *MFT* (named as *AhMFT*) from four peanut cultivars with contrasting pre-harvest sprouting and seed dormancy. GT-C20 is a Spanish-type cultivar with no seed dormancy and severe preharvest sprouting, whereas Tifrunner is a Runner-type cultivar with significant seed dormancy, while SunOleic 97R and NC94022 are intermediate. Phylogenetic analysis suggested AhMFT belonged to the MFT-LIKE classes of the PEBP gene family. Sequence analysis indicated the open reading frame (ORF) of *AhMFT* from GT-C20 is 100% similar to that from Tifrunner. Expression analysis revealed that *AhMFT* was highly expressed in seed coats and seeds without coats and was regulated by development. However, expression variation was observed among all four peanut lines during

seed development in the greenhouse. The expression variation of *AhMFT* between GT-C20 and Tifrunner may result from differences in the promoter regions.

Performance of Release Candidates in the NCSU Peanut Breeding Program. S.C. COPELAND, T.G. ISLEIB*, S.R. MILLA-LEWIS, W.B. DONG, and J.E. HOLLOWELL, Dept. of Crop Science, N.C. State Univ., Raleigh, NC 27695-7629; B.B.SHEW, Dept. of Plant Pathology, N.C. State Univ., Raleigh, NC 27695-7903; and H.E. PATTEE, Dept. of Biological and Agricultural Engineering, N.C. State Univ., Raleigh, NC 27695-7625; and M. BALOTA, Va. Polytechnic. Inst. and State Univ., Tidewater Agric. Res. and Ext. Ctr., 6321 Holland Rd., Suffolk, VA 23437.

Because of the disjoint nature of peanut (*Arachis hypogaea* L.) production and post-harvest handling in the Virginia-Carolina (VC) production area, one must consider the needs of all three segments of the peanut industry in establishing breeding objectives- growers, shellers, and processors. In the N.C. State Univ. peanut breeding program, a series of trials are conducted to evaluate performance of cultivars and breeding lines with respect to the needs and wishes of these various segments. The trials include (1) replicated (y≥2, l=3, r=2) field tests of lines in which are measured yield, grade, and pod brightness and hue; (2) separate replicated trials (y≥2, l=1, r≥3) of reactions to four diseases common in the VC area (leaf spots caused by *Cercospora arachidicola* Hori and *Cercosporidium personatum* [Berk. & M.A. Curtis] Deighton, Cylindrocladium black rot caused by *C. parasiticum* Crous, M.J. Wingf. & Alfenas, Sclerotinia blight caused by *S. minor* Jagger, and tomato spotted wilt caused by *Tomato spotted wilt* tospovirus), and (3) evaluation of sensory quality of paste ground from sound mature kernel samples grown in the field and roasted as near as possibly to a common color. Lines having performed sufficiently well in NCSU's field yield trials for two or more years may graduate to the three-state (Va., N.C., and S.C.) Peanut Variety and Quality Evaluation (PVQE) trials coordinated by Dr. Maria Balota of Virginia Tech's Tidewater Agric. Res. and Ext. Ctr. Yield, grade, color, and quality traits are extensively measured in the PVQE trials. After three years in the PVQE trials, a line may be considered for release. There were 19 NCSU breeding lines (17 of them high-oleic, 2 normal-oleic with very large pods and seeds) entered in the 2011 PVQE program, 7 of them for a second year. There are four lines that appear to be likely candidates for release following a third year of testing agronomic performance, grade, and quality in the PVQE trials: N08070olJC, N08075olCT, N08081olJC, and N08082olJCT. N08070olC and N08081olJC have the advantage in agronomic performance, N08070olJC and N08075olCT in disease resistance, and N08075olCT and N08082olJCT in flavor. Results from an additional year of testing may indicate that a single line is the lead candidate for release.

Sources of Disease Resistance in Recent Virginia-type Cultivar Releases. S.P. TALLURY*, S. C. COPELAND, and T.G. ISLEIB, Department of Crop Science, N.C. State University, Raleigh, NC 27695-7629, and B. B. SHEW, Department of Plant Pathology, N.C. State University, Raleigh, NC 27695-7903.

Historically, the N.C. State University peanut (*Arachis hypogaea* L) breeding program has been developing large-seeded virginia-type cultivars for production in Virginia, North and South Carolina. The overall goal of our program is to produce high-yielding cultivars combined with multiple disease resistance and good flavor. Since 1999, our releases included Gregory, Perry, Phillips, Brantley, Bailey and Sugg. These cultivars are large-seeded, virginia-type with varying degrees of reaction to four of the most common peanut diseases in North Carolina including leaf spots (LS), Tomato spotted wilt virus (TSWV), Cylindrocladium black rot (CBR) and Sclerotinia blight (SB). In the 1990s to early 2000s, the last two diseases were the most prevalent in N. Carolina and resistant sources used as parents in crosses included NC 9 (a cultivar partially resistant to CBR), NC Ac 18229A (a descendant of NC 3033 and highly resistant to CBR,) and N96076L (resistant to SB). NC 12C was released in 1996 as a CBR-resistant cultivar. Gregory was released in 1997 because of its high content of jumbo pods and extra large kernels (ELK) but was susceptible to LS, SB, CBR, and TSWV. Perry was released in 2000 with very good levels of CBR resistance and partial SB resistance; however, it was found to be highly susceptible to TSWV and LS. Because our newly released cultivars often had a severe susceptibility to one or more of the four prevailing diseases, we have initiated a program of multiple disease evaluation in

2003 for all four of the diseases and used N96076L and GP-NC WS 13 as sources of multiple disease resistance. N96076L was released as a germplasm line in 2005 with a broad array of resistances including, LS, CBR, SB and TSWV. It's ancestry includes 25% GP-NC WS 4, a registered germplasm line derived from a cross between *A. hypogaea* PI 261942 and *A. cardenasii* Krapov. and W.C. Gregory, GKP 10017, a diploid wild species with multiple disease and pest resistance. Phillips (2005) and Brantley (2006) were not specifically bred for disease resistance with Phillips released as a cultivar with a high content of bright fancy pods and Brantley as a high-oleic backcross derivative of NC 7. The most recent cultivar releases from our program included Sugg and Bailey. Sugg was a single-backcross derivative of Gregory with SB resistance introduced from Tamrun 98. Bailey has about 25% of N96076L ancestry and in the 2011 growing season exhibited a broad range of disease resistance to the above four diseases. It is reasonable to suggest that the multiple disease resistance of Bailey traces back to *A. cardenasii*. Currently, we have several high-oleic experimental lines closely related to Bailey under field testing as well as several other interspecific breeding lines in our segregating populations. In conclusion, we believe that lines derived from the diploid wild species, *A. cardenasii* form the source of multiple disease resistance in our program.

<u>Stability of Pod Brightness Among Cultivars and Advanced Lines in the NCSU Peanut Breeding Program</u>. T.G. ISLEIB*, S.R. MILLA-LEWIS, W.B. DONG and S.C. COPELAND, Dept. of Crop Science, N.C. State Univ., Raleigh, NC 27695-7629.

Pod brightness is an important breeding objective for peanuts (*Arachis hypogaea* L) grown for the in-shell market. Although pods are not eaten, their aesthetic properties including brightness and hue may be important considerations on the part of the consumer before purchase. Pod brightness and hue were measured for jumbo and fancy pods for each sample graded as part of some tests in the N.C. State Univ. breeding program of 1996 and all plots from 1997 on. The mean values for each line in each trial are saved in a database across years. In order to reduce the impact of artificially low brightness values obtained when there are less than 100 g of jumbo or fancy pods, the weighted average brightness values for jumbo and fancy pods were analyzed. Data were subjected to analysis in which were estimated an environmental standard deviation (σ^2_E), stability variance (Wricke's ecovalence, σ^2_{stab}), the coefficient of regression on the environmental mean (β_i), and the correlation of the line's value with the environmental mean (ρ_i). Lines with regression slopes less than one tended to have large or small environmental and and stability variances. Lines with regression slopes greater than one tended to have large environmental variances and poor stability. There was a strong positive relationship between regression and correlation coefficients, indicating that poor stability was largely a function of deviation of the regression slope from one. Among lines with bright pods on average, stable lines (b_i<1, P<0.05), *i.e.*, those with consistently bright pods, included Bailey (s_E=2.912, s_{stab}=2.212, b_i=0.831±0.057, r_i=0.874, Sugg (s_E=2.700, s_{stab}=2.101, b_i=0.867±0.052, r_i=0.919), VA 98R (s_E=2.601, s_{stab}=1.754, b_i=0.840±0.060, r_i=0.857) and CHAMPS (s_E=2.454, s_{stab}=1.620, b_i=0.798±0.059, r_i=0.904). Other stable lines included cultivars and lines with darker pods on average, *i.e.*, they were consistently dark across environments. Experimental line N06007E (s_E=4.334, s_{stab}=2.568, b_i=1.194±0.068, r_i=0.981) was very responsive to the environmental index (b_i>1, P<0.05). Among lines with greater value per acre, including high-oleic release candidates N08070olJC, N08075olCT, N08081olJC, and N08082olJCT, the only stable line was Bailey. The release candidates all exhibited values of b_i not significantly different from one although they also exhibited greater than average levels of mean pod brightness.

<u>Utilizing NIR to Predict Total Oil, Sugars, Fatty Acids and Tocopherols in Whole Peanut Seeds.</u> B. L. TILLMAN*., PERSON, G., University of Florida, North Florida REC, 3925 Hwy 71, Marianna, FL.32446-7906, HENDRIX, K.W., DEAN, L.L. and SANDERS, T.H., USDA-ARS, Market Handling and Quality Research Unit, 236 Schaub Hall, NC State University, Raleigh, NC 27695

Improving nutritional composition of peanut is a goal of many peanut breeding programs. Among the factors under consideration are total oil, fatty acids, antioxidants, and sugars. Because breeding programs develop and evaluate thousands of segregating progeny each year, they require rapid, inexpensive, and often non-destructive methods to evaluate chemical composition of peanuts. One such tool is Near Infrared Spectroscopy (NIR). The University of Florida peanut breeding program has utilized a ThermoNicolet Nexus 670 FT-IR scanning monochronometer equipped with a NearIR UpDrift Smart to develop predictions for oleic and linoleic fatty acids. This report will summarize progress in developing NIR predictions for palmitic fatty acid, total oil, tocopherols and sugars. Total oil, tocopherols and sugars were measured from samples harvested in 2009 and 2010 from field plots across the entire peanut growing region of the southern United States (Alabama, Florida, Georgia, North Carolina, Oklahoma, South Carolina, Texas and Virginia as part of the Uniform Peanut Performance Tests (UPPT). Constituents were measured by the USDA-ARS Market Handling and Quality Research Unit (MHQRU). Spectra were obtained using a subsample of the seeds used for testing by MHQRU. Calibration models were developed for total sugars, oils and tocopherols. Separately, spectral data were obtained on single seeds and palmitic acid was measured in the seeds by Gas Chromatography. Preliminary NIR predictions utilizing whole, single seeds were developed for total oil, palmitic acid, total tocopherols and total sugars. The calibration equation predicted palmitic acid with an R^2 of 0.72 and a slope of 0.95. Five individual seeds from each of 19 cultivars were used to externally validate the calibration equation. NIR predicted palmitic acid from the external validation set with an R^2 of 0.80 and a slope of 1.04. Calibration results for total oil showed R^2 of 0.84. Results show that prediction of total tocopherols (R^2=0.65) and sugars (R^2=0.71) are not as precise as total oil and oleic/linoleic fatty acids (calibration R^2<0.95). Current methodologies for measuring tocopherols and sugars are not used routinely in peanut breeding programs because they are slow and expensive. Therefore, even a moderate level of predictive accuracy is preferable to no information.

Tilling by Sequencing to Discover Rare Mutations for Stress Related Genes in Peanut (*Arachis hypogaea*) Y. GUO*, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793, B. ABERNATHY, Department of Crop and Soil Sciences, The University of Georgia, Athens, GA 30602., and P. OZIAS-AKINS, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793.

TILLING (Targeting Induced Local Lesions IN Genomes) is a powerful reverse genetics approach to identify rare mutations for understanding gene functions. We selected/cloned a set of genes related to biotic/abiotic stresses in cultivated peanut (*Arachis hypogaea*) and screened mutations for these genes in TILLING populations. Lipoxygenase (LOX) genes play an important role in *Aspergillus*-seed interaction. A set of new *LOX* genes has been isolated by screening a root cDNA library. One new peanut *LOX* gene related to soybean seed *LOX3* (gb|GU942745.1|) and also expressed in seeds was chosen as a TILLING target. We also amplified *PLD1* and *PLD2* genes encoding phospholipase D (PLD, E.C.3.1.4.4) which have been reported to be involved in drought responses. Sanger sequencing of amplicons from the above three genes indicated that there are more than two copies of each gene. Genes for which there is only one copy per genome, peanut allergy genes *Arah1*, *Arah2*, and a peanut fatty acid desaturase gene *AhFAD2*, also were included in the study, both as controls for previously identified mutations and to identify new mutations. Amplified target genes from two dimensional pooled templates representing 728 individuals were sequenced by Illumina HiSeq. Sequencing reads were processed and will be aligned to the reference to identify possible single-nucleotide changes.

Germination and Emergence Effects on Peanut Seed Planted Directly from Cold Storage. J.M. CASON*, B.D. BENNETT, C.E. SIMPSON, Texas AgriLife Research, Texas A&M University System, Stephenville, TX, 76401; J.N. WILSON, Soil and Crop Science Department, Texas A&M University, College Station, TX,77843; B.G. MULLINEX, Texas AgriLife Research, Texas A&M University System, Lubbock, TX, 79403.

Field and germinator experiments were conducted at the Texas AgriLife Research and Extension Center in Stephenville, TX to study the effects on germination and emergence when seed from cold storage (4°C) are planted before warm-up. Two years of field data were conducted in 2010 and 2011. The trials consisted of seven varieties with all four market types represented; three

Runners, two Spanish, and one each of Valencia and Virginia. Two of the Runners and one Spanish were high O/L; the others had normal oil chemistry. The varieties tested were Florunner, Tamrun OL01, Tamrun OL07, Spanco, OLin, NC-7, and New Mexico Valencia C. In the field study seed were removed from cold storage and allowed to warm to 25^{o}C over 24 hours. A second group of seed was removed from cold storage and planted immediately into the soil. Stand counts were taken at 14, 21 and 28 days. A germinator study was also conducted in a Stultz germinator with the same varieties, with a day/night cycle of 30^{o}C day and 22^{o}C night (16/8 hr.) and no supplemental light. Germination counts in this study were taken at 4, 7 and 14 days. All data were subjected to statistical analysis. The field study was analyzed as a split-split plot design. In the fixed effects analysis, variety and seed temperature were significant at the 5% level. The analysis of the germinator study was set up as a split-split-split plot design. An additional split was introduced in order to examine the difference in replications due to seed treatments. The only significant difference between percent germination analysis and a square root transformation of the data was the variety x evaluation day interaction, thus the two years of field data for the percent germination were combined for analysis. There were a number of significant factors in the fixed effects analysis including seed treatment, variety, temperature and the three way interaction of all the variables at the 5% level. Conclusions from the data indicate that there were significant differences in emergence in the field and in germination in the laboratory between cold seed planted immediately and seed that were allowed to equilibrate to room temperature. Data would indicate that further research is need in this area, especially where the number of varieties and market types are concerned. An estimated 14 to 16 varieties are needed in a similar study to ascertain if there are real differences between market (and/or botanical) types.

PHYSIOLOGY AND PRODUCTION TECHNOLOGY

No-Fungicide and No-Insecticide Yield Tests in Peanut. W. D. BRANCH*, Dept. of Crop and Soil Sciences, and A. K. CULBREATH, Dept. of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-5766.

No-fungicide and no-insecticide yield tests were conducted for the past four consecutive years (2007-10) at the
Coastal Plain Experiment Station under irrigation to evaluate for peanut (*Arachis hypogaea* L.) genotypic resistance. The most endemic diseases particularly now in the southeast are tomato spotted wilt caused by *Tomato spotted wilt virus* (TSWV), white mold caused by *Sclerotium rolfsii* Sacc, and both early and late leafspots caused by *Cercospora arachidicola* Hori and *Cercosporidium personatum* (Berk & Curt.) Deighton, respectively. The most endemic insects now are tobacco thrips (*Frankliniella fusca* Hinds) and potato leafhopper (*Empoasca fabae* Harris). Results from these replicated field tests showed significant differences ($P \leq 0.05$) among advanced Georgia breeding lines and cultivars. Three Georgia cultivars ‘Georgia-01R’, ‘Georgia-05E’, and ‘Georgia-10T’ consistently produced the best yields with high levels of resistance to TSWV, white mold, leafhoppers, and leafspot each year. Georgia-01R is a multiple-pest-resistant, runner-type cultivar with late maturity; whereas, Georgia-05E is a multiple-pest-resistant, virginia-type cultivar with medium-late maturity. Georgia-10T is a new runner-type cultivar with high level of TSWV and white mold resistance and late-maturity, similar to Georgia-01R, one of its parents. However, Georgia-10T does not appear to have the high level of leafspot and leafhopper resistance as Georgia-01R, but it still had high yields without any fungicide or insecticide.

Assessment of a Digital Imaging System for Determining Peanut Maturity: Plot and On-Farm Trials. B.C. COLVIN*, D.L. ROWLAND, Agronomy Department, The University of Florida, Gainesville, FL 32611; W.H. FAIRCLOTH, USDA-ARS, National Peanut Research Lab, 1011 Forrester Dr. SE, Dawson, GA, 39842; and J.A. FERRELL, Agronomy Department, The University of Florida, Gainesville, FL 32611.

A system using the color analysis of scanned pod images was developed in 2011 and was found to provide an objective estimation of pod color classification and correlation with yield. The method involves placing blasted pods (exocarp removed) on a standard color scanner and acquisition of a high resolution digital image. The image is then analyzed using a software program that determines pixel area of defined colors. In an effort to validate the method, continued testing of the system was carried out in research plot and on-farm trials. In the research plot trials, studies were conducted in North Florida and South Georgia and involved serial harvests of GA-06G and Georgia Green cultivars. In the on-farm trials, samples were collected close to harvest at five different farms. In both trials, pod samples were blasted and placed on the standard profile maturity board and then they were analyzed using the digital color classification system. The results from the digital system and the profile board were compared in their prediction of maturity. The digital system may provide a quantitative and unbiased harvest prediction that could ultimately improve economic returns.

<ins>Variability for Drought Related Traits of Virginia-Type Peanut Cultivars and Advanced Breeding Lines</ins>. M. BALOTA*, Va. Polytechnic. Inst. and State Univ., Tidewater Agric. Res. and Ext. Ctr., 6321 Holland Rd., Suffolk, VA 23437, T. G. ISLEIB and S. TALLURY Department of Crop Science, North Carolina State University, Raleigh, NC 27695

We report on variability for physiological traits related to drought tolerance and transpiration efficiency of eighteen virginia-type peanut (*Arachis hypogea* L.) genotypes grown in the Virginia-Carolina (VC) peanut growing region. The genotypes are cultivars and advanced breeding lines of the Peanut Variety and Quality Evaluation (PVQE) Program. Water deficit, i.e., rainfall amounts and distribution, is increasingly becoming a limiting factor for peanut production in the VC region. Even though extensive research efforts have been made worldwide to improve drought tolerance in peanut, performance of genotypes largely depends upon the environment in which they grow and no such information is available for the VC area. The objective of this study was to determine the variability for gas exchange and leaf characteristics, i.e., CO_2 assimilation rate (A), stomatal conductance to water vapors (g_s), transpiration efficiency ($A{:}g_s$), specific leaf area (SLA), chlorophyll concentration estimate (SPAD), number of stomata per cm^2 and leaf, and canopy temperature depression (CTD), of virginia-type genotypes grown under rainfed conditions in southeastern Virginia. The relationship of physiological and agronomic traits, i.e., total plant mass, pod mass, harvest index (HI) and pod yield, were then analyzed. Genotype had a significant effect on g_s, $A{:}g_s$, SLA, SPAD, number of stomata per cm^2 and leaf, and CTD in 2009 and on A, g_s, $A{:}g_s$, SPAD, and number of stomata per cm^2 and leaf in 2010. Excepting CTD, year had a significant effect on all physiological characteristics. The genotype × year interaction was not significant for A, g_s, $A{:}g_s$, SPAD, and SLA suggesting dominant controlling factors for these traits. Relationships between gas exchange and leaf characteristics were weak. In 2009, 60% of pod yield variation was explained by A (higher A, higher pod yield) and SPAD (greened leaves, higher pod yield). In 2010, 93% of yield was due to positive effects of A, SPAD, stomata cm^{-2}, and CTD (cooler leaves, higher yields), and negative effects of $A{:}g_s$ (higher $A{:}g_s$ lower yield) and number of stomata $leaf^{-1}$. These results suggest that development of cultivars with greener leaves and higher A when g_s is low may ensure better yields under rainfed conditions in the VC region.

<ins>Effect of Cultivar, Irrigation, and Soil Calcium on Runner Peanut Response to Gypsum</ins>. J. A. Howe*, R. J. Florence, E. van Santen, Agronomy and Soils Department, Auburn University, Auburn, AL 36849; and G. Harris and J. Beasley, Crop and Soil Sciences Department, The University of Georgia, Tifton, GA 31793-0748.

Calcium is often limiting to peanut yield, grade, and germination in the southeastern US. The response of larger-seeded Georgia-06G and smaller-seeded Georgia Green runner peanuts to gypsum applications were evaluated in 14 tests in southern Alabama and Georgia. Experiments were established in a randomized complete block design with four replications of gypsum treatments (0, 560, 1120, and 1680 kg ha-1) in soils with a range of soil calcium (178 – 498 mg kg-1) in both irrigated and non-irrigated tests. Although soil calcium was near or above the critical level for additional gypsum, increases in yield, grade, seed calcium, and germination were observed. Response to applied calcium was most dramatic in non-irrigated peanuts where calcium diffusion was limited. Georgia -06G and Georgia Green peanuts appear to have a critical

seed Ca concentration around 600 mg kg-1 to ensure germination >95%, which is higher than that reported for older cultivars such as Florunner, Southern Runner, Sunrunner, and GK-7.

Establishing a website to aid growers in harvesting and irrigation decisions: “Peanut FARM”. D.L. ROWLAND*, J.A. FERRELL, J.M. BENNETT, D.A. DREW, B.C. COLVIN, Agronomy Department, the University of Florida,
Gainesville, FL 32611; and W.H. FAIRCLOTH, Syngenta, 149 Fairethorne Dr., Leesburg, GA 31763.

Previous studies in the southeastern U.S. have shown the utility of using an adjusted growing degree day (aGDD) method for predicting peanut maturity. The method relies on measurements of ambient temperature and the receipt of irrigation and/or rainfall. To make the aGDD method adoptable, it is necessary to launch the tool on a website that allows growers to input weather and irrigation information for individual fields. A second tool that provides irrigation scheduling recommendations will also be available for growers to access on the website. This model was developed at the University of Florida and utilizes a basic checkbook method based on the prediction of crop development and its associated water-use using aGDD’s. Our team is in the process of launching the Peanut FARM (Field Agronomic Resource Manager) website. Growers will be able to establish individual accounts and enter or upload weather data for individual fields. aGDD values will be calculated by the program and will provide: 1) harvest prediction, and 2) irrigation scheduling. Simultaneously, ongoing research will continue evaluating new peanut cultivars, regional variation, and model prediction accuracy for both crop maturity and water-use calculations. Information about the process of utilizing the website and results from research testing the models will be presented.

Seed Treatment and Seeding Rate Interactions in Peanut Production. R.S. TUBBS*, and J.P. BEASLEY, JR., Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793.

Fungicidal seed treatments are commonly applied prior to planting peanut (*Arachis hypogaea* L.), and are a very minor expense for the benefit they can provide. However, seed costs (on a weight basis) have greatly increased over the last five years, and the dominant runner-market peanut cultivars are much larger/heavier than the industry standard from five years ago (Georgia Green). Thus, growers are interested in saving costs at planting, and one potential method is through reduced seeding rates. The objectives of this study were to evaluate the effectiveness of a seed treatment (azoxystrobin) by applying or withholding at two seed seeding rates (12.5 and 18.8 seed m^{-1}) on Tifguard peanut. A randomized complete block with a 2x2 factorial arrangement was used in 2009-2011 at Plains, GA. Inclusion of the seed treatment did not impact the tested variables (plant stand, plant height at R7, yield, and grade) in 2009 or 2010, but did increase stand (48-64%), height (10-19%), and yield (8%) in 2011. The higher seeding rate improved plant stand every year over the lower seeding rate (24-42%), however yield was only influenced by seeding rate in 2009, when the higher seeding rate resulted in a 10% increase. While a statistical benefit was observed in only one year with a seed treatment in this test, the relatively low cost of the product should encourage its continued use since soil and climatic conditions are highly variable depending on the field and year in which peanut are planted. However, these are favorable results for growers interested in organic production where inorganic/synthetic seed treatments cannot be used. Seeding rate likewise only had one year where a statistical yield advantage was observed for the higher seeding rate, although the reduced seeding rate would have offset seed costs, keeping net revenue more balanced. Further economic analyses need to be conducted for verification. While nearly equivalent results were achieved with a seeding rate as lows as 12.5 seed m^{-1} in this trial, it should be noted that extremely high quality (Foundation or Registered) seed were used in every year of this project. Since plant stands did drop below what is typically considered acceptable (despite minimal effects on yield), a seeding rate as low as 12.5 seed m^{-1} should still be considered risky by growers.

The Effect of Cultivar, Maturity, and Curing Conditions on Seed and Milling Quality. C.L. BUTTS*, M.C. Lamb, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842;

and W. H. FAIRCLOTH, Syngenta, Leesburg, GA 31763.

Several of the recent releases of runner peanut cultivars from the public breeding programs for production in the southeastern U.S. have had larger seed size distributions than some of the previously used cultivars.. The objectives of this study were to determine the effects of: cultivar, maturity and curing conditions on the milling and seed quality of some of the large seeded runner type peanuts. Four runner cultivars were used in the study. The large-seeded runner cultivars used in the study were 'Georgia 06G' and 'Florida 07'. The two conventionally-sized runner cultivars were, 'Georgia Green' and 'Georgia Greener'. A hull scrape maturity sample was secured at digging. All peanuts were planted 05 May 2010 and dug on seven different harvest dates beginning 118 days after planting (23 Sep 2010). After partially curing in the windrow, peanuts were cured using two different drying treatments to either 11 or 10% moisture content. Peanuts were dried using air heated 8C above ambient, but no higher than 35 C or 22 C above ambient but no higher than 41 C. Samples were cleaned and shelled. Three subsamples consisting of a composite of jumbo, medium, and No. 1-sized kernels from each cultivar x harvest x drying temperature x cutoff moisture sample were used to determine germination percentage and a vigor index. Sixty-seed samples were planted on 19 May 2011 and plant stand counts were taken at 7, 14, 21, and 28 days after planting. After 28 days, all plants were removed from the soil, washed, then the dry matter weight/plant was determined. Cutoff moisture had no significant effect on either seed germination or the vigor index. Cultivar, maturity index (total of black + brown pods) had significant effects on vigor index, while germination was affected only by cultivar. When averaged over all harvest dates, Georgia 06G, Georgia Green, and Georgia Greener had germination percentages of 96%. Florida 07 averaged 95% germination. The germination percentage for all cultivars was above 95% for the first 5 harvests then fell to less than 88% for the last harvest on 02 Nov 2010. The average vigor index at harvest 1 was 819, reached a maximum of 889 on the second harvest and gradually decreased to 794 on the sixth harvest and sharply decreased to 577 on the last harvest. While drying temperature had no significant effect on germination or vigor index, the Georgia 06G and Georgia Greener that were cured at the higher temperature had significantly lower vigor index (806 and 791, respectively) compared to the vigor index for the Florida 07 (872) and Georgia Green (908) that were cured at the higher temperature.

<u>Differential Transpiration Response to Aquaporin Inhibitors and Leaf Aquaporin Expression in Peanut Genotypes</u> M.J. DEVI*, T.R. SINCLAIR, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; M. JAIN and M. GALLO, Agronomy Department, University of Florida, Gainesville, FL 32611-0500.

Southeastern U.S. commercial genotypes of peanut (*Arachis hypogaea* L.) were identified that differed in their response to increasing vapor pressure deficit (VPD) such that the transpiration rate (TR) was constrained of continually increased with increasing VPD. The restriction in TR at high VPD conditions is considered as a soil water conservation trait for benefit of crop growth later in the season when water limited conditions may develop. Previous studies have identified the association of constrained TR at high VPD with decreased leaf hydraulic conductance mediated by membrane integrated aquaporins (AQPs). The objective of the present study was to assess and correlate the differences in TR responses under high VPD conditions and AQP transcriptional profiles in peanut leaves. The first study was to document the TR response of six commercial peanut genotypes (AT 3085, C 76-16, C 99R, FL 07, GA 04S and York) treated with AQP inhibitors $HgCl_2$ and $AgNO_3$. Among these six genotypes, York expressed unrestricted TR across increasing VPD environments whereas the other five cultivars have limited TR under high VPD conditions. The cultivars varied significantly in their drop in transpiration rate (DTR) (P<0.01) with a maximum for C 99R and York at 200 and 500 µM with both mercurial and silver inhibitors. The second study examined the transcriptional activity of six putative AQPs (encoding PIP and TIP AQPs) in contrasting genotypes C76-16 and York. Quantitative RT-PCR data revealed a $AgNO_3$- and $HgCl_2$-induced increase in abundance of five AQ*P* transcripts out of the six tested with both inhibitors in C 76-16 than York (significant at P<0.01) at 500 µM concentration. These results document differences in shoot responses to AQP inhibition, and implicate a role for several AQPs in determining differential TR responses under variable VPD conditions in peanut genotypes.

Variability of Fatty Acid Profiles in Peanut Seed. L. DEAN*, K. PRICE, J. DAVIS, T. SANDERS, Market Quality and Handling Research Unit, USDA, ARS, Raleigh, NC 27695-7624.

Peanut seed that are high in oleic acid have been found to have superior stability to oil rancidity when compared to seed with normal oleic acid values. As such, breeding programs have in the past several years been increasing the number of new cultivars with this trait. Buyers of peanuts have begun demanding that shellers supply them with seed that is exclusively high-oleic in many instances. This has increased the pressure on shellers to ensure that high-oleic seed contains minimal percentages of low-oleic acid seed. Several studies using gas chromatography have been performed to look for variations in the amounts of different fatty acids in seed lots, across plants within a single row and even within seeds themselves. This research has shown that lots of seeds can vary not only with high-oleic lots containing some low oleic seed, but also low or normal oleic lots containing some high-oleic seeds. Often the variability within lots is attributed to problems with keeping loads segregated, but since the peanut plant itself is indeterminate flowering, it may also be a consequence of maturity since fatty acid profiles of peanuts change with maturation. Variations within single plants across a range of oleic to linoleic acid ratios of 4 to 50 were seen. It is also known that the fatty acid profiles of the embryo and the cotelydons in a peanut seed are different and our results show that the O/L ratio across the cotelydon itself with vary depending on the area sampled by several percent. These findings will have impact on all facets of the industry involved with peanut lipid quality.

Oleic/Linoleic (O/L) Acid Ratios of Red River Runner Peanut at Three Digging Dates. H. MELOUK* (1), R. MADDEN (1), JACK DILLWITH (1), C. GODSEY (2), and K. CHAMBERLIN (3). (1) Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078; (2) Department of Soil Science, Oklahoma State University; (3) USDA-ARS, Stillwater, OK 74075.

Peanut plots were established at Stillwater, OK in 2011. Each plot consisted of 4 rows each being 6.1 m in length and row spacing of 0.91 m. Plots were arranged in a randomized complete block design with five replications. Plots received a total of 69 cm of water (natural and sprinkler) during the growing season. Standard agronomic practices were performed during the growing season. Digging dates were: 120, 133, and 148 days after planting. Standard digging and curing practices were followed. Kernels from each treatment were graded and sized into 4 categories: <15/64, 15/64, 16/64, and 19/64. Three random kernels were taken from each sample and used to determine O/L ratios using a standard GC methodology. At all digging dates, the O/L ratios increase as the kernel size increased. Average over all digging dates, O/L ratios of 5.7, 7.9, 15.7, and 24.5 were obtained for kernel size corresponding to <15/64, 15/64, 16/64, and 19/64, respectively. These findings clearly indicate that mature Red River Runner peanut kernels possess higher O/L ratios than the less mature ones.

POSTER SESSION

Diallel Analysis of Oil Content in Peanut. M.R. BARING*, J.N. WILSON, Texas AgriLife Research, College Station, TX 77843; M.D. BUROW, Texas AgriLife Research, Lubbock, TX 79403; W.L. ROONEY, Texas AgriLife Research, College Station, TX 77843; C.E. SIMPSON, Texas AgriLife Research, Stephenville, TX 76401; J.L. STARR, Department of Plant Pathology, Texas A&M University, College Station, TX 77843.

The objective of this study was to determine the inheritance of the quantitative trait oil content in crosses between four runner peanut genotypes with different oil contents. A proprietary high oil breeding line developed by the TAMU breeding program was crossed with high oleic acid runner genotypes Tamrun OL01, Tamrun OL07, and advanced high oleic breeding line Lub268 in a complete diallel with reciprocal mating. F_2 progeny and parental lines were arranged in a randomized complete block design in College Station TX in 2010. Significant differences in oil content between progeny and parental lines were observed. Diallel data was analyzed using Griffing's method and the Jinks-Hayman method. Griffing's analysis revealed that general and specific combining ability variance was significant and that general combining ability variation was larger than specific combining ability. An analysis of variance for oil content was performed as outlined by Jinks-Hayman. This analysis of variance revealed significant additive, dominance, and reciprocal effects.

Two Putative TSWV Resistance Gene-specific Markers Linked to a Genetic Linkage Group in Peanut. S. FENG*, X. CHEN, M.K. PANDEY, Z. LIU, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA; and Baozhu GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Among the diseases in peanut, tomato spotted wilt virus (TSWV) is the most destructive viral disease threatening peanut production in the Southeastern U.S. Host-plant resistance through use of resistant cultivars is the best approach compared to other available strategies for controlling this devastating disease. In this study, through data mining two peanut EST sequences with high similarity to tomato *Sw-5* were identified for further investigation. Two putative genes were obtained using 5' and 3'-RACE, named *Ahsw-1* and *Ahsw-2*, respectively. Two gene-specific marker(s) were developed from these two putative TSWV resistance genes and used to amplify four parental lines of two mapping populations segregating for this disease for polymorphism. Genotypic data were generated on one of these mapping population possessing 353 recombinant inbred lines (RILs) derived from SunOleic 97R and NC94022. The two markers, *Ahsw-1*and *Ahsw-2* were mapped to linkage group 4 of the S population between SSR markers Seq2F10-110 and TC7G10-200 along with 6 other markers. Further study will be continued to study association of these two markers with TSWV resistance.

Peanut Cultivar Response to Flumioxazin Applied Preemergence and Imazapic Applied Postemergence.W. J. GRICHAR*, Texas AgriLife Research, 10345 State Hwy 44, Corpus Christi, TX 78406, P. A. DOTRAY, Texas
AgriLife Research, Texas AgriLife Extension, and Texas Tech Univ., 1102 E FM 1294, Lubbock, TX 79403; and M. R. BARING, Texas AgriLife Research, Soil and Crop Science Dept., College Station, TX 77843.

Field studies were conducted in 2009 and 2010 in south Texas (Yoakum) and in the Texas High Plains (Lamesa) to determine peanut cultivar response to flumioxazin applied preemergence and imazapic applied postemergence under weed-free conditions. At Yoakum, two cultivars (Tamrun OL01, Tamrun OL07) were evaluated while at Lamesa, four cultivars (FlavorRunner 458, Tamrun OL01, Tamrun OL02, Tamrun OL07) were evaluated. In 2009, no stunting was noted at Yoakum regardless of cultivar or herbicide treatment. At Lamesa, FlavorRunner 458 and Tamrun OL01 were stunted by flumioxazin at 0.21 kg/ha (6-7%)and imazapic at 0.07 and 0.14 kg/ha (6-17%), Tamrun OL02 was stunted by all rates of flumioxazin and imazapic (5-18%), and Tamrun OL07 was stunted by all rates of flumioxazin and imazapic (6-15%) with the exception of flumioxazin at 0.05 kg/ha. At Yoakum, due to prolonged heavy rains at digging, plots were not harvested while at Lamesa no cultivar response to herbicides was noted. With respect to herbicides, flumioxazin did not have an effect on yield while all imazapic rates reduced yields when compared with the untreated check. In 2010 at Yoakum, little or no ($\leq$ 2%) herbicide stunting was noted on any cultivar and only imazapic at 0.14 kg/ha caused significant stunting (7%). No yield differences were noted between cultivars or herbicide treatments. At Lamesa, all cultivars were stunted by herbicide treatments (6 to 9% stunting). No peanut stunting was noted with flumioxazin at 0.05 kg/ha while imazapic at 0.04 kg/ha and flumioxazin at 0.11 kg/ha resulted in 4 and 6% stunting, respectively. Flumioxazin at 0.21 kg/ha and imazapic at 0.07 kg/ha resulted in 12% stunting and imazapic at 0.14 kg/ha stunted peanut 19%. Both Tamrun OL01 and Tamrun OL07 produced lower yields (≤ 6369 kg/ha) than FlavorRunner 458 (7252 kg/ha) and Tamrun OL02 yields were intermediate (6889 kg/ha). Peanut yields from herbicide treatments were not different from the untreated check.

Characterization of Expressed Resistance Gene Analogs (RGAs) from Peanut (*Arachis hypogaea* L.) Expressed Sequence Tags (ESTs). B. GUO*, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA; Z. LIU, S. FENG, M.K. PANDEY, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA.

Cultivated peanut (*Arachis hypogaea* L.) is one of the most important food legume crops grown worldwide, and is a major source for edible oil and protein. However, due to low genetic variation, peanut is very vulnerable to a variety of pathogens, such as early leaf spot, late leaf spot, rust and Tomato spotted wilt virus (TSWV). In recent years, the peanut research community has developed and deposited a large number of ESTs (225,264 ESTs by 11-11-2011) in GenBank. These data offer good opportunities to identify functional genes and to develop molecular markers. In the present study, we used the protein sequences of the 54 known *R*-genes to screen peanut EST database and identified 995 ESTs targeting different classes of known *R* genes. Among the 995 ESTs, 559 (56%) were from ten cultivated peanut cultivars and 436 (44%) were from three wild peanut genotypes. After assembly, 401 unigenes were developed and considered as peanut expressed RGAs. These expressed RGAs consisted of 75, 196, 89, 27, and 14 RGAs representing for NBS-LRR, protein kinase (PK), LRR-PK/TM, toxin reductase, and other domain encoding *R* genes, respectively. A total of 33 SSRs were identified from 28 peanut expressed RGAs and one SSR (RGA121) was found polymorphic in two mapping populations. Genotypic data were generated on one of these mapping population possessing 353 recombinant inbred lines (RILs) derived from SunOleic 97R and NC94022, and mapped on linkage group 01 along with the putative *qtswv2* (Qin et al. 2012. TAG).

Impact of Enclosure 4L and Temik 15G on peanut root knot control and yield response of two peanut cultivars in southeast Alabama. H. L. CAMPBELL*, A.K. HAGAN, and K.L. BOWEN, Dept of Entomology and Plant Pathology, Auburn University, AL 36849; L. WELLS, Wiregrass Research and Extension Center, Headland, AL 36345

In 2011, Eclosure 4L and Temik 15G were tested for their effectiveness in controlling peanut root knot nematode as well as yield response on root knot susceptible Georgia-06G and resistant peanut cultivar Tifguard at the Wiregrass Research and Extension Center in Headland, AL in a field with a high background population of the peanut root knot nematode. A split plot design with peanut cultivars as whole plots and nematicide treatments as sub-plots was used and whole plots were randomized in complete blocks with 5 replications. Individual sup plots consisted of four 30-ft rows spaced 36-in apart. Leaf spot diseases were controlled with chlorothalonil as a full canopy spray applied seven times during the season. Leaf spot was rated using the Florida 1-10 leaf spot rating system. Stem rot hit counts were rated where 1 hit was defined as ≤ 1 foot of consecutive symptoms and signs of the disease) and root knot damage ratings were made where 1 = no visible damage, 2 = 1-25% of and/or pods damaged, 3 = 26-50% damage, 4 = 51-75% damage, and 5 = >75% damage immediately after plot inversion. Soil samples which were collected prior to plot inversion were assayed using using sugar flotation method. Data were pooled across peanut cutlivars and nematicide treatments. Significance of treatment effects and interactions was evaluated using PROC MIXED procedure in SAS and means were separated using Fisher's protected least significant difference at $P \leq 0.05$. Georgia-06G had higher leaf spot, stem rot, root knot damage, and nematode counts than did Tifguard. When compared with the non-treated control, several Temik 15G and Enclosure 4L programs had higher leaf spot ratings. Increased stem rot incidence was noted with Enclosure 4L IF fb by Enclosure 4L 45 DAP, Enclosure 4L applied at ground cracking fb Enclosure 45 DAP, and Actinogro. Reduced root knot gall ratings were observed with Temik 15G IF fb Temik 15G 10 lb 45 DAP when compared to those for the non-treated control, Enclosure 4L fb Enclosure 4L 45 DAP fb Enclosure 60 DAP, and Actinogro. Root knot juvenile counts for all nematicide programs were similar and all were higher than the non-treated control. When compared with the non-treated control, the Temik 15G IF fb Temik 15 10 lb 45 DAP, Enclosure 4L fb Enclosure 4L GC fb

Enclsure 4L 45 DAP had similar yield. Yields for all other treatments were similar. Yields for the root knot resistant Tifguard and root knot susceptible Georgia-06G did not differ significantly despite Georgia-06G having higher stem rot ratings and root damage ratings. When compared with the non-treated control, no yield gains were noted with either Temik 15G or Enclosure 4L programs.

Effect of Plant Population and Replant Method on Peanut Production. J.M. SARVER*, R.S. TUBBS, J.P. BEASLEY, JR., A.K. CULBREATH, N.B. SMITH, University of Georgia, Tifton, GA 31793; D.L. ROWLAND, University of Florida, Gainesville, FL 32611
The University of Georgia Extension recommendation for optimum plant stand in peanut (*Arachis hypogaea* L.) is 13.1 plants m^{-1}, although previous work has shown that yield potential can be maintained at plant stands lower than optimum. The unpredictable and often extreme weather and the ubiquity of pathogens in the region often contribute to poor emergence and a resultant poor plant stand. When plant stand is adversely affected, a point is reached where replanting the field becomes economically viable. The objectives of this study were to i) determine the plant stand at which a peanut field fails to maintain yield and economic viability in single row pattern, and ii) determine the best method for replanting peanut when an adequate stand is not achieved. A field trial was established at the Southwest Georgia Research and Education Center in Plains, GA in 2011 to evaluate peanut production at six plant stands (3.3, 4.9, 6.6, 8.2, 9.8, and 11.5 plants m^{-1}) in combination with three replant regimes (no replant, destroy the original stand and replant at a full seeding rate, and add a reduced rate of seed to supplement the original stand) in a randomized complete block design. A plant stand of at least 8.2 plants m^{-1} was required to maximize yield. There was a yield advantage for the supplemental treatment (6446 kg ha^{-1}) over the complete replant treatment (5455 kg ha^{-1}), meaning that it would be advantageous for a grower to add supplemental seed to an original stand below 8.2 plants m^{-1} rather than chemically or mechanically destroying the original stand and replanting at a full seeding rate.

Comparing Three Methods Used to Determine the Oleic/Linoleic Acid Ratio in a Single Peanut Seed. K.D. CHAMBERLIN*, USDA-ARS, Wheat, Peanut and other Field Crops Research Unit, 1301 N. Western, Stillwater, OK 74075; N. BARKLEY, USDA-ARS, 1109 Experiment Street, Griffin, GA and B. TILLMAN, University of Florida, NFREC, 3925 HWY 71, Marianna, FL 32446-7906 .

Peanut varieties with high oleic/linoleic acid ratios have become preferred by the peanut industry due to their increased shelf life and improved health benefits. Many peanut breeding programs are trying to incorporate the high oleic trait into new and improved varieties and are in need of diagnostic tools to track its inheritance early in development and at the single seed level. This study compares the methods of capillary electrophoresis (CE), near-infrared spectroscopy (NIR) and Real Time PCR (RT-PCR) with regards to their ability to determine whether a peanut seed is high oleic. Three hundred and ninety samples of individual peanut seed inclusive of all four market types were processed by all three methods and the seed were characterized as being either “high” or “normal” in oleic acid content. Since the CE method is the only one used that will define an exact O/L ratio, results from the other two methods were judged as either being in agreement or disagreement with the CE result. Although completely non-destructive, NIR was deemed the least accurate of the three methods at a rate of 92%. RT-PCR agreed with CE in 98% of the samples. Interestingly, there were 1.4% of the samples where both NIR and RT-PCR disagreed with the CE results. The results from this study will allow researchers to make informed decisions regarding ease, limitations, seed preservation, speed and accuracy when choosing a method for O/L analysis of single peanut seed.

Stand Delays Associated with In-Furrow Liquid Acephate Applications. S. MALONE*, D.A. HERBERT, JR., Department of Entomology, Virginia Tech Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437; M. BALOTA, Department of Plant Pathology, Physiology, and Weed Science, Virginia Tech Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437; and D. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

In 2011, all thrips research plots conducted in Suffolk, VA, with acephate (Orthene 97, AMVAC Chemical Corporation) applied as a liquid in-furrow at planting at 12.4 and 16.5 oz/acre had significantly lower peanut seedling stand counts at 15-16 days after planting than other treatments. Other treatments included liquid in-furrow applied insecticides (i.e., imidacloprid [Admire Pro, Bayer CropScience] and cyantraniliprole [Verimark 20SC, DuPont Crop Protection]), granular in-furrow insecticide (i.e., phorate [Thimet, AMVAC Chemical Corporation]), and plots that had not received any insecticide by 15-16 days after planting. By 22-24 days after planting, Orthene liquid in-furrow stands "caught up" with the other treatments and did not suffer significant yield losses.

Several growers also reported similar stand emergence problems in fields treated with in-furrow liquid Orthene. Slow seedling emergence could result in inadequate spray coverage/thrips plant protection in subsequent foliar insecticide applications (often applied around the late ground-cracking stage). When broadcast sprays are needed to manage heavy thrips populations (usually the case in Virginia), plants that are not emerged would not get protected by the foliar broadcast applications, and would therefore be at higher risk to thrips injury. Although it was not the case in our research plots in 2011, slow seedling emergence or reduced stands could result in yield reductions. Further research is planned to address this issue.

<u>Saturation of Genetic Maps for Identification of QTLs Controlling Biotic Resistance, Morphological Descriptors and Oil Quality in Tetraploid Peanut (*Arachis hypogaea* L.).</u> M.K. PANDEY*, S. FENG, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA; M.K. PANDEY, R.K. VARSHNEY, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India; M.L. WANG, N.A. BARKLEY, USDA-ARS, Plant Genetics Resources Conservation Unit, Griffin, GA; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA; and B. GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Low genetic diversity in cultivated peanut severely hampered construction of high density genetic maps and as a result genetic maps constructed so far could not go beyond 200 markers. The marker density of these maps is not satisfactory concerning the large genome size, allotetraploid nature and 20 linkage groups. Biotic diseases such as tomato spotted wilt virus (TSWV) and late leaf spot (LLS) are constantly posing threat to sustainable peanut productivity of newly released cultivars. In addition, increased awareness among consumers towards health benefits demands for cultivars with good oil quality. In order to overcome the above constraints, two genetic maps were constructed using Tifrunner × GT-C20 (T population, 158 RILs) and SunOleic 97R × NC94022 (S population, 190 RILs) with 239 and 172 marker loci, respectively (Qin et al. 2012. TAG). Further, screening of markers resulted in the identification of an additional 69 polymorphic markers for the S-population. Realizing the potential of this population, phenotypic data were generated on several traits along with new genotypic data for 250 marker loci on 353 RIL lines. Using QTL Cartographer v 2.5, single marker analysis (SMA) with genotypic and phenotypic data resulted in the identification of highly significant (0.01%) markers for LLS (41 markers), TSWV (10 markers), flowering on the main axis (7 markers), growth habit (13 markers), visual prominence of the main stem (one marker), oleic acid (25 markers), linoleic acid (23 markers), oleic/linoleic (O/L) ratio (15 markers), palmitic acid (5 markers), stearic acid (7 markers), arachidic acid (11 markers), gadolic acid (4 markers), behenic acid (26 markers), lignoceric (21 markers) and cerotic (3 markers) acids. However, there were no significant markers detected for leaf color, total oil content and stem pigmentation. More significantly, a total of 13 common markers were detected in both seasons (2010 and 2011) for LLS resistance. Common markers were also detected between several other traits such as flowering on the main axis and growth habit (5), oleic, linoleic acids and O/L ratio (12), oleic and arachidic acids (7), behenic, oleic and linoleic acids (15), lignoceric, oleic and linoleic acids (11). A gene specific marker for the *FAD2B* gene was found to be significantly associated with all the fatty acid component traits except stearic, gadoleic and cerotic acids. The construction of a saturated genetic map and detailed QTL analysis is in progress and will be presented.

Rooting Traits of Peanut Genotypes with Different Yield Response to Terminal Drought. R. KOOLACHART*, S. JOGLOY, N. VORASOOT, A. PATANOTHAI, Department of Plant Science and Agricultural Resources, Khon Kaen University, Khon Kaen 40002, Thailand; S.WONGKAEW,School of Crop Production Technology, Institute of Agricultural Technology, Suranaree University of Technology, NakhonRatchasima, 30000, Thailand; and C.C. HOLBROOK, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA, 31794, USA.

Drought at pod filling and maturity stages can severely reduce yield of peanut. Better root systems can reduce yield loss from drought. The goal of this study was to investigate the responses to terminal drought of peanut genotypes for root dry weight and root length density. A field experiment was conducted at Khon Kaen University's Agronomy Farm in 2010/2011. A split plot design with four replications was used in this study. Five peanut genotypes; ICGV 98308, ICGV 98324, ICGV 98348, Tainan 9 and Tifton 8 were assigned as main plots and two soil moisture levels [field capacity (FC) and 1/3 available water (1/3 AW) at R7 growth stage through harvest] were assigned as subplots. Data were recorded for relative water content (RWC), root dry weight (RDW) and root length density (RLD) at the last day of irrigation, R7 stage and harvest. Pod yield (PY), biomass (BM) and harvest index (HI) were recorded at harvest. Drought significantly reduced pod yield, biomass and harvest index, and differences among peanut genotypes for these traits were observed. ICGV98324 was the best genotype for pod yield and harvest index under drought, whereas Tifton 8 was the best genotype for biomass. ICGV98348 gave the highest drought tolerance index (DTI) for pod yield, biomass and harvest index. Drought did not significantly affect root dry weight, but peanut genotypes were significantly different for this trait. Tifton 8 had the highest root dry weight. Differences among peanut genotypes were also observed for root length density. A higher root length density at deeper layers may allow plants to mine more available water in the sub-soil. Genotypes showed differential responses for root growth and distribution. Gentoypes with higher pod yields under stress versus non-stress conditions had more root length density in the deeper soil layers during terminal drought stress compared to the non-stress treatment.

Preliminary Studies in Peanuts Organic Fertilization with Vermicompost. S SANCHEZ-DOMINGUEZ* and A. CHONG-ESLAVA, Departamento de Fitotecnia, Universidad Autonoma Chapingo, Chapingo Méx. 56230.

Organic agriculture is increasing in Mexico, involving 350,000 ha in 2009. Although vermicompost applications are common, not yet is important in peanut crops. We have tested different dosages of vermicompost applied to peanuts, both growing in pots inside a greenhouse, and at open fields. In 2007 and 2008 the application of 1 kg of vermicompost applied to each pot that contained 10 kg of sandy clay soil, not induced higher peanut pod yields than the control. In spring-summer season, 2010, two different soils textures mixed with 50% of vermicompost (v/v) were used for planting a peanut plant in each pot of 10 kg of soil. Cultivar Rio Balsas was growed. Main results indicate that: Biological yield was the highest (60.8 g) in the clay sandy soil removed before planting than clay sandy soil mixed with 50% of vermicompost (59.8 g). Sandy soil without vermicompost (control) produced only an average of 35 g. In dry pod weigh, the values were 21.0, 24.7 and 20.8 g respectively. This indicates that vermicompost at a dosage of 50% v/v not induced more peanuts yields. On field experiment, vermicompost applied at a dosage of 65 g / two plants, not induced statistical differences between treatments in pod number and pod weigh: In the first sample, 34 and 62 pods were harvested from vermicompost application and control respectively. In a second sample, a similar trend was observed: vermicompost application induced 46 and control 65 pods. In the last sample, the third, peanut plant with vermicompost produced 71 pods, meanwhile control produced 108 pods. This trend was similar on peanuts pod dry weight. Maybe the low dosage of 65 g / hill (two plants), (2031 kg of vermicompost ha^{-1}) applied to 62,500 plants ha^{-1}, was not enough for improved peanut pod yields.

Reducing Peanut Allergens by High Pressure Combined with Polyphenol Oxidase. S.-Y. CHUNG*, S. REED, Southern Regional Research Center, USDA-ARS, New Orleans, LA 70124; and M. HOUSKA, Department of Food Engineering, Food Research Institute Prague, Prague 10, Czech Republic.

High pressure (HP) and polyphenol oxidase (PPO) have been shown to increase enzyme activity and reduce major peanut allergens (Ara h 1 and Ara h 2), respectively. We postulated that further reduction of peanut allergens can be achieved through HP combined with PPO. Peanut extracts were treated with each of the followings: (1) HP; (2) HP + PPO; (3) PPO; and (4) none. The conditions for HP treatment were: 300 and 500 MPa, each for 3 and 10 min. All treatments contained caffeic acid, a phenol compound for cross-linking the allergens through PPO. After treatment, SDS-PAGE was performed and allergenic capacity (IgE binding) of the treated extracts was determined colorimetrically in ELISA and Western blots. SDS-PAGE data showed that HP alone had no effect on major peanut allergens. However, HP (500 MPa) combined with PPO induced a reduction of major peanut allergens and IgE binding, which was found to be higher than the reduction by PPO itself. No difference in the degree of reduction was observed between treatment times (i.e., 3 and 10 min). We concluded that HP (at 500 MPa) combined with PPO enhanced the reduction of major peanut allergens and IgE binding, as compared to PPO alone. Three min appeared to be sufficient for the treatment. In the absence of PPO, HP had no effect on major peanut allergens under the conditions tested.

Weed Control in Peanut (*Arachis hypogaea*) Comparing POST alone or in combination with Classic (chlorimuron) LPOST. T. L. GREY and F.S. TURPIN*, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793-5737.

Field studies were conducted in 2011 to determine peanut weed control with post emergence (POST) residual and contact herbicide applications alone at 42 after planting, or in combination with late post emergence (LPOST) application of Classic at 60 days after planting. Traditional small-plot techniques were utilized with the cultivar Georgia06-G. EPOST treatments were the residual herbicide Cadre @ 2 or 4 oz/A, or the contact herbicides Basagran at 2 pt/A, Aim at 1 oz/A, Storm at 1.5 pt/A, Ultra Blazer at 1.5 pt/A, or Cobra @ 12.5 oz/A. These treatments were applied alone or in combination with LPOST of Classic @ 0.5 oz/A. Weeds evaluated were sicklepod and yellow nutsedge and data included visual evaluation and stand counts. Late season weed control taken 86 days after planting indicated that season long sicklepod control (>88%) required POST applications of Cadre @ 4 oz/A, or at 2 oz/A in combination with Classic LPOST. The contact herbicides Basagran, Aim, Storm, Blazer or Cobra POST provided less than 41% control of sicklepod due to a lack of residual activity. When in combination with the LPOST application of Classic, sicklepod control was improved ranging from 39 to 77%. These data indicate that contact herbicides alone POST followed by Classic LPOST was effective, but did not provide adequate season long sicklepod control. This is attributed to late season sicklepod emergence after the POST applications. Maximum yields were obtained with Cadre POST alone treatments, the addition of Classic did not negatively affect peanut yield.

Anti-inflammatory Effects of Peanut Skin Extracts on COX-2 in Raw 264.7 Cells. G. K. HARRIS, W. LEWIS*, Food, Bioprocessing and Nutrition Sciences Department, North Carolina State University, Raleigh, NC 27965-7694; and L. O. DEAN, Market Quality and Handling Research Unit, USDA-ARS, Raleigh, NC 27695-7694.

Peanut skins have been regarded as a low economic waste by-product of the peanut industry but they contain high levels of bioactive compounds including catechins and procyanidins, which could benefit human health. This is the first report that investigated the anti-inflammatory effects of peanut skin extracts (PSE) *in vitro*. Defatted peanut skins were extracted using aqueous solvent mixtures (acetone/water and ethanol/water) and dried to powders. PSE antioxidant activity was determined by Hydrophilic Oxygen Radical Absorbance Capacity (H-ORAC) and Total Phenol assays. PSE extracted with acetone/water had higher ORAC and total phenolic values (3060 µmol Trolox/100 g and 290 mg GAE/g) than PSE extracted with ethanol/water (2620 µmol Trolox/100 g and 250 mg GAE/g, respectively). Raw 264.7 cells were treated with

three concentrations of PSE (1, 2.5 and 5% (w/v)) and induced with an inflammatory marker, lipopolysaccharide (LPS) for 16 hours. PGE2 was measured by enzyme linked immunosorbant assay (ELISA). Increasing concentrations of PSE induced with LPS demonstrated a decrease in PGE2 concentration. PSE extracted with acetone or ethanol treatments of 5% showed significantly decreased concentrations of PGE2 activity compared to the negative control ($p<0.05$). Western blotting analysis showed an inhibition in COX-2 expression as peanut skin extract levels increased suggesting that PSE's inhibition of PGE2 inhibits COX-2. This study highlights the need to investigate the relationship between antioxidant and anti-inflammatory properties of a waste by-product that has the potential use as anti-inflammatory agent.

Evaluation of Thrips Abundance and Injury to Plants and Incidence of Tomato Spotted Wilt Virus in Virginia Market-Type Peanut Lines. C.R. PHILIPS*, D.A. HERBERT, JR., S. MALONE, Department of Entomology, Virginia Tech, Suffolk, VA 23437; and M. BALOTA, Department of Plant Pathology, Physiology, and Weed Science, Virginia Tech, Suffolk, VA 23437.

Peanut line selection was based on performance in previous Peanut Variety and Quality Evaluation trials. All varieties received a fungicide seed treatment. Fields were fumigated with Metam or Vapam at 10 gal/acre in mid-April. Peanut were planted at the end of April or in early May, in plots 2 rows by 30 or 40 ft long on 36-in beds in a split-plot experimental design. Plots received either no insecticides applied for thrips control, or a conventional thrips control program with Temik 15G at 7 lb/acre applied in-furrow at planting, followed by one or two broadcast applications of Orthene 97 at 4 oz/acre beginning at the late ground cracking stage. Data included weekly thrips plant injury ratings (on a scale of 0=no injury to 10=dead plants), terminal leaflet thrips counts (based on 10 leaflets/plot with thrips extraction in soapy water), seedling stand counts, incidence of tomato spotted wilt virus (number of plants showing visual disease symptoms) and pod yield. Data were analyzed using ANOVA and LSD statistical procedures. Plant injury rating and thrips counts were analyzed by variety and separated by date, year and insecticide treatment. Yield data were analyzed by variety separated by year and insecticide, and TSWV was analyzed by variety and insecticide. In untreated plots, significant differences were observed in plant injury rating on some varieties for specific dates in 2010 and 2011 but overall there was no significant difference. In treated plots significant differences were detected by variety for specific dates in 2011 and overall but not in 2010. Significant differences were detected for thrips counts in untreated plots on two dates in 2010 with no significant differences in 2011, or by year. Varietal yields were not significantly different in 2010, but were significantly different in treated and untreated plots in 2011. Significant differences in incidences of TSWV were observed in variety on both dates in untreated plots and only on 5Aug in treated plots.

Cross-Cultivation for Weed Control in Organic Peanut Production. W. C. JOHNSON, III*, USDA-ARS, Tifton, GA 31793-0748,

Weed control in organic peanut is based on intensive cultivation. Despite the proven effectiveness of this system, weeds present in-row remain difficult to control. Peanut seed are large, seeded approximately 6 cm deep, and have the growing point below the soil surface for several days after emergence. These attributes allow peanut to tolerate aggressive cultivation with the tine weeder from seeding through full-emergence. In an attempt to improve in-row weed control, trials were conducted to determine if early-season cultivation perpendicular to row direction using a tine weeder is a feasible strategy to manage weeds in organic peanut production. Irrigated field trials were conducted in 2011 and 2012 at Tifton, GA to evaluate combinations of parallel cultivation (cultivation in the same direction of the rows), cross-cultivation (cultivation perpendicular to row direction), and banded applications of herbicides derived from natural products that can be used in certified organic crop production. Weed control results were inconsistent among weed species. Parallel cultivation with the tine weeder tended to be more effective than parallel cultivation with sweeps, particularly for the grassy weed Texas millet. Cross cultivation slightly improved overall weed control and peanut yield, but this benefit did not supplement superior weed control from parallel cultivation with the tine weeder. Cross cultivation with narrow, small-scale equipment used in research trials and small-scale organic farms creates multiple tire tracks across the rows, mashes peanut seedlings, and reduces stand. This appears to have lessened the weed control benefits of cross cultivation by creating voids in the peanut stand that allowed subsequent weed emergence.

Physiological Response of Peanut at Different Drought Stress Periods. C.Y. CHEN*, Department of Agronomy and Soils, Auburn University, 201 Funchess Hall, Auburn, AL 36849; P. DANG, R. SORENSEN, and M. LAMB, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793

Drought is a major factor in reducing productivity in peanut (*Arachis hypogaea* L.). The objectives of this study were to: 1) investigate the response patterns of relative water content (RWC), specific leaf area (SLA), and leaf dry mater content (LDMC) when drought stress occurred at 30, 60, and 90 Days After Planting (DAP) compared with fully irrigated and non-irrigated treatments; and 2) indentify potential critical drought stress stage that may differentiate peanut genotypes. Five peanut genotypes ('AP3', 'C76-16', 'A104', 'Georgia Green', '08T-12') were planted in split plot design in 2010 and 2011. This project was completed using rain-out control shelters. Plant RWC, SLA, and LDMC were measured weekly for five weeks during and following a three-week drought stress period. The results showed no distinguishable patterns among drought stress or full irrigation treatments for SLA and LDMC. However, there were distinct patterns corresponding to drought stages and genotypes for RWC at 60 and 90 DAP. Peanut genotypes 'C76-16' and 'A104' had higher RWCs at 90 DAP but lower at 60 DAP, indicating a possible late season drought resistance. 'Georgia Green' had a higher RWC at 60 DAP and lower at 90 DAP, implying a possible middle season drought tolerance. Cultivar 'AP-3' showed lower RWCs at both 60 and 90 DAP compared with all other cultivars, 'AP3', 'C76-16', 'A104', and '08T-12'. These data imply that 'C76-16' and 'Georgia Green' had different mechanisms involved when drought stress occurred. This implies that a three-week drought stress treatment at 60 and 90 DAP could be used as a possible screening tool for gene expression studies and breeding programs.

Molecular genetic variation in cultivated peanut cultivars and breeding lines revealed by highly informative SSR markers. B. HUANG*, X. ZHANG, Henan Academy of Agricultural Sciences, China; L. QIAO, Z. LIU, M.K. PANDEY, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA; M.K. PANDEY, R.K. VARSHNEY, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India; K. MOORE, AgResearch Consultants, Sumner, GA; and B. GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Groundnut or peanut (*Arachis hypogaea* L.) is an economically important crop worldwide as a source of protein and cooking oil, particularly in developing countries. Because of its narrow genetic background and shortage of polymorphic genetic markers, molecular characterization of cultivated peanuts especially released cultivars and breeding lines is very limited, even though there are some genetic diversity studies for cultivated germplasm and wild species. The objective of this study is to investigate the genetic variation of the released peanut cultivars and breeding lines from China and the United States for future molecular genetics and breeding studies, such as genetic mapping population construction and marker-assisted selection in cultivated peanut. Recently, two sets of highly informative SSRs developed by ICRISAT (199 SSRs) and the University of Brasilia (66 SSRs) with higher PIC over 0.5 have been reported. We are using these markers to genotype 48 peanut popular cultivars and breeding lines representing top producing regions from China (Henan Province and Shandong Province) and USA (Georgia and Texas). Genetic relationship analysis will be studied and correlate the current pedigree and taxonomical classification of subspecies and varieties. Thus the highly informative markers could contribute to several genetic studies and marker-assisted improvement of peanut in the future.

Characterization of β-1,3-glucanase gene in peanut (*Arachis hypogaea* L.) by cloning and genetic transformation. L. QIAO, X. DING, H. WANG, J. SUI, J. WANG, Qingdao Agriculture University, China; L. QIAO, University of Georgia, Tifton, GA; S. YU, Shandong Academy of Agricultural Sciences Peanut Research Institute, China; and B. GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Plant β-1,3-glucanase is commonly found to be involved in the disease resistance. A β-1,3-

glucanase gene was isolated from both the genomic DNA and cDNA of peanut variety Huayu20 by PCR and RT-PCR, respectively (GenBank Accession No. JQ801335). The genomic DNA sequence was 1,471 bp including two extrons and one intron, and the coding sequence was 1,047 bp, encoding 348 amino acids with calculated molecular weight of 38.8 kDa. It was found that there was 42%–90% homology to proteins from *Oryza sativa* (BAC83070.1), *Zea mays* (NP_001149308), *Arabidopsis thaliana* (NP_200470.1), *Medicago sativa* (ABD91577.1) and *Glycine max* (XP_003530515.1). The over expression vector pCAMBIA1301-Glu including *Ah-Glu* was constructed, and transformed into peanut variety Huayu22 by *Agrobacterium* EHA105 strain mediated transformation method. Some transgenic plants showed stable integration of the fusion gene as evidenced by GUS stain, PCR and RT-PCR analyses. In vitro and the field tests of T_0 against peanut early leaf spot *Cercospora arachidicola*, transgenic peanuts showed increased disease resistance with less disease symptoms than the non-transgenic peanuts.

Genetic Diversity of Valencia Peanut Genotypes for Traits Associated with Nitrogen Fixation.
S. JOGLOY, N. VORASOOT, S. MAHAKOSEE, Department of Plant Science and Agricultural Resources, Faculty of Agriculture, Khon Kaen University, Muang, Khon Kaen, Thailand, 40002; T. MOEE, State Agricultural Science, Yezin Agricultural University, Nay Pyi Daw, Myanmar; N. PUPPALA*, Agricultural Science Center at Clovis, New Mexico State University, Clovis, New Mexico, USA, 88101.

New Valencia-type peanut germplasm have been introduced from New Mexico State University (NMSU) and the International Crops Research Institute for Semi-Arid Tropics (ICRISAT). Investigation to the new germplasm under Thailand environment for agronomic yield and ability to fix nitrogen was investigated. The objective of this study was to estimate genetic variations of traits associated to nitrogen fixation and agronomic traits. Valencia core collection consisting of 128 peanut accessions were evaluated during September 2010 to January 2011. These accessions were arranged in randomized complete block design with four replications. Data were recorded for biomass production, pod yield and nodule dry weight. Significant variation in nodule dry weight, biomass production and pod yield were observed. Based on the nodule dry weight, these accessions were separated into high and low groups. Nodule dry weight was low when correlated with pod yield. The high pod yield could be identified in PI ?????NM003, Val-A1, ICG 6022 and NM007. There was a strong and positive correlation between nodule dry weight and biomass production for high group whereas, low group was not correlated between nodule dry weight and biomass production. The accession NM003, NM016, Val-A1 and ICG 6022 were identified as nodule with high dry weight and biomass production. It was apparent that nodule dry weight was associated with increased biomass production.

Crop Response to Tillage and Rotation Under Non-Irrigated and Sub-Surface Drip Irrigation Systems. D.L. JORDAN* and P.D. JOHNSON, North Carolina State University, Raleigh, NC 27695; and T. CORBETT and S. BARNES, North Carolina Department of Agriculture and Consumer Services, Lewiston-Woodville, NC 27849.

Research, funded by the North Carolina Peanut Growers Association, was initiated during 2001 at the Peanut Belt Research Station near Lewiston-Woodville (Norfolk sandy loam soil) to compare crop response to agronomic and pest management practices in various irrigation systems including sub-surface drip (SSD). In general, yield increases from SSD irrigation vs. no irrigation were noted for corn, cotton, and peanut in 4 of 4, 6 of 9, and 4 of 6 years, respectively. The average increase in yield for these respective crops was 47% (range of 34 to 59%), 30% (range of 1 to 54%), and 21% (range of 6 to 34%). For year/crop combinations where a yield increase was not observed from SSD irrigation (5 of 19 year/crop combinations), the ratio of water provided by the combination of SSD irrigation and rainfall to rainfall only was 1.25, 1.27, 1.28, 1.29, and 1.43. When a yield increase was observed (14 of 19 year/crop combinations), this ratio was 1.42 in one instance and 1.50 to 4.67 in the remaining 13 year/crop combinations. More specifically, in one experiment conducted from 2007-2010 and repeated from 2008-2011, crop yield in strip tillage vs. conventional tillage was compared in SSD irrigation with no irrigation in a rotation of cotton-corn-corn-peanut. The interaction of experiment (2007-2010 vs. 2008-2011) by irrigation (SSD irrigation vs. no irrigation) was significant for corn, cotton, and peanut yield. Corn, cotton, and peanut yield increased with SSD irrigation compared with no irrigation regardless of tillage system, with differences in yield for experiments reflecting differences in the magnitude of response. Cotton and peanut yield was not affected by tillage system or interactions of tillage and irrigation systems. However, corn yield was affected by this interaction. Corn yield in the first year of the corn sequence was higher in strip tillage than conventional tillage in absence of SSD irrigation; yield was higher in conventional tillage with SSD irrigation. In the second year of the cycle of corn, no difference in yield was noted when comparing tillage systems in absence of SSD irrigation. However, yield in conventional tillage exceeded that of strip tillage when SSD irrigation was included.

Compatibility of Acephate with Herbicides Applied Postemergence to Peanut. G.B. CHAHAL, D.L. JORDAN*, P.M. EURE, and R.L. BRANDENBURG, North Carolina State University, Raleigh, NC 27695.

Numerous agrochemicals can be applied in peanut to control pests. Field and laboratory experiments were conducted in North Carolina during 2009 and 2010 to define biological and physicochemical interactions when acephate was applied in combination with chloroacetamide and contact herbicides. Experiments were also conducted during 2011 to determine peanut response to acephate applied alone or with paraquat when peanut was planted either without aldicarb or when aldicarb was applied in the seed furrow at planting. Peanut damage caused by tobacco thrips (*Frankliniella fusca* Hinds.) feeding was greater when chloroacetamide herbicides were applied without acephate compared with application with acephate regardless of paraquat treatment. Visible injury caused by paraquat was higher when chloroacetamide herbicides were included compared with paraquat alone in one of two years. Visible injury by paraquat was lower when applied with acephate compared to paraquat alone in one of two years. Acephate applied to peanut foliage and aldicarb applied in the seed furrow at planting protected peanut from tobacco thrips feeding similarly. Acephate alone or with chloroacetamide herbicides changed solution pH from slightly acidic to highly acidic. Several combinations of acephate formed transient precipitates.

JOE SUGG GRADUATE STUDENT COMPETITION

Miniature Inverted Repeat Transposable Element Based Sequence Capture for Next Generation Sequencing and Marker Development in Peanut (*Arachis hypogaea* L.). M. CHANDRAN*, J. A. CONNER, and P. OZIAS-AKINS, Department of Horticulture, University of Georgia Tifton Campus, Tifton, GA 31793.

Cultivated peanut (*Arachis hypogaea* L.) is an allotetraploid plant with a large genome size (~ 2800 Mbp) and minor status as a crop, factors that have delayed whole genome sequencing. An alternative to sequencing the entire genome is capturing and sequencing the gene rich regions of the genome. One approach to target such regions is to capture sequences contiguous with Miniature Inverted Repeat Transposable Elements (MITEs) which are known to insert near genes. Peanut genomic DNA enriched for MITE-containing fragments was sequenced on the Illumina Next-Generation sequencing platform to generate sufficient coverage to identify polymorphic insertion sites between three cultivars and two irradiation-induced mutants Several polymorphic markers have already been obtained among cultivated genotypes using Sanger generated sequences of captured MITE-containing inserts. Deep sequencing of gene-rich regions should significantly expand the number of available markers since cultivated peanut has so far shown very little polymorphism at the molecular level in spite of morphological and agronomic variations. Low levels of polymorphism between peanut cultivars have thus far limited the application of marker-assisted selection/molecular breeding in peanut.

Reversal of Atherosclerotic Indicators During Peanut Consumption in Hamsters. A.M. STEPHENS*, Food, Bioprocessing, and Nutrition Sciences Department, North Carolina State University, Raleigh, NC 27695-7624; and T.H. SANDERS, UDSA-ARS Market Quality and Handling Research Unit, Raleigh, NC 27695-7624.

Cardiovascular Disease (CVD) is the number one cause of death in the U.S and atherosclerosis

is a prominent factor in CVD. Peanuts have been shown to reduce development of atherosclerosis in hamsters but the potential for reversion of existing atherosclerosis has not been determined. One of the first markers for atherosclerosis is accumulation of cholesterol esters (CE) in the aorta. Atherosclerosis, as determined by elevated CE in aortas, was induced by 8 weeks of feeding a 20.1% fat, 1.25% cholesterol diet to male Syrian golden hamsters. At 8 weeks cholesterol in the diet was lowered to 0.5 % and hamsters were placed into diet feeding groups, with and without peanuts. Diets were isocaloric based on energy. Plasma and tissue samples were collected at 6 wk intervals over 18 wk. Results indicated that peanuts in the high fat, 0.5% cholesterol diet significantly reversed atherosclerotic indicators (CE) within 6 weeks compared to the control diet. Hamsters that consumed the peanut containing diet had significantly lower total plasma cholesterol and lower density lipoprotein (LDL) cholesterol at all time points. Hamsters in the peanut diet group had significantly lower very low density lipoprotein (VLDL) and higher high density lipoprotein (HDL) cholesterol at all time points compared to the non-peanut diet group. Further, the peanut diet also prevented increases in aortic CE over the 18 week study resulting in up to 92% less aortic CE than animals in the control diet.

Physico-Chemical and Textural Properties of Peanut Pancakes as Affected by Roast and Reheating Time. S. CHINTAGARI* and Y-C. HUNG, Department of Food Science and Technology, University of Georgia, Griffin, GA 30223.

Peanut meal, a byproduct of the processing industry is a very rich source of protein containing about 44-50% by weight. This nutrient dense material is further processed into a fine flour and has been used with various cereals and pulses such as wheat, sorghum, cowpea and many others in the forms of noodles, breads, cookies and muffins to enhance their nutritional quality. Defatted peanut flour is available in different degrees of roasting (dark, medium and light roast) and different fat contents (12% and 28%). Understanding the effect of roasting on the physicochemical properties of peanut flour, can help develop and optimize formulations that allow a substitution of decent amount of peanut flour and thereby increase the nutritional value of the products. Due to the popularity of pancakes as favorite food for breakfast, they have been chosen in this study as potential vehicles to deliver the target protein and essential nutrients to help meet the nutritional requirements. Furthermore, popularity of the frozen meals and breakfast items has grown significantly in recen*t years and frozen pancakes are one such easy and ready to eat options. Hence, this project was designed to investigate the effect of freezing and reheating to facilitate the preparation of peanut pancakes for school lunch program or for the general consumer as a ready to use peanut pancake mix.*
Two different peanut flours, 12% fat medium roast (12M) and 28% fat light roast (28L) were used for the study. All-purpose flour, peanut oil, baking soda, baking powder, non-fat dry milk, enriched golden peanut oil, sugar, salt and dried egg powder were used for the studies. Effect of wheat flour substitution (at 30%) with 12 or 28% fat peanut flour at either light or medium roast levels was investigated on the physico-chemical and textural properties of the pancakes. Both fresh and reheated (frozen) pancakes were evaluated for bulk density, volume, hardness, chewiness, springiness and cohesiveness, while reheated pancakes were further evaluated for volume loss and moisture loss. The results indicated that roast had no significant effect on any of the above listed properties except for springiness. In the case of reheated pancakes, the above listed properties were significantly affected by the reheating time.

Peanut Based Farming Systems in the Rupununi Region of Guyana. A. CHO*, G. MACDONALD, B. TILLMAN Agronomy Department, The University of Florida, Gainesville, FL 32611-0300; R. KEMERAIT and I. POWER.
Plant Pathology Department, University of Georgia, Tifton, GA 31793-0748.

Peanut is an important cash crop for farmers in the rural interior of Guyana in the Rupununi Region. Peanuts are sold to the Georgetown market for roasted whole peanuts and also to the local regional peanut butter cottage industries. These cottage industries are responsible for producing peanut butter and cassava bread snacks that are distributed to over 3,500 students daily via a government-run school snack-feeding program. Maintaining sustainable peanut production in this region is vital to the continuance of the school snack-feeding program. Disease management of peanut in this area is a problem; therefore new varieties of peanut with disease resistance and yield potential are desirable. In 2011, 13 peanut genotypes were evaluated in the village of Aranaputa Velley in the North Rupununi of Guyana. Genotypes were grown in two row plots with four replications in a randomized complete block design. Peanuts were grown under rainfed conditions and no fungicides were applied. Nine of the genotypes were identified to have good disease resistance (to leaf spot and leaf rust) with yields comparable to the locally grown variety. Additionally, these genotypes had more desirable growth habits for potential mechanization of harvesting, which would greatly reduce the cost of harvesting for peanut producers. These genotypes will be evaluated again in 2012 in two locations.

Physiological and Metabolic Responses of Virginia-Type Peanut to Drought and Heat Stress D. SINGH*, M. BALOTA, E. COLLAKOVA, Plant Pathology, Physiology, and Weed Science, Virginia Tech, Blacksburg, VA 24061, G. WELBAUM, Horticulture Department, Virginia Tech, Blacksburg, VA 24061; and T. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, 27695

Drought is increasingly becoming a constraint for peanut (*Arachis hypogea* L.) production in Virginia and Carolinas (V-C). Knowing how peanut responds to water stress in a particular environment is important for development of cultivars with improved tolerance for that environment. For example, plants respond to stress through a combination of biochemical, molecular, and physiological processes at cellular and whole plant levels, involved in protection and recovery. The objective of this study was to identify physiological and metabolic characteristics associated with the response to water stress of eight Virginia-type peanut cultivars and breeding lines, and to compare those with agronomic traits such as pod yield, percentage of extra large kernels (ELK), and sound mature kernels (SMK). Physiological and agronomic characteristics were evaluated in rainfed (moisture stress) and irrigated field trials at Suffolk, VA, in 2011. Physiological characteristics included plasma membrane injury measured by the electrolyte leakage method, quantum yield of photosynthesis measured as ratio of variable (Fv) *vs*. maximum (Fm) chlorophyll fluorescence (Fv/Fm), canopy temperature depression (CTD) calculated from the difference between air and canopy temperature, specific leaf area (SLA), and relative chlorophyll content (SPAD). Along with the physiological measurements, leaf samples were collected for analysis of polar and non-polar metabolites using GC-MS-FID. Water stress increased membrane injury and reduced the Fv/Fm ratio, while metabolite profiling analysis revealed an increase in accumulation of osmoprotectant sugars (fructose and glucose) and sugar alcohols (pinitol) as well as unsaturated fatty acids. Principal component analysis showed that CTD, SLA, and SPAD were associated with pod yield, and % ELK and SMK, suggesting that cooler, greener plants with larger leaves had higher yield and grade factors.

Differentiating the Epidemics of Early and Late Leaf Spot to Determine Implications for Prescription Fungicide Programs. A.M. FULMER*[1], H. SANDERS[1], M. BOUDREAU[2], and R.C. KEMERAIT, JR.[1], [1]Department of Plant Pathology, the University of Georgia, Tifton, GA 31693, and [2]Department of Biological and Agricultural Engineering, the University of Georgia, Athens, GA 30605.

Development of Peanut Rx has allowed growers in the southeastern U.S. to reduce fungicide inputs in reduced-risk situations without sacrificing yield. An assumption from Peanut Rx is that prescription programs are equally effective in management of early leaf spot (*Cercospora arachidicola*) and late leaf spot (*Cercosporidium personatum*). This is mainly due to the non-differentiating nature of the Florida 1-10 scale for assessing severity of leaf spot in peanut. Key objectives of this study were to differentiate the epidemics of each disease and to further validate the efficacy of Peanut Rx by comparing prescription programs to two weather-based systems across two different peanut market types. Studies were conducted at the Attapulgus Research and Education Center (AREC), and the Coastal Plain Experiment Station which included both the Black Shank farm (BSF) and Tifton Vegetable Park (TVP). Plots were planted in May of 2011 to both a runner and Valencia market type ('Georgia-06G' and 'Georgia Valencia' or 'New Mexico Valencia', respectively), and managed and irrigated according to Extension recommendations. For the Valencia market type, sites were determined to be moderate, high and moderate risk to leaf spot, respectively; whereas, for the runner market type, sites were determined to be moderate, high and low risk to leaf spot, respectively. Included in the study were azoxystrobin, tebuconazole, propiconazole, chlorothalonil, and flutolanil at rates and timings appropriate for high, moderate, and low risk programs and for two weather-based advisories. Data collection began in mid-July 2011 and five stems were destructively sampled from the inner canopy of each plot on a bi-weekly basis. The proportion of *C. arachidicola* to *C. personatum* was documented at each location by summing the number of lesions attributable to either early leaf spot or late leaf spot over the season. Effects of fungicide programs and market types on each disease were evaluated by measuring percent defoliation and yield. Area under the disease progress curves (AUDPC) were standardized (stAUDPC) by dividing by the total length of each assessment period in order to compare the epidemics by market type. At AREC and BSF, epidemics of early leaf spot were established by mid-July; initial detection of late leaf spot occurred in late August or in September at all locations. Early leaf spot was predominant at AREC and BSF; late leaf spot was predominant at TVP. Where early leaf spot was predominant, Valencia cultivars had greater than or equal the defoliation of Georgia-06G; however, where late leaf spot was predominant, Georgia-06G had significantly higher levels of defoliation. At all locations, stAUDPC values of percent defoliation were typically significantly lower in treated plots compared to the untreated control. However, stAUDPC values were not statistically lower in plots treated 7 times with fungicides than in plots treated fewer times based upon reduced input programs. For both market types, yields at AREC were significantly greater in treated plots than untreated plots, and reduced input programs often yielded numerically better than the 7 spray programs. Yields at TVP were often numerically greater in treated plots versus untreated plots. Results from this study indicate that both early and late leaf spot are effectively controlled with prescription programs across both market types.

<u>Peanut Response to Simulated Drift Rates of 2,4-D</u>. R.M. MERCHANT* , E.P.PROSTKO, P.M. EURE, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793-5737; and T.M. WEBSTER, USDA-ARS, Tifton, GA 31793-5737.

Significant resources are being dedicated to the development of herbicide-resistant crops. 2,4-D resistance is currently being developed in cotton and soybean. Peanut is often grown in close proximity to cotton and soybean in southern states. The use of 2,4-D resistant crops will likely increase the risk of 2,4-D damage to peanut through drift and/or spray tank contamination. The objective of this study was to evaluate peanut response to simulated drift rates of 2,4-D. Two field trials were conducted in 2011 at Ponder Research Farm and Attapulgus Research & Extension Center. Peanut variety 'GA-06G' was planted in early May at both locations and grown under weed-free conditions. 2,4-D amine (Agristar® 2,4-D 3.8SL) at rates of 0, 2, 4, 8, 16, and 32 oz/A was applied at 30, 60, and 90 days after planting (DAP). Herbicides were applied using a CO_2-pressurized backpack sprayer calibrated to deliver 15 GPA. Treatments were replicated 4 times in a split-plot design. Whole-plots were time of application and sub-plots were 2,4-D rates. Data collected included visual estimates of peanut injury, yield, 100 pod weights, and 100 seed weights. Only yield data are reported herein. Data were combined over location and subjected to ANOVA. A significant interaction between time of application and 2,4-D rate was observed. Regression analyses were conducted for 30 and 60 DAP treatments using Sigma Plot 11. When 2,4-D was applied at 30 DAP, estimated peanut yield losses were 0, 4, 3, 6, 11, and 34% at rates of 0, 2, 4, 8, 16, and 32 oz/A, respectively. When 2,4-D was applied at 60 DAP, estimated peanut yield losses were 0, 12, 13, 16, 23, and 36% at rates of 0, 2, 4, 8, 16, and 32 oz/A, respectively. There was no relationship between rate and time of application for 90 DAP treatments.

<u>Yield Response of New Runner-Type Peanut Cultivars to Fungicide Inputs for Leaf Spot Control.</u>
<u>P.A. NAVIA GINE*</u>. A.K. CULBREATH, Dept. of Plant Pathology, Univ. of Georgia, Tifton, GA 31793-5766; B.L. TILLMAN, North Florida REC, Agronomy Dept., Univ. of Florida, Marianna, FL 32446; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793; W.D. BRANCH, Dept. of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; and N.B. SMITH, Dept. of Agricultural and Applied Economics, Univ. of Georgia, Tifton, GA 31793.

Early and late leaf spot caused by *Cercospora arachidicola* and *Cercosporidium personatum,* respectively, cause substantial economic losses in peanut (*Arachis hypogaea*) through direct reduction of yield and costs associated with fungicidal control. Recently, several new peanut cultivars have been released with excellent yield potential and field resistance to tomato spotted wilt virus. However, the yield response of these cultivars to fungicides applied for leaf spot control has not been thoroughly characterized. To determine this response, field experiments were conducted in 2010 and 2011 in Tifton, GA, and in Attapulgus, and Plains, GA in 2011. In each of these experiments, four cultivars, Florida-07, Georgia-06G, Georgia-07W, and Tifguard, were combined in factorial arrangement with four fungicide treatments, 7, 4, and 3 applications of 1.1 lb ai/A of chlorothalonil (Bravo WeatherStik) and a nontreated control. All application regimes began approximately 35 days after planting, and subsequent applications were made at ca. 14 day intervals. An additional trial was conducted in Tifton in 2010 in which these same treatments were evaluated on Georgia-06G. Applications of 1.0 lb ai/A of flutolanil (Convoy) were made at ca. 60 and 90 days after planting in each trial to minimize effects of *Sclerotium rolsii* on yield. Multiple visual leaf spot ratings were made to estimate the levels of defoliation. Late leaf spot was the predominant foliar disease in all trials. Final defoliation and yield (lb/A) were determined for each plot. Leaf spot epidemics varied in severity among the trials, from low disease pressure and few differences in yield among fungicide treatments for any cultivar at Plains in 2011, to moderate to heavy disease pressure late in the season in the Georgia-06 trial in 2010 and the Attapulgus and Tifton trials in 2011. At Tifton in 2010, yields in the Georgia-06G trial were lowest in the nontreated plots (4566 lb/A), but there was no significant difference between the yield of the 7 spray treatment (5892 lb/A) and the 4 spray treatment (5645 lb/A) (LSD = 512). There was no significant cultivar X treatment effect on yield in any of the cultivar X fungicide trials. At Tifton, across cultivars, yields were 5469, 5694, 5686, and 5813 lb/A (LSD = 392) in 2010, and 5193, 5151, 4951, and 4540 lb/A (LSD = 513) in 2011 for nontreated, 3 application, 4 application and 7 application treatments, respectively. At Attapulgus in 2011, yields were 6264, 5804, 5723, and 5422 lb/A (LSD = 282) for nontreated, 3 application, 4 application and 7 application treatments, respectively. Grade samples were taken for each plot of each trial to allow calculation of value/A for each plot, and economic analysis of response to fungicides is being conducted.

<u>Peanut Survival and Recovery From Soil Drying</u>. P. R. ANDERSON*, T. R. SINCLAIR, T. G. ISLEIB, S. P. TALLURY, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620; and M. BALOTA, Department of Plant Pathology, Physiology, and Weed Science, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061-0331.

Plants respond to drying soil in three successive stages. The ability of peanut to survive and recover from severe soil drying, i.e. Stage III was investigated for 21 genotypes. Plants enter Stage III when transpirable soil water is exhausted and stomates close until soil water is replenished. At this stage, plant survival is dependent upon various mechanisms which limit water loss and delay leaf dehydration. In a preliminary greenhouse study, 20 peanut genotypes were taken to Stage III by withholding water until normalized transpiration rates reached an endpoint of $< .11$. Two stress treatments were imposed on plants and represented either 1 or 3 days of water being withheld after plants reached the endpoint, i.e. entered stage III. Plants were visually rated based on a scale from 1 to 5 one day after re-watering. A rating of one meant that plants were assumed to be dead and five was given to those which showed little or no leaf death and recovered extremely well upon re-watering. Most plants survived the 1-day treatment. Genotypes PI497579, ICGV86388 and TMV2 received ratings of 5, 4.75 and 4.25, respectively for the 3-day treatment. At the bottom end, genotypes HTS02-06, N05008, and Bailey received ratings of 1.75, 1.5, and 1.25, respectively. A second greenhouse study was conducted to confirm findings using 6 selected genotypes. Consistent results between both experiments showed considerable differences among genotypes for survival and recovery.

<u>Comparison of Methods for Late Leaf Spot Phenotyping in Peanut</u>. R. GILL*, Institute of Plant Breeding Genetics and Genomics, The University of Georgia Tifton Campus; A. K. CULBREATH, Department of Plant Pathology, The University of Georgia Tifton Campus; C.

C.HOLBROOK, Crop Genetics and Breeding Research Unit, USDA-ARS Tifton ; and P. OZIAS-AKINS, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793.

A field study was conducted in 2011 to characterize resistance to late leaf spot(LLS), caused by *Cercosporidium personatum*, in a recombinant inbred line (RIL) population developed from a cross between Gregory, a virginia type cultivar and Tifguard, a runner type cultivar. Gregory has been previously characterized as susceptible and Tifguard is reported as moderately resistant to the disease. This biparental population consisted of 78 $F_{7:8}$ lines and was grown with the parents in three replications in a non-sprayed field trial. The leaf spot intensity was assessed four times during the season using the traditional Florida 1 to 10 severity scale and twice using the novel combination of lateral stem assay (LSA) and image analysis. Three lateral stems were randomly collected from each plot across the three replications in the field, and the leaves were then subjected to imaging by a flatbed scanner. The image analysis and manual phenotyping on these lateral stem samples yielded data on percent defoliation, percent area covered by disease, and number of lesions per unit area. In 2012, this RIL population was evaluated in a detached leaf study with artificial disease epiphytotics and data on LLS disease resistance components were collected. Correlations between the Florida scale rating, the lateral stem assay data and detached leaf study data are being evaluated. The various LLS phenotyping methods will be discussed and compared.

<u>The Use of Strip Tillage to Increase Yield in Peanut.</u> J. THOMPSON*, D. ROWLAND, B. TILLMAN, D. WRIGHT, Agronomy Department, The University of Florida, Gainesville, FL 32611-0300; and J. BEASLEY, Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793-0748.

In the past decade in the southeastern US, summer rains have become less frequent and inconsistent, causing many growers to have inadequate soil moisture to grow a peanut crop. Soil moisture can be conserved by using cover crop residues and reduced tillage methods. In both non-irrigated and irrigated systems, maintaining winter crop residues during the growing season has been shown to decrease evaporative losses from the soil (Miguez and Bollero, 2005). The crop residues decrease the soil temperature under the residue and act as a barrier to evaporation. They also increase the organic matter content of the soil over time which increases the water holding capacity. A common way to plant into heavy crop residues is to use strip tillage. Strip tillage into crop residues has been shown to decrease tomato spotted wilt virus and increase yield in peanut (Baldwin and Hook, 1998; Brown et al., 2003; Tubbs & Gallaher 2005; Hurt et al., 2006). Reducing tillage also has other benefits such as decreasing wind and rain erosion, decreasing weed emergence, and improving soil structure. The objective of this study was to test a management system that uses strip tillage in peanut in irrigated and non-irrigated peanut production. The experiment is a replicated, randomized strip plot design with two varieties of peanut (Florida 07 and Tifguard) grown under conventional and strip tillage treatments combined with 100% evapotranspiration replacement irrigation and non-irrigated treatments. Measurements of soil moisture, root architecture, leaf area index, reproductive development, yield and grade were taken. In 2011 we found that strip tillage had a significant yield increase compared to conservation tillage in both irrigated and non-irrigated, with the greatest increase being in the non-irrigated. This was due increased soil moisture throughout the season. The second year of this study will be completed in 2012.

<u>Seed Calcium, Field Emergence, and Late Leaf Spot Resistance in Late Maturing Lines of Peanut</u> S. THORNTON*, M. GALLO, Agronomy Department, University of Florida, Gainesville, FL 32611-0300; B. TILLMAN, Agronomy Department, North Florida Research and Education Center, University of Florida, Marianna FL, 32446-8091

Late leafspot is a fungal disease of peanut that occurs world-wide, and can result in severe yield loss. Highly resistant cultivars have been developed; however problems with emergence during seed production lead to the removal of these cultivars from production. While the exact causes of the poor emergence are not fully understood, poor calcium uptake by the seed of resistant cultivars is believed to be an important factor. Recent research showed that the cultivars have lower average seed calcium concentration than susceptible cultivars when grown on soils with adequate calcium. In addition, low seed calcium has previously been correlated with germination. This suggests that seed of resistant cultivars do not absorb sufficient calcium for germination and emergence. The relationship between leafspot and calcium uptake not well understood. In order to study the relationship between leafspot resistance and calcium uptake and emergence, the leafspot resistance, seed calcium concentration, and field emergence was evaluated in a group of about 175 breeding lines at the F3 and F4 stages. These lines were derived from crosses between York (a resistant cultivar with poor emergence) and several unrelated, susceptible lines and cultivars. Significant differences existed between cultivars for resistance ratings, calcium concentration, and field emergence.

Generation Means Analysis of Oil and Fatty Acid Content in Peanut. J.N. WILSON*, M.R. BARING, Texas AgriLife Research, College Station, TX 77843; M.D. BUROW, Texas AgriLife Research, Lubbock, TX 79403; W.L. ROONEY, Texas AgriLife Research, College Station, TX 77843; C.E. SIMPSON, Texas AgriLife Research, Stephenville, TX 76401; J.L. STARR, Department of Plant Pathology, Texas A&M University, College Station, TX 77843; J.C. CHAGOYA Texas AgriLife Research, Lubbock, TX 79403.

This study was conducted to determine the types of gene action governing the inheritance of oil and fatty acid content in peanut by generation means analysis. The F1, F2, and backcross generations of two sets of crosses involving a proprietary high oil breeding line developed by the TAMU breeding program and two widely adapted high-oleic inbred runner genotypes (Tamrun OL07 and Tamrun OL01) were evaluated in College Station, TX in 2010. Significant differences in oil content between the generations evaluated were observed for both crosses. Significant differences in fatty acid contents between the generations evaluated were observed except for lignocenic acid in the Tamrun OL07 cross. Generation means analysis detected significant additive, dominance, and epistatic effects governing oil content for both sets of crosses. The broad-sense heritability estimates for oil content were 0.85 and 0.78 for Tamrun OL07 and Tamrun OL01 crosses, respectively. Narrow sense heritability estimates were 0.55 and 0.53 for Tamrun OL07 and Tamrun OL01 crosses, respectively. Significance of genetic effects, broad sense heritability, and narrow sense heritability for fatty acid contents depended on the fatty acid measured and the cross.

The Potential of Enzymatic Hydrolysis to Improve Immunotherapy and Ingredient Applications of peanut flour. X. SHI*, S. TAO, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, NC 27695; R. GUO, M. KULIS, A. W. BURKS, Department of Pediatrics, University of North Carolina School of Medicine, Chapel Hill, NC 27514; B.L. WHITE, USDA ARS, Market Quality and Handling Research Unit, Raleigh, NC 27695; T.H.SANDERS, J.P.DAVIS, USDA ARS, Market Quality and Handling Research Unit, Raleigh, NC 27695.

Peanut flour is currently being used as the active ingredient in oral immunotherapy applications designed to desensitize peanut allergic patients. This strategy for treating peanut allergy is proving quite promising; however, there is a risk for adverse reactions using this approach. In the current study, enzymatic hydrolysis of peanut flour was investigated as a processing strategy to minimize such reactions and hence improve immunotherapy applications of peanut flour. To investigate this potential, soluble fractions of 10% (w/w) light roasted peanut flour dispersions were hydrolyzed with Alcalase (pH 8.0, 60°C), pepsin (pH 2.0, 37°C), Flavourzyme (pH 7.0, 50°C), or sequentially with Alcalase and Flavourzyme. SDS-PAGE was used to visualize peptide distribution. Immunoreactivity was evaluated by Western blotting, T cell proliferation, and basophil degranulation. Generally speaking, the SDS-PAGE band intensity of major peanut allergens, Ara h 1 and Ara h 3/4 decreased and a series of smaller MW (3-22 kDa) subunits were produced after enzymatic hydrolysis. Sequential and Alcalase hydrolysates retained minimal IgE binding, whereas Flavourzyme and pepsin hydrolysates displayed very clear IgE binding in the region of 0-28 kDa. These peptide fragments were derived primarily from Ara h 2 as demonstrated by Western blotting experiments using anti-Ara h1 and anti-Ara h2. T cell proliferation assays (n=5 subjects) indicated that hydrolysates retained ~50% of the T helper cells stimulation compared to non-hydrolyzed controls. Data for individual hydrolysates was comparable to unhydrolyzed controls in the basophil assay (n=5 subjects). Additionally, two bioactive properties of the hydrolyzed flours were also characterized: angiotensin-converting enzyme (ACE) inhibition and oxygen radical absorbance capacity (ORAC). Hydrolysis generally improved ACE inhibition and ORAC compared to parent proteins, and specific differences were observed across enzyme conditions. These results indicate that enzymatic hydrolysis has the potential to improve both immunotherapy and food ingredient applications of peanut flour.

Historical Progress of Leaf Spot Resistance in Cultivar Releases of NCSU Peanut Breeding Program. L.E.HASSELL*, S.P. TALLURY, T.G. ISLEIB, S.R. MILLA-LEWIS, and S.C. COPELAND, Dept. of Crop Science, N.C. State Univ., Raleigh, NC 27695-7629, and B.B. SHEW, Dept. of Plant Pathology, N.C. State Univ., Raleigh, NC 27695-7903.

Leaf spots (LS) caused by *Cercospora arachidicola* Hori (early leaf spot or ELS) and *Cercosporidium personatum* (Berk. & M.A. Curtis) Deighton (late leaf spot or LLS) are major foliar diseases of peanut (*Arachis hypogaea* L.) which if untreated can lead to major yield loss due to heavy defoliation as well as the abscission of pegs. The existence of affordable chemical control and the lack of high levels of genetic resistance within *A. hypogaea* have limited success in breeding for leaf spot resistance. Nevertheless, breeding effort for LS resistance has been ongoing since the initiation of the peanut breeding program in the 1940s, and although none of the cultivars released since then has been completely resistant to either LS, we have been able to lower the levels of defoliation from infection considerably within our populations by proper selection of parents in our crossing programs. We have evaluated our cultivars at the Peanut Belt Research Station for over five years with and without chemical control for LS to demonstrate the progress towards breeding for resistance. For resistant checks we used several lines, among which were GP-NC 343, PI 121067, and PI 269685. PI 121067 and PI 269685 had the lowest defoliation scores (2.81±0.23 and 2.62±0.23, respectively) where a score of 1 indicates no defoliation and 9 complete defoliation. The partially resistant lines still yielded in excess of 3100 lb/A. The greatest average yield was obtained with GP-NC 343 with a defoliation score of 4.22±12 and yield of 3931±145 kg/ha (3504±129 lb/A). Among the cultivars without leaf spot control, NC-V 11, released in 1989, had a defoliation score of 6.19±0.13 (susceptible) and yielded 3004±148 kg/ha (2678±132 lb/A). Among the cultivars released from 1999-2009, Gregory, Perry and Phillips had lesser mean defoliation scores of about 5.8 than did Brantley, which had an average defoliation score of 6.0 with an average yield of about 2900 kg/ha (2600 lb/A). Our recent release, Bailey, showed a significantly lower defoliation score of 4.89±0.14 and yielded 4208±159 kg/ha (3751±142 lb/A). Among the cultivars, it was found that the average loss in yield per unit of defoliation was found to be approximately 758.2 kg/ha (675.9 lb/A) per unit of defoliation score or about 60.7 kg/ha (54.1 lb/A) lost per percent of defoliation in a field.

Assessment and Characterization of Oil from Roasted Peanut Skins. C. S. HATHORN*, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, NC 27695; L. O. Dean and T. H. Sanders, USDA ARS, Market Quality Handling Research Unit, Raleigh, NC 27695.

Peanut skins are a low-value material from peanut processing and are a good source of phenolic compounds. Peanut skins do not have a significant use other than as a small component of animal feed. Studies indicate that the compounds in the skin have high antioxidant activity, while little is known specifically about the oil composition from these skins. The aim of this research was to evaluate peanut skins and oil from the skins. Roasted peanut skins were ground, and color, moisture content, oil content, fatty acid profile, tocopherols and heavy metal content were determined. Oxidative stability index was used to determine the resistance of the oil to oxidation. The Hunter L color, moisture and oil contents were 28.6, 7.6% and 11.9%, respectively. Cold solvent extracted oil was used for all analyses. The fatty acid profile of the oil from the skins was similar to published findings on peanut oil. Specifically, the oil contained 55.6 and 23.2 g/100g of oleic and linoleic acid, respectively. Alpha- tocopherol was not detected, while beta, gamma and delta-tocopherols were present at 53.0, 57.1, and 13.6 mcg/g, respectively. These results were unexpected since peanut oil typically has a higher concentration of alpha-tocopherol. Gamma-tocopherol was present in the highest concentration in the oil from peanut skins. Oxidative stability index of skin oil was 1.7 hrs compared to 16 hrs for peanut oil. Peanut skins contained substantial levels of copper (55.6 ppm) and iron (182 ppm). Reasons for the differences in oil composition and stability of skin oil compared to peanut oil are not currently known

WEED SCIENCE

Effect of Paraquat Timing on Yield and Grade of Four Peanut Cultivars. B. BRECKE*, West Florida Research and Education Center, Jay, FL 32565 and J. FERRELL, Agronomy Department, University of Florida, Gainesville, FL 32611.

Field studies were conducted at the West Florida Research and Education Center, Jay, FL and Plant Science Research and Education Unit, Citra, FL. Paraquat was applied at 0.2 kg/ha both with and without bentazon at three timings (true cracking, 20 days after cracking (DAC) or 40 DAC). A nontreated check was included. All treatments were applied to four peanut cultivars (Florida 07, Georgia 07W, TifGuard, and Georgia 06G). Peanut visual injury and canopy width data were collected during the growing season. At termination of the experiment, peanuts were harvested and graded. The field sites were maintained weed free and under irrigation throughout duration of the experiment. At Jay treatments applied 30 DAC reduced foliar growth more than treatments applied earlier. Mixing bentazon with paraquat reduced foliar injury by 5% or less for all cultivars at all application timings. Peanut yield was not reduced compared to the nontreated when paraquat was applied at true cracking or 20 DAC. However, yield was 10% less than the nontreated when paraquat was applied 30 DAC and adding bentazon improved yield. At Citra, peanut foliar growth was not affected by paraquat applied at true cracking or 30 DAC. However, when applied 20DAC, canopy width was less than the untreated when paraquat was applied alone for all cultivars. The addition of bentazon lessened canopy injury for Florida 07 and TifGuard. Herbicide application at true cracking or 20 DAC did not reduce peanut yield. However, paraquat applied alone reduce yield by 10% and paraquat + bentazon reduced yield by 5%. Peanut grade was not affected by any treatment at either location.

Peanut Tolerance and Weed Control with Warrant. P.A. DOTRAY*, Texas Tech University, Texas AgriLife Research, and Texas AgriLife Extension Service, Lubbock, TX 79409-2122; W.J. GRICHAR, Texas AgriLife Research, Beeville, TX 78102; and L.V. GILBERT, Texas AgriLife Research, Lubbock, TX 79403.

Prowl H2O (pendimethalin), Valor SX (flumioxazin) and Dual Magnum (*S*-metolachlor) are currently registered for use preemergence (PRE) in peanut. Warrant (acetochlor) is an encapsulated herbicide currently labeled for use in soybean and cotton, and may be available for use in peanut in 2014. It is well-documented that the first 4 to 6 weeks is critical for peanut growth and development. The objective of this research was to examine peanut response and control of Palmer amaranth (*Amaranthus palmeri*), horse purslane (*Trianthema portulacastrum*), Texas millet (*Panicum texanum*) and citronmelon (*Citrullus lanatus*) using these PRE herbicides alone or as part of a “system” for season-long weed control. Prowl H2O at 0.95 lb ai/A, Valor SX at 0.95 lb ai/A, Dual Magnum at 1.3 lb ai/A, and Warrant at 1.12 lb ai/A were applied alone or in a tank-mix combination. In a separate series of treatments, Warrant PRE was followed by (fb) postemergence (POST) applications of either Cadre (imazapic) at 0.063 lb ai/A, Cobra (lactofen) at 0.2 lb ai/A, Cobra plus Dual Magnum, or Cobra plus Warrant. Preemergence applications were followed by 0.8 inches of overhead irrigation within 24 hours of application. Four weeks after planting, Palmer amaranth was controlled 95 to 100% following all PRE treatments. Prowl H2O was the only herbicide when applied alone did not control Palmer amaranth 100%. Thirteen weeks after the PRE treatments, Dual Magnum applied alone and Dual Magnum + Prowl H20 controlled Palmer amaranth at least 95%. Prowl H2O, Valor SX, and Warrant applied alone controlled this weed 30%, 62%, and 78%, respectively. Thirteen weeks after PRE treatments or 4 weeks after the POST treatments were applied, all “systems” controlled Palmer amaranth at least 80%. Prowl H2O fb Cadre and Prowl H2O fb Dual Magnum + Cobra controlled Palmer amaranth at least 94%. Approximately 20 weeks after PRE treatments, only Dual Magnum PRE (83%), Prowl H2O + Dual Magnum PRE (87%), and Prowl H2O + Warrant PRE (82%) controlled Palmer amaranth at least 80%. No peanut injury was observed 4 weeks after planting (WAP), but at 6 WAP Dual Magnum and Warrant applied alone or in combination with Prowl H2O caused up to 5% injury. This type of chloroacetamide-induced injury (stunt) is common in Texas. Peanut yield ranged from 1346 to 1770 lb/A and was not different from the non-treated control. In a second study on the High Plains, complete Palmer amaranth control was observed 6 WAP and control following Valor, Dual Magnum, and Warrant was 63%, 79 to 89%, and 72 to 80%, respectively, 11 WAP. No peanut injury was observed 4 WAP and slight peanut injury (2%) was observed 6 WAP following several PRE treatments. Peanut yield ranged from 1222 to 1921 lb/A and was not different from the non-treated control. In south Texas, PRE applications of Valor, Dual Magnum, and Warrant controlled horse purslane at least 87% 23 days after treatment (DAT). Valor controlled smellmelon (75 to 81%) better than Dual Magnum (33 to 62%) and Warrant (13 to 40%). At 35 DAT (11 days after POST applications), all treatments that included POST applications of Cobra controlled horse purslane and smellmelon at least 96% while Valor alone controlled horse purslane and smellmelon 73 and 65%, respectively. Dual Magnum alone controlled horse purslane 57% and smellmelon 67% while Warrant alone controlled horse purslane 53% and smellmelon 37%. In separate studies, Texas millet was controlled at least 89% following all PRE herbicides 27 DAT. Citronmelon control was greater than 90% with Prowl H_20 + Warrant PRE or Prowl H_20 followed by POST applications of Cobra. No peanut injury was noted with Warrant. Peanut cultivars were evaluated following Warrant at 1.12 and 2.24 lb ai/A applied preplant incorporated, PRE, early-postemergence (EPOST), and POST. Neither peanut stunting nor yield loss was noted with Tamrun OL01 or Tamrun OL07. In a PRE study in the High Plains, no injury was noted with 4 runner market types (Flavorrunner 458, Tamrun OL01, Tamrun OL02, Tamrun OL07) and one Virginia market type (Brantley). In summary, Warrant was efficacious on a number of weed species in Texas peanut and several cultivars appear to be very tolerant.

<u>Peanut Response to Foliar Applied Pyroxasulfone Tank-Mixtures</u>. P.M. EURE*, E.P. PROSTKO, and R.M. MERCHANT, Department of Crop & Soil Sciences, University of Georgia, Tifton, GA 31793-5737.

Pyroxasulfone 85WG (also known as KIH-485) is a residual herbicide that is being developed for use in several agronomic crops such as corn, soybean, wheat, and sunflower. While pyroxasulfone is highly effective for the control of troublesome annual weeds such as Palmer amaranth, Texas millet, and large crabgrass, little is known about peanut tolerance to pyroxasulfone in weed management systems. Therefore, field trials were conducted in Georgia during 2009 and 2010 to evaluate pyroxasulfone applied POST (12-22 days after planting) with and without tank-mix partners. Herbicide treatments included a factorial arrangement of pyroxasulfone rate (0 and 4 oz/A) and tank-mix partner (none, paraquat 2SL at 8 oz/A; paraquat 2SL at 12 oz/A + bentazon 4SL at 8 oz/A; paraquat 2SL at 12 oz/A + acifluorfen/bentazon 4SL 1.5 pt/A; imazapic 2AS at 4 oz/A; and lactofen 2SC at 12.5 oz/A). Treatments were replicated three or four times and plot areas maintained weed-free. Visual estimates of peanut stunting were recorded throughout the growing season. Since peanut herbicides have been associated with an increase in tomato spotted wilt virus (TSWV), TSWV incidence was recorded (2010 trial only) prior to digging by counting the number of disease loci per linear row in 1 ft sections. Peanut yield was recorded and adjusted to 10% moisture. All data were subjected to ANOVA and means separated using Fisher's Protected LSD Test ($P \leq 0.05$) when appropriate. In 2010, the addition of pyroxasulfone (4 oz/A) to herbicide systems increased peanut stunting 6 days after treatment (DAT) by 8%. However, peanuts recovered by 29 DAT. In systems where paraquat (12 oz/A) was included, 30 to 43% peanut stunting was observed 2-6 DAT. Peanut recovered completely by 69 DAT. TSWV incidence was not influenced by pyroxasulfone. Regardless of tank-mix partner, the addition of pyroxasulfone to herbicide systems did not negatively influence peanut yield.

Weed Control Systems in Peanut (*Arachis hypogaea*) with Warrant (Acetochlor). T.L. GREY*, E.P. PROSTKO, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793-5737, and D.L. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

Four peanut field trials (Ty Ty and Plains, GA; Rocky Mount and Lewiston, NC) were conducted in 2011 to evaluate weed control with Warrant as compared to other residual herbicides. Traditional small-plot techniques were utilized at all locations. Treatments included PRE, EPOST (15-24 days after planting [DAP]), and POST (25-42 DAP) applications. PRE treatments included Warrant @ 3 pt/A, Dual Magnum @ 1.33 pt/A, or Zidua @ 3 oz/A, all in combination with Valor @ 3 oz/A; Prowl H_2O at 34 oz/A PRE followed by spilt application of Warrant @ 3 pt/A or Dual Magnum @1.33 pt/A with Gramxone Inteon @ 12 oz/A plus Storm @ 1 pt/A EPOST, then followed by Warrant @ 3 pt/A or Dual Magnum @ 1.33 pt/A plus Cadre @ 4 oz/A POST. Other treatments included combinations of Prowl H_2O with Valor PRE followed by single applications of Warrant or Dual Magnum with Cobra @ 12.5 oz/A or Cadre POST; Warrant, Dual Magnum or Prowl H_2O PRE. Treatments were replicated four times and included weedy check. Weed species were evaluated at 21 to 40 days after EPOST and POST treatments were Palmer amaranth, Texas millet, broadleaf signalgrass, moningglories, wild poinsettia, and sicklepod. All data by location were subjected to ANOVA and means separated by Tukey-Kramer Least Squares Means LSD Test ($p < 0.05$) where appropriate. Palmer pigweed was controlled by Warrant PRE alone at 83 to 99% at all four locations.

Issues Associated with Expansion of Peanut Production in Pitt County, North Carolina. M. SMITH*, North Carolina Cooperative Extension Service, Greenville, NC 27834; and D.L. JORDAN, B.B, SHEW, and R.L. BRANDENBURG, North Carolina State University, Raleigh, NC 27695.

Peanut acreage in Pitt County is projected to increase by 15% in 2012 due to the introduction of new peanut producers into the peanut market. Peanut acreage in Pitt County has increased due to improved contract prices, the decline of tobacco farmers, and reduced prices for cotton. Since 2009, total flue-cured tobacco acreage has decreased by 33% for county producers. The increase in peanut acreage occurred in fields with no history of peanut production. Cooperative Extension in Pitt County, North Carolina assisted growers by providing a check list of recommended production practices that have been shown to maximize yields per acre. Eleven growers were enlisted in an educational program to receive information from the county center in order to respond to questions raised by these first-time producers. These questions were related to topics such as equipment selection, field selection, seeding rate, varietal selection, and disease management.

Peanut Response to Warrant (Acetochlor). E.P. PROSTKO* , T.L. GREY, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793-5737; and D.L. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

Because of the vast differences in production between the major row crops (corn, soybean, wheat, and cotton) and peanut, minimal effort and resources are devoted to research and development for potential new peanut herbicides. Warrant, a new microencapsulated formulation of the active ingredient acetochlor, is currently labeled for use in cotton, soybean, field corn, and grain sorghum. The tolerance of peanut to this formulation of acetochlor is unknown. Four field trials (Ty Ty and Plains, GA; Rocky Mount and Lewiston, NC) were conducted in 2011 to evaluate the tolerance of peanut to various applications of Warrant. Traditional small-plot techniques were utilized at all locations. Treatments included PPI, PRE, EPOST (18-24 days after planting [DAP]), and POST (25-42 DAP) applications of Warrant 3CS (3 or 6 pt/A) and Dual Magnum 7.62EC (1.33 pt/A); EPOST applications of Gramoxone Inteon 2SL (12 oz/A) + Storm 4SL (16 oz/A) + Warrant (3 pt/A) or Dual Magnum (1.33 pt/A); and POST applications of Cadre 2AS (4 oz/A) + Warrant (3 pt/A) or Dual Magnum (1.33 pt/A). Treatments were replicated four times and the plot areas were maintained weed-free. All data were subjected to ANOVA and means separated by Fisher's Protected LSD Test ($p < 0.05$) when appropriate. No peanut yield loss was observed from any treatment at the Plains, Rocky Mount, or Lewiston locations. At the Ty Ty location, the following treatments caused a significant peanut yield loss: PRE and POST Warrant at 6 pt/A (7.2%-7.4% yield loss); POST Dual Magnum (8.1% yield loss); EPOST Gramoxone + Storm + Dual Magnum (9.6% yield loss); and POST Cadre + Warrant (9.7% yield loss).

ECONOMICS

Economics of Seed Treatment and Seeding Rate in Georgia. A.R. SMITH*, N.B. SMITH, Department of Agricultural and Applied Economics, R.S. TUBBS, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793.

Peanut growers in Georgia have a choice of seed treatments and they need to know the effectiveness of that treatment at a variety of seeding rates. This is even more important since aldicarb (Temik) is no longer available for use by growers. Variations in seeding rate and treatments impact a grower's bottom line from a cost and revenue standpoint. Economic analysis was conducted on data from a three-year seed treatment by seeding rate trial conducted in Plains, GA from 2009 through 2011. Revenue data were collected on yield and grade. Systems costs were collected on the treatment and seeding rates.

Economic Impact of Potential Farm Program Changes on a North Carolina Model Peanut Farm.
S.G. BULLEN*, North Carolina State University, 3326 Nelson Hall Raleigh, NC 27695-8109

This study analyzed economic performance of a North Carolina peanut farm model with potential farm program changes. The overall goal of study was to assist peanut producers and decision makers in analyzing economic impacts of new farm programs, and in making economic decisions critical to the peanut farm. The model peanut farm was developed by interviews with farmers and other experts in the NE North Carolina location. The interviews were followed up to confirm the initial evaluation of farm business characteristics with farm credit officers. This study analyzes the farm-level economic impacts on a North Carolina peanut farm under the current and proposed farm program changes under two different commodity price levels. The model farm was analyzed using FINPACK which is a comprehensive financial planning and analysis system. This model farm is made up of 600 acres of cotton, 200 acres of quota peanuts, 200 acres of wheat double-cropped soybeans. The farmer has 100% share of the crops. The current farm program is made up of two price support program: counter-cyclical payments fixed decoupled payments, and marketing loans. The counter-cyclical payment depends on the current U.S. price. The maximum counter-cyclical payment would be $84/ton ($520-(400/ton+36/ton)) if market price fell below loan rate or lower. If the market price became $484/ton or ($520-$36/ton) then no counter-cyclical payment would be made. The direct payment is paid regardless of the commodity prices. With the estimated peanut yields of 3,500 the direct payment is $63 per acre. With the current the commodity price levels, the model peanut farm received $36,208 in government farm program payment. The study will analysis different proposed price support program changes on net farm income and net worth.

BAYER EXCELLENCE IN EXTENSION AND EXTENSION TECHNIQUES

Extension's Role in the Development of the Peanut Industry in Northeast Mississippi. C. STOKES*, Extension Department, 517 Hwy. 145 N. Ste.1, Aberdeen, MS 39730; and M. HOWELL, Extension Department, P.O. Box 193, Poplarville, MS 39470.

Commercial peanuts had not been produced in Northeast Mississippi until 2005. This presentation discusses how the Mississippi State University Extension Service worked with growers and industry to plan, implement, and evaluate peanut production programs in Northeast Mississippi. Additionally, this presentation deals with how the Extension Service assisted with infrastructure improvements, specifically in the establishment of a peanut buying point in Monroe County in 2008. Through the efforts of the Extension Service, a total of twenty-nine educational programs have been offered, three field days have been conducted, and twelve research and demonstration plots have been conducted. Through evaluation of extension programs over the past six years, a documented economic impact of $620,000 has been realized by the producers, and over the past four years Monroe County has realized $12,758,943 from the peanut industry.

<u>Managing Tobacco Thrips in Peanut with Alternatives to Aldicarb</u>. C. ELLISON*, North Carolina Cooperative Extension Service, Jackson, NC 27845 zip; and D.L. JORDAN, R.L. BRANDENBURG, and B.B. SHEW, North Carolina State University, Raleigh, NC 27695.

Removal of aldicarb from the market for peanut has forced growers to evaluate alternative approaches to controlling thrips. Research was conducted during 2011 to compare thrips control, tomato spotted wilt, days to row closure, and pod yield for the cultivars Bailey, Gregory, CHAMPS, Phillips, and Sugg with and without phorate applied in the seed furrow at 5 lbs product/acre. In other trials, efficacy of acephate applied postemergence was compared when applied alone or with paraquat. Phorate was effective in controlling tobacco thrips regardless of cultivar and for minimizing tomato spotted wilt for tomato spotted wilt-susceptible cultivars. Acephate was effective in protecting peanut from tobacco thrips damage similar to aldicarb applied in the seed furrow.

<u>Extension Peanut Program Development in Southampton County, Virginia-Perspective of a New Agent</u>. C.S. DRAKE*, Virginia Cooperative Extension, Southampton County, Courtland, VA 23837; M. BALOTA, Department of Plant Pathology, Physiology and Weed Science, and D.A. HERBERT, Department of Entomology, Virginia Tech
Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437.

Peanut production has long been a vital and profitable sector of the agricultural community in Southampton County, Virginia. The county is approximately 600 square miles with 93,000 acres in crop production. The fertile, well drained sandy loam soils are well suited to peanut production. For many years dating back to the early 1900's peanut production has had a rich and valued history in Southampton County. At one point in time, the acreage exceeded 30,000 but due to the loss of the quota system, competing commodities at profitable price levels, and loss of infrastructure, acreage has declined to just over 5,000 in 2011. While the acreage has been drastically reduced, the crop provides the best profit margin projections of any crop commercially grown in Southampton County in 2012. Therefore, a strong research and education effort must be maintained in order for our growers to successfully compete in the ever changing world of peanut production. There are many unprecedented challenges facing the peanut producers of the V-C region. Among these are new challenges in insect and disease control. The loss of Temik and the highly restricted use of Metam sodium have left many producers looking for alternative methods of controlling nematodes, thrips, and CBR. Another major constraint to production is the labor requirements involved with peanut production due to harvesting, drying, and transportation. Also, there is a pressing need for the use of a proven method of determining when peanuts are mature and ready to dig. With the new varieties coming into commercial production that may differ slightly from older ones the proper timing of harvesting will be especially critical for maximizing yield and quality potential. As a new agent to a large peanut producing county, it is my opinion that we must do a better job of relaying research based information to our producers so they can better deal with these challenges. I come from a fourth generation peanut farm in the southeastern portion of the county and understand from experience the importance of unbiased information. Since coming aboard in July of 2011, I have circulated among the producers to hear first-hand their concerns and needs. To assist producers in determining optimum crop maturity for digging, in late September I organized a peanut pod blasting clinic in conjunction with Dr.

Maria Balota. The clinic was held at a local buying point and 32 samples from 17 growers were evaluated. These samples represented nearly one third of the acreage in Southampton County. That effort will be expanded in 2012 to accommodate more growers and to monitor peanut maturity from late August through October. When producers were making decisions about corn earworm control, I assisted Dr. Ames Herbert with insecticide efficacy trials on a local producer's farm to help determine the most effective spray treatments. For the upcoming 2012 growing season, I am working with growers to set up on-farm variety trials, insect control evaluations, and to assist in monitoring of pest outbreaks. I will conduct on farm in-season insect scouting clinics to help growers improve their skills in making effective treatment decisions. And finally, I have initiated bimonthly newsletters to inform growers countywide of upcoming programs, production and pest management issues.

Impact of Prothioconazole Applications with Provost or Artisan/Initiate Fungicides on Severity of Soilborne Diseases of Peanut. W. G. TYSON*, University of Georgia Cooperative Extension, Effingham County, Springfield, GA 31329 and R. C. KEMERAIT, University of Georgia, Department of Plant Pathology, 4604 Research Way, Tifton, GA 31794.

Soilborne diseases, to include southern blight and Cylindrocladium black rot (CBR), are a critical problem for peanut producers in Effingham County and must be addressed with additional on-farm research to establish "best management" practices. The producers' current best line of defense to combat these problems involves selection of more-resistant varieties, judicious use of fungicides, and either an in-furrow application of prothioconazole (Proline) or soil fumigation with metam sodium to reduce severity of Cylindrocladium black rot (CBR). Unfortunately, foliar fungicides and more-resistant varieties do not eliminate losses to soilborne diseases in Effingham County and growers are unlikely to use fumigation to manage CBR. Further research is needed to provide recommendations to growers with regards to use of newer fungicides and application strategies for the management of soilborne diseases affecting peanut. In this study conducted over four growing seasons (2008-2011), the effectiveness of prothioconazole (Proline, 5.7 fl oz/A) applied in-furrow at planting and also banded over the row after emergence was evaluated for the management of peanut diseases. Provost (prothioconazole + tebuconazole) and Artisan (flutolanil + propiconazole)/chlorothalonil fungicide programs were evaluated with and without an earlier application of Proline (infurrow and/or banded early emergence) to determine the optimal strategy for disease protection. The experimental design was a randomized complete block design with at least four replications. Data collected throughout this study included severity of leaf spot, incidence of southern blight, Diplodia collar rot, and CBR and yields. Means were separated using Fisher's protected LSD. From the research in Effingham County, the effectiveness of prothioconazole as a part of a disease management program to improve plant stand and reduce other disease such as TSWV, CBR, and white mold has been assessed over the past four years in eastern Georgia. Where outbreaks of CBR or southern blight were significant, use of in-furrow or early-season applications of Proline resulted in lower disease severity and increased yields. Where pressure from soilborne diseases was low, use of Proline early in the season did not provide benefits above a standard fungicide program.

Design, Use, and Advantages of a GPS Controlled Spraying System for Research Plots. J. S. THOMAS*, Y. J. HAN, A. KHALILIAN, and J. W. CHAPIN, School of Agricultural, Forest, and Environmental Sciences, Clemson University, Edisto REC, 64 Research Road, Blackville, SC 29817.

A map-based plot sprayer was developed to improve the efficiency and accuracy of applications to experimental plots. The computer-based, multi-boom, three-point-hitch compressed-air system automatically and precisely applies up to twelve treatments per continuous field pass from twenty-four left and right 4-row booms using a GIS map and RTK GPS guidance. When used with a tractor auto steering system, the mostly hand-free operation eliminates potential errors associated with hand-held plot maps and manual switches, and enhances the operator's ability to monitor the total application process. The system significantly reduces application time in the field, thereby making short interval treatment timing experiments feasible and significantly reducing the risk of thunderstorms confounding experiments. System components, operation, and limitations will be presented.

Peanut Response to Nitrogen Fertilizer and Inoculation. J. MORGAN*, North Carolina Cooperative Extension Service, Trenton, NC 27585; C. FOUNTAIN, North Carolina Cooperative Extension Service, Kenansville, NC 28349; T. BRITTON, North Carolina Cooperative Extension Service, Smithfield, NC 27577; and D.L. JORDAN and P.D. JOHNSON, North Carolina State University, Raleigh, NC 27695.

Inoculation is an important input in peanut production systems. Peanut yield increased by 32% in new ground fields (28 trials) and 4% in fields where peanut was planted previously (26 trials) over a 10-year period when inoculated with in-furrow application of liquid or granular *Bradyrhizobia*. When inoculant does not perform adequately, growers apply nitrogen (N) fertilizer as soon as nitrogen deficiency symptoms are evident. In five trials conducted in new ground fields, yield was 73% of inoculated peanut when inoculant and N were not applied. Nitrogen (as ammoniums sulfate) in absence of inoculant increased yield to 89% (60 lbs actual N/acre), 96% (90 lbs actual N/acre), and 98% (120 and 150 lbs actual N/acre) of inoculated peanut. Ammonium nitrate at these rates of N increased yield 86 to 92%. Results from these trials show the value of inoculation of peanut in all fields, that the rate of N needed to correct an N deficiency is at least 120 lbs/acre, and ammonium sulfate is a more effective source of N than ammonium nitrate.

Assessment of early emergent fungicide applications for improving white mold control.
P. M. CROSBY*, Emanuel County Extension, University of Georgia, Swainsboro, Ga. 30401; R. C. KEMERAIT, Department of Plant Pathology, University of Georgia. Tifton, Ga. 31793

Management of soilborne diseases in peanuts is a major challenge for producers across Southeast Georgia. Management strategies vary based on variety, rotation, crop and environmental conditions and RX disease programs. Fungicide programs targeting the suppression of Southern stem rot are typically initiated 60 days after planting following the current recommendation of the University of Georgia. Extremely hot soil temperatures in May of 2010 required reexamination of the soilborne disease management strategy. Georgia 06-G peanuts were planted on May 16th at the Southeast Georgia Research and Education Center (SEREC) in Midville, Georgia. Using randomized, complete block design with 4 replications, a research protocol was established to evaluate soilborne fungicides applied at 30 and/or 45 days after planting verses the traditional 60 day window. Plots were sprayed using a tractor mounted sprayer that covered 4 rows. Plots were 4 rows wide by 40 feet long. At 60 and 90 days after planting all plots (except the untreated check) were sprayed with 18.5 ounces of Abound. Two applications of Bravo completed the fungicide treatments. Peanuts were inverted on October 12th and roots and pods were evaluated to determine the number of hits per 80 foot of row. The center 2 rows were harvested, bagged and weighed on October 26th. Data showed a significant yield increase (947 lbs) with treatment 1 and a high numerical increase (849 lbs) with treatment 4 when Tebuconazole was applied at 45 days after planting.

Non-Traditional Cropping Systems in Chowan County, North Carolina Including Peanut, Sage, Snap Beans, and Sweet Potato. T. SMITH*, North Carolina Cooperative Extension Service, Edenton, NC 27932; and D.L. JORDAN, North Carolina State University, Raleigh, NC 27695.

Peanut rotation systems most often include corn and cotton. However, more diverse rotation systems can be found in some regions of North Carolina. Rotation crops can include clary sage, snap beans, and sweet potato. Clary sage is planted in August or September and harvested the following June. A common three-year sage/peanut rotation is sage-fallow/sorghum-peanuts-wheat-sage. Cotton growers often extend this rotation to 4 years and plant cotton prior to the

peanut crop in this rotation. Sweet potato and snap beans may also be rotated with peanut in a 3- or 4-year rotation with peanut immediately preceding the potato or bean crop. Research suggests that peanut yield following these crops is not adversely affected by previous rotation systems that include these crops.

Influence of Cropping System, Tillage, and Chlorpyrifos on Arthropod Dynamics and Crop Yield.
W. DRAKE*, North Carolina Cooperative Extension Service, Winton, NC 27986; and D.L. JORDAN, Y.J. CARDOZA, M. SHROEDER-MORENO, D. ESPINOZA, R.L. BRANDENBURG, B. ROYALS, P.D. JOHNSON, and B.B. SHEW, North Carolina State University, Raleigh, NC 27695.

Research was conducted at four locations to determine the influence of tall fescue sod in place for four years (2005-2008) on pest reaction and crop yield compared with reduced tillage systems including corn and cotton. During 2009, cotton yield increased while corn yield was lower following tall fescue compared with reduced tillage rotations of corn and cotton. Peanut and soybean yield was unaffected by previous cropping system. Unlike 2009, when corn was planted in all plots during 2010 and 2011 at two locations, yield was higher following tall fescue than traditional reduced tillage cropping systems. Preliminary data revealed that soil arthropod populations varied by location, cropping system, and chlorpyrifos application. A higher number of arthropods was noted at two of four locations when tall fescue was the previous crop. Surprisingly, at two locations a higher number of arthropods was noted following chlorpyrifos compared with the no-chlorpyrifos control while a lower number was observed at one location when chlorpyrifos was applied. No difference in arthropod numbers due to chlorpyrifos treatment was noted at the final location. Damage from southern corn rootworm was affected by interactions of location by chlorpyrifos treatment and location by tillage system (conventional vs. strip tillage) but not by previous cropping system (tall fescue vs. reduced tillage corn/cotton). Greater scarring and puncturing of pods was noted at 1 of 4 locations in strip tillage compared with conventional tillage. At 2 of 4 locations applying chlorpyrifos reduced pod scarring caused by southern corn rootworm.

Evaluation of Tamrun OL11 under Varying Field Conditions. J.E. WOODWARD*, Texas AgriLIFE Extension Service and Texas Tech University, Lubbock, TX 79403; C.E. SIMPSON, Soil and Crop Sciences Dept. Texas AgriLIFE Research, Stephenville, TX 76401; M.R. BARING, Soil and Crop Sciences Dept. Texas AgriLIFE Research, College Station, TX 77843; and T.A. BAUGHMAN, Institute of Agricultural Biosciences, Oklahoma State University, Ardmore, OK 73401.

Cultivar selection is one of the most economically important decisions made by peanut producers. The development of genotypes capable of maintaining yield and grade under a wide range of conditions is important so that profitability can be maximized. Issues such as declining irrigation capacity and diseases limit production in parts of Texas. Efforts of the Texas AgriLIFE Peanut Breeding Program are to develop genotypes with improved yield potential, grades, and disease resistance. Cultivar trials were conducted in 2009, 2010, and 2011 to evaluate the performance of the cultivar Tamrun OL11, formerly breeding line TX-55308. Trials were established in several different production areas under various field conditions and included the commercial standards Flavor Runner 458 and Tamrun OL07. Yields were similar for Flavor Runner 458 and Tamrun OL07 at 4052 and 4049 lb/A, respectively; whereas, Tamrun OL11 averaged 4326 lb/A. Grades for Tamrun OL11 were 1.3 and 2.4% higher than Flavor Runner 458 and Tamrun OL07, respectively. When grown under three irrigation levels, yields of Tamrun OL11 increased 645 lb/A when comparing the base irrigation treatment to the low irrigation treatment (base - 33%). The addition of the high irrigation treatment (base + 33%) resulted in a 400 lb/A increase over the base irrigation treatment. In additional field studies, Tamrun OL11 performed equal to or better than Flavor Runner 458 and Tamrun OL07 under varying irrigation levels. When comparing cultivars in fields with a severe history of Sclerotinia blight (caused by *Sclerotinia minor*) yield increases of 1107 and 1990 lb/A were observed for Tamrun OL11 over Tamrun OL07 and Flavor Runner 458, respectively. Results from these studies clearly illustrate the high yield potential and superior grades of Tamrun OL11.

Experiences from Pod Maturity Clinics in Martin County, North Carolina. A. COCHRAN* and C.L. SUMNER, North Carolina Cooperative Extension Service, Williamston, NC, 27892; and D.L. JORDAN, North Carolina State University, Raleigh, NC 27695.

Digging peanut at optimum maturity can have a tremendous impact on pod yield and market grade characteristics for Virginia market type peanut. Removing the outer layer of the peanut pods and visually accessing the color of the mesocarp layer, helps to determine peanut maturity. As peanuts mature the mesocarp layer changes color from white to yellow to orange to brown to black. When about 70 percent of the sample reaches the dark orange to black stage the sample is ready to dig. Several peanut maturity clinics are held each year in Martin County. Farmers bring samples in from their fields and each is checked for maturity using the pressure washer method. Each sample is places in a wire basket and the outer layer of the pods removed with a pressure washer. Checking for maturity allows farmers to dig closer to the optimum maturity and increase their yield and market grade. In 2010, 301 samples for 81 farmers representing 7,409 acres were processed while in 234 samples for 72 farmers (7,748 acres) were processed during 2011. Based on conservative estimates, this activity most likely increased value of peanut to farmers in Martin County by 200 lbs/acre for a total of approximately $1.06 million over the two years (15,157 acres x 200 lbs/acre x $0.35/lb peanut) by enabling growers to dig more timely with respect to optimum maturity.

Response of Grain Crops to Previous Rotations Associated with Peanut-Based Cropping Systems in North Carolina. A. BRADELY*, North Carolina Cooperative Extension Service, Tarboro, NC 27886; D.L. JORDAN, North Carolina State University, Raleigh, NC 27695; C. BOGLE, North Carolina Department of Agriculture and Consumer Services, Tarboro, NC 27801; and T. CORBETT, North Carolina Department of Agriculture and Consumer Services, Lewiston-Woodville, NC 27849.

Price of grain crops increased significantly during the past 5 to 7 years, and during that time period until 2011, price of grain crops was often more attractive than the price of peanut, especially given risk associated with economic investment in production of these crops. This scenario led to reductions in peanut acreage in many counties in North Carolina and a transition to grain crops. Cotton price during this time period was also relatively low compared with price of grains. For example, in 2004 approximately 12,000 acres of peanut were planted in Edgecombe County compared with a low of 3,500 acres during 2009 and 5,500 acres during 2011. Corn, soybean, and wheat acreage increased in some years as a replacement for lost peanut acreage. A series of experiments was conducted in North Carolina during 1997-2006 to compare crop yield in peanut-based rotation systems that included corn, cotton, soybean, and tobacco depending on location. Peanut was included in all plots during 2006 following various cycles of peanut and other crops. During 2007-2011, the same grain crop was planted in all plots each year and included corn or wheat/soybean double crop to simulate a transition out of peanut-based cropping systems into grain production systems. At one location in Bertie County (Peanut Belt Research Station near Lewiston-Woodville), corn yield (2007, 2009, and 2011) and wheat/soybean yield (2008) were not affected by previous rotation while during 2010 yield of both wheat and soybean was affected by previous rotation. Peanut yield during 2006, prior to planting grain crops, ranged from 2600 lbs/acre to 5900 lbs/acre and reflected expected response based on the number of years between peanut plantings prior to 2006. At a second location in Edgecombe County (Upper Coastal Plain Research Station near Tarboro), differences in corn, soybean, and wheat yield due to previous peanut-based rotation were noted in 1 of 3, 0 of 2, and 2 of 2 years, respectively. At this location during 2006, peanut yield ranged from 2400 to 3770 lbs/acre based on previous rotation. At a third location in Columbus County (Border Belt Tobacco Research Station near Whiteville), yield of corn (2007 and 2009) and tobacco (2008) did not differ following previous rotations of peanut-based cropping systems.

PLANT PATHOLOGY, NEMATOLOGY AND ENTOMOLOGY

Evaluation of burrower bug occurrence with aflatoxin in peanuts. K.L. BOWEN*, H.L. CAMPBELL, and A.K. HAGAN, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849.

Burrower bug damage has been associated with higher aflatoxin concentration in peanuts and burrower bug populations are known to be higher in conservation tilled peanuts. Studies in South Carolina indicated that peanuts strip-till planted into a killed rye winter cover crop had lower burrower bug damage levels than those planted into wheat residue. In 2011 in Alabama, we evaluated the effects of strip-till planting peanuts into killed rye ('Wrens Abruzzi'), wheat ('SS 8641') or oats ('Harrison ') as well as conventional tillage on burrower bug damage levels and aflatoxin content. Four planting dates, at 2-wk intervals starting 27 Apr, were also evaluated for their influence on burrower bug damage and aflatoxin content. Peanuts were harvested from each plot at maturity and shelled. After eliminating moldy, damaged and undersized seed (overall size < 30% of average), one hundred kernels were counted from each shelled sample, testa were removed, and individual kernels examined for burrower bug damage. Another 200 g of each shelled sample was ground and assayed for aflatoxins. Over all samples, burrower bug damage incidence was 3.6%. Damage ratings were significantly lower (P < 0.05) in samples from conventionally tilled compared to reduced tillage plots (0.7% vs. 4.6%, respectively); there was not a significant difference due to cover crop type among reduced tillage plots or due to planting date. Aflatoxin contamination was not detected despite prevailing high temperatures and lower than average rainfall.

Evaluation of Insecticide Seed Treatments for Management of Thrips and Tomato Spotted Wilt Virus in Peanuts. D.A. HERBERT, JR.*, S. MALONE, Department of Entomology, Virginia Tech Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437; R. L. BRANDENBURG, B.M. ROYALS, Department of Entomology, North Carolina State University, Raleigh, NC 27695; and D. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

Research in Virginia and North Carolina has found that insecticide seed treatments can provide good levels of thrips control in peanut and result in high yields. In Virginia, selected at-plant products were evaluated for efficacy against thrips from 2009-2011. Seed treatments included thiamethoxam (Cruiser 70WS and Cruiser 5FS, Syngenta Crop Protection), experimental compounds (A17460, A17461, A17462, Syngenta Crop Protection), and fungicide-only (Dynasty PD, Syngenta Crop Protection) treatments. For comparison, an untreated check and two granular in-furrow insecticides were included: phorate (Thimet 20G, AMVAC Chemical Corporation) and aldicarb (Temik 15G, Bayer CropScience). 'NC-V 11' peanut were planted in early May on 36" row centers. Data included stand counts, visual thrips injury ratings on a scale of 0=no injury and 10=dead plants, thrips per 10 terminal leaflets, number of *tomato spotted wilt* hits per plot, and yield. In general, Cruiser and experimental seed treatments kept thrips injury levels low, but for a shorter time compared with Temik and Thimet. Also, insecticides treatments typically had similar adult and immature thrips populations. *Tomato spotted wilt* pressure ranged from relatively light in 2009 to moderately heavy in 2011, with fair control gained by most insecticide treatments. In 2009, Cruiser 70WS and A17460 yields were statistically similar to Temik and Thimet, the highest-yielding treatments; all insecticide treatments had similar yields in 2010; and while there were no significant differences in 2011, the experimental seed treatment A17461 had the highest yield. Similar studies were conducted in North Carolina in 2010 and 2011, with results that support the data from Virginia.

Thrips Injury Impact on Yield and Grade of Peanut Cultivars. J.P. BEASLEY, JR.*1, D.B. ADAMS2, S.L. BROWN2, J.E. PAULK, III1; 1Crop and Soil Science Department, The University of Georgia, Tifton, GA 31793-5766 and 2Department of Entomology, The University of Georgia, Tifton, GA 31793-5766.

Tobacco thrips (*Frankliniella fusca*) and Western Flower thrips (*Frankliniella occidentalis*) are serious insect pests in peanut. These two species are the two primary thrips species causing early season damage on peanut in the Southeastern United States. Severe thrips feeding results in symptomology resembling a burned or scorched appearance of the peanut tissue. Peanut has been known to tolerate minimal feeding without significant reduction in yield or percentage of total sound mature kernels (TSMK). Tobacco and Western Flower thrips are also vectors of tomato spotted wilt virus (TSWV). Over the past six years there have been five new runner-type peanut cultivars released for production in the Southeastern U.S. These five cultivars have considerably higher levels of resistance to TSWV than ‘Georgia Green’, the dominant runner-type cultivar during crop years 1996-2006. Trials were conducted in crop years 2010 and 2011 to determine the yield and grade factor response of the more recently released cultivars to thrips injury. ‘Georgia-06G’, ‘Georgia-07’, ‘Georgia Greener’, ‘Florida-07’, and ‘Tifguard’ were planted in late April in both years and evaluated for response to thrips injury when treated with Thimet brand insecticide applied in-furrow at 5.0 lbs/acre at planting compared to no at-plant insecticide. Experimental design was a split-plot with cultivar as the main plot and insecticide treatment as the sub-plot. Individual plots were two rows (6 ft.) by 40 feet in length with four replications. Data collected included plant stand (plants per row-foot) at 10, 20, 30 days after planting and at inversion, thrips injury rating (1-10 scale with 1 being no injury), yield, and grade factors. When pooled over years, data analysis for yield indicated no interaction between cultivar and insecticide treatment. There was a significant difference between the Thimet treatment and the untreated check when averaged over cultivars and years with the Thimet treatment having a significantly higher yield (6825 versus 6505 kg ha-1). Data analysis for total sound mature kernels indicated no interactions but a significantly higher TSMK percentage (75.6%) for the Thimet treatment compared to the untreated check (75.0%). There was significant difference between Thimet (2.3) and the untreated check for thrips injury (6.3) when rated on a 1-10 scale. All five cultivars responded the same to thrips injury when no in-furrow insecticide was applied.

<u>Evaluation of Sampling Techniques and Influence of Tillage on Three Cornered Alfalfa Hoppers in Peanuts</u>. M. S. HOWELL*, Extension Instructor, Mississippi State University Extension Service, Poplarville, MS 39470; and FRED MUSSER, Associate Professor of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, MS 39762.

Four sample techniques were evaluated to determine the most appropriate method for sampling three cornered alfalfa hoppers in peanuts. Techniques evaluated included sweep net, visual observation, ground shakes, and D-Vac. The D-Vac was most effective in sampling adults, followed by the sweep net method. There were no statistical differences between the visual and ground shake methods; however they were both less effective than the other methods. When evaluating nymphs, the D-Vac was the most effective method, followed by the ground shake method, visual, and sweep net. Additionally, the effects of 3 different tillage systems on three cornered alfalfa hopper infestation levels was evaluated under no insecticide, threshold insecticide treatment, and weekly insecticide treatments.

<u>Utility of Tebuconazole for Leaf Spot Management in Fields with Resistant Populations of *Cercospora arachidicola* or *Cercosporidium personatum*.</u> A.K. CULBREATH*, T.B. BRENNEMAN, R.C. KEMERAIT, and K.L. STEVENSON. Dept. of Plant Pathology, Univ. of Georgia, Tifton, GA 31793-5766.

In peanut (*Arachis hypogaea*) production areas in Alabama, Florida, and Georgia, management of early and late leaf spot diseases caused by *Cercospora arachidicola* and *Cercosporidium personatum,* respectively, is heavily dependent on multiple applications of fungicides. Many of those applications are targeted at stem rot, caused by *Sclerotium rolfsii*, as well as leaf spot diseases. For several years after its registration on peanut in 1994, tebuconazole was the standard fungicide that provided control of both leaf spot and stem rot. However, populations of leaf spot pathogens with reduced sensitivity to tebuconazole are now prevalent. Tebuconazole alone is no longer effective in many fields for leaf spot control, but still is active against *S. rolfsii*. Since 2008, multiple field experiments have been conducted on new cultivars Florida-07 and Georgia-06G to determine whether tank mixes of standard rates of tebuconazole (0.2 lb a.i./A) with reduced rates of chlorothalonil (0.75 lb a.i./A) or thiophanate methyl (0.18 lb a.i./A) can provide leaf spot control and allow use of tebuconazole for stem rot control. Across multiple trials, tank mixes of either chlorothalonil or thiophanate methyl with tebuconazole typically provided leaf spot control that was comparable to that of full rate (1.12 lb a.i./A) of chlorothalonil alone, and superior to that of tebuconazole alone. Indications are that these tank mixes can be effective for leaf spot control if tebuconazole is the product of choice for stem rot control in a particular application, even in fields where tebuconazole alone is not effective for leaf spot control.

<u>Evaluation of the experimental fungicides penthiopyrad and flutriafol for control of foliar and soilborne diseases of peanut in Oklahoma</u>. J. P. DAMICONE* and T. J. PIERSON, Department of Entomology and Plant Pathology, and C. B. GODSEY, Department of Plant and Soil Sciences, Oklahoma State University, Stillwater, OK, 74078.

The fungicide penthiopyrad (FRAC group 7) was evaluated for control of early leaf spot (*Cercospora arachidicola*) in 8 field trials from 2006 to 2010 at a rate of 0.24 kg/ha. Penthiopyrad reduced levels of leaf spot and defoliation compared to the untreated check (P=0.05), but was less effective than chlorothalonil at 1.26 kg/ha. Both fungicides increased yield compared to the untreated check (P=0.05). Yield responses to penthiopyrad and chlorothalonil were 550 and 420 kg/ha above the untreated check, respectively. Penthiopyrad was tested at 0.35 kg/ha for control of Sclerotinia blight (*Sclerotinia minor*) in comparison to fluazinam at 0.56 kg/ha and boscalid at 0.39 kg/ha in 5 trials from 2007 to 2011. All fungicides reduced levels of Sclerotinia blight and increased yields compared to the untreated control (P=0.05). Disease control (the percent reduction in disease relative to the untreated check) was 41% for penthiopyrad compared to 52% for fluazinam and 53% for boscalid. Yield responses were statistically similar for the fungicides and averaged 524 kg/ha for penthiopyrad, 644 kg/ha for boscalid, and 791 kg/ha for fluazinam. Flutriafol (FRAC group 3) was evaluated for control of early leaf spot and web blotch (*Phoma arachidicola*) from 2008 to 2010 at rates from 0.06 to 0.25 kg/ha. Declines in the incidence of early leaf spot and defoliation were quadratic with increasing flutriafol rate (P=0.01). Disease control with flutriafol at rates of 0.13 and 0.25 kg/ha was similar to that with chlorothalonil and better than that with tebuconazole at 0.22 kg/ha. Except for the high rate of 0.25 kg/ha, flutriafol was less effective against web blotch than chlorothalonil. All fungicide treatments increased yield (P=0.05) compared to the control, except for the low rate (0.06 kg/ha) of flutriafol. Yield responses averaged from 360 kg/ha for the high rate of flutriafol to 510 kg/ha for tebuconazole. Levels of stem rot (*Sclerotium rolfsii*) were not sufficient to definitively assess fungicide performance. Penthiopyrad, registered for use on peanuts in 2012, should be most beneficial where Sclerotinia blight is a problem while flutriafol appears to be best suited for foliar disease control.

<u>Disease, nematode activity and yield response of a peanut root knot resistant and susceptible peanut cultivar as influenced by crop rotation</u>. A. K. HAGAN*, H. C. CAMPBELL, K. L. BOWEN. Auburn University, AL 36849; and L. WELLS, Wiregrass Research and Extension Center, Headland, AL 36849.

Influence of crop rotation on disease, nematode activity and yield response of a peanut root knot (*Meloidogyne arenaria* race 2) resistant and susceptible peanut cultivar was assessed in a rotation study established at the Wiregrass Research and Extension Center in 1988. The study design included 37 different rotation patterns such as a peanut monoculture, one yr of peanut cropped after one yr of pearl millet, grain sorghum, soybean, or summer fallow; one, two or three yr of corn or cotton; one yr of each of the former crops; and one, two, three, four, or five yr of bahiagrass. Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. The study was irrigated as needed. Beginning in 2009, a split plot design with rotation pattern as the whole plot and peanut cultivar as sub-plots was used. Whole plots, which consisted to twelve 50 ft rows spaced 3-ft apart, were randomized in four complete blocks. In each study year, the peanut root knot resistant cultivar Tifguard was planted on a six row block, while the peanut root knot susceptible cultivar Florida 07, which was planted using a KMC strip-till rig, in 2009 and 2010, or Georgia-06G, which was planted in 2011, was sown on the adjacent six row block. Varieties were randomly assigned to a six row block within each twelve row plot. All plots received seven applications of Bravo Weather Stik 6F at 1.5 pt/A at 2-wk intervals for leaf spot control. While TSWV incidence and leaf spot severity was assessed just prior to plot inversion, stem rot incidence was determined immediately after plot inversion. Soil samples for a nematode soil assay, which were collected prior to inversion, were processed using the sugar flotation method. When appropriate, data were pooled across peanut cultivars and rotations. While TSWV and stem rot incidence as well as leaf spot severity and root knot juvenile counts were higher for Florida 07 than Tifguard in 2009, yield was significantly higher for the former cultivar. Root knot juvenile counts were higher in 2010 for Florida 07 and Tifguard, and stem rot indices as well as yield for both cultivars did not significantly differ. In 2011, similar leaf spot severity, stem rot indices, and yield were noted for Tifguard and Georgia-06G. Peanut cropping frequency often had a significant impact on leaf spot severity, stem rot incidence, root knot juvenile counts, and yield. Leaf spot severity was higher in 2009 for continuous peanuts when compared with the one, two, and three yr out rotations. While stem rot incidence was consistently lower for the two and three yr out rotations when compared with continuous peanuts, lower stem rot counts were also recorded for the one yr out rotation pattern in two of three years. Higher root knot juvenile counts were noted for continuous peanuts than the 3 yr but not 1 and 2 yr out rotations. In all study years, yields were significantly higher for the 1, 2, and 3 yr out rotation patterns than continuous peanuts. In two of three years, higher yields were recorded for the 2 and 3 yr compared with the 1 yr out rotation.

Performance of Disease Management Programs and How Fontelis (penthiopyrad) Fits into Such Programs Under South Carolina Conditions. J. W. CHAPIN*, J. S. THOMAS, and W. S. MONFORT, School of Agricultural, Forestry, and Environmental Sciences, Clemson University, Edisto REC, 64 Research Road, Blackville, SC 29817.

Over an eight year period (2004 - 2011) selected peanut fungicide programs were evaluated including: untreated, Bravo or generic chlorothalonil, Folicur or generic tebuconazole + Bravo, Abound (azoxystrobin), Abound alternated with tebuconazole, Artisan or Convoy (flutolanil), Provost (prothioconazole + tebuconazole, Provost alternated with Convoy+ Bravo or Headline (pyraclostrobin), Quash (metconazole) + Bravo, and Fontelis (penthiopyrad). Treatments were made over four application dates at approximately 60, 75, 90, and 105 DAP with all programs including a chlorothalonil application at 45 DAP. Not all treatments were compared in all years. Programs were evaluated for efficacy against late leaf spot, *Cercosporidium personatum* (Berk. and Curt.) Deighton and stem rot, *Sclerotium rolfsii* Sacc., and for yield performance. The tebuconazole + Bravo program consistently suppressed both late leaf spot and stem rot resulting in an average yield increase of 453 lb/ac over the Bravo leaf spot control program and 910 lb/ac over the untreated check. Although some programs demonstrated superior leaf spot or stem rot efficacy relative to tebuconazole + Bravo under high disease conditions, there were relatively few measurable yield increases over the tebuconazole + Bravo program. Nevertheless, by reducing the substantial risk of increased loss from late leaf spot when harvest is delayed by adverse weather or from stem rot under severe disease pressure, some of these alternatives to tebuconazole + Bravo have significant value, particularly in the 60 through 90 DAP use interval. These results have been used to develop current fungicide programs for S. C. conditions, typically including the use of tebuconazole + Bravo (or Headline) at 45 DAP and tebuconazole + Bravo at 105 DAP. Fontelis provides one more alternative chemistry for resistance management which can be used effectively as one or two alternated applications within the 60 to 90 DAP interval under S. C. production conditions.

A Survey of Aflatoxin Contamination from Peanuts Affected by Nematodes and Burrower Bugs. R.C. KEMERAIT, JR.*[1], F.H. SANDERS[1], J.M. Luis[1], K. BOWEN[2], and J.P. BEASLEY[3]. [1]Department of Plant Pathology, the University of Georgia, Tifton, GA 31793; [2]Department of Entomology and Plant Pathology, Auburn University, Auburn, AL 36849, [3]Department of Crop and Soil Science, the University of Georgia, Tifton, GA 31793.

Aflatoxin, produced by *Aspergillus flavus* and *A. parasiticus*, is a more serious problem when peanuts are grown under drought stress, when pods are damaged by plant parasitic nematodes and insects, and when harvested peanuts are improperly stored. The objective of this two-year study was determine if aflatoxin found in samples could be related to soil nematode counts, root damage from peanut root-knot nematodes (*Meloidogyne arenaria*), and damage to kernels from

burrower bugs (P*angaeus bilineatus*). Commercial fields were identified in 2010 and soil samples were collected and analyzed for root-knot and ring nematodes. At harvest, peanut samples were obtained from these fields and analyzed for aflatoxin. In preparation for analysis, samples were shelled, crushed and ground. Aflatoxin was extracted from samples with a mixture of methanol and water; after further preparation the solution was passed through a VICAM column and analyzed using a fluorometer. Also, samples were collected from commercial loads of peanuts determined to be "Seg 2" based upon damage from the burrower bug and analyzed as above. In 2011, samples were obtained from trials conducted at the Black Shank Farm, Coastal Plain Experiment station and the Stripling Irrigation Park. Damage from the peanut root knot nematode was significant in each study. At the Stripling Irrigation Park, roots were rated for gall damage and soil samples were collected. End-of-season soil samples were collected at the Black Shank Farm and analyzed for nematodes. At each location, two samples from each plot were analyzed for aflatoxin where one sample was randomly selected and the second was composed of those kernels with the greatest damage. Aflatoxin content from samples analyzed in 2010 was below 10 ppb for all samples, regardless of soil counts for root-knot and ring (*Criconomella ornata*) nematodes. Out of 33 samples collected for burrower bug damage in 2010, only two had aflatoxin levels above 10 ppb and none were above 15 ppb. From samples collected in 2011, levels of aflatoxin tended to be greater in samples where kernels were selected for damage and less in random samples. However, aflatoxin contamination could not be clearly linked to populations of either root-knot or ring nematodes. From this study, aflatoxin contamination in peanuts is related to damaged kernels, but less attributable to increased population of plant-parasitic nematodes in the soil or root damage from nematodes.

<u>Alternatives to Soil Fumigation for Control of Cylindrocladium Black Rot (CBR) of Peanut</u>. P. M. PHIPPS* and D. E. P. TELENKO. Tidewater Agr. Res. & Ext. Ctr., Virginia Tech, Suffolk, VA 23437.

The response of Virginia- and runner-type cultivars to control of CBR with Proline 480SC 5.7 fl oz/A (prothioconazole), Propulse 400SC 13.69 fl oz/A (1:1 prothioconazole/fluopyram), and Q8Y78 240SC 23 fl oz/A (picoxystrobin) was compared to soil fumigation with Vapam 42% 7.5 gal/A (metam sodium) in field trials naturally infested with *Cylindrocladium parasiticum*. Vapam was applied 8 in. under rows with a coulter and trailing chisel shank during strip tillage at least 2 wks prior to planting. All plots were treated with Temik 15G 7 lb/A in-furrow at planting in 2010 and Orthene 97S 12 oz/A in-furrow in 2011. Fungicide treatments were applied to the seed furrow through microtubes in a volume of 5 gal/A at planting. Bailey had the lowest CBR incidence and highest yield followed by Florida Fancy in Virginia types in 2010, and CHAMPS had the highest CBR incidence and lowest yield. CBR incidence was higher in Virginia types, except Bailey, compared to runner types. Florida 07-R and AP-4 in the runner types had the lowest CBR and highest yield, whereas GA Green had higher CBR incidence and lower yield. Tomato spotted wilt virus was low in both Virginia and runner types in 2010. CBR control and yield with Propulse and Q8Y78 was similar to that with Vapam and significantly better than Proline and untreated plots. None of the treatments increased yield significantly in runner types. Overall, the results in 2010 demonstrated the superior value of Propulse as an alternative to soil fumigation with Vapam and the high level of CBR resistance in the Virginia type, Bailey. The runner types, AP-4 and FL-07R, were not as susceptible to CBR as GA Green or the Virginia-types, CHAMPS and Sugg. In 2011, the same treatments were compared for control of northern root-knot nematode and CBR in the same Virginia-type cultivars, but in the runner-type cultivars, GA Green was replaced with GA-06G. All plots were treated with Orthene 97S 12 oz/A in furrow or tank mixed with fungicide treatments and applied to the seed furrow as defined for 2010. CHAMPS had significantly more tomato spotted wilt virus (TSWV), stem rot, and Sclerotinia blight than Bailey and Sugg. TSWV in Bailey was significantly lower than in CHAMPS and Sugg. In CHAMPS, Vapam had the lowest number of yellow/dead plants (CBR) followed by Propulse, Q8Y78, and Proline. Root galling by northern root-knot nematode was significantly lower on Bailey compared to Sugg and CHAMPS. Vapam was the only treatment to increase yield significantly in Virginia-type cultivars. Vapam reduced root-knot galling significantly in both Virginia-type and runner-type cultivars. Bailey was the highest yielding Virginia-type cultivar followed by Sugg, and CHAMPS had the lowest yield. TSWV and CBR incidence was lower in runner types and not significantly different in cultivars. Southern stem rot was significantly lower in AP-4 compared to GA-06G and Tifguard. Root-knot galling and nematode counts in Tifguard were significantly lower compared to AP-4 and GA-06G. There was no significant treatment effect on yield in runner-type cultivars, but Vapam produced the highest yield. GA-06G yielded significantly higher than Tifguard. These results provided additional evidence of superior disease resistance and high yield potential in Bailey, however, the low incidence of CBR in 2011 did not allow for confirmation of significant differences in treatments that were found in 2010.

Spray volume and timing evaluations for early emergence applications of Proline for peanut stem rot management. T. B. BRENNEMAN[1]* and K. RUCKER[2], Department of Plant Pathology[1] University of Georgia, and Bayer CropScience[2], Tifton, GA 31794.

Recent work has shown that prothioconazole (Proline, 5.7 fl oz/A) can be applied in a banded (3-4 inch), high volume (40 gallon per acre) spray 2-3 weeks after planting to control the early onset of stem rot caused by *Sclerotium rolfsii.* Growers anxious to adopt early emergence (EE) applications expressed reservations about the high spray volume required. Therefore trials were conducted to compare Proline applications at 10 versus 40 gallons per acre, and timings of 2, 3, 4, or 5 weeks after planting (WAP). A standard stem rot program of Provost 8 fl oz/A (prothioconazole + tebuconazole) applied broadcast at sprays 3-7 was also included. Three trials with 5-6 reps each were conducted in 2011 using Tifguard peanut. All trials were coversprayed with chlorothalonil, but the first two sprays were omitted to determine if the EE sprays had an effect on leaf spot (primarily *Cercospora arachidicola*). Pod yield could be combined across trials, and there was no difference in yield between the different spray volumes at any of the four application dates. All treatments increased yield compared to the nontreated control except for the 2 WAP sprays. There were generally increasing yields with later application timings, and the 5 WAP applications gave similar yields as the Provost 4 application block (about 800 lb/A increase above chlorothalonil alone). Due to interactions, trials could not be combined for analysis of disease ratings. Leaf spot epidemics were not severe due to dry weather, but nearly all Proline applications reduced disease intensity, and the later application timings usually gave the best control. Severe stem rot occurred in two trials, and most Proline treatments reduced disease incidence. Later application dates were usually more effective, and generally provided control similar to the four sprays of Provost. Results support the use of early emergence applications of Proline, and indicate that lower spray volumes and possibly later timings can be used.

Summary of Eight Years of Field Evaluation of the Transgenic Blight Blocker Peanut with Sclerotinia Blight Resistance. D. E. P. TELENKO*, P.M. Phipps, Tidewater Agricultural Research & Extension Center (AREC), Virginia Tech, Suffolk, VA 23427, J.H. Hu, Citrus Research and Education Center, The University of Florida, Alfred, FL 33850; and E. A. Grabau, Dept. of Plant Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, VA 24061.

Transgenic peanut lines with a barley oxalate oxidase gene were evaluated in field trials from 2004 to 2011. Three superior lines (N70, P39 and W73) have been selected to move forward through deregulation under the name “Blight Blocker.” These lines contain strong resistance to Sclerotinia blight due to the expression of oxalate oxidase gene and each line has the same seed, quality and grade characteristics of their parents. Tight clustering into homogenous subgroups in a multivariate, canonical discriminate analysis (CDA) has shown the similarity between the transformed lines to their parents. The superior Blight Blocker lines were evaluated in split-plot trials with and without Omega fungicide from 2007 to 2011. The three transgenic lines had a five year average of 91.3 to 97.0% less Sclerotinia blight under no application of Omega and 92.5 to 97.0% less disease when Omega was applied to their non-transformed parent (NC 7, Perry and Wilson). Blight Blocker transgenic lines N70, P39 and W73 have a five-year average of 15.1 to 22.1 % greater yields (889-1253 kg/ha) than their parents with no fungicide application and 0.05 to 8.5% increase in yield (3-500 kg/ha) with the application of Omega for Sclerotinia blight control. “Blight Blocker” lines show great promise in providing resistance to Sclerotinia blight while retaining the yield and quality traits of their non-transformed parents.

Comparison of Calendar versus Threshold-Base Fungicide Applications for Management of Pod Rot. T. A. WHEELER*, Texas AgriLife Research, Lubbock, TX 79403-6653; S. A. RUSSELL, Texas AgriLife Extension Service, Brownfield, TX 79316-4307; M. G. ANDERSON, Texas AgriLife Extension Service, Seminole, TX 79360-4341; and J. E. WOODWARD, Texas AgriLife Extension Service, Lubbock, TX 79403-6653.

A comparison was made between applying fungicides on a calendar basis (without regard to pod rot level) or applying them based on a threshold of pod rot (1-2%=low, 3-4%=moderate, 5-6%=high). The tests were conducted at five sites. Pod rot during the season (based on weekly evaluations) was lower for the calendar treatments using Abound FL (average of 0.8%) than for all threshold based applications (average of 1.5, 2.3, and 1.6% for low, moderate, and high thresholds, respectively) or the nontreated check (average of 1.8%). There were no differences in peanut grade, % damaged kernels, or price/ton between the calendar and threshold based treatments. Yield was higher for the low threshold based treatment (5131 lbs/acre) than for the moderate (4764 lbs/acre) and high (4685 lbs/acre) threshold based treatments or the nontreated check (4729 lbs/acre). The low threshold treatment had similar yield to the calendar based treatments using only Abound FL (5000 lbs/acre). When the price/ton was used to calculate a value/acre for the peanuts, and then the fungicide costs were subtracted, there were no differences between any fungicide treatments and the nontreated check.

SYMPOSIUM
"THE ORPHAN LEGUME GENOME WHO'S TIME HAS COME"

Genome Sequences in *Arachis* . S.A. JACKSON*, Center for Applied Genetic Technologies, University of Georgia, Athens, GA 30621.

Sequencing of the peanut genome, as well as two putative diploid ancestors, has been recently undertaken by an international consortium. This sequencing is being done in conjunction with the generation of high-density genetic maps that will be used to help anchor the genome sequences. An update on sequencing progress and activities of the consortium will be provided.

Potential Economic Impact of the Peanut Genomic Project (PGP). H.VALENTINE*, Peanut Foundation, Jasper, GA 30143.

The Peanut Foundation began organizing the Peanut Genomics Initiative (PGI) in 2005. The peanut industry felt that the cost of producing peanuts in the US was making US peanuts uncompetitive with other global origins and with other crops in the US. This talk will examine the cost savings for the US peanut industry through the use of Marker Assisted Selection in developing new varieties. The traits that the PGI identified in 2005 as important to the industry were disease resistance, drought tolerance, and improve nutritional benefits. All three of these areas of improvement will benefit the industry economically by reducing the cost of production, reducing water usage, and making the peanut more marketable based on improved nutrition. An additional effort on improving the sustainability of peanut has set the base levels for greenhouse gases, water usage, soil erosion, and energy consumption. This PGP will continue to help the industry show improvement in all these areas over the next several decades and make US peanuts a more sustainable crop. The PGP is an international effort as well and will also make peanuts a more sustainable crop in developing countries where there are limited resources for producing high protein crops such as peanut.

Development and Phenotyping of Recombinant Inbred Line (RIL) Populations. C. C. HOLBROOK[1*], T. G. ISLEIB[2], P. OZIAS-AKINS[3], Y. CHU[3], S. J. KNAPP[4], B. TILLMAN[5], C. L. WU[3], B. GUO[6], R. GILL[7], and M. D. BURROW[8]. [1]USDA-ARS, Tifton, GA 31793; [2]North Carolina State Univ., Raleigh, NC; [3]Univ. of Georgia, Tifton, GA; [4]Monsanto, Woodland, CA; [5]University of Florida, Marianna, FL; [6]USDA-ARS, Tifton, GA; [7]Institute of Plant

Breeding and Genetics and Genomics, The University of Georgia Tifton Campus; [8]Texas A&M, Lubbock, TX.

Development and phenotypic evaluation of recombinant inbred line (RIL) populations, along with molecular genotyping, will be essential for marker development. The primary objective of this research is to develop 16 structured RIL populations that can be used by the peanut research community, and to begin high-resolution phenotyping of these populations. Crosses were made using a 2 x 8 (common x unique) factorial nested association mapping design. Parents were selected to attempt to maximize genetic diversity while meeting practical breeding objectives. First, two modern runner cultivars (Tifrunner and Florida 07) were selected as common parents because runner cultivars account for about 80% of the production in the US. Second, the eight unique parents were selected to supply diversity across market classes and botanical varieties and are donor of favorable alleles for enhancing drought tolerance and resistance to most important diseases of peanut in the US. The eight unique parents are a Bailey derived high O/L breeding line, C76-16, NC 3033, SPT06-6, SSD 6, Olin, New Mexico Valencia A, and Florunner. The 16 populations were advanced using summer and winter nurseries. An update on the current status of these populations will be presented. A plan for phenotyping, including some preliminary data, will also be discussed.

<u>Bioinformatics resources for crop improvement in peanut and across the legumes</u>. S.B. CANNON*, USDA-ARS and Department of Agronomy, Iowa State University, Ames, IA 50011.

Breeding projects typically focus on single crop species, both because of the challenges of maintaining stocks and breeding lines, and because of the specialized, deep knowledge required about the particular germplasm resources, growth patterns, and breeding objectives for a single crop. Nevertheless, genomic information such as genes, markers, and QTLs are often transferrable – via conserved genomic regions – across long taxonomic distances. The Legume Information System, SoyBase, and several other legume database projects are working to integrate gene annotations, genome sequences, markers, and trait information, across all legumes. I discuss features of a peanut genomic database and web portal, and prospects for use of this information for use in several kinds of breeding programs, and in direct gene manipulation across species using techniques such as targeted editing using zinc finger nucleases.

<u>The Value of Diploid Peanut Relatives for Breeding and Genomics</u>**.** H.T. STALKER* and S.P. TALLURY, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; P. OZIAS-AKINS, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793-0748; D.A. Bertioli, Catholic University of Brasília, Campus II, SGAN 916, CEP 70.790-160, Brasília, DF, Brazil; and S.C.M. LEAL-BERTIOLI, EMBRAPA Genetic Resources and Biotechnology, C.P. 02372, CEP 70.770-900, Brasília, DF, Brazil.

The genus *Arachis* has 80 named species that are divided into nine sectional groups based on both morphology and cross compatibility relationships. The cultivated peanut (*Arachis hypogaea* L.; $2n = 4x = 40$; AB genomes) is a member of section *Arachis* along with 29 diploid species ($2n = 2x = 20$; A, B, D genomes). Many of the *Arachis* species have extremely high levels of disease or pest resistances to many of the most economically important problems of peanut, for example to early and late leaf spots, tomato spotted wilt virus, rust, and postharvest aflatoxin. Introgression to the cultivated peanut is difficult, however, because of sterility and ploidy differences between the diploid species and tetraploid cultivated species. *Arachis hypogaea* is completely incompatible with species of the other eight sections, thus the majority of hybridization and molecular research has been within section *Arachis*. Selection of fertile interspecific crosses between *A. hypogaea* and diploid species has resulted in small blocks of diploid chromosomes being incorporated into the *A. hypogaea* genome at multiple chromosomes sites; and improved germplasm lines and cultivars have been released with several disease and nematode resistances. On a molecular level, species are highly variable among and with species as opposed to significantly less variation within *A. hypogaea.* The described sections of *Arachis* are more loosely defined based on molecular analyses. The progenitor species of *A. hypogaea* have been confirmed using molecular data; and the first maps of peanut were made with interspecific hybrids between two diploid species of section *Arachis*. High density maps of A and B genome species have been produced which will aid in developing markers for selection by plant breeders. Several traits have been linked to molecular markers and recombinant inbred lines of A and B genome species are being produced to identify additional linkages of disease resistance traits. Genomic analyses of wild peanut species have identified the origin of the allergen proteins in cultivated peanut, which is useful for designing breeding programs. High-throughput genotyping of cultivated and synthetic tetraploids with Illumina GoldenGate SNP arrays confirmed previous observations with SSRs that showed the synthetic x cultivated hybrid polymorphism is greater than among cultivated lines. SNP arrays also have been useful for genotyping of A- and B-genome diploids in order to select parents that could maximize polymorphic markers between amphidiploids and *A. hypogaea*. Using molecular markers to tag traits derived from interspecific hybrids will be significantly easier than tagging traits in crosses between cultivated lines.

Recent Advances in Molecular Genetic Linkage Maps of Cultivated Peanut (*Arachis hypogaea* L.). B.Z. GUO[1*], M.K. PANDEY[1,2,3], A.K. CULBREATH[2], R.K. VARSHNEY[3]. [1]USDA-ARS, Tifton, GA 31793; [2]University of Georgia, Department of Plant Pathology, Tifton, GA; [3]International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India.

The competitiveness of peanuts in domestic and global markets has been threatened by losses in productivity and quality that are attributed to diseases, pests, environmental stresses and allergy or food safety issues. Narrow genetic diversity and deficiency of polymorphic DNA markers have severely hindered construction of dense genetic maps for effective QTL analysis to deploy linked markers in marker-assisted peanut improvement. Peanut Genome Initiative (PGI) was formed in 2004 and expended to a global effort in 2006 to coordinate the research in molecular marker development and improvement of map resolution and coverage, which would enhance genetic map utilization and facilitate QTL analysis for marker-assisted selection in peanut breeding programs. Thereafter, recent years have witnessed accelerated development of genomic resources in peanut such as generation of expressed sequenced tags (ESTs) (252,832 ESTs as March 2012 in the public NCBI EST database), development of molecular markers (over 6,000 SSRs), and cultivated peanut genetic maps that facilitate the identification of QTLs and discovery of markers/genes associated with resistance to biotic and abiotic stresses and agronomic traits. As a result molecular marker-assisted breeding for several traits has been successfully initiated. Based on 11 genetic maps, an international reference genetic map comprising of 897 marker loci has been developed. As a part of the Peanut Genome Project, the international peanut community has initiated genome sequencing. Developed reference genetic map together with SNP-based genetic maps for diploid species and BAC-based physical map will assist the assembly of the whole genome sequences. The ultimate goal of genome research is to find all the genes or gene spaces and to develop tools for using in genetic improvement and genetic study of peanut. Soon availability of peanut genome sequences and genomic tools will accelerate the use of biotechnological approaches for peanut improvement.

Generation of ultra-dense genetic maps for the A and B genomes of peanut. L. FROENICKE*, C. BEITEL, D. SCAGLIONE, R.W. MICHELMORE, Genome Center, University of California Davis, Davis, California 95616, D. BERTIOLI, Catholic University of Brasília, Brasília, DF, Brazil, M.C. MORETZSOHN, P. GUIMARAES, S.C.M. LEAL-BERTIOLI, Embrapa Recursos Genéticos e Biotecnologia, Brasília, DF, Brazil, M. PANDEY and H.D. UPADHYAYA, R.K. Varshney, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India.

As part of the International Peanut Genome Initiative we are generating ultra-high density genetic maps through genotyping by low coverage, whole genome, shotgun sequencing. These maps will be generated by sequencing recombinant inbred line (RIL) mapping populations of the diploid wild progenitor species of both the peanut A and B genomes. The gene space of the parental lines of each RIL population (at 20x coverage) and of each of 92 RILs (at 1x coverage) and each accession of the diversity panel accessions are being sequenced using an Illumina HiSeq 2000. In contrast to previous mapping-by-sequencing efforts, these maps are being generated for species that lack an existing reference genome using a new genome mapping pipeline. This has been used to generate an ultra-dense map of *Arachis ipaensis* (B genome). The SNPs identified in the diversity panel will be analyzed for linkage disequilibrium and the LD data will be used to refine the order of loci within the genetic bins generated from analysis of the RIL segregation data. These maps will assist the assembly of the reference genome for cultivated peanut and provide the foundation for further GWAS and QTL mapping studies.

HARVESTING, CURING, SHELLING, STORING AND HANDLING PROCESSING AND UTILIZATION

Changes in Seed Sugar Pools during Roasting of Different Peanut Genotypes. D.A. SMYTH* and A.A.CARDONA, Kraft Foods, Research & Development, 200 DeForest Ave., East Hanover, NJ 07936; and M.SILVENT, Reading Scientific Ltd., Reading Science Center, Pepper Lane, Reading RG6 6LA

Free sugars in peanut seeds (*Arachis hypogaea* L.) contribute to the flavor and color of roasted snack nuts. It is known that plant growing conditions and seed genetic composition influence the amount of free sugars, and that high concentrations are correlated with more accelerated roasting process and sweeter finished products. In this study, the seed sugar concentrations for 11 peanut cultivars from the 2010 crop were measured by liquid chromatography in both raw seed, and after roasting the seeds for 8-14 minutes at 320o F in a forced air oven. The goal was to determine if there was a relationship between the changes in sugar concentration during roasting, and the processed snack nut properties of roast color development and roasted peanut flavor in these superior peanut genotypes. Raw seed sugar concentrations varied approximately twofold among the 11 cultivars with cultivar ACI-149 grown in Texas containing the highest concentrations of sucrose (48,221 mg/kg dry weight), stachyose (3,942), raffinose (987), inositol (433), and glucose (563). Cultivars Florida Fancy and Georgia 09B grown in Georgia had some of the lowest sugar concentrations. Low levels of fructose were detected during the roasting process in all cultivars which suggest active sucrose hydrolysis was occurring during roasting. Sugar consumption rates for cultivar ACI-149/Texas were 4556, 447, 63, and 62 mg/kg dry weight/10 minutes for sucrose, stachyose, raffinose, and inositol, respectively. The rate of roast color development (-Δ CIE L*/10 minutes) during roasting did show some relationship to amount of free sugar in the seed. For example, the higher sugar examples of cultivars ACI-149 and Florida Fancy grown in Texas had roast color rates of 11.42 and 9.79, respectively, and rates of 6.09 and 7.48 when grown in Georgia. Roast flavor developed differently among the 11 cultivars. Consumption of the free sugars during roasting was variable among different cultivars, but clearly the majority of these potential flavor reactants did not participate during the roasting process. More sophisticated techniques will be required to link specific free sugars to the formation of desirable peanut flavor.

Value Added Processing of Aflatoxin Contaminated Peanut Meal. B.L. WHITE*, A.J. OAKES, USDA ARS, Market Quality and Handling Research Unit, Raleigh, NC 27695; X. SHI, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, NC 27695; M. LAMB, V. SOBOLEV, USDA ARS, National Peanut Research Laboratory, Dawson, GA 39842;T.H.SANDERS J.P.DAVIS* USDA ARS, Market Quality and Handling Research Unit, Raleigh, NC 27695.

Peanut meal (PM) is the solid material remaining after commercial extraction of oil. Despite being an excellent source of high quality protein, applications of PM are limited to feed markets as this material typically contains high concentrations of aflatoxin. Our research group has developed a novel processing technology for sequestering aflatoxin from contaminated PM to generate protein/peptide concentrates with negligible aflatoxin levels. For the current study, this process was evaluated for the first time on the pilot scale to better understand commercial potential. Approximate 400 L aqueous dispersions (18% w/v) of aflatoxin contaminated PM (191 ppb dry weight) were mixed with one of two commercial available bentonite clays and the commercially available protease, Alcalase, in a jacketed mixer, hydrolyzed for 1 h, heated to inactive protease, and solids and liquids were separated using a decanter. Under optimum conditions, liquid hydrolysates derived from this process had > 95% reduction in dry weight aflatoxin when clays were present due to aflatoxin sequestration. There were no significant differences in angiotensin-converting enzyme (ACE) inhibition among clay type or amount, with liquid hydrolysates having an IC_{50} value of 297.5 µg/mL. After ultrafiltration, the fraction that exhibited the highest inhibitory activity was the <3 kDa fraction (IC_{50} = 113.0 µg/mL), indicating that low molecular weight peptides are more affective ACE inhibitors than larger ones. Insoluble solids derived from this process had >80% reduction in aflatoxin when clay was present compared to an approximate 33% reduction for control samples lacking clay. Insoluble fractions were dried and proximate compositions determined for a separate turkey poult feeding study. These results suggest that this novel process is feasible on a commercial scale, and further research is needed to explore potential functional food applications for PM hydrolysates.

Near Infrared Reflectance Spectroscopic Method to Determine Moisture Content and Fatty Acid Composition in In-Shell Peanuts. C.V.K. KANDALA*, National Peanut Research Laboratory, USDA, ARS, Dawson, GA 39842, J. SUNDARAM, Russell Research Center, Athens, GA 30605 and N. PUPPALA, Peanut Breeder, New Mexico State University, Clovis, NM 88101)

Near Infrared (NIR) Reflectance spectroscopy has established itself as an important analytical technique in the field of food and agriculture. It is quicker and easier to use and does not require processing the samples with corrosive chemicals such as acids or hydroxides. However, for a long time the samples had to be grounded into powder form before making any measurements. Thanks to the development of new soft ware packages for use with NIR instruments, NIR techniques could be used in the analysis of intact grains and seeds. While most of the commercial instruments presently available work well with small grain size materials such as wheat and corn, they were found to be unsuitable for large kernel size products such as shelled or in-shell peanuts. In this paper principles of NIR Reflectance spectroscopy are discussed in particular reference to the water and oil bands, and the application of NIR in the rapid and nondestructive measurement of moisture and total oil contents in shelled and in-shell peanuts. Ability to rapidly and nondestructively measure the water and total oil content, and analyze the fatty acid composition, will be immensely useful in the grading process of grain and nuts.

Development of Oral Immunotherapy (OIT) and Sublingual Immunotherapy (SLIT) for the Treatment of Peanut Allergy. M.D. KULIS*, A.W. BURKS, University of North Carolina Children's Hospital, Chapel Hill, NC 27514

Peanut allergy is an immunologic disease affecting approximately 1% of the United States. Strict dietary avoidance of peanuts is required to prevent allergic reactions, which can result in life-threatening anaphylaxis. Currently, no therapeutic options are available. Our research group has performed double-blind, placebo-controlled clinical trials to assess safety, efficacy, and immunologic changes with oral (OIT) and sublingual immunotherapy (SLIT) for peanut allergy in children. Subjects received initial doses of peanut below the threshold for inducing allergic reactions (< 1 mg), which was gradually escalated to maintenance dosing of 4000 mg for OIT and 2 mg for SLIT. Following 12 months of therapy, subjects underwent a food challenge with peanut. 16 of 18 subjects on OIT and 7 of 26 subjects on SLIT (median age 8.6 and 8.8 years, respectively) passed the peanut challenge after 12 months of treatment. Both OIT and SLIT treatment were superior to placebo ($p<0.01$). Immunologic changes associated with both OIT and SLIT included decreased skin prick tests; decreased basophil degranulation; increased peanut-specific IgG4; decreased allergenic T cell (Th2-type) responses; and increased regulatory T cell (Treg) responses. SLIT therapy resulted in fewer allergic side effects than OIT, while OIT induced more dramatic immunologic changes. Both OIT and SLIT therapy for peanut allergy are experimental and should not be performed outside of a clinical research study.

Peanut Origin Quality Comparisons. 1986-2011. T.H. SANDERS*, L.O. DEAN, and K.H HENDRIX. USDA, ARS, Market Quality and Handling Research Unit, NCSU, Raleigh, NC 27695.

Flavor and composition relative to quality and shelf life have been compared four times in the last 25 years on peanuts produced in the United States, Argentina, and China. Descriptive sensory analysis indicated consistently higher intensities of roasted peanut flavor and fewer and/or lower intensity of off flavors in lots of peanuts from the United States. Peanut lots from China were characterized by higher levels of bitter taste while peanut lots from Argentina were characterized by fruity fermented off flavor. In sequential studies, the frequency of fruity fermented off flavor In Argentina peanuts remained about the same but overall intensity decreased. An extensive European consumer study demonstrated more consistent flavor liking for peanuts produced in the United States than the other two origins. Oleic and linoleic fatty acid composition analyses revealed a consistently higher O/L ratio in peanuts produced in the United States. Until the 2010 crop year, tocopherol content was highest in peanut produced in the United States. Oxidative stability index was consistently higher in peanuts produced in the United States. Sample lots were selected from similar count per ounce lots by manufacturers but seed size distributions in the count per ounce lots were more consistent in peanut produced in the United States.

Hypoallergenic Edible Peanut Protein Matrix to Enable Novel Functional Food & Immunotherapy Applications M.H. GRACE, M.A. LILA, Plants for Human Health Institute, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Kannapolis, NC 28081; B.L.WHITE*, K.M. PRICE, T.H. SANDERS, J.P. DAVIS, Market Quality and Handling Research Unit, USDA ARS, North Carolina State University, Raleigh, NC 27695; and M. KULIS, A.W. BURKS, Department of Pediatrics, University of North Carolina School of Medicine, Chapel Hill, NC 27514

Peanut allergies can present life-threatening consequences; therefore, there is an intense interest in developing therapeutic strategies that could reduce the danger and severity of the allergic reaction in peanut sensitive patients. We have developed a unique technology to modify or mask allergenic epitopes in peanut flour by complexing them with health-protective phytochemicals derived from fruits and vegetables, without using solvents or artificial additives. Allergenicity of modified peanut flours was evaluated *in vitro* using SDS-PAGE and Western Blotting to measure IgE binding after exposure to sera from peanut-allergic patients. The ability of the modified flours to attenuate degranulation and histamine release from basophils was also evaluated using blood from peanut-allergic patients. Flours complexed with proanthocyanidin-rich cranberry juice concentrate demonstrated a significant reduction in IgE binding such that only trace binding was observed. These flours also showed less degranulation, compared to unmodified peanut flour preparations. Peanut flours enriched with cranberry polyphenols had significantly reduced basophil activation capacity (~50%), compared to unmodified peanut flours. Flours fortified with purified cranberry anthocyanins or proanthocyanidins in the presence of tyrosinase enzyme also showed a substantial decrease in basophil degranulation. Additionally, attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR) spectra suggested that the secondary structures of the proteins were significantly altered after complexation with proanthocyanidin-rich extracts, but not by extracts containing only anthocyanins and other flavonoids. Our results demonstrate this technology is successful for modifying the allergenicity of milled peanut flour by complexing with fruit polyphenols, in particular, oligomeric proanthocyanidins. The polyphenol-fortified peanut protein edible matrix has potential in immunotherapy and novel functional food applications.

Immunity Enhancement and Characterization of Bioactive Peanut Sprout Powder and Purified Peanut Arachidin-1. S. -M. LIN[1], W.-C. KO[1], J.-C. CHANG[1], F. L. HUANG[1], B. B.-C. WENG[2], S.-H. WANG[1], R. Y.-Y. CHIOU[1]*, [1]Department of Food Science, National Chiayi University, Chiayi 60051, Taiwan, ROC.; [2]Department of Microbiology, Immunology and Biopharmaceuticals, National Chiayi University, Chiayi, Taiwan, ROC.

Bioactive stilbenoids including resveratrol are characterized as the secondary metabolites biosynthesized by the germinating peanut kernels. After germination for an appropriate period, the germination-enhanced peanut kernels were further processed by heat treatment, grinding and de-fatting in preparation of bioactive peanut sprout powder (BPSP). In assessment of immune functions of dietary BPSP, 8-wk-old BALB/c mice were fed with diets supplemented with various levels of BPSP. Based on effectiveness of mitogen-activated cell proliferation of the spleen lymphocytes and cytokines secretion, a dose-dependent increase on immunomodulatory activity was observed. In further purification and isolation of arachidin-1, one of the most potent antioxidant stilbenoids ever tested, and subjection to oral administration with mice by various doses, arachidin-1 was effective in enhancement of immune functions.

Phytoestrogenic Activity of Resveratrol and Peanut Arachidin-1. B. B.-C. WENG[1]*, W.-H. Lin[1], C.-W. HU[1], S.-M. LIN2, J.-C. CHANG[2], R. Y.-Y. CHIOU[2], [1]Department of Microbiology, Immunology and Biopharmaceuticals, National Chiayi University, Chiayi 60051, Taiwan, ROC.; [2]Department of Food Science, National Chiayi University, Chiayi 60051, Taiwan, ROC.

High estrogen level is correlated to increased circulating CD4+CD25+ regulatory T cells in mediating immunohomeostasis. Resveratrol possesses phytoestrogenic property exhibiting a variety of immunosuppressive activities, including suppression on T cells proliferation, enhancement of IL-10 generation, and retarding autoimmune diseases. In this study, resveratrol (Res) and peanut arachidin-1 (Ara) were subjected to comparison with 17-β-estradiol (E2) on CD4+CD25+ Tregs population and immunosuppressive activity of ConA activated T cell repertories of splenocytes or thymocytes. Ratios of CD4+CD25+ cell population in ConA activated T cell repertories were not affected by pre-incubation with Res, Ara or E2 measured by flow cytometry. Immunosuppressive related molecules, CTLA-4, FoxP3, IL-10 and TGF-β were upregulated by Ara, Res and E2. Inhibitory effects of Ara and Res and E2 on ConA activated lymphocytes proliferation were recovered by estrogen receptor blocker, tamoxifen. When low (L-S-PNT) and high (H-S-PNT) levels bioactive peanut sprout powder fortified diets were provided ad libitum to 6 mo-old CD-1 mice for 48 wks, their circulating CD4+CD25+ Tregs populations were assessed, and gene expressions of CTLA-4 and TGF-β of magnetic beads enriched Tregs were significantly ($P < 0.05$) elevated as assessed via semi-quantitative RT-PCR.

RTK GPS and Automatic Steering for Peanut Digging. G. ROBERSON* and D. JORDAN, North Carolina State University, Raleigh, NC 27695.

Yield loss during digging is a key concern for peanut growers. Losses can come from the peanut digger blades, the transition from the blade up to the shaker, the shaker chain, the transition from the shaker chain to the inverter and the inverter. These potential losses may be compounded by the inability of the equipment operator to accurately position the digger over the peanut row during the digging operation. To address this concern, the use of RTK-GPS based automatic steering systems for peanut digging was evaluated. Autmatic steering guidelines were created during planting and used to guide the implement during digging. Digging tests were conducted on plots with and without an application of Apogee, with manual steering and automatic steering, and with straight and curved or crooked rows. Results to date indicate a potential average yield increase of approximately 300 pound per acre when automatic steering was employed.

Assessment of GreenSeeker® in Peanut Disease Detection. D. ISAEV*, G. ROBERSON, M. BOYETTE, and D. JORDAN, North Carolina State University, Raleigh, NC 27695.

Crop diseases, especially soil-borne disease, often commonly occur in patchy patterns throughout field peanut fields. The patchy distribution creates the possibility for growers to use precision agriculture tools to manage disease based on location in the field. In most instances pesticides are applied uniformly irrespective of distribution of disease. This method of disease management can increase production costs and in some instances may have adverse environmental impact. Consequently, having a device that can distinguish between healthy and stressed crop canopies that can be used to develop disease maps of fields would be a potential asset for farmers. The active optical sensor, GreenSeeker®, was used to assess disease incidence in peanut beginning in mid-August (2011) through October (2011). Reflectance of the peanut canopy was used to calculate the normalized difference vegetation index (NDVI) which was correlated with visual disease assessment and yield of peanut. A negative correlation between NDVI and visual disease assessment was observed suggesting that peanut with disease present a lower NDVI ratio. Correlation results between yield and NDVI ratio were positive indicating peanut with higher yields have higher NDVI ratios. Results from all statistical analyses demonstrate that GreenSeeker® can be applicable for disease detection in peanut. However, accurate identification disease or other biotic and abiotic stress will be critical in proper use of field maps developed for future management in specific fields.

MINUTES OF THE BOARD OF DIRECTORS MEETING
44th Annual Meeting,
Raleigh, NC
10 July 2012

President Todd Baughman called the meeting to order at 32:30 PM and welcomed everyone. Attending the meeting were T. Baughman, J. Starr, A. Herbert, J. Davis, H. Valentine, T. Brenneman, T. Grey, C. Butts, D. Rowland, P. Dotray, R. Kemerit, J. Beasley, P. Donahue, J. Elder, C. Goodsey, N. Puppala.

Pres. Baughm called on J. Starr, Executive Officer, to present the minutes of the last Board of Directors meeting, conducted at the 2011 Annual Meeting held in San Antonio Texas. The minutes as reported in the 2011 Proceedings, vol. 43, were approved.

The following reports were presented to and approved by the Board. Listed at actions taken by the Board of Directors. Unless noted otherwise, the Board voted to accept each report as presented. Full reports from each committee are produced elsewhere in these proceedings,

Executive Officer Report – The Administrative Assistant Irene Nichols retired December 31, 2011, the position was left vacant and all operations of APRES in Oklahoma were closed. The mailing addressed was changed to APRES, PO Box 15825, College Station, TX 77841. I have employed a bookkeeping service (Excel Bookkeeping) in Bryan Texas to assist with financial aspects of the Society's affairs and have taken personal responsibility for all other activities formally handled by the Administrative Assistant. I have also begun making greater use of electronic systems (email and postings on our website) for communications with our membership. As a result these actions I expect the operating expenses of the Society to be reduced by about $6,000 for 2011/2012 and by about $10,000 annually in future years, mostly due to a reduction in expenditures for salary. The financial affairs of the Society are good, as detailed in the report from the Finance Committee. I give formal notice to the Board of Directors of my intention to resign as Executive Officer of the Society, effective with the 2013 meeting of the Society but will be available thereafter as needed for the transition of activities and responsibilities to a new Executive Officer. I recommend that the Society adopt a 1 January to 31 December fiscal year to enable greater coordination of expenses and revenues. These items are both centered around the annual meeting but are currently in different fiscal years. The Board accepted the recommendation to initiate a search for a new Executive Officer and to adopt a 1 January to 31 December.

Program Committee –
There were 201 persons registered for the meeting, with 108 presentation (including 19 poster presentations. The presentations covered the following topics: Breeding, Biotechnology, and Genetics; Production Technology, Physiology, and Seed Technology; Weed Science; Economics; Plant Pathology, Nematology and Entomology; the Bayer Excellence in Extension and Extension Technology session and the Joe Sugg Graduate Student Competion. Additionally, there was a special symposium entitled "the Orphan Legume Genomic Who's Time Has Come".

Finance Committee –
The committee was asked to prepare a contingency plan for any remaining assets if APRES should cease to exist for some reason. Our recommendation is that in such an event, all assets would be used to establish one or more research fellowships to be awarded competitively to graduate students working on peanuts. These funds would be held, and administered, by the American Peanut Council providing they agree to do so.

Providing staff salaries and benefits is evolving with the retirement of Irene Nickels in December, 2011. The Executive Officer, Jim Starr, was given an increased stipend to assume those duties, and additional funds were allocated for bookkeeping services. We recommend those arrangements be continued for another year, with no changes made to the current budget. We recognize that significant changes will be forthcoming with the planned retirement of Dr. Starr, and actions taken by the Board of Directors to replace him.

Site Selection Committee – The APRES Site Selection Committee reported that the 2013 APRES annual meeting will be held July 9-11 at the Brasstown Valley Resort near Young Harris, GA. The 2014

APRES annual meeting will be held in the Southwest region. Jason Woodward (Texas A&M University / Texas Tech University) and Todd Baughman (Oklahoma State University). Upon approval from the committee, Jason and Todd will work with Jim Starr, APRES Executive Officer, to finalize a contract on the recommended property. Timeline for completing this task is within a month of the 2012 annual meeting. The proposed meeting dates for the 2014 meeting are July 8-10. The 2015 meeting will be held in the Virginia-Carolina region. The 2016 annual meeting will be held in the Southeast region.
The Board approved twh requested action items; 1) to negotiate a block of rooms (number or percentage of total rooms blocked to be determined and negotiated with property) at or as close to the federal per diem as possible, and 2) Barry Tillman and Nick Dufault have been asked to communicate with the leadership of the Southern Peanut Farmers Federation about the possibility of holding the 2016 APRES meeting the Tuesday-Thursday prior to the Southern Peanut Growers Conference.

The Board was asked to increase the number of members on this committee. This request will require a revision of the existing By-Laws and will be considered in the future.

Nominating Committee –
The nominating committee would like to propose the following individuals to fill the positions that are rotating vacant after the 2012 APRES meeting:

President-elect Tim Brenneman
BOD (Industry-Production) Keith Rucker

Public Relations Committee - The Committee offered three resolutions honoring the contributions and life's of three recently deceased members of the Society, namely William M. Birdsong, Jr., William E. Dykes, Sr., and Ray O. Hammons.

Publications and Editorial Committee – The committee also recommended that the board consider paying for the extra service offered by Allen Press to upload reviewer comments on manuscript documents.
Milbra Schweikert will remain as the web designer. The committee recommends linking the main part of the Proceedings with the committee reports. On some links this is the case, while on others, the two are separate. The committee also recommended the addition of job listings on the website.

Editor of Peanut Science – No items for Board approval or action.

Peanut Quality – No items for Board approval or action.

Bailey Award Committee – Of the 7 papers from the 2011 APRES meeting that were nominated for the 2012 APRES Bailey Award Committee, 4 manuscripts were submitted for award consideration. Based on the committee's review, Diane Rowland has been selected as the 2012 Bailey Award Winner for the paper, **Digital Analysis System to Evaluate Peanut Maturity: Predicting Yield and Grade.** D.L. ROWLAND[1]*, B.C. COLVIN[1], W.H. FAIRCLOTH[2], and J.A. FERRELL[1]

Coyt T. Wilson Distinguished Services Award Committee – The Coyt T Wilson Service Award Committee has reached a unanimous recommendation for the 2012 award: Dr. Pat Phipps.

Dow Agrosciences Awards Committee – The committee has selected Tim Sanders to receive the Dow AgroSciences research award and Todd Baughman to receive the Dow AgroSciences Education award.

Fellows Award Committee – The Board approved the recommendation of the committee that Kelly D. Chamberlin, Robin Y. Y. Ciou, and W. Carroll Johnson III be named as Fellows of APRES. Additionally,the Board approved the recommendation that nominations be submitted electronically to the committee and further, that members of the Board of Directors be made eligible to receive the Fellows Award.

J**oe Sugg Graduate Student Award Committe**e – No Items for Board approval or action.

BUSINESS MEETING AND AWARDS CEREMONY
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Sheraton Raleigh Hotel,
Raleigh, North Carolina
July 12, 2012

1. **President's Report**...
3. **Reading of Minutes of Previous Meeting**

4. **New Business**

a. Nominating Committee .... Barbara Shew
b. Finance Committee... Kelly Chamberlin
c. Public Relations Committee .... Ryan Lepicier
d. Peanut Quality Committee .... Victor Nwosu
e. Site Selection Committee.. Barry Tillman
f. Publications and Editorial Committee... Diane Rowland
g. Program Committee... Todd Baughman
h. Other Business

5. **Adjourn**

APRES COMMITTEE REPORTS

FINANCE COMMITTEE REPORT - Overall, APRES remains in good financial condition. We ended the 2011/2012 fiscal year with a net gain of approximately $5,000. The society's reserves continue to grow despite the current low interest rates, with holdings of ca $30,000 in a Money Market account earning 0.3%. The society also has ca $129,000 in certificates of deposit earning 1-2% interest. The rate on new CD's is about 0.5%, prompting the committee to investigate other options for increasing interest income. These include interest checking accounts and possibly short term bond funds. The latter are relatively stable and offer potentially higher returns, but are not FDIC insured and would involve some level of risk. These options are being evaluated further.

The committee was asked to prepare a contingency plan for any remaining assets if APRES should cease to exist for some reason. Our recommendation is that in such an event, all assets would be used to establish one or more research fellowships to be awarded competitively to graduate students working on peanuts. These funds would be held, and administered, by the American Peanut Council providing they agree to do so.

Providing staff salaries and benefits is evolving with the retirement of Irene Nickels in December, 2011. The Executive Officer, Jim Starr, was given an increased stipend to assume those duties, and additional funds were allocated for bookkeeping services. We recommend those arrangements be continued for another year, with no changes made to the current budget. We recognize that significant changes will be forthcoming with the planned retirement of Dr. Starr, and actions taken by the Board of Directors to replace him.

PUBLIC RELATIONS COMMITTEE REPORT – The Committee offered three resolutions honoring the contributions and life's of three recently deceased members of the Society, namely William M. Birdsong, Jr., William E. Dykes, Sr., and Ray O. Hammons.

Resolution by the American Peanut Research and Education Society Honoring

William (Bill) McLemore Birdsong Jr.

Whereas, William (Bill) McLemore Birdsong Jr. was born January 6, 1934, to Yancey B. and William

McLemore Birdsong Sr. of Suffolk, Virginia, and earned the rank of Eagle Scout in 1948 from Boy Scout Troop 1, graduated from Suffolk High School in 1952 and graduated from Randolph Macon College with a Bachelor of Arts degree in Business Administration in 1956.

Whereas, William Birdsong Jr. served two years of active duty in the U.S. Army after college and then began his career as an employee of Birdsong Peanut in 1957, learning all phases of the plant before working in the Franklin office in 1964, and becoming the vice president of the company for 28 years.

Whereas, William Birdsong Jr. Bill was an active member and served as Chairman twice of High Street United Methodist Church in Franklin, was a supporter of the Boy Scouts, and having been an Eagle Scout he served on the Board of Directors and was awarded the Silver Beaver award in April of 1998. And, whereas, William Birdsong Jr. served as a Trustee of the Franklin-Southampton United Way, was a member and past president of the Franklin Rotary Club, served on the Cypress Cove Country Club Board, on the Board of Directors of the Virginia Crop Improvement Association, the Franklin Industrial Authority Board, the Board of Directors of Southampton Memorial Hospital, Virginia Agribusiness Council and was appointed to the Board of the Virginia Foundation for Agriculture in the Classroom by the VA Farm Bureau.

Whereas, William Birdsong Jr. passed away December 10, 2011, in Sentara Virginia Beach Hospital after a brief bout with cancer and was surrounded by his wife, Dale Brothers Birdsong of 54 years and their three children.

Whereas, William Birdsong Jr. was preceded in death by father William McLemore Birdsong, Sr. of Suffolk, Virginia; and is survived by his wife Dale Brothers Birdsong; his mother Yancey B. Birdsong; his son William McLemore Birdsong, III and his wife Betsy of Courtland, Virginia; his son Everett Brooking Birdsong and his wife Miriam, of Suffolk, Virginia; his daughter, Chris Birdsong White and her husband, Rob, of Richmond, Virginia; and six grandchildren; Everett Brooking Birdsong Jr., William McLemore Birdsong IV, Sarah Lillie Birdsong, Charles Phillip Birdsong, Ali Russell White, and Wyndham Robertson White V.

Be it resolved on this day, July 12, 2012, at the 44th annual meeting in Raleigh, North Carolina, that the American Peanut Research and Education Society remembers and honors the life of William (Bill) McLemore Birdsong Jr., his worthwhile contributions to the peanut industry, his influence in his community and his support of APRES.

Resolution by the American Peanut Research and Education Society Honoring

William E. (Bill) Dykes Sr.

Whereas, William E. (Bill) Dykes Sr. was born in 1922, served in the U.S. Army during World War II and earned his engineering degree at Georgia Tech following his service.

Whereas, William Dykes Sr. became an engineer at McNeel Marble Company in Marietta, Georgia, and then purchased Peerless Manufacturing Company in Shellman, Georgia, in 1973; owning the company throughout his life and making his mark on the peanut industry.

Whereas, William Dykes Sr. passed away on Thursday, January 26, 2012, at age of 90 and was preceded in death by his wife, Rebecca W. Dykes; is survived by his son William E. (Bill) Dykes Jr. and wife Meredith; his son, Michael L. Dykes of Albany; two granddaughters, three grandsons, and four great grandsons.

Be it resolved on this day, July 12, 2012 at the 44th annual meeting in Raleigh, North Carolina, that the American Peanut Research and Education Society remembers and honors the life of William E. (Bill) Dykes Sr., his lifelong contributions to the peanut industry and his service to APRES.

Resolution by the American Peanut Research and Education Society Honoring

Dr. Ray Otto Hammons

Whereas, Dr. Ray Otto Hammons was born October 2, 1919, one of eleven children, near Wesson, Mississippi in Copiah County, graduated from Copiah County High School in 1938 as valedictorian, received an A.A. degree from Copiah-Lincoln Community College in 1941, received his B.S. and M.S. degrees in 1947 and 1948, respectively, from Mississippi State University, and his Ph.D. from North Carolina State University in 1953.

Whereas, Dr. Ray Hammons joined the U.S. Navy and served as a flight instructor and a naval aviator in the South Pacific during World War II, where he received the Distinguished Flying Cross for combat action in the Guadalcanal area.
Whereas, Dr. Ray Hammons joined the faculty of Purdue University where he taught for two years and then joined the USDA-ARS at Tifton in 1955 as a research geneticist in charge of peanut breeding, becoming Research Leader for the crops research unit in 1972 before retiring in 1984.

Whereas, Dr. Ray Hammons was one of three individuals, along with Dr. Kenneth Garren and Mr. Astor Perry, to be the first ever members of APRES elected as Fellow of APRES in 1982, was also named the 1975 winner of the Golden Peanut Research Award presented by the National Peanut Council, and was elected as a Fellow of the American Society of Agronomy in 1975. And, whereas, Dr. Ray Hammons traveled extensively across the globe serving as a premier expert on peanut genetics and wrote over 300 scientific articles. And, whereas, Dr. Ray Hammons authored the chapter "Early History and Origin of Peanut" In *Peanuts: Culture and Uses* published in 1973 by APRES, and the chapter, "Origin and Early History" In *Peanut Science and Technology* published in 1984 by APRES. And, whereas, Dr. Ray Hammons was the editor of *Peanut Research*, the long-time newsletter of APRES and served the society in numerous other capacities.
Whereas, Dr. Ray Hammons was a very active and longtime member of Northside Baptist Church in Tifton, GA where he served as a Deacon, taught Sunday School, and along with his wife Annie in 1993 co-authored the book, *The History of Northside Baptist Church*.

Whereas, Dr. Ray Hammons passed away on October 2, 2011, on his 92nd birthday, was preceded in death by his parents, four brothers, five sisters, and his son and is survived by his wife, three daughters and two sons-in-law, seven grandchildren, and eight great-grandchildren.

Be it resolved on this day, July 12, 2012 at the 44th annual meeting in Raleigh, North Carolina that the American Peanut Research and Education Society remembers and honors the life of Dr. Ray Hammons, his scientific contributions in peanut breeding and genetics, and his contributions to APRES.

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT - The committee met on July 10, 2012 at the annual APRES meeting in Raleigh, NC. The following members were present: James Grichar, Chris Butts, Tim Grey, Nathan Smith, Jason Woodward, and Diane Rowland. The following members were absent: Kira Bowen and Wilson Faircloth.

<u>The committee discussed the following items:</u>
1. Tim Grey will inquire with Allen Press about setting up some automated reminders for reviewers to turn in timely reviews.
2. The committee recommended that the review process for manuscripts be shortened to: 4 week review period, 1 week for AE decision after reviews are complete, and 1 week for Editor's final decision. This plan was communicated to the board.
3. The committee also recommended that the board consider paying for the extra service offered by Allen Press to upload reviewer comments on manuscript documents.
4. Milbra Schweikert will remain as the web designer. The committee recommends linking the main part of the Proceedings with the committee reports. On some links this is the case, while on others, the two are separate. The committee also recommended the addition of job listings on the website.
5. The committee discussed several possibilities for advertising Peanut Science and soliciting more submissions. Tim Grey will contact the Allen Press representative and inquire about the publisher's capability to increase the advertising and recruitment of new submissions, and if there is a cost

associated with it. Other possible avenues:

- Facebook/Google campaigns
- Ask department heads to announce Peanut Science to their faculty

6. If Allen Press has no avenues for further advertisement, it was suggested that (based on a previous suggestion by Todd Baughman) the board consider forming a new Technology Committee that could address the issue of recruitment and advertising for Peanut Science and APRES in general by taking advantage of new social media and technological venues.

Peanut Science Performance Report

	Jan 1 - Dec 30, 2011			Jan 01 - July 1, 2012		
Submission Report						
Manuscripts Received	24			8		
Manuscripts Returned to the Author and Removed by the Author	2			1		
Revisions Requested	33			14		
Revised Manuscripts Received	28			15		
Total Revisions Received	**Revision 1**	**Revision 2**		**Revision 1**	**Revision 2**	**Revision 3**
Revisions Submitted by Author	18	10		8	6	1
Revisions Declined by Author	3	0		0	0	0
Average Turnaround by Author (Days)	52	12		19	7	0
Journal Turnaround Time						
Submission to Technical Check Complete	13			20		
Technical Check Complete to Editor Assignment	0			1		
Submission to Editor Assignment	5			21		
Submission to Reviewer Invitation	19			30		
Submission to First Decision	104			104		

Jan 1 - Dec 30, 2011

Original Submission

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision
Accept	3	11.50%	85.3
Accept w/Major Revision	4	15.40%	144.5
Accept w/Minor Revision	3	11.50%	119.3
Accept With Revisions	10	38.50%	184.9
Reject	3	11.50%	143
Reject, Revise and Resubmit	3	11.50%	189
Total Editor Decisions	**26**	**100%**	**155.3**

Revision 1

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision
Accept	6	28.60%	65.2
Accept w/Minor Revision	5	23.80%	56.6
Accept With Revisions	8	38.10%	90.1
Reject	2	9.50%	78.5
Total Editor Decisions	**21**	**100%**	**73.9**

Revision 2

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision
Accept	10	100%	20.7
Total Editor Decisions	**10**	**100%**	**20.7**

Jan 01 - July 1, 2012

Original Submission

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to
Accept w/Major Revision	4	40%	97.5
Accept w/Minor Revision	4	40%	131.8
Reject	2	20%	70.5
Total Editor Decisions	**10**	**100%**	**105.8**

Revision 1

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to
Accept	3	37.50%	52
Accept w/Minor Revision	5	62.50%	132.6
Total Editor Decisions	**8**	**100%**	**102.4**

Revision 2

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to
Accept	5	83.30%	14.4
Accept w/Minor Revision	1	16.70%	1
Total Editor Decisions	**6**	**100%**	**12.2**

Revision 3

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to
Accept	1	100%	0
Total Editor Decisions	**1**	**100%**	**0**

PEANUT SCIENCE EDITOR'S REPORT –

The Associate Editors of Peanut Science met Tuesday, July 10, 2012 at the Annual APRES meeting in Raleigh, NC. Chris Butts, Editor, introduced Dr. Tim Grey as co-editor of Peanut Science. Dr. Grey will be responsible for manuscripts submitted following the annual meeting and Dr. Butts will manage the manuscripts already in process. Dr. Butts will also mentor Dr. Grey in the process of moving manuscripts

through the system from submission to publication. The goal is for Dr. Grey to fully assume the duties of editor following the publication of Volume 39, Issue 2 (2012) of Peanut Science.
Various journal performance statistics are shown in Tables 1-3 for the 12-month time period from 01 July 2011 to 30 June 2012. Dr. Grey has expressed a goal of reducing the time between submission and first decision from 119 to 90 days. Use of the PeerTrack website was discussed. The instructions to authors and a manuscript template still needed to be developed and made available on the APRES and Peanut Science websites.
The associate editors completing a 3-year term expiring 2012 are Tim Brenneman, Wilson Faircloth, Tim Grey, Yen-Con Hung, Peggy Ozias-Akins, and Nathan Smith. The following will serve as associate editors with terms ending in 2015: Albert Culbreath, Mike Marshall, Yen-Con Hung, and Nathan Smith.

Table 1. Average time required to complete various stages of manuscript review from submission to first decision between 01 July 2011 and 30 June 2012.

Journal Task	**Average time to complete (days)**
Submission to Technical Check Complete	12.1
Technical Check Complete to Editor Assignment	0.5
Submission to Editor Assignment	10.6
Submission to Reviewer Invitation	38.8
Submission to First Decision	118.9

Table 2. Average number of days to make decision for manuscripts submitted for publication in Peanut Science from 01 July 2011 to 30 June 2012.

	Average Number of Days to Decision		
Decision	**Initial Submission**	**1st Revision**	**2nd Revision**
Accept	0	66	19
Accept with Revision	163		
Accept w/Major Revision	121		
Accept w/Minor Revision	163	95	1
Reject	140	79	
Overall	123	84	18

Table 3. Performance statistics of reviewers for articles submitted to Peanut Science between 01 July 2011 and 30 June 2012.

Reviewer Performance Metric	**Measure**
Days to Respond to Invitation	2.3
Days to Complete Review (from Date Invited)	36.4
Days to Complete Review (from Date Agreed to Review)	33.7
Number of Reviews per Reviewer	1.1
Number of Late Reviews	9
Average Days Late	7.3
Number of Early Reviews	24
Average Days Early	24.9

NOMINATING COMMITTEE REPORT - The nominating committee would like to propose the following individuals to fill the positions that are rotating vacant after the 2012 APRES meeting:

President-elect Tim Brenneman

BOD (Industry-Production) Keith Rucker

FELLOWS COMMITTEE REPORT - The Fellows Committee received a number of nominations for society fellow in 2012. The committee recommends to the Board of Directors that Kelly D. Chamberlin, Robin Y.-Y. Chiou, and W. Carroll Johnson III be named society fellows in 2012. The committee discussed several minor issues related to the fellows nomination process. The first was to consider modifying the nomination guidelines to have the nominator prepare the brief bio that appears in the proceedings. This responsibility currently falls on the committee chair. The committee envisions that this could be done after the nomination is approved. The rational being the nominator is most familiar with the nominee and best suited to highlight the significant accomplishments. The committee also suggests that the society may want to revisit the maximum number of fellows per year allowed as specified in the bylaws, given the changing demographics of the society. Thirdly the committee encourages members to nominate qualified members are nominated. The committee recommends that the restriction in the nominating guidelines that excludes members being named fellow while serving on the Board of Directors be removed from the APRES bylaws. The nominating guidelines will be edited for BOD approval. Scott Tubbs will be chair of the Fellows Committee in 2013.

Kelly Chamberlin

Dr. Kelly Chamberlin received a B.S. in Biochemistry and Molecular Biology in 1987, and a Ph.D. in Biochemistry and Molecular Biology in 1992 from Oklahoma State University. She received Robert Glenn Rapp Distinguished Graduate Fellow Award at Oklahoma State University from 1987 to 1992. She was a Postdoctoral Research Associate in the Department of Plant Pathology at Oklahoma State University working on virology and plant transformation from 1992 to 1996. Dr. Chamberlin is a Research Biologist at the USDA-ARS Peanut Research Unit in USDA-ARS, Stillwater, OK.

Dr. Chamberlin developed the first transgenic peanuts with combined resistance to Sclerotinia blight, high yield, and high quality by transforming peanut with fungal resistance genes from rice and alfalfa. These studies also provided evidence that transgenic peanut containing antifungal transgenes retained the desirable agronomic and nutritional traits of the parent genotype. Dr. Chamberlin's current research focus is to develop and release peanut varieties with new value-added characteristics to lessen the impact of biotic stress.

Her program identified the only molecular marker known to date associated with resistance of peanut to Sclerotinia blight. The marker is currently used in marker-assisted selection of disease resistant breeding populations and screening of germplasm for new sources of resistance. Dr. Chamberlin's program has helped develop a non-destructive method to extract DNA from individual peanut seed allowing breeders to rapidly screen for desired genetics saving both time and resources required to grow plants in the greenhouse or field. She also helped develop a method for peanut oil analysis using capillary electrophoresis (CE) to determine the oleic/linoleic acid ratio of a single peanut seed while preserving embryonic integrity. Her research has been published in 33 refereed journal articles.

Dr. Chamberlin is active in Uniform Peanut Performance Testing, attending and participating in Oklahoma Peanut Commission meetings, extension-sponsored field tours and production meetings, and regional grower/sheller meetings where she routinely provides growers and industry leaders with research updates. She has been actively involved in the National Peanut Board's promotion of peanut products and “Peanuts—Energy for the Good Life” promotion, including attending and working the kick-off event in New York City at Grand Central Terminal in 2009. Dr. Chamberlin has also developed an elementary school outreach program where she educates young children on peanut production and health benefits.

Dr. Chamberlin has actively served the American Peanut Research and Education Society (APRES) through service on committees including the Board of Directors, as Associate Editor of PEANUT SCIENCE, Technical Program Chair, and President.

Robin Y.-Y. Chiou

Dr. Robin Y.-Y. Chiou earned a B.S. in soil science from National Chungshin University in 1975, and a M.S. in agricultural chemistry from National Taiwan University in 1977, both in Taiwan. After serving four years as an Instructor at National Chiayi University (NCYU) he was supported by the National Science Council and completed his Ph.D. in Food Science at the University of Georgia in 1985. During the past 35 years at NCYU, he has been an Instructor, Associate Professor, Professor, and Distinguished Professor serving as a mentor for many students and young scientists. His exceptional administrative abilities have resulted in increasing responsibilities as Department Head, Dean of Student Affairs, Dean of Academic Affairs, College Dean of Life Sciences, and President of NCYU effective on February 1, 2012.

Dr. Chiou’s primary research emphasis for the past 30 years has been peanut with an emphasis on post-harvest product quality and value-added processing. Under Robin’s leadership, the Chiou Lab has conducted and published an exceptional balance of applied and basic studies. Specific areas of research include aflatoxin elimination, peanut flavor enhancement, and development of value-added products. The Chiou Lab has recently published some of the most comprehensive structural and bioactivity data ever compiled for nutritionally relevant stilbenoids, such as resveratrol. In recent years, research progress in biosynthetic enhancement of peanut stilbenoids, application of those compounds in functional foods, and development of bio-medicinal products in prevention of chronic diseases have drawn extensive national interest from peanut related industries.

Although Dr. Chiou carries extensive administrative duties and maintains a heavy teaching load, he has been a highly productive researcher publishing 118 periodical papers (51 papers published in English pertaining to peanut). These research and academic contributions have resulted in his receipt of awards from Ministry of Education, National Science Council, Taiwan Agricultural Chemistry Society and Association of Food Science and Technology, such as Stephen S. Chang’s Outstanding Achievement in Food Science and Technology.

Dr. Chiou has attended APRES meetings since 1987 and has also sponsored many students to attend the annual meetings. Dr. Chiou continues to seek opportunities to strengthen international peanut collaborations including student/faculty exchange with National Chiayi University.

W. Carroll Johnson III

Dr. Carroll Johnson received a B.S. in Entomology at Auburn University in 1979, and M.S. and Ph.D. degrees in Weed Science in 1981 and 1984, respectively, from North Carolina State University. Dr. Johnson began his professional career as an Assistant Professor and Extension Agronomist in 1984 at the University of Georgia, Tifton; moving to an Assistant Professor and Extension Agronomist position in weed science at the University of Georgia, Tifton, from 1987 to 1989. Since 1989, he has been a Research Agronomist at USDA-ARS, Tifton, GA.

Dr. Johnson has developed a well-rounded weed science program that has emphasized research on integrated weed management in agronomic and vegetable cropping systems, methyl bromide alternatives, and on weed management in organic crop production. He and co-workers determined the benefits of crop rotation as part of an integrated weed management system to manage yellow nutsedge. Recognizing that weeds are a primary limiting factor to organic crop production, Dr. Johnson and his research team developed the first effective integrated systems of weed management for organic peanut and sweet onion production. Dr. Johnson systematically identified weed management approaches that did not work such as propane flaming and naturally derived herbicides, and showed the importance of timely cultivation. His research findings have been published in 62 refereed journal articles.

Dr. Johnson's contributions to extension education include coordinating responses of the peanut industry to cancelations of the growth regulator daminozide in 1986 and the herbicide dinoseb in 1987. As an extension specialist, Dr. Johnson made numerous appearances as a special guest on agricultural television programs broadcast throughout the region; presentations at extension-sponsored seminars, short courses, and field days; prepared the first extension bulletin in the US that described the *Hull Scrape Method* to assess peanut maturity; and prepared the first and only extension bulletin in Georgia that thoroughly discussed *Using Adjuvants with Herbicides*. Recently, Dr. Johnson has been a featured speaker at the Georgia Organics Conference. Dr. Johnson has authored 35 popular press articles and 11 Extension bulletins and circulars.

Dr. Johnson has served the profession as an ad-hoc reviewer for several refereed journals and has served as Associate Editor for PEANUT SCIENCE and WEED TECHNOLOGY. His service to the American Peanut Research and Education Society (APRES) includes numerous presentations at annual meetings and service on several committees including the Board of Directors. Dr. Johnson received the Dow AgroSciences Award for Excellence in Research in 2002 from APRES, Weed Scientist of the Year Award in 2009 from the Southern Weed Science Society, and the Georgia Organics Land Stewardship Award in 2012.

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. 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 (5) 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 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." The body of the nomination, excluding publications lists and supporting letters, should be no more than eight (8) pages.

Supporting letters. The nomination shall include a minimum of three supporting letters (maximum of five). Two of the three required 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. Those writing supporting letters need not repeat factual information that will obviously be given by the nominator, but rather should evaluate the significance of the nominee's achievements.

Deadline. Nomiantions are to be submitted electronically to the committee chair by the date listed in the call for nominations on the APRES website (www.apresinc.com).

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 APRES and to the profession.

Processing of Nominations

The Fellows Committee shall evaluate the nominations, assign each nominee a score, and make recommendations 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 will be reconsidered the following year and nominators will be contacted and given the opportunity to provide a letter that updates the nomination. After the second year unsuccessful nominations will be reconsidered only following submission of a new, complete nomination package.

Recognition

Fellows shall receive a plaque at the annual business meeting of APRES. The Fellows Committee Chairman shall announce the elected Fellows and the President shall 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 Nominator.

Distribution of Guidelines

These guidelines and the format are to be published in the APRES PROCEEDINGS. Nominations should be solicited by an announcement published on the APRES website (www.apresinc.com).

BAILEY AWARD COMMITTEE REPORT - The committee's business related to the 2011 Bailey Award winner was conducted by email, prior to the annual meeting. Nominations were receivedfrom all fifteen eligible sessions of the 2010 annual meeting, and nominees were notified shortly after the meeting. Eight manuscripts were received and accepted for final evaluation by the committee. The winning paper is to be presented the Bailey Award at the Thursday afternoon awards ceremony.

The winning paper is from a presentation titled "Identification of QTL Associated with Reduced Post-Harvest Aflatoxin Accumulation in Peanut (Arachis hypogeae L.)" by Christina E. Rowe, Vijay J. Vontimitta, Thomas G. Isleib**, Susana R. Milla-Lewis*. The winning paper had two authors indicated as presenters, Thomas G. Isleib** & Susana R. Milla-Lewis*. Susana Milla-Lewis was the planned presenter, but Tom Isleib actually presented the paper at the meeting. Tom Isleib was notified of the nomination, and Susan Milla-Lewis submitted the manuscript to the Awards Committee. Based on the published Guidelines for the APRES Bailey Award, the committee agreed that Tom Isleib is the recipient of the award.

The committee met on July 12, 2011 at the Menger Hotel in San Antonio, TX. The chair and two members were in attendance. The committee reviewed a proposed standardized form for use to evaluate presentations within each session, and discussed potential new members to the committee. The committee agreed that Dr. Jao Augusto be invited to join the committee, as he served as an adjunct member during the manuscript review process after one of the committee members was unable to participate. The chair would like to thank the committee for serving as reviewers and for their timely responses.

2010-11 Bailey Award Committee:
Emily Cantonwine, Chair (2011)
Tom Stalker (2012)
David Jordan (2012)
Naveen Puppala (2013)
Mehboob Sheikh (2013)
Austin Hagan (2013)
Joa Augusto, adjunct

Respectfully Submitted by:
Emily Cantonwine, chair

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:

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 committeemembers 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'sname and paper title.

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

Joe Sugg Graduate Student Award Committee – . Seven students participated in the graduate student competition. First place in the Joe Sugg Student Award went to Steven Thornton of the University of Florida for the paper entitled "Determining the relationship between field emergence and late leaf spot resistance in peanut," co-authored by M. Gallo and B. Tillman. Second place went to Justin Moss, University of Georgia for the paper entitled "Agronomic and economic evaluation of double-crop and relay-intercropping systems of peanut with wheat," coauthored by R. S. Tubbs, T. L. Grey, N. B. Smith and J. W. Johnson.

Respectfully submitted by:
Robert Kemerait, chair

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT - The Coyt T Wilson Service Award Committee has reached a unanimous recommendation for the 2012 award: Dr. Pat Phipps.

Patrick M. Phipps

Central to the APRES Coyt T. Wilson Award is <u>service</u>: service to the society, service to the peanut industry, and service to humankind. The unanimous selection for this year's award, Dr. Patrick M. Phipps, Emeritus Professor at Virginia Tech, truly embodies this spirit of service. Dr. Phipps has been a member of APRES for 38 years and during this time he has attended 35 meetings while serving as president in 2005, vice president in 2004, and as a member of the board of directors from 1999-2001. During this time, he has also chaired, or served, often for multiple years, on the following committees: fellows, local arrangements, Coyt T. Wilson Award, site selection, technical program, and finance. Dr. Phipps was elected an APRES fellow in 2002 and received the APRES Past President's Award in 2007.

Dr. Phipps was born in New Martinsville, WV and he earned a B.S. (1970) in biology from Fairmont State College, a Masters (1972) in Plant Pathology from Virginia Tech, and a Ph.D. (1974) in Plant Pathology from West Virginia University, Morgantown. He accepted a post-doctoral position at North Carolina State University immediately after his PhD, and he remained at NCSU until accepting an assistant professorship in the Department of Plant Pathology at Virginia Tech in 1978. At Virginia Tech, he climbed the ranks of the professorship including Associate (1983), Full (1989), and Emeritus (2010).

Dr. Phipps has had a distinguished career in research and extension with a focus on disease control in peanuts, work that is considered the industry standard in the Virginia-Carolina region of peanut production. Dr. Phipps has presented or served as a co-author with graduate students and colleagues at each of the 35 APRES meetings that he has attended. He was awarded the APRES Wallace K. Bailey Award for best paper presentation in 1985, 1990, and 2007, in addition to the APRES Dow Agrosciences Award for Excellence in Education in 1999. Further evidence of his excellent work in peanut research and extension includes the Excellence in Extension Award from the American Phytopathological Society in 1994 and election as fellow of this organization in 2009. Furthermore, Dr. Phipps was awarded the Excellence in Extension Award in 1994, and the Outstanding Alumnus Award in 2006, from the Virginia Tech College of Agriculture and Life Sciences Alumni Association.

In addition to these awards, perhaps Dr. Phipps' most important legacy to APRES is his ability to bring people together. It has been noted that during his tenure as vice president and president, the society was experiencing "tumultuous times due to disagreements on governance and future direction of the society” and as one colleague stated, Dr. Phipps “lead with patience and wisdom, resolving conflicts if possible, and quietly guiding the society through challenging issues.” Related, another colleague stated:

> “Pat is a modest person. I doubt that he actively sought to be Vice President and President of APRES, but he willingly did it during the only time I can remember when we had some open and very unpleasant dissent within APRES. I will always respect Pat Phipps, among others, for the restraint and leadership they showed for the good of our organization at that time. The end result was an even stronger society.”

APRES is a better society due to Dr. Phipps’ numerous and unselfish contributions to the organization. These outstanding contributions make him truly deserving of the 2012 APRES Coyt T. Wilson Distinguished Service Award.

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 thenominator are not eligible to write supporting letters.

IV. Re-consideration of nominations. Unsuccessful nominations will be reconsidered the following year and nominators will be contacted and given the opportunity to provide a letter that updates the nomination. After the second year unsuccessful nominations will be reconsidered only following submission of a new, complete nomination package.

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 – The committee has selected Tim Sanders to receive the Dow AgroSciences research award and Todd Baughman to receive the Dow AgroSciences Education award.

BIOGRAPHICAL SUMMARY OF DOW AGROSCIENCES AWARD FOR EXCELLENCE IN EDUCATION RECIPIENT

Dr. Todd Baughman has been a tireless member and participant in the American Peanut Research and Education Society for almost 20 years. He has served or chaired many committees and served as Board Member to represent the Southwest Area from 2006 to 2008. Dr. Baughman is currently serving as President of the society. Dr. Baughman has been an extremely innovative and outstanding peanut extension educator. He has worked with peanut growers across the vast state of Texas helping assist them in profitability producing peanuts. His work has assisted in reducing the use of products that do not add to a grower's bottom line. He has also worked on developing guidelines for irrigation termination, digger timing, and plant populations in peanut. He has also conducted variety trials yearly to help assist growers in making the best choice possible in planting varieties most suited to their production area. Dr. Baughman, along with other colleagues in Texas, has formed one of the preeminent weed science teams in the country. Their work, knowledge, and extension programs have helped produces throughout the state of Texas in developing effective weed management systems in peanut. Not only has Dr. Baughman conducted research in these areas but has presented this to 1000's of growers at field days and county educational extension meetings. Dr. Baughman with assistance from the Texas Peanut Producers Board started the Peanut Progress Newsletter. This electronic newsletter is produced during each production season to address various production issues as they arise. He has pulled together support from all of the peanut extension personal in Texas to contribute to this newsletter. Topics have ranged from herbicide selection, disease management, freeze and hail damage in peanut just to name a few. This newsletter has been varied well-received by the peanut producers and industry of Texas. He is always willing to help in crop management recommendations, share ideas about future cooperative research projects, assists in county educational program planning, help in experimental design and proper use of statistical analysis, and is a good listener to facilitate problem solving. Dr. Baughman is a gifted scientist, dedicated to his growers, students, and professional societies including APRES.

BIOGRAPHICAL SUMMARY OF DOW AGROSCIENCES AWARD FOR EXCELLENCE IN RESEARCH RECIPIENT

Dr. Tim Sanders' exceptional scientific career has resulted in numerous significant contributions and impacts on science, technology and the peanut industry. Dr. Sanders has conducted and cooperated in research on an extremely wide range of critical industry topics. He is one of the most respected peanut experts in the world and is called upon by both domestic and international peanut industries. Results of his research and cooperative research are used in almost all aspects of the peanut industry from production to manufacturing to marketing. He served as an integral member of an award winning team which developed critical understanding of factors contributing to preharvest aflatoxin contamination and led research demonstrating the relationship between physiological maturity and *Aspergillus flavus* invasion and the relative contribution of pod stress and whole plant (root) stress to aflatoxin contamination. This new body of scientific knowledge had a major impact on farmer, sheller, and manufacturer technological approaches to prevention and removal of contaminated seed in response to the multimillion dollar aflatoxin problem. Dr. Sanders has conducted extensive research in development and technology transfer of peanut flavor and quality issues in both domestic and international markets. His research findings have affected harvest, curing, handling, storage and manufacturing of peanuts in relation to flavor. Sanders research in peanut lipid composition and the finding that peanut butter contained nondetectable levels of trans-fatty acids was a major industry accomplishment. Dr. Sanders initiated studies to compare U.S. and other origin peanuts. This comprehensive data demonstrated the superior flavor and oil quality of U.S. peanuts and the preference of European consumers for US peanuts. This information serves as the most noteworthy marketing information for export sales of U.S. peanuts. Sanders demonstration of the presence of resveratrol in undamaged, edible grade peanuts added significantly to the growing body of nutritional information on peanuts. This work was timely and important to the peanut industry as it had only just begun efforts through the American Peanut Council and the Peanut Institute to educate consumers to the growing body of evidence that nut and peanut consumption as part of a healthy diet is nutritionally sound advice. Dr. Sanders led studies to define and confirm identification of compounds responsible for roasted peanut flavor and for compounds responsible for fruity fermented off flavor. Continuing in the nutritional research area he led studies to demonstrate that peanuts as well as the fat free portion of peanuts were effective in prevention of atherosclerosis in an animal model system, and more recently in ongoing research he and cooperators are demonstrating the reversal of atherosclerosis in an animal model due to peanut consumption. This nutritional related research along with his involvement in kill step temperatures and determination of oven roaster temperatures in relation to Salmonella reduction in peanut roasting signify his continued involvement and commitment to research on critical industry issues. Other areas in which Dr. Sanders research or research leadership has had impact include size-maturity flavor quality relationships; development of a flavor lexicon which is the industry standard; flavor lexicon training of domestic and international industry personnel; moisture and roast peanut quality relationship, in-shell peanut quality factors, definition of windrow and other curing temperatures on development of fruity fermented off flavor, innovative research on shelf life of blanched peanuts, numerous studies on the relation of pre and post harvest factors to roasted peanut flavor, effect of seed moisture on oil roasting, utilization of peanut skins to include isolation and testing of compounds, utilization of peanut meal to include protein and peptide isolation, effect of roasting time and temperature protocols on peanut flavor development. In addition Dr. Sanders' team has contributed to the overall efforts and improvements in peanut breeding in the US by evaluating the sensory and oil chemistry characteristics of peanuts in the 13 state Uniform Peanut Performance Trials. Dr. Sanders' outstanding research productivity is demonstrated in authorship on over 230 manuscripts, 250 abstracts and 10 book chapters. Evidence of his team-building attitude is the fact that he has participated with about 160 different authors on published manuscripts. He has made over 225 national and international industry and scientific presentations and over half were by invitation.

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. An individual may receive either award only once as an individual or as a team member. 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 must 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. Unsuccessful nominations will be reconsidered the following year and nominators will be contacted and given the opportunity to provide a letter that updates the nomination. After the second year unsuccessful nominations will be reconsidered only following submission of a new, complete nomination package.

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.

PEANUT QUALITY COMMITTEE REPORT - The meeting was called to order by Chairman Jim Elder at 3:30 pm. Those in attendance were the following: J. Elder, M. Kline, V. Nwosu, L. Dean, G. Birdsong, P. Donahue, L. Moore, B. Branch, T. Isleib, B. White, C. Chen, M. Burow, C. Holbrook, D. Smyth, J. Davis, H. Valentine and T. Sanders.

Review of 2011 minutes: The membership was asked to approve the 2011 meeting minutes. The meeting minutes were approved.

<u>Review of Old Business</u>:

Jim reinitiated the 2011 discussion on how to measure water use efficiency. A discussion ensued with the following key points:

- Water efficiency should be measured by amount of water used versus productivity, measuring water/lb yield will remove maturity as a factor
- Comparisons should be completed on peanuts with similar maturity dates and each variety should be grown varying water usage
- Efficiency of water usage depends greatly on what growth stage water is applied to the plant.
- Other related measures were canopy temperature, SPAD chlorophyll, flowering under water stress, and paraheliotropism.
- Victor recommended evaluating varieties within one origin, the SW and also to evaluate in several locations/altitudes.

Tom Isleib summarized the production of 2011 Certified Seed by region, market type, and cultivar. This shows Manufacturers and Shellers what varieties to expect for the 2012 CY. A few special notes: Georgia-06G was the top Runner cultivar planted (50.7%) and 100% of the Runners and Spanish planted in the SW are now high-oleic. Tom also summarized the UPPT quality data from 2001 – 2011. These results, when linked with the Certified Seed cultivars, will help predict the flavor and composition results. Virginia's on average were lower in flavor than Runner's which may be related to maturity. Tom also highlighted the importance of sample management and suggested we republish a quality document describing how to manage samples appropriately.

<u>Review of New Business</u>:
Mark reviewed an issue that Mars is experiencing with internal mold damaged peanuts that have a strong off flavor and turn black through the roasting process. Howard mentioned a similar issue occurred in 1984-5 and was attributed to immature, hollow hearted peanuts. The cause was related to reduced calcium absorption with prolonged high temperatures for 20+ days. Victor suggested inducing the phenomenon at Dawson by holding peanut plants at 90°F for 20 days.

Jim kicked off a discussion on post-roast microbial interventions. Product recalls of U.S. peanut products over the last several years were caused by post-roasting environmental contamination. It is desirable to be able to have a microbial intervention just prior to packaging, as part of the packaging, or after packaging to ensure a wholesome product is delivered to the consumer. The meeting participants were encouraged to think of potential technologies. Victor highlighted that if GMP's are properly managed it should not be an issue. Howard mentioned that education is best and Seminars led by Steve Calhoun appeared to be working well for small scale Manufacturer's.

Darlene Cowart posed a question as to whether newer varieties that require more calcium are more susceptible to Aflatoxin. It was mentioned that Ron Henning completed extensive testing in the 1980's on increased calcium and reduced Aflatoxin and found no correlation, however, today's larger seeded varieties may need more calcium. Tom mentioned that there appears to be an increase in Aflatoxin when normal oleic lines are converted to high oleic. Victor mentioned that peanuts with thinner hulls have elevated Aflatoxin levels.

PROGRAM COMMITTEE REPORT - There were 201 persons registered for the meeting, with 108 presentation (including 19 poster presentations. The presentations covered the following topics: Breeding, Biotechnology, and Genetics; Production Technology, Physiology, and Seed Technology; Weed Science; **Economics; Plant Pathology, Nematology and Entomology; the Bayer Excellence in Extension and Extension** Technology session and the Joe Sugg Graduate Student Competion. Additionally, there was a special symposium entitled "the Orphan Legume Genomic Who's Time Has Come".

SITE SELECTION COMMITTEE REPORT - The Georgia representatives on the APRES Site Selection Committee are John Beasley and Peggy Ozias-Akins. We discussed numerous options for hosting the 2013 APRES meeting in Georgia. The following locations were discussed and considered for pros and cons:

- Brasstown Valley Resort in the north Georgia mountains between Young Harris and Hiawassee
- Evergreen Conference Center at Stone Mountain
- Callaway Gardens at Pine Mountain, GA between Columbus and Atlanta Columbus Marriott in downtown Columbus
  Jekyll Island on the Georgia Atlantic Coast between Savannah and Jacksonville, FL
- Hyatt Regency (hosts of the 1999 and 2006 APRES meetings) in Savannah
- Hilton Savannah Desoto
- The Westin Savannah Harbor

After weighing pros and cons of these options, we eliminated the Evergreen Conference Center, Callaway Gardens, Columbus Marriott, and Jekyll Island. Proposals were requested from the following: Hyatt Regency, Hilton Savannah Desoto, and The Westin Savannah Harbor in Savannah and the Brasstown Valley Resort.
As of the Site Selection Committee's meeting in San Antonio on July 12, 2011, we had proposals in hand from the three hotels in Savannah and Brasstown Valley Resort. The major negative, or con, for the Brasstown Valley Resort would be its distance from a major airport. It is approximately 2 hours from the following airports: Atlanta, Asheville, NC, Chattanooga, TN, and Greenville, SC.
At the Site Selection Committee meeting on Tuesday, July 12 in San Antonio the overall committee discussed the options for the 2013 meeting in Georgia. The proposed dates are July 9 – 11, 2013. After evaluating and discussing the proposals from Georgia, the committee recommended that the following two proposals be forwarded to the Board of Directors:
Hyatt Regency in Savannah
Brasstown Valley Resort near Young Harris, GA

The following are summaries of the proposals from both properties:
Hyatt Regency - $142/night single/double occupancy (dates and rates available until September 15, 2011). Room nights for Monday – Thursday nights are 50, 175, 175, 150. Meeting room rental is waived. Hotel requests $20,625 in food and beverage as based on current program. Complimentary internet in guest rooms. Room upgrades based on meeting 80% of block.

Brasstown Valley Resort - $129/night lodge and cottage. Room nights for each night Monday – Thursday is 134. Four upgrades to one bedroom suites at lodge rate. $10 resort fee per night which includes: Unlimited local phone calls and Unlimited toll free calling, access to Fitness Center and steam/sauna features, access and equipment usage for onsite bass fishing pond, unlimited hours of lighted tennis court time with complimentary equipment usage, daily newspaper and In-room coffee, Wireless Internet access, and business center access. Although this property is 2 hours from major airports the property will coordinate shuttles. It is also expected that this location will be within driving distance of a high percentage of the membership.

Other Business

Dr. Starr asked the Site Selection Committee to consider future site selection guidelines based on a regional model. Based on three regions (SE, SW, & VC) this could include returning to a single hotel/site in each region to simplify local arrangements and securing hotel contracts. The site selection committee will consider this idea in future meetings, but noted that a single hotel/site would mean a return every three years. The recommendation is that a minimum of two sites be chosen per region so that we would return to the same hotel/site once every six years. Further, we recommend that the Site Selection Committee be composed of 9 individuals, 3 from each region, with the regional sub-committee of 3 persons charged with selecting the site for their region every three years. We also discussed the possibility of surveying the membership and their families after each meeting to help understand the pros and cons of each site and hotel.

Respectfully submitted by:
Barry Tillman, chair

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

ARTICLE I. NAME

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

ARTICLE II. PURPOSE

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

ARTICLE III. MEMBERSHIP

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

a. Individual memberships:

1. Regular, any person who by virtue of professional or academic interests wishes to participate in the affairs of the society.

2. Retired, persons who were regular members for at least five consecutive and immediately preceding years may request this status because of retirement from active employment within the peanut or academic community. Because of their past status as individual members and service to the society, retired member would retain all the right and privileges of regular individual membership.

3. Student, persons who are actively enrolled as a student in an academic institution and who wish to participate in the affairs of the society. Student members have the all rights and privileges of regular members except that they may not serve on the Board of Directors. Student members must be proposed by a faculty member from the student's academic institution and that faculty member must be regular or retired member of the society.

b. 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.

1. Silver Level, this maintains the current level and is revenue neutral. Discounted meeting registration fees would result in revenue loss with no increase in membership fee. Registration discounts can be used as an incentive for higher levels of membership.

2. Gold Level, the person designated by the sustaining member would be entitled to a 50% discount on annual meeting registration. This benefit cannot be transferred to anyone else.

3. Platinum Level, the person designated by the sustaining member would be entitled to a 100% discount on annual meeting registration. This benefit cannot be transferred to anyone else. 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 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.

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. Those members present and entitled to vote at a meeting of the Society, after proper notice of the meeting, shall constitute a quorum.

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. The Board of Directors and all committees may conduct meetings and votes by conference call or by electronic means of communication as needed to carry out the affairs of the Society.

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.

Section 8. The editor is responsible for timely publication and distribution of the Society's peer reviewed scientific journal, Peanut Science, in collaboration with the Publications and Editorial Committee. Editorial responsibilities include:

1. Review performance of associate editors and reviewers. Recommend associate editors to the Publications and Editorial Committee as terms expire.

2. Conduct Associate Editors' meeting at least once per year. Associate Editors' meetings may be conducted in person at the Annual Meeting or via electronic means such as conference calls, web conferences, etc.

3. Establish standard electronic formats for manuscripts, tables, figures, and graphics in conjunction with Publications and Editorial Committee and publisher.

4. Supervise Administrative/Editorial assistant in:
   a. Preparing routine correspondence with authors to provide progress report of manuscripts.
   b. Preparing invoices and collecting page charges for accepted manuscripts.

5. Screen manuscript for content to determine the appropriate associate editor, and forward manuscript to appropriate associate editor.

6. Contact associate editors periodically to determine progress of manuscripts under review.

7. Receive reviewed and revised manuscripts from associate editor; review manuscript for grammar and formatting; resolve discrepancies in reviewers' and associate editor's acceptance decisions.

8. Correspond with author regarding decision to publish with instructions for final revisions or resubmission, as appropriate. Follow-up with authors of accepted manuscripts if final revisions have not been received within 30 days of notice of acceptance above.

9. Review final manuscripts for adherence to format requirements. If necessary, return the manuscript to the author for final format revisions.

10. Review final formatting and forward compiled articles to publisher for preparation of first run galley proofs.

11. Ensure timely progression of journal publication process including:
    a. Development and review of galley proofs of individual articles.
    b. Development and review of the journal proof (proof of all revised articles compiled in final publication format with tables of contents, page numbers, etc.)
    c. Final publication and distribution to members and subscribers via electronic format.

12. Evaluate journal publisher periodically; negotiate publication contract and resolve problems; set page charges and subscription rates for electronic formats with approval of the Board of Directors.

13. Provide widest distribution of *Peanut Science* possible by listing in various on-line catalogues and databases.

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 University representatives - these directors are to be chosen based on their involvement in APRES activities, and knowledge in peanut research, and/or education, and/or regulatory programs. One director will be elected from each of the three main U.S. peanut producing areas (Virginia-Carolinas, Southeast, Southwest).

e. United States Department of Agriculture representative – this director is one whose employment is directly sponsored by the USDA or one of its agencies, and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits.

f. Three Industry representatives - these directors are (1) the production of peanuts; (2) crop protection; (3) grower association or commission; (4) the shelling, marketing, and storage of raw peanuts;(5) 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 or a representative of the President as designated by 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.

i. National Peanut Board representative, will serve a three year term.

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.

Section 8. Should a member of the Board of Directors resign from the board before the end of their term, the president shall request that the Nominating Committee nominate a qualified member of APRES to fill the remainder of the term of that individual and submit their name for approval by the Board of Directors.

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 four members that represent the diverse membership of the Society, each appointed to a three-year term. 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.

a. 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 by June 15 prior to that year's annual meeting. The president will then distribute those nominations to the Board of Directors for their review. 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.

Nominees to the APRES Board of Directors shall have been a member of APRES for a minimum of five (5) years, served on at least three (3) different committees, and be familiar with a significant number of APRES members and the various institutions and organizations that work with peanut.

c. Publications and Editorial Committee: This committee shall consist of four members that represent the diverse membership of the Society and who are appointed to three-year terms. 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 four members that represent the diverse membership of the Society and are appointed for a three-year term. The primary purpose of this committee 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 four members that represent the diverse membership of the Society and who are themselves Fellows of the Society. 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 four members that represent the diverse membership of the Society and with each serving three-year terms. The Chairperson of the committee shall be from the region in which the future meeting site is to be selected as outlined in subsections (1) – (3) and the Vice-Chairperson shall be from the region that will host the meeting the following year. The vice-chairperson will automatically move up to chairperson. *All of the following actions take place two years prior to the annual meeting for which the host city and hotel decisions are being made.* Site Selection Committee shall:

Identify a host city for the annual meeting in the designated region;
Solicit and evaluate hotel contract proposals in the selected host city;
Recommend a host city and hotel for consideration and decision by the Board of Directors
Board of Directors shall

Consider proposal(s) submitted by the Site Selection Committee;
Make a final decision on host city and hotel;
Direct the Executive Officer to sign the contract with the approved hotel

i. Coyt T. Wilson Distinguished Service Award Committee: This committee shall consist of four members that represent the diverse membership of the Society, each serving three-year terms. 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. AMENDMENTS

<u>Section 1.</u> 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.

The By-Laws may also be amended by votes conducted by mail or electronic communication, or a combination thereof, provided that the membership has 30 days to review the proposed amendments and then votes cast within a subsequent 30 day period. For such a vote to be valid at least 15% of the regular members of the society must cast a vote. In the absence of a sufficient number of members voting, the proposed amendment will be considered to have failed.

<u>Section 2.</u> 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
14 July 2011, San Antonio, Texas

MEMBERSHIP (1975-2006)

	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
2001	314	51	34	24	11	434
2002	294	47	29	34	11	415
2003	270	36	30	23	10	369
2004	295	43	22	19	11	390
2005	267	38	28	15	8	356
2006	250	33	27	25	7	342

MEMBERSHIP (2007-2010)

	2007	2008	2009	2010	2011	2012
Individual, Regular	228	185	184	172	162	204
Individual, Retired	13	13	14	13	10	9
Individual, Post Doc/Tech Support	6	9	7	11	4	5
Individual, Student	20	16	28	22	14	30
Sustaining, Silver	7	8	6	9	6	9
Sustaining, Gold	1	2	3	5	3	2
Sustaining, Platinum	1		1	1	2	1
Institutional	6	21	21	19	21	23
TOTAL	280	254	264	252	215	283

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