

**2002
PROCEEDINGS**



**American Peanut Research
and
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**2002
PROCEEDINGS**

of

**THE AMERICAN PEANUT RESEARCH
AND EDUCATION SOCIETY, INC.**

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BOARD OF DIRECTORS

2002-03

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(SE Area) E. Jay Williams (2005)

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Shelling, Marketing, Storage G. M. "Max" Grice (2004)

Manufactured Products Richard Rudolph (2005)

American Peanut Council President Jeannette H. Anderson (2003)

ANNUAL MEETING SITES

1969 - Atlanta, Georgia	1986 - Virginia Beach, Virginia
1970 - San Antonio, Texas	1987 - Orlando, Florida
1971 - Raleigh, North Carolina	1988 - Tulsa, Oklahoma
1972 - Albany, Georgia	1989 - Winston-Salem, NC
1973 - Oklahoma City, Oklahoma	1990 - Stone Mountain, Georgia
1974 - Williamsburg, Virginia	1991 - San Antonio, Texas
1975 - Dothan, Alabama	1992 - Norfolk, Virginia
1976 - Dallas, Texas	1993 - Huntsville, Alabama
1977 - Asheville, North Carolina	1994 - Tulsa, Oklahoma
1978 - Gainesville, Florida	1995 - Charlotte, North Carolina
1979 - Tulsa, Oklahoma	1996 - Orlando, Florida
1980 - Richmond, Virginia	1997 - San Antonio, Texas
1981 - Savannah, Georgia	1998 - Norfolk, Virginia
1982 - Albuquerque, New Mexico	1999 - Savannah, Georgia
1983 - Charlotte, North Carolina	2000 - Point Clear, Alabama
1984 - Mobile, Alabama	2001 - Oklahoma City, Oklahoma
1985 - San Antonio, Texas	2002 - Research Triangle Park, NC

1969-1978: American Peanut Research and Education Association (APREA)

1979-Present: American Peanut Research and Education Society, Inc. (APRES)

APRES COMMITTEES
2002-03

Program Committee		Public Relations Committee	
Ben Whitty, chair	(2003)	Jeff Crawford, chair	(2005)
		Phil Mulder	(2003)
Finance Committee		J. H. Williams	(2003)
		Kenny Robison	(2003)
Marshall Lamb, chair	(2004)	Cecil Yancy	(2003)
Vernon Langston	(2003)	Dan Gorbet	(2005)
David Hunt	(2003)	Bob Sutter	(2005)
Hassan Melouk	(2004)		
Fred Shokes	(2005)	Bailey Award Committee	
John Beasley	(2005)	Todd Baughman, chair	(2004)
Ron Sholar, ex-officio		Glen Wehtje	(2003)
Nominating Committee		Clyde Crumley	(2003)
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Mary Webb	(2003)	Kenton Dashiell	(2005)
Harold Pattee	(2003)	Ames Herbert	(2005)
Albert Culbreath	(2003)		
Publications and Editorial Committee		Fellows Committee	
Kenton Dashiell, chair	(2004)	Charles Swann, chair	(2003)
David Jordan	(2003)	Roy Pittman	(2003)
Eric Prostko	(2003)	Chip Lee	(2004)
Jay Chapin	(2004)	Gene Sullivan	(2004)
Tom Whitaker	(2005)	Corley Holbrook	(2005)
Michael Franke	(2005)	Max Grice	(2005)
Peanut Quality Committee		Site Selection Committee	
Mark Burow, chair	(2004)	Maria Gallo-Meagher, chair	(2003)
Yolanda Lopez	(2003)	Ben Whitty	(2003)
Mac Birdsong	(2004)	Robert Lemon	(2004)
Jim Cary	(2005)	James Grichar	(2004)
Tim Sanders	(2005)	Patrick Phipps	(2005)
Emory Murphy	(2005)	Fred Shokes	(2005)
Victor Nwosu	(2005)	Bob Kemerait	(2006)
		Diane Rowland	(2006)

**Coyt T. Wilson Distinguished
Service Award Committee**

Richard Rudolph, chair	(2003)
Corley Holbrook	(2003)
Eric Prostko	(2004)
James Hadden	(2004)
Pat Phipps	(2005)
Charles Simpson	(2005)

Dow AgroSciences Awards Committee

John Baldwin, chair	(2004)
Albert Culbreath	(2003)
Fred Shokes	(2003)
Mike Kubicek	(2004)
Rick Brandenburg	(2005)
Chip Lee	(2005)

**Joe Sugg Graduate Student
Award Committee**

Carroll Johnson, chair	(2003)
Ron Weeks	(2003)
Peter Dotray	(2003)
Robert Kemerait	(2004)
Brent Besler	(2004)

PAST PRESIDENTS

John P. Damicone	(2001)	Gale A. Buchanan	(1984)
Austin K. Hagan	(2000)	Fred R. Cox	(1983)
Robert E. Lynch	(1999)	David D. H. Hsi	(1982)
Charles W. Swann	(1998)	James L. Butler	(1981)
Thomas A. Lee, Jr.	(1997)	Allen H. Allison	(1980)
Fred M. Shokes	(1996)	James S. Kirby	(1979)
Harold Pattee	(1995)	Allen J. Norden	(1978)
William Odle	(1994)	Astor Perry	(1977)
Dallas Hartzog	(1993)	Leland Tripp	(1976)
Walton Mozingo	(1992)	J. Frank McGill	(1975)
Charles E. Simpson	(1991)	Kenneth Garren	(1974)
Ronald J. Henning	(1990)	Edwin L. Sexton	(1973)
Johnny C. Wynne	(1989)	Olin D. Smith	(1972)
Hassan A. Melouk	(1988)	William T. Mills	(1971)
Daniel W. Gorbet	(1987)	J.W. Dickens	(1970)
D. Morris Porter	(1986)	David L. Moake	(1969)
Donald H. Smith	(1985)	Norman D. Davis	(1968)

FELLOWS

Dr. John P. Beasley, Jr.	(2002)	Dr. Johnny C. Wynne	(1992)
Dr. Robert E. Lynch	(2002)	Dr. John C. French	(1991)
Dr. Patrick M. Phipps	(2002)	Dr. Daniel W. Gorbet	(1991)
Dr. Ronald J. Henning	(2001)	Mr. Norfleet L. Sugg	(1991)
Dr. Norris L. Powell	(2001)	Dr. James S. Kirby	(1990)
Mr. E. Jay Williams	(2001)	Mr. R. Walton Mozingo	(1990)
Dr. Gale A. Buchanan	(2000)	Mrs. Ruth Ann Taber	(1990)
Dr. Thomas A. Lee, Jr.	(2000)	Dr. Darold L. Ketrin	(1989)
Dr. Frederick M. Shokes	(2000)	Dr. D. Morris Porter	(1989)
Dr. Jack E. Bailey	(1999)	Mr. J. Frank McGill	(1988)
Dr. James R. Sholar	(1999)	Dr. Donald H. Smith	(1988)
Dr. John A. Baldwin	(1998)	Mr. Joe S. Sugg	(1988)
Mr. William M. Birdsong, Jr.	(1998)	Dr. Donald J. Banks	(1988)
Dr. Gene A. Sullivan	(1998)	Dr. James L. Steele	(1988)
Dr. Timothy H. Sanders	(1997)	Dr. Daniel Hallock	(1986)
Dr. H. Thomas Stalker	(1996)	Dr. Clyde T. Young	(1986)
Dr. Charles W. Swann	(1996)	Dr. Olin D. Smith	(1986)
Dr. Thomas B. Whitaker	(1996)	Mr. Allen H. Allison	(1985)
Dr. David A. Knauft	(1995)	Mr. J.W. Dickens	(1985)
Dr. Charles E. Simpson	(1995)	Dr. Thurman Boswell	(1985)
Dr. William D. Branch	(1994)	Dr. Allen J. Norden	(1984)
Dr. Frederick R. Cox	(1994)	Dr. William V. Campbell	(1984)
Dr. James H. Young	(1994)	Dr. Harold Pattee	(1983)
Dr. Marvin K. Beute	(1993)	Dr. Leland Tripp	(1983)
Dr. Terry A. Coffelt	(1993)	Dr. Kenneth H. Garren	(1982)
Dr. Hassan A. Melouk	(1992)	Dr. Ray O. Hammons	(1982)
Dr. F. Scott Wright	(1992)	Mr. Astor Perry	(1982)

BAILEY AWARD

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.
1997 J. W. Dorner, R. J. Cole and P. D. Blankenship
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
1995 J.S. Richburg and J.W. Wilcut
1994 T.B. Brenneman and A.K. Culbreath
1993 A.K. Culbreath, J.W. Todd and J.W. Demski
1992 T.B. Whitaker, F.E. Dowell, W.M. Hagler, F.G. Giesbrecht and J. Wu
1991 P.M. Phipps, D.A. Herbert, J.W. Wilcut, C.W. Swann,
G.G. Gallimore and T.B. Taylor
1990 J.M. Bennett, P.J. Sexton and K.J. Boote
1989 D.L. Ketting and T.G. Wheless
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
1985 K.V. Pixley, K.J. Boote, F.M. Shokes and D.W. Gorbet
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 Thomas B. Whitaker
1975 R.E. Pettit, F.M. Shokes and R.A. Taber

JOE SUGG GRADUATE STUDENT AWARD

2002 S.C. Troxler	1995 P.D. Brune
2001 S.L. Rideout	1994 J.S. Richburg, III
2000 D.L. Glenn	1993 P.D. Brune
1999 J.H. Lyerly	1992 M.J. Bell
1998 M.D. Franke	1991 T.E. Clemente
1997 R.E. Butchko	1990 R.M. Cu
1996 M.D. Franke	1989 R.M. Cu

COYT T. WILSON DISTINGUISHED SERVICE AWARD

2002 Dr. H. Thomas Stalker	1996 Dr. Olin D. Smith
2001 Dr. Daniel W. Gorbet	1995 Dr. Clyde T. Young
2000 Mr. R. Walton Mozingo	1993 Dr. James Ronald Sholar
1999 Dr. Ray O. Hammons	1992 Dr. Harold E. Pattee
1998 Dr. C. Corley Holbrook	1991 Dr. Leland Tripp
1997 Mr. J. Frank McGill	1990 Dr. D.H. Smith

DOW AGROSCIENCES AWARD FOR EXCELLENCE IN RESEARCH

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

DOW AGROSCIENCES AWARD FOR EXCELLENCE IN EDUCATION

2002	Kenneth E. Jackson	1996	John A. Baldwin
2001	Thomas A. Lee	1995	Gene A. Sullivan
2000	H. Thomas Stalker	1994	Charles W. Swann
1999	Patrick M. Fnípps	1993	A. Edwin Colburn
1998	John P. Beasley, Jr.	1992	J. Ronald Sholar
1998	<i>Changed to Dow AgroSciences Award for Excellence in Education</i>		
1997	<i>Changed to DowElanco Award for Excellence in Education</i>		
1992-1996	<i>DowElanco Award for Excellence in Extension</i>		

APC RESEARCH AND EDUCATION AWARD

2002	T.E. Whitaker and J. Adams	1981	G.A. Buchanan and E.W. Hauser
2001	C.E. Simpson and J.L. Starr	1980	T.B. Whitaker
2000	P.M. Phipps	1979	J.L. Butler
1999	H. Thomas Stalker	1978	R.S. Hutchinson
1998	J.W. Todd, S.L. Brown, A.K. Culbreath and H.R. Pappu	1977	H.E. Pattee
1997	O. D. Smith	1976	D.A. Emery
1996	P. D. Blankenship	1975	R.O. Hammons
1995	T.H. Sanders	1974	K.H. Garren
1994	W. Lord	1973	A.J. Norden
1993	D.H. Carley and S.M. Fletcher	1972	U.L. Diener and N.D. Davis
1992	J.C. Wynne	1971	W.E. Waltking
1991	D.J. Banks and J.S. Kirby	1970	A.L. Harrison
1990	G. Sullivan	1969	H.C. Harris
1989	R.W. Mozingo	1968	C.R. Jackson
1988	R.J. Henning	1967	R.S. Matlock and M.E. Mason
1987	L.M. Redlinger	1966	L.I. Miller
1986	A.H. Allison	1965	B.C. Langleya
1985	E.J. Williams and J.S. Drexler	1964	A.M. Altschul
1984	Leland Tripp	1963	W.A. Carver
1983	R. Cole, T. Sanders, R. Hill and P. Blankenship	1962	J.W. Kickens
1982	J. Frank McGill	1961	W.C. Gregory
1997	<i>Changed to American Peanut Council Research & Education Award</i>		
1989	<i>Changed to National Peanut Council Research & Education Award</i>		

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GRADUATE STUDENT COMPETITION I

Peanut Pod Lightness Measured Using a Computerized Image Processing System.

D. BOLDOR* and T.H. SANDERS, Department of Food Science, North Carolina State University, Raleigh, NC 27695-7624 and USDA, ARS, NC State University, Raleigh, NC 27695-7624.

A significant share of the peanut market is represented by bulk, in-shell peanuts. During farmer marketing, peanuts are subjectively graded for pod discoloration and pods with greater than 25% discoloration reduce the lot value. This study was performed to evaluate the use of a computer-assisted image processing system to determine pod discoloration of in-shell valencia-type peanuts. The system was composed of a standardized illumination system, video camera and a computer equipped with an image acquisition card. Samples of valencia-type pods graded by New Mexico Department of Agriculture personnel were used in this study. Preliminary research indicated that discoloration was not evenly distributed on a pod. However, the distribution of discoloration for all pods in a sample was the same when pods were sequentially rotated to measure discoloration on four different surfaces. Pod discoloration was measured in three different ways: average pod brightness, calibrated density, and percent of the surface area covered by discoloration. A Hunter colorimeter was used to measure L value. Measurements of discoloration were correlated with each other and with the weight percent of the pods considered as discolored by inspectors. The Hunter L correlation with the weight percent of discolored pods was $R^2 = 0.68$.

Physiological Basis for Antagonism of Clethodim by Imazapic. I.C. BURKE* AND

J. W. WILCUT. Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

A complex of grass and broadleaf weeds is often prevalent in peanut fields. The effectiveness of imazapic on grasses, broadleaf weeds, and sedges and clethodim on annual and perennial grass weeds make the use of these herbicides applied post-emergent (POST), either sequentially or in tank mixtures, a good option for broad spectrum weed control in peanut (*Arachis hypogaea* L.). However, imazapic can antagonize goosegrass control with clethodim. Therefore, laboratory and greenhouse studies were conducted to determine the effect of imazapic on absorption, translocation, and metabolism of clethodim in goosegrass [*Eleusine indica* (L.) Gaertn.], and to examine the effect of imazapic on photosynthetic rate of actively growing goosegrass. When plants reached the four leaf stage, the second uppermost fully expanded leaf was covered. Immediately after application of two non-radiolabeled mixtures, clethodim alone (140 g ai/ha) or a mixture of clethodim and imazapic (70 g ai/ha), 5 1- μ L droplets of ^{14}C -clethodim solution containing ^{14}C -clethodim (1.7 kBq of radioactivity), Select 2EC, deionized water, crop oil concentrate, and/or imazapic were placed on the adaxial

surface of the then uncovered second uppermost fully expanded leaf. Plants were harvested at 0.5, 1, 4, 8, 24, or 96 h after treatment (HAT) and then divided into the treated leaf, roots, shoot above and shoot below the treated leaf. For absorption and translocation, plant parts were oxidized to recover ^{14}C . For metabolism, plants were harvested at 4, 8, 24, or 96 HAT, and only the treated leaf contained sufficient ^{14}C for detection. The ^{14}C was extracted, concentrated, and fractionated using high performance liquid chromatography. For the photosynthetic rate experiment, treatments were non-treated and imazapic (70 g ai/ha) treated plants. Single leaf photosynthetic rates of the second uppermost fully expanded leaf were measured with a portable photosynthesis system. Measurements were made just before herbicide treatment and 1, 2, 6, and 8 days after treatment. Absorption, translocation, and metabolism of clethodim were similar when clethodim was applied alone or in the presence of imazapic. Absorption was 36% of applied ^{14}C -clethodim at 0.5 h, and 89% of applied ^{14}C -clethodim at 96 h. By 96 h after treatment, only 3.6 % of applied ^{14}C had moved into the portion of the shoot below the treated leaf, the location of the intercalary meristem (or the site of action of clethodim). By 96 HAT, 58% of recovered ^{14}C extracted from treated leaves was a relatively more polar compound than ^{14}C -clethodim, and no ^{14}C -clethodim was recovered. Immediately before an application of imazapic, rates of photosynthesis were similar for both treatments. One day after treatment, the photosynthetic rate in plants treated with imazapic had decreased, and remained lower than non-treated plants at the 2, 6 and 8 d sampling times. Graminicides require actively growing meristematic regions for inhibition of acetyl-CoA carboxylase (ACCase). Photosynthetic rate of goosegrass and presumably growth and ACCase activity was reduced with imazapic treatment. Clethodim was absorbed and translocated similarly to other graminicides, and absorption, translocation, and metabolism of clethodim was not affected by the presence of imazapic. The rapid metabolism of clethodim, which was unaffected by the presence of imazapic, resulted in detoxification of clethodim to nontoxic metabolites before reactivated ACCase was present.

Persistence of *Pasteuria penetrans* in a Peanut Root-Knot Nematode Suppressive Site. R. CETINTAS*, and D.W. DICKSON. Entomology and Nematology Department, University of Florida, Gainesville, FL 32611-0620.

Pasteuria penetrans (Thorne) Sayre & Starr, a parasite of *Meloidogyne arenaria* (Neal) Chitwood race 1, was reported to suppress this nematode in a peanut field in Levy County, FL. Our objective was to determine the persistence of *P. penetrans* in this site by determining the density of the bacterium following 9 years of growing bahiagrass (*Paspalum notatum* Flugge cv. Tifton 9), rhizomal peanut (*Arachis glabrata* Benth. cv. Florigraze), and weed fallow. The treatments were chosen to include root-knot nematode nonhosts (bahiagrass and rhizomal peanut) and weed hosts, hairy indigo (*Indigofera hirsuta*) and alyce clover (*Alysicarpus vaginalis* (L) (weed fallow). The

plots were established in a randomized complete block design and replicated 10 times in the summer of 1991. The plot size was 38 \times 10.6 m. In 1999, the bahiagrass and weed fallow plots were deep plowed, disked, and cv. Florunner peanut (*Arachis hypogaea* L.) planted. Glyphosate was sprayed over the rhizomal peanut in the summer of 1999 and they were deep plowed and disked in the spring of 2000. All plots were planted to cv. Southern Runner peanut in the spring of 2000 and cv. Georgia Green in the spring of 2001. In 1999, the initial density of *M. arenaria* second-stage juveniles (J2) was low in all plots and no J2 with endospores attached were recovered. After the first peanut harvest, the only visible symptoms of root knot were in weed fallow plots. Approximately 2.5% of root-knot nematode females recovered from peanut grown in weed fallow plots were endospore filled, and none were recovered from peanut grown in bahiagrass plots. In 2001, the percentage of J2 with endospores attached reached the highest levels between June and August (65.3%, 6.5%, and 2.3% from weed fallow, bahiagrass, and rhizomal peanut, respectively). The percentage of endospore-filled females recovered from peanut grown in weed fallow plots increased to 51.3% in 2001, whereas the percentages in bahiagrass and rhizomal peanut plots were 11.3% and 1.3%, respectively. Peanut yields were significant higher in rhizomal peanut plots followed by bahiagrass, and weed fallow plots over the past 2 years. Peanut roots, pegs, and pods were severely galled in all plots in 2001. In summary, the density of *P. penetrans* increased in all plots over the 3-year period. The incidence of the bacterium seems to be related to the density of the peanut root knot nematode.

The Influence of Soil moisture on Incidence of Pod rot of Peanut caused by *Pythium myriotylum* and *Rhizoctonia solani*. VIJAYKUMAR CHOPPAKATLA*, T.A. WHEELER, G.L. SCHUSTER, D. PORTER, C. ROBINSON. West Texas A&M University, Canyon, TX 79015.

Peanut Pod rot is a soil-borne disease, characterized by the presence of brownish black lesions on the shell with variations in the texture and color of the rotted tissues depending on the organisms involved and other edaphic factors. Principal fungi that are involved in the complex include *Pythium* species and *Rhizoctonia solani* Kuhn. Excessive soil moisture may be one of the prime factors for severe outbreak of this disease. The objective of this study was to relate irrigation intensity (based on % evapotranspiration [ET] water replacement) with the incidence of pod rot. The study was conducted at the Western Peanut Growers Association Research Farm located near Denver City, TX. The first two spans of the circle at this site were in their second consecutive year in peanuts. During the 2000 growing season, no location had $> 1\%$ incidence of pod rot, and the entire area was irrigated with 75 % ET. In 2001, the entire first span was irrigated at 100 % ET (42 row-circles). The inner half of the second span was irrigated with 75 % ET (21 row-circles) and the outer half with 50 % ET (21 row-circles). All nozzles were of a low-pressure spray type (Senninger LDN). Forty-two locations were identified in each irrigation treatment, and aluminum

access tubes were established for monitoring soil moisture with a neutron probe. Moisture readings were taken from 2 July to 14 September at 1-2 week intervals. Pods were sampled at 90 and 130 days after planting. Rating of peanut pods for pod rot incidence was done by counting the number of pods with pod rot divided by total number of pods on a single peanut plant. At 90 days after planting, 50% of the sampled plants irrigated with 100% ET and 20% of the sampled plants irrigated with 75% ET had at least one pod rotted per plant. None of the sampled plants irrigated with 50% ET had pod rot. At harvest, 65% of the sampled plants irrigated with 100% ET had some degree of pod rot (ranging from 2 -34 % incidence per plant). For plants irrigated with 75 % ET, 55% of the sampled plants had pod rot (ranging from 1%-38% incidence per plant). With the lowest irrigation level, 25% of the sampled plants had pod rot (ranging from 2 - 29% incidence per plant). Mean disease incidence per plant for each irrigation treatment was 10.2, 7.9, and 2.4 % for 100, 75, and 50 % ET, respectively. Of those locations (16 of 126) with significant levels of disease ($\geq 10\%$ pods with rot), 56 % were irrigated with 100 % ET, 31 % were irrigated with 75 % ET, and 13 % were irrigated with 50 % ET. While average pod rot was similar between the 75 and 100 % ET irrigation levels, there was a strong correlation between those areas with significant pod rot and ET. This would indicate the need to apply more fungicide protection to those areas receiving more water.

Economic Assessment of Diclosulam and Flumioxazin in Strip- and Conventional-Till-age Peanut. S. B. CLEWIS* and J. W. WILCUT. Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

Experiments were conducted in Lewiston, NC in 1999 and 2000 and Rocky Mount, NC in 1999 to evaluate weed management systems in strip- and conventional-till-age peanuts (*Arachis hypogaea*). The peanut cultivars grown were 'NC 10C', 'NC 12C', and 'NC 7', respectively. Weed management systems consisted of different combinations of preemergence (PRE) herbicides including Strongarm and Valor plus commercial postemergence (POST) herbicide systems. The PRE herbicide options included: 1) Outlook (dimethenamid) alone (1.25 lb/A), 2) Outlook plus Strongarm (0.024 lb/A), 3) Outlook plus Valor (0.063 lb/A), and 4) nothing. The postemergence herbicide options included: 1) Basagran (bentazon) (0.25 lb/A early postemergence [EPOST]) plus Gramoxone (paraquat) (0.125 lb/A EPOST) followed by Storm [Blazer (acifluorfen) (0.25 lb/A) plus Basagran (0.50 lb/A)] (postemergence [POST]), 2) paraquat EPOST followed by Storm POST, and 3) nothing. All postemergence options included a nonionic surfactant (NIS) at 0.25% (v/v PRE). The strip tillage systems required paraquat at 0.625 lb/A plus NIS for burndown of emerged vegetation. The experimental design was a split plot with a factorial treatment arrangement and 3 replications. Only Strongarm systems controlled yellow nutsedge (*Cyperus esculentus*) greater than 90% late season. Strongarm systems were the most consistent for purple nutsedge (*Cyperus rotundus*) control (minimum control = 85%). Grass control was not adequate and required Select (clethodim) for full season control, regardless of tillage system. Outlook plus Strongarm or Valor PRE controlled common lambsquarters,

eclipta, and prickly sida at least 91%. Strongarm and Valor provided variable control of three *Ipomoea* species (59 to 91%) and Storm POST provided >90% control. Outlook plus Strongarm or Valor PRE produced equivalent yields and net returns with no significant differences between the two PRE options. Both systems produced higher yields and net returns than Outlook regardless of the POST herbicide option. The tillage production system did not influence weed control of eight weeds, peanut yields, or net returns. The addition of Strongarm or Valor to Outlook PRE improved weed control compared to Outlook PRE alone.

Early Leaf Spot Suppression by Peanut-Corn Intercropping. L.E. DUFFIE*, B.B. SHEW, and M.A. BOUDREAU, Dept. Plant Pathology, NC State Univ., Raleigh, NC 27695; Dept. Biology, Warren Wilson College, Asheville, NC 28815.

Peanut-corn intercropping was evaluated for its potential to suppress early leaf spot (ELS) of peanut, caused by *Cercospora arachidicola*. Peanut was grown in field plots with corn (*Zea mays*), and the effects of intercropping on temporal and spatial dynamics of disease were examined. In 2000, the experiment consisted of five replicate blocks of square plots 16 rows wide and 14.6 m long. Treatments included nonsprayed peanut (p) monoculture, sprayed peanut monoculture, alternating rows of peanut and corn (c), and four-row strip intercrops (2c, 4p, 4c, 4p, 2c). In 2001, a second strip intercrop treatment was added (4c, 4p, 4c, 4p) and plots were 15.4 m long. Corn and peanut (VA 98R) were planted on May 9, 2000 at the Horticultural Crops Research Station near Castle Hayne, NC, and May 10, 2001 at the Umstead Farm Unit near Butner, NC. Both locations are outside of normal peanut production areas, but are suitable for peanut culture. In late July 2000 and in mid August 2001, focal epidemics were initiated by placing infected peanut stems centrally in each plot. ELS incidence and defoliation were determined weekly in a stratified sampling routine that allowed estimation of disease gradients in four directions. ELS symptoms were first observed near the inoculation site 22 days after inoculation in 2000 and 23 days after inoculation in 2001. In 2000, intimate intercrop and nonsprayed monocrop reached the highest mean level (averaged across distance and direction) of disease incidence at 41% by 63 days after inoculation. Disease incidence AUDPC's for intimate intercrop and nonsprayed monocrop were significantly greater than the AUDPC for strip intercrop, which was significantly greater than the AUDPC for sprayed monocrop. Natural populations of *Cercosporidium personatum* caused a non-point source late leaf spot epidemic on the peanuts. In 2001, nonsprayed monocrop again reached the highest level of disease incidence at 15.4%, 62 days after inoculation. Disease incidence AUDPC's for nonsprayed monocrop were significantly higher than the other four treatments. Intimate intercrop had a moderate AUDPC, which was significantly greater than the two strip treatments and the sprayed monocrop. The two strip intercrop treatments also had moderate AUDPC's. The second strip treatment had significantly greater area than the spray treatment. The AUDPC for the first strip treatment was not

significantly different from that of the sprayed treatment. Another non-point source late leaf spot epidemic occurred, but was much less severe than in 2000. A repeated measures analysis revealed a treatment by distance interaction ($p<0.05$) during the last four sampling days of each ELS epidemic. This is likely due to the sprayed monocrop treatment, which maintained low disease levels at all distances from the inoculum. The analysis also revealed a distance by direction interaction ($p<0.05$) on day 49 in 2000 and on day 46 in 2001. These dates corresponded with a point of rapid increase in the disease progress in each year.

Entomology

Recent Strategies for Rootworm Management in North Carolina Peanut Production.

R. L. BRANDENBURG*, B. M. ROYALS, J. H. SCOTT , Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613, T.G. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629 and D. A. HERBERT, Jr., Department of Entomology, VPI&SU, Tidewater AREC, Suffolk, VA 23437.

The southern corn rootworm (*Diabrotica undecimpunctata howardi* Barber) has been a chronic pest of peanut production in the Virginia-North Carolina production area. The subterranean nature of this pest and its sporadic occurrence make it challenging to manage in a cost-effective manner. In addition, no remedial treatments are available and as a result peanut growers rely up on the use of prophylactic insecticide treatments to prevent yield loss. Our research efforts over the past five years have focused on two areas. The first has been an effort to isolate peanut lines that show some level of resistance to rootworms. The second area of research has focused on documenting the incidence of southern corn rootworms in peanuts and developing decision aids for growers. Results of field evaluations for rootworm resistance have led to inconsistent results primarily due to variable pest pressure from year to year. A laboratory bioassay has demonstrated potential to serve as an early screening tool to minimize the number of lines that need to be examined in the field. This technique isolates slight differences in developmental time for rootworm on different peanut lines which correlates with in-field resistance results. Surveys and site evaluations for the incidence of rootworms have revealed that over the past five years, rootworm occurrence has been quite low and only a small percentage of fields suffer economic infestations. Correlation of soil characteristics with infestation levels provides insight into the potential for rootworm occurrence. A rootworm index has been developed to assist growers in treatment decisions, but field history remains a critical component of the index that is often lacking due to persistent insecticide use.

Burrower Bugs in Peanut: Seasonal Species Abundance, Tillage Effects on Populations, and Feeding Effects on Grade. J.W. CHAPIN* and J.S. THOMAS. Department of Entomology, Clemson University, Edisto Res. & Ed. Center, Blackville, SC 29817.

Pitfall traps placed in South Carolina peanut fields collected three species of burrower bugs (Heteroptera: Cydnidae): *Cyrtomenus ciliatus* (Palisot de Beauvois), *Sehirus cinctus cinctus* (Palisot de Beauvois), and *Pangaeus bilineatus* (Say). *Cyrtomenus ciliatus* was rarely collected and there was no evidence of reproduction in peanut. *Sehirus cinctus* produced a nymphal cohort in peanut during April to June, probably due to an abundance of henbit seeds, *Lamium amplexicaule* L. No *S. cinctus* were

present during peanut pod formation. *Pangaeus bilineatus* was the most abundant species collected and the only species associated with peanut kernel feeding injury. Overwintering *P. bilineatus* adults were present in a conservation tillage peanut field prior to planting and two subsequent generations were observed, indicating that this species is at least bivoltine in South Carolina. Few nymphs were collected until the R6 (full seed) growth stage. Spring tillage, choice of cover crop, and fall tillage to establish cover crops, all affected *P. bilineatus* populations. Peanuts strip-tilled into corn or wheat residue developed greater *P. bilineatus* populations and kernel-feeding injury levels than in rye residue or no-residue, conventional tillage systems. When the wheat cover crop was planted with conventional tillage rather than being drilled directly into corn residue, subsequent *P. bilineatus* populations and peanut kernel feeding were reduced, indicating that winter tillage disrupted diapaused adults. Kernels with *P. bilineatus* feeding sites were 10.3 ± 1.8 % lighter than kernels which were not fed-on. *Pangaeus bilineatus* feeding reduced peanut grade primarily by reducing individual kernel weight, and increasing the percentage of damaged kernels. *Pangaeus bilineatus* affected grade to a lesser extent by reducing kernel size. Each 10 % increase in kernels fed-on by *P. bilineatus* was associated with a 1.7 % decrease in total sound mature kernels. When more than 20 % of kernels were fed-on, there was an increase in percentage of damaged kernels. A 50 % level of kernels fed-on corresponded to approximately 2.5 % damaged kernels and a risk of severe grade penalties from consignment to segregation II.

Impact and Management of Potato Leafhopper (PLH), *Empoasca fabae* (Harris), in Virginia Peanut. D. A. HERBERT, JR.*. Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437.

Potato leafhopper is an annual pest of peanut grown in Virginia that causes a characteristic leaflet injury, called 'yellowing' or 'hopper burn', to plants in many fields. Injury can vary from light, with only a few leaflets showing symptoms, to severe with almost all leaflets injured. Growers' reaction to this injury also varies, as some apply remedial insecticide treatments upon first seeing injury, and others wait until many, or most, leaflets show symptoms before treating. The current literature does not provide much information regarding the impact of PLH injury on peanut, or direction as to management. Nineteen peanut field experiments were conducted from 1998 to 2001, at either the research center (indicated in above title) or in growers' fields. All experiments were conducted similarly, using small plots (4 peanut rows x 40 ft in length) and a randomized complete block experimental design with four replicates. Different insecticides and rates were evaluated in each experiment, applied as full coverage foliar sprays with a CO₂-pressurized backpack sprayer calibrated to deliver 14.7 gpa at 41.5 psi through three D2-13 disk-core nozzles per row, one over the top and one on each side of each treated row. Only the center two rows of each 4-row plot were treated and evaluated. PLH populations (nymphs plus adults) were

sampled using a 15-inch diameter sweep net, 10 sweeps per plot, at designated times both prior to and after treatment application. Degree of plant injury was determined by visually estimating the percentage of injured leaflets. Yields were determined by digging and combining the two treated rows of each plot. Over all experiments, PLH population levels (based on the highest number per 10-sweep sample) varied greatly, from zero to 69.8. Percentages of leaflet injury also varied greatly, from zero to 65. Yields were not affected unless PLH populations exceeded about 15 per sample for at least two consecutive sample dates, and percentage leaflet injury exceeded about 20 percent. PLH populations and percentage leaflet injury exceeded these levels in 11 of the 19 experiments. In those, yields in untreated controls were significantly lower compared with yields in treatments that reduced PLH population and leaflet injury levels. Yield reductions ranged from 329 to 667 lb/acre, or a 10 to 18 percent reduction of the total, respectively. In 2000 and 2001, regression analyses were used to determine the relationship, in all experiments combined, of yield to level of leaflet injury. In both years, yield was significantly reduced as level of leaflet injury increased [(2000: $y = -17.8x + 3571$; $R^2 = 0.71$; $P = 0.0010$) (2001: $y = -15.4x + 3547$; $R^2 = 0.22$; $P = 0.0025$)].

Evaluation of Management Strategies to Reduce the Incidence of Tomato Spotted Wilt virus in Peanut in North Carolina. C. A. HURT*, R. L. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613, and D. L. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629.

Tomato Spotted Wilt virus (TSWV), a very debilitating pathogen to peanut plants that is vectored by several species of thrips, was the most significant disease of peanut in 2001 in the eastern North Carolina peanut growing region. This was the first time that this virus caused drastic losses to peanut growers in this area, unlike other peanut producing areas that have already been heavily infested with the virus. Useful techniques to limit the disease have already been established in areas such as Georgia, Florida, and Alabama to minimize the damage caused by TSWV. However, in North Carolina, our differing cultivars, production systems, and growing conditions require that we evaluate methods useful to growers in this region. During this past season we evaluated methods such as increased plant populations, different varieties of peanut, twin- and single-row plantings, reduced tillage, varied planting dates, and compared different in-furrow insecticides. This approach utilizes ways of altering the typical production of peanuts in the Virginia-Carolina area in a manner that makes them less desirable to thrips, which harbor the virus. In 2001, our studies included three trials with different combinations of these cultural and chemical controls across 10 different locations across NC. Starting in June and continuing through September, symptomatic plants were flagged for future testing. In September prior to harvest, four locations were inspected for actual signs of infected plants by running tests to confirm the virus. When taking samples from each field to test for presence of the virus, we

pulled one to two leaflets from every symptomatic plant that had been previously flagged. Later in the month, we found that taproot samples were a more accurate indication of the presence of virus, and switched our methods to root samples. In addition to the symptomatic plants, we also took asymptomatic plants from the same fields. In this case, we sampled 20 plants, which appeared to be healthy, per plot (10 per row—2 rows/plot). After testing each sample we began to compile the data and the techniques to determine which methods reduced the virus. The preliminary results showed that peanuts planted in twin-rows had a reduced amount of virus compared to single-rows, NC V-11 variety showed less virus than Gregory or Perry, and plants treated with Thimet in-furrow had much fewer incidences of virus than those treated with Temik in-furrow.

Evaluation of Georgia Green and C99R Peanut Cultivars for Thrips and Nematode Damage, Southern Stem Rot and Tomato Spotted Wilt Tospovirus Incidence and Peanut Yield and Grade. J. R. WEEKS,* A. K. HAGAN, H. L. CAMPBELL and L. WELLS. Dept. of Entomology/Plant Pathology and Alabama Agricultural Experiment Station. Auburn University, AL. 36849.

Studies were conducted in 2001 at the Wiregrass Research & Extension Center in Headland to compare the impact of insect, disease and nematode pests on Georgia Green (GG) and C99R peanut (*Arachis hypogaea*) under four thrips and/or nematode management programs. Treatments consisted of aldicarb in-furrow @ 1.0 lb ai/A; aldicarb @ 1.5 lb ai/A banded at planting + 1.5 lb ai/A banded at pegging; phorate @ 1.0 lb ai/A in-furrow; and an untreated control. Thrips control, as evaluated by visual ratings, was significantly better in all insecticide treated peanuts. There was no significant difference in thrips damage between GG and C99R peanuts. There were no significant differences in tomato spotted wilt tospovirus (TSWV) among insecticide treatments or peanut cultivars. Peanut root knot (*Meloidogyne arenaria*) damage was significantly reduced in the aldicarb treatment (1.5 lb ai/A at plant + 1.5 lb ai/A pegging) compared to the untreated peanuts. Root knot damage, as a visual assessment of roots and pods at harvest, was not significantly different between the GG and C99R peanuts. Treated peanuts had significantly higher yields than did untreated peanuts. Peanut yields of the GG and C99R peanuts of the same treatments were not significantly different. In the GG peanut grades were significantly improved in the aldicarb treatment compared to the untreated or phorate treated peanuts. Grades of C99R treated or untreated peanuts did not differ.

Graduate Student Competition II

Disease Management and Peanut Response with Subsurface Drip and Sprinkler Irrigation Systems. J.E. LANIER*, D.L. JORDAN, J.S. BARNES, J.E. BAILEY, W.J. GRIFFIN, G. GRABOW, J. MATTHEWS, and P.D. JOHNSON. North Carolina State University, Raleigh, NC 27695-7620 and North Carolina Department of Agriculture and Consumer Services, Peanut Belt Research Station, Lewiston-Woodville, NC 27849.

Research was conducted in North Carolina during 2001 to compare disease reaction, pod yield, market grade characteristics, and gross economic value of peanut grown with subsurface drip irrigation (SDI) or with overhead sprinkler irrigation under three disease management programs (no fungicides, fungicides applied based on weather advisories, fungicides applied bi-weekly). In an additional experiment, peanut response with no irrigation was compared to peanut under SDI and sprinkler irrigation when fungicides were applied bi-weekly. Early leaf spot (caused by *Cercospora arachidicola*) incidence in late August was 11 and 61% when fungicides were not applied and peanut were grown under SDI and sprinkler irrigation, respectively. Early leaf spot incidence in mid September in these respective irrigation systems was 64 and 95%. Leaf defoliation caused by early leaf spot was 50% in SDI and 74% in sprinkler irrigation in late September when fungicides were not applied. Incidence of tomato spotted wilt tospovirus and Sclerotinia blight (caused by *Sclerotinia minor*) did not differ between irrigation systems, although incidence of these diseases was less than 5% for any combination of disease management and irrigation system. There was no difference in early leaf spot incidence or defoliation when fungicides were applied bi-weekly or based the weather advisory. A total of four, five, and six fungicide applications were made under the combinations of SDI and targeting fungicides based on weather advisories, sprinkler irrigation and targeting fungicides based weather advisories, and either SDI or sprinkler irrigation with fungicides applied bi-weekly, respectively. Approximately 6 inches of irrigation was administered throughout the season (June through September) in both irrigation systems. Rainfall increased total water to approximately 13 inches during this time period. Pod yield generally reflected differences in early leaf spot control. When fungicides were applied bi-weekly, pod yield was 880 and 610 lb/acre lower when peanut was not irrigated when compared with SDI and sprinkler irrigation, respectively. The percentage of fancy pods was higher with irrigation. There was a trend for a lower percentage of extra large kernels under SDI compared to sprinkler irrigation. Pod maturity, based on hull mesocarp color, did not differ among irrigation treatments.

USDA/ARS NPRL Multi-Crop Irrigation Research Farm, Year One Results and Economic Analysis. M.H. MASTERS*. Auburn University Department of Agricultural Economics and Rural Sociology, Auburn Univ., AL 36849 and USDA/ARS National Peanut Research Laboratory, 1011 Forrester Drive, S.E., Dawson, GA 31742.

Increased attention to water resource availability in Southwest Georgia prompted the USDA/ARS National Peanut Research Laboratory to develop an irrigation research farm in 2001. Designed as a long-term project, six crop rotation systems will be examined under twelve different watering regimes for a minimum of six years. Crops included in the research are peanut, cotton, corn, wheat, and soybean. Irrigation is controlled using a specially designed three-spray lateral move sprinkler system that applies water at a full, 2/3, and 1/3 rate. The subsurface drip irrigation (SDI) was designed to apply water in the same fashion using different drip tape technologies. Following *a priori* expectations, 2001 average crop yield across varieties was maximized at the full sprinkler irrigation level for cotton, corn, and soybean. Average peanut yield across five cultivars (GA Green, AT 201, C99R, ATC 3256, and GA 9892508) was maximized at the 2/3 sprinkler irrigation level. Similar results were found under SDI regimes. Rainfall during the peanut growing season totaled 21.6 inches. Total water amounts available to the plants were 25.9 in, 28.74 in, and 30.82 in for the 1/3, 2/3, and full irrigation levels, respectively. Using a quota price of \$610/ton, the marginal revenue gained from the irrigation practice was \$391.45/acre at the 1/3 irrigation level. That is, applying 4.36 in of irrigation above rainfall caused a gain of \$391.45/acre. However, a net loss of \$50.22/acre was realized at the full irrigation level. Drawing conclusions from the first-year data would be irresponsible. However, the importance of this research cannot be over-emphasized. The uncertainty present in both the peanut industry and water availability in Southwest Georgia demands that growers act optimally to realize positive returns and efficient use of the water resource. The knowledge gained from this work will assist producers in making these optimal decisions.

Screening of weed species for reaction to Sclerotinia minor and Sclerotium rolfsii.

C.B. Meador* and H.A. Melouk. Department of Entomology and Plant Pathology and USDA-ARS. D.S. Murray Department of Plant and Soil Science, Oklahoma State University, Stillwater, OK 74078.

Sclerotium rolfsii and Sclerotinia minor have wide host ranges that can significantly affect the epidemiology of the diseases caused by these pathogens. Three-week-old plants of sixteen weed species (Citronmelon, Crownbeard, Cypressvine morningglory, Eclipta, Hemp sesbania, Ivyleaf morningglory, Jimsonweed, Kochia, Pitted morningglory, Red root pigweed, Sicklepod, Smallflower morningglory, Spurred anoda, Tall morningglory, Velvetleaf and Venice mallow) from eight families (Amaranthaceae, Asteraceae, Chenopodiaceae, Convolvulaceae, Cucurbitaceae, Leguminosae, Malvaceae and Solanaceae) and Okrun, a susceptible variety of peanut, were inoculated

with *S. minor* and *S. rolfsii* in separate experiments. For both experiments, plants were grown in the greenhouse and then placed in a chamber maintained at 24-29 °C and 100% relative humidity. Inoculation with *S. minor* was accomplished by placing a 5-mm diameter agar plug, containing mycelia from a two-day old culture of *S. minor*, against the stem in a leaf axil at approximately two-thirds of the height of the plant. Inoculation with *S. rolfsii* was performed by positioning a piece of filter paper on the soil surface around the base of each plant and then placing two sclerotia on the filter paper in contact with the plant stem. At days three, four and five post inoculation, data on formation of lesions were recorded. Plants were left in the humidity chambers for an additional seven days for sclerotia formation. Viability of sclerotia was determined by germination on potato dextrose agar medium containing 100 μ g of streptomycin sulfate/ml. Two experiments were conducted with both pathogens in August and September 2001(Experiment 1) and again in February and March 2002 (Experiment 2). *S. minor* and *S. rolfsii* were pathogenic to varying degrees to all weed species and to Okrun peanut. In experiment 1, stems of Sicklepod and Crownbeard were totally invaded and colonized with *S. minor* at 5 days post inoculation, and produced an average of 26 and 20 viable sclerotia/5-cm of stem, respectively, while Ivyleaf morningglory, Smallflower morningglory, Spurred anoda, Velvetleaf and Venice mallow developed only small lesions (<25-mm) and formed no sclerotia. In experiment 2, Sicklepod formed only small lesions (<22mm) in response to *S. minor* and only 2 sclerotia/5cm of stem. However, Spurred anoda, Velvetleaf, and Venice mallow were completely colonized by day 5, and formation of sclerotia were 8, 0 and 4 (sclerotia/5cm of stem), respectively. Most weeds were less susceptible to *S. rolfsii*. Both experiments with *S. rolfsii* yielded small lesions (<30mm) and no sclerotia formed on symptomatic stems. These data suggest that many weeds may serve as hosts in maintaining pathogen population in the soil and that a seasonal effect may have influenced the susceptibility of the weeds. Additional research is being performed to determine those effects.

Best Linear Unbiased Prediction of Breeding Value for Tomato Spotted Wilt Virus Incidence in Virginia-Type Peanuts. S.R. MILLA* and T.G. ISLEIB. Dept. of Crop Science, North Carolina State Univ.

Spotted wilt, caused by the tomato spotted wilt tospovirus (TSWV) has progressively become more prevalent in the Virginia-Carolina peanut (*Arachis hypogaea* L.) production area. Management tactics for control of spotted wilt are limited. Development of cultivars with field resistance to TSWV is the most promising formula for managing the disease. Breeding efficiency can be maximized by choosing parents based on their potential to produce elite progeny. Best Linear Unbiased Prediction (BLUP) is a method for estimating the breeding value of a parent based on its relatives' performance as well as its own. The method was used in the present study to identify lines with superior ability to transmit TSWV field resistance to their progeny. Data were collected on 118 breeding lines, 12 cultivars and one var. *hirsuta* accession.

Genotypes were evaluated for TSWV incidence over 18 tests conducted in 7 combinations of year and location. Agronomic traits were evaluated in 84 tests over 30 year-location combinations. Because only estimates of broad-sense heritability (H) were available, BLUPs were computed using a range of estimates for narrow sense heritability (h^2). BLUPs obtained with different estimates of h^2 were highly correlated ($r>0.85$), indicating that BLUPs are not critically affected by inaccurate estimates of h^2 . Breeding values predicted by BLUP were moderately correlated ($0.54< r < 0.83$) with line means estimated from a fixed-effect model. Specific lines with high breeding values for TSWV field resistance included a set of lines resistant to early leafspot (*Cercospora arachidicola*) and the hirsuta accession, PI 576636. However, breeding value estimates for this accession might not be accurate due to its complete lack of genetic relationship to any other line in the data set. BLUPs for yield, meat content, crop value, and pod brightness were also calculated in order to select lines with superior breeding values for a combination of traits of interest. Four leafspot-resistant lines (N950761, N00012L, N00019L, and N00024L) were found to possess superior breeding values for at least three of the five traits.

Small and Large Plot Evaluations of Strip-Tillage, Resistant Cultivars, and Reduced Fungicide Inputs for Management of Peanut Leaf Spot. W.S. MONFORT*, A.K. CULBREATH, and T.B. BRENNEMAN, The University of Georgia, Coastal Plain Expt. Stn., Tifton, GA 31793-0748.

Field experiments were conducted in 2000 and 2001 to determine the effects of tillage and reduced fungicide applications on early leaf spot (*Cercospora arachidicola*) of peanut (*Arachis hypogaea*). A split-split plot experiment with four replications was conducted at the Lang Farm on the Coastal Plain Expt. Station. Whole-plot treatments were conventional (CONV) vs. strip-tillage (ST) seedbed preparation. Sub-plot treatments were cultivars: Georgia Green (GG), C-99R, and Florida MDR-98. Sub-sub-plot treatments were seven fungicide regimes, and included: 1) no fungicide; 2) chlorothalonil (CHL) 1.26 kg/ha; 3) tebuconazole (TEB) 0.23 kg/ha (sprays 3-6) and CHL 1.26 kg/ha (all other sprays); and 4) azoxystrobin (AZO) 0.33 kg/ha (sprays 3 and 5) and CHL 1.26 kg/ha (all other sprays), applied at 14 day intervals (7 total sprays). Treatments 5-7 consisted of the same fungicides used in treatments 2-4, respectively, but applied at 21-28 day intervals (4 total sprays). In treatments 6 and 7, TEB or AZO, respectively, were applied at sprays 2 and 3 and CHL in all others. Area under the disease progress curve (AUDPC) values were based on multiple leaf spot severity ratings (Fla. 1-10 scale, where 1 = no leaf spot and 10 = total defoliation). AUDPC values were lower in strip-till than in conventional tillage. AUDPC values for Trts 1-7 were 381, 255, 239, 228, 311, 260, and 247 in 2001 (LSD = 21) and 328, 131, 111, 119, 212, 163, and 150 in 2000 (LSD = 20), respectively, for conventional-till plots and 297, 190, 177, 186, 231, 197, and 185 in 2001 (LSD = 27) and 238, 97, 98, 95, 144, 120, and 106 in 2000 (LSD = 22), respectively, for strip-till for Georgia Green. AUDPC values were lower for C-99R and MDR-98, but followed similar trends for treatments and tillage. Split-plot experiments with four replications were conducted

in two commercial fields (one using ST and one using CONV tillage practices) ca. 0.25 miles apart in 2000 and one commercial field in 2001 in Worth Co., GA. Whole plots were 12 ft x 800 -1200 ft in size, and treatments consisted of cultivars GG and Florida MDR-98 in 2000 with the addition of C-99R in 2001. Sub-plots were two fungicide treatments: 1) AZO 0.33 kg/ha (sprays 3 and 5) and CHL 1.26 kg/ha (all other sprays), applied at 14 day intervals and 2) AZO 0.33 kg/ha (sprays 2 and 4) and CHL 1.26 kg/ha (all other sprays), applied at 21-28 day intervals. Leaf spot ratings were 2.3 and 4.4 for GG (LSD = 0.4) for treatments 1 and 2, respectively in CONV plots, and 2.1 and 2.9 for GG (LSD = 0.2) respectively in ST plots in 2000. For 2001, Leaf spot ratings were 3.0 and 4.7 for GG (LSD = 0.3) for treatments 1 and 2, respectively in CONV plots, and 1.9 and 2.9 for GG (LSD = 0.3) respectively in ST plots. Large plot evaluation followed the same trend of lowered levels of leaf spot severity in strip-tillage and in resistant cultivars. Thus, the use of strip-tillage may help reduce fungicide requirements for leaf spot control on GG, and should allow for even better leaf spot control when combined with moderately resistant cultivars such as Florida MDR-98 or C-99R.

Genetic Diversity Within the Genus *Arachis* Evaluated using AFLP Markers. M.L. NEWMAN*, R.N. PITTMAN, R.E. DEAN, M.S. HOPKINS, T.M. JENKINS.
Plant Genetic Resources Conservation Unit, University of Georgia, Griffin,
GA 30223

The genus *Arachis* is a diverse taxa containing both the cultivated peanut, *A. hypogaea*, and its wild relatives. The genus contains 69 known species partitioned into nine sections based on morphological and interspecific hybridization studies. In addition, 11 new species have been recently identified. In this study, AFLP marker technology was used to assess the genetic variability within and between all sections of the genus *Arachis*. AFLP technology has proven to be a very informative and reproducible means to assess genetic variation across species. Although this type of investigation into the genus *Arachis* has been done with other technologies such as seed protein profiles and isozymes, this study is more comprehensive in that it surveys all sections with one marker system thus providing cohesive genetic information for the entire genus. Also, this is the first molecular data collected for the 11 newly identified species. Initially, primer sets were screened against a diverse set of twenty peanut accessions representing the six botanical varieties of *A. hypogaea* plus three wild accessions in order to identify primer sets that produce a high percentage of well defined, polymorphic loci. In total, 140 primer sets were screened which utilized three different sets of restriction enzyme combinations - EcoRI\TaqI, PstI\Msel and PstI\TaqI. Ten percent of the study samples were randomly chosen to measure reproducibility. The reproducibility of the AFLP profiles ranged from 95-100% depending on sample and primer set. In *A. hypogaea*, no polymorphic loci were detected in our screen. However, a great number of polymorphic loci were identified in the genus as a whole. Three primer sets were chosen to survey the genetic diversity within and between the different sections of the genus. The survey included three accessions from each *Arachis* species where

available. Diversity measures calculated using Shannon's diversity index ranged from 0.2494 to 0.3967 within sections indicating that there is a rich genetic diversity within the genus. A phylogenetic tree constructed using the UPGMA method supports current taxonomical grouping of the *Arachis* species into the nine sections; although several sections did not group into robust clades. *Extranervosae*, *Heteranthae* and *Caulorrhizae* grouped together as did *Erectoides*, *Rhizomatosae* and *Procumbentes*. Section *Arachis* annuals grouped with section *Arachis* perennials into a large clade; although most annuals and perennials were separated within the clade. The results of the study emphasize the important role the wild *Arachis* species can play in expanding the genetic pool of cultivated peanut and in providing sources of increased disease/pest resistance. The results also indicate that the utility of AFLP markers to study genetic diversity within the species, *A. hypogaea*, is limited, and the authors suggest the use of other markers, in particular simple sequence repeats (SSRs), in studies focused on this single species.

Potential for Integrated Management of Sclerotinia Blight on Peanut with Fluazinam and the Biocontrol Agent *Coniothyrium minitans*. D.E. PARTRIDGE¹*, J.E. BAILEY¹, D.L. JORDAN². ¹Department of Plant Pathology, ²Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

Sclerotinia blight of peanut (*Sclerotinia minor*) is an important disease that has spread to all major peanut producing counties in North Carolina. *C. minitans* is capable of colonizing sclerotia of *Sclerotinia* spp. and is currently available as a commercial formulation, ContansWG. A long-term field experiment was initiated in 1999 to test repeated soil applications of *C. minitans* at rates of 2 kg/ha and 4 kg/ha for control of Sclerotinia blight. *C. minitans* was applied in the fall of 1999 and in 2000 in a field that had been planted to cotton and harvested prior to the applications. Peanuts were planted in the spring of 2001 with chemical (fluazinam) and cultivars (susceptible NC-V11 and moderately resistant Perry) subplot treatments. Fluazinam (2.5 pt/ha) was applied according to a weather based sclerotinia advisory warning system and was found to reduce disease across both cultivars. Application of *C. minitans* at 4 kg/ha reduced disease only in the cultivar, Perry. The combination of *C. minitans* and fluazinam on Perry showed greatest control of Sclerotinia blight.

Economics

Economic Considerations of Sod Based Rotations for Peanuts. T.D. HEWITT*, J.J. MAROIS, and D.L. WRIGHT. North Florida Research and Education Center, University of Florida, Marianna, FL 32446 and Quincy, FL 32351.

With the changes in the peanut program and as profit margins become tighter, looking at ways to increase profits and improve efficiency is important to producers. Utilizing a sod based rotation for Southeastern peanut and cotton producers is one possibility of developing a viable production system. Sod based rotation systems are a way of reducing costs, reducing pest pressures, and increasing yields. A sod based rotation utilizing bahia grass has been shown in a number of experiments as a way of maintaining organic matter and as a cultural practice to increase yields and lower inputs. Both disease and nematode problems have been shown to decrease which results in lower input costs. Studies in both Florida and Georgia utilizing sod in rotations have resulted in increased yields for peanut. One study that rotated peanuts, corn, soybeans, and a small grain crop resulted in a yield increase of 2100 pounds per acre over continuous peanuts. Another ongoing experiment that compared peanuts rotated up to three years with bahia resulted in over 1500 pounds per acre increase. A production model that has been developed at NFREC-Quincy for a 200 acre farm rotating peanuts, cotton, and bahia results in a whole farm profit of \$31,000 in the third and fourth year of the rotation. The model does make the assumption that a market exists for the bahia hay. Cattle may also be incorporated into the model and may increase the returns. However, labor constraints must be factored into the decision and may limit the use of this option. The increased yields for cotton and peanuts in this type of system makes the sod based rotation economically viable. The sod based rotation experiments are continuing and the results have indicated that this type of production system should be considered by producers as a way to maintain profits and improve soil and cropping conditions.

Economic and Production Efficiencies of Peanut Cultural Practices in Bolivia. D.J. ZIMET* and T.D. HEWITT. North Florida Research and Education Center, University of Florida, Marianna, FL 32446.

Peanut is a significant crop throughout South America. In Bolivia over 2,000 ha are utilized in peanut production. Peanut is used principally for local consumption and cultural practices are limited to basic cultivation methods that utilize family labor on mainly small holdings. As part of a Peanut CRSP (UFL 16P) project with the University of Georgia and Florida, production practices are being evaluated and on-farm experiments are being conducted to improve the economic situation for peanut producers in Bolivia. One of the purposes of working with producers in Bolivia is to develop a more economically viable peanut production system. This type of system

would result in increased costs to the producers and it became necessary to convince the peanut producers that increasing costs would result in higher and more economical yields. Demonstration tests were conducted to look at planting dates, planting densities, pest management, and planting and harvesting methods. Economic constraints must be overcome and the labor issues must be addressed to make this system usable. The new production system incorporates the various cultural practices into a production regime that will increase yields and require more inputs. More efficient use of labor will result in some human capital adjustments which are difficult to implement. The use of cooperatives is also a means of working with the constraints as well as introducing new machinery in peanut production. These new production practices do increase costs but show economic returns in the demonstration fields due to much higher yields. By changing to a different production system and improving the marketing infrastructure, peanut production could increase in Bolivia and the economic incentives could improve both economic and social well-being.

Regional and Farm Level Economic Impacts of Peanut Quota Program Changes.

S.G. BULLEN*, Department of Agricultural and Resource Economics, North Carolina State University, Raleigh NC 27695-8109, and N. SMITH, Department of Agricultural and Applied Economics, University of Georgia, Tifton GA 31793.

The peanut farm program was implemented during the Great Depression as means to stabilize prices and control production. The current peanut program allocates an annual national poundage quota among states and individual producers based on historical quota rights. Peanut imports are restricted by a schedule of tariffs to protect the U. S. market from foreign competition. The new farm program would eliminate the peanut quota system, making peanuts similar to the existing programs for corn and cotton. Eligible peanut producers would receive direct support payment through fixed and counter-cyclical payments based on historical productions and price protection through loan deficiency and market loan payments. Peanut quota holders would receive a five-year payment as reimbursement for the elimination of their quota. The farm level effects of the new peanut program in two of the peanut-producing regions were examined. Model farms for Georgia and North Carolina were utilized to evaluate

The Economic Effects of Considered Change in Federal Peanut Policy. J. CHVOSTA*,

W. N. THURMAN, and B. BROWN North Carolina State University, Department of Agricultural and Resource Economics, Raleigh, NC

Government regulatory programs that restrict the level of agricultural production are common in the United States and world wide. This paper examines such restrictions in the context of the peanut industry and discusses the possible impacts of changes now being considered in the 2002 Farm Bill debate. The marketing of edible peanuts in the United States is regulated through the federal peanut program, which has evolved

since its inception in the 1930s. In its current incarnation, producers who possess marketing quota are guaranteed to receive a support price for their peanuts, which is approximately twice the world price. Over-quota, or additional, peanuts can be sold for export or placed into cooperative pools, from where they may be bought back for edible use or sold for domestic crushing. This system appears soon to be transformed into one much more like other federal crop programs, with loan deficiency payments, target prices, and program base acreage and yields. Most significantly, quota restrictions on edible market sales likely will be eliminated. Among recent forces for change in the peanut program are international trade agreements signed by the United States, most importantly NAFTA and the GATT/WTO. Under these treaties, imports of domestic edible peanuts rose substantially. Free-trade pressures and others led in 1996 to the FAIR act, which lowered the support price, and to reductions in the aggregate level of quota. Both changes reduced the cost of the program. However, peanut program opponents have pushed for further changes. In July 1998, during floor debate on an agriculture appropriations measure, the U.S. House rejected an amendment that would further lower the quota support price to \$550. In 1999 and 2000, the differences between growers and manufacturers became deeper and the House of Representatives and U.S. Senate began work on a new farm bill that contemplated the elimination of the current peanut program. We analyze the most recent versions of the 2002 Farm Bill and discuss the implications for the domestic price of peanuts, the location of production, and the economic effects on producers, consumers, and current owners of peanut quota.

Adoption and Sustainability of New Farm Technology: Beyond "Blaming the Victim" to Community and Regional Influence. R.L. MOXLEY and K.B. LOUGHridge, Department of Sociology and Anthropology, North Carolina State University, Raleigh, North Carolina 27695-8107

This research examines influences on long-term-adoption (adoption maintenance) of new technology among Jamaican peanut farmers six years after the termination of a project to introduce a new peanut variety in St Elizabeth, Jamaica. The research begins by explaining the nature of the main innovation (a new peanut variety) and the reasons farmers gave for discontinuing its adoption. Other innovations, also introduced by the same project, were adopted and are still maintained. It is these that are studied along with the influences on their long term adoption. The research examines not only traditional adoption/diffusion characteristics of farmers but also influences of the larger structural context (community network centrality) in which the farmer operates. It is not a traditional adoption/diffusion study of the timing and order of acceptance of a key innovation among farmers. This is a study of the collateral labor-reducing mechanical devices introduced to make sure that the new variety would succeed. Our study is an attempt to sort out the influences on the adoption of these devices and to determine the relative impact of traditional adoption theory variables, versus theory derived notions regarding community and subcommunity structural characteristics (community centrality, and social contact linkages). Based on regression analysis, the

results indicate that individual and farm characteristics make no difference, and local interpersonal contact networks make little difference, when compared to local church membership (negatively related), and a community's socioeconomic centrality within the parish, which is positively related. Community "socioeconomic centrality" is the strongest predictor of high levels of long-term-adoption of new farm technology.

Graduate Student Competition III

Yellow Nutsedge (*Cyperus esculentus* L.) Management with Reduced Strongarm and Dual Magnum Rate Combinations in Texas Southern High Plains Peanut.

B.L. PORTER*, P.A. DOTRAY, J.W. KEELING, and T.A. BAUGHMAN; Texas Tech University, Texas Agricultural Experiment Station, Lubbock, and Texas Cooperative Extension, Vernon.

Yellow nutsedge (*Cyperus esculentus* L.) infests numerous acres on the Texas Southern High Plains. Experiments were conducted in 1999 and 2000 to evaluate yellow nutsedge control with Strongarm applied PRE at four rates (0, 0.008, 0.016, and 0.024 lbs (active ingredient) per acre), Dual Magnum applied postemergence (POST) at four rates (0, 0.5, 1.0, and 1.3 lbs per acre), and combinations of these herbicides. Yellow nutsedge densities were counted at season's end. Data were subjected to analysis of variance with partitioning appropriate for a factorial arrangement. Means were separated using Fisher's Protected LSD at $\alpha = 0.05$. Strongarm at 0.008, 0.016, and 0.024 lbs/A PRE controlled yellow nutsedge 47%, 62%, and 78% (71 DAP) in 2000. Dual Magnum at 0.5, 1.0, and 1.3 lbs/A POST controlled yellow nutsedge 15%, 38%, and 52%, respectively (71 DAP). A Strongarm by Dual Magnum interaction was observed 71 DAP. When Strongarm was applied at 0.008 lbs/A PRE, additional applications of Dual Magnum POST did not provide acceptable yellow nutsedge control 71 DAP. When Strongarm was applied at 0.016 lbs/A PRE, Dual Magnum at 1.3 lbs/A POST improved yellow nutsedge control to 88%. This control was better than Dual Magnum at 0.5 or 1.0 lbs/A POST, and equivalent to Strongarm 0.024 lbs/A PRE with any rate of Dual Magnum POST. When Strongarm was applied at 0.024 lbs/A PRE, all Dual Magnum POST rates provided equivalent control of yellow nutsedge (85 to 88%). End of season yellow nutsedge density was similar across herbicide combinations, with plots averaging from 0.4 to 2.5 yellow nutsedge plants per foot². Untreated plots averaged 17.9 plants per foot². No injury was observed at harvest, and neither grade nor yield was affected by any herbicide treatment. Yields averaged 1,532 lbs/A. Strongarm at all rates controlled yellow nutsedge greater than 90% 40 and 55 DAP in 2001, but control dropped to less than 75% 69 DAP. Dual Magnum at 1.0 and 1.3 lbs/A controlled yellow nutsedge greater than 75% 55 and 69 DAP. A Strongarm by Dual Magnum interaction was observed 69 DAP. When Strongarm was applied at 0.008 lbs/A, Dual Magnum at 1.3 lbs/A controlled yellow nutsedge 95%. This control was similar to the yellow nutsedge control provided by the highest herbicide-rate combinations. When Dual Magnum was applied at 1.3 lbs/A, all rates of Strongarm controlled yellow nutsedge more effectively than Dual Magnum at 0.5 lbs/A. End-of-season yellow nutsedge density was similar across herbicide combinations, with plots averaging from 0.2 to 1.6 yellow nutsedge plants per foot². Untreated plots averaged 6.8 plants per foot². No injury was observed at harvest, and neither grade nor yield was affected by any herbicide treatment. Yields averaged 4,857 lbs/A.

Yield and Physiological Response of Peanut (*Arachis hypogaea*) to Glyphosate Drift.

B.L. ROBINSON*, W.E. THOMAS, W.A. PLINE, I.C. BURKE, D.L. JORDAN and J.W. WILCUT. Department of Crop Science, North Carolina State University, Raleigh, NC 27612.

The increase in Roundup Ready corn, soybeans and cotton acreage has introduced potential problems for peanut growers. Approximately 70-80% of the cotton and soybean acreage, and 7% of the corn acreage are planted to Roundup Ready varieties in North Carolina. Peanuts are often grown in areas that are situated near corn, soybean and cotton fields, and are sensitive to Roundup UltraMax (glyphosate) drift. Accumulation of shikimic acid in nontransgenic crops may be used to determine glyphosate drift. Field trials were conducted in 2001 at the Peanut Belt Research Station at Lewiston-Woodville, NC to determine yield, crop damage and shikimic acid accumulation. Roundup UltraMax was applied EPOST at 0.0078, 0.0156, 0.03125, 0.0625, 0.125, 0.25, 0.5, and 1.0 lb ai /ac to peanut plants 4-6 inches in diameter. Crop stunting, discoloration and stand reduction were visually rated 34, 41 and 47 d after the EPOST treatment. Samples for shikimic acid accumulation were taken 7, 14, 21, and 28 d after Roundup UltraMax treatments. Shikimic acid accumulation was determined by the methods developed by Singh and Shaner (1998). Shikimic acid accumulation was found to be an effective diagnostic tool to determine drift rates in peanuts at 7 DAT, but not 14, 21 or 28 DAT. Shikimic acid accumulation increased as Roundup UltraMax rates increased. Roundup UltraMax rates of 0.25, 0.5 and 1.0 lb ai/acre resulted in significant economic loss, crop injury and reduced peanut yield. Crop injury was evaluated as a summation of crop discoloration, crop stunting and stand reduction. Shikimic acid accumulation was not significantly different at 14, 22, or 31 d after EPOST treatment (DAT). Injury, stunting, and plant discoloration values also increased as Roundup UltraMax rates of 0.063 lb ai/ac or higher. Shikimic acid accumulation also was detected at those rates. As shikimic acid accumulation increased, peanut yield and quality decreased.

Effect of Twin Row Spacing on Epidemiology of Peanut Stem Rot. L.E. SCONYERS*,

T.B. BRENNEMAN, and K.L. STEVENSON, Department of Plant Pathology, University of Georgia, Athens, GA 30602.

An experiment was conducted for two years to determine the effects of twin row spacing on the development of peanut stem rot caused by *Sclerotium rolfsii*. Two single rows of peanut seed were planted on 36-in. centers and a second row was planted adjacent to one of the existing rows at alternating 5-foot intervals with a row spacing of 0, 4, 8, or 12 in. The center plant of each outer row was inoculated with *S. rolfsii* on one of two dates and the plots irrigated to promote disease development. At 97 DAP, disease severity was rated on the inoculated plants, as well as disease spread along each row and across rows. There were no interactions between row spacing and inoculation date in either year. In 2000, row spacing had a significant effect on spread along rows as well as across rows. Twin rows that were planted 4 inches apart had greater disease

spread along rows than twins with 12-in. spacing or 36-in. single rows. Based on a chi-square analysis, row spacing also had a significant effect on disease spread across rows. Inoculation date had a significant effect on disease severity and spread along rows. Plots inoculated at 50 DAP had greater disease severity on the inoculated plants and greater disease spread along rows. In 2001, row spacing did not affect disease severity or spread along rows, which may be attributed to lack of disease development due to non-conducive environmental conditions. Inoculation date had a significant effect on disease severity of inoculated plants and disease spread along rows. Plots inoculated at 50 DAP had greater disease severity (0.02) than plots inoculated at 90 DAP (0.01). Spread along rows was greater in plots inoculated at 50 DAP (8.16 inches) than plots inoculated at 90 DAP (1.41 inches). Based on a chi-square analysis, row spacing also had a significant effect on disease spread across rows. Based on these data, it is apparent that greater disease severity and spread occurs in twin rows that are planted at closer row spacing than single rows at wider row spacing.

Evaluation of Tissue Resistance to *Sclerotinia minor* in Detached Peanut Plant Parts.

D.L. SMITH* and B.B. SHEW. Department of Plant Pathology, NC State University, Raleigh, NC 27695.

The objectives of this study were to evaluate resistance to infection by *Sclerotinia minor* in various peanut plant tissues and to determine if plant parts in different peanut lines respond similarly to infection by *S. minor*. A better understanding of part susceptibility will help plant breeders develop strategies to improve resistance to *S. minor* in high yielding cultivars. A method for evaluating resistance to *S. minor* using detached leaflet inoculation was adapted to compare susceptibility of peanut plant parts. Two trials were conducted and for each trial three peanut lines were grown in the greenhouse for 8 to 10 weeks before inoculation. The lines included NC 12C (highly susceptible line), NC 7 (moderately susceptible line), and NC-GP WS 12 (resistant line). A calcium treatment was also applied to one-half of the plants in each line. In the first trial, 1.23 g of landplaster (CaSO_4) was added to each pot when the plants began flowering. In the second trial, calcium chloride was applied to foliage in a solution of 5g CaCl_2 /liter of water. Immediately prior to inoculation, plant parts were detached, placed in humidity boxes (35 cm X 27 cm X 10 cm) containing moist sand in the bottom, and inoculated. A 3 mm diameter mycelial plug cut from the margin of an actively growing culture on PDA was used. The isolate of *S. minor* was obtained from the Len Jordan Farm in Chowan County, NC and was known to be aggressive on peanut.

Main stems were inoculated in the center of the second branching node from the bottom of the stem. Inoculum was placed in the center of pegs and single leaflets still attached to their petioles. Primary lateral branches were inoculated either at a vegetative node, or at a flowering node. Plant parts were arranged randomly within boxes and sprayed with deionized water amended with Tween 20 (30 ml/100 ml of

water). The experimental design was a split plot with peanut lines by calcium treatment as whole plots and parts as sub plots. Boxes comprising each of the replicates were blocked together in a growth chamber set at 20 C. For seven days after inoculation, lesion lengths were measured in mm along the longest axis of each part. The ratio of lesion size to the overall length of the plant part was calculated to account for the large range in size of each peanut part. Areas under the curves (AUC) of lesion length versus time were calculated. Mean AUCs of 4.02 for leaves, 2.83 for pegs, 0.63 for main stems, 0.70 for reproductive node branch inoculations, and 0.83 for vegetative node branch inoculations indicate that stems were significantly more resistant to infection than leaves and pegs. No significant differences between main stem, vegetative, or reproductive branch inoculations were found. There was also a part by line interaction observed in which leaflets of NC 7 and NC 12C did not have significantly different lesion lengths, whereas, leaflets of NC-GP WS 12 had smaller lesions. Similar differences between lines were not found for other plant parts. There were no significant effects of the calcium treatments in either trial.

Uptake, Translocation, and Metabolism of Root-applied Sulfentrazone in Peanut (*Arachis hypogaea*), Prickly sida (*Sida spinosa*), and Pitted morningglory (*Ipomoea lacunosa*). S. C. TROXLER*, S. B. CLEWIS, J. W. WILCUT, and W. D. SMITH. Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

Sulfentrazone is a phenyl triazolinone herbicide registered for preplant incorporated and preemergence weed control in tobacco (*Nicotiana tabacum* L.) and soybean [*Glycine max* (L.) Merr.]. Sulfentrazone controls numerous grasses and broadleaf weeds, however exceptions include prickly sida and sicklepod [*Senna obtusifolia* (L.) Irwin and Barnaby]. Tobacco tolerance to sulfentrazone is due to rapid metabolism. Soybean tolerance is attributed to the ability of soybean cultivars to tolerate protoporphyrin IX-produced oxygen stress. Field studies conducted by North Carolina State and other universities have shown peanut tolerance to soil-applied sulfentrazone. Reasons for differential tolerance of prickly sida and pitted morningglory by sulfentrazone have not been investigated. Likewise, physiological behavior of sulfentrazone in peanut has not been reported. Therefore, studies were conducted to evaluate uptake, translocation, and metabolism of root-applied ¹⁴C-sulfentrazone in peanut, prickly sida, and pitted morningglory in an attempt to elucidate the basis for differential susceptibility among these species, and data will be presented at this meeting.

The Use of Descriptive Analysis and Consumer Research Methods in the Evaluation of Peanuts from Different Origins. N.D. YOUNG,* Department of Food Science, NC State University, Raleigh, NC 27695-7624, T.H. SANDERS, USDA, ARS, NC State University, Raleigh, NC 27695-7624, M.A. DRAKE, Department of Food Science, NC State University, Raleigh, NC 27695-7624, and G.V. CIVILLE, Sensory Spectrum, Inc., 24 Washington Ave., Chatham, NJ 07928.

Differences in variety, environment, and handling result in a range of flavor quality in peanuts from various origins. Determination of the flavor profile of peanuts from specific origins will be helpful to manufacturers of peanut products throughout the world. General industry conversation regarding use of other origin peanuts and limited research strongly suggests that the excellence of U.S. farm-to-market operations results in superior flavor quality and a highly reduced incidence of off-flavor. The objective of this study was to conduct descriptive sensory analysis and consumer flavor/preference evaluations of peanuts from the U.S., China, and Argentina. Twenty lots from each country were randomly selected in either The Netherlands or Great Britain, shipped to the U.S., roasted, ground into paste, and subjected to descriptive sensory analysis. Using the descriptive sensory data, principal component analysis, roast peanut intensity ranking and total off-flavor ranking were integrated to select six samples from each country that represented the range of overall high to low flavor from each country. For consumer evaluation, roasted, unsalted, chopped peanuts were evaluated using a constant control across six days. Consumers ($n \geq 600$) evaluated peanuts for overall liking, overall flavor liking, and the strength/intensity for liking of: color, roasted peanut flavor, sweet taste, bitter taste, fresh peanut flavor, and crisp texture using a nine-point hedonic scale. Descriptive and consumer data were analyzed by univariate and multivariate analysis of variance. Descriptive sensory analysis clearly indicated the superior overall flavor of U.S. peanuts and the more frequent occurrence of the off-flavor musty in peanuts from Argentina and higher bitter taste in peanuts from China. Consumer scores for overall liking were 5.40, 4.77, and 4.66, while scores for overall flavor liking were 5.28, 4.87, and 4.60 for peanuts from the U.S., China, and Argentina, respectively. Overall liking and overall flavor liking scores were significantly different and were correlated to significant differences in the strength/intensity for liking of the color and flavor attributes evaluated ($p < 0.05$). These data demonstrate the superior flavor quality and U.S. consumer preference for peanuts produced in the U.S.

Comparison of Aflatoxin Production in Normal- and High-Oleic Backcross-Derived Peanut Lines. H.Q. XUE*, T.G. ISLEIB, G.A. PAYNE, R.F. WILSON, and W.F. NOVITZKY. Dept. of Crop Science, Dept of Plant Pathology, and USDA-ARS, North Carolina State Univ.

Resistant cultivars should be a component of an integrated program of aflatoxin management, but to date no successful *Aspergillus*-resistant peanut (*Arachis hypogaea* L.) cultivar has been released. Linoleic acid has been variously reported to increase or decrease aflatoxin production *in vitro*. To test the hypothesis that the Florida high-oleate trait would affect aflatoxin production, two experiments were conducted to compare backcross-derived pairs of lines, one member of each pair (the recurrent parent) with normal and the other with high oleic acid content. Five seeds of each entry were manually blanched, quartered and inoculated with spores of *A. flavus* Link ex Fries, placed on moistened filter paper in 10 cm petri dishes, and incubated for 8 d at 28°C. Samples were dried, ground, and tested for aflatoxin content by HPLC. In Experiment 1, pairs of lines in the background genotypes of NC 7, NC 9, NC 10C, NC-V 11, and VA-C 92R were tested; petri dishes were stacked in groups of 10 in plastic bags to prevent desiccation; and a Latin square design was used with bags and positions in stacks as blocking factors. Position effects within stacks were pronounced for all traits measured. Background genotype had no significant effect on content of aflatoxins B1 and B2 or total aflatoxin, but oleate level had a highly significant effect. High-oleic lines averaged nearly twice as much aflatoxin as normal lines (3136 vs. 1938 ppb aflatoxin B1, 88 vs. 53 ppb aflatoxin B2, and 3226 vs 1994 ppb total aflatoxin). Although the interaction between background genotype and oleate level was not statistically significant, the difference between high- and normal-oleic lines was not consistent across all background genotypes, being most pronounced in VA-C 92R and NC 9 and least in NC-V 11. In Experiment 2, 3 additional pairs in the genetic backgrounds of NC 12C, Gregory, and VA 93B were included. Experimental procedure was modified to reduce position effects. The 16 petri dishes in each rep were arranged in 4 rows and 4 columns on a tray enclosed in a large plastic bag, using a 4x4 balanced lattice design with columns as blocks within reps. Stacked trays were separated by short sections of PVC pipe to eliminate pressure on petri dishes in lower trays. Using this method, fungal growth and color were much more uniform, and aflatoxin production was higher. Tray effects ($P<0.01$) still occurred in spite of daily rotation of the stack, but CV's for all traits were lower. Background genotype, oleate level, and their interaction were all significant. The high oleate trait increased aflatoxin B1 (43104 vs 22791), B2 (1570 vs 712) and total aflatoxin (44535 vs 23388). The difference between high- and normal-oleate variants was not consistent across background genotypes. Because they tend to support more aflatoxin production than normal peanuts, special care should be taken with high-oleic lines to prevent growth of *Aspergillus* spp. and concomitant development of aflatoxin contamination.

Extension Techniques and Technology/ Education for Excellence

Extension Efforts for Quality Peanut Production in Prince George County, Virginia.

G. F. CHAPPELL, II* and D. A. HERBERT, JR., Prince George Extension, Prince George, VA 23875 and Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, Virginia 23437.

Prince George County's 1500 acres of peanuts are located in the northern most production area of Virginia and therefore face unique challenges. Prince George has the shortest growing season and some of the heaviest soils in the Virginia production area. Strategies designed to promote maturity are of particular interest to our growers. In addition to the conventional production meetings and the use of regional advisory systems, on-farm replicated research plots play a major role in our extension programs. Local agents work with specialists from the Tidewater Agricultural Research and Extension Center to implement replicated trials that are statistically analyzed and provide local growers with onsite data. The "Evaluation of Selected Materials for Potato Leafhopper Control in Peanuts" is one example. Seven insecticide treatments; LABS 126-F01 4F @ 1.5 pt/A, Asana XL @ 3.0 oz/A, Karate Z @ 1.28 oz/A, Danitol 2.4EC @ 10.6 oz/A, Steward 1.25EC @ 2.56 oz/A, Lorsban 15G @ 13 lbs/A (band) and an untreated control were evaluated for control of potato leafhoppers. Treatments were applied July 31 in 4 row x 40-ft plots with a CO₂ pressurized sprayer utilizing three D2-13 disk-core nozzles per row. Plots were evaluated (Aug. 8, Aug. 15, Aug. 28, Sep. 13) through mid September by recording adult/nymph populations per 10 sweeps per plot, using a 15-inch diameter sweep net. In addition to insect population data, mean percent leafhopper damage was determined by visual inspection. All treatments were superior to the untreated based on mean leafhopper populations at the Aug. 8 observation date and only the Steward 1.25EC treatment was not statistically superior to the untreated on Aug. 15. As on Aug. 15, Steward 1.25EC provided the least control on Aug. 28 but only differed significantly from the Danitol 2.4EC and Lorsban 15G treatments. No statistical differences were observed in mean leafhopper populations on Sep. 13. Karate Z was the only treatment significantly better than the untreated based on mean percent leafhopper damage on Aug. 8. All treatments provided significant reductions in leafhopper damage when compared to the untreated on Aug. 15 and Sep. 13. Only the Steward 1.25EC treatment did not differ from the untreated on Aug. 28. Asana XL was superior to the LABS 126-F01 4F, Steward 1.25EC and Lorsban 15G treatments on Aug. 15, but not significantly better than the others. Asana XL, Karate Z, Danitol 1.25EC and Lorsban 15G reduced leafhopper damage when compared to the untreated and Steward 1.25EC treatments but not statistically better than LABS 126-F01 4F on Aug 28. Karate Z yielded the lowest numerical percent damage and statistically better control than Asana XL or Steward 1.25EC but not significantly better than LABS 126-F01 4F, Danitol 2.4EC or Lorsban 15G treatments on Sep. 13. Plots were harvested Oct. 3 by combining

How Has Being a Consultant Made Me a Better Extension Peanut Crops Agent.

C. ELLISON* and D.L. JORDAN. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh, NC 27695-7620.

Peanut producers evaluate information from a variety of sources prior to making decisions on implementing production and pest management practices. By serving peanut producers as a private consultant and a cooperative extension crops agent, a better understanding of how to serve the agricultural community has been realized. The goal of solving problems should be identified and addressed as a group, not taken on as individuals. Whether you are the producer, consultant, crop advisor or the extension agent, there is a niche to be filled by each when looking for the answers.

Producer Awareness of Damage Due to Leafhopper and Three Cornered Alfalfa Hoppers.

C. MASON*, Barbour County, Alabama Cooperative Extension System, Clayton, AL 36016, R. WEEKS, Wiregrass Research & Extension Center, Headland, AL 36345, and L. CAMBELL, Dept. of Entomology/Plant Pathology Auburn University, AL 36849.

Leafhoppers and Three cornered alfalfa hoppers (TCAH) should become a greater concern for peanut producers in Barbour County, Alabama. Barbour County is located in east central Alabama along the Chattahoochee River. Peanuts are often grown in a bahiagrass rotation. Many peanut fields are located adjacent to bahia pastures or bermudagrass hayfields. Producers are beginning to observe the movement of leafhoppers and TCAH from adjacent pastures and hayfields into peanut fields in June as pastures and hayfields becomes unpalatable and peanut foliage and stems are more succulent. To determine the most economical control of leaf hoppers and TCAH a demonstration plot was established with six treatments: Karate (1 oz/ac) at 60 days after planting, Karate at 60 and 90 days, Leverage (3.75 oz/ac) at 60 days, Centric (3 oz/ac) at 60 days, Centric at 60 and 90 days and Centric at 90 days. Georgia Green peanuts were planted May 22, 2001. In late June increasing numbers of leaf hoppers and TCAH were observed when scouting peanuts according to Alabama Extension recommendations. Plots were laid out with each having 8 – 40 feet long rows. Treatments were arranged in a randomized complete design with 4 replications. The first treatment was applied 60 days (7/27/01) after planting to the 4 middle rows of each plot. A backpack sprayer equipped with 3 TX tips and 3 nozzles per row. This arrangement produced 17.3 gallons per acre of spray mix. This same arrangement was used for the 90-day application on 8/22/01. To establish a baseline pre-treatment counts were made for both leafhopper and alfalfa hoppers. Ten random sets of 15 sweeps per set were taken 7/27/02 resulting in an average of 5.7 leafhopper per 15 sweeps and 1.3 alfalfa hoppers per 15 sweeps. After treatments were applied counts were made on August 2, 9, 22, 28, and September 6 at 15 sweeps per plot. The results showed that all treatments except Centric significantly reduced leafhopper number over the control. Leafhopper numbers remained significantly lower than untreated

control through the second week following treatments except for Centric. Over all plots leafhopper numbers were increasing and at the time of the 90-day treatments only Karate and Centric had significantly fewer numbers than the control. On August 28th all treatments had significantly reduced leafhopper numbers compared to the control. The 60 and 90 day Karate treatment significantly reduced leafhopper numbers more than all other treatments except the single Centric application at 90-days. This same trend held through September 6th. None of the treatments out performed the others when alfalfa hoppers were considered. Only Karate and Leverage showed any significant reduction in TCAH numbers over the untreated control. Visual damage to plots indicated that untreated peanuts exceeded the Alabama Extension System recommended threshold of 30 per cent damage for leafhoppers. Although yields were not taken in this demonstration, damage levels based upon other research studies indicate that more growers in Barbour Co., AL, should be treating for leafhoppers in peanuts.

Fungicide Treatment Effects on the Incidence of Soilborne Diseases in Peanut. P.D.

WIGLEY¹, S.J. KOMAR¹ AND R.C. KEMERAIT². ¹ Calhoun County Extension Service, University of Georgia, Morgan, GA 31766. ² Department of Plant Pathology, University of Georgia, Tifton, GA 31793-0748.

Field experiments were conducted to evaluate four fungicide programs for control of Rhizoctonia limb rot in peanut (*Arachis hypogaea*). The trial was conducted in a commercial field in Morgan, GA in 2001 using a randomized complete block design with four replications. All plots were treated with fungicides seven times during the season on a 14-day calendar schedule. The fungicide treatments included chlorothalonil (Bravo 6 EC, 1.5 pt/A, applications 1-7), azoxystrobin (Abound 2.08 F, 18.5 fl oz/A, applications 2 +5), tebuconazole (Folicur 3.6 F, 7.2 fl oz/A, applications 3-6), flutolanol (Moncut 50 WP, 1.5 lb/A, applications 3 and 5), and flutolanol plus propiconazole (Montero, 1.2 lb/A + 4 fl oz/A, applications 3 + 5). Chlorothalonil, 1.5 pt/A, was applied to plots on dates when a soilborne fungicide was not applied and during both applications of Moncut. There were no significant differences among treatments in the disease ratings for early or late leaf spot at the end of the season. The severity of southern stem rot caused by *Sclerotium rolfsii* was minimal across all treatments. Use of azoxystrobin and flutolanol + propiconazole provided significantly better control of Rhizoctonia limb rot than did the other treatments with 60 to 80% fewer diseased plants per 100 ft of row when the plots were rated after digging and inversion. Plots treated with azoxystrobin and tebuconazole produced significantly greater yields when compared to the chlorothalonil control and other treatments. These results are similar to those from 2000.

Potential Impact of Nutrient Management Regulations on Peanut Production Systems and Associated Rotation Crops in Sensitive Watersheds in North Carolina. S. UZZELL*, A. COCHRAN, C. ELLISON, W.J. GRIFFIN, J. PEARCE, M. RAYBURN, M. SHAW, B. SIMONDS, L. SMITH, P. SMITH, C. TYSON, J.M. WILLIAMS, A.J. WHITEHEAD, F. WINSLOW, D.L. JORDAN, and D. OSMOND. North Carolina Cooperative Extension Service, Raleigh, NC 27695-7620.

Management practices for crop production were developed and implemented in the Neuse River basin in North Carolina to minimize environmental impact from a variety of farming practices. Eventually, similar mandates and subsequent practices will be developed for other regions of the state. The Tar, Roanoke, and Chowan Rivers and their tributaries flow through the peanut production region of North Carolina. Cropping systems and livestock production will influence development of these management plans for these river basins. Although production strategies for peanut may not be altered significantly, indirect effects of programs implemented for other crops in peanut rotations may have indirect effects on peanut production and pest management.

Development, Implementation, and Acceptance of Integrated Pest Management Practices for Peanut in Northeastern North Carolina. M.L. RAYBURN*, H.M. LINKER, D.L. JORDAN, J.E. BAILEY, and R.L. BRANDENBURG. North Carolina Cooperative Extension Service, Raleigh, NC 27695.

Integrated pest management (IPM) is an important component of peanut production in North Carolina. Establishing long rotations, developing field histories, scouting for pests, selecting resistant cultivars, and incorporating a variety of decision aids when formulating management strategies are critical to minimize damage and loss from pests and to increase precision of pesticide applications. IPM practices available to control Sclerotinia blight (caused by *Sclerotinia minor*) and early leaf spot (caused by *Cercospora arachidicola*), an index to target insecticide applications for southern corn rootworm (*Diabrotica undecimpunctata*), targeting postemergence herbicide applications based on economic thresholds using HADSS (Herbicide Application Decision Support System), and using a variety of other damage-based or pest population thresholds are available to peanut growers. The concepts used to develop these approaches and implementation of these decision aids have varied considerably. Strengths and weaknesses of these approaches to pest management will be discussed as related to implementation at the farm level. Adoption of IPM strategies in peanut varies with the grower, IPM strategies used in other crops, time available to make management decisions, anticipated return for efforts expended, what other "key" growers are doing, and the use of consultants. For example, scouting for foliar-feeding insects is commonly implemented peanut growers because procedures are similar to those used in soybean [*Glycine max* (L.) Merr.] where economic benefits are established. Weed scouting is less often implemented because of conflicting time commitments and more questionable economic return in the eyes of the farmer.

Push, Pull, or Partner – A Process of Implementation for Public Good and Profit. H.M. LINKER, S.M. PHEASANT*, S.C. LILLEY, R.L. BRANDENBURG, and D.A. HERBERT, Jr. Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620; Center for Agricultural Partnerships, 1 W. Pack Sq, Ste 401, Asheville, NC 29901; Department of Sociology and Anthropology, North Carolina State University, Raleigh, NC 27695-8107; Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613; Tidewater Agric. Res. and Ext. Ctr., Virginia Tech, Suffolk, VA 23437.

Successful peanut production is dependent on organophosphates (OP) for control of damaging subterranean insect pests. OP insecticides are used on an estimated 60% of production acres whereas they are actually needed on 6%. The pending loss of federal subsidies poses a significant problem for the peanut industry and creates a serious need for new, cost-effective pest management decision support systems. A predictive tool (the Rootworm Advisory) can be used to guide the use of OP insecticides but it will represent a new way of managing insect pests (a risk index versus prophylactic application) that requires growers to understand and trust the basis and value of this approach. To successfully use the tool, growers, agents, and consultants need an understanding of the tool, the ability to incorporate it into their pest management decision-making, and confidence in the tool's efficacy. Using the Southern Corn Rootworm Advisory as a case study, the authors demonstrate the blueprint utilized in a) increasing understanding of the decision-making processes by which peanut growers adopt insecticide-mitigating pest management methods; b) maximizing that understanding to design and carry out regional education and demonstration efforts for growers, agents, and consultants and subsequently reduce the use of soil-applied OP insecticides; and c) evaluating the impacts of the education and demonstration effort in terms of changes in decision-making, adoption of the Rootworm Advisory, and changes in insecticide use. Just as there is a clear and accepted methodology for conducting scientific investigation, the process of helping people adopt new pest management practices requires a similar methodology for supporting changes in decision-making and behavior. In its essence, this blueprint represents a replicable, systematic process by which publicly generated innovations can be implemented in commercial agriculture for public good and improved farm profitability.

Production Technology I

Residual effects of Broiler Litter Application on Strip-Tilled Peanut in a Three-Year

Rotation. G.J. GASCHO* and T.B. BRENNEMAN. Departments of Crop and Soil Sciences and Plant Pathology, University of Georgia, Tifton, GA 31793-0748.

Peanut is known to respond to residual soil fertility and less than many crops to applied fertilizers. Our previous work has indicated no positive responses, but some negative responses for yield, grade and value of strip-tilled peanut to pre-plant applications of broiler litter on soils testing "medium" or "high" for phosphorus and potassium. Other research has shown positive responses in conventionally-tilled peanut planted in fields with soil tests rated as "low". Some of the negative responses in our research were believed due to increased *Rhizotonia* limb rot where high rates of litter were applied. Our plots were used to determine if 0, 2, 4, and 6 ton broiler litter/crop, applied to both summer and winter crops from 1996 through 1999, had lasting effects on yield, grade, value, or incidence of disease in runner-type peanut (var. Georgia Green) in 2000 and 2001. During the experiment Mehlich-1 P remained "high" (28 mg/kg) for the plots that received no P for 6 years and "very high" (49 to 59 mg/kg) for all plots receiving broiler litter from 1996-1999. In 2000, soil K was "high" (70 mg/kg) for the no residual litter plots and "very high" (96 to 112 mg/kg) for all plots that received litter in the period, 1996-1999. In 2001, soil test K was "high" (49 to 73 mg/kg) for all residual litter rates. Soil pH (6.6), Ca (282 to 786 mg/kg) and Mg (30 to 60 mg/kg) remained adequate to high regardless of previous broiler litter application. In 2000, incidence of Southern stem rot was significantly greater in plots that had never received litter than in plots that received 4 or 6 ton/acre in prior years. By 2001, Southern stem rot incidence was no longer affected by the residual rates of litter. Residual litter rates resulted in a 3-fold increase in the incidence of *Rhizoctonia* limb rot in 2000. The effect was decreased in 2001, but the incidence remained greater in those plots that received 6 tons of litter/crop during the period from 1996 to 1999 than in plots receiving lesser rates. Residual broiler litter rates had no effect on the incidence of tomato spotted wilt virus in 2001. Pod yield, grade, value/ton and value/acre were high in both years. Pod yield averaged 5196 lb/acre in 2000 and 4628 in 2001. Grade was 73 in 2000 and 76 in 2001. Value/ton was \$630 in 2000 and \$654 in 2001. Value/acre was \$1639 in 2000 and \$1513 in 2001. Pod yield, grade, and values were not changed significantly by the residual broiler litter rates. The results emphasize that increasing fertility levels with broiler litter (or with fertilizers) to values greater than the soil tests recommended by state extension services is counter productive for peanut farmers.

Interdisciplinary Approach to Evaluating Peanut Cultivars Planted in Twin and Single Rows by Conventional and Reduced Tillage Methods.

D.L. HARTZOG*, J. ADAMS, K. BALKCOM, J. BALDWIN, D. WRIGHT, E.J. WILLIAMS, N. SMITH, T. HEWITT, T. BRENNEMAN, B. KEMERIAT, R.N. GALLHER, and G. MacDONALD. Auburn University, Headland, AL, University of Georgia, Tifton, GA, and University of Florida, Gainesville, FL.

Peanut production must continue to improve cultural practices to maintain maximum profitability. An experiment was initiated in 2001 to determine the optimum tillage, variety and row spacing for the best management practice. The test was a split-split design with tillage as the whole plots, variety conventional (moldboard plow) and strip tillage. The varieties were Georgia Green, Virugard, AT 201 and C-99 with sub-subplots as single or twin row. Yield, TSMK and incidence of tomato spotted wilt virus were collected. Yields were affected by tillage, variety and row spacing. Higher yields were obtained with conventional tillage and AT 201 was highest yielding variety. In addition twin row were significantly higher in yield. Significant interactions were found for tillage and variety including row spacing and variety. TSMK were affected to a lesser degree than yield. Tillage had no effect on TSMK, but variety and row spacing showed responses. AT 201 appeared to have the highest TSMK in conventional tillage but no differences in row spacing, but across all varieties twin rows showed high TSMKs. Tomato spotted wild virus was affected by treatments but to a lesser degree.

Tillage Methods for Peanuts in Caddo County, Oklahoma. D.L. NOWLIN*. Extension Educator, Agriculture, 4-H Youth, & C.E.D. Oklahoma Cooperative Extension Service Anadarko, Oklahoma 73005

Tillage systems used in peanut production for southwestern Oklahoma have been changing rapidly over the past 5 years. Several of these tillage systems were reviewed on a case by case basis to determine the tillage system used, the varieties selected, the planting method chosen, and the herbicide program that was included. This information may be used to determine what type of tillage research needs to be conducted within southwest Oklahoma. Conventional tillage is still widely used, however several other systems with various herbicide and planting schemes are being used by farmers throughout Caddo County. These include no-till, row-till, and various methods of reduced tillage. Caddo County has 33,000 acres of peanut production which is mostly irrigated farmland which is farmed by approximately 450 growers. Although there is no data to show a significant increase in yield for no-till or reduced tillage systems, acreage planted with these methods have increased to approximately 5,000 in 2001 within Caddo County. This number is expected to increase again in 2002. Yield increases are not the primary reason that local producers are using reduced tillage and no-till systems. Reducing the costs of controlling soil erosion, fewer trips across the field, expected changes in the farm bill that will reduce producer financial inputs,

improved stands, and attempting to increase organic matter are some of the other reasons. Expected changes in the current Farm Bill are forcing producers to look at any and every type of production system that will allow them to reduce input costs concerning peanut production.

Yield, Grade, and Tomato Spotted Wilt Virus Incidence of Six Peanut Cultivars When Planted by Strip Tillage or Conventional Methods in Twin or Single Row Patterns at Thirteen Locations in Georgia from 1999-2001. J.A. BALDWIN*, Crop and Soil Sciences Department; E. J. WILLIAMS, Department of Biological and Ag Engineering; J. W. TODD, Department of Entomology and D. E. McGRIFF, Decatur County Cooperative Extension Service, University of Georgia.

During 1999-2001, studies were conducted at thirteen locations in Georgia comparing strip tillage and conventional planting methods, utilizing twin or single row planting patterns to evaluate six peanut cultivars (*Arachis hypogaea* L.) for yield, grade (%TSMK) and Tomato Spotted Wilt Virus Incidence (%TSWV). The cultivars, 'Georgia Green', 'AT 201', 'ViruGard', 'AT 1-1', 'Georgia Hi/OL', and 'C99-R' were planted in a split plot design, with row patterns as main plots and cultivars as sub-plots. Each cultivar was planted at 3 seed/foot of row for twins and 6 seed/foot of row for singles. All locations were irrigated. There were no interactions due to any treatment. There was a significant ($P \leq .05$) yield (4060 lbs/A vs. 4320 lb/A) and grade (72.4% vs 73.4%) increase and less TSWV (20.6% vs. 11.6%) when cultivars were planted in the twin row pattern. When row patterns were averaged, there were no differences found between strip tillage or conventionally planted peanuts for yield (4340 vs 4030 lbs/A) or grade (73.5 vs 72.3% TSMK), however, the strip tillage plots had less ($P \leq .05$) %TSWV (13.3% vs 18.6%) than the conventional plots.

Peanut Response and Tomato Spotted Wilt Virus Incidence Following Various Cultural Practices. J.S. BARNES*, D.L. JORDAN, C.R. CROZIER, R.L. BRANDENBURG, C. HURT, J.E. BAILEY, J.E. LANIER, P.D. JOHNSON, and F.R. COX. North Carolina Department of Agriculture and Consumer Services, Peanut Belt Research Station, Lewiston-Woodville, NC 27849 and North Carolina State University, Raleigh, NC 27695.

Tomato spotted wilt tospovirus is becoming more prevalent in North Carolina peanut. A variety of studies have been conducted to identify cultural practices that reduce severity of infestation. In experiments initially designed to evaluate interactions among gypsum rates, pH regimes, and cultivar selection, incidence of tomato spotted wilt virus was greater when pH was 5.0 or 5.5 compared with pH of 4.5 or 6.0. Gypsum did not affect incidence of tomato spotted wilt virus. However, applying poultry litter increased incidence of tomato spotted wilt virus. Tomato spotted wilt virus was lower in peanut planted in strip tillage compared with conventional tillage and when peanut

was planted in twin rows rather than single rows. Results from these and other research projects will be used increase the understanding of tomato spotted wilt virus and assist in developing recommendations to minimize severity of infestation in peanut.

FarmSuite, a Pattern for Research and Technology Transfer. J. I. DAVIDSON, JR.^{1*},

M. C. LAMB¹, C. L. BUTTS¹, D. A. STERNITZKE¹, and N. W. WIDSTROM².

¹USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742 and

²USDA, ARS, Tifton, GA 31793.

FarmSuite is a computerized crop production management system being developed by retired and active agricultural scientists, crop consultants, and expert farmers. It is based upon the latest research and expert knowledge, and is updated on a continuing basis. It is owned and marketed by the Peanut Foundation. It is being developed and marketed through a cooperative research and development agreement (CRADA) between the Peanut Foundation and the USDA, Agricultural Research Service. FarmSuite consists of several models and modules that manage whole farm planning (PNTPLAN), irrigated (Irrigator Pro) and non-irrigated (Dryland Pro) peanut production, peanut harvesting (HarvPro), peanut drying (PECMAN), corn aflatoxin management (CAMS), cotton irrigation, and capital investment. FarmSuite's performance has been outstanding, reducing water and pesticide use 10-20% while increasing net returns by 20-30%. FarmSuite also provides for more efficient research planning, identifying gaps in knowledge and science, and optimizing management inputs to maximize net returns, food quality, and environmental enhancement. FarmSuite is also an outstanding technology transfer and risk assessment tool providing the user with the latest production technology. New concepts and technology included in FarmSuite are discussed, and data are presented to demonstrate the validity and the performance of FarmSuite.

Peanut Response to Various Fertility Practices. D.L. JORDAN*, P.D. JOHNSON,

J.E. LANIER, and B.R. WALLS. North Carolina State University, Raleigh, NC

27695 and North Carolina Department of Agriculture and Consumer Services,

Raleigh, NC 27607.

Research was conducted to compare accumulation of elemental boron and manganese in peanut leaf tissue following foliar applications of a variety of commercial products. Fertilizers were applied in water at 140 L/ha using a CO₂-pressurized backpack sprayer to the cultivar NC-V 11 in late July, 2001. Leaves were removed and washed for 30 seconds in 500 ml water to remove residues on the leaf surface. Standard tissue analyses were performed to determine the concentration of elemental boron and manganese in the leaf tissue. Accumulation of the boron was greater following application of the manufacturer's recommended rate of Solubor when compared to N-Boron (Brand Consolidated) or Boron Xtra (Custom Application Formulations).

Accumulation of manganese was greater following application of the manufacturer's recommended rate of Techmangum when compared to Meherrin Mangum Manganese (Meherrin) or Manganese Xtra (Custom Application Formulations). Research was also conducted to determine the appropriate rate of ammonium sulfate needed to correct a nitrogen deficiency in peanut. Although results were somewhat variable, in part due to differences in native nitrogen fertility of soil, a rate of at least 700 pounds/acre was needed for yields to approach or equal those from inoculated peanut when a true nitrogen deficiency occurred. In other studies, fumigation did not affect peanut yield regardless of whether or not peanut was inoculated at planting. Folicur (tebuconazole) did not affect inoculation of peanut from the in-furrow liquid inoculant Lift. Applying in-furrow inoculant was needed under both rows in a twin-row planting pattern to optimize yield.

Plant Pathology and Nematology I

Evaluation of In-Furrow Treatments of Abound 2SC on Southern Stem Rot over Three Years. K.L. BOWEN*, H.L. CAMPBELL, and A.K. HAGAN. Dept. of Entomology and Plant Pathology, Auburn University, AL 36849.

Abound 2SC has been evaluated for its effect on the incidence of southern stem rot (SSR), caused by *Sclerotium rolfsii*, and peanut yield for several years. One treatment of interest has been the application of Abound 2SC in-furrow at plant. Rates used in these tests have ranged from 5.6 to 11.1 fl. oz. of product per acre. Season-long foliar treatments have included standard fungicide regimes. In general, hit counts of SSR at peanut inversion have not consistently been reduced with in-furrow treatment of Abound 2SC, nor have yield gains been observed. However, a critical analysis of data from three years indicates that rainfall patterns and rain amounts during the first 60 days after planting (DAP) affects the efficacy of in-furrow treatments on SSR. In 1999, at 30 DAP, SSR was lower due to plot treatment with Abound 2SC in-furrow, and 1.6 inches rain was recorded on site during those 30 days. Conversely, 0.16 inches rain was recorded over the first 30 DAP in 2000, and SSR incidence at 30 DAP was similarly low (<0.3 hits per 15.5 m) in all plots. However, reduction in SSR incidence at 30 DAP due to at-plant treatment did not necessarily persist through the season due to numerous other factors affecting SSR development. Similarly, yield differences cannot be correlated to a reduction in early season levels of SSR.

Effects of Azoxystrobin, Tebuconazole, and Flutolanol on Cylindrocladium Black Rot of Peanut. T. B. BRENNEMAN* and R. C. KEMERAIT, JR. Department of Plant Pathology, University of Georgia, Tifton, GA 31794.

The effects of azoxystrobin (0.15 lb/A), tebuconazole (0.20 lb/A), and flutolanol (0.40 lb/A) on Cylindrocladium black rot (CBR) were evaluated in 2000 and 2001 on irrigated Georgia Green peanuts. Each fungicide was applied four times as a foliar spray (20 GPA) at timings 3-6 of a seven spray schedule on a 14-day interval. Each fungicide was also applied on the same schedule at half rates, either alone or in paired tank mix combinations, and as alternating sprays. All plots were sprayed with chlorothalonil to control leaf spot, and all differences reported are significant at $P \leq 0.05$. Severe CBR epidemics developed both years (50-65% incidence) and only low levels of other diseases were present. Tebuconazole reduced CBR both years at full and half rates (mean of 47 and 30% control, respectively), but only increased yield compared to the chlorothalonil check one year (1476 and 721 lb/A increase, respectively). Azoxystrobin reduced CBR by 38% and increased yield by 1593 lb/A, but only in 2000 at the high rate. Flutolanol did not suppress CBR or increase yield in either year. Tank mixes and alternating programs gave similar results. Combinations of azoxystrobin and tebuconazole reduced disease both years by 41-58% and increased yields by 910-1471 lb/A. Combinations containing flutolanol were superior to flutolanol alone,

but were generally less effective than the azoxystrobin/tebuconazole combinations. These results show that both tebuconazole and azoxystrobin can suppress CBR when applied as midseason foliar sprays, and that the two fungicides combined give the

Combined Effects of Biological Control Formulations, Cultivars, and Fungicides on Preharvest Aflatoxin Contamination of Peanuts. J. W. DORNER*. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

A three-year field study was conducted to determine the effect of biological control formulations of nontoxicogenic strains of *Aspergillus flavus* and *A. parasiticus*, peanut cultivars, and fungicides on preharvest aflatoxin contamination of peanuts. Formulation treatments consisted of: (1) no biocontrol treatment; (2) the fungi cultured on rice via solid-state fermentation; (3) conidia of the fungi coated onto the surface of rice; and (4) conidia coated onto the surface of wheat (year one) or hulled barley (years two and three). Experiments consisted of factorial combinations of the four formulation treatments, two peanut cultivars (Florunner or Georgia Green), and two fungicide treatments (chlorothalonil [Bravo] or combinations of chlorothalonil and tebuconazole [Folicur]). Florunner and Georgia Green peanuts were each planted in 32 individual plots consisting of six rows 15.2 m in length. Biological control formulations, consisting of a mixture of nontoxicogenic strains of *A. flavus* (NRRL 21882) and *A. parasiticus* (NRRL 21369), were applied to the same plots in each of the three years at a rate of 22.4 kg/ha (20 lb/acre). Foliar applications of fungicides were made as recommended for control of leafspot with one treatment being full season applications of chlorothalonil and the other being two applications of chlorothalonil followed by four applications of tebuconazole and a final application of chlorothalonil. Only in year two of the study was late-season drought sufficient to produce preharvest aflatoxin contamination. Aflatoxin in Georgia Green peanuts with no biocontrol treatment averaged 242 ppb, which was significantly ($P < 0.01$) lower than that in Florunner (1101 ppb). All three biocontrol formulations produced significant reductions in aflatoxin averaging 81.4%. There was no interaction between cultivar and biocontrol treatment, and no differences were observed between the two fungicide treatments. Analysis of soil for populations of *A. flavus* and *A. parasiticus* throughout the study showed that all formulations, except the conidia-coated wheat in the first year, were effective in delivering competitive levels of the nontoxicogenic strains. In the third year, which did not result in aflatoxin contamination, analysis of peanuts for fungal colonization showed no significant differences among biocontrol treatments (including control) for total amounts of *A. flavus* and *A. parasiticus* in peanuts. However, the incidence of toxigenic strains in peanuts was significantly

Efficacy of Headline for the Control of Early Leaf Spot and Southern Stem Rot on Peanut. A. K. HAGAN*, H. L. CAMPBELL, and K. L. BOWEN. Department of Entomology and Plant Pathology, Auburn University, AL 36849.

In 1999, 2000, and 2001, efficacy of the strobilurin fungicide Headline F500 (pyraclostrobin) for the control of early leaf spot (*Cercospora arachidicola*) and southern stem rot [SSR] (*Sclerotium rolfsii*) on peanut was compared to that of registered fungicide standards. In mid-May, peanut cv 'Georgia Green' was planted at the WREC in Headland, AL in fields heavily infested with *S. rolfsii* and a history of frequent peanut cultivation. In each year, this study was irrigated as needed. Over the three-year test period, Headline F500 was screened at rates ranging from 4.6 to 15.2 fl oz/A. Treatment programs that included tank-mixes of Headline + Moncut or alternating applications of Headline and Folicur 3.6F were also tested. Typically, two to four applications of Headline F500 were made at two, three, and in 1999 at four-week intervals. Bravo Ultrex at 1.4 lb/A, Bravo 720 6F at 1.5 pt/A, Folicur 3.6F, Abound 2.08SC, Moncut 50W, or Moncut 70DF were applied according to label directions. In 1999 and 2001, Folicur 3.6F was evaluated for the control of early leaf spot and SSR at two, three, and four week intervals. When applied at two-week intervals as part of a 7-spray program with Bravo Ultrex or Bravo 720, Headline F500 at rates of 4.6 to 12.2 fl oz/A consistently gave better control of early leaf spot than did Bravo Ultrex or Bravo 720 alone. Headline F500 also proved as effective in controlling early leaf spot as Folicur 3.6F or Abound 2.08SC. In 1999 and 2001, the level of leaf spot control with 4.6 to 9.0 fl oz/A of Headline F500 applied at three-week intervals was similar to that obtained with Bravo Ultrex/Bravo 720 applied every two weeks. However, single degree contrast analysis showed that Headline F500, when applied every two weeks rather than at longer treatment intervals, was more effective in controlling early leaf spot. Incidence of SSR on peanuts treated with Headline F500 was significantly below damage levels recorded in the plots treated with Bravo Ultrex/Bravo 720 alone and was often comparable to the results obtained with recommended Folicur 3.6F, Abound 2.08SC, and Moncut 50W/Moncut 70DF programs. In 2000 and 2001, yield of peanuts treated with Headline F500 was significantly higher compared to the standard Bravo Ultrex/Bravo 720 programs. Again, the yield gains obtained with the Headline F500 programs were similar to and, in some cases, superior to those recorded for the Folicur 3.6F, Abound 2.08SC, and Moncut 50W/Moncut 70DF programs. Overall, however, contrast analysis suggests that Headline F500 may be less consistent in controlling SSR and improving peanut yield than other recommended fungicide programs and might be best adapted for use on a peanut cultivar with partial resistance to SSR.

Cylindrocladium Black Rot Control in Peanuts in Miller County, Georgia. T. W. MOORE*. University of Georgia Extension Service, Colquitt, GA 31737.

Cylindrocladium black rot incidence in Georgia has been on the increase for several years. One of the areas of highest incidence has been in Miller County in the southwest corner of the state. Although chemical control has long been used in other growing regions, it had not been used in southwest Georgia until 1999. This study was undertaken to document yield response and incidence of disease when metam sodium was applied as a fumigant prior to planting. The first 2 years of this study showed yield responses of 571 and 877 pounds per acre. Both of these years the test was conducted using the Georgia Green variety. However, in 2001 the AT201 variety was used and a yield advantage of only 87 pounds was found. The 2001 test was in the same field as the 1999 test. After reviewing these results, as well as similar results in Early County, Georgia, it is thought that the AT201 variety may be less susceptible to CBR.

Control of Cylindrocladium Black Rot (CBR) of Peanut with Metam and the Additive Benefits of In-furrow and Foliar Applications of Folicur. P. M. PHIPPS*, Tide-water Agricultural Research & Extension Center, Virginia Polytechnic Institute & State University, Suffolk, VA 23437.

The additive benefits of Metam, Folicur 3.6F in-furrow at planting, and foliar sprays of Folicur for control of CBR were tested in field trials over a 4-year period. Treatments were replicated in four randomized complete blocks and plots were four rows spaced 36 in. apart. Plots lengths ranged from 40 ft in 1998 to 30 ft in 2000. Metam at 7.5 gal/A was applied 2 wk prior to planting at a depth of 8 in. in the center of rows. During application, rows were shaped to form raised beds measuring 4 in. high and 24 in. wide. In-furrow treatments with Folicur 3.6F at 7.2 fl oz/A were applied through a microtube to the seed furrow at planting in a volume of 5 gal/A. Foliar sprays of Folicur 3.6F 7.2 fl oz/A were applied with Induce (8 fl oz/100 gal) using three, D,23 nozzles/row at 50 psi and a volume of 15 gal/A. Chlorothalonil (Echo 720 or Bravo 720 1.5 pt/A) was applied in the same manner for control of early leaf spot in the absence of foliar sprays of Folicur. All foliar sprays were applied according to the Virginia peanut leaf spot advisory program. CBR incidence in the two center rows of each plot was recorded just prior to harvest. In 1998, CBR incidence averaged 19.8 hits/plot treated only with Echo. CBR incidence was reduced 40% by four foliar sprays of Folicur, 60% by Folicur in-furrow and three foliar sprays of Folicur, 73% by Metam and foliar sprays of Echo, and 75% by Metam and four foliar sprays of Folicur. Yields with Folicur and/or Metam were significantly greater than the yield with Echo alone. Metam followed by Folicur in-furrow and foliar sprays of Folicur were not tested in 1998. In 1999, CBR incidence averaged 27.8 hits/plot treated with Echo. No treatment suppressed CBR incidence or increased yield significantly. In 2000, plots with Bravo alone averaged 93.5 hits/plot. Metam and four foliar sprays of Bravo suppressed

disease incidence by 57%, and Metam followed by Folicur in-furrow plus three foliar sprays of Folicur suppressed CBR incidence by 52%. Metam followed by four foliar sprays of Folicur reduced disease incidence by 36% and was the only other treatment to result in a significant reduction of disease. In 2001, Metam followed by Folicur in-furrow and three sprays of Folicur suppressed CBR incidence by 66% and Metam followed by foliar sprays of Bravo suppressed disease incidence by 54%. Folicur in-furrow followed by three foliar sprays of Folicur suppressed CBR incidence by 42%, which was significantly different from sprays of Bravo alone. Yields in 2000 and 2001 were combined for comparison, because the year-by-treatment effect was not significant. All treatments increased yield significantly over that of Bravo alone (1474 lb/A), except for foliar sprays of Folicur (1799 lb/A). Yields were 2185 lb/A with Folicur in-furrow followed by three foliar sprays of Folicur. Metam with or without Folicur resulted in significantly higher yields than all other treatments, but the additive benefits of Folicur in-furrow and/or foliar sprays of Folicur were not significant. In all four years, Folicur in-furrow reduced the speed of seedling emergence and suppressed early season growth of peanut, but this was generally a short-term effect that diminished by mid-season.

Breeding, Biotechnology, and Genetics I

Field Testing of Transgenic Peanut Lines for Resistance to *Sclerotinia minor*. K.D. CHENAULT*. and H.A. Melouk. USDA-ARS, Plant Science and Water Conservation Research Laboratory, Stillwater, OK 74075.

Fungal diseases of peanut, such as Sclerotinia blight caused by *Sclerotinia minor*, are responsible for increased production costs and yield losses of up to 50% for peanut producers in the Southwest, North Carolina and Virginia. Traditional breeding practices have produced few cultivars with moderate disease resistance. Introduction of anti-fungal genes into peanut germplasm through genetic engineering offers an alternative method of control of Sclerotinia blight and other fungal diseases. Transgenic peanut plant lines containing anti-fungal genes have been produced from somatic embryos of the susceptible cultivar Okrun and have been tested for *S. minor* resistance under greenhouse conditions. This study reports the results from field trials in which these transgenic peanut lines were subjected to high disease pressure with no application of fungicide for *S. minor* control. Most of the transgenic peanut lines tested (72%) demonstrated increased resistance to *S. minor* infection when compared to susceptible Okrun controls. Four transgenic peanut lines demonstrated levels of resistance >50% of that reported for susceptible controls. Performance of these transgenic peanut lines indicates there is great potential for the use of genetic engineering to control Sclerotinia blight incidence without pesticide use.

Growth and Oxalic Acid Production in Liquid Culture by Isolates of *Sclerotinia minor*. J.L. HAMPTON, D.M. LIVINGSTONE*, T. BOLUARTE-MEDINA, F. MEDINA-BOLIVAR, B.B. SHEW, J. HOLLOWELL, P.M. PHIPPS, E.A. GRABAU. Department of Plant Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, VA 24061, Tidewater Agricultural Research & Extension Center, Suffolk, VA 23437 and Dept. of Plant Pathology, North Carolina State University, Raleigh, NC 27695.

A previous study reported correlation between aggressiveness of *Sclerotinia minor* on susceptible peanut and colony size and color change on pH indicator plates two to three days after transfer (Hollowell *et al.*, 2001). The authors also reported that lesion size on leaves was correlated with mycelial growth in broth culture but not oxalic acid production after two or three days in culture. We have undertaken further studies to examine growth characteristics of the fungal isolates during two weeks in liquid culture and to measure oxalic acid production over the extended time period. In addition, we have compared different methods for detection of oxalic acid in culture medium. Our comparison of different isolates of *Sclerotinia minor* confirmed that mycelial growth in potato dextrose broth is correlated with aggressiveness. For example, mycelial growth after 10 days (measured as dry weight) was 3.8 times greater for the highly

aggressive isolate NC13 compared to NC42, which exhibited low aggressiveness (9.2 ± 0.8 mg/ml of culture vs. 2.4 ± 0.16 mg/ml, respectively). However, levels of oxalic acid in culture medium over the same time period varied considerably and could not be used as reliable predictors of aggressiveness. Culture medium from the moderately aggressive isolate NC22 contained 3 times the amount of oxalic acid compared to NC13 based on mycelial dry weight after ten days (4.08 mg/g vs. 1.38 mg/g, respectively). To investigate whether oxalic acid detection methods influenced the accuracy and reproducibility of these findings, we compared two different protocols for measuring oxalic acid in culture medium. We tested high performance liquid chromatography (HPLC) and a commercially available kit, designed for detection of urinary oxalate, for characteristics such as sensitivity, accuracy, cost, and ease of use. HPLC (Shodex RSpak KC-811 column) accurately quantifies oxalic acid over a broader range of concentrations than the spectrophotometric assay in the kit (0.1 – 200 mg for HPLC vs. 0.1 – 20 mg for the kit). Although reagents for the spectrophotometric assay are more expensive, HPLC is more labor intensive, requires the availability of the appropriate instrumentation, and involves extraction with organic solvents.

Stable Transformation of Green Fluorescent Protein in Peanut (*Arachis hypogaea* L.).

M. JOSHI¹*, G.H. FLEMING¹, H. YANG¹, C. NIU¹, J. NAIRN², P. OZIAS-AKINS¹. ¹Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793-0748; ²School of Forestry, The University of Georgia, Athens, GA 30602.

The ability to non-destructively visualize transient and stable gene expression has made Green Fluorescent Protein (GFP) a most efficient reporter gene for routine plant transformation studies. However, the success of stable tissue transformation and subsequent regeneration of transgenic plants harboring GFP varies with different forms of GFP and the target plant species. In order to optimize a peanut transformation system using GFP as the selectable marker, we have evaluated three fluorescent protein mutants for their transient expression efficiencies after particle bombardment of embryogenic cultures of the peanut cultivar, Georgia Green. The fluorescent protein variants used in the present study (Enhanced Green Fluorescent Protein (EGFP), Enhanced Yellow Fluorescent Protein (EYFP) and Enhanced Cyan Fluorescent Protein (ECFP)) differed in their emission and excitation peaks. All were expressed from the CaMV35S promoter. A fourth construct expressing EGFP from a double 35S promoter with an AMV enhancer sequence also was compared. The brightest fluorescent signal was observed from the construct containing EGFP driven by the enhanced double 35S promoter. Bombardments with this construct produced tissue sectors expressing GFP that could be visually selected under the fluorescence microscope over multiple subcultures. Embryogenic lines showing stable expression of GFP over an eight to twelve month period have been obtained. These embryos will be used to regenerate transformed peanut plantlets.

Genetic Transformation of Peanut for Resistance to *Sclerotinia minor*. D.M. LIVING-
STONE*, J.L. HAMPTON, P.M. PHIPPS, E.A. GRABAU. Department of Plant
Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, VA 24061
and Tidewater Agricultural Research & Extension Center, Suffolk, VA 23437.

Genetic transformation offers the potential for introducing genes into commercial peanut cultivars to enhance resistance to pathogens such as *Sclerotinia minor*. Our objectives were to optimize initiation and regeneration of embryogenic cultures for Virginia peanut cultivars, to demonstrate successful gene transfer into these cultures using microprojectile bombardment, and to investigate the use of a barley oxalate oxidase gene for dual purposes as a resistance gene and reporter of transgene expression. We have established tissue culture conditions for production of embryogenic material for several elite Virginia cultivars. Embryogenic callus was obtained in 2 weeks from $67.5 \pm 9.5\%$ of mature zygotic embryos cultured for cv. Perry and $60 \pm 5.8\%$ for cv. Wilson. However, zygotic embryos derived from mature seed produce somatic embryos that are not as regenerable as somatic embryos from immature seeds (1-10% vs. up to 60%). Because regeneration is the rate-limiting step in peanut transformation, the acquisition and culture of immature seeds is important. We have established cultures of immature embryos of the cvs. NC-7, Perry and Wilson. Approximately 70 - 80% of immature embryos produced embryogenic callus within 1 week on media containing 3 mg l⁻¹ picloram. We have cloned the barley oxalate oxidase gene for microprojectile bombardment of peanut cultures. A sensitive, simple and inexpensive assay for oxalate oxidase activity allows us to use the cloned gene as a reporter to monitor bombardment and regeneration protocols. From transient expression studies we have demonstrated an average of 1788 ± 472 oxalate oxidase-expressing foci per cm² in embryogenic cultures. We have selected transformants on media containing 40 mg l⁻¹ hygromycin B and have continued to observe oxalate oxidase gene expression after several months. We are extending our bombardment studies to embryogenic cultures derived from immature seed of NC-7, Perry and Wilson.

Inheritance of the High Oleic Trait in Peanut: Unsolved Puzzle. Y. LOPEZ^{1*}, M.R.
BARING¹, C.E. SIMPSON² and M.D. BUROW³. Department of Soil and Crop
Sciences, College of Agriculture and Life Sciences, Texas A&M University,
2474 TAMU, College Station, TX 77843-2474; Texas Agricultural Experiment
Station, Stephenville, TX 76401; Texas Agricultural Experimental Station, Route
3, Box 219, Lubbock, TX 79401.

High oleic content in peanut increases shelf-life of roasted peanuts and enhances nutritional value. Inheritance studies indicate that the high O/L trait is mainly under the control of two recessive genes. However, there seems to be more allelic variation both within and among cultivars, and the probability that epistasis interaction is involved, possibly even the action of three to four genes. Analyses for the high O/L trait of more advanced generations and other populations have been performed. Three crosses of low x low Spanish varieties were made and 60 F₂ progenies from each cross, for a total

of 180 individual seeds, were analyzed for O/L. All were low with values ranging from 0.9 to 1.5. No low-intermediate O/L values were observed. A larger number of individuals per population for the high x low Spanish crosses were analyzed and results showed two populations fitting a 36:19:9 (low: intermediate: high, respectively) ratio. Such a ratio fits a three genes model under a dominant and recessive epistasis interaction, the third gene being dominant for high O/L (χ^2 values of 0.64 and 1.10). Analyses of four Spanish-type F_3 populations may indicate some quantitative action. Also, advanced populations (F_4 or F_5) have agreed with earlier results that some lines can be fixed for low-intermediate O/L values while others still will be segregating. Progeny of high O/L individual plants has shown segregation for low-intermediate values. In addition, F_2 populations of low x high O/L crosses, produce different ranges of O/L values when comparing Spanish and runner-type peanuts. The Spanish-type values for low and low-intermediate range from 0.9 to 4.5, while in runner-type the values range from 0.9 to 7.8. A good fit genetic model has not been identified

Transformation of Peanut (*Arachis hypogaea* L. cv. Georgia Green) with a Nonheme Chloroperoxidase Gene by Particle Bombardment. C.NIU*, Y. AKASAKA, M. JOSHI, H. YANG, P. OZIAS-AKINS. Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793-0748.

A nonheme chloroperoxidase gene (CPO-P) from *Pseudomonas pyrrocinia*, which has been reported to inhibit the growth of mycotoxin producing fungi, was introduced into peanut via particle bombardment. The expression of the CPO-P gene is predicted to increase pathogen defense in plants. Embryogenic peanut tissues were bombarded with gold beads (0.6-1.0 μm) coated with plasmid pRT66 cpo-p DNA, which includes the CPO-P and hygromycin phosphotransferase genes, both under the control of a CaMV 35S promoter. Selection for hygromycin-resistant somatic embryos was initiated at 3-4 days after bombardment on liquid medium containing 10-20 mg/L hygromycin. The presence and expression of the CPO gene was confirmed by PCR and Northern blot analyses of hygromycin-resistant tissues. Plantlets have been regenerated from these PCR- and Northern blot-positive lines and are being used for pathogen bioassay. Gene expression and bioassay results will be presented.

Field Resistance to Tomato Spotted Wilt Virus in a Transgenic Peanut (*Arachis hypogaea* L.). P. OZIAS-AKINS^{1*}, H. YANG¹, A.K. CULBREATH², D.W. GORBET³, J.R. WEEKS⁴. Departments of ¹Horticulture and ²Plant Pathology, The University of Georgia Tifton Campus, Tifton, GA 31793-0748; ³North Florida Research and Education Center, 3925 Highway 71, Marianna, FL 32446; ⁴Wiregrass Experiment Station, Auburn University, Headland, AL 36345.

Tomato spotted wilt virus has become a persistent problem for peanut cultivation in the southeastern US. A consistent reduction in crop losses due to the virus can be achieved by a combination of cultivar choice and cultural practices, but total control of viral infection has not been possible. Since host plant resistance is a primary factor for reducing infection incidence, we have explored the possibility for enhancing host plant resistance using transgenic methods. The nucleocapsid protein gene from tomato spotted wilt virus was introduced into embryogenic cultures of *Arachis hypogaea* L. cv. Marc I, and transgenic plants were recovered from stably transformed tissues. One plant line showed a simple DNA integration pattern based on Southern blot analysis, and Mendelian inheritance of the transgene was observed. Inheritance of the transgene and expression of the transgene, as determined by Northern blots and ELISA, were perfectly correlated. This line was tested in replicated field trials for two years, the first year in one location (Tifton, GA) and the second year in three locations (Tifton, GA; Marianna, FL, and Headland, AL). In both years, the transgenic line showed a significantly lower incidence of disease than its background genotype, Marc I. The transgenic line was comparable to or exceeded the resistance level of Georgia Green. In all three locations, yield and grade of harvested peanuts from the transgenic line were consistently higher compared with the background genotype Marc I. We conclude that pathogen-derived resistance based on expression of the nucleocapsid protein gene from tomato spotted wilt virus can significantly enhance host-plant resistance and may offer a means to combine multiple mechanisms of resistance into one genotype.

Production Technology II

Peanut Yield and Grade With Different Row Orientation and Seeding Rate when Irrigated with SDI. R.B. SORENSEN* and D.A. STERNITZKE. USDA-ARS-National Peanut Research Laboratory, P.O. Box 509; 1011 Forrester Dr. SE, Dawson, GA 31742.

Peanut (*Arachis hypogaea L.*) is typically planted in a single or twin row orientation, however, research indicates that peanut planted at equidistance between rows and plants in alternating rows (diamond shape) and using the same planting rate can increase pod yield. A study was conducted to evaluate peanut pod yield and peanut kernel quality with different row orientations and seeding rates when irrigated using subsurface drip irrigation (SDI). Peanuts were planted on single 1.83 m beds using three row orientations (single, twin and diamond), two seeding rates (9.8 and 19.7 seeds m^{-2}) replicated three times at two locations (Sasser and Shellman, GA). Single rows, S, were planted 0.91 m apart with two rows on one bed. Twin rows, T, were planted 22.8 cm apart with 4 rows on one bed (68.6 cm between the middle rows). Diamond rows were planted 16.5 cm apart with 8 rows on a bed (25.4 cm between the two middle rows). Soils were a Tifton sandy loam (fine, loamy, kaolinitic, thermic Plinthic Kandiudults) and Greenville fine sandy loam soil (fine, kaolinitic, thermic Rhodic Kandiudults) at the Sasser and Shellman sites, respectively. Irrigation water was applied through the SDI system following published water use curves. Yield data across both sites show no yield difference between the T and D pod yield (5395 kg ha^{-1}) which averaged about 16% higher yield than the S orientation (4595 kg ha^{-1}). There was no yield difference with increased seed rate. However, the plant population (Sasser site only) at harvest averaged 15.1 plants m^{-2} (23% less than desired) while the low seed rate averaged 9.5 plants m^{-2} . Across sites, both T and D had the same TSMK and were 1.5 percentage points higher than the S (72.8%) orientation. There was no grade difference between seeding rates. Kernel size distribution showed that T had 17% more jumbos and D had 4.4% more medium kernels than the S row. Overall, both T and D had higher yield and grade than S at both sites.

Single Row Yield as a Function of Plant Spacing with Implications for Increasing Yield using Two-dimensional Planting Patterns. D.A. STERNITZKE*, J.I. DAVIDSON, JR, and M.C. LAMB, USDA-ARS-National Peanut Research Laboratory, Dawson, GA 31742

Field experiments were conducted at two locations in Terrell County, GA from 1997-99 to determine the impact of plant spacing on pod mass and yield for nonirrigated single row peanuts. Plants within treatments were thinned at random until average plant spacings of 23, 30 38, 48, and 61 cm were attained. Checks were not thinned and averaged 7.9 cm/plant. Pod mass per plant increased with spacing because competition for water, nutrients, and light decreased. In contrast, yield decreased with spacing because pod mass gains were offset by population losses associated with greater spacing. Increased

spacing will increase pod mass per plant but not yield because yield is the product of pod mass per plant and population. It is impossible to increase spacing without decreasing single row population. In contrast, it is possible to increase spacing using two-dimensional planting patterns without reducing population. An empirical equation was developed to predict single row yield as a function of plant spacing and an environmental coefficient. Results from the previous experiments fostered a CY 2001 study to quantify the impact of spacing on pod mass and yield for 40 seed/m Georgia Green peanut planted on 1.8 m raised beds using single, twin, and eight-row planting patterns. Eight row pattern yields exceeded twin and single row yields. Canopy closure was more rapid with the eight-row pattern. Rapid closure appeared to reduce weed growth and propagation, soil temperature extremes, soil-water evaporation, and soil erosion. Preliminary results suggest planting in a multi-row pattern will elevate yield above equal populations planted in single and twin row patterns.

Improving Peanut Production with Surface Drip Irrigation. H. ZHU*, M. C. LAMB,
R. B. SORENSEN, C. L. BUTTS, AND P. D. BLANKENSHIP. USDA, ARS,
National Peanut Research Laboratory, Dawson, GA 31742.

Surface drip irrigation due to its simplicity has been used to irrigate many types of crops for many years. It can precisely deliver water, nutrients, and chemicals to the crop root zone. One of the greatest advantages of using surface drip irrigation is that the system can be installed easily with low initial investment and provide flexible irrigation schedules without using large pumps and wells. Surface drip irrigation could satisfy the need to irrigate regularly and irregularly shaped fields with a low initial investment. Peanut growers who rent land or who plan to use land for short term operations could use surface drip irrigation as well. However, no information on peanut production using surface drip irrigation is available in the scientific literature. A simple surface drip irrigation system was installed to irrigate twin-row peanut (Georgia Green) planted in Greenville type soil during 2001. Drip tapes were placed on the soil surface in the middle line of the twin-row planting pattern. Distance between two drip tapes was 0.91 m. Emitters were spaced 46 cm apart along the drip tape, and flow rate from each emitter was 1.26 L/h at 70 kPa. A centrifugal pump powered by a gasoline engine was used to deliver water from a 5500 L plastic tank to the drip tapes. Irrigation was scheduled with the decision support system, Irrigator Pro. A total of 19.3 cm of water was applied to the peanut crop during the entire growing season. Soil temperature and volumetric water content were measured at different locations to track soil temperature and water movement from drip tapes. Test results were compared with the adjacent non-irrigated area planted with the same variety of peanut. The maximum soil temperature in the irrigated area was substantially lower than in the non-irrigated area. The difference in temperatures between the irrigated and non-irrigated areas increased as irrigation rate increased. The soil temperature in the irrigated area was 29.0 C compared to 32.5 C in the non-irrigated plots, 24 h after a 12.5 mm irrigation applied. Similarly, 24 h after a 25 mm irrigation applied, the soil temperature in the irrigated plots was 26.6 C compared

to 35.4 C in the non-irrigated plots. It took 92 h for the moisture content in the center-line to decrease from 30.5 to 27% after 25 mm of water was applied. Comparatively, it took 51 h for the moisture content to decrease from 30.5% to 27% after 12.5 mm of water was applied. About 16 h were required for water to travel 46 cm and then hold the moisture for 14 h before decreasing for both 12.5 and 25 mm irrigation in the same area. Surface drip irrigation produced 5750 kg/ha which was 2018 kg/ha more than the non-irrigated area although rainfall during the growing season of 2001 was 59.8 cm. The quota value of peanut from the irrigated area was 3766 US \$/ha while the non-irrigated area was 2525 US \$/ha.

Calendar Based versus Physiological Growth Stages as Determinants for Timing of Early Harvest® PGR Applications on Peanut. J.P. BEASLEY, JR. Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793.

Early Harvest® PGR is a growth stimulant labeled for use on peanut and marketed by Griffin LLC. It contains 26.8, 13.4, and 8.9 mg of cytokinins, indole butyric acid, and gibberellic acid, respectively, per fluid ounce of formulated material. Tests were conducted in crop years 2000 and 2001 to determine the response of peanut, *Arachis hypogaea*, L., to Early Harvest PGR applied on a calendar based schedule compared to applications triggered by physiological growth stages. In the 2001 test, foliar treatments of Early Harvest PGR at 3 versus 6 fl oz/A were compared with and without Early Harvest TST, a talc based material with the same concentration of the three growth hormones as the PGR formulation, on the seed at planting. The 2000 test was conducted at the Southeast Georgia Research and Education Center near Midville. 'Georgia Green' cultivar was planted on 10 May 2000 and plots were six rows by 50 feet long arranged in a randomized complete block design with four replications. The 2001 test, conducted at the Coastal Plain Experiment Station near Tifton, was planted to Georgia Green cultivar on 30 April 2001 in two-row plots, 40 feet in length, with five replications. The treatments in 2000 were all based on physiological growth stage. Comparisons were made among sequential applications beginning at the three to five-inch canopy width and concluding with the peak pod fill stage. Analysis of data indicated no difference ($p \leq 0.05$) among treatment means for yield, however, the standard application of 3.2 fluid ounces per acre of Early Harvest PGR applied at pegging and peak pod fill stage provided the highest yield. In 2001, comparisons were made between calendar based applications that corresponded with fungicide applications and applications made based on physiological growth stages. Analysis of the data indicated there was a significant ($p \leq 0.05$) interaction between Early Harvest PGR rate and whether or not Early Harvest TST was applied to the seed. When there was no TST applied to the seed, there was a significant reduction in yield when the Early Harvest PGR rate was increased from 3 to 6 ounces per acre. There was also a significant interaction between application timing, calendar versus growth stage, and whether or not Early Harvest TST was applied to the seed. When seed were not treated with Early Harvest TST, there was a significant reduction in yield for treatments applied based on physiological growth stage compared to the calendar based

Water-Use Efficiency of Peanut Varieties: Variation Across Peanut Production Regions and Irrigation Treatments. D. ROWLAND*, K. BALKCOM, M. LAMB, N. PUP-PALA, J. BEASLEY, M. BURROW, D. GORBET, D. JORDAN, H. MELOUK, and C. SIMPSON. USDA/ARS, National Peanut Research Laboratory, Dawson, GA 31742; New Mexico State University, Las Cruces, NM 88003, University of Georgia, Tifton, GA 31793; Texas A&M University, Lubbock, TX 79403; N. Florida Res. & Educ. Center, Marianna, FL 32446; NC State University, Raleigh, NC, 27696; USDA/ARS, Oklahoma State University, Stillwater, OK 74078; Texas A&M University, Stephenville, TX 76401.

The picture of water availability across most of the US peanut producing areas is bleak and becoming worse every year. Years of drought and increasing urban drains on water resources are forcing producers to make do with diminishing irrigation stores. The ability of a peanut variety to use water efficiently can spell the difference between high yields or a failed crop when water is limited. High water-use efficiency (WUE), or the ratio of dry matter production to water use, may now become a priority in many peanut breeding programs. We examined the variation in WUE of up to 19 varieties at six US peanut producing areas: Georgia, Florida, North Carolina, Texas, Oklahoma, and New Mexico, by measuring carbon isotope discrimination. It has been well documented that carbon isotope discrimination is an accurate surrogate for WUE in peanut. We also examined WUE variation at a single site in Georgia among three commonly grown varieties under four overhead sprinkler application rates. In both studies, we correlated both specific leaf area and leaf chlorophyll content with carbon isotope discrimination in order to determine if these easy and inexpensive measurements could be indicators of WUE and easily selected for in breeding programs.

The Effect of Floor Open Area on Airflow Distribution in Peanut Drying Trailers.
C.L. BUTTS* and E.J. WILLIAMS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742, and Biological and Agricultural Engineering Department, University of Georgia, Tifton, GA 31793.

Peanut curing wagons have typically been constructed using perforated metal floor with 23% open area (O.A.). Recent designs for larger peanut drying trailers have used perforated metal with 40% O.A. However, no data has been collected to determine the effect of the different O.A. on total airflow or the distribution of airflow through the peanuts. Six 6.4-m peanut drying wagons were loaded with dry farmer stock peanuts at a local peanut processing facility. Three wagons had floors with 23% O.A. and three had floors with 40% O.A. Peanuts were leveled on each trailer and peanut depth ranged from 114 to 130 cm. A 76-cm diam., 1750 rpm, 4-blade vane axial fan, dryer with a 91-cm long straightening inlet transition was connected to each peanut drying trailer. The rated airflow capacity of the dryer was approximately 300 m³/min at 12 mm H₂O. Total airflow was measured using a pitot tube traverse across the inlet transition. Static pressure was measured in the wagon plenum using a U-tube

manometer. The top of the trailer was divided into 40 sections using a 5 x 8 cell grid. The airflow through each grid cell was measured using a vane anemometer mounted on a conical transition placed in the center of each grid cell. No significant differences in static pressure, total airflow, [or] airflow distribution due to the percent O.A. of the perforated drying floor were detected. The average static pressure observed for wagons with the 23 and 40% O.A. was identical at 12.4 mm H₂O. Total airflow measured at the fan inlet averaged 283 m³/min for the 40% O.A. trailers compared to 277 m³/min for trailers with 23% O.A. Specific airflow averaged 9.42 m³/min/m³ for the peanut wagons with 23% O.A. with a standard deviation 1.13 m³/min/m³. Similarly, the drying wagon with a 40% O.A. floor had an average specific airflow of 9.50 ± 1.12 m³/min/m³. Contour plots indicated that some variations exist within the trailer due to position and possibly concentration of foreign material. Possible differences due to fan performance will be discussed.

High Moisture Peanut Grading, M.C. LAMB¹*, P.D. BLANKENSHIP¹, C.L. BUTTS¹, T.B. WHITAKER², and E.J. WILLIAMS³. ¹USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742, ²USDA, ARS, Market Quality and Handling Research Unit, NC State Univ., Raleigh, NC 27965, and ³Univ. of Georgia Cooperative Extension Service, Tifton, GA 31793.

Previous research has shown that the farmer stock grade, lot weight, and value could be accurately determined at kernel moisture contents greater than 10.5% without negative impact on either the producer or purchaser. In the 1998 and 1999 crop years, 686 farmer stock lots consisting of runner, virginia, and spanish types were graded and weighed at high moisture content (HMC), cured, and graded and weighed at low moisture content (LMC). The results of this research indicated that LMC grade, lot weight, and lot value could be accurately predicted from HMC grade, lot weight, and lot value for individual farmer stock lots. However, the research did not address variability between HMC and LMC grade, weight, and values. In crop year 2001, a study was conducted in Georgia on runner type peanuts to address variability in HMC and LMC grade, weight, and values. As farmer stock lots entered the buying point each lot was graded and weighed six times at HMC. The prediction equations estimated from the 1998 and 1999 studies were applied to the HMC values to obtain predicted grades, lot weights, and lot values. The lot was cured and graded and weighed six times at LMC and compared to the six predicted grades, lot weights, and lots values. Thirty-four farmer stock lots were included in the study. There were no significant differences in mean grade, lot weight, and lot value between the predicted and actual LMC value. Sound mature kernels and sound splits (SMKSS) differed by 0.10%. Mean lot weight differed by 11 pounds (0.12%). Mean lot value differed by \$12.74 (0.50%). Variability between predicted and actual SMKSS, lot weight, and lot value was not significantly different.

Development of a Low-Cost Imaging System for Determining Shell Brightness of Valencia Peanuts. P.D. BLANKENSHIP^{1*}, H.T. SHEPPARD¹, T.H. SANDERS², and D. BOLDER². ¹USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; and ²USDA, ARS, Market Quality and Handling Research Unit, NC State Univ., Raleigh, NC 27695-7625.

Most valencia peanuts are consumer marketed by processors in-shell after farmer marketing. Shell brightness is an important consumer factor. During farmer marketing, percent discolored shells is determined subjectively during the farmer stock grading procedure. If discolored shells are 25 % or greater, lot value is reduced. This study was performed utilizing the pods from 220 samples scored by New Mexico inspectors during the 2001 harvest of valencia peanuts in Portales, NM. Three low-cost imaging systems were designed and evaluated during the study. One system measured shell brightness using two contrast sensors located on opposite sides of individual pods moving past the sensors. The other two systems utilized digital video cameras with accompanying hardware and software evaluating pods grouped from the samples spread into single layers. Shell brightness was measured on opposite sides of layers after rotation. As a standard, Hunter L value of each pod sample was determined three times with mixing of pods after each determination. The measurements of shell brightness from all systems were correlated and compared to the percentage of the discolored pods determined during official grading.

Plant Pathology and Nematology II

Nicobifen: A New Broad-Spectrum Fungicide for Use on Peanuts. T.E. McKEMIE*,
W.M. FLETCHER, M.C. BOYLES and J.S. BARNES. BASF Corporation,
Research Triangle Park, NC 27709.

Nicobifen is a new fungicide being developed by BASF Corporation for peanuts. Registration in the US is pending. The chemistry is novel and differs from currently available fungicides in peanuts with regard to both mode of action and disease spectrum. Fungal respiration is inhibited by nicobifen at complex II in the mitochondria and deprives fungal cells of essential cell building blocks. The compound is systemic and provides effective control of important soil and foliar fungal pathogens in peanuts. Field research indicates that nicobifen is efficacious against Sclerotinia blight (*Sclerotinia minor*), web blotch (*Phoma arachidicola*) and leaf spot pathogens (*Cercospora arachidicola*, *Cercosporidium personatum*). This is the first product that utilizes this mode of action against this spectrum of diseases in peanuts. Nicobifen will be an excellent addition for peanut disease control programs and resistance management.

Headline: Results From 2001 Peanut Large Plot Demonstration Trials. S. H. NEWELL*, T.E. McKEMIE, B. S. ASHEW, BASF Corporation, Statesboro, GA, Durham, NC and Lubbock, TX

A new strobilurin fungicide, Headline (pyraclostrobin) was evaluated in grower fields for efficacy against the spectrum of peanut diseases. Two Headline applications were incorporated into a control program including the use of other fungicides for season long disease control. The plots in the trials were either replicated or strip plots. All plots were at least one-quarter acre in size, using locally adapted varieties and applied by growers using standard farm equipment and application techniques. Application timings varied according to peanut growing region. In the Virginia/Carolina and SE production areas, two of the first three applications were Headline treatments. In the Oklahoma/Texas production area, Headline was applied at approximately 60 and 90 days after planting. Standard fungicide programs varied according to production region, but included at least five fungicide applications during the growing season. Efficacy evaluations were taken mid season and again at harvest. Foliar diseases evaluated were early leafspot (*Cercospora arachidicola*), late leafspot (*Cercosporidium personatum*) and web blotch (*Phoma arachidicola*). Soilborne diseases evaluated were southern stem rot (*Sclerotium rolfsii*) and Rhizoctonia limb peg and pod rot (*Rhizoctonia solani*). Activity of Headline treatments was excellent and equal or superior to the standard fungicide treatments for control of all foliar diseases. Activity of Headline treatments was comparable to the standard treatments for control of soilborne diseases. Yield was taken and the Headline containing treatments provided numerically superior yield to the standard fungicide treatments.

Web Blotch Control with Fungicide Applications on Calendar or Advisory Application Schedules.

R. D. RUDOLPH* AND P. M. PHIPPS. Bayer Corporation, Tyrone, GA and Tidewater Agr. & Ext. Ctr., Virginia Polytechnic Institute & State University, Suffolk, VA 23437

Folicur and Bravo were evaluated for efficacy against web blotch [*Phoma arachidicola* Marasas] at the VPI & SU Tidewater Agricultural and Extension Center in 2001 utilizing a 14 day schedule of seven applications and leaf spot advisory programs with three, four, or five applications. In the calendar spray program, fungicide applications were initiated at peanut growth stage R1 [June 19], and continued on a 14-day schedule. Leaf spot advisory spray schedules were initiated at either R1 [June 19], R2 [July 3], R3 [July 9], or R5 [July 31] with subsequent applications made according to leaf spot advisory recommendations. Web blotch was first detected at trace levels in June and remained low through July. By August 28, incidence had reached 38% and increased to 79% by Oct 5.

In the seven application spray program, both Folicur at 227 g ai/ha and Bravo at 841 g ai/ha provided 78% web blotch control when evaluated October 5, 2001. The efficacy of Folicur was less affected when applied in leaf spot advisory programs than that of Bravo. With Folicur applied in the advisory programs, web blotch control ranged from 66% to 88%. All advisory spray schedules with Folicur provided web blotch control statistically equal to the seven application program. With Bravo, all advisory spray schedules had significantly less efficacy than the seven application calendar program. Web blotch control with Bravo according to the advisory program varied from 0% to 47%. These data suggest that for web blotch control, application timing for a systemic fungicide like Folicur is less critical than for a protectant fungicide like Bravo. Data also suggest that Bravo should be used in a calendar spray program to control web blotch, while Folicur can be used effectively in leaf spot advisory programs. The residual efficacy and/or kickback activity of Folicur was sufficient to prevent significant web blotch infection between applications when spray intervals were stretched to more than 14 days in the advisory spray schedules. All spray schedules with both Folicur and Bravo provided excellent control of early leaf spot [*Cercospora arachidicola* S. Hori]. An additional test showed that a spray program with Folicur applied on June 19, July 11, and July 31 and followed with Bravo applied on August 15 developed only 6% web blotch from August 1 to August 28. In comparison, four Bravo applications had 24% web blotch develop during this time and the untreated check had 35% web blotch. Stratego at 128 g ai/ ha induced a response similar to Folicur. By Oct 5, the untreated had 64% web blotch compared to 37% for the Folicur/Bravo treatment, 33% for the Stratego/Bravo treatment, and 41% for the Bravo. By the end of the season, all fungicide treatments had similar disease levels due to rapid disease development in September. The use of systemic fungicides early in the season appeared to delay disease development in August, but disease rapidly developed 30 days after Folicur or Stratego sprays were terminated according to the current resistance management recommendations in Virginia.

Summary of 2001 Stratego Efficacy for Control of Peanut Soil-borne Pathogens in Georgia and Alabama. H. S. YOUNG and D. HUNT*, Bayer Corporation, Tifton, GA and Opelika, AL.

During 2001, the first year of commercial sale of Stratego on peanuts (*Arachis hypogaea* L.), essentially all use was at 7.0 fl. oz./A for control of Early and Late Leafspots and Web Blotch. In 2001, Stratego was extensively evaluated at 14 fl. oz./A at application timings 3 & 5 targeting Rhizoctonia limb rot (*Rhizoctonia solani*). Chlorothalonil was used for sprays 1,2,4,6 & 7. Only a small number of these trials conducted had Rhizoctonia limb rot as the primary disease. Stratego 2.08 EC was evaluated on peanut in 19 trials at 14 fl.oz./A at application timings 3 & 5 conducted in Georgia, Alabama and Texas. Three of these trials were infected with Rhizoctonia limb rot (*Rhizoctonia solani*) and 14 had Southern stem rot (*Sclerotium rolfsii*) as the primary soil-borne disease. Three trials had Rhizoctonia limb rot as the primary pathogen. Two of these locations were large-plot grower trials in Georgia with "aerial Rhizoctonia" present at high infection levels at the time of initial application. In these two trials, Stratego (14 fl.oz./A), applied at timings 3 & 5, performed similarly to Abound 2.07 SC (18.2 fl.oz./A). In a Tift Co., Georgia trial, that was replicated 10 times, Stratego and Abound yields differed by only 1%, with Stratego having the higher, non-significant yield of 5662 lb./A. One entire row (avg. 550'/plot) of each plot was evaluated for R. limb rot. Stratego had 13.1% and Abound 24.0% infection with no statistical difference. In a 60-acre Extension Service trial with 4 replications, located in Calhoun Co., Georgia, Stratego and Abound produced yields of 7256 and 7260 lb./A, respectively. Evaluations of multiple 100' strips within each plot indicated 9.9 "hits" for Abound and 23.7 "hits" for Stratego. Both test sites were irrigated and had heavy vine growth early in the season. Results from the third Rhizoctonia limb rot specific site demonstrated a 16% reduction of limb rot compared with a chlorothalonil treatment, while Folicur 3.6F and Headline 2.08 SC resulted in a 37 and 33% reduction, respectively. Abound provided the only significant yield increase in the trial with 574 lb./A compared with chlorothalonil. A summary of the yield data from 14 trials, where S. stem rot infection averaged 13.7% at harvest, indicated that Stratego averaged 1516 lb./A more than the untreated control and 384 lb./A more than chlorothalonil. Headline (9 and 12 fl.oz./A), which was evaluated in 7 of the 14 trials, yielded an average of 411 pounds less than Stratego. Relative efficacy for S. stem rot was demonstrated in one Yoakum, TX trial where the high rate of each fungicide was applied in a full-season program. In this trial, Stratego applied at 14 fl.oz./A, provided a 76% disease reduction and a 73% yield increase when compared with a no fungicide control. Control of S. stem rot with Stratego was superior to 7 applications of Abound (18 fl.oz./A), and 4 applications of Folicur (7.2 fl.oz./A) applied at timings 3-6. Seven applications of Headline (12 fl.oz./A) provided 76% greater yield than the untreated and was the only fungicide in this trial that out-yielded Stratego. In one Plains, GA trial infected with (CBR) Cylindrocladium black rot (*Cylindrocladium crotalariae*), Stratego resulted in a 24% yield increase compared with the chlorothalonil control. Yield in this trial was similar to that achieved with Folicur, but 10% less than the Abound yield of 3768 lb/A. The performance of Stratego at the high label rate of 14 fl.oz./A applied at application timings 3 & 5 exceeded expectations by providing control of R. limb rot, S. stem rot and CBR that was similar to that provided by more costly fungicide programs.

Effect of Omega 500 on Frost Injury of Peanut. V. L. CURTIS* and J.E. BAILEY.
Department of Plant Pathology, North Carolina State University, Raleigh, NC
27695-7616.

Two tests were planted to examine the conclusions of a 1999 test which indicated that Omega 500 provided protection from frost injury on peanuts. Of the 16 cultivars included in that test, NC7, a Virginia type cultivar, appeared most prone to frost injury and FLAC99R, a Runner type, appeared least prone, so these two varieties were selected. Test One was planted on May 12, 2000 at the Peanut Belt Research Station. Test Two was planted on May 18, 2000 at the Upper Coastal Plain Research Station. Seven treatments per variety consisted of Omega 500 (fluazinam @4.17 lbs ai/gal) at two rates: 16 fl oz/acre, and 64 fl oz/acre, each at three spray schedules: early advisory, early plus late advisory, and late advisory, and an untreated control. Applications were made at Test One on 7-27-00 and 8-24-00, and at Test Two on 7-24-00 and 8-24-00, using a tractor-mounted sprayer with 3 hollow-cone nozzles per row, at 40 psi and 15 gal water/acre. Plots consisted of two treatment rows 36 inches apart and 40 feet long. Two unsprayed border rows were between plots. Frost occurred on 11-06-00, and ratings were taken on 11-13-00. A freeze occurred at Test One on 11-15-00 (temperatures dropped to 28 degrees F) and ratings were done on 11-17-00. Frost Rating Index: 1 < 5% green leaves, 4 > 50% green leaves; values between 1 and 4 were scaled from 5 to 50%. Stems were not rated, and varied from brown, to black, to bright green. When rating percentage of green leaves in a plot, those obviously dead from disease were ignored, and the rating was based on the remaining leaves. Test One peanuts were dug on 11-28-00 and harvested on 11-30-00. Test Two peanuts were both dug and harvested on 11-29-00. Moisture samples were taken from untreated plots of each variety. Yields were adjusted to 9 percent moisture. In both tests, NC7 was more prone to frost injury than FLAC99R. In Test One, when rated on 11-13-00 after the frost event, frost protection was effected at the high rate of Omega 500, and was most pronounced when applied twice (LSD P =0.05). There was little, if any frost injury on the FLAC99R. On 11-17-99 after the freeze, protection was no longer evident on the cultivar NC7, however, frost protection was significant at the high rate when applied twice to FLAC99R (LSD P =0.05). Yields appeared to be unaffected by the treatments. In Test Two, which experienced two frosts but did not experience the freeze event, both rates of Omega 500 gave some level of frost protection in most cases (LSD P=0.05). Two applications were more effective than one and the high rate was better than the low rate. Yield increases paralleled frost protection in FLAC99R. NC7 showed a tendency toward higher yields (not statistically significant) at the highest rate only. Results are remarkable considering the length of time between the applications and the frost ratings. There was a 74-day lapse between the last treatment application and the first frost event, and a 97-day lapse between that treatment and harvest. Results of these studies are consistent with those from 1999. Research is needed to assess potential frost protection on other crop species.

Sclerotinia Blight Chemical Control Past, Present, Future. T.A. LEE, JR.*. Department of Plant Pathology & Microbiology, Texas Cooperative Extension, Stephenville, TX 76401.

Considerable advances in chemical control of Sclerotinia Blight caused by *Sclerotinia minor* have been made in the last ten years. Rovral (iprodione) has held a federal label for the longest period. Numerous state labels for Botran (dicloran) have provided short term help in several years. The first significant level of control is offered by the new Omega 500 (fluazinam) chemical. New chemistry from BASF (BAS 510) offers considerable help in the future. Both Rovral and Botran fail to really meet grower needs. They sometimes work well but both often fail to pay dividends. After many years of testing, Omega 500 appears to be a solid performer if applied early enough. The new BASF material although different chemistry than Omega 500, appears to have about the same level of control. If it can be labeled it should allow for a healthy level of market price competition.

Breeding, Biotechnology, and Genetics II

'Olin' and 'Tamrun OL 01' – Two New High O/L Peanut Cultivars. M.R. BARING*, C.E. SIMPSON, Y. LOPEZ, A.M. SCHUBERT, and H.A. MELOUK. Dept. of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843, Texas Agricultural Experiment Station, Stephenville, TX 76401, and Lubbock, TX 79401, and USDA, Stillwater, OK 74078.

Genes for the high O/L trait were transferred into TAMU Spanish breeding lines by using UF435-2-1 and UF435-2-2 as donor parents and 'Tamspan 90' as the recurrent parent. Tamspan 90 was released as a Spanish variety with high yield and grade potential and some resistance to *Sclerotinia minor*. The original cross was made in College Station in 1991. Individual F_1 's were harvested that same year and F_2 populations were planted for individual plant selection work in 1992. It was evident from the beginning that many unacceptable traits were linked with the high desired O/L trait. Low yields, poor grades and small seed size were all linked with the high O/L trait when crossing with the UF435 materials. A modified backcrossing program was initiated in which pollen from the $F_{2,3}$ selections were used to cross back to the recurrent parent Tamspan 90 in 1993. Tx962120 was a breeding line selected out of the 1996 BC₁ materials in an effort to provide both the industry and the growers with a high O/L Spanish variety immediately. Yield tests were conducted at multiple locations beginning in 1997. From the 1999 testing generation (BC₁ $F_{5,10}$), 850 individual seeds were planted and tested for O/L value to establish breeder seed. Two hundred and thirty-nine of the original 850 plants were selected for increase and grown in the '99 – '00 Puerto Rico winter increase. These plant rows were blended together as BC₁ $F_{5,11}$ seed and sent to the Foundation Seed Service. Tx962120 has been approved from release as 'Olin' in honor of the late Dr. Olin D. Smith who initiated the O/L breeding project and was the co-project lead of the peanut-breeding program for 27 years. Genes for the high O/L trait were transferred into the TAMU runner breeding lines by using SunOleic 95R as the donor parent and several of the program's Tomato Spotted Wilt Virus resistant lines as the recurrent parent. Tx896100 was released as 'Tamrun 96' as runner with good yield and grade potential and tolerance to TSWV. The original cross was made in 1995 at College Station and the F1 hybrid was used for the first backcross in the spring of 1996. The BC₁ F_1 populations were harvested that same year from the Bryan nursery and space planted for individual plant selections in the '96 – '97 Puerto Rico winter nursery. Line Tx977006 was selected from the BC₁ $F_{2,3}$ Frio County plant rows as a high yielding, high O/L line with tolerance to both TSWV and *Sclerotinia* pressure in 1997. Since 1998 yield tests were conducted at multiple locations under both disease pressures and under disease free conditions. From the 1999 testing generation (BC₁ $F_{2,5}$), 30 individual seeds from two replications at three locations for a total of 180 were analyzed for O/L values and the results proved that 99.4% were high. These seed were then bulked together and grown as BC₁ $F_{2,6}$ Breeder Seed increase in 2002. The line Tx977006 has been approved for release as 'Tamrun OL 01'.

Breeding for Early-Maturing Peanut. M. D. BUROW*, M. R. BARING, Y. LÓPEZ, and C.E. SIMPSON. Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; Department of Soil and Crop Sciences, College of Agriculture and Life Sciences, Texas A&M University, College Station, TX 77843; and Texas Agricultural Experiment Station, Texas A&M University, Stephenville, TX 76401.

The quality of peanut grown in West Texas is affected by a shorter growing season, longer time to maturity, and reduced oleic to linoleic ratios (O/L). We have begun development of material to combine earlier maturity and high O/L. Five F_2 populations and four $BC_{2:4}$ populations were evaluated at Denver City and Fieldton, Texas for maturity, growth habit, number of lateral branches (runners), vigor, overall appearance, damage from foliar diseases, and O/L ratios. Maturity was estimated by either scraping or blasting 50 pods per plant and evaluating hull color as white, yellow-1, yellow-2, orange, brown, or black. Plants with black hull color were considered to be mature. Maturity data on F_2 and $BC_{2:4}$ material indicated that numerous progeny were earlier than standard Spanish and runner varieties. F_2 single plants ranged from 0% to between 76% and 100% black pods, compared to 51% and 21% black pods for Tamspan 90 and Florunner, respectively. The range in $BC_{2:4}$ lines ranged from a minimum of between 5% and 52% to a maximum of from 94% to 96% black pods in the runner x runner and runner x Spanish crosses. Although the five F_2 populations included the late-maturing UF435 as high O/L donor, there was no significant correlation between O/L ratio and maturity in two populations in which O/L has been determined. This suggests the feasibility of developing early-maturing peanut lines with high oleic content.

Improved Peanut Root-Knot Nematode Resistance in Peanut Lines Derived from Plant Introductions and Wild Species Introgression. W.F. ANDERSON¹, C.C. HOLBROOK², P. TIMPER², A. K.HAGAN³, and E. MCGRIFF⁴, ¹AgraTech Inc. Ashburn, GA 31714; ²USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793, ³Auburn University, AL 36849-5624, and ⁴Georgia Cooperative Extension Service, Bainbridge, GA.

A peanut root-knot nematode (*Meloidogyne arenaria*) resistance evaluation study was conducted in 2001. Thirty-three entries were evaluated over five replications at two field locations (Headland, AL and Bainbridge, GA). Entries included breeding lines derived from crosses with resistant parents found in the U.S. germplasm collection or from interspecific hybrid lines. Yields and grades were recorded for each location. Nematode populations were measured at planting and again at digging in plots of eight entries. Thirty-one of the entries were also evaluated for nematode resistance in the greenhouse. Single plants grown in 4 inch plastic pots were inoculated with 8000 nematode eggs after emergence. Plants were harvested after 60 days and roots were washed with dilute NaOCl. Roots were weighed and nematode eggs were counted.

One entry (00-0812) besides COAN was highly resistant (276 eggs/gram of root) compared to susceptible cultivars Georgia Green and ViruGard (14,998 eggs/g.r. and 17,561 eggs/g.r.). Nine other entries showed partial resistance (>3,000 – 8,000 eggs/gram of root). C99R ranked first in yield in Georgia (4436 lb/acre) while 99-1975 ranked first in Alabama (4427 lb/acre). Both of the lines were susceptible to nematodes in the greenhouse. Resistant line 00-0812 was 27th in yield in Georgia (3084 lb/acre) and 11th in yield in Alabama (3914 lb/acre) where the nematode population was higher. Partially resistant lines (00-3081B and 00-2663) ranked two, three in yield at the Alabama location.

Field Evaluation Trials of Peanut Genotypes for *Cylindrocladium* Black Rot (CBR)

Resistance. W. D. BRANCH* and T. B. BRENNEMAN. Department of Crop and Soil Sciences and Plant Pathology, respectively, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Field evaluation trials were conducted during three consecutive years (1999, 2000, and 2001) at the University of Georgia, Southeast Georgia Branch Station near Midville, GA. The test site has a long history of heavy incidence of CBR caused by *Cylindrocladium parasiticum* Crous, Wingfield, & Alfenas; syn *C. crotalariae* (Loos) Bell & Sobers, and has been purposely maintained for resistance screening and evaluation by alternating every other year between the two host legume crop species, peanut (*Arachis hypogaea* L.) and soybean (*Glycine max* L.). Thirty peanut genotypes were evaluated in a randomized block design with six replications. Highly significant (P#0.05) differences were found among genotypes for mid season, mid-late season, late season, and after digging ratings as well as pod yields. Disease ratings included both CBR and tomato spotted wilt tospovirus (TSWV) which was also present each year, but the predominant disease was CBR. Georgia-01R, GA 962540, and GA 982508 had significantly less disease incidence at the late-season rating as compared to the CBR resistant but TSWV susceptible checks: NC 3033, NC 8C, NC 12C, and Perry. After digging, several runner-type genotypes were found comparable to the best CBR resistant checks in CBR ratings and pod yields.

Development of Breeding Lines with Resistance to Tomato Spotted Wilt Virus and the Peanut Root-knot Nematode. C. C. HOLBROOK*¹, P. TIMPER¹, and A. K. CULBREATH², USDA-ARS, 'Coastal Plain Exp. Stn. Tifton, GA 31793; ²Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

Tomato spotted wilt virus (TSWV) has become a major problem in peanut (*Arachis hypogaea* L.) production areas of the southern United States. The peanut root-knot nematode [*Meloidogyne arenaria* (Neal) Chitwood race 1] is also an important pathogen in this production area. Peanut cultivars are available that have resistance to TSWV or the peanut root-knot nematode (PRN), however, no cultivars are available that have resistance to both pathogens. The objective of this research was to identify

peanut breeding lines that have resistance to both pathogens. Fifteen breeding lines were evaluated for 1 yr in a field test with high *M. arenaria* population densities and for 2 yr in a field test with little or no *M. arenaria*. This material was also evaluated in three greenhouse tests to measure nematode reproduction. In all field trials these breeding lines exhibited a level of resistance to TSWV at least as good as Georgia Green (the moderately resistant check), and significantly better than COAN (the susceptible check). In greenhouse trials these breeding lines supported significantly less nematode reproduction in comparison to Georgia Green (the susceptible check), but significantly more than COAN (the highly resistant check). In field trials with little or no *M. arenaria*, all breeding lines yielded similar to Georgia Green, and significantly higher than COAN. Breeding lines were identified which had significantly higher yield than either check cultivar in a field trial with high levels of pressure from both pathogens. These results document the development of breeding lines with moderate resistance to both pathogens.

Application of Regression Techniques to Determine Stability of Field Resistance to Tomato Spotted Wilt Virus in Virginia-Type Peanuts. T.G. ISLEIB*, P.W. RICE and R.W. MOZINGO, II. Dept. of Crop Science, North Carolina State Univ.

Although present in North Carolina peanut crop since the early to mid-1990s, tomato spotted wilt virus has increased in distribution and severity in the past two years. Differential reactions to the virus have been observed among virginia-type cultivars and breeding lines. Since 1996, the NCSU breeding program has routinely tested advanced breeding lines for TSWV reaction in field trials conducted with wide (25 cm) or very wide (50 cm) seed spacing and no chemical insect control to prevent the thrips vector from spreading the virus. Results from these tests have varied with mean TSWV incidence ranging from 19% to 60% of plants exhibiting symptoms. It was observed that TSWV incidence was high in some genotypes thought to be field resistant on the basis of data collected prior to 2000. Regression analysis was applied to data on lines tested for several years to identify lines for which TSWV symptoms did not increase proportionally to the mean increase. Four different reaction types were observed. Four cultivars (Gregory, NC-V 11, VA-C 92R, and VA 98R) behaved very similar to Georgia Green. Their mean TSWV incidence values were similar to Georgia Green's (~27%), and their regression slopes were very close to 1.00. One variety, NC 9, showed consistently more symptoms of TSWV at all mean levels of disease. Four varieties (NC 7, NC 10C, NC 12C, and Perry) were better than or equal to Georgia Green at low levels of disease pressure, but much worse at high levels. Their means were higher than Georgia Green's and their regression slopes were greater than 1.00. PI 576636, a late-maturing purple seeded introduction with little or no commercial value as a virginia-type peanut, had outstanding resistance to TSWV as evidenced by its low mean (3%) and flat regression line ($b=0.16$).

An Interdisciplinary Approach for Selection of Peanuts for Multiple Insect and Disease Resistance Derived from Bolivian Germplasm. R.N. PITTMAN¹, J.W. TODD², A.K. CULBREATH², D.W. GORBET³, and D.J. ZIMET³. ¹USDA-ARS, PGRCU, Griffin, Ga.; ²Coastal Plain Expt. Station, Tifton, Ga.; and ³North Florida Res. & Ed. Center, Marianna, Fl.

Peanut producers in the U.S. generally have well adapted and highly productive cultivars; but most cultivars are susceptible to the major diseases, insects, and nematodes that are yield-limiting. This project was started to evaluate the resistance of germplasm from Bolivia to disease and insects of the Georgia, Florida, and Alabama region; cross selected germplasm with southeastern adapted cultivars; and make selections within populations of the various hybrid populations. Disease resistant landraces from Bolivia were identified in 1997 and crosses were made with U.S. varieties in 1997, 1999, and 2001. F_1 through F_5 plants were space planted in the field at Attapulgus, Ga., for evaluation and selection. Each year, individual plants and plots were selected based on resistance to Tomato Spotted Wilt Virus, foliar diseases, pod and seed appearance, flavor, and yield. Florida MDR 98 x Bayo Grande selections were reduced to 13 populations for the 2001 crop year. Evaluation information for the 2001 crop identified six of the selections to carry forward. Yield from these selections ranged from 2900 to 3800 lbs/A. One mid-oleic selection was found with an oleic value similar to Florida MDR98. In addition, all selections for 2002 have very good resistance to tomato spotted wilt tospovirus and foliage diseases. Germplasm landraces from Bolivia offer an excellent source of resistance for various disease and insect problems.

NemaTAM a New Root-knot Nematode Resistant Peanut. C.E. SIMPSON*, J.L. STARR, M.D. BUROW, A.H. PATERSON, and G. T. CHURCH. Texas Agric. Exp. Station, Stephenville, TX 76401, Texas A&M Univ., Plant Path. & Micro. Dept., College Station., TX. M.D. Burow and A.H. Paterson both formerly of Soil & Crop Sci. Dept. Texas A&M Univ. College Station; presently at TAES and Texas Tech, Lubbock, TX and Univ. of GA, Athens, GA; and Plant Path. & Micro. Dept. Texas A&M Univ. College Sta. TX.

The new peanut cultivar, NemaTAM, was released in January 2002 by the Texas Agricultural Experiment Station. NemaTAM is a high yielding runner peanut cultivar that has excellent resistance to the root-knot nematode, *Meloidogyne arenaria* (RK), and it also has proven to be resistant to the *M. javanica*. This cultivar was developed by introgressing the gene for resistance from the wild *Arachis* species, *A. cardenasi*, into the cultivated peanut, cultivar Florunner. The specific line of Florunner which was used as the recurrent parent in seven backcross generations was UF439-16-10-3-2. After the gene for resistance was discovered in 1987 in the BC₁ progenies of Florunner X [*A. batizocoi* X (*A. cardenasi* X *A. diogoi*)]^{4x}, backcrosses were made each fall, the F_1 grown in the greenhouse, F_2 embryos sent to College Station for nematode testing; resistant plants determined and cuttings sent back to Stephenville

for the next backcross, thus, completing one backcross cycle per year. Resistance was determined by planting the seed in small pots, inoculating with 10,000 nematode eggs, incubating for eight weeks, harvesting and collecting roots, counting nematode eggs per gram of root, and making cuttings of resistant lines. Plants with 10% of the egg count per gram of root of the susceptible check, Florunner were considered resistant. Lines from the fifth, sixth and seventh backcrosses were yield tested. The best yields and grades were obtained from the materials from the seventh backcross. The final purification of the line was made by planting three hundred individual seed in a space plant nursery, taking DNA samples from plants and using molecular markers associated with the gene, making phenotypic selections and then looking at the markers to see if the plant had the nematode resistance gene and if it was homozygous. If the plant was phenotypically desirable and was homozygous resistant then it was retained to make up the breeder seed. If it did not meet all the criteria, the plant was discarded. Of the 300 plants, 121 were selected to go into plant rows to comprise the breeder seed. These 121 plant rows were grown in the Puerto Rico winter nursery to accelerate the distribution of seed. Yield of NemaTAM have been 32% above COAN with and without nematodes present. Yield of NemaTAM and Florunner has been equal without nematodes, and NemaTAM yields have been from 40 to 160% higher with RK nematodes present, depending upon the nematode pressure.

Weed Science I

Peanut Tolerance to Applications of Acifluorfen. T. A. BAUGHMAN*, B. J. BRECKE, P. A. DOTRAY, T. L. GREY, W. J. GRICHAR, D. L. JORDAN, E. P. PROSTKO, J. W. WILCUT, J. W. KEELING, J. C. REED, J. R. KARNEI, T. A. MURPHREE, B. L. PORTER, B. A. BESLER, and K. D. BREWER. Texas A&M University, Vernon, Lubbock, and Yoakum; University of Florida, Milton; University of Georgia, Tifton; and North Carolina State University, Raleigh.

Peanut producers regardless of growing region are concerned about herbicide injury. Producers are especially concerned about leaf burn from mid to late season herbicide applications. The concern is that the injury will potentially reduce yields, grades, and delay maturity, which can impact overall productivity. Therefore, eight trials were established in Florida, Georgia, North Carolina, and Texas to evaluate peanut tolerance to various application timings of acifluorfen (Blazer/Ultra Blazer). At the Georgia and Texas locations, acifluorfen was applied at 0.375 lb ai/A (1.5 pt pr/A) with 1% v/v crop oil concentrate. Application timings included 30, 45, 60, 75, 90, 120, 30 + 90 days after planting (DAP). In Florida, acifluorfen was applied 0.5 lb ai/A (1 qt pr/A) with 0.25 % v/v nonionic surfactant. Application timings coincided with 14, 28, 42, 56, 70, and 84 days after cracking (DAC). The Florida and Georgia location also included two varieties. Both acifluorfen at 0.25 lb ai/A (1 pt pr/A) and acifluorfen + bentazon (Storm) at 0.75 lb ai/A (1.5 pt pr/A) were evaluated in North Carolina. Both herbicides were applied with 0.25 % v/v nonionic surfactant. Application timings were 21 DAP, 35 DAP, 56 DAP, 70 DAP, and 84 DAP. Standard preplant incorporated and preemergence herbicides combined with hand weeding were used at each location to maintain weed-free conditions. Traditional small-plot techniques were used to apply herbicides and harvest trials. In several instances, initial visual peanut injury of greater than 10% was observed with applications of acifluorfen and acifluorfen + bentazon at each of the locations. However, this injury was transient and was not observed several weeks after application. No yield reductions were observed with any of the treatments applied in Texas. There were no yield effects from herbicide or variety at the Florida location or one of the Georgia locations. However, at the other Georgia location combined over herbicide timings 'C-99R' yielded higher than 'Georgia Green'. Acifluorfen applied at either 75 or 90 DAP yielded less than the weed-free check when combined over varieties. There was no yield affect from either acifluorfen or acifluorfen + bentazon at one of the North Carolina locations. At the second North Carolina location, the only treatments that yielded less than 3750 lb/A was acifluorfen applied at 21 or 84 DAP and acifluorfen + bentazon applied at 21, 70, and 84 DAP. At six of eight locations, acifluorfen did not affect yields, and at seven locations applications made at or prior to 60 DAP planting did not affect yields. Producers should be aware, however, that the label requires that acifluorfen be applied 75 days prior to harvest. Therefore, late applications may not affect yield, but could delay harvest due to the preharvest interval.

Response of Full and Reduced Rates of Imazapic and Diclosulam for Yellow Nutsedge Control When Peanuts are Grown in a Conventional vs Twin Row Configuration. B. A. BESLER*, W. J. GRICHAR, AND K. D. BREWER. Texas Agricultural Experiment Station, Yoakum, TX 77995.

Growers in south Texas have expressed interest in planting peanuts in a twin row configuration to possibly increase yield. Also, due to the quicker canopy closer of a twin row system, reduced rates of herbicides could possibly be used to control or suppress various troublesome weeds. With this concept in mind, a field study was conducted at the Texas Agricultural Experiment Station near Yoakum to evaluate the response of reduced and full rates of imazapic and diclosulam when applied to twin row and conventional planting configurations for weed control and yield. The test design was set up as a split-plot design with subplots consisting of 2 rows by 25 ft long the variety, Georgia Green, was planted in a conventional (36 in apart - 6 seed/ft) and twin row (7 in apart on 36 in bed – 3 seed/ft) configuration. Imazapic was applied POST at 0.73 oz/A (1/2x rate) and 1.44 oz/A (1x rate). Diclosulam was applied PRE at 0.23 oz/A (1/2x rate) and 0.44 oz/A (1x rate). Yellow nutsedge was the predominant weed in this study and ratings were taken throughout the growing season to determine percent control where 0 = no control and 100 = complete control. Mid to late season yellow nutsedge suppression was significantly better for the twin row configuration compared to the conventional row spacing for both herbicides and rates. Averaged across all treatments, yellow nutsedge control was significantly better in the twin row spacing (87%) compared to conventional row spacing (70%). Averaged across both row spacings, the full rate of imazapic provided significantly better yellow nutsedge control than all other herbicide treatments. A significant yield increase resulted when Georgia Green was planted in a twin row configuration compared to the conventional row spacing. All herbicides treatments, averaged across both row spacings, provided significantly higher yields compared to the untreated check.

Diclosulam Persistence in Soil and Its Effect on Peanut Rotational Crops. C.A. GERNGROSS* and W.J. GRICHAR. Texas Agricultural Experiment Station, PO Box 755, Yoakum, TX 77995; and S.A. SENSEMAN, Texas Agricultural Experiment Station, College Station, TX 77843-2474.

Diclosulam is used to control broadleaf weeds in peanut (*Arachis hypogaea*) production, but has rotation restrictions of 10 months for cotton and 18 months for corn and sorghum. Therefore, field studies were conducted at the Texas Agricultural Experiment Station in Yoakum and at a cooperator's field near De Leon, TX to evaluate the persistence of diclosulam and its potential injury to peanut rotational crops. The peanut variety, 'GK-7' was planted in 2000. Rotational crops planted in 2001 included conventional corn, imidazolinone resistant corn, grain sorghum and cotton. The diclosulam preemergence (PRE) treatments in 2000 simulated rotation carryover and consisted of 18 g a.i./ha, 27 g/ha, 53 g/ha and 81 g/ha. These rates represent

2/3X, 1X, 2X and 3X of the labeled rates, respectively. In 2001, five PRE treatments consisting of 13 g a.i./ha, 7 g/ha, 3 g/ha, 1.5 g/ha and 0.8 g/ha were applied to the rotational crops. Data taken from the rotational crops in 2001 included stand counts, height measurements, fresh biomass weights and dry weights. Soil samples were also taken at 0, 1, 2, 3, 6 and 12 months after the 2000 PRE treatments. The plots sprayed in 2000 were quantified in 2001 by two methods. First, rotational crop data were compared to a standard crop response curve created from the crop response to the known applications made in 2001. Second, the collected soil samples were extracted and analyzed by GC-MS to determine the amount of diclosulam remaining in the soil and to predict a degradation rate of diclosulam in different environments. No adverse effect from diclosulam was detected in imidazolinone resistant corn. Furthermore, no differences existed in the fresh and dry weights of all crops. Sorghum heights were significantly reduced at the 3X rate in Yoakum, but plant height remained constant at De Leon. Cotton heights were also affected at the 2X rate in De Leon, but the results were not consistent with treatments. Thus, it can be concluded for the given year and conditions, diclosulam did not cause injury to these specific rotational crops.

Influence of Preplant Applications of 2,4-D, Dicamba, Tribenuron and Tribenuron Plus Thifensulfuron on Peanut (*Arachis hypogaea*) Yield. T.L. GREY*, E.P. PROSTKO, and E.F. EASTIN, Department of Crop and Soil Science, University of Georgia, Tifton, GA 31793; W.C. JOHNSON, III. USDA-ARS Tifton GA; D.L. JORDAN, Department of Crop Science, N.C. State University, Raleigh, NC 27695; W.J. GRICHER, B.A. BESLER, and K.D. BREWER, Texas Agriculture Experiment Station, Yoakum, TX 77995.

Field trials were conducted in 2000 and 2001 in Georgia, Texas, and North Carolina to evaluate the effect of preplant applications of 2,4-D, dicamba, tribenuron, and tribenuron plus thifensulfuron on peanut yield. All herbicides were applied at 30, 15, 7, or 0 days before planting (DBP). Peanut yields were not influenced by 2,4-D amine or ester formulation when applied at any timing. These results greatly improve the interpretation of the current product label which indicates that rotational crops can only be planted 3 months after application or until the product dissipates from soil. Dicamba reduced peanut yield when applied at 0 DBP in 2 of 7 trials. Tribenuron had no influence on yield regardless of application timing. However, tribenuron plus thifensulfuron reduced yields when applied at 7 DBP in 1 of 5 trials. 2,4-D, dicamba, tribenuron, and tribenuron plus thifensulfuron can be safely used for preplant weed control in peanut when applied 7 to 15 days before planting depending on the herbicide.

Cotton Response to Cadre and Pursuit Residues Following Peanut. W. J. GRICHAR^{*1},
T. A. BAUGHMAN², C. W. BEDNARZ³, B. A. BESLER¹, K. D. BREWER¹,
A. S. CULPEPPER³, P. A. DOTRAY⁴, T. L. GREY³, R. G. LEMON⁵, E. P.
PROSTKO³, and S. A. SENSEMAN⁶. ¹Texas Agricultural Expt. Stat., Yoakum,
TX 77995; ²Texas Cooperative Extension, Vernon, TX 76385; ³University of
Georgia, Tifton, GA 31793; ⁴Texas Agricultural Expt. Stat., Lubbock, TX
79409; ⁵Texas Cooperative Extension, College Station, TX 77843; and Texas
Agricultural Expt. Station, College Station, TX 77843.

Field studies were conducted during the 2001 growing season to determine the response of cotton (*Gossypium hirsutum*) when exposed to simulated residue levels of the ALS inhibitors, Cadre and Pursuit. Both Cadre and Pursuit currently have an eighteen-month plant back restriction for cotton. Therefore, it becomes important to determine the level of Cadre and Pursuit residues in the soil that have the greatest potential to cause cotton injury. Cadre at 0.032, 0.016, 0.008, 0.004, 0.002, and 0.001 lb ai/A was applied PRE at Tifton and Plains, GA while Cadre and Pursuit were applied PPI at those same rates at Denver City, Munday, and Yoakum, TX. Two cotton varieties were planted at each location in Georgia while one variety was planted at each location in Texas. Cotton growth was evaluated during the growing season and lint and fiber quality were determined at the end of the growing season.

At Tifton, GA there was no variety interaction and significant cotton injury and yield loss was noted with all rates of Cadre and Pursuit except the 0.001 lb/A (1/64 X) rate. At Plains, GA there was no variety interaction and significant cotton injury and yield loss was noted with all rates of Cadre and Pursuit except the 0.001 lb/A and 0.002 lb ai/A (1/32 X) rate. At Denver City, TX, no reduction in cotton stand was observed 2 wk after planting; however, 24 wk after planting, cotton stand was reduced when rates were averaged across herbicides. Injury to cotton at 12 and 18 wk after planting was greater with Cadre than Pursuit. Lint yield was reduced in plots treated with the 0.008 lb ai/A (1/8 X) rate to 0.032 lb/A (1/2 X) rate when averaged across herbicides. At Munday, no reduction in cotton stand was observed. When averaged across herbicides, cotton injury was at least 50% with the 0.016 (1/4 X) and 0.032 lb/A rates. Lint yield was reduced following the 0.016 and 0.032 lb/A rates, when averaged across herbicides. At Yoakum, three weeks after planting, Cadre was more injurious than Pursuit at the 0.016 and 0.032 lb/A rates. Lint yield was reduced with the 0.016 and 0.032 lb/A rates when averaged across herbicides. These results suggest there is a significant risk of cotton injury from residues of Cadre and Pursuit. Cadre was at least as injurious as Pursuit at all locations and rates.

Plant Pathology and Nematology III

Rust Reactions among Selected Peanut Genotypes in Southwest Texas. M.C. BLACK*, A. M. SANCHEZ, M. R. BARING, and C. E. SIMPSON, Texas A&M University, Texas Cooperative Extension, Uvalde, TX 78802-1849 and Texas Agricultural Experiment Station, College Station, TX 77843-2474 and Stephenville, TX 76401-0292.

Peanut rust, caused by *Puccinia arachidis* Speg., occurs annually in southwest Texas and is an important factor in fungicide decisions. The fungus is not known to over-winter in the U.S. and wind-blown urediniospores apparently are introduced annually from the Caribbean, Mexico, and Central America. Several 1999 and 2001 replicated small plot tests at two locations per year had significantly different rust severity among entries and several peanut genotypes were common to many of these tests. Tests were located within two irrigated production fields of Georgia Green in 1999 and two fields of Tamrun 96 in 2001 where they occupied approximately 1% of the field areas. Up to five fungicide applications per season (tebuconazole, chlorothalonil, sulfur, copper) were applied by airplane to fields and plots to minimize yield losses from rust, early leaf spot, late leaf spot, and southern blight diseases caused by *Cercospora arachidicola* S. Hori, *Cercosporidium personatum* (Berk. & M. A. Curtis) Deighton, and *Sclerotium rolfsii* Sacc. Early and late leaf spots were at near zero severity due in part to fungicide use. Plots were two single-rows 4.3- or 4.6-m long with 0.91-m row spacing. There were three or four replications per test. Plots were evaluated late in the season with the ICRISAT 1-9 rust scale with 1 for no rust and 9 for maximum severity rust. The ranges of test-wide mean rust ratings were 4.4-6.1 in 1999 and 3.9-5.4 in 2001. Three genotype reaction categories were detected under these conditions of multiple fungicide applications. Most resistant genotypes included COAN, Southern Runner, NemaTAM, TP2964-4, and US 224. Genotypes with intermediate reactions included C-11-2-39, Flavor Runner 458, Florunner, Georgia Green, NC 7, Tamrun 96, Tamrun OL 01, TX977053, and ViruGard. Least resistant genotypes included AT-108 and Tamrun 88. Genetic variability for rust reaction exists among peanut genotypes in U.S. breeding programs. In areas at risk for rust disease, there is potential for reduced fungicide input on the most resistant genotypes.

Response of Moderately Resistant Peanut Breeding Lines and Cultivars to Chlorothalonil for Management of Early Leaf Spot. E. G. CANTONWINE¹*, A. K. CULBREATH¹, C. C. HOLBROOK², and D. W. GORBET³ ¹Dept. of Plant Pathology, The University of Georgia, and ²USDA-ARS, Coastal Plain Expt. Station, Tifton, GA 31793, and ³University of Florida, Marianna Ag. Res. Center, Marianna, FL.

Field tests were conducted in Tifton, in 2000 and 2001 to determine the response of advanced peanut (*Arachis hypogaea*) breeding lines to applications of chlorothalonil for control of early leaf spot caused by *Cercospora arachidicola*. A split-plot design

was used. Fungicide treatments were the whole plots and included: 1.) nontreated control 2.) application of chlorothalonil (1.26 kg ai/ha) at 28-day intervals, 3.) 21-day intervals, and 4.) 14-day intervals. Total fungicide applications were 0, 4, 5, and 7 for treatments 1 – 4, respectively. Sub-plots consisted of 5 genotypes, including advanced USDA-ARS breeding lines C-11-2-39 and C28-305, moderately resistant cultivars C-99R and MDR-98, and the standard leaf spot susceptible cultivar Georgia Green. Early leaf spot was the predominant foliar disease in both years. Final leaf spot intensity ratings (Florida 1-10 scale) were made immediately prior to digging. Within fungicide treatments, final leaf spot ratings were higher in Georgia Green than in all other entries. Across both years, average final leaf spot ratings for treatments 1-4, respectively, were 6.7, 5.5, 4.1, and 3.7 for C-11-2-39; 7.3, 5.6, 4.5, and 4.1 for C28-305; 7.5, 7.0, 4.8, and 4.2 for C-99R; 9.1, 8.2, 6.5, and 5.5 for Georgia Green, and 7.5, 6.4, 4.9, and 3.9 for MDR-98. Yields of Georgia Green were lower than any other entry in plots that received no fungicide or that were sprayed with chlorothalonil on a 28-schedule. Across both years, yields for treatments 1-4, respectively, were 3659, 4210, 4642 and 4303 lb/A for C-11-2-39; 3522, 3856, 4077, and 4082 lb/A for C28-305; 3497, 3846, 4210, and 4185 lb/A for C-99R; 2362, 2932, 3950, and 3650 lb/A for Georgia Green, and 3433, 3842, 4033 and 3905 lb/A for MDR-98. The number of fungicide applications required to manage early leaf spot potentially could be

Possible Resistance to Cylindrocladium Black Rot in AgraTech 201. B.L. CRESS-WELL* and R.C. KEMERAIT. University of Georgia Cooperative Extension Service, Blakely, GA 31723

Cylindrocladium Black Rot (CBR) is a pathogen that is not commonly found in Early County. This trial was intended to be a variety trial between AgraTech 201, Georgia Green, and C-99R. However in 2001 cooler temperatures accompanied by rainfall and/or irrigation caused CBR to initially show itself. In some instances CBR was very prolific. This variety- trial –turned- CBR- resistance -trial was such an instance. CBR was first noticed in this field in 1995. However, when peanuts were planted here in 1998 no CBR was seen. In 2001 over 40% of this 110 acre field was positively identified as being infected with CBR including the variety trial. This trial was randomized using four replications of the three varieties. As August progressed, it appeared that there was a definite visual difference in the number of dead plants due to CBR in one variety and a much larger number dead in another variety. Visually this could be seen to the row of each variety in each replication. A disease rating was taken one day after digging from one hundred feet of row. Across the four replications, AgraTech 201 averaged 29 hits of CBR per 100 feet (B) (hit=1 foot of row) and 2.4 hits of white mold (*Sclerotium rolfsii*) per 100 feet (A), Georgia Green averaged 40.2 hits of CBR per 100 feet (B) with no white mold, and C-99R averaged 71 hits per 100 feet (A) and .5 hits of white mold per 100 feet (B). As expected, the yields followed this trend: AgraTech 201 yielded 5,268 pound per acre (A), Georgia Green yielded 4,452 pound per acre (AB), and C-99R, 3,662 pounds per acre (B). (Means followed by the same letter do not differ significantly as determined by Fisher's protected least significant

Evaluations of Genetic Resistance and Seeding Rate on Tomato Spotted Wilt Virus Epidemics in Louisiana. G.B. PADGETT* and W. REA. Northeast Research Station, Macon RidgeBranch, LSU AgCenter, Winnsboro, LA 71295.

To assess the impact of genetic resistance and seeding rate on tomato spotted wilt virus (TSWV), epidemics were monitored in seven peanut varieties ('AT 201', 'AT 1-1', 'C99R', 'Georgia Green', 'Virugard', 'Ga Hi-OL', 'Sunoleic') and in two seeding rates of 'Georgia Green' (3 and 6 seed per row foot). Tests were conducted in Morehouse parish, Tensas parish, and at the Northeast Research Station, Macon Ridge location. Varieties and seeding rates were planted in single blocks for both off-station trials, and arranged in a randomized complete block in the research station test. To monitor disease progress, plants were monitored for symptoms of TSWV at 7 to 14 day intervals beginning two weeks after planting. Symptomatic plants were flagged with a color unique to each rating period. Disease incidence was calculated based on plant densities recorded two to four weeks after planting. Agdia ImmunoStrips (TSWV and INSV) were used to serologically confirm the presence of TSWV in symptomatic plant tissue collected from the experiments. Based on whole plant samples and visual injury, thrips injury was light to moderate. In Morehouse parish, plant densities of 'Georgia Green' seeded at six and three seed per row foot were 4.5 and 2.7 plants per row foot, respectively. TSWV was detected at low levels (< 1%) six weeks after planting and did not exceed 4% for the remainder of the season. Even though incidence was low, there was a trend toward more diseased plants in peanut seeded at three seed per row foot. In the varieties evaluated in Tensas parish, TSWV final incidence ranged from 3.3% in 'C99R' to 9.8% in 'Sunoleic'. Yield was negatively correlated ($r=-0.81$) to TSWV incidence. At the Northeast Research Station, plants were monitored weekly beginning 12-Jun to 24-Aug (93 DAP) for TSWV symptoms. On 5-Jul, TSWV incidence ranged from 0.46% in 'C99R' to 1.81% in 'Georgia Green' (6 seed per row foot). Compared to 'Georgia Green' (6 seed per row foot), TSWV incidence on 24-Aug was less in 'AT 201', 'C99R', 'Ga HiOL', and 'Virugard'. Tomato spotted wilt virus incidence was lowest in 'C99R' (3.07%). Tomato spotted wilt virus incidence was not affected by seeding rate. Genetic resistance to TSWV appears to be an effective means for managing this disease, but seeding rate had minimal impact when disease incidence was low.

A Procedure For Reproducing Peanut Pod Breakdown by *Sclerotium rolfsii*. ¹H. A.

MELOUK*, ²C. SAUDE and ²K.E. JACKSON. ¹USDA-ARS, PSWCRL and

²Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

Peanut plants >Okrun=, a *Sclerotium rolfsii*-susceptible cultivar were each grown for 125 days in pots (18 cm dia) containing a non-pasturized mixture of sand, soil and shredded peat moss (2:1:1; v/v/v) in the greenhouse under favorable conditions for pod production. Individual, firm pods were lifted carefully from soil with the peg intact and washed with water. Pods were singly placed into a 7-cm long tube-like pouch made from 2.5 cm dia dialysis tubing with a molecular cut-off weight of 12,000. Pods were each inoculated with *S. rolfsii* by placing 2 sclerotia in contact with the distal end of the pod at the bottom of the pouch. Pouches were returned to the soil with the top rim of the pouch above the soil. The top of the pouches were closed with twist ties at about 1.5 cm above the basal end of the pods. Plants were watered for normal peanut growth. Pods were examined for infection starting at day 5 and continuing to day 15 post inoculation. Pods were evaluated for breakdown at 145 days after planting. Pod breakdown occurred in about 35% of inoculated pods. The dialysis-tubing pouches allowed normal movement of solutes around the pods in the soil environment. Also, most of the extracellular cell-wall degrading enzymes produced by *S. rolfsii* remained in the pouches around the pods that allowed acceleration of the pod breakdown process. This technique will be used to study factors influencing the interaction between peanut pods and *S. rolfsii* under controlled conditions.

Breeding, Biotechnology, and Genetics III

A Genetically Modified Plant: The Case of Peanut. H. DODO*, K. KONAN and O. VIQUEZ. Food Biotechnology Laboratory, Dept of Food & Animal Sciences, Alabama A&M University, Normal AL 35762.

Peanut (*Arachis hypogaea* L.) is a nutritious, inexpensive and popular food, rich in proteins, unsaturated fatty acids, carbohydrates, fibers, vitamins, and minerals. However, peanut is one of the most potent food allergens affecting over 1.6 million Americans. Peanut allergy is an IgE mediated immunological reaction with symptoms varying from mild, acute, severe to life threatening. Accidental ingestion of peanut is increasing because peanut is added to a lot of processed foods. There is no cure for peanut allergy. Therefore, novel molecular strategies are being developed in our laboratory to reduce and/or eliminate offending peanut allergens one gene at a time starting with Ara h 2, the major allergen most stable to thermal degradation. Initial research steps included the isolation and sequencing of the Ara h 2 gene, and the establishment of a tissue culture regeneration and transformation system. Somatic embryogenesis was induced from zygotic embryo explants of peanut Florunner and Georgia green varieties, and propagated. Embryogenic tissues were co-bombarded with a plasmid pDK2 which contains a 430 bp fragment of the Ara h 2 gene inserted between the CaMV 35S enhanced promoter and the Nos terminator, and a second plasmid pCB13 containing *hpt* selection marker. PCR, Southern, and Northern analyses confirmed the stable integration of the Ara h 2 transgene and its transcripts in the transgenic plant lines.

Cloning of Allergenic Protein Genes from *Arachis hypogaea*. G.H. FLEMING^{1*}, M. GALLO-MEAGHER², and P. OZIAS-AKINS¹. ¹Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793-0748; ²Department of Agronomy, University of Florida, Gainesville, FL 32611-0300.

The number of children in the United States affected by allergies to peanut has doubled in the last ten years. Allergic reactions to peanut range from severe to life-threatening, but they tend to persist throughout the lifetime of the allergic individual (Hoffman and Haddad, *Allergy Clin Immunol* 54:165 (1974)). Because the avoidance of peanut in food products is becoming increasingly difficult, we are pursuing a line of research aimed at altering the expression of peanut seed proteins to which a majority of people are allergic. Expressed sequences of *Ara h1* and *Ara h2* cloned as cDNAs have been used for Southern analyses of their copy number in cultivated peanut and related species. For the *Ara h2* gene, there are two copies of the gene in the tetraploid species *A. hypogaea* and *A. monticola*, which comigrate with the single copies found in the diploid species *A. ipaensis* and *A. duranensis*.

The primary screening of a genomic library of *A. hypogaea* (provided to us by Dr. Albert Abbott, Clemson University) with *Ara h1*- and *Ara h2*- specific probes identified 18 genomic clones for each gene. Of these, four of the *Ara h2* clones have been purified. Initial characterization of the *Ara h2* isolates revealed two sizes of PCR amplified sequences, differing in size by about 50 base pairs. Using PCR amplification of genomic DNA from leaf tissue of *A. hypogaea* (Florunner and Georgia Green), *A. monticola*, *A. ipaensis*, and *A. duranensis*, we determined that the larger of the two alleles migrated with the allele amplified from *A. ipaensis*. The smaller PCR product migrated with a band amplified from *A. duranensis*. Both size alleles were amplified from the other tissue sources.

Characterization of Three Major Peanut Allergen Genes. I-H. KANG, M. GALLO-MEAGHER*, Agronomy Department, The University of Florida, Gainesville, FL 32611-0300; and P. OZIAS-AKINS, Department of Horticulture, The University of Georgia, Tifton, GA 31793-0748.

We have examined the expression patterns of three major peanut allergen genes, *arah1*, *arah2*, and *arah3*. The proteins encoded by these genes belong to the vicilin, conglutin and glycinin families of seed storage proteins, respectively. Total RNA was isolated from four seed developmental stages (1-4) of 12 different peanut genotypes. Northern blot analysis revealed that transcripts of all genes are evident at the earliest stage (1) of seed development. However, *arah1* transcripts continue to accumulate throughout development with a maximum level observed at the most mature stage (4), while *arah2* and *arah3* transcript levels appear to peak earlier in seed development. Expression patterns were similar for most genotypes, however there were exceptions that will be discussed. No transcripts of *arah1* or *arah2* could be detected in total RNA isolated from flowers, leaves or roots. However, a low level of *arah3* transcript could be observed in flower and leaf tissues. Southern blot analysis revealed a low gene copy number for *arah1* and *arah2*, and multiple gene copies of *arah3* present in the peanut genome.

Knocking Down the Major Peanut Allergen Ara h 2 in Transgenic Peanut Plants. KN KONAN*, OM VIQUEZ, and HW DODO. Department of Food and Animal Sciences, Food Biotechnology Laboratory, Alabama A&M University, Normal AL, 35762

Ara h 2 is reported to be one of the most prevalent allergens in peanut, recognized by the IgE of more than 90% of peanut allergic individuals. Genomic DNA of this allergen was for the first time isolated and characterized in our laboratory. To overcome peanut allergy risks, genetic manipulation of peanut is essential to render this nutritive crop safer for consumption. The objective of this investigation is to apply the transgene-induced gene silencing technology to peanut, in order to knock down the expression of *Ara h 2* in transgenic peanut plants. An *Xba*I/*Sac*I fragment of 430

base pairs was PCR amplified from Ara h 2 genomic DNA, and inserted in sense orientation into a pUC-base transformation vector, between an enhanced 35S promoter and the Nos terminator. This construct, named pDK2, was used in co-transformation with pCB13, a plasmid containing the hygromycin selection marker. Transformation was performed with the biolistic device, on embryogenic tissues of peanut varieties Georgia Green and Florunner. About 40 different transgenic plant lines were recovered, and transferred to the greenhouse. Polymerase chain reactions targeting the enhanced 35S promoter, confirmed the presence of the transgene in 85% of transgenic plant lines. Southern hybridization confirmed the stable integration of the transgene into the peanut genome, and northern analyses revealed the presence of Ara h 2 transgene transcripts in transgenic plant lines. Northern experiments performed on leaves, stems, petioles and seeds from control non transgenic peanut plants revealed that, Ara h 2 gene is expressed only in peanut seeds, and not in vegetative tissues. Elisa and western blots performed on transgenic seeds will confirm the knock down of Ara h 2.

Genomic Characterization of The Third Major Peanut Allergen Gene, Ara h 3/ 4.

O. M. VIQUEZ*, K.N. KONAN and H.W. DODO, Food Biotechnology Laboratory, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762

Peanut is a legume and an important protein-rich oilseed crop widely used in the food and confectionery industries. However, peanut has been listed as a top offender in triggering allergic reactions with symptoms varying from mild to very severe leading to death. Up to 7 peanut seed storage proteins have been identified as allergens. Ara h 3/ 4, a member of the glycinin family is one of the major allergens. Therefore, genomic characterization and sequencing of peanut allergen genes will provide critical information about the nature and regulation of this gene. The objectives of this study were to isolate, sequence, and characterize at the genomic level the structure and regulatory regions of peanut Ara h 3/ 4 genes. A peanut genomic library was screened using two ³²P labeled oligonucleotides designed based on Ara h 3 and Ara h 4 cDNA sequences. Four putative positive Lambda Fix II clones were obtained after four rounds of screening. After digestion with *Sac* I, two fragments of 1.5 and 10 kb hybridized to the probes. Both fragments were subcloned into pBluescript II SK(+-) phagemid vector and sequenced. The isolated genomic Ara h 3/ 4 gene is a full-length clone of about 3.5kb. The full ORF has 4 exons, interrupted by 3 introns. The 5' upstream promoter region was also characterized and in the 3' downstream region a stop codon and a polyadenylation signal AATAAA are present.

Weed Science II

The Influence of Classic on Tomato Spotted Wilt Virus of Peanut. E. P. PROSTKO*, R. C. KEMERAIT, W. C. JOHNSON, III, B. J. BRECKE, and S. N. BROWN. Departments of Crop & Soil Science and Plant Pathology, University of Georgia, Tifton, GA 31794; USDA/ARS, Tifton, GA 31794; University of Florida, Milton, FL 32583; and University of Georgia Cooperative Extension Service, Moultrie, GA 31768.

Classic (chlorimuron) is registered for use on peanuts in Alabama, Florida, Georgia, North Carolina, South Carolina, and Virginia. It can be applied from 60 days after emergence (DAE) until 45 days before harvest. In Georgia, Classic is used on approximately 25% of the peanut acreage for the late-season control of Florida beggarweed (*Desmodium tortuosum*). Over the past several years, observations from producer fields suggest that Classic might have an influence on the severity of tomato spotted wilt virus (TSWV). Consequently, the objective of this research was to evaluate the effects of Classic on the development of TSWV. Small plot research was conducted in 2000 and 2001 at 4 locations in Georgia and 1 location in Florida. Classic 25DG was applied at 0.5 oz/A (0.008 lb ai/A) at various intervals ranging from 21 to 90 DAE. The peanut varieties 'Georgia Green' and 'C-99R' were used at all locations. The plot areas were maintained weed-free and TSWV ratings were made just prior to inverting. Yield data was obtained using commercial harvesting equipment. No herbicide treatment by variety interaction was observed at any location. At Tifton, GA in 2000, Classic applied at 46, 63, and 80 DAE caused a significant increase in TSWV and decrease in peanut yield. At Ty-Ty, GA in 2001, only Classic applied at 77 DAE caused a significant increase in TSWV. However, yields were significantly reduced when Classic was applied at 26, 33, and 48 DAE. At Attapulgus, GA in 2001, TSWV was increased when Classic was applied at 45 and 90 DAE. Yields at this location were not reduced by any application of Classic. At Sale City, GA in 2001, TSWV was increased when Classic was applied at 58 and 72 DAE. Peanut yields at this location were not collected. At Jay, FL in 2001, TSWV ratings were not obtained but peanut yields were significantly reduced when Classic was applied at 45 and 75 DAE. Other herbicides evaluated, including Cadre (imazapic), Basagran (bentazon), Gramoxone Max (paraquat), Spartan (sulfentrazone), Strongarm (diclosulam), Valor (flumioxazin), and Ultra Blazer (acifluorfen) did not influence TSWV.

Phytotoxicity of Delayed Applications of Flumioxazin on Peanut. W. C. JOHNSON, III* and E. P. PROSTKO. USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.

Weed free trials were conducted in 2001 and 2002 at Attapulgus, GA to investigate the phytotoxicity of flumioxazin intentionally applied too late on >C99R > peanut. The experimental design was a split with four replications. Main plots were times of flumioxazin application; 0, 2, 4, 6, 8, and 10 days after planting (DAP). Sub-plots were flumioxazin rates; nontreated, 0.071, and 0.105 kg ai/ha. Soil at the Attapulgus site was

a Lucy loamy sand; 88% sand, 8% silt, 4% clay, and 0.4% organic matter. In addition, peanut were seeded shallow, 3.2 cm deep, creating worse-case conditions for phytotoxicity. Immediately after seeding, peanut were irrigated. Data collected were visual estimations of peanut injury (three ratings), canopy width (three measurements), final stand, and yield. Peanut seed were sprouting at 6 DAP, causing the soil surface to crack. Peanut seedlings were beginning to emerge and epicotyl visible at 8 DAP. Peanut were fully emerged with considerable foliage present 10 DAP. Flumioxazin applied to peanut 6, 8, and 10 DAP significantly injured peanut and reduced canopy width. Phytotoxicity was greater with flumioxazin at 0.105 kg/ha compared to 0.071 kg/ha. However, stand was not reduced by any of the applications or rates. Peanut growth recovered by mid-season. Peanut yields were not affected by either flumioxazin times of application or rate. These preliminary results show that the optimum time of application is from immediately after planting to three days after planting, but within that range the earlier applications are suggested. The highest recommended flumioxazin rate, 0.105 kg/ha, is not overly phytotoxic when applied within the recommended range of timings.

Weed Populations and Herbicide Recommendations in Selected Peanut Fields in North Carolina. G. G. WILKERSON, D.L. JORDAN*, and D. KRUEGER. North Carolina State University, Raleigh, NC 27695.

One of the perceived limitations to incorporating HADSS (Herbicide Application Decision Support System) into routine weed management decisions is ability to economically scout fields. A total of 52 peanut (*Arachis hypogaea*) fields were scouted from 1997 through 2001 in the peanut belt of North Carolina to investigate the value of scouting and to compare the currently recommended scouting strategy to alternatives requiring less time and effort. Weed species and density were recorded for each acre of the field. HADSS was used to determine the expected return for each treatment on each acre, and the treatment with the highest net return across all acres was considered to be the optimal "whole-field" treatment. For 17 fields that were 12 or more acres in size, a "3-stop" or "6-stop" approach was used to see if the recommendation based on fewer stops would be similar to the recommendation generated from the greater number of stops used in the whole-field approach. The 3-stop approach represented one pass through the middle of the field (front, middle, and back of field). The 6-stop approach represented two passes through the field with 3 stops made on the initial pass with an additional 3 included while returning to the initial starting point. Both methods are common among practitioners. Expected net returns were compared under various weed size options, moisture conditions, and pricing structures. Yellow nutsedge (*Cyperus esculentus*), entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula*), common cocklebur (*Xanthium strumarium*), broadleaf singalgrass (*Brachiaria platyphylla*), horsenettle (*Solanum carolinense*), and common ragweed (*Ambrosia artemisifolia*) were present in 39, 39, 27, 13, 13, and 12% of the acreage, respectively. Using the whole field approach to scouting, which included sampling each acre, theoretical net return was \$5 per acre greater than using the 3-stop approach and \$1 per acre greater than using the 6-stop approach, when pooled over all conditions and 17 fields. The optimal whole-field treatment was the recommendation in 48% and 73% of fields using the 3-stop and 6-stop approaches,

respectively. Site-specific management (treating each acre with the most economical treatment recommended by HADSS for that acre) increased net returns from 0 to \$10 per acre in approximately 68% of fields. In some fields site-specific weed management increased net returns substantially more than \$10 per acre.

Peanut and Rotational Crop Response to Diclosulam. J.R. KARNEI*, P.A. DOTRAY, J.W. KEELING, and T.A. BAUGHMAN. Texas Tech University and Texas Agricultural Experiment Station, Lubbock, and Texas Cooperative Extension Service, Vernon.

Field studies were conducted in West Texas in 2000 and 2001 to evaluate diclosulam applied preplant incorporated (PPI) and preemergence (PRE) to peanut (*Arachis hypogaea*). Also, rotational crop response to diclosulam and imazapic applied alone or in sequential combination was evaluated in 2000 and 2001 from applications made to peanut in 1999 and 2000. All plots received a PPI treatment of ethalfluralin at 0.75 lb ai/A for Palmer amaranth (*Amaranthus palmeri*) control. Peanut tolerance trials were conducted at the Agricultural Complex for Advanced Research and Extension Systems (AG-CARES) near Lamesa in 2000 and 2001 and near Seminole in 2001. Diclosulam was applied PPI and PRE at 0.016 (2/3X), 0.024 (1X), and 0.048 (2X) lb ai/A. Other treatments included imazapic at 0.063 lb ai/A postemergence (POST) and flumioxazin at 0.094 lb ai/A (PRE). All plots were kept weed-free throughout the season. Soil pH ranged from 8.0 to 8.2 and organic matter was less than 0.5% at all locations. At 14 days after planting (DAP), diclosulam at the 1X rate delayed peanut emergence 28 to 30% (PPI) and 17 to 27% (PRE) in both years. Diclosulam at the 2X rate delayed emergence 40 to 50% regardless of application method. Injury from diclosulam treatments was observed throughout the growing season. Diclosulam at the 1X rate applied PPI or PRE injured peanut less than 8% late-season. In 2000 and 2001, plots treated with diclosulam at a 2X rate PPI produced the lowest yields. Plots treated with diclosulam at a 1X rate PPI yielded less than plots treated with diclosulam at the 1X rate PRE in both years. Peanut grade was not affected by any treatment when compared to the non-treated check. At the Seminole location, injury was less severe than that observed at the Lamesa location early-season, and less than 10% injury was observed late-season. No differences were observed in yield or grade at Seminole. Rotational crop response experiments were initiated at AG-CARES and at the Texas Agricultural Experiment Station (TAES) near Lubbock in 1999 and 2000 and were evaluated in 2000 and 2001. Diclosulam was applied at 0.024 and 0.048 lb ai/A PRE, and imazapic was applied at 0.063 and 0.125 lb ai/A POST. Sequential combinations of diclosulam at 0.024 lb/A followed by (fb) imazapic at 0.032 or 0.063 lb/A and diclosulam at 0.048 lb/A fb imazapic at 0.063 lb/A were also evaluated. Diclosulam applied at the 1X rate alone caused less than 15% injury to corn, cotton, or grain sorghum at either location. No reduction in yield was observed for corn or cotton at either location. A reduction in sorghum yield was only observed in one year at Lubbock; however, it did not correlate to injury observed. Diclosulam at the 2X rate alone caused greater injury than 1X diclosulam alone at both locations. Corn and sorghum injury as high as 40% was observed at Lubbock; however, no reduction in yield was observed with any crop. Injury increased as rate increased when diclosulam

and imazapic were used in a sequential combination. Greater rotational crop injury was observed following a dry fall and winter (2000) than following a wet fall and winter (2001). Injury increased as rate increased for diclosulam and imazapic applied alone when injury was observed.

Texas Peanut Varietal Tolerance to Diclosulam and Flumioxazin. T. A. MURPHREE*, P.A. DOTRAY, J.W. KEELING, B.L. PORTER, T.A. BAUGHMAN, W.J. GRICHAR, and R.G. LEMON. Texas Tech University and Texas Agricultural Experiment Station, Lubbock; Texas Cooperative Extension Service, Vernon, Yoakum, and College Station.

Field studies were conducted near Denver City, Texas in 2001 to observe varietal tolerance to diclosulam (Strongarm) and flumioxazin (Valor) in Texas peanut. In addition, diclosulam application timing was also evaluated. Four high oleic peanut lines (Flavor Runner 458, Sunoleic 97R, TX 977006, Georgia Hi O/L) and a conventional variety (Tamrun 96) were used in this study. Diclosulam is a new triazolopyrimidine sulfonanilide herbicide for use in peanut and soybean. It has been reported to have broad-spectrum broadleaf weed control when applied preemergence (PRE), but some peanut injury has been observed. Flumioxazin is an *N*-phenylphthalimide herbicide that acts as a protoporphyrinogen oxidase inhibitor. In 1999 and 2000, early-season diclosulam injury was observed on the Texas Southern High Plains at 0.024 and 0.048 lb ai/A PRE, but was not apparent at the end of the season. Therefore, the objective of this study was to evaluate peanut varietal tolerance to diclosulam and flumioxazin and to also observe diclosulam timing. Diclosulam at two rates, 0.016 and 0.024 lb ai/A, was applied both PRE and postemergence (POST), while flumioxazin was applied PRE at 0.063 and 0.094 lb ai/A. Percent injury from PRE treatments were observed 14, 42, and 118 days after treatment (DAT) while POST treatments were evaluated 14, 58 and 90 DAT. Peanut grades and yields were determined at the end of the season. At 14 DAT, diclosulam at 0.016 and 0.024 lb ai/A PRE injured peanut 10 to 40% in all varieties, except Tamrun 96. At 42 DAT, diclosulam injury in the Flavor Runner 458 and the Sunoleic 97R varieties was 20 to 25%, while injury to the Georgia Hi O/L variety from diclosulam at 0.024 lb ai/A PRE was 35 to 45%. At 118 DAT, injury decreased to < 5% in all varieties and yield was not affected by diclosulam PRE. Less than 5% peanut injury was observed in all varieties from flumioxazin applied PRE at 14 DAT. No injury was observed at 42 and 118 DAT. Yield was not affected by any flumioxazin treatment. At 14 DAT, diclosulam POST at both rates injured peanut < 5% in all varieties and no injury was observed 90 DAT. Yield was not affected by POST applications of diclosulam. The same study was conducted near Yoakum and in Motley County, Texas. No peanut response was observed following any treatment of diclosulam and flumioxazin applied PRE at the Yoakum location. When flumioxazin was applied PRE at the Motley County location, no injury was observed in any variety, at any rate, throughout the growing season and yield was not reduced. These studies will be repeated in 2002 to evaluate diclosulam POST and to determine the factors that contribute to diclosulam and flumioxazin PRE injury.

Plant Pathology and Nematology IV

Factors Affecting the Maintenance of *Aspergillus flavus* Toxigenicity in Agricultural Fields. B.W. HORN* and J.W. DORNER. National Peanut Research Laboratory, USDA, ARS, Dawson, GA 31742.

Aspergillus flavus is notorious for its genetic instability when repeatedly transferred on culture media in the laboratory. Serial transfers often result in the loss of aflatoxin production and in associated morphological changes such as reduced sporulation, proliferation of aerial hyphae and an inability to produce sclerotia. In agricultural fields, however, individual genotypes are repeatedly dispersed to new substrates over time, yet show no evidence of the degeneration resulting from laboratory transfers. Freshly isolated strains from nature always exhibit wild-type morphological characters and in some regions of the United States, *A. flavus* populations are predominantly aflatoxigenic. Experiments were designed to test the hypothesis that wild-type characters of *A. flavus* populations in agricultural fields are maintained by competition with other microorganisms and by exposure to suboptimal growth conditions. Three aflatoxin-producing strains of *A. flavus* were serially transferred using conidia for 20 generations (three independent generation lines per strain) on potato dextrose agar at 30 C. The rate of degeneration was compared to that of cultures grown in the presence of competing fungi (*A. terreus*, *Penicillium funiculosum* and the yeast, *Pichia guilliermondii*) and under adverse conditions of elevated temperature, reduced water activity, low pH, and nutrient deprivation. The loss of aflatoxin production over generations varied considerably according to strain and the generation line within each strain. In the strain most sensitive to degeneration on potato dextrose agar, aflatoxin-producing ability was maintained to varying degrees under adverse culture conditions but not when *A. flavus* was competing with other fungi. Cultures following serial transfers produced a mixture of conidia comprising wild-type aflatoxin producers and morphological variants that were low or nonproducers of aflatoxins. Therefore, in populations from agricultural fields, adverse environmental conditions may select for wild-type individuals and remove variant individuals that are observed only in the laboratory.

The Occurrence of *Meloidogyne javanica* on Peanut in Florida. R.D. LIMA¹, M.L. MENDES², J.A. BRITO³, D.W. DICKSON², and Cetintas, R²*. ¹Depto. de Fitopatologia, Universidade Federal de Viçosa, 36571-000 Viçosa, MG, Brazil, ²Entomology and Nematology Dept., University of Florida, Gainesville, FL 32611-0620, USA, ³Division of Plant Industry, Gainesville, FL 32618-7100, USA.

Biochemical analysis of *Meloidogyne* spp. females extracted from roots of peanut collected in Alachua, Levy and Marion Counties, Florida was made by polyacrylamide gel electrophoresis. Enzyme phenotypes, e.g., esterase and malate dehydrogenase, were used in the diagnosis of the species. Of ten populations characterized eight showed a typical esterase pattern for *M. arenaria* phenotype A2, whereas two populations collected from Levy County showed typical esterase pattern for *M. javanica* J3 phenotype. This is the first occurrence of *M. javanica* on peanut in Florida.

The Influence of Environment and Host Growth on Epidemics of Southern Stem Rot in Peanut. S.L. RIDEOUT*(1), T.B. BRENNEMAN(1), A.K. CULBREATH(1), and K.L. STEVENSON(2). (1)Department of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA, 31793; (2)Department of Plant Pathology, University of Georgia, Athens, GA 30602.

Southern stem rot (*Sclerotium rolfsii* Sacc.) is one of the most devastating diseases of peanut (*Arachis hypogaea* L.) in Georgia. Stem rot management is accomplished mainly through fungicide applications based upon a calendar schedule. Though in many years this scheme is effective, in some growing seasons stem rot control is sporadic, especially when earlier or later than normal epidemics occur. To examine temporal development of stem rot epidemics, peanut plants were periodically and destructively sampled from set row lengths at four locations in each 1999, 2000, and 2001. Different irrigation schemes and soil types were represented in each year by the four locations. Frequency of infected plants, plants exhibiting pod infection, and plants showing visible signs or symptoms of the pathogen, *S. rolfsii* were assessed. Five different models were used to fit the disease progress data: linear, exponential, monomolecular, logistic, and Gompertz. For each year, growth curve model performance was similar across all four locations, but variability was noted across the three growing seasons. The monomolecular model provided the best fit for frequency of infected plants in 1999 ($0.66 < R^2 < 0.83$) and 2000 ($0.65 < R^2 < 0.72$). However, in 2001, the Gompertz model provided the best fit ($0.76 < R^2 < 0.82$). The Gompertz model best described the increase in pod infections over time in all three years ($0.75 < R^2 < 0.78$ in 1999, $0.62 < R^2 < 0.75$ in 2000, and $0.49 < R^2 < 0.58$ in 2001). In 1999 and 2000, the monomolecular model provided the best description of the increase in frequency of plants with signs or symptoms of *S. rolfsii* ($0.61 < R^2 < 0.81$ and $0.43 < R^2 < 0.66$, respectively). In 2001, the frequency of plants showing signs and symptoms of the pathogen was best fit by the Gompertz model ($0.63 < R^2 < 0.74$). Soil temperature (5 cm depth), canopy temperature and relative humidity, precipitation, and host growth were recorded for all 12 trials. Environmental conditions across the three growing seasons and locations were markedly different. Correlations between the environmental and host growth parameters were conducted to determine which factors promote southern stem rot epidemics.

Prevalence of Cylindrocladium Black Rot in Commercial Peanut Seedlots and the Impact of the Disease on Seed Quality. R.R. WALCOTT* and T. B. BRENNEMAN. Department of Plant Pathology, University of Georgia, Athens GA 30602; CPES Tifton, GA 31793.

To determine the prevalence of *Cylindrocladium parasiticum*-infested seedlots in commercial seed sources in the southeastern US, 145 lots from Georgia, Florida or Alabama were sampled before processing, and assayed for Cylindrocladium black rot (CBR). Seedlots were assayed by visual examination ($n=400$ seeds/lot) as well as by plating on semi-selective agar ($n=100$ seeds/lot) followed by incubation at 25C

in the dark for 7 - 10 days. Seeds displaying characteristic reddish-brown speckles (microsclerotia) were considered to be positive by visual examination and as well as those from which typical *C. parasiticum* mycelia grew on agar plates. Of the seed-lots, 24% contained at least one seed with apparent microsclerotia of *C. parasiticum*. Seedlot infestation levels ranged from 0.25 to 1% by visual estimation. However, attempts to recover the fungus from seed samples were unsuccessful. To investigate the impact of CBR on seed quality, peanuts were harvested from research field plots with CBR incidence ranging from 5.2 to 50.4% by visual estimation. Peanuts from each plot were shelled and assayed for *C. parasiticum* by visual assessment (n=400 seeds/lot) and by plating on semi-selective media (n=100 seeds). Seed samples (n=400 seeds) from each lot were used to estimate seed quality parameters including warm germination, cold germination and conductivity (electrolyte leakage). There was a positive relationship between field estimates of CBR incidence and incidence of symptomatic seed ($r^2 = 0.87$), but the data indicated very weak relationships between seed infestation and seed quality. Hence, while *C. parasiticum* was found in some commercial seed sources in the southeast, it was present only at very low levels and the pathogen was often not viable. The data also suggest that the disease has a minimal effect on peanut seed quality.

The Role of Cotton in Tomato Spotted Wilt Virus Epidemics of Peanut in Georgia.

M.L. WELLS*, A.K. CULBREATH, and J.W. TODD. University of Georgia,
Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Georgia's cotton acreage has risen from around 400,000 acres in 1991 to approximately 1.5 million acres in 2001. During this time, tomato spotted wilt virus (TSWV) has become the single-most important disease in peanut and currently drives peanut production practices in the state. Peanut losses to TSWV rose steadily with the increasing cotton acreage until the late 1990's when the TSWV Risk Assessment Index was successfully implemented. This led to the concern of many growers that cotton was a contributing factor to the TSWV epidemic in peanut since the two crops are grown side by side throughout much of south Georgia. As a result of this concern we examined the role of cotton in TSWV epidemics of peanut. Field plots were arranged in a RCB design at the UGA Rigdon research farm, Tift County, Georgia. All plots were 10 rows each. Four treatments were examined: (1) Untreated peanut; (2) Peanut treated with phorate (5 lbs./acre in-furrow); (3) Untreated peanut+2 row cotton strip on center bed of plot; (4) Treated peanut (as above)+2 row cotton strip on center bed of plot. Peanut variety was Sun Oleic 97R and cotton variety was DPL 33B. Early season thrips damage to peanut was not affected by the cotton border. Thrips movement from cotton to peanut was greater when squares were forming in cotton and 2 wks after 1st bloom in peanut. Tobacco thrips were found to be the dominant vector species in peanut, while western flower thrips predominated in cotton. The percentage of NSS-positive thrips were higher in peanut than in cotton; however, among cotton blooms the percentage of NSS-positive thrips was higher in

cotton bordering untreated peanut than in cotton bordering treated peanut. ELISA results suggested that only 1% of 200 cotton leaves tested were positive for TSWV. No cotton roots were found to be positive for TSWV. Final incidence of TSWV was higher in treated peanut bordering cotton than in all other treatments. Cotton may serve as an additional source of thrips vectors, potentially leading to a higher degree of secondary infection of TSWV to peanut.

Assessment of Doppler Radar-based AU-pnnt Leaf Spot Advisory for Use in Georgia. R. C. KEMERAIT*, G. HOOGENBOOM, R. G. McDANIEL, and W. A. MILLS, III. Departments of Plant Pathology, University of Georgia, Tifton, GA, 31794; Department of Biological and Agricultural Engineering, University of Georgia, Griffin, GA 30223; University of Georgia Cooperative Extension Service, Waynesboro, GA 30830; and Southwest Georgia Research and Education Center, Attapulgus, GA 31715.

Field trials were conducted to verify the effectiveness of the Doppler radar-based AU-pnnt advisory in Georgia and compare rainfall data from ten weather stations (Georgia Automated Environmental Monitoring Network) with Doppler radar estimates. Data was collected from 1 May until 31 Oct 01 and field trials were established at Tifton and Attapulgus with the cv. Georgia Green. A factorial design was used at both sites where main effects were spray schedule (14-d calendar vs. AU-pnnt) and fungicide program. Fungicide programs included 1) chlorothalonil, 1.5 pt/A, full season, 2) propiconazole, 2 fl oz/A, +chlorothalonil, 1 pt/A, sprays 1 and 2, azoxystrobin, 18.5 fl oz, sprays 3 and 5, and chlorothalonil, 1.5 pt/A, sprays 4, 6, and 7; and 3) chlorothalonil, 1.5 pt/A, sprays 1, 2, and 7, and tebuconazole, 7.2 fl oz/A, sprays 3-6. All fungicide applications at Tifton were initiated 35 days after planting (DAP) while the AU-pnnt and calendar treatments in Attapulgus were initiated 24 and 34 DAP, respectively. Data from all weather stations and the Doppler radar provided by the Agricultural Weather and Information Service, Inc., were in agreement 90.5% of the time as to whether or not a rain event (accumulation ≥ 0.10 in 24 h) had occurred. Doppler radar provided false positive results (rain event predicted but did not occur) 8.8% of the time and false negative results (failed to predict a rain event) 0.7% of the time. At Tifton, all plots received 7 fungicide applications; however, fungicide applications for AU-pnnt treatments were generally 3 or 4 days earlier than for the calendar schedule. There was no interaction between spray schedule and fungicide program. There were no differences in leaf spot control, severity of southern stem rot, or yield between the calendar-based and the AU-pnnt programs, nor were there differences in leaf spot control or yield across fungicide treatments. There was significantly more southern stem rot in plots that received only chlorothalonil. At Attapulgus, 8 fungicide applications were required for the AU-pnnt schedule versus 7 for the calendar program. There was a significant interaction between spray schedule and fungicide program. For fungicide programs that included azoxystrobin or tebuconazole, there were no differences in yield, leaf spot severity, or severity of soilborne disease (Rhizoctonia limb rot + southern stem rot) based upon spray schedule. Where chlorothalonil was

used alone, leaf spot control was better when fungicides were applied on the AU-pnun schedule rather than the calendar program. Control of soilborne disease and yields were significantly greater in plots that received azoxystrobin or tebuconazole. Use of a Doppler radar-based AU-pnun leaf spot advisory was an effective tool to manage diseases of peanut without loss of yield in this study. Doppler radar data is not precise at weather stations in determining rain events; however it appears to be accurate enough to use with AU-pnun.

Present and Future Decision Support System Tools for Peanut Disease and Crop Management. R.D. MAGAREY*, T.B. SUTTON, D. JORDAN and W.T. COOPER. Department of Plant Pathology and Crop Science, NCSU, Raleigh, NC; Agricultural Consultant, Suffolk, VA.

An effective decision support system (DSS) provides site-specific information in a format that is quick and easy to use. In recent years, we have been testing DSS products from an agricultural IT company called SkyBit. The SkyBit E-weather peanut disease product has forecasts for four diseases: early and late leaf spot, web blotch and *Sclerotinia* blight. Daily summaries of disease risk are based on weather conditions and the degree of separation of the peanut canopy. Disease risk is rated from 0 to 100 to enable calibration for individual fields and is also categorized as none, low, medium or high for easy interpretation. The product is delivered daily to subscribers by fax or e-mail. The disease forecasts are based on the estimated weather conditions at a 1-km² spatial resolution and include temperature, humidity and leaf wetness for the subscriber's site. Unlike many products in the past, the E-weather product does not require an on-site or local weather station. Instead the predictions are made from simulated weather data and one to seven day forecasts produced by complex meteorological models. One present weakness with some peanut disease forecast tools is that the estimated weather variables better represent a weather station environment than the crop canopy. Work is in progress to more effectively predict the peanut canopy microclimate. In the future, we envision that the next generation of DSS tools will become more complex and address all aspects of crop management including irrigation and precision fertilizer application. The tools will be delivered over the web, allowing farmers to interactively enter site-specific information. In addition to these site-specific products, map-based tools are also being developed for regional and national applications.

Processing and Utilization

Perceptions of Consumers and Culinary Professionals Concerning Peanuts and Peanut Products. M.B. DAUGHERTY, C.M. BEDNAR*, R. KANDALAF, and M. KWAN. Department of Nutrition and Food Sciences, Texas Woman's University, Denton, TX 76204-5888.

Qualitative research with selected groups of individuals can provide insight and direction for the development of new products and marketing strategies. The purpose of this project was to determine through focus group discussions the perceptions of consumers and chefs concerning peanuts and peanut products. Focus group procedures and questions were developed and pilot tested for each audience. Consumers were served a lunch of peanut items followed by a 25-30 minute discussion. Groups with chefs included discussion only. All focus groups were audiotaped and transcribed; transcripts were analyzed to determine frequency of key words and messages. Five consumer focus groups included 40 participants who were parents of school age children. Five focus groups with chefs included 52 individuals who were either chefs or student chefs. Questions for consumers focused on most frequently purchased peanut products, quality of peanuts, peanut butter, and peanut cookies, health effects of peanuts, and suggested new peanut products. Topics for chefs were similar but omitted quality of peanut cookies and instead included quality of peanut oil. Peanut butter, peanut cookies, peanuts, and peanut butter crackers were popular items with consumers. Consumers cited manufacturer brand as the most important purchasing influence for peanut butter and cost as a key influence for purchase of snack peanuts. A number of consumers stated that they did not buy peanut butter cookies, but preferred homemade. Consumers named flavor, additives, and freshness as attributes affecting perception of quality of peanut products. Oiliness, roasting process, and texture/crunchiness were perceived to have important effects on quality of peanut butter. Chefs stated that Asian foods, desserts, peanut sauce, and peanut butter soup were popular menu items with customers. Chefs mentioned freshness and packaging as influences on quality of peanuts; flavor and smoke point for peanut oil; and oiliness, texture, and flavor for peanut butter. Cost influenced purchase of peanut oil. Both consumers and chefs associated fat and protein with the health effects of peanuts. The majority of consumers perceived fat in peanuts to have a detrimental health effect (weight gain), while chefs were evenly divided on whether fat in peanuts had a positive or negative effect on health. New ingredients that chefs would like to see on the market included peanut flour, peanut paste, peanut extract, finely crushed peanuts, peanut liqueur, peanut flour crusting, sliced peanuts, and dark roasted peanut oil.

Study of the Relationship Between Stress Proteins and Peanut Allergenicity. S.Y. CHUNG*, and E.T. CHAMPAGNE. USDA-ARS, SRRC, New Orleans, LA 70124.

Stress proteins are proteins induced in plants in response to stresses caused by changes in temperature, water loss and/or lack of oxygen. Previously, two major stress proteins, which occur during peanut maturation and curing, were identified in this laboratory (J. Agric. Food Chem. 1998, 46, 4712-4716). The functions of these proteins are thought to protect cells from damage, confer tolerance, and maintain homeostasis. In the immune systems, stress proteins are known to serve as carriers of antigens or allergens which ultimately are delivered to the cells and cause allergic reactions. For this reason, it was postulated that the higher the level of stress proteins, the more allergenic the peanuts. To support this postulation, binding of immunoglobulin E (IgE) antibodies to different peanut samples (a measure of allergenicity) was determined, respectively, in immunoassays (e.g., ELISA) using polyclonal antibodies against a plant stress protein and a pooled serum containing IgE antibodies from patients allergic to peanuts. The samples included: (1) peanuts with and without stress proteins; (2) raw and roasted peanuts; and (3) peanuts treated with peroxidase, an enzyme that polymerizes proteins. Results showed that IgE binding was higher in peanuts with stress proteins than without stress proteins. Both roasting and enzyme treatment led to an increase of IgE binding that coincided with an increase of stress proteins. It was concluded that there is a potential relationship between levels of stress proteins and peanut allergenicity. The implication of this study is that stress proteins may be potential predictors of peanut allergenicity.

GC-MS Analysis of Volatile Flavor Compounds Arising from Twin-screw Extrusion Processing of Peanuts. M.J. HINDS*, Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, M.N. RIAZ, Food Protein R&D Center, Texas A&M University, College Station, TX 77843, D. MOE and D. SCOTT, OK Food & Agricultural Products Processing Center, Oklahoma State University, Stillwater, OK 74078.

Extrusion processing of peanuts produces texturized materials that have value-added potential. In previous studies, peanut flour has been extruded with other items (e.g., corn) but no information on the flavor of texturized peanut (TP) has been reported. The objective of this study was to evaluate the profile of volatile flavor compounds present in TP, and compare it with that of the flour and seeds from which the TP was prepared. Because in the US, splits are commonly used for oil manufacture, but the resulting presscake is underutilized for human consumption, runner splits were selected for this study. The splits were blanched, then defatted using a Komet Press vegetable oil expeller. The presscake obtained was ground (hammer mill, 60 mesh) to produce peanut flour (PF, 9.5% fat). The PF, conditioned with water, was processed in a Wenger TX52 Twin Screw Extruder at temperatures ranging from 40-120C among

the 7 zones, and 500 psi pressure in zone #7, forced through a venture die, then reduced to two smaller sizes by a commitrol. Volatile flavor compounds of RS, TP and PF were analyzed using a Tekmar Static Headspace Autosampler connected in series to an Agilent 6890 Gas Chromatograph – 5973 Mass Spectrometer, fitted with HP-5 (5% phenyl methyl siloxane) columns. Generally, processing operations decreased the levels of off-flavor compounds, and facilitated development of on-flavor compounds in TP. Size of TP did not affect flavor profile. Raw splits (RS) only contained 2 :g/g p-xylene and negligible ethyl benzene. Levels of acetone, 2-methyl propanal and 1-methyl pyrrole increased, respectively from RS (0, 0, 2 :g/g) to PF (6, <2, 12 :g/g) to TP (36, 3, 25 :g/g). Traces of 2-methyl butanal present in RS increased to 2 :g/g in PF, but were absent from TP. TP contained more (147 :g/g) acetaldehyde than RP (52 :g/g) and PF (42 :g/g). There were negligible quantities of benzaldehyde and hexanal in PF and TP, and of dimethyl sulfide in all samples. TP alone contained 2-butanone (0.7 :g/g), 3-methyl butanal (3 :g/g), 2,5-dimethyl pyrazine (2 :g/g), and traces of benzeneacetaldehyde and 3-ethyl-2,5-dimethyl pyrazine, and these are associated with sweet/roasted/nutty flavor notes. The texturized peanut contained very low levels of off-flavor compounds and low levels of compounds that contribute to the typical roasted peanut flavor. This indicates the potential for developing new value-added products from peanut presscake.

Comparison of RF Impedance and DC Conductance Measurements for Single Peanut

Kernel Moisture Determination. C.V.K. KANDALA* and C.L. BUTTS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Two methods for measuring the moisture content (wet basis) of individual kernels of peanut, *Arachis hypogaea* L., were compared with a standard oven method. One method was based on the capacitance, dissipation factor, and phase angle measurements of a parallel-plate capacitor with a single peanut held between the plates at two frequencies, 1.0 and 4.5 MHz. This method has been tested and published using measurements on jumbo- and medium-sized Florunner (cv) kernels harvested during the 1989 CY. The other method was a dc conductance measurement on a single peanut as it passed between two crushing-roller electrodes. This method is used in a commercial single kernel moisture meter for peanut. The capacitance measurement is a non-destructive test compared to the commercially available conductance meter. Peanuts, Georgia Green (cv.) grown during the 2001 CY were shelled and sized. Five samples, 3 of jumbo-sized kernels and two of medium-sized kernels were used for these studies. Each sample consisted of 30 kernels and were rehydrated after cold storage to moisture contents ranging from 5 to 15%, wet basis. Single kernel moisture contents determined using the capacitance and conductance methods agreed closely with the standard oven values. Measurement accuracy was not affected by kernel size.

Alterations in the Structure of Allergens Can Influence Their Function. S.J. MALEKI*
**and E.T. CHAMPAGNE. USDA-ARS, Southern Regional Research Center,
New Orleans, LA.**

It is now believed that 1% of (or approximately 3 million) children suffer from peanut or tree nut allergy. Also, it is known that the number one cause of emergency room visits, due to anaphylaxis, is food allergies. The overwhelming number of these anaphylactic reactions is due to accidental ingestion of peanut products. Therefore, a significant, growing, and costly portion of the FDA's food recalls have been due to mislabeled products that contain allergens. Meanwhile, little is known about the reason why certain foods are allergenic while others are considered hypoallergenic. Even less is known about what happens to the allergenicity of foods after being subjected to various processing events. In order to assess the consequences of processing on the allergenic properties of peanut proteins, the biophysical and immunological differences between whole roasted and raw peanut proteins and the purified major allergen Ara h 2 were determined. The primary sequence of Ara h 2 is highly homologous to trypsin inhibitors. We found that Ara h 2 functions as a trypsin inhibitor and most significantly, Ara h 2 purified from roasted peanuts was found to be several times more active as a trypsin inhibitor than the Ara h 2 purified from raw peanuts. In addition, Ara h 2 purified from roasted peanuts was less soluble, bound high level of IgE and was less digestible than raw Ara h 2. These findings suggest that the structural and functional changes that occur during food processing events such as roasting can contribute to increase in the allergenic properties of peanut proteins.

Effect of the High-Oleic Trait on Roasted Peanut Flavor in Backcross-Derived Breeding Lines. H.E. PATTEE*, T.G. ISLEIB, D.W. GORBET, K.M. MOORE, Y. LOPEZ, M.R. BARING and C.E. SIMPSON. USDA-ARS, and Crop Science Dept., North Carolina State Univ., Raleigh, NC 27695, North Florida Res. & Educ. Center, Marianna, FL 32446, AgraTech Seeds Inc., Ashburn, GA 31714, Soil and Crop Sciences Dept., Texas A&M Univ., College Station, TX 77843 and Texas Agric. Exp. Station, Stephenville, TX 76401

Previous research suggested that the high-oleic trait of peanut (*Arachis hypogaea* L.) might have a positive impact on roasted peanut sensory attribute. A series of lines derived by backcrossing the high-oleic trait into several existing cultivars or by mutating cultivars to the trait were compared with their parent cultivars at locations in Florida, Georgia, North Carolina, and Texas. Breeders in the different states grew their high-oleic lines and parents in 3-rep tests at one or two locations. Florida high-oleic line F435-2-1 was grown at each location. The test included normal- and high-oleic variants of F435, GK 7, NC 7, NC 9, Sunrunner, Tamrun 96, and Tamspan 90. SMK samples were roasted, ground into paste and submitted to a sensory panel at Raleigh, NC. Background genotype had an effect ($P<0.01$) on the heritable sensory attributes roasted peanut, sweet, and bitter. Oleate level had a positive effect on the intensity of roasted peanut, increasing it by 0.3 flavor intensity units (fiu) averaged across all 7

background genotypes. However, interaction between oleate level and background genotype was significant ($P<0.01$) for roasted peanut and bitter attributes, indicating that the magnitude of improvement varied across background genotypes. The trait had no effect or increased the intensity of roasted peanut attribute in each background genotype. The increase was greatest in Tamrun 96 (+0.6 fiu, $P<0.05$) and spanish genotypes Tamspan 90 (+0.4 fiu, $P<0.05$) and F435 (+0.4 fiu, $P<0.10$). A change of 0.5 fiu or more should be perceptible to consumers. The trait had a positive effect on the bitter attribute only in the background genotype of Tamspan 90 (+0.7 fiu, $P<0.01$). There was a nonsignificant positive change in bitterness in the other spanish background genotype, F435. Changes in bitterness in runner and virginia-type backgrounds were either close to zero or negative. Incorporation of the high-oleic trait into peanut cultivars is likely to improve the intensity of roasted peanut attribute, but it may also increase the bitter attribute in spanish genotypes.

Effect of Microwave Energy on Blanchability, Shelf-life and Roast Quality of Peanuts.

T.H. SANDERS* and K.W. HENDRIX, USDA, ARS, Box 7624, Raleigh, NC 27695-7624; T.D. RAUSCH and T.A. KATZ, Dept. of Food Science, NC State University, Box 7624, Raleigh, NC 27695-7624; and J.M. DROZD, Industrial Microwave Systems, Inc., 3000 Perimeter Park Dr., Bldg. I, Morrisville, NC 27560.

Novel microwave technology that creates a uniform distribution of microwave energy was utilized to examine the effect of microwave energy on blanchability and quality of peanuts. Preliminary studies indicated that the time for reduction of peanut moisture content by approximately 2 percentage points was less than 6 min utilizing microwave energy compared to 60 min for conventional blanching technology with heated air. Raw, runner-type peanuts were subjected to a total of 9 treatment combinations of 5, 7.5, or 10 kW of microwave power for 1.47, 2.85, 4.2 or 5.78 min duration. After treatment, samples were examined for total moisture content, single seed moisture distribution, and blanchability before being stored at 30 C for 28 wk. Peroxide value, oxidative stability index, hexanal, and pentanal were determined as measures of shelf-life of the treated samples. Samples with the highest moisture after blanching had the longest shelf life. From these data five treatment protocols were selected for use in additional blanching tests with subsequent roasting and storage of samples. Following the five microwave treatments, peanuts were blanched and roasted at 350 F in a gas-fired pilot scale roaster, then stored in sealed glass containers at 30 C for 12 wk. Blanching efficiency of 95% was achieved for the highest energy input while the lowest energy input resulted in 58% efficiency. Samples with the highest moisture content before roasting had the shortest shelf-life during storage. Sensory analysis indicated that roast peanutty intensity steadily declined from *ca.* 5.0 to 4.0 for all samples. The lipid degradation related off-note, painty, was stable at <0.75 for all samples until week 4, then increased more rapidly for the control and lower power treatments. These data suggest strong potential for advancements in peanut moisture removal technology using this novel microwave technology.

Poster I

Comparing Irrigation Levels for Conventional and Conservation Tillage Systems

K.S. BALKCOM*, D.L. ROWLAND, and M.C. LAMB. USDA-ARS, National Peanut Research Laboratory, P.O. Box 509 Dawson, GA 31742.

Tillage practices, that conserve moisture, may reduce irrigation frequency and/or amounts, which will benefit rural and urban residents as water issues become more prevalent across the U.S. Information is limited on how much water growers can conserve by utilizing conservation tillage systems. A study will be initiated this year to compare optimal amounts of water to maximize yields and profits of selected crops for conventional and conservation tillage systems. Three replications of conventional tillage, no tillage, and strip tillage plots will be randomly assigned under a three span lateral irrigation system in conjunction with a dryland control for a peanut (*Arachis hypogaea* L.), corn (*Zea mays* L.), cotton (*Gossypium hirsutum* L.) rotation on approximately 4 ha located near Dawson, GA. Planned measurements include yield and quality data for each crop, soil moisture and temperature measurements across the site, and intensive water use measurements in peanut. This experimental design will help quantify how much water a grower can conserve by utilizing conservation tillage practices compared to conventional tillage practices. Possible increased water savings from conservation tillage systems should provide incentives to growers to utilize these tillage practices, which may lower production costs associated with irrigation.

Characterization of Phospholipase D Gene (PLD) in Peanut and PLD Expression

Associated with Drought Stress. B. Z. GUO¹, Y. CAO², G. XU², C. C. HOLBROOK³, and R. E. LYNCH¹. ¹USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA; ²Department of Entomology, University of Georgia, Tifton, GA; ³USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

Preharvest aflatoxin contamination has been identified by the peanut industry as the most serious challenge. Drought stress is the most important environmental factor exacerbating *Aspergillus* infection and aflatoxin contamination in peanut. Development of resistant peanut cultivars would represent a major advance for the U.S. peanut industry. In this study, we identified a novel *PLD* gene, encoding a putative phospholipase D, a main enzyme responsible for the drought-induced degradation of membrane phospholipids in plants. The completed cDNA sequence was achieved by using the consensus-degenerate hybrid oligonucleotide primer strategy. We have used the sequence information encoded by the cloned fragments to amplify both the 5' and 3' ends of this gene to obtain a full length clone. The deduced amino acid sequence shows high identity with known *PLD* genes, having similar conserved features. The *PLD* gene expression under drought stress in greenhouse has been studied using two peanut cultivars, Tift 8 (drought tolerant) and Georgia Green (drought sensitive). Northern

analyses had showed that PLD gene expression was induced faster by drought stress in Georgia Green than in Tift 8. More peanut lines will be studied to characterize the PLD gene expression as marker for screening germplasm for drought tolerance and aflatoxin formation.

Conservation of Peanut Seed Under Modified Atmosphere Within an African Context.

ROUZIERE, J. MARTIN, A. MAYEUX*. Centre de Cooperation Internationale en Recherche Agronomique pour le Développement (CIRAD), 34398 Montpellier Cedex 5, France.

In Africa peanut seeds are traditionally stored unshelled at ambient temperature. Seed viability can be adversely affected by physical, chemical and biotic factors. Within this context, cold storage is difficult and expensive and the supply of electricity may also be unreliable. CIRAD is currently working on the conservation of shelled kernels under modified atmosphere. This technique is a viable alternative for maintaining germplasm and foundation seed viability and for insect pest control. Seeds were packaged in airtight, multi-layered, retractable packets (60 or 90 μ thick) under a complete vacuum or in a modified atmosphere (O_2 and CO_2 electronically dosed), then hermetically heat-sealed. Modified atmosphere regimes included complete vacuum (± 200 mm Hg), partial anoxia compensated with only nitrogen (98% N_2) or with the addition of carbon dioxide (88% N_2 - 10% CO_2) equalized at atmospheric pressure. The level of insect control varied according to species, developmental stage and level of infestation. Generally, insects that develop inside the seed were more susceptible to high levels of CO_2 while those that develop outside the seed were more susceptible to anoxia. Stored peanut is attacked by common pests like flour beetles (*Tribolium* spp.) and Khapra beetles (*Trogoderma granarium*), but in Africa, the most important is the groundnut seed beetle (*Caryedon serratus*). Adults attack the hull of healthy pods and larvae feed and develop inside the seeds. Packaging seeds under a complete vacuum was the most lethal treatment against *C. serratus*. Adults were highly susceptible to lowered air pressure and the entire population was eradicated after 1 day. Eggs were less susceptible but were killed after 3 days of treatment. Larvae were the most resistant, but were almost entirely eliminated after 7 days (only 1% survive). The two other types of modified atmosphere gave similar results, however those with injected carbon dioxide (CO_2) were slightly better. In addition, CO_2 is often more readily available than nitrogen. These two techniques require packets that are less resistant than those needed for packaging under complete vacuum. Viability studies were conducted over a 36-month period with observations made at 6-month intervals. The results of the CO_2 treatment (10% CO_2 and 88% N_2) were significantly better than the control. A good level of seed viability was maintained: 90% for an initial value of 98%, and a germination time of 49.5 hours compared to 54.6% and 53.2 hours respectively for the control treatment. Under simple anoxia (vacuum compensated only with N_2) the results were less promising with seed viability of 80%. Conservation of a high level of seed viability is equally linked to very low seed water content ($\pm 4\%$). This storage

technique is an interesting alternative for short term seed conservation in Africa, however, good results are closely related to initial seed quality. Seeds must be harvested at maturity, carefully shelled, sorted and adequately cured.

Irrigation Management for Peanut Production under Water-Limiting Conditions. D.O.

PORTER*, A.M. SCHUBERT, J. REED, T.A. WHEELER. Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403.

Irrigation management for peanut production must address the need for adequate moisture necessary for desired crop yield and quality within location specific constraints of limited irrigation capacities, climate, soils and topographic conditions. Water is the most limiting factor in peanut production in many regions, including the Texas Southern High Plains. Multi-year studies have been conducted at two locations to address two important aspects of irrigation management: 1) irrigation capacity necessary to produce the peanuts at acceptable yield and quality; and 2) irrigation application method for optimal production and water use efficiency. Irrigation application target rates ranging from 50% to 125% evapotranspiration demand, estimated from data obtained at on-site weather stations, were applied through center pivot irrigation systems. Possible confounding factors were noted; these included spatial variability within the field and interactions between application rates, application methods, and topographic conditions. Irrigation application methods, including Low Energy Precision Application (LEPA) and Low Elevation Spray Application (LESA) were compared to determine whether there is an optimal application method for peanut production. In the 2000 season, LEPA methods produced significantly better harvested yield than LESA methods (mean harvested yield of 3,334 kg ha⁻¹ and 2,449 kg ha⁻¹ for LEPA and LESA, respectively). In the 2001 cropping season, there were no statistically significant differences in yield (mean harvested yield of 4,213 kg ha⁻¹), but LESA irrigated peanuts were of somewhat better quality than LEPA irrigated peanuts (mean grades of 75.9 and 72.7 for LESA and LEPA, respectively). The research has been expanded to address potential variety by environment interactions.

Response of Valencia Peanuts to Nitrogen Rates, Rhizobium Inoculant and Row Pattern. N. PUPPALA*, R.D. BAKER and R.B. SORENSEN. Agricultural Science

Center at Clovis, NMSU, Clovis, NM 88101; USDA-ARS-National Peanut Research Lab, Dawson, Georgia 31742.

Peanut is nodulated by Rhizobia that also nodulate many species of tropical leguminous plants and are classified as the cowpea miscellany. Peanut farmers in New Mexico do not apply inoculum at the time of planting but do apply high rates of nitrogen fertilizer (300 to 350 kg ha⁻¹). A study was conducted at South Research Facility in 2001 to determine the yield advantage of Valencia-C peanuts to single and twin row orientation with four different treatments. The experimental design was a split plot

with three replications. The main plot consisted of row pattern (Single vs. Twin) while the subplots consisted of four treatments a.) Control (no N and no rhizobium) b.) Nitrogen (200 kg ha⁻¹) c.) Seed treatment with rhizobium and d.) Combination of nitrogen plus rhizobium. The test site was on an Amarillo-Clovis loamy fine sand under sub-surface drip irrigation, which had been planted with cotton in 2000 and peanuts in 1999. Single rows were centered on 100-cm row spacing. Twin rows were spaced 18 cm apart with each of the twin rows spaced 16 cm to each side of the 100-cm row center. The seeding rate was 115 kg ha⁻¹. Urea (32-0-0) was applied prior to planting to only those rows, which required nitrogen using a Gandy box and the fertilizer was thoroughly incorporated. Cowpea strain of rhizobium was applied by seed mixing at 70 g of the inoculant per hectare. Pod yield with Twin row averaged 4058 kg ha⁻¹ or a 9% increase over single row planting (3735 kg ha⁻¹). Among the four treatments tested, the combination of nitrogen plus rhizobium resulted in 22% increase in pod yield compared to control (3482 kg ha⁻¹). Seed treatment with rhizobium alone resulted in 15% increase in pod yield compared to control and was statistically similar to seed treatment with rhizobium in combination with nitrogen application. Application of nitrogen alone resulted in 11% increase in pod yield compared to control. These results suggest that seed treatment with rhizobium may be more economical and environmentally friendly than direct nitrogen applications. More research is needed to identify the most suitable strain of the rhizobium that will be ideal for peanut seed and soil type, and also the best procedure to apply the inoculant in the soil or to the seed.

Characterization and Classification of Mexican Peanut (*Arachis hypogaea* L.) Germoplasm. S. SÁNCHEZ-DOMÍNGUEZ* and ABEL MUÑOZ-OROZO. Departamento de Fitotecnia, Universidad Autónoma Chapingo, Chapingo Méx. 56230; Colegio de Postgraduados en Ciencias Agricolas, Montecillos Méx, 56230.

The objective of this research was to characterize and classify Mexican peanut germplasm for use in further investigations. Sixty-four accessions were planted in Miacatlán (L1) and Cuauchichinola Mor. (L2) Mexico, under rainfed conditions in the summer of 1988. Thirty-three vegetative and reproductive traits were recorded and all data were subjected to analysis of variance. A cluster analysis (UPGMMA) also was performed. The L1 location ranked highest in immature fruit and gynophore number, seed weight, pod length, and stem color. Pod weight, plant height, biomass, covering percentage and seed oil content were highest at L2. Statistical differences were found among varieties for most traits measured, indicating very high genetic variability among the lines and varieties tested. Genotype by environment (localities by accessions) interactions were found for immature fruit number, pod reticulation, covering percentage, and seed oil content. A cluster analysis (Euclidian Distance and UPGMMA) of genotype effects detected four groups of accessions. One of these included spreading accessions with very high growth rates and dry matter yields. Another group included twenty accessions with spreading growth habits but short stems, similar to American runner types. This group ranked high in pod and seed yield. For genotype by environment effects, the cluster procedure detected three different

groups. Those accessions with the highest taxonomic distances (2.0 – 4.0) showed locality by environment interactions more frequently than those accessions with small taxonomic distances (0 – 1.0).

Nondestructive Determination of Ploidy Levels in Peanut Interspecific Hybrids.

S. P. TALLURY*, and S. C. COPELAND. Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629.

Diploid species in section *Arachis* are a valuable source of disease and pest resistant genes. Several pathways have been proposed involving chromosomal and ploidy level manipulations to transfer these genes into *A. hypogaea* genotypes. Determination of the hybridity and the chromosome number is a necessity before any backcrosses are made. Traditionally, chromosome number of hybrids is determined by collecting young flower buds. However, each removed flower bud could be a potential pod and as a result, the objective of this study was to develop a non-destructive method to determine ploidy levels in peanut interspecific breeding. The plant material included the peanut cultivar, Gregory and two section *Arachis* diploid species (*Arachis herzogii* (KSSc 36029); *A. diogoi* (GK 10602), autotetraploids of these two *Arachis* species, triploid F₁ hybrids between Gregory and the two *Arachis* species, and a hexaploid hybrid of Gregory x *A. herzogii*. Lower epidermis from mature leaves of the above plant material was stained in a 1% aqueous solution of silver nitrate and the number of plastids in the guard cells, were counted to determine ploidy levels. A minimum of 50 guard cells were considered and observations indicated that the mean plastid numbers in Gregory, *A. herzogii* and *A. diogoi* were 13.9, 8.8 and 7.5, respectively. Triploid F₁ hybrids, Gregory x *A. herzogii* had a mean number of 11.0 whereas Gregory x *A. diogoi* had a mean of 12.4. Similarly, the autotetraploid plants of *A. herzogii* and *A. diogoi* had a mean of 13.1 and 14.7. A single hexaploid plant of Gregory x *A. herzogii*, exhibited mean plastid number of 17.8. The observations suggest that plastid number of guard cells is a reliable and a non-destructive method to determine ploidy levels in interspecific hybrids of peanut.

Poster II

Comparison of Sensory Characteristics and Nutritional Components of Texas, Virginia, and Georgia Peanuts. C.M. BEDNAR*, C.C. KING, M.B. DAUGHERTY and M. KIHATO. Department of Nutrition and Food Sciences, Texas Woman's University, Denton, TX 76204-5888.

The purpose of this project was to evaluate sensory characteristics and nutritional composition of peanuts grown in Texas, Virginia, and Georgia. Peanut samples were obtained from a commercial processing company in Texas and Virginia and from a university researcher in Georgia. A sensory evaluation method for peanuts using a 9-point scale for 6 descriptors (color, roasted peanutty, raw/beany, sweetness, bitterness, and crunchiness) with accompanying standards was developed. Peanuts were blanched and roasted using an electric rotisserie oven. Roasting times, which varied from 10 to 15.75 minutes, were adjusted based on colorimeter readings. Eleven panelists were trained for sensory testing of peanuts. Triplicate sensory tests were conducted in a random block design comparing two cultivars of peanuts (Georgia Green and NC7) that had been grown in three areas of the country (Texas, Virginia, and Georgia). A repeated contrasts test was used to compare sensory evaluation ratings for the series of sensory tests. Panelists in this study rated Texas-grown Georgia Green peanuts as having a significantly darker color ($p \leq 0.0001$), roasted peanutty flavor ($p=0.006$), and crunchiness ($p=0.008$) than the same peanut cultivar grown in Georgia. The Virginia-grown NC7 peanuts were judged to be significantly darker in color ($p=0.003$) than the Georgia NC7 peanuts, and Texas grown NC7 peanuts were significantly more crunchy ($p \leq 0.0001$) than either Georgia or Virginia NC7 peanuts. There were no significant differences in sweetness, bitterness, or raw/beany flavor for peanuts grown in the three areas. Panelists did not report any "off-flavors" in peanut samples. Georgia Green peanuts from the 3 growing locations averaged 51.4% fat, 5.5% moisture, and 6.7% sugar. The NC7 peanuts averaged 51.7% fat, 6.5% moisture, and 7.1% sugar. The Texas grown NC7 peanuts had a higher than mean sugar content of 9.04% while the Virginia grown NC7 peanuts had a lower fat content of 48.00%. Results of this study indicate some differences in peanut composition which may be linked to growing conditions. The limited sensory testing conducted for this study indicates that Texas-grown peanuts compare favorably with those grown in other locations.

Evaluation of Proteinase Inhibitors for Southern Corn Rootworm and Lesser Corn-stalk Borer Infesting Peanut. L. A. CAMELO¹*, J. S. ARMSTRONG¹, K. Z. SALZMAN² and F. L. MITCHELL³. Department of Plant and Soil Science¹, Box 42122, Texas Tech University, Lubbock, TX 79409 and Texas Agricultural Experiment Station, Lubbock, TX 79403, Department of Entomology Texas A & M University², College Station, TX 77843. Texas A&M Research and Extension Center³, Stephenville, TX 76401.

We are evaluating proteinase inhibitors (PIs) via diet assays that are active in the gut of key insect pests of peanut. Initial diet assays involve feeding the southern corn rootworm *Diabrotica undecimpunctata howardi* Barber and lesser cornstalk borer *Elasmopalpus lignosellus* (Zeller) borer from 0.25 to 0.75 % (per weight basis of total diet) of a cysteine and serine PI in diet assays. The mode of action of a specific PI is to bind and inhibit the dietary assimilation of proteins in the insects gut. Our research will identify the PI's active against Lepidoptera and Coleoptera pests of peanut, screen peanut germplasm for the DNA promoters that express PIs and incorporate them into peanut breeding programs. The fruition of this research will aid peanut production from relying on insecticides that are few in number and limited in availability.

Pathogenicity of *Sclerotinia minor* on Weeds in Peanut Fields. J.E. HOLLOWELL*, B.B. SHEW, M.A. CUBETA, Department of Plant Pathology, and J.W. WILCUT, Department of Crop Science, North Carolina State University, Raleigh, North Carolina 27695.

Sclerotinia minor is a soilborne fungus that overwinters and survives between peanut crops as sclerotia in soil or on crop debris. Crop species that are hosts of *S. minor* are not usually grown in rotation with peanut, and little is known about the pathogenicity of *S. minor* to most weed species commonly found in peanut fields. Host weed species growing in fallow or rotated peanut fields could act as reservoirs of the peanut pathogen and add to the inoculum density in the field. Bleached stems and sclerotia were observed in March 2001 on winter annual weed species growing in harvested peanut fields in northeastern North Carolina. These fields had known histories of Sclerotinia blight caused by *S. minor*. Symptomatic plants were collected and brought back to the laboratory for identification and isolation. *Sclerotinia minor* was isolated from all symptomatic plants. Non-symptomatic plants were inoculated with the respective isolate of *S. minor* and completion of Koch's postulates by reisolation confirmed that nine winter annual weed species were hosts of *S. minor*. They included *Lamium aplexicaule* (henbit), *Cardamine parviflora* (small-flowered bitter-cress), *Stellaria media* (common chickweed), *Cerastium vulgatum* (mouseear chickweed), *Coronopus didymus* (swinecress), *Oenothera laciniata* (cutleaf evening primrose), *Conyza canadensis* (horseweed), *Brassica kaber* (wild mustard), and *Arabidopsis thaliana* (mouse-ear cress). This is the first report of these species as hosts of *S. minor* in the natural environment. All isolates of *S. minor* obtained from these weed species were

tested and shown to be pathogenic to peanut. Isolate effects on lesion length were significant at $P = 0.002$. Day 3 lesion lengths on detached peanut leaflets ranged from 22.6 to 33.1 mm. To further characterize the potential host range of *S. minor*, pathogenicity was tested on weed species commonly found in peanut fields during the growing season. In these trials, detached weed leaves were inoculated with mycelial agar plugs of an *S. minor* isolate from peanut. Lesions developed on all species tested, and susceptibility varied with species.

Use of BAS 125 Growth Regulator Alone and Mixed with Fungicide on Peanut in South Texas. A. J. JAKS*, B. A. BESLER and W. J. GRICHAR. Texas Agricultural Experiment Station, Yoakum, TX 77995.

BAS 125 also known as APOGEE, common name prohexadione calcium, is a plant growth regulator developed by BASF Corp. The product inhibits gibberilllic acid production thereby reducing internode length resulting in a compact plant. The Tamrun 96 peanut variety grown under optimum conditions in south Texas is characterized by profuse vegetative growth. Many pegs are formed on upper branches of the plant which never enter the ground. Test goals were to 1) reduce plant growth; 2) evaluate BAS 125 and fungicide compatibility; 3) determine number of applications needed to reduce growth; 4) increase yield; 5) determine effect on grade and \$/A; and 6) evaluate foliar and soilborne disease control from fungicide plus growth regulator treatments. BAS 125 was used alone and tank mixed with a fungicide (Bravo WS or Folicur) in three, four and five applications. BAS 125 treatments applied three times were initiated at 44 days after planting (DAP) and continued at three week intervals. Four and five spray treatments started 30 DAP and continued on a respective 21 day and 14 day schedule. Untreated plots as well as fungicide-treated plots only were included for checks. Plots were sprayed with a hand-held boom. BAS 125 (0.17 lb/A) was mixed with 28% UAN (1.0 qt/A) and Agri-Dex (1.0 qt./A) in the alone treatments. BAS 125 and 28% UAN were mixed with fungicide at recommended rates except that Agri-Dex was omitted. All treatments whether applied alone or mixed with fungicide, had statistically reduced canopy growth from check plots. There was no statistical difference in canopy growth from any plots receiving three and four treatments of BAS 125. Five applications of BAS 125 reduced canopy growth more than three or four applications with the exception of the four application alone treatment which was not different from the five application treatment with fungicide. No significant difference was noted in plant height from three and five BAS 125 sprays. Overall, growth suppression was not as much as desired at the rate tested. Yields were comparable between BAS 125 alone treatments and those mixed with fungicides. Some plots had higher yields than untreated plots but this was probably due to fungicide control of leaf spot and rust. Grade data was similar for all treatments. Four of the six BAS 125 treatments had numerically higher \$/A value than fungicide alone treatment, although statistically there was no difference.

Economic Comparison of North Carolina Peanut Producers now and with the Proposed End of Peanut Quota Program D. LASSITER*, S.G. BULLEN, Department of Agricultural and Resource Economics North Carolina State University, Raleigh, NC 27695.

Peanuts are an important cash crop to farmers in the northeastern region of North Carolina. The income generated from the production of peanuts is essential to farmers in this area. Policy foundations of a peanut quota system dates back to the New Deal during the Great Depression of the 1930's. Since the New Deal of the 1930's, acreage allotments and market quotas have regulated domestic production of peanuts for the edible market. Imported peanuts have also been restricted to protect the U.S. market from competition. The Commodity Credit Corporation (CCC) controls support price for domestic quota peanuts. The recent farm program debate has captured the attention of many farmers from the northeastern region of North Carolina. The current peanut quota system would be abolished if the Farm Security Act of 2001 (H.R. 2646) or the Senates version (S 1628) were ratified. The new farm program would make peanut like other commodity crops. With the new program, eligible peanut producers would receive payments through both fixed and counter-cyclical payments based on historical production. Eligible peanut producers would also have price protection through loan deficiency and marketing loan payments based on existing production. Economics theory suggests, with the elimination of the quota system, peanut production would decrease and market income would decrease in high-cost regions of North Carolina. A 1,500-acre Northhampton County peanut farm was developed to model the economic impact of the peanut program changes. Three long-range financial plans were developed, one current plan under the current farm bill, one plan with the proposed new Senate S 1628 farm bill in the year of 2002 and one plan for 2006, the last year of the bill.

IPM Strategies for Peanut Growers in North Carolina: Knowledge vs. Application.
S.C. LILLEY*, G. E. FLEISHER, J. E. BAILEY and J. SABELLA. Department of Sociology and Anthropology, North Carolina State University, Raleigh, NC 27695-8107; Department of Plant Pathology, North State University, Raleigh, NC 27695-7616

IPM research must be based on a thorough assessment of the motivations and barriers to the adoption or adaptation of IPM practices. University researchers have developed an impressive list of IPM practices that can play a significant role in maintaining profitability and providing effective pest control options. Some IPM practices have been more readily adopted while others have not. An assessment of the limitations of grower adoption of current and emerging IPM practices in peanut production using focus groups and a survey of peanut growers in eastern North Carolina was conducted. Attention was directed toward the early phases of the decision process in an attempt to identify the features that influence growers' awareness and interest in learning more about appropriate practices; evaluating opinions on potentially useful IPM techniques; and assessing the level of acceptance of known IPM practices. Farmer-identified

limitations included costs, time constraints, lack of research and timely information and inability to accurately scout fields for insects, weeds and diseases. Age, farm size, income and long-term outlook significantly influenced adoption of practices, attitudes toward IPM and perception of barriers to adoption.

Evaluating Farm Level Impacts Of The 2002 Farm Bill: A Computer Decision Aid.

N.B. SMITH¹*, W.D. SHURLEY¹, V. SUBRAMANIAM¹, S.M. FLETCHER².

Department of Agricultural and Applied Economics, University of Georgia,

¹Tifton, GA 31793, ²Griffin, GA 30223.

Monumental change in the peanut program is proposed for the 2002 Farm Bill. The quota supply system that has been in existence for over sixty years would be eliminated and replaced with a marketing loan program similar to the major program crops. Producers will need to evaluate how the new program impacts their farm operation in relation to peanuts and other crops. The University of Georgia Cooperative Extension Service and National Center for Peanut Competitiveness have developed a computer decision aid that helps analyze the 2002 Farm Bill provisions and its implications on the peanut enterprise and whole-farm operation. Producers will likely be faced with two major decisions: If and where to update base on peanuts and all other program crops? Crop planting mix based on cost of production and market prices or market loan rates. The decision aid allows a producer or county agent to enter individual data on program variables, such as base acres and program, and farm planning data to address the two major questions. Producers are given a program payment analysis with comparisons between crops and sensitivity analyses on yields and prices. A whole farm analysis is given showing potential returns under the new farm bill. This poster demonstrates the components of the decision aid and how producers, county agents, landlords, bankers and others can use the decision aid to better assess the impact of the changes in the 2002 Farm Bill.

Development of High Protein Snacks from Defatted Peanut Flour and Fish Mince. K.

MATHEWS, M. AHMEDNA and I. GOKTEPE, Food Science and Nutrition, 161

Carver Hall, North Carolina A&T State University, Greensboro, NC 27411

Peanut is an important crop grown in the U.S. and worldwide. It is used as a food source in many forms including oil production, peanut butter, confections, and snack products.

Peanut flour is an inexpensive byproduct derived from peanut press cake following oil extraction. It is a very versatile source of high-quality protein for human foods, containing 47-55% protein. Research is needed to promote value-added utilization of peanut and its byproducts as a source of required nutrients in common and new foods to help the peanut industry in the developing countries and the U.S. The objectives of this study were to 1) develop new value-added products from peanut and fish mince for consumers in the U.S. and West Africa, and 2) evaluate consumer acceptability of the peanut-based fish

snacks. Focus groups were conducted to explore the use of various peanut flours as extenders of tilapia and catfish minces to produce consumer acceptable fish nuggets. These two fish species were selected because they are economically important in Africa and in the US. Modified and unmodified defatted peanut flours were used as fish extenders in proportions ranging from 5 to 30%, with and without binders. A consumer panel of 100 individuals judged products' color, texture, flavor and overall liking using a 9-point hedonic scale. Off-flavor and purchase intent were judged using a yes/no scale. Raw defatted and lightly roasted defatted peanut flours were highly acceptable as fish extenders up to 15 and 10%, respectively. Consumer tests showed that the addition of peanut flour reduced undesirable fishy flavors and improved product's color and texture. Fish nuggets containing peanut flour were not significantly different from their respective controls in terms of color, texture, flavor, and overall liking. Raw defatted peanut flour yielded the most acceptable fish nuggets with mean overall acceptability exceeding 6 out of 9. The heavy fishy flavor of tilapia and muddy flavor of catfish were reduced by the addition of raw or roasted peanut flours. Over 60% of panelists expressed willingness to buy the fish nuggets formulated with peanut flour at the levels tested. The above data indicate a good potential for the combination of fishery by-products and peanut flour to produce high protein nuggets for consumers in West Africa and the U.S. These value-added products are expected to be inexpensive since their main ingredients are two underutilized byproducts of the food industry.

Growth Enhancement Effects of Aldicarb on Peanuts. K.T. INGRAM, University of Georgia, Griffin, GA, J.M. ROSEMOND*, Aventis CropScience, Tifton, GA

Aldicarb has known growth enhancement effects on agronomic and horticultural crops such as cotton, soybeans, potatoes, and citrus. A two-year study was conducted to document these growth enhancements in peanuts. Peanut plants were planted and grown pest free in growth chamber or greenhouse conditions. The first year plants were treated up to 0.30 – 0.75 lb ai/A aldicarb and compared to an untreated control. In the second year, plants were treated with an equivalent of 0.75 lbs ai/A aldicarb and compared to phorate at 1.0 lbs. a.i./A and to an untreated. Additionally plants were subjected to drought stress. Measurements of shoot growth, root growth, and pod weight were collected throughout the trial period. Results from year 1 indicated that up to a 54% increase in dry matter, a 64% increase in pod weight/plant, and increased root growth rate were associated with the aldicarb treatments compared to an untreated. Results from year 2 indicated a 41% increase in root length with aldicarb at the 8 inch depth level compared to untreated or phorate treated peanuts. Stem lengths were also longer (up to 24%) with aldicarb treated peanuts compared to untreated or phorate. Peanuts treated with aldicarb produced up to 38% more mature kernels than phorate and 21% less immature kernels than phorate. When exposed to drought stress aldicarb treated plants produced higher amounts of dry matter, leaf area, and fresh pod weight compared to untreated or phorate treatments. In conclusion, aldicarb has growth enhancement characteristics that affect peanut plant growth in the absence of pests or stress.

Technology Dissemination and Adoption by Peanut Farmers in Rayalaseema Region of Amdhra Pradesh, India. SOUNDARARAJAN S. MUDIPALLI, D. SAILAJA KUMARI, S. M. REDDY, and N. V. SARALA. Sri Sakthi Development Society, Tirupati, AP, 517 502, India.

Improved management practices in rain fed and irrigated peanut have increased pod yields by 30-40% as shown by large scale, on-station trials at the Regional Agricultural Research Station, Tirupati. In farmer's fields, especially with rain fed groundnut, disastrous yield losses are very common due to prolonged moisture stress, non-adoption of improved management practices and inappropriate cropping systems. In irrigated groundnut, biotic stress, improper use of pesticides and other factors can lead to low yield. Extension efforts to demonstrate improved management practices bridged the gap, cut the cost of production, and stabilized yield and income. The need for precision in the adoption of the improved practices over a larger area deserves major extension efforts.

Farmer Education for Effective *Bradyrhizobium* Inoculation of West Texas Peanut.

C.L. TROSTLE*. Texas A&M Research & Extension Center, Route 3, Box 213AA, Lubbock, TX 79403.

Producers often take for granted that effective *Bradyrhizobium* nodulation of peanut (*Arachis hypogaea* L.) is achieved simply because inoculant was applied at planting. Observations of West Texas peanut fields in 1999-2001 suggest that approximately 25% of West Texas peanut fields are undernodulated, and in some fields few if any nodules are found in spite of *Bradyrhizobium* inoculation. In addition, observations on volunteer peanut plants the year after peanut production indicate little carryover of *Bradyrhizobium* to the following year, perhaps in part due to the extremely sandy soil texture (often loamy sand), high pH (7.4 to 8.3), and low organic matter (0.3% organic C). The objective of this farmer education program was to document basic differences in the degree of *Bradyrhizobium* nodulation at 0X, 1X (standard rate), and 2X rates of inoculant. Nodule counts at 0X can be as high as 50% of nodulation at 1X rates, but are often less than 10%. Doubling standard inoculant rates may further increase nodule numbers, but is probably not necessary unless farmers anticipate problems with soil chemical and environmental conditions. These results serve as a basis for recommendations to growers not only in the potential for *Bradyrhizobium* inoculation to effect good nodulation of peanut, but also help reduce producer error in handling and applying inoculants. Texas Cooperative Extension now recommends that West Texas peanut producers scout for *Bradyrhizobium* nodulation beginning about 5 to 6 weeks after planting (in advance of mid-season nitrogen fertilizer applications) much in the same way we recommend producers scout for insects or disease. Scouting for nodules provides guidance to growers for possibly reducing N application rates if nodulation is good, but on the other hand ensures that fields which have minimal to no nodulation may be scheduled to receive N applications to reach their yield potential. Two Extension publications been produced summarizing field observations, tips for *Bradyrhizobium* product choice and application, and common producer mistakes involving *Bradyrhizobium* inoculants.

**Minutes of the APRES Board of Directors Meeting
34th Annual Meeting, Sheraton Imperial Hotel
Research Triangle Park, NC
July 16, 2002**

President John Damicone called the meeting together at 7:00 p.m. Those present were John Damicone, Ron Sholar, Bob Sutter, Jeannette Anderson, Ken Dashiell, Mark Braxton, Ron Weeks, Tom Isleib, Stan Fletcher, Richard Rudolph, Marshall Lamb, Hassan Melouk, David Jordan, John Baldwin, Tom Stalker, Corley Holbrook, Austin Hagan, Carroll Johnson.

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

President Damicone called on Executive Officer, Ron Sholar, to read the minutes of the last Board of Directors meeting held in Oklahoma City, OK. The minutes were approved as published in the 2001 Proceedings.

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

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

Executive Officer Report – Ron Sholar

Dr. Sholar reported that our society is in excellent condition financially. We are changing as the industry changes and there continues to be a small annual decline in membership. This reflects the fact that there are now fewer companies and individuals involved in the peanut industry.

American Society of Agronomy Liaison Report – Tom Stalker

See report.

Council for Agricultural Science and Technology – Stan Fletcher

CAST has continued to maintain communications about sound agricultural technology/biotech. The society has been one of the strong supporters on a per capita basis. CAST has established a new membership director position.

The biotech initiative has been a very strong success. Several reports have been published. One report is *Environmental Effects of Transgenic Plants, Scope and Adequacy of Regulations* (*completed in Feb of this year*). A biotechnology webpage has been created. The written report in Proceedings will provide details. This website can be consulted to get related testimonies and briefings etc. CAST has also just completed a report on the *Evaluation of the US Regulatory Process for Crops Developed through Biotechnology* to help understand what the steps and process are. In peanuts, we do have several scientists working in the biotech area. A new publication will revisit the issue of mycotoxins and aflatoxin will be a key part of that report.

CAST has done a lot of good work.

Finance Committee – Marshall Lamb

The Finance Committee met with the Executive Officer and reviewed the finances of the society and the proposed budget for 02-03 and found the society in sound condition.

The proposed budget was provided to all members of the Board of Directors.

Marshall Lamb reported that the Finance Committee had unanimously approved to bring forward the proposed budget to the Board of Directors. The proposed budget shows expenditures of \$95,448 and total receipts of \$80,300.

Marshall reported on the 10 year audit of the society's finances conducted by Sylvia Duncan. The audit covered the years ending June 30, 1993 through June 30, 2001. (*Editor's note: The audit for the period July 1, 2001 through June 30, 2002 will be provided to the society in November 2002*). The audit was reviewed by the Finance Committee. The audit was unanimously accepted by the Finance Committee. (*The Board of Directors was also provided a copy of the audit report completed in June*).

The Finance Committee reviewed the registration fee for the annual meeting which is currently \$75 for members and \$100 for nonmembers. The Finance Committee recommended that the registration fee be increased to \$100 for members and \$150 for nonmembers. The Finance Committee felt that this amount was still significantly lower than other professional meetings. The Finance Committee didn't foresee any harmful impacts due to changing the registration fee. This increase should generate about \$6250 per year in new income. The committee did not recommend a change in membership dues at this time; however, this item will be discussed at next year's meeting.

Marshall reported that the Finance Committee is concerned about membership numbers. Since 98-99, the society has lost about 70 members. That is a lot for a society of our size. The Finance Committee recommended that all new members pay only 1/2 the membership fee for the first year. This is an attempt to get increased membership.

Marshall reported that there remain 848 copies of *Advances in Peanut Science* in the inventory. That is a lot of copies of a book that is six years old. The Finance Committee recommended that the price of *Advances in Peanut Science* be dropped from \$45 per copy to \$10 per copy to try to move some of these books out of inventory.

Ron Sholar reported that the cost of publishing the book has been recovered through the copies that have already been sold and that Sylvia Duncan recommended that we drop the price of the book as we dropped the price of *Peanut Science and Technology* a few years ago.

There was discussion on the proposal to reduce the membership fee for new members. Ron Sholar reported that material would be provided to key leaders in each state to assist in recruiting new coworkers or cooperators who should be members of the society. The Board of Directors approved the recommendation to reduce membership fees to 1/2 regular price for one year for new members.

The Board of Directors approved the proposal to reduce the price of *Advances in Peanut Science* from \$45 to \$10 per copy.

The Board of Directors approved the proposal to increase registration fees to \$100 for members and to \$150 for nonmembers.

There was discussion about why the Executive Officer position will be compensated and the Editor of Peanut Science will not be. John Damicone indicated that the society was in a crisis situation with Dr. Sholar's plans to step down after the annual meeting in July, 2002. Dr. Damicone indicated that the Board of Directors approved asking Dr. Sholar to stay on for at least two more years for compensation.

Tom Stalker commented that the two positions in the society that require a great deal of time are the Executive Officer position and the Editor of Peanut Science position. He indicated that some long-term decisions need to be made about whether this is a long-term commitment. If this is to be done on a long-term basis, then the society should also consider compensating the Peanut Science Editor's position.

Austin Hagan described the process that was used to try to recruit a volunteer for the Executive Officer position but that the pool of candidates was very small. He also pointed out that he believes that with some universities providing the opportunity for faculty members to boost their salaries through grants, that it will be very difficult in the future to find someone who will altruistically perform these duties.

President Damicone pointed out that he would be appointing an ad hoc committee to study how the major positions in the society will be filled, how they will be compensated, and where the money will come from.

The Board of Directors approved moving \$1000 from travel designated for CAST representative travel to the CAST Initiatives program. This will be the third consecutive year for APRES to contribute \$1000 to CAST initiatives. The previous funding has been spent on biotech initiatives but CAST has other plans in the works. Stan Fletcher proposed that the \$1000 planned for the CAST biotech initiative program be left for CAST programs. The proposal was approved.

Austin Hagan moved that the proposed budget be approved. The budget was approved by the Board of Directors.

Site Selection Committee – Bob Sutter

The following is the location schedule for upcoming meetings:

July 7-11, 2003 – Hilton, Clearwater Beach, Florida
(\$118+ tax per night)

2004 – Texas

2005 – Virginia

Texas members of the Site Selection Committee presented three options for the 2004 meeting (San Antonio, Galveston, and Ft Worth). The Site Selection Committee recommended San Antonio as the site for the 2004 meeting.

Jeannette Anderson proposed that APRES and the USA Peanut Congress work to explore the potential for a joint meeting in 2005 in Virginia. Both organizations are scheduled to meet in the Virginia area in 2005. The APC will have more information after their December meeting. Fred Shokes of Virginia recommended that APRES pursue having their 2005 meeting in the Williamsburg area and the Site Selection committee recommended this to the Board of Directors. Hassan Melouk asked if a joint meeting would affect registration fees and Bob Sutter indicated this would be part of the negotiations between the two organizations. Bob indicated that the two meetings would not be combined but there might be some overlap on one day.

The recommendation to meet in San Antonio in 2004 was approved by the Board. Texas members of the Site Selection Committee will negotiate with San Antonio hotels for a contract to be signed in November 2002.

There was additional discussion on the potential for a joint meeting with the USA Peanut Congress. Jeannette Anderson pointed out that a major benefit would be the ability to negotiate a better hotel contract because of larger number of attendees. Bob Sutter offered that it would also permit individuals who do not normally attend both meetings to do so. The meetings could be run concurrently with possibly a one-day overlap. The Virginia Site Selection Committee members would work with members of the USA Peanut Congress on this.

The Board approved exploring the feasibility of a joint meeting with the USA Peanut Congress in Williamsburg, VA in 2005. Jeannette Anderson indicated that the American Peanut Council would have something to present to their board by their December meeting. Subsequent to this, discussions could begin with the APRES board.

Nominating Committee – Austin Hagan

The committee met on July 16th. Nominations were made and are as follows:

President-elect – Ben Whitty, University of Florida, Gainesville, FL
State Employee Representative - Southwest area – Ken Dashiell
State Employee Representative - Southeast area – Jay Williams
Manufactured Products – Richard Rudolph

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

Publications and Editorial Committee – Ken Dashiell

See complete report. Ken indicated that he would be referring to the Peanut Science Editor's report in his committee report. He passed out two documents prepared by Carroll Johnson, previous chair of the Publications and Editorial Committee.

Thomas Stalker was in attendance to present the Peanut Science Editor's Report and Carroll Johnson was also present and gave the report of the Electronic Publication Ad Hoc Committee Report (see report below). John Beasley was invited to give a report on the Peanut Research publication but he did not participate in the meeting.

Dr. Dashiell reported that the Publications and Editorial Committee had a thorough discussion and found that the advantages of converting Peanut Science to an electronic journal would be: 1) faster publication, 2) wider readership because anyone on the world wide web could access the journal, 3) more citations of Peanut Science, 4) higher quality graphics and 5) fewer publication errors. However, the disadvantages would be 1) some libraries would stop receiving the journal (less income), 2) start up costs, 3) some people will want paper copies of the journal and they will not be available, 4) some individual members will not renew their membership (less income), 5) backup problems and 6) archiving old issues.

Ken Dashiell reported that the Publications and Editorial Committee endorses the Electronic Publication Ad Hoc Committee Report (see below) and passes their recommendations on to the Board of Directors.

ELECTRONIC PUBLICATION AD HOC COMMITTEE REPORT

1. The Ad Hoc Committee is in favor of changing PEANUT SCIENCE from a printed publication to an electronic Internet accessible journal, provided that careful analysis shows that to be within the budgetary limits of the society.
2. Survey the APRES membership with a written ballot to determine support for the proposed change. Terminate the process if the membership is not in favor of the change.
3. Commission another committee to conduct a detailed analysis on the cost (start-up and recurring) of the proposed change, the processes involved with an electronic publication, vendors who do this type of work, and compare costs of the proposed change to current costs of operating the journal.
4. Expand this discussion to include APRES web-site improvements, email communications to membership at-large, and all publications in electronic format accessible from the APRES web-site (newsletter, proceedings, PEANUT SCIENCE, and Call for Papers).

Respectively submitted by,
W. Carroll Johnson, III, Chair

Tom Stalker presented the Peanut Science Editors Report (this report is given below). The committee discussed this report and also expressed their appreciation to Tom Stalker and the Editorial Board for their dedication and service to the Peanut Science Journal.

The Publications and Editorial Committee expressed concern about delays in publishing Peanut Research and the 2001 Proceedings.

The Publications and Editorial Committee recommended the following to the Board of Directors:

Recommendations to the Board of Directors

- 1) The members of APRES need to be given information about the advantages and disadvantages of having Peanut Science and Peanut Research published on the World Wide Web and have them vote if they want one or both of them to continue as is or change to be published on the Web. Based on the results of this survey the Board can decide how to proceed. If a decision is made to change to electronic publication of the Journal this can start with Volume 30 in 2003.
- 2) The following should be appointed as Associate Editors of Peanut Science, Eric Prostko, James Gricher, and Tom Whitaker with Jay Williams as an alternate in case one of the persons named can't serve.
- 3) Because some copies of Peanut Science, Vol. 28, No. 2 had major mistakes we need advice from the Board on what action needs to be taken. 1) Ask the printer to print copies again and mail to the members, 2) Send reprints of articles that had mistakes, 3) Send letter to members with offer to send new issue or 4) Send letter to members with offer to send reprints of articles with mistakes.
- 4) Recommendations 1 through 4 as given in the Electronic Publication Ad Hoc Committee Report.

Carroll Johnson indicated that his ad hoc committee felt strongly that some sort of membership survey should be conducted to determine members feelings about electronic publishing.

There was discussion as to whether the journal should be password accessible only or available to all.

Tom Stalker stated that the mission of the society is to distribute information to the greatest number of people. Right now our journal is passed by for all the electronic searches because we are not keyed in. Our society is not known. We are missing in all the aflatoxin work and in the medical work. We are listed in Current Contents. There are a lot of searches out there that we are not a part of. We need to get into the system, the mainstream scientific work.

Carroll Johnson suggested that we need a group to research how other groups are doing this. Someone has to be paying the bill with resources other than subscriptions. For example, Cotton Journal is being underwritten largely by Cotton Incorporated.

Tom Stalker stated that a rough estimate is that it would cost about the same to publish the journal electronically as it does for the current method. If we continue to publish a paper copy and add on electronic publication, the cost would go up by \$10,000–15,000 each year. There would be no savings by going to electronic only. Set up costs would be the same.

Carroll Johnson indicated that even though costs would be the same, the society could get the information into more hands world wide and distribution would be quicker with the electronic method. It would allow for better quality pictures, graphs etc.

The Board decided to pass out a survey to ask the membership at the annual meeting for their opinion on electronic publishing. The results will be announced at the Friday morning business meeting. The results will be used by the Board of Directors to help plan for the future of Peanut Science.

Ken Dashiell indicated that his committee recommended that the same survey be completed for Peanut Research (newsletter).

The Board of Directors voted to adopt recommendations 1 and 2 of those submitted by the Publications and Editorial Committee.

There was discussion of item 3 of the committee report as to what to do about Peanut Science, Vol 28, No. 2. Jeannette Anderson indicated that we should not pay since it was the printer's mistake. Tom Stalker indicated that he had not yet discussed the issue with the printer.

The board voted to require the publisher to fix the problem.

Peanut Quality Committee – Mark Burow

Mark Burow reported that the committee discussed four issues of peanut seed quality. No recommendations were made to the Board of Directors; however, further discussion was suggested. Four areas were discussed: (1) UPPT Data, (2) Environmental variability in quality data, (3) Oil quality and quantity and (4) Peanut allergens. Mark Burow mentioned that several papers will be presented at this meeting on peanut allergy.

See the complete written report by the Peanut Quality Committee.

Public Relations Committee – Phil Mulder

No report was made.

Bailey Award Committee – Todd Baughman

There were 13 qualified nominees for the Bailey Award from 2001 meeting in Oklahoma City. Eight manuscripts were received for evaluation for the Bailey Award to be presented at the 2002 meeting in Raleigh. The winning paper was submitted by Dr. Maria Gallo-Meagher and titled "Phorate-induced peanut genes that may condition acquired resistance to tomato spotted wilt". There were 16 qualified nominees for the Bailey Award from the Raleigh meeting. This included 1 from the graduate student section and one from each of the other sections of the meeting. Letters are being prepared at this time to notify each of the candidates of their nomination and to ask them to consider preparing a manuscript for the Bailey Award.

Fellows Award Committee – Hassan Melouk

The Fellows Committee announced that three society members had been voted to Fellowship by the Board of Directors. They are John Beasley, Robert Lynch, and Pat Phipps.

The Fellows Committee recommended that nominators whose nominees were not selected for Fellow be encouraged to update the nomination package for re-submission the following year providing that the nominee agrees to be reconsidered for the nomination.

The Fellows Committee recognized the tremendous service, support, and leadership of the late Dr. Jack Bailey to the American Peanut Research and Education Society over the last twenty years.

Coyt T. Wilson Distinguished Service Award Committee – Richard Rudolph

The selection of Dr. Harold Thomas Stalker as recipient of the 2002 award was confirmed.

The committee thanks those who nominated Society members for consideration, and commends you for the excellent nomination packages prepared.

The committee recommended that before the end of the year, either by email or newsletter, the membership be reminded of the early spring deadline for submitting nominations. This information along with information on all awards should go out about Thanksgiving.

Dow AgroSciences Award Committee – John Baldwin

Nominations were received and found to meet all the guidelines for acceptance.

The recipient of the 2002 Dow AgroSciences Award for Excellence in Research is Dr. W.C. Johnson, III, USDA/ARS Agronomist/Weed Scientist, Tifton, Georgia. The recipient of the Dow AgroSciences Award for Excellence in Education is Mr. Kenneth E. Jackson of Oklahoma State University, Department of Entomology and Plant Pathology. Biographical summaries for each winner will be published in the APRES Proceedings and available as press releases.

The committee would like to encourage nomination of qualified APRES members. All members of APRES from all segments of the peanut industry should be considered for nomination for these prestigious awards. The 2002 committee further recommends that qualified nominees not receiving the award be allowed to be considered for one additional year with the current package and have the option to update the application by the deadline if desired. Also the wording on page 121 of the 2001 proceedings “A nominator’s submittal letter summarizing the significant professional achievements and their impact on the peanut industry may be submitted with the nomination” should read “must be” instead of “may be”.

The final recommendation is that the committee would prefer electronic submission of the nominations and supporting letters to the committee Chair for ease of transfer to other committee members.

Joe Sugg Graduate Student Award Committee – Carroll Johnson

Twenty students competed in the 2002 Joe Sugg Graduate Student Contest. There were 12 student presentations at the 2001 meeting.

Copies of the student’s abstracts were obtained from the technical editor and distributed to the five judges. These were to be used to help brief the judges on the presentations, since there are 20 uninterrupted graduate student presentations with little time to tabulate scores. The abstracts were not used in the overall evaluation and scoring.

In follow-up business, the committee would like to make the following recommendations for action by the APRES Board of Directors:

1. Provide a provision to allow the Contest to be split into two or more sections in cases where there are more than 12 students entering the contest. The Joe Sugg Committee would decide in advance how the contestants would be split; by discipline, subject material, degree, or random drawing and coordinate this separation with the Program Chairman. This would require allocation of additional prize monies for the extra sections.
2. Authorize for 2002, recognition of a third place winner, with prize money of \$125.00. We are proposing this change since there are 20 students competing this year with a large number of disciplines represented.

Carroll commended the program committee for the excellent job of working the student papers into the program.

The Board approved \$125 for the third place winner for the 2002 meeting.

There was discussion about the fact that currently the abstract is not part of the judging process. There was also discussion on the committee's proposal to have two sessions when there are more than 12 papers presented. The two sessions would consist of groups of papers that are most alike. This would also require additional prize money.

Jeannette Anderson suggested that prize money be solicited from other grower groups since all states sponsor research.

The Board did not approve recommendation number one made by the Joe Sugg Award Committee.

Program Committee – Tom Isleib

The Program Committee received 113 presentations and 23 posters. Some late submissions were received and these were given the opportunity to submit a poster.

Ron Sholar indicated that the National Peanut Board has asked for time to present the first Carver Award at the 2002 meeting. There was discussion about whether to permit this at future meetings but no decision was made.

The Board voted that only 2x2 slide presentations will be allowed at the 2002 meeting.

Other Business

The meeting was adjourned at 9:20 pm by President Damicone.

**OPENING REMARKS BY THE PRESIDENT
AT THE 2002 APRES AWARDS AND BUSINESS MEETING
July 19, 2002**

Trends in Oklahoma Peanut Production

Oklahoma is blessed with soils and water that will support high yields and production of quality peanuts. However, due to the variability in soils and water availability, not all production areas in the state produce the sufficiently high yields needed to remain competitive in the current farm economy. Over the last twelve years there has been a downward trend in acreage planted to peanuts. Harvested acres have declined from more than 100,000 acres to an estimated 65,000 acres in 2002. The two most precipitous drops in acreage occurred in 1996 and 2002 when new farm legislation was implemented. Acreage dropped about 20,000 acres in 1996 primarily due to the loss of under-marketings. In 2003, an acreage reduction of about 12,000 acres is a result of the drastic reduction in peanut price. The decline in acreage may continue next year. Trends indicate that recent farm legislation has not been beneficial for peanut production in Oklahoma.

Dramatic changes have occurred in geographic production areas within Oklahoma. In 1990, about half of the production was located in central and south-central counties. Yields in this production area were generally low because of dryland production or limited irrigation and high disease pressure due to lack of adequate crop rotation. In 1996 when cross-county quota transfers were initiated, production and quota gradually moved to counties in the southwestern corner of the state. The southwestern production area includes Caddo Co. which has long been the largest peanut-producing county with stable plantings of about 30,000 acres. Acreage in the southwestern production area increased to more than 80% of the state acreage in 2001 and is likely to include 90% of the acreage in 2002. Except for Sclerotinia blight which is a major production constraint in Caddo Co., the southwestern area experiences lower disease pressure, particularly from foliar disease. New producers have been or are cotton farmers who have switched to peanuts or included peanuts in rotations with cotton.

It is assumed by many that the shifting peanut production in Oklahoma is a result of unprofitable dryland acres in the traditional production areas moving to irrigated fields in the southwest capable of producing higher yields. However, farm statistics do not yet support this notion. Irrigation has been stable at about 70-75% from 1990 to 2000, but did increase to 82% in 2001. Except for three outlying years with weather-related problems, average state yields have fluctuated between 2,200 and 2,600 lb/A without an obvious upward trend.

For Oklahoma to remain a significant peanut producing state in the future, it will be critical to retain production in Caddo Co. and increase production in other southwestern counties. It is unlikely that peanut production will recover in central and south-central areas. For example, Bryan Co. in south-central Oklahoma had more than 16,000 acres in 1990, 4,000 acres in 2001, and only about an estimated 400 acres in 2002. Salinity and water availability problems may limit further increases in acreage in the new production areas of southwestern Oklahoma. However, further increases in production may be possible to the north in western Oklahoma.

In Caddo Co. and other areas where quota holders are trying to continue peanut production under the new economic climate, the "million-dollar question" has been "How are we going to maintain high yields while reducing the costs of production?". Unfortunately, we have few new answers to this question except that the Peanut Improvement Team at Oklahoma State University has been continually working toward that end for many years. We have been "chipping away" at production costs by demonstrating and recommending the cost-effective practices such as 1) judicious fertilization based on soil testing, 2) reduced seeding rates, 3) conservation tillage, 3) efficient fungicide timing through use of the weather-based, early leaf spot advisory program available statewide on the internet, 4) partially resistant varieties for Sclerotinia blight and other diseases, 5) omitting insecticide application for cosmetic insect problems. Except for the planting partially resistant varieties such as Tamspan 90 and Tamrun 96 for control of Sclerotinia blight, adoption of efficient production practices by growers can be greatly improved. However, more intensive oversight and management by growers will be required to fully utilize the improved, research-based practices.

Application of currently-available technology is beneficial, but only limited reductions in production inputs can be expected. For example, in addition to simply planting a partially resistant variety, a fungicide program that costs from \$40 to \$80/acre is required to achieve maximum productivity in fields where Sclerotinia blight is a problem. New breakthroughs are needed to "split the rock" of production inputs. Improving genetic resistance to diseases and insect pests will be key for making sizable gains in reducing pesticide inputs. In Oklahoma, projects are currently underway to increase levels of Sclerotinia blight resistance using both biotechnology and traditional breeding methods. The gains realized in other crops using biotechnology for herbicide and insect resistance have yet to be realized in peanut production.

The economic pressures that face us in Oklahoma are probably similar to those in other production areas of the United States. While I believe we are up to the challenge, the impacts of the drastic changes in peanut economics that occurred so quickly will not wait for long-term solutions. These economic

impacts were covered in detail during the symposium on peanut provisions of the new farm legislation presented earlier in the meeting. The future of peanut production in Oklahoma will depend on economics at the farm level, i.e., whether or not the crop is profitable. While we remain somewhat optimistic, more changes are likely to occur and they will occur quickly!

BUSINESS MEETING AND AWARDS CEREMONY
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
SHERATON IMPERIAL HOTEL
RESEARCH TRIANGLE PARK, NORTH CAROLINA
JULY 19, 2002

The meeting was called to order by President John Damicone. The following items of business were conducted.

1. President's Report – John Damicone
2. Reports were given and awards were made by the following people. Detailed reports are presented in the PROCEEDINGS.
 - a. Coyt T. Wilson Distinguished Service Award – Richard Rudolph
 - b. Fellows Award – Hassan Melouk
 - c. Bailey Award – Barbara Shew
 - d. Joe Sugg Graduate Student Competition – Carroll Johnson
 - e. Dow AgroSciences Awards for Research and Education – John Baldwin
 - f. Past President's Award – John Damicone
 - g. Peanut Science Associate Editors – Tom Stalker
3. The following reports were made, accepted, and approved by the membership. Detailed reports are presented in the PROCEEDINGS.
 - a. Executive Officer Report and Reading of Minutes of 2001 meeting – Ron Sholar
 - b. Finance Committee Report – Marshall Lamb
 - c. Public Relations Committee Report – Curtis Jolly
 - d. Publications and Editorial Committee Report – Ken Dashiell
 - e. Peanut Science Editor's Committee Report – Tom Stalker
 - f. Nominating Committee Report – Austin Hagan
 - g. Fellows Award Committee Report – Hassan Melouk
 - h. Bailey Award Committee Report – Barbara Shew
 - i. Joe Sugg Graduate Student Award Report – Carroll Johnson
 - j. Coyt T. Wilson Distinguished Service Award Report – Richard Rudolph
 - k. Dow AgroSciences Awards Committee Report – John Baldwin
 - l. Peanut Quality Committee Report – Mark Burow
 - m. Site Selection Committee Report – Ron Sholar
 - n. Publications and Editorial Committee Report – Ken Dashiell
 - o. Program Committee Report – Thomas Isleib
4. John Damicone turned the meeting over to the new President, Thomas Isleib of North Carolina, who then adjourned the meeting.

FINANCE COMMITTEE REPORT

The APRES finance committee met Tuesday, July 16, with the following members present – Vernon Langston, David Hunt, Austin Hagan, Hassan Melouk, Marshall Lamb and Ron Sholar as ex-officio. David Hunt reported that the society does not need liability insurance for activities because contractors have coverage. A 10 year procedural audit was reviewed and unanimously approved. No recommendations were made by the auditors to change the current accounting procedures.

The committee unanimously recommended that registration fees for the 2003 meeting be raised by \$25.00. The committee unanimously recommended that all new member membership dues be set at 1/2 rate for 1 year to encourage joining APRES.

The society currently owns 848 copies of Advances in Peanut Science and the committee recommended that the price per book be set at \$10.00 to sell more books.

The committee unanimously voted to submit a budget of \$94,824.00 for 2002-2003. This includes compensation for the executive officer position and a 4% raise for our two employees. Overall, the society remains in excellent financial position. However, we must closely monitor future income and expenses to ensure the long-term financial stability of the society.

Respectfully submitted by,
Marshall Lamb, Chair

**AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BUDGET 2002-03**

RECEIPTS

Registration	\$21,000
Membership Dues	18,000
Special Contributions	18,000
Other Income (Spouses program)	0
Differential Postage	1,200
Peanut Science & Technology	100
Quality Methods	0
Proceedings	0
Peanut Science & Page Charges	15,000
Peanut Research	0
Interest	6,000
Advances in Peanut Science	1,000
Other Income (Awards)	0
Total Receipts	\$80,300

EXPENDITURES

Annual Meeting	\$11,000
Spouse Program	500
Coyt Wilson Awards	1,000
Dow AgroSciences Awards	2,000
Fellows	150
Sugg, Bailey, Other Awards	750
CAST Membership	500
CAST BioTech	1,000
CAST Travel	0
Office Supplies	1,500
Secretarial Services	16,224
Postage	2,500
Travel – Officers	1,500
Bayer – Expense reimbursement (to Extension Agents)	4,000
Legal Fees (tax preparation)	2,200
Proceedings	5,000
Peanut Science	28,624
Peanut Science & Technology	0
Peanut Research	500
Quality Methods	0
Bank Charges	200
Miscellaneous	0
Advances in Peanut Science	0
Corporation Registration	300
OK/NC Sales Tax	0
Executive Officer Services	16,000
Reserve	0
Total Expenditures	\$95,448

**AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
BALANCE SHEET FOR FY 2001-02**

<u>ASSETS</u>	<u>June 30, 2001</u>	<u>June 30, 2002</u>
Petty Cash Fund	\$ 298.19	\$ 493.23
Checking Account	26,958.62	21,822.91
Certificate of Deposit #1	28,670.65	30,318.18
Certificate of Deposit #2	17,925.77	19,090.17
Certificate of Deposit #3	10,065.16	10,415.45
Certificate of Deposit #4	13,151.95	13,609.11
Certificate of Deposit #5	17,032.38	18,138.79
Certificate of Deposit #6	13,815.78	14,713.21
Certificate of Deposit #7	11,710.74	12,471.44
Certificate of Deposit #8	5,000.00	5,581.94
Money Market Account	1,836.20	1,850.12
Savings Account (Wallace Bailey)	919.33	757.12
Bayer Account	12,292.94	8,635.35
Computer/printer	1,247.53	677.72
Peanut Science Account (Wachovia Bank)	1,453.60	2,939.08
Inventory of PEANUT SCIENCE AND TECHNOLOGY Books	3,600.00	3,530.00
Inventory of ADVANCES IN PEANUT SCIENCE Books	<u>18,340.00</u>	<u>17,774.08</u>
TOTAL ASSETS	\$184,318.84	\$182,817.90
<u>LIABILITIES</u>		
No Liabilities	0.00	0.00
<u>Fund Balance</u>	<u>\$184,318.84</u>	<u>\$182,817.90</u>
<u>TOTAL LIABILITIES & FUND BALANCE</u>	<u>\$184,318.84</u>	<u>\$182,817.90</u>

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

RECEIPTS	<u>June 30, 2001</u>	<u>June 30, 2002</u>
Advances in Peanut Science Book	\$ 1,492.57	\$ 1,125.00
Annual Meeting Registration	17,925.00	20,795.00
Contributions	24,554.41	14,050.00
Differential Postage	1,937.50	1,265.00
Dues	19,398.00	17,618.00
Interest	6,318.01	7,113.05
Peanut Research	36.00	0.00
Peanut Science	1,312.50	136.00
Peanut Science Page Charges	11,574.30	11,683.50
Peanut Science and Technology Book	255.00	95.00
Proceedings	78.00	43.00
Quality Methods	0.00	0.00
Spouse Registration	2,033.00	656.25
Miscellaneous Income	270.00	0.00
(\$240-AL Field Tour/\$30 credit Wallace Bailey checking account for service charges)		
Award Income (Bayer paid 2 plaques)	0.00	216.39
TOTAL RECEIPTS	\$87,184.29	\$74,796.19

EXPENDITURES	<u>June 30, 2001</u>	<u>June 30, 2002</u>
Advances in Peanut Science Book	\$ 0.00	0.00
Annual Meeting	22,999.86	15,147.61
Bank Charges	143.25	83.50
CAST Membership	1,529.00	1,546.00
Corporation Registration	100.00	230.00
Legal Fees	437.00	565.00
Miscellaneous	0.00	423.45
Office Expenses	1,377.16	1,367.84
Peanut Research	644.26	0.00
Peanut Science	23,110.15	28,174.41
Peanut Science and Technology Book	0.00	0.00
Postage	3,894.35	2,351.69
Proceedings	4,463.61	4,336.78
Sales Tax	62.40	48.79
Sec Services - Salary	11,166.00	12,062.40
Sec Services - Federal Withholding	1,008.00	984.00
Sec Services - FICA	1,660.56	1,785.60
Sec Services - Oklahoma Withholding	144.00	231.00
Sec Services - Medicare	388.32	417.60
Spouse Program Expenses	2,877.31	1,476.68
Refund (J French & K Robison)	30.00	0.00
Travel - Officers	1,062.93	1,852.04
Travel - CAST representative	0.00	0.00
Bayer - Reimb. expenses to Ext Agents	3,766.57	3,492.49
TOTAL EXPENDITURES	\$80,864.73	\$76,576.88

2001 EXCESS RECEIPTS OVER EXPENDITURES	\$ 6,319.56
2002 EXCESS EXPENDITURES OVER RECEIPTS	\$ -1,780.69

**PEANUT SCIENCE BUDGET
2002-2003**

INCOME

Page and reprint charges	\$14,600.00
Journal orders	400.00
Foreign mailings	1,300.00
APRES member subscriptions	9,000.00
Library subscriptions	<u>2,700.00</u>

TOTAL INCOME **\$28,000.00**

EXPENDITURES

Printing and reprint costs	\$9,500.00
Editorial assistance	15,600.00
Office supplies	400.00
Postage	<u>2,500.00</u>

TOTAL EXPENDITURES **\$28,000.00**

**ADVANCES IN PEANUT SCIENCE
SALES REPORT AND INVENTORY ADJUSTMENT
2001-02**

Beginning Inventory	875
1st Quarter	25
2nd Quarter	2
3rd Quarter	0
4th Quarter	0
TOTAL	27

27 BOOKS SOLD X \$20.96 = \$565.92 decrease in value of book inventory.
848 REMAINING BOOKS X \$20.96 (BOOK VALUE) = \$17,774.08 total
value of remaining book inventory.

Fiscal Year	Books Sold
1995-96	140
1996-97	99
1997-98	66
1998-99	34
1999-00	45
2000-01	33
2001-02	27

**PEANUT SCIENCE AND TECHNOLOGY
SALES REPORT AND INVENTORY ADJUSTMENT
2001-02**

Beginning Inventory		360
1st Quarter	2	358
2nd Quarter	2	356
3rd Quarter	0	356
4th Quarter	3	353
TOTAL	7	

7 books sold x \$10.00 = \$70.00 decrease in value of book inventory.

353 remaining books x \$10.00 (book value) = \$3,560.00 total value of remaining book inventory.

<u>Fiscal Year</u>	<u>Books Sold</u>
1985-86	102
1986-87	77
1987-88	204
1988-89	136
1989-90	112
1990-91	70
1991-92	119
1992-93	187
1993-94	85
1994-95	91
1995-96	50
1996-97	33
1997-98	49
1998-99	37
1999-00	30
2000-01	22
2001-02	7

PUBLIC RELATIONS COMMITTEE REPORT

The committee met in July 2001. Two members were present, Kenny Robinson and Phil Mulder.

The committee investigated possibilities of networking through e-mail and electronic mail.

The committee investigated possibilities through the web-media. The committee believes that a membership drive is opportune at this moment.

The committee remembers Dr. Jack Bailey.

Respectfully submitted by,
Phil Mulder, Chair

Also included in this report is the necrology report on Dr. Jack Eugene Bailey.

Dr. Jack Eugene Bailey

Dr. Jack Eugene Bailey, 50 of 266 Wythe Lane Wendell, North Carolina, died April 2, 2002 at Duke Medical Center. He was a participant in a clinical trial for a possible cure for Myodisplasia Syndrome, an otherwise incurable bone marrow disorder. Through his death, he hoped that his "one more data point" could provide scientists with more information.

Jack developed his personal passion for science as an undergraduate at Stephen F. Austin University in Nacogdoches, Texas, while working on an environmental impact study of the Trinity River. That experience, and the mentoring he received while doing it, kindled a lifelong love for active learning and a commitment to helping young people. Jack continued his education at Michigan State University, East Lansing, Michigan, where he was granted both a Master's degree and PhD in Plant Pathology. In 1980, he began his career as a Professor, researcher, and an Extension Plant Pathologist in the Department of Plant Pathology at North Carolina State University, Raleigh, North Carolina, where he had primary responsibility for peanuts and small grains. Jack made notable innovations in the area of plant disease forecasting through the development of original computer models and weather sensing equipment. His methods for rating the likelihood of plant disease outbreaks, based on cumulative weather data, are now common agricultural practice. Jack had a unique ability to explain complicated concepts with persuasive clarity. The primary goal for all of his research was to provide better nutrition for the people of the world with the least possible negative impact on the environment. That led to participation in applied research projects in developing countries, including: Ghana, Mali, China, Russia, Thailand, Australia, The Philippines, and most recently, Korea and Nicaragua. Closer to home, it led him into countless public school classrooms, where he volunteered his time to introduce children to the excitement he felt about creative, scientific discovery. Jack's life was marked by zest for each day, great good humor, and kindness to all. He was a devoted husband, father, and friend.

He is survived by his wife, Dr. Rebecca Young Bailey; sons, Grant Bailey of Raleigh, North Carolina, and Burke, Trent and Gaines Bailey of the home; brother Sid Bailey and his wife Mindy of Murfreesboro, Tennessee, and brother Blake Bailey of Tyler, Texas, and Nan Bailey of Tyler, Texas; five nieces, five nephews, and many loving friends. His parents, Blake E. and Jenna F. Bailey of Fort Worth, Texas, preceded him in death. Memorial services were held on Saturday, April 20, 2002, at 11:00 a.m. on the grounds of the Bailey home with dinner following for all. The family requests that whenever you make your annual donations to your favorite charities, that you always think of Jack, and add an additional amount in his memory.

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT

Members present: Kenton Dashiell (Chairman), Ames Herbert, James Sutton, David Jordan, Eric Prostko and Jay Chapin

Thomas Stalker was in attendance to present the Peanut Science Editor's Report and Carroll Johnson was also present and gave the report of the Electronic Publication Ad Hoc Committee Report. John Beasley was invited to give a report on the Peanut Research publication but he did not participate in the meeting.

Carroll Johnson presented the report of the ad hoc committee to study the Electronic Publication of Peanut Science.

Electronic Publication Ad Hoc Committee

The committee had a thorough discussion and found that the advantages of converting Peanut Science to an electronic journal would be: 1) faster publication, 2) wider readership because anyone on the world wide web could access the journal, 3) more citations of Peanut Science, 4) higher quality graphics and 5) fewer publication errors. However, the disadvantages would be 1) some libraries would stop receiving the journal (less income), 2) start up costs, 3) some people will want paper copies of the journal and they will not be available, 4) some individual members will not renew their membership (less income), 5) backup problems and 6) archiving old issues.

The committee endorses the report of the Ad Hoc Committee and passes their recommendations on to the Board of Directors.

Tom Stalker presented the Peanut Science Editors Report (this report is given below). The committee discussed this report and also expressed their appreciation to Tom Stalker and the Editorial Board for their dedication and service to the Peanut Science Journal.

The Committee expressed concern about delays in publishing Peanut Research and the 2001 Proceedings.

The Committee recommends the following to the Board.

- 1) The members of APRES need to be given information about the advantages and disadvantages of having Peanut Science and Peanut Research published on the World Wide Web and have them vote if they want one or both of them to continue as is or change to be published on the Web. Based on the results of this survey the Board can decide how to proceed. If a decision is made to change to electronic publication of the Journal this can start with Volume 30 in 2003.
- 2) The following should be appointed as Associate Editors of Peanut Science, Eric Prostko, James Gricher, and Tom Whitaker with Jay Williams as an alternate in case one of the persons named can't serve.
- 3) Because some copies of Peanut Science, Vol. 28, No. 2 had major mistakes we need advice from the Board on what action needs to be taken. 1) Ask the printer to print copies again and mail to the members, 2) Send reprints of articles that had mistakes, 3) Send letter to members with offer to send new issue or 4) Send letter to members with offer to send reprints of articles with mistakes.
- 4) Recommendations 1 through 4 as given in the Electronic Publication Ad Hoc Committee Report.

Respectively submitted by,
Kenton Dashiell, Chair

ELECTRONIC PUBLICATION AD HOC COMMITTEE REPORT

The Electronic Publication Ad Hoc Committee met on Tuesday 16 July to discuss the possibility of changing PEANUT SCIENCE from a traditional printed publication to an electronic internet accessible publication. Committee members were Carroll Johnson (Chairman), Ames Herbert, James Sutton, Ken Dashiell, Jay Chapin, Tom Stalker, David Jordan, and Eric Prostko.

The members informally surveyed their colleagues on this proposed change. The majority of those questioned favored the change to an all electronic publication.

The Ad Hoc committee made the following recommendations to the Publications and Editorial Committee:

1. The Ad Hoc Committee is in favor of changing PEANUT SCIENCE from a printed publication to an electronic internet accessible journal, provided that careful analysis shows that to be within the budgetary limits of the society.
2. Survey the APRES membership with a written ballot to determine support for the proposed change. Terminate the process if the membership is not in favor of the change.

3. Commission another committee to conduct a detailed analysis on the cost (start-up and recurring) of the proposed change, the processes involved with an electronic publication, vendors who do this type of work, and compare costs of the proposed change to current costs of operating the journal.
4. Expand this discussion to include APRES web-site improvements, email communications to membership at-large, and all publications in electronic format accessible from the APRES web-site (newsletter, proceedings, PEANUT SCIENCE, and Call for Papers).

Respectively submitted by,
W. Carroll Johnson, III, Chair

PEANUT SCIENCE EDITOR'S REPORT

Volume 28 of Peanut Science had 26 manuscripts totaling 149 pages. Included in this volume were nine papers from the 2000 APRES Symposium "Genetic Resources for the Third Millennium". It should be noted that all symposium papers were peer reviewed before acceptance, and that not all of the papers presented at the symposium were published in the journal. Volume 29, issue no. 1 is in press and will have 13 manuscripts which should be sent to the membership in September. Five manuscripts have been accepted for Volume 29, no. 2.

Thirty-nine manuscripts were submitted to the journal from July 1, 2001 to June 30, 2002. This number represents an equal number to the previous year, and reverses a downward trend when the journal was averaging only 24 manuscripts.

Last year's budget has been itemized and a proposed budget for the coming year has been completed. Both budgets can be found in these Proceedings. The journal experienced a financial loss of \$2,459 and to be financially solvent, the journal needs to have a larger distribution to membership and libraries.

During the past year the publisher has caused lengthy and unnecessary delays. All of the papers were submitted to Pierce Publishing Co., by the 2nd week of October 2001, and the journal was not complete until June 2002. Several galley proofs had tables and whole paragraphs missing; and for the first time, we had to proof the book twice after galley proof corrections were suppose to have been made by the publisher. Further, a random leaf-through of several copies of the journal had pages with the wrong text and at least one article has five of six pages missing. Other copies had the correct text. Because the journal was mailed before errors in binding were found, an estimate of the number of bad copies cannot be made. I am beginning the process to identify another publisher for the journal.

Christopher L. Butts and Timothy H. Sanders have completed six-year terms as Associate Editors of the journal. Drs. Robert G. Lemon and David L. Jordan have completed three-year terms as Associate Editors, and because of other

commitments they will have resigned as associate editors. Sincere thanks is expressed to each of these Associate Editors for service to the journal and to APRES.

Respectfully submitted by,
H. Thomas Stalker
Editor, Peanut Science

NOMINATING COMMITTEE REPORT

Report to the Board of Directors, Thirty Fourth Annual Meeting of the American Peanut Research and Education Society.

The Nominating Committee for the 2002 Annual Meeting of the American Peanut Research and Education Society consisted of Walt Mozingo (Tidewater Research and Education Center, VPI&SU), Max Grice (Birdsong Peanuts), Christopher Butts (USDA, National Peanut Laboratory), and Austin Hagan (Auburn University, Past President).

The Nominating Committee was charged with nominating candidates to serve as President-Elect, and representatives to the Board of Directors.

The Nominating Committee met at 3:00 p.m. in the Sheraton Imperial Hotel. Walt Mozingo, Christopher Butts, and Austin Hagan were in attendance.

The committee nominated the following individuals:

President-Elect	Ben Whitty
Industry Representative	Richard Rudolph
Southwest Representative	Ken Dashiell
Southeast Representative	Jay Williams

Respectively submitted by,
Austin Hagan, Chair
Walt Mozingo
Christopher Butts
Max Grice

FELLOWS COMMITTEE REPORT

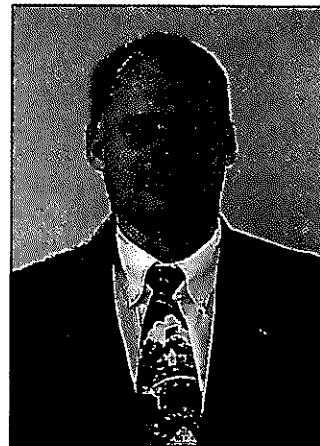
The Committee met on Tuesday, July 12. Committee recommends that nominators whose nominees were not selected for Fellow are encouraged to update the nomination package for re-submission the following year providing that the nominee agrees to be reconsidered for the nomination.

The Fellow Committee is hereby recognizing the tremendous service, support, and leadership of the late Dr. Jack Bailey to the American Peanut Research and Education Society over the last twenty years.

Respectfully submitted by,
Hassan Melouk, Acting Chair
John Baldwin
Charles Swann
Roy Pittman
Thomas A. Lee,Jr.

BIOGRAPHICAL SUMMARIES OF FELLOWS

Dr. John Palmer Beasley, Jr. is Professor and Extension Peanut Agronomist with the Crop and Soil Sciences Department of the University of Georgia. He is a native of Columbia, Alabama. Dr. Beasley received his B.S. (1979) in Agronomy and Soils from Auburn University, Auburn, AL.; M.S. (1981) in Agronomy from Oklahoma State University, Stillwater, OK; and Ph.D. (1985) in Crop Science from Louisiana State University, Baton Rouge, LA. While an undergraduate at Auburn, Dr. Beasley was hired in 1975 as one of the first field scouts in the federal peanut pest management program in Alabama under the leadership of Ron Weeks.



Dr. Beasley began his professional career in 1985 in Tifton, GA as Extension Peanut Agronomist with the University of Georgia. From the very start, he strongly emphasized the "team approach" to solving problems, realizing that peanut production is complex and requires teamwork, input, and expertise from many disciplines. As a result, the University of Georgia "Peanut Team" has been a very successful model of how research-based information has been developed and disseminated to county agents and farmers. As an extension agronomist, Dr. Beasley has been responsible for the development of applied research and educational programs in the area of peanut production and management. He has developed a very successful career that has been recognized with numerous awards. Dr. Beasley has placed a major emphasis on input management and production efficiency in order to maximize net profit. In the mid 1980's, when several new peanut cultivars were released, Dr. Beasley began to evaluate their response to the twin row pattern. In the late 1980's and early 1990's, he focused on seed input cost and management, especially in the twin row pattern where the tendency was to increase seeding rate. As a result, many growers lowered their seeding rates and cost per acre. Since tomato spotted wilt virus (TSWV) became a serious problem in the 1990's, Dr. Beasley has worked as a part of the TSWV team to help develop production management systems that help producers lower their risk of TSWV. Other areas in which Dr. Beasley has focused his program are: adaptation of new cultivars, evaluation of plant growth regulators and yield enhancers, and quality parameters affected by agronomic production.

Dr. Beasley's extension program has been very productive. He has authored 70 extension bulletins, circulars, leaflets, and production guide chapters, 56 abstracts, and over 380 newsletter articles. He was a co-author on the "Peanut Cultural Practices" chapter in *Advances in Peanut Science*. Dr. Beasley has been interviewed on 181 TV programs and 277 radio programs. Dr. Beasley has presented 36 professional society papers as senior author, conducted 62 in-service extension agent training sessions, 555 county extension production meetings, and been invited on 109 occasions as guest speaker at national,

regional, and state peanut industry meetings. In addition, he has given 13 international presentations. Dr. Beasley helped initiate the University of Georgia - Australian Peanut Industry Agronomist Exchange Program. Dr. Beasley was invited as the keynote speaker for the 2nd Annual Australian Peanut Conference in 1997. Dr. Beasley was also one of three individuals that together conceived and developed the idea of the Georgia Peanut Tour, which has been a huge success since the initial tour in 1987.

Dr. Beasley has won numerous awards, including the Dow AgroSciences Award of Excellence in Education from APRES, the Early Career Award in Technology Transfer from the Southern Branch of the American Society of Agronomy, the Georgia Peanut Commission Research and Education Award on three separate occasions, and five "Certificates of Excellence" for Development of Agronomic Educational Material from the American Society of Agronomy. He has also been very active in the peanut industry, especially the American Peanut Council where he has served as chairman of several committees. He has also served on the Quality Task Force and co-chaired the Best Management Practices Manual revision Task Force.

Dr. Beasley first joined APRES in 1979 when he began his work as a graduate student in peanut breeding under Dr. Jim Kirby. Although his Ph.D. program at LSU was in cotton, he maintained his membership with APRES, not knowing that just four years later he would be back working in peanuts. He has been a very active member of APRES, having served on the Board of Directors (1996-1999) and as Chair of the Local Arrangements Committee for the 1999 annual meeting. Other committees on which Dr. Beasley has served include Public Relations (Chair), Outstanding Extension Program Ad-hoc, 1990 Annual Meeting Technical Program, Dow AgroSciences Research and Education Award, Fellows, and Bailey Award (Chair). Dr. Beasley has presented 15 papers at APRES meetings since the 1986 annual meeting, including two invited symposia papers. He is currently serving as editor of "Peanut Research".

Dr. Beasley has had a very successful and productive career in peanut extension work. He has always been a strong proponent of the teamwork approach to solving problems and derives his greatest satisfaction from seeing producers succeeding as a result of peanut scientists working together.

Dr. Robert E. Lynch is the Research Entomologist, USDA-ARS, Tifton, GA. He is a native of Luxora, AR. Dr. Lynch received his B.S.E. (1965) from Arkansas State University, Jonesboro, AR, and M.S. (1969) and Ph.D. (1974) from Iowa State University, Ames, IA.

For the past 22 years Dr. Lynch has conducted a comprehensive, problem-oriented research program on peanut and forage grasses dealing with plant resistance to insect pests, crop quality/yield/grade relationships resulting from plant pathogens vectored by insects, interactions among damage to peanut pods by insects, environmental conditions, and aflatoxin contamination of peanut seed. Dr. Lynch is a recognized national and international leader in research on plant resistance to insects of peanut, forage grasses, corn and tritrophic interrelationships among peanut, insect damage to pods, and aflatoxin formation.

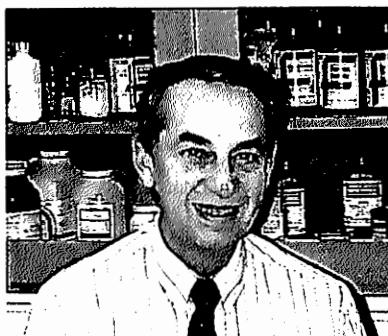


During his research career, he has authored or co-authored 128 scientific publications, made over 120 paper presentations at scientific meetings, more than 30 of which were by invitation. His ability to lead other scientists and work cooperatively is exemplified by more than 80 scientists with whom he has co-authored scientific publications, and by requests by the Area Office that he assume increased administrative leadership roles.

During Dr. Lynch's career he has received many honors and awards including a Certificate of Merit from Dr. Roger Breeze, Area Director, South Atlantic Area, for outstanding performance as Acting Laboratory/Location Coordinator for Tifton (1998); Recipient of a Certificate of Merit from Dr. Mary Carter, Area Director, South Atlantic Area, for exemplary service as Acting Associate Director (1995); Elected President of the Southeastern Branch, Entomological Society of America (1993-1994) and also elected as President of the Georgia Entomological Society (1994-1995); Appointed to serve on the Board of Directors, American Peanut Research and Education Society(1996-1999); Elected President of the American Peanut Research and Education Society(1999-2000); and elected Fellow of the Georgia Entomological Society (2002).

Dr. Lynch has served APRES, the Entomological Society of America, ARS, and national and international agriculture in an outstanding manner. He has been very productive as a research scientist and leader in pioneering the development of new concepts, methods, and technologies for advancing the use of integrated farming systems, and plant resistance to insects and aflatoxin contamination as major components in integrated, sustainable systems for management of key agricultural pests.

Dr. Patrick M. Phipps is Professor of Plant Pathology, Virginia Polytechnic Institute and State University and is stationed at the Tidewater Agricultural Research and Extension Center. Dr. Phipps received the B. S. (1970) degree from Fairmont State College, M.S. (1972) from Virginia Polytechnic Institute and State University, and Ph.D. (1974) from West Virginia University.



Dr. Phipps is an outstanding extension specialist, researcher and educator. Throughout his career working with diseases of field crops in Virginia, Dr. Phipps has conducted an exceptional program to manage and control diseases that affect peanut production. He was an early innovator in the practical applications of computer technology in extension programs. He initiated the Peanut Leaf Spot Advisory in Virginia that has served as a model program for reducing pesticide applications. He implemented a weather monitoring system for peanut and the Peanut/Cotton InfoNet to improve client access to crop advisories. Through regional and cooperative programs, the Sclerotinia Blight Advisory and the Frost Advisory Programs were developed and implemented.

Dr. Phipps demonstrated the importance of nematode control in peanut-producing counties. He developed an applied research laboratory and Plant Diagnostic Clinic at the Tidewater Center to provide technical support for peanut and other crops. Dr. Phipps was the first researcher to demonstrate the use of metam sodium for control of Cylindrocladium black rot. His research has been crucial for improved control of Cylindrocladium black rot, leaf spots, and Sclerotinia blight in peanut.

Dr. Phipps has been the major advisor of eight graduate programs. His students have won awards four times at the American Peanut Research and Education Society annual meetings and four times at the American Pathological Society meetings.

Dr. Phipps has been active in the American Peanut Research and Education Society with service on the Board of Directors, chair of numerous committees, and as an Associate Editor of Peanut Science for six years.

He is the author of numerous refereed journal publications, book chapters and abstracts related to peanut research. Additionally, Dr. Phipps has authored more than 100 extension publications, videotapes and web pages in addition to more than 100 articles in trade journals.

Dr. Phipps has received numerous awards presented at Virginia Tech and by the American Society of Agronomy for extension and research contributions. In addition, he was awarded the Peanut Research and Education Award by the American Peanut Council (2000), Dow AgroSciences Award for Excellence in Education by APRES (1999), The Bailey Award three times by APRES (1985, 1990, and 1991), and the First Place Award for Best News Article by the Virginia Peanut Growers Assoc. (1979).

Dr. Phipps has made significant contributions to disease control in peanut which have had large impacts on production. His contributions have benefited the peanut industry in Virginia and other states. He has been an effective leader in the American Peanut Research and Education Society and his long-term extension, research, and educational efforts have greatly enhanced science and technologies related to peanut.

Guidelines for
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
FELLOW ELECTIONS

Fellows

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

Eligibility of Nominators

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

Eligibility of Nominees

Nominees must be active members of the Society at the time of their nomination and must have been active members for a total of at least five (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 and voting members of the APRES Board of Directors are ineligible for nomination.

Nomination Procedures

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

Format. Organize the nomination in the order shown in the "Format for Fellow Nominations." 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. Members of the Fellows Committee, the APRES Board of Directors, and the nominator are not eligible to write supporting letters.

Deadline. Six (6) copies of the nomination are to be received by the chairman of the Fellows Committee by March 1 each year.

Basis of Evaluation

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

Processing of Nominations

The Fellows Committee shall evaluate the nominations, assign each nominee a score, and make 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 shall be returned to the nominators and may be resubmitted the following year.

Recognition

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

Distribution of Guidelines

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

Format for

**AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
FELLOW NOMINATIONS**

TITLE: "Nomination of _____ for Election to Fellowship by the American Peanut Research and Education Society."

NOMINEE: Name, date and place of birth, mailing address, and telephone number.

NOMINATOR: Name, signature, mailing address, and telephone number.

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

Secondary areas: designate contributions in areas other than the nominee's primary area of activity.

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

I. Personal Achievements And Recognition (10 points)

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

II. Achievement in Primary (50 Points) And Secondary (10 Points) Fields of Activity

A. Research

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

B. Extension

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

C. Service to Industry

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

D. Administration or Business

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

III. Service to The Profession (30 Points)

A. Service to APRES including length, quality, and significance of service

1. List appointed positions.
2. List elected positions.
3. Briefly describe other service to the Society.

B. Service to the profession outside the Society including various administrative skills and public relations actions reflecting favorably upon the profession

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

EVALUATION: Identify in this section, by brief reference to the appropriate materials in sections II and III, the combination of the contributions on which the nomination is based. Briefly note the relevance of key items explaining why the nominee is especially well qualified for fellowship.

BAILEY AWARD COMMITTEE REPORT

There were 13 qualified nominees for the Bailey Award from 2001 meeting in Oklahoma City. Eight manuscripts were received for evaluation for the Bailey Award to be presented at the 2002 meeting in Raleigh. The winning paper was submitted by Dr. Maria Gallo-Meagher and titled "Phorate-induced peanut genes that may condition acquired resistance to tomato spotted wilt". There were 16 qualified nominees for the Bailey Award from the Raleigh meeting. This included 1 from the graduate student section and one from each of the other sections of the meeting. Letters are being prepared at this time to notify each of the candidates of their nomination and to ask them to consider preparing a manuscript for the Bailey Award.

Respectfully submitted by,
Todd Baughman, 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:

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

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

JOE SUGG GRADUATE STUDENT AWARD COMMITTEE REPORT

The committee met at 3:00 p.m. at the Sheraton Hotel in Research Triangle Park, North Carolina. The following members were present; Carroll Johnson, Peter Dotray, Ron Weeks, Brent Besler, and Bob Kemerait.

Twenty students competed in the 2002 Joe Sugg Graduate Student Contest. Score sheets were mailed in May to each student participating in the contest as an aid in preparing their presentations.

Copies of the student's abstracts were obtained from the technical editor and distributed to the five judges. These were to be used to help brief the judges on the presentations, since there are 20 uninterrupted graduate student presentations with little time to tabulate scores. The abstracts were not used in the overall evaluation and scoring.

Judges were encouraged to provide as many constructive comments on the score sheets as possible, increasing the student's learning experiences from the contest. Chairman Johnson will then mail score sheets to the students after the meeting.

In follow-up business, the committee would like to make the following recommendations for action by the APRES Board of Directors:

1. Provide a provision to allow the Contest to be split into two or more sections in cases where there are more than 12 students entering the contest. The Joe Sugg Committee would decide in advance how the contestants would be split; by discipline, subject material, degree, or random drawing and coordinate this separation with the Program Chairman. This would require allocation of additional prize monies for the extra sections.
2. Authorize for 2002, recognition of a third place winner, with prize money of \$125.00. We are proposing this change since there are 20 students competing this year.

Respectively submitted by,
W. Carroll Johnson, III, Chair

THE COYT T. WILSON DISTINGUISHED SERVICE AWARD COMMITTEE REPORT

The Coyt T. Wilson Distinguished Service Award Committee met at 1:00 p.m. July 16, 2002 in Raleigh, North Carolina. The selection of Dr. Harold Thomas Stalker as recipient of the 2002 award was confirmed.

The committee thanks those who nominated Society members for consideration, and commends you for the excellent nomination packages prepared.

We also recommend that before the end of the year, either by email or newsletter, the membership be reminded of the early spring deadline for submitting nominations.

Respectfully submitted by,

Richard Rudolph, Chair

Thomas B. Whitaker

A. M. Schubert

Corley C. Holbrook

Eric P. Prostko

Charles E. Simpson

BIOGRAPHICAL SUMMARY OF THE COYT T. WILSON DISTINGUISHED SERVICE AWARD RECIPIENT

Dr. H. Thomas Stalker earned both his B.S. and M.S. degrees in Agronomy from the University of Arizona, and his Ph.D. in Genetics from the University of Illinois. After earning his doctorate in genetics, Dr. Stalker became a Research Associate at North Carolina State University in 1977. Since then, he has served as Assistant Professor [1979-1983], Associate Professor [1983-1989], Professor [1989-date], and Head [1999-date] of the Department of Crop Science at North Carolina State University.

Dr. Stalker's research has focused on introgression of genes from wild to the cultivated species. When he began this research in 1977, it was long-term and high-risk research with many barriers, which had to be overcome before success would be possible. Dr. Stalker's research on cytogenetics, taxonomy, crossing schemes, in vitro culture and regeneration methods, and the use of molecular markers has overcome many of the initial barriers. As a result of Dr. Stalker's research, nine interspecific peanut germplasm lines with resistance to leaf spot, two interspecific peanut germplasm lines with resistance to root-knot nematode, and four interspecific peanut germplasm lines with resistance to

insects have been released. During his tenure at North Carolina State University, Dr. Stalker has served as the major professor or committee member for 33 Masters and Ph.D. students. His dedication to teaching science is further demonstrated by his volunteer service in local elementary schools where he conducts demonstrations and lectures.

Dr. Stalker has been a member of the American Peanut Research and Education Society for 25 years. During that time, he has attended 23 annual meetings and served the Society in numerous capacities. As a member, Chair, or Ad-Hoc member Dr. Stalker has served on 30 Society committees. While on the Bailey Award Committee, Dr. Stalker played a significant role in revising the guidelines so that the Bailey Award is now more in keeping with the spirit of the award and the desires of our Society. On the Student Presentation Committee, Dr. Stalker was one of the leaders in developing the process that APRES now uses for bestowing the graduate student paper award at our annual meeting. In addition, he has been Chairman or Co-chairman of two Society Symposia. Dr. Stalker has authored or co-authored 41 papers for presentation at American peanut Research and Education Society meetings since 1977. Dr. Stalker's most significant contributions to the Society have been in the area of publications. He was a reporter for Peanut Research from 1983 to 1992, Associate Editor for Peanut Science from 1987 to 1994, and Editor of Peanut Science since 1994. Dr. Stalker also served as Co-Editor of Advances in Peanut Science from 1992 to 1995.

Throughout his distinguished career, Dr. Stalker has received many honors and awards from an assortment of organizations. For his contributions to the peanut industry, Dr. Stalker received the American Peanut Council Research and Education Award in 1999, and the Dow AgroSciences Award for Excellence in Research in 2000. The widespread recognition of Dr. Stalker's contributions to agriculture are evident in that he is recognized as a Fellow by the Crop Science Society of America, the American Society of Agronomy, and the American Peanut Research and Education Society.

APRES is fortunate to have a member like Dr. Stalker. As the author of one of the supporting letters stated: "Perhaps the distinguishing feature of Dr. Stalker's long and active career in APRES is that so many of his contributions to our society have been significant". He is richly deserving of receiving the recognition afforded.

Guidelines for

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

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

Eligibility of Nominators

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

Eligibility of Nominees

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

Nomination Procedures

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

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

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

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

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

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

Qualifications of Nominee

I. Personal Achievements and Recognition:

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

II. Service to the Society:

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

III. Supporting letters:

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

Award and Presentation

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

DOW AGROSCIENCES AWARDS COMMITTEE REPORT

The Dow AgroSciences Awards Committee consisted of seven members in 2001-2002.

They were as follows:

John Baldwin, Chair (2004)	Fred Shokes (2003)
Joe Funderburk (2002)	Mike Kubicek (2004)
Peggy Ozias-Akins (2002)	Albert Culbreath (2003)
Vernon Langston (Dow AgroSciences)	

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

The recipient of the 2002 Dow AgroSciences Award for Excellence in Research is Dr. W.C. Johnson, III, USDA/ARS Agronomist/Weed Scientist, Tifton, Georgia. The recipient of the Dow AgroSciences Award for Excellence in Education is Mr. Kenneth E. Jackson of Oklahoma State University, Department of Entomology and Plant Pathology. Biographical summaries for each winner is published in the APRES Proceedings and available as press releases.

The committee would like to encourage nomination of qualified APRES members. All members of APRES from all segments of the peanut industry should be considered for nomination for these prestigious awards. The 2002 committee further recommends that qualified nominees not receiving the award be allowed to be considered for one additional year with the current package and have the option to update the application by the deadline if desired. Also the wording on page 121 of the 2001 proceedings "A nominator's submittal letter summarizing the significant professional achievements and their impact on the peanut industry may be submitted with the nomination" should read "must be" instead of "may be". The final recommendation is that the committee would prefer electronic submission of the nominations and supporting letters to the committee Chair for ease of transfer to other committee members.

Respectfully submitted by,
John Baldwin, Chair

**BIOGRAPHICAL SUMMARY OF
DOW AGROSCIENCES AWARD FOR EXCELLENCE IN
RESEARCH RECIPIENT**

W. Carroll Johnson, III, a native of Auburn, AL, completed his B. S. degree in Entomology at Auburn University in 1979, M. S. (1981) and PhD (1984) degrees in Weed Science from North Carolina State University. He joined the University of Georgia faculty in 1984 as Extension Agronomist - Peanuts and later Extension Agronomist - Weed Science located at the Tifton Campus. In 1989, he joined the USDA-ARS at the Coastal Plain Experiment Station as Research Agronomist where he continued the peanut weed science research program started by Dr. Ellis Hauser. In 1993, Dr. Johnson's program was expanded to include weed science research on vegetable crops. Currently, Dr. Johnson weed science research efforts are evenly split between peanut and vegetable crops.

Dr. Johnson has written 33 referred journal articles, 11 extension publications, 33 popular press articles, and 62 abstracts during his eighteen-year research and extension career. He regularly assists in county agent training sessions, short courses, and is frequently invited to make presentations at meetings of grower associations for peanut and vegetable crops. Dr. Johnson is an active member of the Georgia Weed Science Committee, a grass-roots team of public-service weed scientists in Georgia who develop weed control recommendations, coordinate research and extension programs, and provide technical guidance on weed science issues.

Dr. Johnson is proud to be a second-generation agronomist; his father is Dr. Wiley C. Johnson, Jr., retired professor in the Agronomy and Soils Department at Auburn University. Carroll's father and his graduate advisor, Dr. Harold D. Coble, both shaped his overall approach to agricultural research: be an agronomist first, weed scientist second.

Carroll is married to June Womack Johnson and they have twin daughters, Anna and Sara.

**BIOGRAPHICAL SUMMARY OF
DOW AGROSCIENCES AWARD FOR EXCELLENCE IN
EDUCATION RECIPIENT**

Mr. Ken Jackson is an Assistant Extension Specialist in the Entomology and Plant Pathology Department at Oklahoma State University, Stillwater. Mr. Jackson received a B. S. in Agriculture (1969) from Fort Hays State University, Hays, Kansas, and a M. S. degree in Plant Pathology (1972) from University of Arkansas, Fayetteville, Arkansas. His entire career in Plant Pathology has been spent at Oklahoma State University.

Mr. Jackson has extensive knowledge of agriculture and plant pathology. He has been the heart and soul of the peanut disease program at Oklahoma State University. His work ethic and productivity are truly remarkable. He is highly respected by both growers and his coworkers in the peanut industry. Mr. Jackson has served the peanut industry in an exemplary manner in the last 30 years by conducting crucial demonstration research of fungicides, nematicides, biological control agents, cultural practices, and evaluating of peanut germplasm and cultivars for disease reaction under various chemical inputs to identify the most effective and economical treatments.

Mr. Jackson has made recommendations on an incredible number of new products. He is a master at transferring the knowledge and insight he has gained from his field work to producers. He is a much sought after speaker at field days and tours and county meetings. His straight-forward delivery is met with great enthusiasm by growers, and he has the touch for packaging his message in a way that growers will want to hear and respond positively to it. He knows how to separate the grain from the chaff and his style of delivery is highly effective with growers.

Mr. Jackson has been actively involved in the American Peanut Research and Education Society, and has served the society in many capacities in the last 20 years. His contributions to higher education are many, where in the last 15 years he has served on several graduate student committees at Oklahoma State University. Mr. Jackson has played an active role in the development and release of several peanut cultivars, where he has provided expertise in disease evaluation and management.

Guidelines for
DOW AGROSCIENCES AWARDS FOR EXCELLENCE
IN RESEARCH AND EDUCATION

I. Dow AgroSciences Award for Excellence in Research

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

Eligibility of Nominees

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

II. Dow AgroSciences Award for Excellence in Education

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

Eligibility of Nominees

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

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

Eligibility of Nominators

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

Nomination Procedures

Nominations will be made on the Nomination Form for Dow AgroSciences Awards. Forms are available from the Executive Officer of APRES. A nominator's submittal letter summarizing the significant professional achievements and their impact on the peanut industry 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.

Dow AgroSciences Awards Committee

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

NOMINATION FORM FOR DOW AGROSCIENCES AWARDS

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

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

Dow AgroSciences Award for Excellence in Education
 Dow AgroSciences Award for Excellence in Research

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

Nominee(s):

Address

Title _____ Tel No. _____

II. Nominator:

Name _____ Signature _____

—

Address

Title _____ Tel No. _____

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

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

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

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

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

PEANUT QUALITY COMMITTEE REPORT

Attendance: Mark Burow (Chair), Doug Smyth, Victor Nwosu, T. G. Isleib, Pat Donahue, Margaret J. Hinds, Alain Mayeux, Charles E. Simpson, Rick Wilson, Michael Baring, Mac Birdsong, Joe Dorner, Marshall Lamb, Paul Blankenship, Howard Valentine, Paul Woodall, and Mpoko Bokanga.

The committee discussed four issues of peanut seed quality. No recommendations were made to the Board of Directors, however further discussion was suggested. Four areas were discussed.

1. UPPT Data. Mark Burow mentioned that the 2001 UPPT Chemical, Sensory, and Shelf Life Properties booklets now contain data on oil content and O/L ratios, iodine value, tocopherols, total sugars, and flavor characteristics. Tom Isleib mentioned that Harold Pattee had done considerable work in flavor evaluation and study of flavor components, and these data were being used in the NC State breeding program. Charles Simpson mentioned that Texas A&M has had a National Peanut Board grant and for the last 2 years has been obtaining data on sugar, oil, blanchability, seed size distribution, and shelling percentage. In West Texas, sugar content is the most important. However, more data are needed from earlier generations to be of more benefit to breeders.
2. Environmental variability in quality data. Mark Burow cited the UPPT booklet, stating that there were ranges from 2% to 5% sugar content for certain varieties, depending upon location. It was noted that industry adjusts processing for geographic region. For West Texas, a lower roasting temperature is used to compensate for higher sugar content. Doug Smyth mentioned that sugar itself is not necessarily the problem. Immaturity of varieties is the major problem associated with flavor in West Texas. Industry receives complaints about off flavors. Victor Nwosu mentioned that problems in the Southwest are in Virginias and runners, but not in Spanish peanuts.
3. Oil quality and quantity. Mark Burow mentioned that new high oleic/linoleic varieties are being developed to help with shelf life. He asked why there were such large differences in O/L ratios in the UPPT results for some varieties between different locations. Some of the boxes from West Texas was damaged during shipment and seeds may have been mixed, resulting in low values for Tx977006. Charles Simpson said that use of mediums biased the results, because Tx977006 would be more properly sold as a Virginia peanut, based on seed size. Mediums were largely immature and had lower O/L values. Tom Isleib mentioned that in a backcross population, high O/L varieties had increased roasted peanut flavor.

Doug Smyth said that total oil is important for industry. This has dropped from 1 to 1 1/2 percentage points relative to Florunner. As a consequence, external oil must be added to make salt stick, and affects the consistency of peanut butter. Tom Isleib stated that breeders need a figure for what is the ideal oil percentage.

Tom Isleib stated that although there are genetic effects of quality, environmental effects are often more significant but poorly understood. TSWV affects flavor, and it is possible that cultivation practices or treatments may affect flavor. Harold Pattee found that genetic variance for sweetness is only 25%; for roasted peanut flavor, heritability is less than 12%. It would be useful to study the effects of cultural practices on flavor. Howard Valentine mentioned that the American Peanut Council will have a meeting in December with industry and sheller representatives to discuss ideal peanut characteristics, and invited breeders to attend and discuss ideal trait values.

4. Peanut allergens. Mark Burow mentioned that several papers will be presented at this meeting on peanut allergy. Howard Valentine mentioned a hypoallergenic peanut hasn't been developed yet. A peanut vaccine is currently under development.

PROGRAM COMMITTEE REPORT

The North Carolina APRES membership worked to develop the program for the 2002 annual meeting. Special recognition is due to David Jordan for local arrangements, Barbara Shew for technical program, and Bob Sutter of the North Carolina Peanut Growers Association. APRES Executive Officer, Ron Sholar, and office administrator, Irene Nickels, provided invaluable assistance. Linda Sholar, Peggy Brantley, Susan Copeland, and Betsy Randle-Schadel staffed the registration desk and spouses' program.

The plenary session of the 2002 annual meeting was devoted to a panel discussion of the legislative development and economic implications of the recently passed federal agricultural program. One hundred thirteen technical presentations were submitted, including 20 in the graduate student competition, and 23 posters were submitted. The rate of no-shows was relatively high for posters.

The program committee decided not to support the use of Powerpoint during the technical sessions due to the problems its use presents to session chairs. Nearly all authors complied with the restriction without problem.

Registration included 275 members and 135 spouses and children.

Respectfully submitted,
Thomas G. Isleib

Contributors to the 2002 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:

Special Activities

BASF Corporation	Bayer Crop Science
Dow AgroSciences	Syngenta

Regular Activities

Amvac	Bayer Crop Science
Becker Underwood	Birdsong Peanuts
Chem Nut	Eden BioSciences
Golden Peanut Company	Gowan
Griffin LLC	Gustafson
Lipha Tech	Meherin
Peanut Farmer Magazine	Sipcam Agro USA, Inc.
Southeast Farm Press	Southern States
Triangle Chemical Company	UAP Carolina
Uniroyal	US Gypsum
Valent	

Products

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Birdsong Peanuts
Florida Peanut Producers Association
Georgia Peanut Commission
Georgia Peanut Producers Association
North Carolina Peanut Growers Association
Oklahoma Peanut Commission
Sanfilippo and Sons, Inc.
Severn Peanut Company
South Carolina Peanut Producers Board
Southern Peanut Farmers Federation
Texas Peanut Producers Board
Tom's Foods
Virginia Peanut Growers Association

**Thirty-Fourth Annual Meeting
American Peanut Research and Education Society
July 16-19, 2002
Sheraton Imperial
Research Triangle Park, North Carolina**

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PROGRAM COMMITTEE
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Local Arrangements

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Spouse's Program

Virginia Curtis	Helene Stalker
Janet Roe	Linda Yancy

Program Highlights

Monday, July 15

APRES Peanut Plot Tour

1:00-10:00 Lewiston-Woodville, NC

Tuesday, July 16

Committee, Board, and Other Meetings

8:00-12:00	Crops Germplasm Committee	Royal
12:00-8:00	APRES Registration	Empire Foyer A
1:00-10:00	Speakers' Ready Room.....	Park Boardroom
1:00-10:00	Spouses' Hospitality	Bull Durham
1:00-5:00	Poster Set-up	Foyer ACDE
1:00-2:00	Associate Editors, Peanut Science.....	Empire D
1:00-2:00	Site Selection Committee	Empire E
1:00-2:00	Fellows Committee	Royal A
1:00-2:00	Coyt T. Wilson Distinguished Service Award	Royal B
2:00-3:00	Publications and Editorial Committee	Empire C
2:00-3:00	Public Relations Committee	Empire D
2:00-3:00	Bailey Award Committee	Empire E
2:00-3:00	Dow AgroSciences Awards Committee	Royal A
3:00-4:00	Nominating Committee	Empire C
3:00-4:00	Joe Sugg Graduate Student Award Committee.	Empire D
3:00-4:00	Extension Specialists.....	Crown
3:00-4:00	Peanut Quality Committee.....	Empire E
4:00-5:00	Finance Committee	Royal A
4:00-5:30	Peanut Systems	Royal B
7:00-11:00	Board of Directors.....	Imperial 1
7:00-9:00	Ice Cream Social.....	Crystal Coast Patio and Pool
	Bayer Crop Science	

Wednesday, July 17

8:00-4:00	APRES Registration	Empire Foyer A
8:00-5:00	Spouses' Hospitality	Bull Durham
8:00-10:00pm	Speakers' Ready Room.....	Park Boardroom
8:00-10:00	General Session	Empire Ballroom
10:00-10:30	Sponsored Break	Foyer ACDE
10:00-5:00	Poster Viewing	Foyer ACDE
10:30-12:00	Graduate Student Competition I	Empire ABC
10:30-11:45	Entomology	Empire E
1:15-3:00	Economics	Empire E
1:15-3:00	Graduate Student Competition II	Empire ABC
2:30-3:00	Poster Session I	Foyer ACDE
3:00-3:15	Sponsored Break	Foyer ACDE
3:15-5:00	Graduate Student Competition III	Empire ABC
3:15-5:00	Extension Techniques and Technology/ Education for Excellence	Empire E
6:00-9:00	Reception/Evening Meal	Empire ABCD
		Bayer Crop Science/BASF Corporation

Thursday, July 18

8:00-12:00	APRES Registration	Empire Foyer A
8:00-5:00	Spouses' Hospitality	Bull Durham
8:00-5:00	Poster Viewing.....	Foyer ACDE
8:00-5:00	Speakers' Ready Room.....	Park Boardroom
8:00-9:45	Production Technology I	Empire AB
8:00-9:30	Plant Pathology and Nematology I	Empire C
8:00-9:45	Breeding, Biotechnology, and Genetics I.....	Empire D
9:45-10:00	Sponsored Break.....	Foyer ACDE

10:00-12:00	Production Technology II	Empire AB
10:00-11:30	Plant Pathology and Nematology II	Empire C
10:00-12:00	Breeding, Biotechnology, and Genetics II.....	Empire D
11:30-12:00	Poster Session II	Foyer ACDE
1:30-2:45	Weed Science I	Empire AB
1:30-2:45	Plant Pathology and Nematology III	Empire C
1:30-2:45	Breeding, Biotechnology, and Genetics III.....	Empire D
2:45-3:00	Sponsored Break	Foyer ACDE
3:15-4:30	Weed Science II	Empire AB
3:15-5:00	Plant Pathology and Nematology IV	Empire C
3:15-5:00	Processing and Utilization	Empire D
6:00-9:00	Reception/Evening Meal.....	Museum of Life Sciences Syngenta Durham,NC

Friday, July 19

7:00-8:00	Awards Breakfast.....	Empire ABCD
	Dow AgroSciences	
8:00-10:00	APRES Awards Ceremony & Business Meeting.....	Empire ABCD
10:00-12:00	Peanut CRSP Project	Piedmont

GENERAL SESSION **Wednesday, July 17 – Morning** **Empire Ballroom**

8:00	Call to Order Dr. Thomas G. Isleib, APRES President-Elect
8:05	Welcome to Research Triangle Park Dr. Johnny C. Wynne, Associate Dean and Director, North Carolina Agricultural Research Service College of Agriculture and Life Sciences North Carolina State University

8:25 Impact of the 2002 Farm Bill on Peanuts in the United States
Moderator: Mr. Robert Sutter, CEO
North Carolina Peanut Grower's Association

8:30 Legislative Perspective
Mr. David Rouzer, Assistant to the Dean and
Director of Commodity Relations,
College of Agriculture and Life Sciences
North Carolina State University

8:45 Impact on the Runner Market Type
Dr. Stanley M. Fletcher
University of Georgia

9:00 Impact on the Virginia Market Type
Dr. Blake Brown
North Carolina State University

9:15 Sheller's Perspective
Dr. Marshall C. Lamb, USDA-ARS
National Peanut Research Laboratory

9:30 Discussion

TECHNICAL SESSIONS
Wednesday, July 17 – morning

GRADUATE STUDENT COMPETITION I
Empire ABC

Moderator: T. E. McKemie, BASF Corp., RTP, NC

10:30 (1) Peanut Pod Lightness Measured Using Computerized Image Processing System. D. Boldor* and T.H. Sanders. USDA-ARS, North Carolina State University, Raleigh, NC.

10:45 (2) Physiological Basis for Antagonism of Clethodim by Imazapic. I.C. Burke* and J.W. Wilcut. North Carolina State University, Raleigh, NC.

11:00 (3) Persistence of *Pasteuria penetrans* in a Peanut Root-Knot Nematode Suppressive Site. R. Cetintas* and D.W. Dickson. University of Florida, Gainesville, FL.

11:15 (4) The Influence of Soil Moisture on Incidence of Pod Rot of Peanut Caused by *Pythium myriotylum* and *Rhizoctonia solani*. Vijaykumar Choppakatla*, T.A. Wheeler, G.L. Schuster, D. Porter, and C. Robinson. West Texas A&M University, Canyon, TX.

11:30 (5) Economic Assessment of Diclosulam and Flumioxazin in Strip-and Conventional-Tillage Peanut. S.B. Clewis*, and J.W. Wilcut. North Carolina State University, Raleigh, NC.

11:45 (6) Early Leaf Spot Suppression by Peanut-Corn Intercropping. L.E. Duffie*, B.B. Shew, and M.A. Boudreau, North Carolina State University, Raleigh, NC.

ENTOMOLOGY

Empire E

Moderator: J.W. Todd, University of Georgia, Tifton, GA

10:30 (7) Recent Strategies for Rootworm Management in North Carolina Peanut Production. R. L. Brandenburg*, B.M. Royals, J.H. Scott, T.G. Isleib, and D.A. Herbert Jr. North Carolina State University, Raleigh, NC and VPI&SU, Tidewater AREC, Suffolk, VA

10:45 (8) Burrower Bugs in Peanut: Seasonal Species Abundance, Tillage Effects on Populations, and Feeding Effects on Grade. J.W. Chapin* and J.S. Thomas. Clemson University, Edisto Res. & Ed. Center, Blackville, SC.

11:00 (9) Impact and Management of Potato Leafhopper (PLH), *Empoasca fabae* (Harris), in Virginia Peanut. D.A. Herbert, Jr*. Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA.

11:15 (10) Evaluation of Management Strategies to Reduce the Incidence of Tomato Spotted Wilt Virus in Peanut in North Carolina. C.A. Hurt*, R.L. Brandenburg, and D.L. Jordan. North Carolina State University, Raleigh, NC.

11:30 (11) Evaluation of Georgia Green and C99R Peanut Cultivars for Thrips and Nematode Damage, Southern Stem Rot and Tomato Spotted Wilt Tospovirus Incidence and Peanut Yield and Grade. J.R. Weeks,* A.K. Hagan, H.L. Campbell, and L. Wells. Auburn University, Auburn, AL.

Wednesday, July 17 – afternoon

GRADUATE STUDENT COMPETITION II
Empire ABC

Moderator: R. L. Brandenburg,

North Carolina State University, Raleigh, NC

1:15 (12) Disease Management and Peanut Response with Subsurface Drip and Sprinkler Irrigation Systems. J.E. Lanier*, D.L. Jordan, J.S. Barnes, J.E. Bailey, W.J. Griffin, G. Grabow, J. Matthews, and P.D. Johnson. North Carolina State University, Raleigh, NC.

1:30 (13) USDA/ARS NPL Multi-Crop Irrigation Research Farm: Year One Results and Economic Analysis. M.H. Masters. USDA-ARS National Peanut Research Laboratory, Dawson, GA.

1:45 (14) Screening of Weed Species for Reaction to *Sclerotinia minor* and *Sclerotium rolfsii*. C.B. Meador*, H.A. Melouk, and D. S. Murray. USDA-ARS, Oklahoma State University, Stillwater, OK.

2:00 (15) Best Linear Unbiased Prediction of Breeding Value for Tomato Spotted Wilt Virus Incidence in Virginia-Type Peanuts. S.R. Milla* and T.G. Isleib. North Carolina State University, Raleigh, NC.

2:15 (16) Small and Large Plot Evaluations of Strip-Tillage, Resistant Cultivars, and Reduced Fungicide Inputs for Management of Peanut Leaf Spot. W.S. Monfort*, A.K. Culbreath, and T.B. Brenneman. The University of Georgia, Tifton, GA.

2:30 (17) Genetic Diversity Within the Genus *Arachis* Evaluated Using AFLP Markers. M.L. Newman*, R.N. Pittman, R.E. Dean, M.S. Hopkins, and T.M. Jenkins. University of Georgia, Griffin, GA.

2:45 (18) Potential for Integrated Management of Sclerotinia Blight on Peanut with Fluazinam and the Biocontrol Agent *Coniothyrium minitans*. D.E. Partridge*, J.E. Bailey, and D.L. Jordan. North Carolina State University, Raleigh, NC.

ECONOMICS
Empire E

Moderator: M.C. Lamb, USDA-ARS

National Peanut Research Laboratory, Dawson, GA

1:15 (19) Economic Considerations of Sod Based Rotations for Peanuts. T.D. Hewitt*, J.J. Marois, and D.L. Wright. North Florida Research and Education Center, University of Florida, Marianna, FL.

1:30 (20) Economic and Production Efficiencies of Peanut Cultural Practices in Bolivia. D.J. Zimet* and T.D. Hewitt. North Florida Research and Education Center, University of Florida, Marianna, FL.

1:45 (21) Regional and Farm Level Economic Impacts of Peanut Quota Program Changes. S.G. Bullen and N. Smith*. University of Georgia, Tifton, GA.

2:00 (22) The Economic Effects of Considered Change in Federal Peanut Policy. J. Chvosta*, W.N. Thurman, and B. Brown. North Carolina State University, Raleigh, NC.

2:45 (23) Adoption and Sustainability of New Farm Technology: Beyond "Blaming the Victim" to Community and Regional Influence. R.L. Moxley* and K.B. Loughridge. North Carolina State University, Raleigh, North Carolina.

GRADUATE STUDENT COMPETITION III Empire ABC

Moderator: R. C. Kemerait, University of Georgia, Tifton, GA

3:15 (24) Yellow Nutsedge (*Cyperus esculentus* L.) Management with Reduced Strongarm and Dual Magnum Rate Combinations in Texas Southern High Plains Peanut. B.L. Porter*, P.A. Dotray, J.W. Keeling, and T.A. Baughman. Texas Tech University, Texas Agricultural Experiment Station, Lubbock, TX.

3:30 (25) Yield and Physiological Response of Peanut (*Arachis hypogaea*) to Glyphosate Drift. B.L. Robinson*, W.E. Thomas, W.A. Pline, I.C. Burke, D.L. Jordan, and J.W. Wilcut. North Carolina State University, Raleigh, NC.

3:45 (26) Effect of Twin Row Spacing on Epidemiology of Peanut Stem Rot. L.E. Sconyers*, T.B. Brenneman, and K.L. Stevenson. University of Georgia, Athens, GA.

4:00 (27) Evaluation of Tissue Resistance to *Sclerotinia minor* in Detached Peanut Plant Parts. D.L. Smith* and B.B. Shew. North Carolina State University, Raleigh, NC.

4:15 (28) Uptake, Translocation, and Metabolism of Root-applied Sulfentrazone in Peanut (*Arachis hypogaea*), Prickly sida (*Sida spinosa*), and Pitted morningglory (*Ipomoea lacunosa*). S.C. Troxler*, S.B. Clewis, J.W. Wilcut, and W.D. Smith. North Carolina State University, Raleigh, NC.

4:30 (29) The Use of Descriptive Analysis and Consumer Research Methods in the Evaluation of Peanuts from Different Origins. N.D. Young*, T.H. Sanders, M.A. Drake, and G.V. Civille. North Carolina State University, Raleigh, NC.

4:45 (30) Comparison of Aflatoxin Production in Normal- and High-Oleic Backcross-Derived Peanut Lines. H.Q. Xue*, T.G. Isleib, G.A. Payne, R.F. Wilson, and W.F. Novitzky. North Carolina State University, Raleigh, NC.

EXTENSION TECHNIQUES AND TECHNOLOGY/ EDUCATION FOR EXCELLENCE

Empire E

Moderator: R. Rudolph, Bayer Corporation, Tyrone, GA

3:15 (31) Extension Efforts for Quality Peanut Production in Prince George County, Virginia. G.F. Chappell, II* and D. A. Herbert, Jr., Prince George Extension, Prince George, VA.

3:30 (32) How Has Being a Consultant Made Me a Better Extension Peanut Crops Agent. C. Ellison* and D.L. Jordan. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh, NC.

3:45 (33) Producer Awareness of Damage Due to Leafhopper and Three Cornered Alfalfa Hoppers. C. Mason*, R. Weeks, and L. Cambell. Barbour County, Alabama Cooperative Extension System, Clayton, AL.

4:00 (34) Fungicide Treatment Effects on the Incidence of Soilborne Diseases in Peanut. P.D. Wigley*, S.J. Komar, and R.C. Kemerait. Calhoun County Extension Service, University of Georgia, Morgan, GA.

4:15 (35) Potential Impact of Nutrient Management Regulations on Peanut Production Systems and Associated Rotation Crops in Sensitive Watersheds in North Carolina. S. Uzzell*, A. Cochran, C. Ellison, W.J. Griffin, J. Pearce, M. Rayburn, M. Shaw, B. Simonds, L. Smith, P. Smith, C. Tyson, J.M. Williams, A.J. Whitehead, F. Winslow, D.L. Jordan, and D. Osmond. North Carolina Cooperative Extension Service, Raleigh, NC.

4:30 (36) Development, Implementation, and Acceptance of Integrated Pest Management Practices for Peanut in Northeastern North Carolina. M.L. Rayburn*, H.M. Linker, D.L. Jordan, J.E. Bailey, and R.L. Brandenburg. North Carolina Cooperative Extension Service, Raleigh, NC.

4:45 (37) Push, Pull, or Partner – A Process of Implementation for Public Good and Profit. H.M. Linker, S.M. Pheasant*, S.C. Lilley, R.L. Brandenburg, and D.A. Herbert, Jr. North Carolina State University, Raleigh, NC.

Thursday, July 18 – morning

PRODUCTION TECHNOLOGY I
Empire AB

Moderator: J.F. Spears, North Carolina State University, Raleigh, NC

8:00 (38) Residual Effects of Broiler Litter Application on Strip-Tilled Peanut in a Three-Year Rotation. G.J. Gascho* and T.B. Brenneman. University of Georgia, Tifton, GA.

8:15 (39) Interdisciplinary Approach to Evaluating Peanut Cultivars Planted in Twin and Single Rows by Conventional and Reduced Tillage Methods. D.L. Hartzog*, J. Adams, K. Balkcom, J. Baldwin, D. Wright, E.J. Williams, N. Smith, T. Hewitt, T. Brenneman, B. Kemerait, R.N. Gallher, and G. MacDonald. Auburn University, Headland, AL.

8:30 (40) Tillage Methods for Peanuts in Caddo County, Oklahoma. D.L. Nowlin*. Oklahoma Cooperative Extension Service, Anadarko, Oklahoma.

8:45 (41) Yield, Grade, and Tomato Spotted Wilt Virus Incidence of Six Peanut Cultivars When Planted by Strip Tillage or Conventional Methods in Twin or Single Row Patterns at Thirteen Locations in Georgia from 1999-2001. J.A. Baldwin*, E.J. Williams, J.W. Todd, and D.E. McGriff. University of Georgia, Tifton, GA.

9:00 (42) Peanut Response and Tomato Spotted Wilt Virus Incidence Following Various Cultural Practices. J.S. Barnes*, D.L. Jordan, C.R. Crozier, R.L. Brandenburg, C. Hurt, J.E. Bailey, J.E. Lanier, P.D. Johnson, and F.R. Cox. North Carolina State University, Raleigh, NC.

9:15 (43) FarmSuite, a Pattern for Research and Technology Transfer. J.I. Davidson, Jr.*, M.C. Lamb, C.L. Butts, D.A. Sternitzke, and N.W. Widstrom. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

9:30 (44) Peanut Response to Various Fertility Practices. D.L. Jordan*, P.D. Johnson, J.E. Lanier, and B.R. Walls. North Carolina State University, Raleigh, NC.

PLANT PATHOLOGY AND NEMATOLOGY I
Empire C

Moderator: J.P. Damiconi, Oklahoma State University, Stillwater, OK

8:00 (45) Evaluation of In-Furrow Treatments of Abound 2SC on Southern Stem Rot over Three Years. K.L. Bowen*, H.L. Campbell, and A.K. Hagan. Auburn University, AL.

8:15 (46) Effects of Azoxystrobin, Tebuconazole, and Flutolanil on Cylindrocladium Black Rot of Peanut. T.B. Brenneman* and R.C. Kemerait, Jr. University of Georgia, Tifton, GA.

8:30 (47) Combined Effects of Biological Control Formulations, Cultivars, and Fungicides on Preharvest Aflatoxin Contamination of Peanuts. J.W. Dorner*. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

8:45 (48) Efficacy of Headline for the Control of Early Leaf Spot and Southern Stem Rot on Peanut. A.K. Hagan*, H.L. Campbell, and K.L. Bowen. Auburn University, AL.

9:00 (49) Cylindrocladium Black Rot Control in Peanuts in Miller County, Georgia. T.W. Moore*. University of Georgia Extension Service, Colquitt, GA.

9:15 (50) Control of Cylindrocladium Black Rot (CBR) of Peanut with Metam and the Additive Benefits of In-furrow and Foliar Applications of Folicur. P.M. Phipps*, Tidewater Agricultural Research & Extension Center, Virginia Polytechnic Institute & State University, Suffolk, VA.

BREEDING, BIOTECHNOLOGY, AND GENETICS I **Empire D**

Moderator: H.T. Stalker, North Carolina State University, Raleigh, NC

8:00 (51) Field Testing of Transgenic Peanut Lines for Resistance to *Sclerotinia minor*. K.D. Chenault* and H.A. Melouk. USDA-ARS, Plant Science and Water Conservation Research Laboratory, Stillwater, OK.

8:15 (52) Growth and Oxalic Acid Production in Liquid Culture by Isolates of *Sclerotinia minor*. J.L. Hampton, D.M. Livingstone*, T. Boluarte-Medina, F. Medina-Bolivar, B.B. Shew, J. Hollowell, P.M. Phipps, and E.A. Grabau. Virginia Tech, Blacksburg, VA.

8:30 (53) Stable Transformation of Green Fluorescent Protein in Peanut (*Arachis hypogaea* L.). M. Joshi*, G.H. Fleming, H. Yang, C. Niu, J. Nairn, and P. Ozias-Akins. The University of Georgia, Tifton, GA.

8:45 (54) Genetic Transformation of Peanut for Resistance to *Sclerotinia minor*. D.M. Livingstone*, J.L. Hampton, P.M. Phipps, and E.A. Grabau. Virginia Tech, Blacksburg, VA.

9:00 (55) Inheritance of the High Oleic Trait in Peanut: Unsolved Puzzle. Y. Lopez*, M.R. Baring, C.E. Simpson and M.D. Burow. Texas A&M University, College Station, TX.

9:15 (56) Transformation of Peanut (*Arachis hypogaea* L. cv. Georgia Green) with a Nonheme Chloroperoxidase Gene by Particle Bombardment. C. Niu*, Y. Akasaka, M. Joshi, H. Yang, and P. Ozias-Akins. The University of Georgia, Tifton, GA.

9:30 (57) Field Resistance to Tomato Spotted Wilt Virus in a Transgenic Peanut (*Arachis hypogaea* L.). P. Ozias-Akins*, H. Yang, A.K. Culbreath, D.W. Gorbet, and J.R. Weeks. The University of Georgia, Tifton, GA.

PRODUCTION TECHNOLOGY II Empire AB

Moderator: J.A. Baldwin, University of Georgia, Tifton, GA

10:00 (58) Peanut Yield and Grade with Different Row Orientation and Seeding Rate when Irrigated with SDI. R.B. Sorensen* and D.A. Sternitzke. USDA-ARS-National Peanut Research Laboratory, Dawson, GA.

10:15 (59) Single Row Yield as a Function of Plant Spacing with Implications for Increasing Yield Using Two-dimensional Planting Patterns. D.A Sternitzke*, J.I. Davidson, Jr, and M.C. Lamb. USDA-ARS National Peanut Research Laboratory, Dawson, GA.

10:30 (60) Improving Peanut Production with Surface Drip Irrigation. H. Zhu*, M.C. Lamb, R.B. Sorensen, C.L. Butts, and P.D. Blankenship. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

10:45 (61) Calendar Based versus Physiological Growth Stages as Determinants for Timing of Early Harvest® PGR Applications on Peanut. J.P. Beasley, Jr*. University of Georgia, Tifton, GA.

11:00 (62) Water-Use Efficiency of Peanut Varieties: Variation Across Peanut Production Regions and Irrigation Treatments. D. Rowland*, K. Balkcom, M. Lamb, N. Puppala, J. Beasley, M. Burrow, D. Gorbet, D. Jordan, H. Melouk and C. Simpson. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

11:15 (63) The Effect of Floor Open Area on Airflow Distribution in Peanut Drying Trailers. C.L. Butts* and E.J. Williams. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

11:30 (64) High Moisture Peanut Grading. M.C. Lamb*, P.D. Blankenship, C.L. Butts, T.B. Whitaker, and E.J. Williams. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

11:45 (65) Development of a Low-Cost Imaging System for Determining Shell Brightness of Valencia Peanuts. P.D. Blankenship*, H.T. Sheppard, T.H. Sanders, and D. Bolder. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

PLANT PATHOLOGY AND NEMATOLOGY II Empire C

Moderator: A. Tally, Syngenta, Greensboro, NC

10:00 (66) Nicobifen; A New Broad-Spectrum Fungicide for Use on Peanuts. T.E. McKemie*, W.M. Fletcher, M.C. Boyles, and J.S. Barnes. BASF Corporation, Research Triangle Park, NC.

10:15 (67) Headline: Results From 2001 Peanut Large Plot Demonstration Trials. S.H. Newell*, T.E. McKemie, and B.S. Ashew. BASF Corporation, Statesboro, GA.

10:30 (68) Web Blotch Control with Fungicide Applications on Calendar or Advisory Application Schedules. R.D. Rudolph* and P.M. Phipps. Bayer Corporation, Tyrone, GA.

10:45 (69) Summary of 2001 Stratego Efficacy for Control of Peanut Soil-Borne Pathogens in Georgia and Alabama. H.S. Young and D. Hunt*. Bayer Corporation, Opelika, AL.

11:00 (70) Effect of Omega 500 on Frost Injury of Peanut. V.L. Curtis* and J.E. Bailey. North Carolina State University, Raleigh, NC.

11:15 (71) Sclerotinia Blight Chemical Control Past, Present, Future. T.A. Lee, Jr.*. Texas Cooperative Extension, Stephenville, TX.

BREEDING, BIOTECHNOLOGY, AND GENETICS II Empire D

Moderator: R.W. Mozingo

Tidewater Agricultural Research and Extension Center, Suffolk, VA

10:00 (72) 'Olin' and 'Tamrun OL 01' - Two New High O/L Peanut Cultivars. M.R. Baring*, C.E. Simpson, Y. Lopez, A.M. Schubert, and H.A. Melouk. Texas A&M University, College Station TX.

10:15 (73) Breeding for Early-Maturing Peanut. M.D. Burow*, M.R. Baring, Y. López, A.M. Schubert and C.E. Simpson. Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX.

10:30 (74) Improved Peanut Root-Knot Nematode Resistance in Peanut Lines Derived from Plant Introductions and Wild Species Introgression. W.F. Anderson*, C.C. Holbrook, P. Timper, A.K. Hagan, and D.E. McGriff AgraTech Inc. Ashburn, GA.

10:45 (75) Field Evaluation Trials of Peanut Genotypes for Cylindrocladium Black Rot (CBR) Resistance. W.D. Branch* and T.B. Brenneman. University of Georgia, Tifton, GA.

11:00 (76) Development of Breeding Lines with Resistance to Tomato Spotted Wilt Virus and the Peanut Root-knot Nematode. C.C. Holbrook*, P. Timper, and A.K. Culbreath, USDA-ARS, University of Georgia, Tifton, GA.

11:15 (77) Application of Regression Techniques to Determine Stability of Field Resistance to Tomato Spotted Wilt Virus in Virginia-Type Peanuts. T.G. Isleib*, P.W. Rice, and R.W. Mozingo, II. North Carolina State University, Raleigh, NC.

11:30 (78) An Interdisciplinary Approach for Selection of Peanuts for Multiple Insect and Disease Resistance Derived from Bolivian Germplasm. R.N. Pittman*, J.W. Todd, A.K. Culbreath, D.W. Gorbet, and D.J. Zimet. USDA-ARS, PGRCU, Griffin, GA.

11:45 (79) NemaTAM a New Root-knot Nematode Resistant Peanut. C.E. Simpson*, J.L. Starr, M.D. Burow, A.H. Paterson, and G.T. Church. Texas Agricultural Experiment Station, Stephenville, TX

Thursday, July 18 – afternoon

WEED SCIENCE I
Empire AB

Moderator: C.W. Swann

Tidewater Agricultural Research and Extension Center, Suffolk, VA

1:30 (80) Peanut Tolerance to Applications of Acifluorfen. T.A. Baughman*, B.J. Brecke, P.A. Dotray, T.L. Grey, W.J. Grichar, D.L. Jordan, E.P. Prostko, J.W. Wilcut, J.W. Keeling, J.C. Reed, J.R. Karnei, T.A. Murphree, B.L. Porter, B.A. Besler, and K.D. Brewer. Texas A&M University, Vernon, TX.

1:45 (81) Response of Full and Reduced Rates of Imazapic and Diclosulam for Yellow Nutsedge Control When Peanuts are Grown in a Conventional vs Twin Row Configuration. B.A. Besler*, W.J. Grichar, and K.D. Brewer. Texas Agricultural Experiment Station, Yoakum, TX.

2:00 (82) Diclosulam Persistence in Soil and Its Effect on Peanut Rotational Crops. C.A. Gerngross*, W.J. Grichar and S.A. Senseman. Texas Agricultural Experiment Station, Yoakum, TX.

2:15 (83) Influence of Preplant Applications of 2,4-D, dicamba, Tribenuron and Tribenuron Plus Thifensulfuron on Peanut (*Arachis hypogaea*) Yield. T.L. Grey*, E.P. Prostko, W.C. Johnson, III, D.L. Jordan, W.J. Grichar, B.A. Besler K.D. Brewer and E.F. Eastin. University of Georgia, Tifton, GA.

2:30 (84) Cotton Response to Cadre and Pursuit Residues Following Peanut. W.J. Grichar*, T.A. Baughman, C.W. Bednarz, B.A. Besler, K.D. Brewer, A.S. Culpepper, P.A. Dotray, T.L. Grey, R.G. Lemon, E.P. Prostko, and S.A. Senseman. Texas Agricultural Experiment Station, Yoakum, TX.

PLANT PATHOLOGY AND NEMATOLOGY III Empire C

Moderator: T.B. Brenneman, University of Georgia, Tifton, GA

1:30 (85) Rust Reactions among Selected Peanut Genotypes in Southwest Texas. M.C. Black*, A.M. Sanchez, M.R. Baring, and C.E. Simpson. Texas A&M University, Uvalde, TX.

1:45 (86) Response of Moderately Resistant Peanut Breeding Lines and Cultivars to Chlorothalonil for Management of Early Leaf Spot. E.G. Cantonwine*, A.K. Culbreath, C.C. Holbrook, and D.W. Gorbet. The University of Georgia, Tifton, GA.

2:00 (87) Possible Resistance to Cylindrocladium Black Rot in AgraTech 201. B.L. Cresswell* and R.C. Kemerait. University of Georgia Cooperative Extension Service, Blakely, GA.

2:15 (88) Evaluations of Genetic Resistance and Seeding Rate on Tomato Spotted Wilt Virus Epidemics in Louisiana. G.B. Padgett* and W. Rea. Northeast Research Station, Macon Ridge Branch, LSU AgCenter, Winnsboro, LA.

2:30 (89) A Procedure for Reproducing Peanut Pod Breakdown by *Sclerotium rolfsii*. H.A. Melouk*, C. Saude, and K.E. Jackson. USDA-ARS, PSWCRL, Oklahoma State University, Stillwater, OK.

BREEDING, BIOTECHNOLOGY, AND GENETICS III Empire D

Moderator: K.D. Chenault, USDA-ARS

Plant Science and Water Conservation Research Laboratory, Stillwater, OK

1:30 (90) A Genetically Modified Plant: The Case of Peanut. H. Dodo*, K. Konan, and O. Viquez. Alabama A&M University, Normal, AL.

1:45 (91) Cloning of Allergenic Protein Genes from *Arachis hypogaea*. G.H. Fleming*, M. Gallo-Meagher, and P. Ozias-Akins. The University of Georgia, Tifton, GA.

2:00 (92) Characterization of Three Major Peanut Allergen Genes. I-H. Kang, M. Gallo-Meagher*, and P. Ozias-Akins. The University of Florida, Gainesville, FL.

2:15 (93) Knocking Down the Major Peanut Allergen Ara h 2 in Transgenic Peanut Plants. K.N. Konan*, O.M. Viquez, and H.W. Dodo. Alabama A&M University, Normal, AL.

2:30 (94) Genomic Characterization of the Third Major Peanut Allergen Gene, Ara h 3 / 4. O.M. Viquez*, K.N. Konan and H.W. Dodo. Alabama A&M University, Normal, AL.

WEED SCIENCE II Empire AB

Moderator: J.S. Barnes

**North Carolina Department of Agriculture and Consumer Services
Lewiston-Woodville, NC**

3:15 (95) The Influence of Classic on Tomato Spotted Wilt Virus of Peanut. E.P. Prostko*, R.C. Kemerait, W.C. Johnson, III, B.J. Brecke, and S.N. Brown. University of Georgia, Tifton, GA.

3:30 (96) Phytotoxicity of Delayed Applications of Flumioxazin on Peanut. W.C. Johnson, III* and E.P. Prostko. USDA-ARS, Coastal Plain Experiment Station, Tifton, GA.

3:45 (97) Weed Populations and Herbicide Recommendations in Selected Peanut Fields in North Carolina. G.G. Wilkerson, D.L. Jordan*, and D. Krueger. North Carolina State University, Raleigh, NC.

4:00 (98) Peanut and Rotational Crop Response to Diclosulam. J.R. Karnei*, P.A. Dotray, J.W. Keeling, and T.A. Baughman. Texas Tech University and Texas Agricultural Experiment Station, Lubbock, TX.

4:15 (99) Texas Peanut Varietal Tolerance to Diclosulam and Flumioxazin. T.A. Murphree*, P.A. Dotray, J.W. Keeling, B.L. Porter, T.A. Baughman, W.J. Grichar, and R.G. Lemon. Texas Tech University and Texas Agricultural Experiment Station, Lubbock, TX.

PLANT PATHOLOGY AND NEMATOLOGY IV Empire C

Moderator: P.M. Phipps

Tidewater Agricultural Research and Extension Center, Suffolk, VA

3:15 (100) Factors Affecting the Maintenance of *Aspergillus flavus* Toxigenicity in Agricultural Fields. B.W. Horn* and J.W. Dorner. National Peanut Research Laboratory, USDA-ARS, Dawson, GA.

3:30 (101) The Occurrence of *Meloidogyne javanica* on Peanut in Florida. R.D. Lima, M.L. Mendes, J.A. Brito, D.W. Dickson and R. Cetintas*. Universidade Federal de Viçosa, Viçosa, MG, Brazil and University of Florida, Gainesville, FL.

3:45 (102) The Influence of Environment and Host Growth on Epidemics of Southern Stem Rot in Peanut. S.L. Rideout*, T.B. Brenneman, A.K. Culbreath, and K.L. Stevenson. University of Georgia, Tifton, GA.

4:00 (103) Prevalence of Cylindrocladium Black Rot in Commercial Peanut Seedlots and the Impact of the Disease on Seed Quality. R.R. Walcott* and T.B. Brenneman. University of Georgia, Athens, GA.

4:15 (104) The Role of Cotton in Tomato Spotted Wilt Virus Epidemics of Peanut in Georgia. M.L. Wells*, A.K. Culbreath, and J.W. Todd. University of Georgia, Tifton, GA.

4:30 (105) Assessment of Doppler Radar-based AU-pnut Leaf Spot Advisory for Use in Georgia. R. C. Kemerait*, G. Hoogenboom, R.G. McDaniel, and W.A. Mills, III. University of Georgia, Tifton, GA.

4:45 (106) Present and Future Decision Support System Tools for Peanut Disease and Crop Management. R.D. Magarey*, T.B. Sutton, D. Jordan, and W.T. Cooper. North Carolina State University, Raleigh, NC

PROCESSING AND UTILIZATION **Empire D**

Moderator: T.B. Whitaker, North Carolina State University, Raleigh, NC

3:15 (107) Perceptions of Consumers and Culinary Professionals Concerning Peanuts and Peanut Products. M.B. Daugherty, C.M. Bednar*, R. Kandalaft, and M. Kwan. Texas Woman's University, Denton, TX.

3:30 (108) Study of the Relationship Between Stress Proteins and Peanut Allergenicity. S.Y. Chung* and E.T. Champagne. USDA-ARS, SRRC, New Orleans, LA.

3:45 (109) GC-MS Analysis of Volatile Flavor Compounds Arising from Twin-screw Extrusion Processing of Peanuts. M.J. Hinds*, M.N. Riaz, D. Moe, and D. Scott. Oklahoma State University, Stillwater, OK.

4:00 (110) Comparison of RF Impedance and DC Conductance Measurements for Single Peanut Kernel Moisture Determination. C.V.K. Kandala* and C.L. Butts. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.

4:15 (111) Alterations in the Structure of Allergens Can Influence Their Function. S.J. Maleki* and E.T. Champagne. USDA-ARS, Southern Regional Research Center, New Orleans, LA.

4:30 (112) Effect of the High-Oleic Trait on Roasted Peanut Flavor in Backcross-Derived Breeding Lines. H.E. Pattee*, T.G. Isleib, D.W. Gorbet, K.M. Moore, Y. Lopez, M.R. Baring, and C.E. Simpson. USDA-ARS, North Carolina State University, Raleigh, NC.

4:45 (113) Effect of Microwave Energy on Blanchability, Shelf-life and Roast Quality of Peanuts. T.H. Sanders*, K.W. Hendrix, T.D. Rausch, T.A. Katz, and J.M. Drozd. USDA-ARS, North Carolina State University, Raleigh, NC.

POSTER I - WEDNESDAY, JULY 17, 2:30-3:00
Foyer ACDE

**Coordinator: Shyamalrau Tallury,
North Carolina State University, Raleigh, NC**

- (114) Comparing Irrigation Levels for Conventional and Conservation Tillage Systems. K.S. Balkcom*, D.L. Rowland, and M.C. Lamb. USDA-ARS, National Peanut Research Laboratory, Dawson, GA.
- (115) WITHDRAWN
- (116) Characterization of Phospholipase D Gene (PLD) in Peanut and PLD Expression Associated with Drought Stress. B.Z. Guo*, Y. Cao, G. Xu, C.C. Holbrook, and R.E. Lynch. USDA-ARS, University of Georgia, Tifton, GA.
- (117) Conservation of Peanut Seed Under Modified Atmosphere Within an African Context. A. Rouziere, J. Martin, and A. Mayeux*. Centre de Cooperation Internationale en Recherche Agronomique pour le Developpment (CIRAD), Montpellier, France.
- (118) Irrigation Management for Peanut Production under Water-Limiting Conditions. D.O. Porter*, A.M. Schubert, J. Reed, and T.A. Wheeler. Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX.
- (119) Response of Valencia Peanuts to Nitrogen Rates, Rhizobium Inoculant and Row Pattern. N. Puppala*, R.D. Baker, and R.B. Sorensen. Agricultural Science Center at Clovis, NMSU, Clovis, NM.
- (120) Characterization and Classification of Mexican Peanut (*Arachis hypogaea* L.) Germplasm. S. Sanchez-Dominguez* and Abel Munoz-Orozoco. Departamento de Fitotechia, Universidad Autonoma Chapingo, Chapingo Mex. 56230, Colegio de Postgraduados en Ciencias Agricolas, Montecillos Mex, 56230.
- (121) Nondestructive Determination of Ploidy Levels in Peanut Interspecific Hybrids. S.P. Tallury*, and S.C. Copeland. North Carolina State University, Raleigh, NC.

POSTER II - THURSDAY, JULY 18, 11:30 - 12:00
Foyer ACDE

**Coordinator: Joyce Hollowell,
North Carolina State University, Raleigh, NC**

- (122) Comparison of Sensory Characteristics and Nutritional Components of Texas, Virginia, and Georgia Peanuts. C.M. Bednar*, C.C. King, M.B. Daugherty, and M. Kihato. Texas Woman's University, Denton, TX.
- (123) WITHDRAWN

(124) Evaluation of Proteinase Inhibitors for Southern Corn Rootworm and Lesser Cornstalk Borer Infesting Peanut. L.A. Camelo*, J.S. Armstrong, K.Z. Salzman, and F.L. Mitchell. Texas Tech University, Lubbock, TX.

(125) Pathogenicity of *Sclerotinia minor* on Weeds in Peanut Fields. J.E. Hollowell*, B.B. Shew, M.A. Cubeta, and J.W. Wilcut. North Carolina State University, Raleigh, NC.

(126) Use of BAS 125 Growth Regulator Alone and Mixed with Fungicide on Peanut in South Texas. A.J. Jaks*, B.A. Besler, and W.J. Grichar. Texas Agricultural Experiment Station, Yoakum, TX.

(127) Economic Comparison of North Carolina Peanut Producers Now and with the Proposed End of Peanut Quota Program. D. Lassiter* and S.G. Bullen. North Carolina State University, Raleigh, NC.

(128) IPM Strategies for Peanut Growers in North Carolina: Knowledge vs. Application. S.C. Lilley*, G.E. Fleisher, J.E. Bailey, and J. Sabella. North Carolina State University, Raleigh, NC.

(129) Evaluating Farm Level Impacts of the 2002 Farm Bill: A Computer Decision Aid. N.B. Smith*, W.D. Shurley, V. Subramaniam, and S.M. Fletcher. University of Georgia, Tifton, GA.

(130) Development of High Protein Snacks From Defatted Peanut Flour and Fish Mince. K. Mathews, M. Ahmedna, and I. Goktepe. North Carolina A&T State University, Greensboro, NC.

(131) WITHDRAWN

(132) Growth Enhancement Effects of Aldicarb on Peanuts. K.T. Ingram, J.M. Rosemond*. University of Georgia, Griffin, GA and Aventis CropScience, Tifton, GA.

(133) Technology Dissemination and Adoption by Peanut Farmers in Rayalaseema Region of Amdhra Pradesh, India. S.S. Mudipalli*, D.S. Kumari, S.M. Reddy and N.V. Sarala. Sri Sakthi Development Society, Tirupati, India.

(134) Farmer Education for Effective *Bradyrhizobium* Inoculation of West Texas Peanut. C.L. Trostle. Texas A&M Research & Extension Center, Lubbock, TX 79403.

SITE SELECTION COMMITTEE REPORT

The Site Selection Committee met at 1:00 p.m. in the Empire E Room, Sheraton Imperial Hotel, Research Triangle Park, North Carolina. Present were Austin Hagan, Todd Baugman, Brent Besler, Fred Shokes, Ron Sholar, Ben Whitty, Howard Valentine, Jeannette Anderson, Pat Phipps and Bob Sutter.

Ron Sholar and Ben Whitty reported on arrangements for 2003. The meeting will be held at the Hilton Clearwater Beach Resort, Clearwater Beach, Florida. The date for the meeting will be July 7-11, with a room rate of \$118, plus taxes, per night.

James Grichar, Todd Baughman and Brent Besler of Texas presented three options for the 2004 meeting; San Antonio, Galveston and Fort Worth, Texas. The committee discussed transportation issues, available activities, and room prices and decided to recommend San Antonio. Dates will be determined by local arrangement committee in negotiations with selected hotel.

Jeannette Anderson, President of the American Peanut Council, proposed that APRES and the USA Peanut Congress work on holding their 2005 meetings jointly. Both the Congress and APRES are obligated for 2003 and 2004, therefore 2005 would be the first year for a possible joint meeting. Both organizations are slated to meet in the Virginia area in 2005. Fred Shokes of Virginia recommended that APRES pursue a joint meeting, possibly in Williamsburg, for 2005. The committee makes that recommendation to the board.

Respectfully submitted by,
Bob Sutter, Chair

AMERICAN SOCIETY OF AGRONOMY LIAISON REPRESENTATIVE REPORT

The annual meetings of the joint American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America were held in Charlotte, NC from October 21 - 25, 2001. More than 3,000 scientific presentations were made of which 14 were devoted to peanut research. Twenty-two members of APRES authored or co-authored presentations, including five symposium presentations. Tom Stalker is chair of the C1 (plant breeding) division of the Crop Science Society of America for 2001-02. The next annual meeting will be held in Indianapolis, IN from November 10-14, 2002.

Respectfully submitted by,
H. Thomas Stalker, Chair

CAST REPORT

The Council for Agricultural Science and Technology (CAST) Board met in Raleigh, North Carolina fall 2001 and Washington, D.C. spring 2002. Your APRES representative, Stanley Fletcher, is chairperson of the National Concerns Standing Committee and a member of the Plant and Soil Science Workgroup. CAST has a core membership of 37 scientific societies that represent over 173,000 member scientist. CAST has established a Washington, D.C. office that is the base for executive vice president Teresa Gruber and the Biotechnology Communications Coordinator, Cindy Lynn Richard.

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

- Serves as a biotechnology-specific information resource to the public and the media.
- 26 scientists from academia and professional societies participated in the CAST Biotechnology Communicators' Summit.
- Coordinated and hosted a teleconference regarding studies on the impact of Bt corn pollen on monarch butterflies.
- Entered into an agreement with the United Soybean Board to coordinate a report on the comparative environmental impacts of biotechnology-derived and traditionally bred commodity crops.
- Entered into an agreement with the U.S. Trade and Development Agency to coordinate a U.S.-China food and agricultural biotechnology training program and dialogue.
- Prepared communicators and served as a resource for regulatory and popular press reports for release of the NAS report "Environmental Effects of Transgenic Plants: The Scope and Adequacy of Regulation."
- Developed a biotechnology web page (<http://www.cast-science.org/biotechnology>).
- Provides a weekly e-mail update on the current events in Washington, D.C. to all CAST members who provided their e-mail address to CAST.
- Published an issue paper entitled, "Evaluation of the U.S. Regulatory Process for Crops Developed Through Biotechnology." This paper was submitted in the form of public comments to the EPA prior to the agency's ruling on the registrations of genetically modified varieties of corn and cotton.
- Published an issue paper entitled, "Invasive Pest Species: Impacts on Agricultural Production, Natural Resources and the Environment."
- Report in the works entitled, "Mycotoxins: Risks in Plant and Animal Systems."

CAST has established a membership program where part of the first year's dues of new members of CAST from member societies would be remitted back to the member societies.

Further information on CAST can be found on their web site (www.cast-science.org).

Respectfully submitted by,
Stanley M. Fletcher

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

ARTICLE I. NAME

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

ARTICLE II. PURPOSE

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

ARTICLE III. MEMBERSHIP

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

- a. Individual memberships: Individuals who pay dues at the full rate as fixed by the Board of Directors.
- b. Institutional memberships: Libraries of industrial and educational groups or institutions and others that pay dues as fixed by the Board of Directors to receive the publications of the Society. Institutional members are not granted individual member rights.
- c. Organizational memberships: Industrial or educational groups that pay dues as fixed by the Board of Directors. Organizational members may designate one representative who shall have individual member rights.
- d. Sustaining memberships: Industrial organizations and others that pay dues as fixed by the Board of Directors. Sustaining members are those who wish to support this Society financially to an extent beyond minimum requirements as set forth in Section 1c, Article III.

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

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

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

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

ARTICLE IV. DUES AND FEES

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

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

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

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

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

ARTICLE V. MEETINGS

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

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

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

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

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

ARTICLE VI. QUORUM

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

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

ARTICLE VII. OFFICERS

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

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

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

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

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

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

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

ARTICLE VIII. BOARD OF DIRECTORS

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

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

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

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

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

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

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

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

ARTICLE IX. COMMITTEES

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

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

- a. Finance Committee: This committee shall consist of six members, three representing State employees, one representing USDA, and two representing Private Business segments of the peanut industry. Appointments in all categories shall rotate among the three U.S. peanut production areas. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendations as they deem necessary or as requested or directed by the Board of Directors. The term of the chairperson shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given on the work of the Finance Committee under his/her leadership, whichever is later.
- b. Nominating Committee: This committee shall consist of four members appointed to one-year terms, one each representing State, USDA, and Private Business segments of the peanut industry with the most recent available past-president serving as chair. This committee shall nominate individual members to fill the positions as described and in the manner set forth in Articles VII and VIII of these By-Laws and shall convey their nominations to the president of this Society on or before the date of the annual meeting. The committee shall, insofar as possible, make nominations for the president-elect that will provide a balance among the various segments of the industry and a rotation among federal, state, and industry members. The willingness of any nominee to accept the responsibility of the position shall be ascertained by the committee (or members making nominations at the annual business meeting) prior to the election. No person may succeed him/herself as a member of this committee.
- c. Publications and Editorial Committee: This committee shall consist of six members appointed to three-year terms, three representing State, one USDA, and two Private Business segments of the peanut industry with membership representing the three U.S. production areas. The members may be appointed to two consecutive three-year terms. This committee shall be responsible for the publication of Society-sponsored publications as authorized by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

- d. **Peanut Quality Committee:** This committee shall consist of seven members, one each actively involved in research in peanuts—(1) varietal development, (2) production and marketing practices related to quality, and (3) physical and chemical properties related to quality—and one each representing the Grower, Sheller, Manufacturer, and Services (pesticides and harvesting machinery in particular) segments of the peanut industry. This committee shall actively seek improvement in the quality of raw and processed peanuts and peanut products through promotion of mechanisms for the elucidation and solution of major problems and deficiencies.
- e. **Public Relations Committee:** This committee shall consist of seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from the host state who will serve a one-year term to coincide with the term of the president-elect. The primary purpose of this person will be to publicize the meeting and make photographic records of important events at the meeting. This committee shall provide leadership and direction for the Society in the following areas:
 - (1) **Membership:** Development and implementation of mechanisms to create interest in the Society and increase its membership. These shall include, but not be limited to, preparing news releases for the home-town media of persons recognized at the meeting for significant achievements.
 - (2) **Cooperation:** Advise the Board of Directors relative to the extent and type of cooperation and/or affiliation this Society should pursue and/or support with other organizations.
 - (3) **Necrology:** Proper recognition of deceased members.
 - (4) **Resolutions:** Proper recognition of special services provided by members and friends of the Society.
- f. **Bailey Award Committee:** This committee shall consist of six members, with two new appointments each year, serving three-year terms. This committee shall be responsible for judging papers which are selected from each subject matter area. Initial screening for the award will be made by judges, selected in advance and having expertise in that particular area, who will listen to all papers in that subject matter area. This initial selection will be made on the basis of quality of presentation and content. Manuscripts of selected papers will be submitted to the committee by the author(s) and final selection will be made by the committee, based on the technical quality of the paper. The president, president-elect and executive officer shall be notified of the Award recipient at least

sixty days prior to the annual meeting following the one at which the paper was presented. The president shall make the award at the annual meeting.

- g. **Fellows Committee**: This committee shall consist of six members, two representing each of the three major geographic areas of U.S. peanut production with balance among State, USDA, and Private Business. Terms of office shall be for three years. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. From nominations received, the committee shall select qualified nominees for approval by majority vote of the Board of Directors.
- h. **Site Selection Committee**: This committee shall consist of eight members, each serving four-year terms. New appointments shall come from the state which will host the meeting four years following the meeting at which they are appointed. The chairperson of the committee shall be from the state which will host the meeting the next year and the vice-chairperson shall be from the state which will host the meeting the second year. The vice-chairperson will automatically move up to chairperson.
- i. **Coy T. Wilson Distinguished Service Award Committee**: This committee shall consist of six members, with two new appointments each year, serving three-year terms. Two committee members will be selected from each of the three main U.S. peanut producing areas. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. This committee shall review and rank nominations and submit these rankings to the committee chairperson. The nominee with the highest ranking shall be the recipient of the award. In the event of a tie, the committee will vote again, considering only the two tied individuals. Guidelines for nomination procedures and nominee qualifications shall be published in the Proceedings of the annual meeting. The president, president-elect, and executive officer shall be notified of the award recipient at least sixty days prior to the annual meeting. The president shall make the award at the annual meeting.
- j. **Joe Sugg Graduate Student Award Committee**: This committee shall consist of five members. For the first appointment, three members are to serve a three-year term, and two members to serve a two-year term. Thereafter, all members shall serve a three-year term. Annually, the President shall appoint a Chair from among incumbent committee members. The primary function

of this committee is to foster increased graduate student participation in presenting papers, to serve as a judging committee in the graduate students' session, and to identify the top two recipients (1st and 2nd place) of the Award. The Chair of the committee shall make the award presentation at the annual meeting.

ARTICLE X. DIVISIONS

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

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

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

ARTICLE XI. AMENDMENTS

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

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

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

APRES MEMBERSHIP
1975-2002

	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

* Total reflects dues payments through 9/30/02.

2002-03 MEMBERSHIP ROSTER

INDIVIDUAL MEMBERS

TIMOTHY ADCOCK
UNITED AGRI PRODUCTS
219 REDFIELD DRIVE
JACKSON TN 38305
PHONE: 731-661-0396
FAX: 731-661-9981
EMAIL: tim.adcock@uap.com

MOHAMED AHMEDNA
FOOD SCIENCE & NUTRITION PROGRAM
161 CARVER HALL
NC A&T STATE UNIVERSITY
GREENSBORO NC 27411
PHONE: 336-334-7963
FAX: 336-334-7239
EMAIL: ahmedna@ncat.edu

WES ALEXANDER
EXTENSION AGENT
PO BOX 10
COURTLAND VA 23837
PHONE: 757-653-2572
FAX: 757-653-2849
EMAIL: walexand@vt.edu

JOHN ALTOM
VALENT
3700 NW 91st ST, BLDG C, STE 300
GAINESVILLE FL 32606
PHONE: 352-336-4844
FAX: 352-336-7752
EMAIL: john.altom@valent.com

WILLIAM F ANDERSON
PO BOX 644
ASHBURN GA 31714
PHONE: 229-567-3438
FAX: 229-567-2043
EMAIL: bander@surfsouth.com

BRIAN ANTHONY
M&M MARS
295 BROWN STREET
ELIZABETHTOWN PA 17022
PHONE: 717-367-0984
FAX: 717-361-4608
EMAIL: brian.anthony@effem.com

SCOTT ARMSTRONG
DEPT PLANT & SOIL SCI- BOX 42122
TEXAS TECH UNIVERSITY
LUBBOCK TX 79415
PHONE: 806-742-9786
FAX: 806-742-1898
EMAIL: joarmstr@ttacs.ttu.edu

SCOTT ASHER
2206 93rd PLACE
LUBBOCK TX 79423
PHONE: 806-745-8228
FAX: 806-745-7863
EMAIL: asherb@basf-corp.com

JAMES E ASHLEY, JR
11913 SIMSBURY PLACE
GLEN ALLEN VA 23059
PHONE: 804-747-7148
FAX: 804-747-7249
EMAIL: jeashley@ashgrow.com

RICHARD T AWUAH
DEPT CROP SCIENCE
UNIVERSITY OF SCIENCE & TECH
KUMASI
GHANA WEST AFRICA
PHONE: 233-51-60332
FAX: 233-51-60137
EMAIL: rtawuah@internetghana.com

R D BAKER
NEW MEXICO STATE UNIVERSITY
AGRICULTURAL SCIENCE CENTER
STAR ROUTE BOX 77
CLOVIS NM 88101
PHONE: 505-985-2292
FAX: 505-985-2419
EMAIL: ccrops@nmsu.edu

JOHN A BALDWIN
PO BOX 1209
TIFTON GA 31793
PHONE: 229-386-3430
FAX: 229-386-7308
EMAIL: jbaldwin@uga.edu

KIP BALKCOM
NATIONAL PEANUT RESEARCH LAB
PO BOX 509
DAWSON GA 31742
PHONE: 229-995-7464
FAX: 229-995-7416
EMAIL: kbalkcom@nprl.usda.gov

T RICHARD BARBER, JR
2940 W SILVER SPRINGS BLVD
OCALA FL 34475-5654
PHONE: 352-732-3419
FAX: 352-351-5780

MICHAEL BARING
SOIL & CROP SCIENCES DEPT
TEXAS A&M UNIVERSITY
2474 TAMU
COLLEGE STATION TX 77843-2474
PHONE: 979-845-8802
FAX: 979-845-0456
EMAIL: m-baring@tamu.edu

STEVE BARNES
PEANUT BELT RESEARCH STATION
112 RESEARCH STATION LANE
LEWISTON NC 27849
PHONE: 252-348-2213
FAX: 252-348-2298
EMAIL: peanutbelt.resst@ncmail.net

BILLY BARROW
307 HICKORY FORK ROAD
EDENTON NC 27932
PHONE: 757-934-6700
FAX: 757-925-0496
EMAIL: bbarrow@gpc.admworld.com

ALLAN L BASNIGHT
7548 FOREST EDGE LN
MONTGOMERY AL 36117
PHONE: 334-277-0813
FAX: 334-244-7782
EMAIL: alb@liphatech

TODD BAUGHMAN
TEXAS A&M RES & EXT CENTER
PO BOX 2159
VERNON TX 76385
PHONE: 940-552-9941
FAX: 940-553-4657
EMAIL: ta-baughman@tamu.edu

JOHN P BEASLEY, JR
UNIV OF GEORGIA – CROP & SOIL SCIENCE
PO BOX 1209
TIFTON GA 31793-1209
PHONE: 229-386-3430
FAX: 229-386-7308
EMAIL: jbeasley@uga.edu

CAROLYN M BEDNAR
TEXAS WOMAN'S UNIVERSITY
NUTRITION & FOOD SCI – PO BOX 42588
DENTON TX 76208
PHONE: 940-898-2658
FAX: 940-898-2634
EMAIL: cbednar@twu.edu

JERRY M BENNETT
UNIVERSITY OF FLORIDA
PO BOX 110500
GAINESVILLE FL 32611-0500
PHONE: 352-392-1811 x201
FAX: 352-392-1840
EMAIL: jmbt@mail.iras.ufl.edu

KELLY BENNETT
PEANUT PROCESSORS INC
PO BOX 160
DUBLIN NC 28332-0160
PHONE: 910-862-2136
FAX: 910-862-8076
EMAIL: peanutprocessors@carolina.net

BRENT BESLER
TEXAS AGRICULTURAL EXP STATION
PO BOX 755
YOAKUM TX 77995
PHONE: 361-293-6326
FAX: 361-293-2054
EMAIL: b-besler@tamu.edu

BILL BIRDSONG
BIRDSONG PEANUTS
PO BOX 776
FRANKLIN VA 23851
PHONE: 757-562-3177
FAX: 757-562-3556
EMAIL: bbirdsong@birdsong-peanuts.com

MAC BIRDSONG
BIRDSONG PEANUTS
PO BOX 776
FRANKLIN VA 23851
PHONE: 757-562-3177
FAX: 757-562-3556
EMAIL: macbirdsong@birdsong-peanuts.com

MARK C BLACK
TEXAS AG EXT SERVICE
PO BOX 1849
UVALDE TX 78802-1849
PHONE: 830-278-9151 x141
FAX: 830-278-4008
EMAIL: m-black@tamu.edu

PAUL D BLANKENSHIP
USDA, ARS, NPRL
PO BOX 509
DAWSON GA 31742-0509
PHONE: 912-995-7434
FAX: 912-995-7416
EMAIL: pblankenship@nprl.usda.gov

JIM BLOOMBERG
BAYER CORPORATION
8400 HAWTHORN RD
PO BOX 4913
KANSAS CITY MO 64120
PHONE: 816-242-2268
FAX: 816-242-2753
EMAIL:
jim.bloomberg@bayercropscience.com

CLYDE BOGLE
UPPER COASTAL PLAIN RES STN
RT 2, BOX 400
ROCKY MOUNT NC 27801
PHONE: 252-442-7326
FAX: 252-442-9478
EMAIL: clyde.bogle@ncmail.net

MPOKO BOKANGA
6620 OLD MADISON PIKE NW, #207
HUNTSVILLE AL 35806

J P BOSTICK
ALABAMA CROP IMPROVEMENT ASSN
PO BOX 357
HEADLAND AL 36345
PHONE: 334-693-3988
FAX: 334-693-2212

MARK A BOUDREAU
PO BOX 9000, CPU 6196
WARREN WILSON COLLEGE
ASHEVILLE NC 28815-9000
PHONE: 828-771-3069
FAX: 828-299-4841
EMAIL: markb@warren-wilson.edu

KIRA L BOWEN
AUBURN UNIVERSITY
DEPT ENTO – 209 LIFE SCIENCES BLDG
AUBURN AL 36849-5624
PHONE: 334-844-1953
FAX: 334-844-1947
EMAIL: kb Bowen@acesag.auburn.edu

WILLIAM D BRANCH
UNIV OF GEORGIA –
DEPT OF CROP & SOIL SCIENCE
COASTAL PLAIN EXP STATION
TIFTON GA 31793-0748
PHONE: 229-386-3561
FAX: 229-386-7293
EMAIL: wdbranch@tifton.cpes.peachnet.edu

RICK L BRANDENBURG
NORTH CAROLINA STATE UNIVERSITY
BOX 7613
RALEIGH NC 27695-7613
PHONE: 919-515-8876
FAX: 919-515-7746
EMAIL: rick_brandenburg@ncsu.edu

BO BRAXTON
9630 MICCOSUKEE RD
TALLA FL 32309
PHONE: 850-656-9616
FAX: 850-878-6092
EMAIL: lbraxton@dowagro.com

MARK BRAXTON
2825 JACKSON BLUFF RD
MARIANNA FL 32446
PHONE: 850-482-1042
FAX: 850-482-1040
EMAIL: w.mark.braxton@monsanto.com

BARRY J BRECKE
WEST FLORIDA RES & ED CENT
5988 HWY 90, BLDG 4900
MILTON FL 32583
PHONE: 850-983-5216
EMAIL: bjbe@mail.ifas.ufl.edu

JOHN BREEN
1231 MEDALIST DR
MORRISVILLE NC 27560
PHONE: 919-467-6800
FAX: 919-467-6831
EMAIL: breen@dow.com

TIMOTHY BRENNEMAN
COASTAL PLAIN EXP STATION
DEPT PLANT PATHOLOGY
TIFTON GA 31794
PHONE: 229-386-3121
FAX: 229-386-7285
EMAIL: arachis@tifton.cpes.peachnet.edu

STEVEN BROSCIOUS
BASF CORPORATION
26 DAVIS DRIVE
RTP NC 27709-3528
PHONE: 919-547-2621
FAX: 919-547-2428

A BLAKE BROWN
CAMPUS BOX 8109,
AG & RESOURCE ECON
NORTH CAROLINA STATE UNIVERSITY
RALEIGH NC 27695-8109
PHONE: 919-515-4536
FAX: 919-515-6268
EMAIL: blake_brown@ncsu.edu

STEVE L BROWN
UNIVERSITY OF GEORGIA
PO BOX 1209
TIFTON GA 31793
PHONE: 229-386-3424
FAX: 229-386-7133
EMAIL: bugbrown@uga.edu

GALE A BUCHANAN
THE UNIVERSITY OF GEORGIA
101 CONNER HALL, DEAN &
DIRECTOR'S OFFICE
ATHENS GA 30602-7501
PHONE: 706-542-3924
FAX: 706-542-0803
EMAIL: caesdean@uga.edu

S GARY BULLEN
DEPT AG ECON & RES ECONOMICS
CAMPUS BOX 8109
RALEIGH NC 27695-8109
PHONE: 919-515-6096
FAX: 919-515-6268
EMAIL: gary_bullen@ncsu.edu

ROGER BUNCH
PO BOX 249
TYNER NC 27980
PHONE: 252-221-4466

MARK BUROW
TEXAS AGRICULTURAL EXP STATION
TEXAS A&M UNIVERSITY
1102 EAST FM 1294
LUBBOCK TX 79403
PHONE: 806-746-6101
FAX: 806-746-6528
EMAIL: mburow@lamu.edu

CHRISTOPHER BUTTS
NATIONAL PEANUT RESEARCH LAB
1011 FORRESTER DRIVE, SE
DAWSON GA 31742
PHONE: 229-995-7431
FAX: 229-995-7416
EMAIL: cbutts@nprl.usda.gov

JOHN E CAGLE
RT 1 BOX 113
MILL CREEK OK 74856
PHONE: 580-622-6304
FAX: 580-622-3115

LEE CAMPBELL
DEPT OF ENTOMOLOGY & PLANT PATH
209 LIFE SCIENCES BLDG
AUBURN UNIVERSITY AL 36849
PHONE: 334-844-1951
FAX: 334-844-1947
EMAIL: lcampbel@acesag.auburn.edu

WILLIAM V CAMPBELL
4312 GALAX DRIVE
RALEIGH NC 27612-3715
PHONE: 919-787-1417
EMAIL: williamvcampbell@aol.com

CHARLES CANON
CANNON FARMS INC
8036 AMERICAN LEGION ROAD
ABBEVILLE GA 31001
PHONE: 229-467-2042

PIRAN CARGEEG
BECKER UNDERWOOD
3835 THATCHER AVE
SASKATOON, SASK
CANADA S7R 1A3
PHONE: 306-373-3060
FAX: 306-376-8510
EMAIL: piran.cargeeg@beckerunderwood.com

JOHN CASON
1490 CAGE ST
STEPHENVILLE TX 76401
PHONE: 254-968-4144 x236
FAX: 254-965-3759
EMAIL: j-cason@tamu.edu

JAY W CHAPIN
EDISTO RESEARCH & EDUCATION CTR
64 RESEARCH ROAD
BLACKVILLE SC 29817
PHONE: 803-284-3343
FAX: 803-284-3684
EMAIL: jchapin@clemson.edu

GLENN F CHAPPELL, II
PO BOX 68
PRINCE GEORGE VA 23875-2527
PHONE: 804-733-2686
RAX: 804-733-2676
EMAIL: gfcii@vt.edu

KELLY CHENAULT
1301 N WESTERN
STILLWATER OK 74075
PHONE: 405-624-4141 x225
FAX: 405-372-1398
EMAIL: kchenault@pswcrl.ars.usda.gov

JOHN P CHERRY
ERRC, ARS-USDA
600 EAST MERMAID LANE
WYNDMOOR PA 19038
PHONE: 215-233-6595
FAX: 215-233-6777
EMAIL: jcherry@errc.ars.usda.gov

MANJEET CHINNAN
1109 EXPERIMENT ST -
DEPT FOOD SCIENCE & TECH
UNIVERSITY OF GEORGIA
GRIFFIN GA 30223
PHONE: 770-412-4741
FAX: 770-412-4748
EMAIL: chinnan@uga.edu

SI-YIN CHUNG
USDA - ARS SRRC
1100 ROBERT E LEE BLVD
NEW ORLEANS LA 70124
PHONE: 504-286-4465
FAX: 504-286-4419
EMAIL: sychung@srrc.ars.usda.gov

TERRY A COFFELT
USDA/ARS, US WATER CONSERVATION LAB
4331 E BROADWAY ROAD
PHOENIX AZ 85040-8832
PHONE: 602-437-1702 x238
FAX: 602-437-5291
EMAIL: tcoffelt@uswcl.ars.ag.gov

DANIEL L COLVIN
UNIVERSITY OF FLORIDA
PLANT SCIENCE RESEARCH UNIT
2556 W HWY 318
CITRA FL 32113-2132
PHONE: 352-591-2678
FAX: 352-591-1578
EMAIL: dlcol@gnv.ifas.ufl.edu

FORREST J CONNELLY
UGA EXT SERVICE (BERRIEN COUNTY)
516A COUNTY FARM RD
NASHVILLE GA 31639
PHONE: 229-686-5431
FAX: 229-686-7831
EMAIL: forrestc@uga.edu

JOHN R CRANMER
VALENT USA CORP
110 IOWA LANE, SUITE 201
CARY NC 27511
PHONE: 919-467-6293
FAX: 919-481-3599
EMAIL: jcran@valent.com

BRIAN CRESSWELL
1495 MAGNOLIA ST
BLAKELY GA 31723
PHONE: 229-723-3072
FAX: 229-723-3135
EMAIL: brianlc@uga.edu

ALBERT K CULBREATH
DEPT OF PLANT PATHOLOGY
THE UNIV OF GEORGIA,
COASTAL PLAIN EXPERIMENT STATION
PO BOX 748
TIFTON GA 31793-0748
PHONE: 229-386-3370
FAX: 229-386-7285
EMAIL: spotwilt@tifton.cpes.peachnet.edu

VIRGINIA CURTIS
BOX 7616 NCSU
RALEIGH NC 27695-7616
PHONE: 919-513-2331
FAX: 919-515-7716
EMAIL: virginia_curtis@ncsu.edu

HIROYUKI DAIMON
UNIVERSITY OF OSAKA PREFECTURE
1-1 GAKUEN-CHO
SAKAI-SHI, OSAKA-FU, 599-8531
JAPAN
PHONE: 81-722-54-9407
FAX: 81-722-54-9407
EMAIL: daimon@plant.osakafu-u.ac.jp

JOHN P DAMICONE
DEPT OF PLANT PATHOLOGY – 127 NRC
OKLAHOMA STATE UNIVERSITY
STILLWATER OK 74078-9947
PHONE: 405-744-9962
FAX: 405-744-7373
EMAIL: jpd3898@okstate.edu

GORDON DARBY
LIPHA TECH NITRAGIN BRAND INOC
732 WALNUT
MARKS MS 38646
PHONE: 662-326-4789
FAX: 662-326-4825
EMAIL: gdarby@LiphaTech.com

KENTON DASHIELL
DEPT OF PLANT & SOIL SCIENCES
368 AG HALL
STILLWATER OK 74078-6028
PHONE: 405-744-9600
FAX: 405-744-5269
EMAIL: dashiel@mail.pss.okstate.edu

JIM DAVIDSON
USDA-ARS
NATIONAL PEANUT RESEARCH LAB
PO BOX 509
DAWSON GA 31742
PHONE: 229-995-7428
FAX: 229-995-7416
EMAIL: jdavidson@nprl.usda.gov

JAMES C DAVIS
BECKER UNDERWOOD
418 KIMBALL DRIVE
MARION SC 29571
PHONE: 843-423-2036
FAX: 843-423-2044
EMAIL: james.davis@beckerunderwood.com

ROBERT DOBSON
248 BOB SIKES RD
DEFUNIAK SPRINGS FL 32433
PHONE: 850-892-3996
EMAIL: robert@gdsys.net

HORTENSE DODO
DEPT OF FOOD & ANIMAL SCIENCE
ALABAMA A&M UNIV
PO BOX 1628
NORMAL AL 35762
PHONE: 256-858-4171
FAX: 256-851-5432
EMAIL: aamhwd01@aamu.edu

PAT DONAHUE
40906 10th STREET
BOX 215
GREENFIELD CA 93927
PHONE: 831-674-3131 x204
FAX: 831-674-5139
EMAIL: donahuep@nabisco.com

WEIBO DONG
CROP GENETICS & BREEDING RES UNIT
COASTAL PLAIN EXP STATION
PO BOX 748
TIFTON GA 31793-0748
FAX: 912-391-3701
EMAIL: dweibo@yeah.net

JOE W DORNER
USDA,ARS NATIONAL PEANUT RES LAB
PO BOX 509
DAWSON GA 31742
PHONE: 229-995-7408
FAX: 229-995-7416
EMAIL: jdorner@nprl.usda.gov

PETER DOTRAY
TEXAS TECH UNIVERSITY
PLANT & SOIL SCIENCE
BOX 42122
LUBBOCK TX 79409-2122
PHONE: 806-742-1634
FAX: 806-742-0988
EMAIL: p-dotray@tamu.edu

JUANGJUN DUANGPATRA
DEPT OF AGRONOMY – FACULTY OF AG
KASETSART UNIVERSITY
BANGKOK 10900
THAILAND
PHONE: 662-579-3130
FAX: 662-579-8580
EMAIL: agrjua@nontri.ku.ac.th

JOHN B EITZEN AGRA TECH PO BOX 644 ASHBURN GA 31714 PHONE: 229-567-3438 FAX: 229-567-2043 EMAIL: jeitzen@surfsouth.com	MICHAEL FRANKE J LEEK ASSOCIATES, INC PO BOX 1232 BROWNFIELD TX 79316 PHONE: 806-637-9598 FAX: 806-637-9408 EMAIL: michaelfranke@jleek.com
RICHARD CRAIG ELLISON COLLEGE OF AG & LIFE SCIENCES – NCSU NC COOP EXT, NORTHAMPTON COUNTY CENTER PO BOX 636 JACKSON NC 27845 PHONE: 252-534-2711 FAX: 252-534-1827 EMAIL: cellison@northamp.ces.ncsu.edu	JOHN R FRENCH SIPCAM AGRO USA, INC 300 COLONIAL CENTER PKWY, STE 230 ROSWELL GA 30076 PHONE: 770-587-1032 FAX: 770-587-1115 EMAIL: frenchjrfry@msn.com
JOHN W EVEREST AUBURN UNIVERSITY 107 EXTENSION HALL AUBURN UNIVERSITY AL 36849 PHONE: 334-844-5493 FAX: 334-844-4586 EMAIL: everejw@auburn.edu	DUANE FUGATE WOODROE FUGATE & SONS PO BOX 114 WILLISTON FL 32696 PHONE: 352-528-5871 FAX: 352-528-4919
JOHN FARRIS CEA-AG TEXAS AGRICULTURAL EXTENSION SERVICE BOX 1268 LAMESA TX 79331 PHONE: 806-872-3444 FAX: 806-872-5606 EMAIL: j-farris@tamu.edu	NORM FUGATE WOODROE FUGATE & SONS PO BOX 114 WILLISTON FL 32696 PHONE: 352-528-0019 FAX: 352-528-4919
STANLEY M FLETCHER UNIVERSITY OF GEORGIA 1109 EXPERIMENT ST – DEPT AGRI & APP ECON GRIFFIN GA 30223-1797 PHONE: 770-228-7231 x127 FAX: 770-228-7208 EMAIL: sfletch@gaes.griffin.peachnet.edu	MARIA GALLO-MEAGHER UNIVERSITY OF FLORIDA PO BOX 110300, AGRONOMY DEPT GAINESVILLE FL 32611-0300 PHONE: 352-392-1823 x206 FAX: 352-392-7248 EMAIL: mgmea@gnv.ifas.ufl.edu
KIM FRANKE J LEEK ASSOCIATES, INC PO BOX 1232 BROWNFIELD TX 79316 PHONE: 806-637-9598 FAX: 806-637-9408 EMAIL: kimfranke@jleek.com	FRED GARNER BIRDSONG PEANUTS PO BOX 1400 SUFFOLK VA 23439
	GARY GASCHO UNIVERSITY OF GEORGIA, CPES PO BOX 748 TIFTON GA 31793 PHONE: 229-386-3329 FAX: 229-386-7293 EMAIL: gascho@tifton.cpes.peachnet.edu

HANS GEYER
M&M MARS
295 BROWN STREET
ELIZABETHTOWN PA 17022
PHONE: 717-367-0964
FAX: 717-361-4601
EMAIL: hans.geyer@effem.com

LEONARD P GIANESSI
NCFAP
1616 P STREET, NW
WASHINGTON DC 20036
PHONE: 202-328-5036
FAX: 202-328-5133
EMAIL: gianessi@ncfap.org

OSCAR GIAYETTO
UNIVERSIDAD NACIONAL DE RIO CUARTO
RUTA NACIONAL 36, KM 601
5800 RIO CUARTO (CORDOBA)
ARGENTINA
PHONE: 54-0358-4642530
FAX: 54-0358-4680280
EMAIL: ogiayetto@ayv.unrc.edu.ar

IDNACIO JOSE GODOY
INSTITUTO AGRONOMICO C.P. 28
13001-970 CAMPINAS – SP
BRAZIL
PHONE: 019-241-5188
FAX: 019-242-3602
EMAIL: ijgodoj@cec.iac.br

DEWITT T GOODEN
PEEDEE RESEARCH & EDUC CENTER
2200 POCKET ROAD
FLORENCE SC 29506-9706
PHONE: 843-669-1912 x203
FAX: 843-661-5676
EMAIL: dgooden@clemson.edu

DANIEL W GORBET
N FLORIDA RES & EDUC CENTER
3925 HIGHWAY 71
MARIANNA FL 32446-7906
PHONE: 850-482-9956
FAX: 850-482-9917
EMAIL: dgorbet@mail.ifas.ufl.edu

CHARLES GRAHAM
PO BOX 1046
GRENADA MS 38901
PHONE: 601-229-0723
FAX: 601-229-0724
EMAIL: cgraham@gustafson.com

TIMOTHY L GREY
DEPT CROP & SOIL SCIENCE, UNIV OF GA
PO BOX 748
TIFTON GA 31793-0748
PHONE: 229-386-7239
FAX: 229-386-7239
EMAIL: tgrey@tifton.cpes.peachnet.edu

G M "MAX" GRICE
BRIDSONG PEANUTS
PO BOX 698
GORMAN TX 76454
PHONE: 254-734-2266
FAX: 254-734-2029
EMAIL: mgrice@birdsong-peanuts.com

JAMES GRICHAR
TEXAS AG EXPT STATION
PO BOX 755
YOAKUM TX 77995
PHONE: 361-293-6326
FAX: 361-293-2054
EMAIL: w-grichar@tamu.edu

KEITH GRIFFITH
CROMPTON CORPORATION
5211 FAWNWAY COURT
ORLANDO FL 32819
PHONE: 407-876-8698
FAX: 407-876-8697
EMAIL: keith_griffith@uniroyalchemical.com

MELVIN GROVE
ISK BIOSCIENCES CORP
2237 HADEN ROAD
HOUSTON TX 77015
PHONE: 713-393-3750
FAX: 713-393-3751
EMAIL: grovem@iskbc.com

CHARLES GRYMES
RT 2 BOX 214
IDALOU TX 79329
PHONE: 806-892-2130
FAX: 806-892-2337
EMAIL: charles.grymes@syngenta.com

BAOZHU GUO
CROP PROTECTION LAB, USDA-ARS
PO BOX 748
TIFTON GA 31793-0748
PHONE: 229-387-2334
FAX: 229-387-2321
EMAIL: bguo@tifton.cpes.peachnet.edu

JAMES F HADDEN SYNGENTA 97 WILLIAM GIBBS RD TIFTON GA 31793 PHONE: 229-391-9032 FAX: 229-391-9136 EMAIL: james.hadden@syngenta.com	LARRY R HAWF MONSANTO LIFE SCIENCE CO PO BOX 188 SASSER GA 31785 PHONE: 229-698-2111 FAX: 229-698-2211 EMAIL: larry.r.hawf@monsanto.com
AUSTIN K HAGAN AUBURN UNIVERSITY 106 EXTENSION HALL AUBURN UNIVERSITY AL 36849-5624 PHONE: 334-844-5503 FAX: 334-844-4072 EMAIL: ahagan@acesag.auburn.edu	GUOHAO HE TUSKEGEE UNIVERSITY 205 MILBANK HALL TUSKEGEE AL 36088 PHONE: 334-727-8459 FAX: 334-727-8552 EMAIL: hguohao@tusk.edu
TIM HALL BEN HILL COUNTY EXT COORDINATOR UNIVERSITY OF GEORGIA PO BOX 630 FITZGERALD GA 31750 PHONE: 229-426-5175 FAX: 229-426-5176 EMAIL: thall@uga.edu	AMES HERBERT TIDEWATER AG RES & EXT CENTER 6321 HOLLAND ROAD SUFFOLK VA 23437 PHONE: 757-657-6450 X122 FAX: 757-657-9333 EMAIL: herbert@vt.edu
P W HARDEN PEANUT COMPANY OF AUSTRALIA, LTD PO BOX 26 KINGAROY, QUEENSLAND 4610 AUSTRALIA PHONE: 617-41626311 FAX: 617-41624402 EMAIL: pharden@pca.com.au	TIMOTHY D HEWITT UNIVERSITY OF FLORIDA 3925 HIGHWAY 71 MARIANNA FL 32446 PHONE: 850-482-9904 FAX: 850-482-9917 EMAIL: thewitt@mail.ifas.ufl.edu
STEVE A HARRISON SYNGENTA CROP PROTECTION 8000 CENTERVIEW PKWY, SUITE 501 CORDOVA TN 38018 PHONE: 901-751-5206 FAX: 901-751-5223 EMAIL: steve.harrison@syngenta.com	MARGARET J HINDS NUTRITIONAL SCIENCES DEPARTMENT OKLAHOMA STATE UNIVERSITY 425 HES BLDG STILLWATER OK 74078 PHONE: 405-744-5040 FAX: 405-744-7113 EMAIL: hindsmj@okstate.edu
DALLAS L HARTZOG WIREGRASS RESEARCH & EXTENSION CTR PO BOX 217 HEADLAND AL 36345 PHONE: 334-693-3800 FAX: 334-693-2957 EMAIL: dhartzog@acesag.auburn.edu	C CORLEY HOLBROOK USDA/ARS-SAA PO BOX 748 TIFTON GA 31793 PHONE: 229-386-3176 FAX: 229-391-3701 EMAIL: holbrook@tifton.cpes.peachnet.edu

PAUL L HOLLIS FARM PRESS PO BOX 1415 AUBURN AL 36831 PHONE: 334-826-7451 FAX: 334-826-7979 EMAIL: phollis@primediabusiness.com	YASUYUKI ISHIDA SAITAAMA UNIVERSITY AGRONOMY LABORATORY FACULTY OF EDUCATION URAWA JAPAN
JOYCE HOLLOWELL NORTH CAROLINA STATE UNIVERSITY BOX 7903 RALEIGH NC 27695-7903 PHONE: 919-515-3930 FAX: 919-513-1279 EMAIL: joyce_hollowell@ncsu.edu	THOMAS G ISLEIB DEPARTMENT OF CROP SCIENCE BOX 7629 NORTH CAROLINA STATE UNIVERSITY RALEIGH NC 27695-7629 PHONE: 919-515-3281 FAX: 919-515-5657 EMAIL: tom_isleib@ncsu.edu
W CLAYTON HOLTON, JR 197 CHURCHILL CIRCLE LEESBURG GA 31763	AKIHIRO ISODA FACULTY OF HORTICULTURE/CHIBA UNIV MATSUDO 648 CHIBA 271-8510 JAPAN PHONE: 81-47-308-8814 FAX: 81-47-308-8814 EMAIL: isoda@midori.h.chiba-u.ac.jp
GERRIT HOOGENBOOM UNIVERSITY OF GEORGIA DEPT OF BIO/AG ENGINEERING GRIFFIN GA 30223-1797 PHONE: 770-229-3438 FAX: 770-228-7218 EMAIL: gerrit@griffin.peachnet.edu	YOSHIHARU IWATA CHIBA PREF AG RES CEN PEANUT PLANTS HE-199, YACHIMATA-SHI CHIBA-KEN, 289-1113 JAPAN PHONE: 043-444-0676
BRUCE HORN NATIONAL PEANUT RESEARCH LAB PO BOX 509 DAWSON GA 31742-0509 PHONE: 229-995-7410 FAX: 229-995-7416 EMAIL: bhorn@nprl.usda.gov	KENNETH E JACKSON OKLAHOMA STATE UNIVERSITY ENTO & PLANT PATH DEPT 127 NRC STILLWATER OK 74078 PHONE: 405-744-9959 FAX: 405-744-7373 EMAIL: kej6872@okstate.edu
RANDY HUCKABA 300 FRYING PAN HOLLOW ROAD FERRUM VA 24088 PHONE: 540-484-5532 FAX: 540-484-9069	MIKE JACKSON J LEEK ASSOCIATES, INC PO BOX 267 EDENTON NC 27932 PHONE: 252-482-4456 FAX: 252-482-5370 EMAIL: mikejackson@jleek.com
DAVID HUNT BAYER CORP 1911 NORTHGATE DRIVE OPELIKA AL 36801 PHONE: 334-745-3921 FAX: 334-741-5469 EMAIL: david.hunt@bayercropscience.com	JAMES JACOBS 516A COUNTY FARM ROAD NASHVILLE GA 31639 PHONE: 229-686-5431 FAX: 229-686-7831 EMAIL: jamesj@uga.edu
I BONE LIBRARY C CORRES 209 3400 CORRIENTES ARGENTINA	

BRENT D JACOBSON
607 E 48th ST
TIFTON GA 31794
PHONE: 229-391-9121
FAX: 229-391-9835
EMAIL: jacobsb1@basf.com

A J JAKS
TEXAS A&M UNIVERSITY, TAES
PO BOX 755
YOAKUM TX 77995-0755
PHONE: 361-293-6326
FAX: 361-293-2054
EMAIL: a-jaks@tamu.edu

KATHERINE JENNINGS
BASF
110 CANYON LAKE CIRCLE
MORRISVILLE NC 27560
PHONE: 919-319-9837
FAX: 919-319-9837
EMAIL: jenningkm@basf.com

SANUN JOGLOY
DEPT OF AGRONOMY, FACULTY OF AG
KHON KAEN UNIVERSITY
KHON KAEN 40002
THAILAND
PHONE: 66-043-342949
FAX: 66-043-364636
EMAIL: sanun@kku.ac.th

BECK JOHNSON
JOHNSON AGRONOMICS, INC
2612 LANIER
WEATHERFORD OK 73096
PHONE: 580-774-0737
FAX: 580-774-0408

RALPH JOHNSON
GA SEED DEV COMM
1547 US HWY 280 W
PLAINS GA 31780
PHONE: 229-824-7881

W CARROLL JOHNSON, III
USDA-ARS
PO BOX 748
TIFTON GA 31793
PHONE: 229-386-3172
FAX: 229-386-3437
EMAIL: cjohson@tifton.cpes.peachnet.edu

CURTIS M JOLLY
212 COMER HALL
DEPT OF AG ECON & RURAL SOCIOLOGY
AUBURN UNIVERSITY
AUBURN AL 36849-5406
PHONE: 334-844-5613
FAX: 334-844-5639
EMAIL: cjolly@acesag.auburn.edu

DAVID L JORDAN
NORTH CAROLINA STATE UNIVERSITY
BOX 7620 CROP SCIENCE DEPT
RALEIGH NC 27695-7620
PHONE: 919-515-4068
FAX: 919-515-7959
EMAIL: david_jordan@ncsu.edu

LANIER JORDAN
BAKER COUNTY EXTENSION SERVICE
PO BOX 220
NEWTON GA 31770
PHONE: 229-734-3015
FAX: 229-734-4642
EMAIL: emmelt3@uga.edu

MICHAEL J JORDAN
279 HUNTERS FORK RD
TYNER NC 27980
PHONE: 252-482-2222
FAX: 252-482-3151
EMAIL: mjordan@morvenpartners.com

MADHUMITA JOSHI
DEPARTMENT OF HORTICULTURE
UGA COASTAL PLAIN
EXPERIMENTAL STATION
TIFTON GA 31793-0748
PHONE: 229-391-2594
FAX: 229-386-3356
EMAIL: mjoshi@tifton.cpes.peachnet.edu

H E JOWERS
2741 PENNSYLVANIA AVE, STE 3
MARIANNA FL 32448-4022
PHONE: 850-482-9620
FAX: 850-482-9287
EMAIL: hej@mail.ifas.ufl.edu

ROGER P KAISER
7712 BLUFF TOP CT
RALEIGH NC 27615
PHONE: 919-549-2188
FAX: 919-549-3952
EMAIL: roger.kaiser@bayercropscience.com

CHARI KANDALA
NPRL, USDA, ARS
PO BOX 509
DAWSON GA 31742-0509
PHONE: 229-995-7452
FAX: 229-995-7416
EMAIL: ckandala@nprl-usda.gov

KENT R KEIM
OKLAHOMA STATE UNIVERSITY
369 AG HALL, PLANT & SOIL SCIENCE
STILLWATER OK 74078
PHONE: 405-744-7397
FAX: 405-744-5269
EMAIL: kkent@mail.pss.okstate.edu

ROBERT C KEMERAIT, JR
15 RURAL DEVELOPMENT CENTER RD
PO BOX 1209
TIFTON GA 31793
PHONE: 229-386-7495
FAX: 229-386-7415
EMAIL: kemerait@arches.uga.edu

RAKKASEI KEN
CHIBA PREF AG RES CEN PEANUT PLANTS
HE-199 YACHIMATA-SHI
CHIBA-KEN 289-1113
JAPAN
PHONE: 043-444-0676

EUGENE KING
KING CONSULTING
5524 – 76th STREET
LUBBOCK TX 79424
PHONE: 806-794-4252
FAX: 806-794-4326
EMAIL: trique@hub.ofthe.net

DEAM A KOMM
BAYER CORPORATION
2524 TILTONSHIRE LANE
APEX NC 27502
PHONE: 919-772-3128
FAX: 919-662-2611
EMAIL: dean.komm.b@bayer.com

KOFFI N KONAN
ALABAMA A&M UNIVERSITY
DEPT OF FOOD & ANIMAL SCIENCE
PO BOX 1628
NORMAL AL 37762
PHONE: 256-858-4171
FAX: 256-851-5432
EMAIL: hkkonan@aamu.edu

DAN KRIEG
PLANT & SOIL SCIENCE DEPT
TEXAS TECH UNIVERSITY – MS 42122
LUBBOCK TX 79401
PHONE: 806-742-1631
FAX: 806-742-0775
EMAIL: dkrieg@ttu.edu

THOMAS A KUCHAREK
UNIVERSITY OF FLORIDA
PO BOX 110680
1421 FIFIELD HALL – PLANT PATH
GAINESVILLE FL 32611-0513
PHONE: 352-392-1980
FAX: 352-392-6532
EMAIL: tak@gnv.ifas.ufl.edu

MARSHALL C LAMB
USDA-ARS-NPRL
PO BOX 509
DAWSON GA 31742
PHONE: 229-995-7417
FAX: 229-995-7416
EMAIL: mlamb@nprl.usda.gov

IRA BUDDY LEE
LIPHA TECH
602 EAST FIFTH ST
DONALSONVILLE GA 31745
PHONE: 912-524-2560
FAX: 912-524-2561
EMAIL: ibl@liphatech.com

THOMAS A LEE, JR
ROUTE 2, BOX 1
STEPHENVILLE TX 76401
PHONE: 254-968-4144
FAX: 254-965-3759
EMAIL: t-lee4@tamu.edu

H MICHAEL LINKER
NORTH CAROLINA STATE UNIVERSITY
PO BOX 7620
RALEIGH NC 27695-7620
PHONE: 919-515-5644
FAX: 919-515-5315
EMAIL: mike_linker@ncsu.edu

D MALCOLM LIVINGSTONE
FRALIN BIOTECHNOLOGY CENTER
WEST CAMPUS DRIVE
VIRGINIA TECH
BLACKSBURG VA 24061
PHONE: 540-231-4778
EMAIL: dlivings@vt.edu

ELBERT J LONG
SEVERN PEANUT CO, INC
PO BOX 710
SEVERN NC 27877
PHONE: 252-585-0838
FAX: 252-585-1718

YOLANDA LOPEZ
5540 19th ST, APT 122
LUBBOCK TX 79407
PHONE: 806-746-4024
FAX: 806-746-6528
EMAIL: y-lopez@tamu.edu

NORMAN LOVEGREN
211 W BROOKS ST
NEW ORLEANS LA 70124-1107
PHONE: 504-482-0352

ELIZABETH S LOVELACE
ADECCO-TAD TECHNICAL
2945 SOUTH MIAMI BOULEVARD
DURHAM NC 27703-8024

AUDREY S LUKE-MORGAN
UNIVERSITY OF GEORGIA, CPES-NESPAL
PO BOX 748
TIFTON GA 31793-0748
PHONE: 229-391-6877
FAX: 229-386-7371
EMAIL: aluke@tifton.uga.edu

JAMES N LUNSFORD
SYNGENTA CROP PROTECTION
218 LAKEWOOD DRIVE
ENTERPRISE AL 36330
PHONE: 334-393-2891
FAX: 334-308-9276
EMAIL: lunsford.james@syngenta.com

ROBERT E LYNCH
USDA – ARS, PO BOX 748
INSECT BIOLOGY LAB
TIFTON GA 31793-0748
PHONE: 229-387-2347
FAX: 229-387-2321
EMAIL: rlynch@tifton.cpes.peachnet.edu

J FRANK MCGILL
615 WEST 10th ST
TIFTON GA 31794
PHONE: 229-382-6912
EMAIL: mrpnut@surfsouth.com

THOMAS E McKEMIE
BASF
7 CAMEROONS PLACE
DURHAM NC 27703
PHONE: 919-598-9088
FAX: 919-957-0095
EMAIL: mckemit@bASF.com

KAY McWATTERS
GEORGIA EXPERIMENT STATION
FOOD SCIENCE DEPT
GRIFFIN GA 30223-1797
PHONE: 770-412-4737
FAX: 770-229-3216
EMAIL: kmcwatt@griffin.peachnet.edu

GREG MacDONALD
PO BOX 110500
UNIVERSITY OF FLORIDA
GAINESVILLE FL 32611
PHONE: 352-392-1811 x214
FAX: 352-392-1840
EMAIL: gemac@mail.ifas.ufl.edu

KAZUMI MAEDA
HIGASHI 2-55 MIDORINO
NOICHI-CHO KOCHI-KEN
781-5205
JAPAN
PHONE: 08875-5-1327
FAX: 08875-5-1327

ROGER MAGAREY
PLANT PATHOLOGY, NCSU
CAMPUS BOX 7616
RALEIGH NC 27695-7616
PHONE: 919-515-6688
EMAIL: roger_magarey@ncsu.edu

SOHEILA MALEKI
USDA-ARS-SRRC
1100 ROBERT E LEE BLVD
NEW ORLEANS LA 70124
PHONE: 504-286-4590
FAX: 504-286-4430
EMAIL: sjmaleki@srrc.ars.usda.gov

CHARLIE MASON
PO BOX 99
CLAYTON AL 36016
PHONE: 334-775-3284
FAX: 334-775-7245
EMAIL: cmason@aces.edu

MICHAEL MATHERON
UNIVERSITY OF ARIZONA/YUMA
AG CENTER
6425 W 8th ST
YUMA AZ 85364
PHONE: 928-726-0458
FAX: 928-726-1363
EMAIL: matheron@ag.arizona.edu

ALAIN MAYEUX
CIRAD-CA
37, AVENUE JEAN XXIII
BP 6478
DAKAR-ETOILE SENEGAL
PHONE: 221-823-9265
FAX: 221-823-9265
EMAIL: mayeux@sento.sen

HASSAN A MELOUK
USDA-ARS,
OKLAHOMA STATE UNIVERSITY
DEPT OF PLANT PATH, 311A NOBLE CTR
STILLWATER OK 74078
PHONE: 405-744-9957
FAX: 405-744-7373
EMAIL: hassan@okstate.edu

FOY MILLS, JR
210 ZONA LUCE BUILDING
ACU BOX 27986
ABILENE TX 79699-7986
PHONE: 915-674-2401
FAX: 915-674-6936
EMAIL: f.mills@agenv.acu.edu

KIM MOORE
AGRATECH SEEDS, INC
PO BOX 644
ASHBURN GA 31714
PHONE: 229-567-3438
FAX: 229-567-2043
EMAIL: kmoore@surfsouth.com

TIM W MOORE
UGA COOP EXTENSION
406 W CRAWFORD
COLQUITT GA 31737
PHONE: 229-758-4106
FAX: 229-758-4106

HARVEY MORRIS
PO BOX 160
DUBLIN NC 28332

FRANK MORRISON
85824 519th AVENUE
CLEARWATER NE 68726
PHONE: 402-887-5335
FAX: 402-887-4709

ROBERT B MOSS
PO BOX 67
PLAINS GA 31780
PHONE: 229-824-5775
FAX: 229-824-3589

R WALTON MOZINGO
TIDEWATER AGRIC RES & EXT CENTER
6321 HOLLAND ROAD
SUFFOLK VA 23437
PHONE: 757-657-6450 x107
FAX: 757-657-9333
EMAIL: rmozingo@vt.edu

ROY W MOZINGO, II
5105 MELBOURNE ROAD
RALEIGH NC 27606
PHONE: 919-515-3281
FAX: 919-515-5657
EMAIL: rmozingo@unity.ncsu.edu

PHIL MULDER
OKLAHOMA STATE UNIVERSITY
DEPT ENTOMOLOGY & PLANT PATH
127 NOBLE RESEARCH CENTER
STILLWATER OK 74078
PHONE: 405-744-9413
FAX: 405-744-6039
EMAIL: philmul@okstate.edu

ALAN MURPHY
3604 LULLWATER RD
TIFTON GA 31794
PHONE: 229-382-7994
FAX: 229-387-7442
EMAIL: amurphy@friendlycity.net

KENNETH R MUZYK
GOWAN COMPANY
408 LARRIE ELLEN WAY
BRANDON FL 33511
PHONE: 813-657-5271
FAX: 813-684-8404
EMAIL: kmuzyk@gowanco.com

TATEO NAKANISHI NATIONAL SHIKOKU AGRIC EXP STATION 1-3-1 SENYU-CHO ZENTUJI-SHI, KAGAWA-KEN 765-0001 JAPAN PHONE: 0877-62-0800	VICTOR NWOSU 800 HIGH STREET HACKETTSTOWN NJ 07840 PHONE: 908-850-7545 FAX: 908-850-2697 EMAIL: victor.nwosu@effem.com
SANFORD H NEWELL BASF PO BOX 969 STATESBORO GA 30458 PHONE: 912-865-3370 FAX: 912-865-3371 EMAIL: newells@basf.com	WILLIAM C ODLE VALENT USA CORPORATION 1701 GATEWAY BLVD, STE 385 RICHARDSON TX 75080 PHONE: 972-664-1716 FAX: 972-664-1393 EMAIL: bill.odle@valent.com
SHYAM N NIGAM ICRISAT CENTER PATANCHERU A.P. 502324 INDIA PHONE: 91-40-3296161 FAX: 91-40-3241239 EMAIL: s.nigam@cgiar.org	PHIL ODOM PO BOX 3970 AUBURN AL 36831
CHEN NIU DEPARTMENT OF HORTICULTURE UNIVERSITY OF GEORGIA PO BOX 748 TIFTON GA 31793 PHONE: 229-391-2594 FAX: 229-386-3356 EMAIL: niuc@tifton.cpes.peachnet.edu	PEGGY OZIAS-AKINS COASTAL PLAIN EXPERIMENT STATION DEPT OF HORT, PO BOX 748 TIFTON GA 31793-0748 PHONE: 229-386-3902 FAX: 229-386-3356 EMAIL: ozias@tifton.cpes.peachnet.edu
KEVIN L NORMAN PEANUT COMPANY OF AUSTRALIA PO BOX 26 KINGAROY QLD 4610 AUSTRALIA PHONE: 61741-626311 FAX: 61741-624402 EMAIL: norman@pca.com.au	A T PALRANG BAYER CORPORATION 6552 NEEDHAM LN AUSTIN TX 78739 PHONE: 512-301-1274 EMAIL: drew.palrang@bayercropscience.com
DAVID NOWLIN OSU EXTENSION 201 W OKLAHOMA ANADARKO OK 73005-3430 PHONE: 405-247-3376 FAX: 405-247-7638 EMAIL: nowlin@okstate.edu	HAROLD E PATTEE USDA/ARS – NCSU BOX 7625 RALEIGH NC 27695-7625 PHONE: 919-515-6745 FAX: 919-515-7760 EMAIL: harold_pattee@ncsu.edu
	JAMES R PEARCE EDGEcombe COUNTY PO BOX 129 TARBORO NC 27886 PHONE: 252-641-7815 FAX: 252-641-7831 EMAIL: james_pearce@ncsu.edu

CHARLES PEARSON
SYNGENTA CROP PROTECTION, INC
8000 CENTERVIEW PARKWAY, STE 501
CORDOVA TN 38018
PHONE: 910-751-5208
FAX: 901-751-5224
EMAIL: charles.pearson@syngenta.com

JAMES PEASE
301 C HUTCHESON HALL
VIRGINIA TECH
BLACKSBURG VA 24061
PHONE: 540-231-4178
FAX: 540-231-7417
EMAIL: peasej@vt.edu

GARY A PEDERSON
USDA,ARS, PLANT GENETIC RES
CONSERVATION UNIT
1109 EXPERIMENT ST
GRIFFIN GA 30223
PHONE: 770-228-7254
FAX: 770-229-3323
EMAIL: gpederson@ars-grin.gov

VIBOON PENSUK
FACT. OF SCIENCE & TECHNOLOGY
RAJABHAT INSTITUTE UDONTHANI
UDONTHANI 4100
THAILAND
PHONE: 66-43-342949
FAX: 66-43-364636
EMAIL: vpensuk@hotmail.com

PATRICK M PHIPPS
TIDEWATER AGRIC RES & EXT CENTER
6321 HOLLAND ROAD
SUFFOLK VA 23437
PHONE: 757-657-6450 x120
FAX: 757-657-9333
EMAIL: pmphipps@vt.edu

TEODORO PICADO
PO BOX 111
CHINANDEGA, NICARAGUA
CENTRAL AMERICA
PHONE: 505-882-5118
FAX: 505-883-0929
EMAIL: tpicado@lbw.com.ni

ROY PITTMAN
USDA/ARS REG PLANT INTRO STATION
1109 EXP STATION
GRIFFIN GA 30223-1797
PHONE: 770-229-3252
FAX: 770-229-3323
EMAIL: rpittma@gaes.griffin.peachnet.edu

DUNK PORTERFIELD
SYNGENTA CROP PROTECTION, INC
101 GLEN ALPINE CIRCLE
GARY NC 27513
PHONE: 919-380-1812
FAX: 919-380-1816
EMAIL: dunk.porterfield@syngenta.com

ERIC P PROSTKO
UNIVERSITY OF GEORGIA
RURAL DEVELOPMENT CENTER
PO BOX 1209
TIFTON GA 31793
PHONE: 229-386-3194
FAX: 229-386-7308
EMAIL: eprostko@uga.edu

NAVEEN PUPPALA
COLLEGE ASSIST PROFESSOR, ASC-CLOVIS
STAR ROUTE BOX 77
CLOVIS NM 88101
PHONE: 505-985-2292
FAX: 505-985-2419
EMAIL: npuppala@nmsu.edu

BETSY RANDALL-SCHADEL
N.C.D.A. & C.S. SEED SECTION
PO BOX 27647
RALEIGH NC 27611
PHONE: 919-733-3930
FAX: 919-733-1041
EMAIL: betsy-randall-schadel@ncmail.net

MARJORIE RAYBURN
NC COOP EXTENSION SERVICE
PO BOX 46
GATESVILLE NC 27938
PHONE: 252-357-1400
FAX: 252-357-1167
EMAIL: marjorie_rayburn@ncsu.edu

MICHAEL J READ
CANON GARTH LTD
ALEXANDER HOUSE, 31-39 LONDON RD
SEVENOAKS KENT TN13 1AR
UNITED KINGDOM
PHONE: 44-1732-743434
FAX: 44-1732-743444
EMAIL: mike.read@etes-ltd.co.uk

SAMUEL SANCHEZ-DOMINGUEZ
CHABACANO NO15
FRAC SAN MARTIN
TEXCOCO MEX
C.P. 56199
PHONE: 595-95-5-1654
FAX: 595-95-2-1642
EMAIL: samuels@correo.chapingo.mx

JULI ROBERTSON
PEANUT COMPANY OF AUSTRALIA
PO BOX 26
KINGAROY, QLD 4610
AUSTRALIA
PHONE: 617-41626311
FAX: 617-41624402
EMAIL: jrobertson@pca.com.au

TIMOTHY H SANDERS
USDA, ARS
BOX 7624, NCSU
RALEIGH NC 27695-7624
PHONE: 919-515-6312
FAX: 919-515-7124
EMAIL: tim_sanders@ncsu.edu

E W ROGISTER, JR
5951 US 258 HWY
WOODLAND NC 27897
PHONE: 252-587-9791
EMAIL: billrogister@schoollink.net

ROBERT SCHILLING
CIRAD
TA 70/01 – AVENUE AGROPOLIS
34398 MONTPELLIER CEDEX 05
FRANCE
PHONE: 33-04-67-615918
FAX: 33-04-67-615820
EMAIL: schilling@cirad.fr

MALONE ROSEMOND
BAYER CROPSCIENCE
2812 N PARK AVE
TIFTON GA 31794
PHONE: 229-388-0267
FAX: 229-388-0268
EMAIL:
malone.rosemond@bayercropscience.com

A M SCHUBERT
TEXAS AGRIC RES & EXTENSION CENTER
ROUTE 3 BOX 219
LUBBOCK TX 79403-9803
PHONE: 806-746-6101
FAX: 806-746-6528
EMAIL: a-schubert@tamu.edu

DIANE ROWLAND
USDA-ARS NRRL
PO BOX 509, 1011 FORRESTER DR SE
DAWSON GA 31742
PHONE: 229-995-7430
FAX: 229-995-7416
EMAIL: drowland@nrnl.usda.gov

MEHBOOB B SHEIKH
PLANT BIOTECHNOLOGY
DIV AGRICULTURAL SCIENCES
FLORIDA A&M UNIVERSITY
TALLAHASSEE FL 32307
PHONE: 850-561-2218
FAX: 850-599-3119
EMAIL: mehboob.sheikh@famu.edu

RICHARD RUDOLPH
BAYER CORPORATION
1029 PEACHTREE PKWY NORTH, PMB 357
PEACHTREE CITY GA 30269-4210
PHONE: 770-632-9440
FAX: 770-632-4424
EMAIL: richard.rudolph.b@bayer.com

JOHN L SHERWOOD
PLANT PATHOLOGY DEPT
2105 MILLER PLANT SCIENCE BLDG
UNIVERSITY OF GEORGIA
ATHENS GA 30602
PHONE: 706-542-2571
FAX: 706-542-1262
EMAIL: sherwood@uga.edu

JAMES SCOTT RUSSELL
PO BOX 571
MOULTRIE GA 31776
PHONE: 229-890-8929

BARBARA B SHEW
NORTH CAROLINA STATE UNIVERSITY
DEPT OF PLANT PATHOLOGY, BOX 7903
RALEIGH NC 27695-7903
PHONE: 919-515-6984
FAX: 919-513-1279
EMAIL: barbara_shew@ncsu.edu

F M SHOKES
TIDEWATER AGRIC RES & EXT CENTER
6321 HOLLAND ROAD
SUFFOLK VA 23437-9588
PHONE: 757-657-6450 x104
FAX: 757-657-9333
EMAIL: fshokes@vt.edu

J RONALD SHOLAR
OKLAHOMA STATE UNIVERSITY
376 AG HALL
STILLWATER OK 74078
PHONE: 405-744-9616
FAX: 405-744-0354
EMAIL: sholar@okstate.edu

ANDREW SIMON
PEANUT COMPANY OF AUSTRALIA
PO BOX 802
KATHERINE NT 0851
AUSTRALIA

CHARLES E SIMPSON
TEXAS AGRIC EXPERIMENT STATION
PO BOX 292
STEPHENVILLE TX 76401-0292
PHONE: 254-968-4144
FAX: 254-965-3759
EMAIL: c-simpson@tamu.edu

JACK SIMPSON
BIRDSONG PEANUTS
PO BOX 698
GORMAN TX 76454
PHONE: 254-734-2266
FAX: 254-734-2029
EMAIL: jsimpson@birdsong-peanuts.com

ANIL K. SINHA
CARDI REPRESENTATIVE
CARIBBEAN AGRICULTURAL RES
& DEV INST
BELMOPAN BELIZ
CENTRAL AMERICA
PHONE: 501-822-2602
EMAIL: cardi@btl.net

LEWIS W SMITH, JR
COUNTY EXTENSION DIRECTOR
NC COOPERATIVE EXTENSION SERVICE
PERQUIMANS COUNTY CENTER
PO BOX 87
HERTFORD NC 27944
PHONE: 252-426-5428
FAX: 252-426-1646
EMAIL: lewis_smith@ncsu.edu

NATHAN B SMITH
UNIVERSITY OF GEORGIA, RDC
PO BOX 1209
TIFTON GA 31793
PHONE: 229-386-3512
FAX: 229-386-3440
EMAIL: nathans@uga.edu

DOUGLAS A SMYTH
KRAFT FOODS
200 DE FOREST AVENUE
EAST HANOVER NJ 07936
PHONE: 973-503-4877
FAX: 973-503-3833
EMAIL: smyhd@nabisco.com

RONALD B SORENSEN
USDA-ARS, NATIONAL PEANUT LAB
PO BOX 509, 1011 FORRESTER DR SE
DAWSON GA 31742
PHONE: 229-995-7411
FAX: 229-995-7416
EMAIL: rsorensen@nprl.usda.gov

JANET FERGUSON SPEARS
NORTH CAROLINA STATE UNIVERSITY
CROP SCIENCE DEPT, BOX 7620
RALEIGH NC 27695-7620
PHONE: 919-515-2653
FAX: 919-515-7959
EMAIL: jan_spears@ncsu.edu

H THOMAS STALKER
CROP SCIENCE DEPT, BOX 7620
NORTH CAROLINA STATE UNIVERSITY
RALEIGH NC 27695-7620
PHONE: 919-515-2647
FAX: 919-515-5657
EMAIL: hts@unity.ncsu.edu

JAMES L STARR
TEXAS A&M UNIVERSITY
DEPT OF PLANT PATHOLOGY
& MICROBIOLOGY
COLLEGE STATION TX 77802
PHONE: 979-845-8278
FAX: 979-845-6483
EMAIL: j-starr@tamu.edu

DON STERNITZKE
NATIONAL PEANUT RESEARCH LAB
PO BOX 509
DAWSON GA 31742
PHONE: 229-995-7432
FAX: 229-995-7416
EMAIL: dsternitzke@nprl.usda.gov

R V STURGEON, JR
1729 LINDA AVE
STILLWATER OK 74075
PHONE: 405-372-0405

PALA SUBRAHANYAM
ICRISAT/MALAWI AIARC
901 N WASHINGTON ST, STE 706
ALEXANDRIA VA 22314-1535
PHONE: 265-707-297
FAX: 265-707-298
EMAIL: ICRISAT-malawi@cgiar.org

GENE A SULLIVAN
GLOBAL AGRONOMICS, INC
741 RAINS CROSSROADS ROAD
PRINCETON NC 27569
PHONE: 919-965-5525
FAX: 919-965-5525
EMAIL: gooberp1@aol.com

JAMES SUTTON
GA SEED DEVELOPMENT COMMISSION
2420 SOUTH MILLEDGE AVE
ATHENS GA 30605
PHONE: 706-542-5640
FAX: 706-227-7159
EMAIL: gaseedjs@bellsouth.net

KAZUO SUZUKI
4-688 DAIZENNO-CHO MIDORI-KU
CHIBA-SHI CHIBA-KEN 266-0006
JAPAN
PHONE: 043-291-5788

SHIGERU SUZUKI
CHIBA PREF AG RES CEN CROPS BREEDING
17-5 MIYOGUTI CHOSEI-SON CHOSEI-GUN
CHIBA-KEN 299-4335
JAPAN
PHONE: 0475-32-3377
FAX: 0475-32-1294

CAREL J SWANEVELDER
AGRIC RESEARCH COUNCIL
PRIVATE BAG X1251
POTCHEFSTROOM 2520
REPUBLIC OF SOUTH AFRICA
PHONE: 2718-299-6333
FAX: 2718-297-6572
EMAIL: cjs@ops1.agric.za

CHARLES W SWANN
TIDEWATER AGRIC RES & EXT CENTER
6321 HOLLAND ROAD
SUFFOLK VA 23437-9588
PHONE: 757-657-6450 x117
FAX: 757-657-9333
EMAIL: cswann@vt.edu

S P TALLURY
BOX 7629, CROP SCIENCE
NORTH CAROLINA STATE UNIVERSITY
RALEIGH NC 27695-7629
PHONE: 919-515-3809
FAX: 919-515-5657
EMAIL: tallury@ncsu.edu

ALLISON TALLY
SYNGENTA CROP PROTECTION
PO BOX 18300
GREENSBORO NC 27419
PHONE: 336-632-7231
FAX: 336-632-2884
EMAIL: allison.tally@syngenta.com

KEN TEETER
1008 SWIFT CREEK DR
CLAYTON NC 27520
PHONE: 919-989-8591
FAX: 919-989-8596
EMAIL: ken.teeter@syngenta.com

JAMES S THOMAS
345 McCAIN DRIVE
DENMARK SC 29042
PHONE: 803-793-5971
EMAIL: jthomas@clemson.edu

STEPHEN D THOMAS
GENERAL DELIVERY
DULCE NM 87528
PHONE: 505-759-3569
FAX: 505-759-3985
EMAIL: sthomas194@aol.com

JAMES W TODD
COASTAL PLAIN EXP STATION
PO BOX 748
TIFTON GA 31793
PHONE: 229-386-3529
FAX: 229-386-3086
EMAIL: todd@tifton.cpes.peachnet.edu

LELAND D TRIPP
2811 CAMELOT DR
BRYAN TX 77802
PHONE: 979-776-1588
EMAIL: lbtripp@cox-internet.com

CALVIN TROSTLE
5426 69th STREET
LUBBOCK TX 79424

J F M VALLS
CENARGEN/EMBRAPA
SAIN – PQ E BIOLOGICA-CP 02372
CEP 70770-900
BRASILIA-DF
BRAZIL
PHONE: 5561-448-4644
FAX: 5561-340-3624
EMAIL: valls@cenargen.embrapa.br

WILLIAM T VENTRESS, JR
SESSIONS COMPANY, INC
PO BOX 311310
ENTERPRISE AL 36331-1310
PHONE: 334-393-0200
FAX: 334-393-0240

SIMPLACE DAVID VODOUHE
2BP 8033 COTONOU – BENIN
WEST AFRICA
PHONE: 229-30-1975
FAX: 229-30-0276
EMAIL: obepab@intnet.bj

FARID WALIYAR
ICRISAT PATANCHERU P.O.
502324 ANDHRA PRADESH
INDIA
PHONE: 0091-40-3296161
EMAIL: f.waliyar@cgiar.org

IZHACK S WALLERSTEIN
PO BOX 6
BET-DAGAN 50250
ISRAEL
PHONE: 972-3-9683479
FAX: 972-3-9669642
EMAIL: vcwaller@volcani.agri.gov.11

BOBBY WALLS
501 PARKWOOD LANE
GOLDSBORO NC 27530
PHONE: 919-736-2571
FAX: 919-733-2837
EMAIL: bobby.walls@ncmail.net

LARRY WALTON
DOW AGROSCIENCES
693 WALTON ROAD SW
TUPELO MS 38804-8350
PHONE: 662-862-3544
FAX: 662-862-3251
EMAIL: lwalton@dow.com

JAMES R WEEKS
WIREGRASS EXPERIMENT STATION
PO BOX 217
HEADLAND AL 36345
PHONE: 334-693-3800
FAX: 334-693-2957
EMAIL: jweeks@acesag.auburn.edu

GLENN WEHTJE
AGRONOMY 233F
AUBURN UNIVERSITY
AUBURN AL 36830
PHONE: 334-844-3993
FAX: 334-844-3945
EMAIL: gwhehtje@acesag.auburn.edu

LENNY WELLS
UGA COOPERATIVE EXTENSION SERVICE
125 PINE AVENUE, STE 100
ALBANY GA 31701
PHONE: 229-436-7216
FAX: 229-436-6760
EMAIL: lwells@uga.edu

JAMES A WELLS, JR
TEXAS AGRIC EXT SERVICE
1229 NORTH US HWY 281
STEPHENVILLE TX 76401
PHONE: 259-968-4144
FAX: 254-965-3759
EMAIL: j-wells@tamu.edu

TERRY WEST
BIRDSONG PEANUTS
PO BOX 491
FT COBB OK 73038
PHONE: 405-643-2304
FAX: 405-247-9329
EMAIL: terrywest@yahoo.com

THOMAS B WHITAKER
NORTH CAROLINA STATE UNIVERSITY
BOX 7625
RALEIGH NC 27695-7625
PHONE: 919-515-6731
FAX: 919-515-7760
EMAIL: whitaker@eos.ncsu.edu

ARTHUR WHITEHEAD, JR
4897 PHILLIPS RD
SCOTLAND NECK NC 27874
PHONE: 252-583-5161
FAX: 252-583-1683
EMAIL: arthur_whitehead@ncsu.edu

E B WHITTY
UNIVERSITY OF FLORIDA
PO BOX 110500
GAINESVILLE FL 32611-0500
PHONE: 352-392-1817
FAX: 352-392-1840
EMAIL: ebw@gnv.ifas.ufl.edu

JOHNNA L WIER
152 N PRAIRIEVIEW RD
LOVINGTON NM 88260
PHONE: 505-396-2721
FAX: 505-396-5768
EMAIL: johnnalee.patterson@nm.usda.gov

PAUL D WIGLEY
COUNTY EXTENSION COORDINATOR
PO BOX 309
MORGAN GA 31766
PHONE: 229-849-2685
FAX: 229-849-2026
EMAIL: uge4037@uga.edu

DAVID E WILLIAMS
711 SILVER SPRING AVE
SILVER SPRING MD 20910
PHONE: 301-588-7652
EMAIL: d.williams@cgiar.org

E JAY WILLIAMS
UNIVERSITY OF GEORGIA, EXTENSION ENG
PO BOX 1209
15 R D C ROAD
TIFTON GA 31793
PHONE: 229-386-3442
FAX: 229-386-3448
EMAIL: jwillms@uga.edu

J MICHAEL WILLIAMS
730 N GRANVILLE STREET
EDENTON NC 27932
PHONE: 252-482-6585
FAX: 252-482-6590
EMAIL: j_mike_williams@ncsu.edu

JONATHAN "TIM" WILLIAMS
UNIVERSITY OF GEORGIA, PEANUT CRSP
1109 EXPERIMENT ST
GRIFFIN GA 30223-1797
PHONE: 770-467-0530
EMAIL: twillia@gaes.griffin.peachnet.edu

KAREN WILLIAMS
NATIONAL GERMPLASM RESOURCES LAB
BUILDING 003, ROOM 402
BARC-WEST
BELTSVILLE MD 20705
PHONE: 301-504-5421
FAX: 301-504-6305
EMAIL: kwilliams@ars-grin.gov

REX B WILSON
GOLDEN PEANUT COMPANY
PO BOX 488
ASHBURN GA 31714
PHONE: 229-567-3311
FAX: 229-567-2006
EMAIL: rwillson@gpc.admworld.com

RICHARD F WILSON
USDA, NATIONAL PROGRAM LEADER
5601 SUNNYSIDE AVENUE
BELTSVILLE MD 20705-5139
PHONE: 301-504-4670
FAX: 301-504-6191
EMAIL: rfw@ars.usda.gov

LUKE WISNIEWSKI
12002 DEBONNAIRE DRIVE
ST LOUIS MO 63146-5242
PHONE: 909-989-1988
EMAIL: lukewski@carthlink.net

HARRY C WOOD
PO BOX 46
EVINSTON FL 32633
PHONE: 352-332-1490

DAVID ZIMET
5901 CAMINO DEL SOL, #101
BOCA RATON FL 33433
PHONE: 561-367-0533
EMAIL: capnzman@aol.com

PAUL WOODALL
PO BOX 114
SYLVESTER GA 31791
PHONE: 229-434-4854
FAX: 229-434-4819
EMAIL: paul.woodall@effem.com

JOHNNY C WYNNE
NORTH CAROLINA STATE UNIVERSITY
BOX 7643, 100 PATTERSON HALL
RALEIGH NC 27695-7643
PHONE: 919-515-2717
FAX: 919-515-7745
EMAIL: johnny_wynne@ncsu.edu

HENRY YONCE
BASF CORPORATION
1092 GLENWOOD TRAILS
DELAND FL 32720
PHONE: 386-527-1124
FAX: 386-736-0366

MIGUEL ZAVALA
COMASA
NICABOX #239
PO BOX 02-5640
MIAMI FL 33102-5640
PHONE: 505-266-5296
FAX: 505-266-9387
EMAIL: peanuts@lbw.com.ni

TIM ZECH
SIPCAM AGRO USA, INC
300 COLONIAL CENTER PKWY, STE 230
ROSWELL GA 30076
PHONE: 770-335-3015
FAX: 770-587-1115
EMAIL: sipcamagroman@aol.com

HEPING ZHU
USDA/ARS-NATIONAL PEANUT RES LAB
PO BOX 509
1011 FORRESTER DR SE
DAWSON GA 31742
PHONE: 229-995-7459
FAX: 229-995-7416
EMAIL: hzhu@nprl.usda.gov

INSTITUTIONAL MEMBERS

ACQUISITIONS DEPT 12 LIBRARY 1408 W GREGORY DRIVE URBANA IL 61801-3607	KIT INFORMATIE BIBLIOTHEEK 2675 en DOCUMENTATIE IBD POSTBUS 95001 1090 HA AMSTERDAM NETHERLANDS
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SOUTHWESTERN PEANUT SHELLERS ASSOC WAYNE S WEAVER 299 S COLUMBIA STEPHENVILLE TX 76401	UNIVERSITATSBIBLIOTHEK UND TIB 1.1.2 ZEITSCHRIFTENERWERBUNG POSTFACH 60 80 D-30060 HANNOVER GERMANY
SWETS SUBSCRIPTION SERVICE 440 CREAMERY WAY, SUITE A EXTON PA 19341	

UNIVERSITI PUTRA MALAYSIA (UPM)
DEPT RESOURCE & DEVELOP LIBRARY
SERIALS DIVISION
43400 UPM SERDANG – SELANGOR
MALAYSIA

UNIVERSITY OF CALIFORNIA AT DAVIS
THE LIBRARY
ACQUISITIONS DEPT SERIAL RECORDS
DAVIS CA 95616-5292

UNIVERSITY OF CALIFORNIA LIBRARY
BIOSCIENCE & NATURAL RES
2101 VLSB #6500
BERKELEY CA 94720

UNIVERSITY OF GEORGIA LIBRARIES
SCIENCE PERIODICALS DEPARTMENT
ATHENS GA 30602

UNIVERSITY OF GEORGIA LIBRARIES
COLLEGE OF AGRICULTURE
GEORGIA EXPERIMENT STATION
GRIFFIN GA 30223-1797

UNIVERSITY OF TENNESSEE LIBRARY
SERIALS DEPARTMENT
1015 VOLUNTEER BLVD
KNOXVILLE TN 37996-1000

VPI & STATE UNIVERSITY
UNIVERSITY LIBRARY SERIALS RECEIVING
PO BOX 90001
BLACKSBURG VA 24062

ORGANIZATIONAL MEMBERS

ART ASSAD 715 BITTERSWEET TR ATLANTA GA 30350 PHONE: 678-441-0030 FAX: 678-441-0031 EMAIL: artassad@agrisel.com	BIRDSONG PEANUTS JOHN TRAWICK PO BOX 650 BLAKELY GA 31723 PHONE: 229-723-3641 FAX: 229-723-2869
ALABAMA PEANUT PRODUCERS ASSOC H RANDALL GRIGGS PO BOX 8805 DOOTHAN AL 36304-0805 PHONE: 334-792-6482 FAX: 334-792-5876 EMAIL: rgriggs@alpeanuts.com	BIRDSONG PEANUTS TOM WEST PO BOX 1400 SUFFOLK VA 23439 PHONE: 757-539-3224 FAX: 757-539-8006 EMAIL: twest@birdsong_peanuts.com
AMERICAN PEANUT COUNCIL JEANNETTE H ANDERSON 1500 KING ST, SUITE 301 ALEXANDRIA VA 22314-2730 PHONE: 703-838-9500 FAX: 703-838-9508 EMAIL: janderson@peanutsusa.com	CENTER FOR AGRICULTURAL PARTNERSHIPS, INC SUSAN M PHEASANT 1219 FOURTH ST WENATCHEE WA 98801 PHONE: 509-665-3812 FAX: 509-665-4912 EMAIL: pheasant@nwi.net
AMERICAN PEANUT SHELLERS PO BOX 70157 ALBANY GA 31708-0157 PHONE: 229-888-2508 FAX: 229-888-5150	DELEON PEANUT COMPANY KEN SNIDER PO BOX 1562 DENVER CITY TX 79323 PHONE: 806-592-9191 FAX: 806-592-9955 EMAIL: ksnider@emailtx.net
BASF WILL FLETCHER 26 DAVIS DRIVE RTP NC 27709 PHONE: 919-547-2257	DELEON PEANUT COMPANY JUSTIN TUGGLE HC3 BOX 57CC BROWNFIELD TX 79316 PHONE: 806-637-0568 FAX: 806-637-0569 EMAIL: jtuttle@emailtx.net
BAYER CROPSOURCE VIDO RILLANO 400 BURT DRIVE, C-48 DOOTHAN AL 36305 PHONE: 334-673-9301 FAX: 334-673-4898 EMAIL: vido.rillano@bayercropscience.com	GFA PEANUT ASSOCIATION JAMES E GODWIN, MGR 5201 HWY 19 SOUTH PO BOX 488 CAMILLA GA 31730 PHONE: 229-336-5241 FAX: 229-336-9503 EMAIL: gfapeanut@mindspring.com
BIRDSONG PEANUTS KEVIN CALHOUN PO BOX 650 BLAKELY GA 31723 PHONE: 229-723-3641 FAX: 229-723-2869	GEORGIA CROP IMPROVEMENT ASSOC TERRY HOLLIFIELD 2425 S MILLEDGE AVE ATHENS GA 30605 PHONE: 706-542-2351 FAX: 706-542-9397 EMAIL: georgiacrop@aol.com
BIRDSONG PEANUTS SHANE POWELL PO BOX 650 BLAKELY GA 31723 PHONE: 229-723-3641 FAX: 229-723-2869	

GEORGIA PEANUT COMMISSION
EMORY M MURPHY
PO BOX 967
TIFTON GA 31793
PHONE: 229-386-3470
FAX: 229-386-3470
EMAIL: emory@gapeanuts.com

BERRY LEWIS
GUSTAFSON
PO BOX 6718
ROCKY MOUNT NC 27802
PHONE: 252-972-3840
FAX: 252-972-2696
EMAIL: blewis@gustafson.com

NATIONAL PEANUT BOARD
MARIE RIZZO
900 CIRCLE 75 PARKWAY, SUITE 1220
ATLANTA GA 30339
PHONE: 866-825-7946

NORTH CAROLINA CROP
IMPROVEMENT ASSOC
TERRY ELDREDGE
3709 HILLSBOROUGH STREET
RALEIGH NC 27607-5464
PHONE: 919-515-2851
FAX: 919-515-7981
EMAIL: terry_eldridge@ncsu.edu

NORTH CAROLINA PEANUT
GROWERS ASSOC
BOB SUTTER, CEO
PO BOX 8
NASHVILLE NC 27856
PHONE: 252-459-5060
FAX: 252-459-7396
EMAIL: bob@aboutpeanuts.com

PEANUT FARMER MAGAZINE
MARY EVANS
5808 FARINGDON PLACE, SUITE 200
RALEIGH NC 27609
PHONE: 919-872-5040
FAX: 919-876-6531
EMAIL: mevans@peanutfarmer.com

SHULTZ PEANUT & COLD STORAGE INC
CARY W SHULTZ
PO BOX 40
WAKEFIELD VA 23888
PHONE: 757-899-8900
FAX: 757-899-2185

SOUTHWESTERN PEANUT GROWERS' ASSOC
DAN HUNTER, MANAGER
PO BOX 338
GORMAN TX 76454
PHONE: 254-734-2222
FAX: 254-734-2288
EMAIL: hunterswpga@hotmail.com

UNIVERSAL BLANCHERS, LLC
JAMES LEE FENN, III
PO DRAWER 727
BLAKELY GA 31723
PHONE: 229-723-4181
FAX: 229-723-8887
EMAIL: jfenn@universalblanchers.com

VIRGINIA-CAROLINA PEANUT PROMOTIONS
BETSY OWENS
PO BOX 8
NASHVILLE NC 27856-0008
PHONE: 252-459-9977
FAX: 252-459-7396
EMAIL: betsy@aboutpeanuts.com

VIRGINIA PEANUT GROWERS ASSOC
RUSSELL C SCHOOLS
PO BOX 356
CAPRON VA 23829
PHONE: 434-658-4573
FAX: 434-658-4531
EMAIL: vpga@beldar.com

WESTERN PEANUT GROWERS ASSOC
TED HIGGINBOTTOM
PO BOX 252
SEMINOLE TX 79360
PHONE: 915-758-2050
FAX: 915-758-3837
EMAIL: wtpeanut@wtaccess.com

WILCO PEANUT COMPANY
KURT G WARNKEN
PO DRAWER B
PLEASANTON TX 78064
PHONE: 830-569-3808
FAX: 830-569-2743
EMAIL: kgw@wilcopeanut.com

ZVI BAR
HEVEL MAON
REGIONALAG & DEV ENTERPRISES LTD
M.P.O. NEGEV
ISREAL 85465
PHONE: 07-998-7239
FAX: 07-998-7230
EMAIL: zvika_ba@yaham.co.il

STUDENT MEMBERS

MOHAMMED A AL-SALEH ENTOMOLOGY & PLANT PATH DEPT OKLAHOMA STATE UNIVERSITY 127 NRC STILLWATER OK 74078 PHONE: 405-744-7988 FAX: 405-744-7373 EMAIL: mohama@okstate.edu	SCOTT B CLEWIS NCSU CAMPUS BOX 7620 4402 WILLIAMS HALL RALEIGH NC 27695-7620 PHONE: 919-515-5655 FAX: 919-515-5513 EMAIL: scott_clewis@ncsu.edu
GABRIELA ALANDIA 3137 B, KINGS CT RALEIGH NC 27606 PHONE: 919-515-3788 FAX: 919-515-6688 EMAIL: gralandi@unity.ncsu.edu	R AL COCHRAN PO BOX 1148 WILLIAMSTON NC 27892 PHONE: 252-792-1621 FAX: 252-792-2408 EMAIL: al_cochran@ncsu.edu
DORIN BOLDOR 39 SCHAUB HALL, NCSU FOOD SCIENCE DEPT – PO BOX 7624 RALEIGH NC 27695-7624 PHONE: 919-515-4410 FAX: 919-515-7124 EMAIL: dboldor@unity.ncsu.edu	RANDY L COOK 1813 78TH STREET LUBBOCK TX 79423 PHONE: 806-781-5972 FAX: 806-742-0775 EMAIL: texasag@hotmail.com
IAN BURKE 2702 EVERETT AVE RALEIGH NC 27607 PHONE: 919-515-5654 EMAIL: ilburke@unity.ncsu.edu	LAURA DUFFIE NORTH CAROLINA STATE UNIVERSITY BOX 7616 RALEIGH NC 27695 PHONE: 919-515-3930 EMAIL: laura_duffie@ncsu.edu
EMILY CANTONWINE 258A EARLE HUTCHINSON RD TIFFON GA 31794 PHONE: 229-388-9866 EMAIL: ctwine@uga.edu	CECILIA GERNGROSS PO BOX 755 YOAKUM TX 77995 PHONE: 361-293-6326 FAX: 361-293-2054 EMAIL: celicia@tamu.edu
RAMAZAN CENTINTAS UNIVERSITY OF FLORIDA ENTOMOLOGY & NEMATOLOGY DEPT GAINESVILLE FL 32611-0620 PHONE: 352-392-1901 x177 EMAIL: cetintas@mail.ifas.gnv.uf.edu	SARA GREMILLION 120 COLEMANOR DR, #3 ATHENS GA 30606 PHONE: 706-372-4783 EMAIL: sarag@uga.edu
VIJAYKUMAR CHOPPAKATLA 104 N 28TH STREET, APT #21 CANYON TX 79015 PHONE: 806-679-8642 FAX: 806-746-6528 EMAIL: choppakatla@yahoo.com	SARAH HANS 1221 DUPLIN ROAD RALEIGH NC 27607 PHONE: 919-881-0884 EMAIL: srhans@unity.ncsu.edu
	CHRISTIE HURT 626 DREW ST RALEIGH NC 27604 PHONE: 919-389-3726 EMAIL: cahurt@unity.ncsu.edu

JARRED R KARNEI
TEXAS AG RES CENTER
RT 3 BOX 219
LUBBOCK TX 79403
PHONE: 806-746-6101
FAX: 806-746-2856
EMAIL: j-karnei@tamu.edu

TRENT MURPHREE
TEXAS AG EXP STATION
RR 3 BOX 213 AA
LUBBOCK TX 79403
PHONE: 806-746-6101 x4315
FAX: 806-746-6528
EMAIL: tmurph35@hotmail.com

JAMES LANIER
NORTH CAROLINA STATE UNIVERSITY
BOX 762
RALEIGH NC 27695
PHONE: 919-859-9375
EMAIL: jelanier@unity.ncsu.edu

MELANIE NEWMAN
1109 EXPERIMENT ST
GRIFFIN GA 30224
PHONE: 770-412-4096
FAX: 770-229-3323
EMAIL: mnewman@gaes.griffin.peachnet.edu

DONNY LASSITER
1535 LASKER RD
CONWAY NC 27820
PHONE: 919-515-8465
EMAIL: donny-lassiter@hotmail.com

DARCY PARTRIDGE
5006 FORT SUMTER RD E
RALEIGH NC 27606
PHONE: 919-859-1947
EMAIL: departri@unity.ncsu.edu

MARK MASTERS
NPRL, PO BOX 509
DAWSON GA 31742
PHONE: 229-995-7400
FAX: 229-995-7416
EMAIL: mmasters@npnl.usda.gov

BRUCE PORTER
TEXAS AG EXPT STATION
RR 3 BOX 213AA
LUBBOCK TX 79403
PHONE: 806-746-6101
EMAIL: b-porter@tamu.edu

KENDRA MATTHEWS
509 THREE CEDAR LANE
GIBSONVILLE NC 27249
PHONE: 336-449-7677
EMAIL: matthewskendra@hotmail.com

STEVE RIDEOUT
COASTAL PLAIN EXP STATION
DEPT PLANT PATHOLOGY
TIFTON GA 31794
PHONE: 229-386-7351
EMAIL: srideout@tifton.cpes.peachnet.edu

CHRISTOPHER B MEADOR
ENTOMOLOGY & PLANT PATHOLOGY
127 NRC, OKLAHOMA STATE UNIVERSITY
STILLWATER OK 74078
PHONE: 405-744-7988
FAX: 405-744-7373

BRIDGET ROBINSON
608 CHARLESTON RD, APT 1-S
RALEIGH NC 27606
PHONE: 919-280-0841
EMAIL: bridget_robinson@ncsu.edu

SUSANA R MILLA
BOX 7629
CROP SCIENCE – NCSU
RALEIGH NC 27695-7629
PHONE: 919-515-3809
FAX: 919-515-5657
EMAIL: susana_milla@ncsu.edu

LAYLA SCONYERS
PLANT PATHOLOGY, CPES-UGA
PO BOX 748
TIFTON GA 31793
PHONE: 229-386-7351
FAX: 229-386-7285
EMAIL: lsconyrs@arches.uga.edu

SCOTT MONFORT
14 KAY CIRCLE
TIFTON GA 31794
PHONE: 229-387-0938
EMAIL: smonfort@arches.uga.edu

SACHIKO SENOO
CHIBA UNIVERSITY
648 MATSUDO, MATSUDO CHIBA
271-8510
JAPAN
PHONE: 81-47-308-8814
FAX: 81-47-308-8814
EMAIL: sachiko@green.h.chiba-u.ac.jp
and peanut@qj8.so-net.he.jp

DAMON L SMITH
NORTH CAROLINA STATE UNIVERSITY
BOX 7903
RALEIGH NC 27695-7903
PHONE: 919-515-3930
FAX: 919-513-1279
EMAIL: dsmith6@unity.ncsu.edu

MATT WINSLOW
SYNGENTA CROP PROTECTION
2504 BEECH GAP CT
RALEIGH NC 27603
PHONE: 919-838-6183

HUIQIN XUE
PO BOX 7629
RALEIGH NC 27695
PHONE: 919-515-3809
FAX: 919-515-5657
EMAIL: hxue@cropser1.cropsci.ncsu.edu

SUSTAINING MEMBERS

ANDERSON'S PEANUTS

DENNIS R FINCH

PO BOX 810

OPP AL 36467

PHONE: 334-493-4591

FAX: 334-493-7767

EMAIL: dfinch@andersonspeanuts.com

BASF

MARK WAYLAND

8432 STONEWOOD COVE W

CORDOVA TN 38018

PHONE: 901-737-4858

FAX: 901-737-4859

EMAIL: waylanm@BASF.com

DOW AGROSCIENCES

VERNON B LANGSTON

314 N MAPLE GLADE CIRCLE

THE WOODLANDS TX 77382

PHONE: 281-419-7550

FAX: 281-419-7615

EMAIL: vblangston@dow.com

FLORIDA PEANUT PRODUCERS ASSOC

JEFF CRAWFORD, JR

2741 PENN AVE, SUITE ONE

MARIANNA FL 32448

PHONE: 850-526-2590

FAX: 850-526-2277

EMAIL: flpeanuts@phoni.com

GRIFFIN L.L.C.

BOND MCINNES

2509 ROCKY FORD ROAD

VALDOSTA GA 31601

PHONE: 229-293-4100

FAX: 229-249-5977

EMAIL: bond.mcinnes@griffinllc.com

ISK BIOSCIENCES CORPORATION

GARY L EILRICH

7470 AUBURN ROAD, SUITE A

CONCORD OH 44077

PHONE: 440-357-4656

FAX: 440-357-4661

EMAIL: eilrichg@iskbc.com

OKLAHOMA PEANUT COMMISSION

MIKE KUBICEK

PO BOX 1949

SHAWNEE OK 74802

PHONE: 405-275-5994

FAX: 405-878-0887

PEANUT GROWERS COOP MARKETING ASSOC

THOMAS R COTTON, JR

PO BOX 59

FRANKLIN VA 23851

PHONE: 757-562-4103

FAX: 757-562-0744

EMAIL: dcotton25@cs.com

TEXAS PEANUT PRODUCERS BOARD

MARY WEBB

PO BOX 398

GORMAN TX 76454

PHONE: 254-734-2853

FAX: 254-734-2017

EMAIL: mary@cctc.net

UNIVERSITY OF GEORGIA

PEANUT CRSP

1109 EXPERIMENT ST

STUCKEY BLDG RM 148

GRIFFIN GA 30223-1797

PHONE: 770-228-7312

FAX: 770-229-3337

EMAIL: crspgrf@gaes.griffin.peachnet.edu

VICAM

ERIN DONAHUE

313 PLEASANT STREET

WATERTOWN MA 02472

PHONE: 617-926-7045

FAX: 617-923-8055

EMAIL: vicam@vicam.com

AUTHOR INDEX

Author	Page	Author	Page
Adams, J.	57	Butts, C.L.	59, 72, 74, 75, 110
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