2013 AMERICAN PEANUT RESEARCH & EDUCATION SOCIETY

PROCEEDINGS

8-11 July 2013
Brasstown Valley Resort
Young Harris, Georgia

Volume 45

Publication Date
December 2013

Editors: Scott Tubbs and Kimberly Cutchins

2013
PROCEEDINGS

Of The

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC.

Meeting
8-11 July 2013
Young Harris, Georgia

Publication Date
December 2013

Editors: Scott Tubbs and Kimberly Cutchins

Contributors to 2013 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

Bayer CropScience & BASF – Wednesday Evening Meal - **Sunset Pavilion**
Dow AgroSciences – Thursday Evening Reception - **Creekside Pavilion**
Becker Underwood & Novozymes - APRES Golf Event

Ice Cream Social & Breaks

Agrisel USA, Inc. Birdsong	Amvac Chemical Crop Chem
Peanuts Cheminova	Nut Inc.
Farm Press	Dupont
Helena Chemical Company	Golden Peanut Company
Olam Edible Nuts	Nichino America
Syngenta	Penton Media Triangle
US Gypsum	Chemical Valent

Product Contributors

Alabama Peanut Producers Association
American Peanut Shellers Association
Florida Peanut Producers Association
Georgia Farm Bureau
Georgia Peanut Commission
Hershey's
Mars Chocolate, North America
National Peanut Board
The Peanut Institute
Oklahoma Peanut Board
Planters
Smucker's
Snyder's-Lance
South Carolina Peanut Board
Southern Peanut Growers
Texas Peanut Producers Board
Western Peanut Growers Association
Virginia Peanut Growers Association

APRES Field Tour

Georgia Mountain Research and Education Center
University of Georgia
Blairsville, GA

TABLE OF CONTENTS

BOARD OF DIRECTORS
2012-2013

President:	Ames Herbert (2013)
Past President:	Todd Baughman (2013)
President-elect	Timothy Brenneman (2013)
Executive Officers:	James L. Starr/Kim Cutchins (2013)
University Representatives:	
(VC Area)	Thomas Isleib (2013)
(SE Area)	Scott Tubbs (2013)
(SW Area)	TBD (2014)
USDA Representative:	Jack Davis (2013)
Industry Representatives:	
Production	Keith Rucker (2015)
Shelling, Marketing Storage	Julie Marshall (2013)
Manufactured Products	TBD (2014)
National Peanut Board Representative:	Michael Davis (2013)
American Peanut Council Representative:	Howard Valentine (2013)

Past Presidents

Ames Herbert	2012
Todd Baughman	2011
Maria Gallo	2010
Barbara Shew	2009
Kelly Chenault Chamberlin	2008
Austin K. Hagan	2007
Albert K. Culbreath	2006
Patrick M. Phipps	2005
James Grichar	2004
E. Ben Whitty	2003
Thomas G. Isleib	2002
John P. Damicone	2001
Austin K. Hagan	2000
Robert E. Lynch	1999
Charles W. Swann	1998
Thomas A. Lee, Jr.	1997
Fred M. Shokes	1996
Harold Pattee	1995
William Odle	1994
Dallas Hartzog	1993
Walton Mozingo	1992
Charles E. Simpson	1991
Ronald J. Henning	1990
Johnny C. Wynne	1989
Hassan A. Melouk	1988
Daniel W. Gorbet	1987
D. Morris Porter	1986
Donald H. Smith	1985
Gale A. Buchanan	1984
Fred R. Cox	1983
David D. H. Hsi	1982
James L. Butler	1981
Allen H. Allison	1980
James S. Kirby	1979
Allen J. Norden	1978
Astor Perry	1977
Leland Tripp	1976
J. Frank McGill	1975
Kenneth Garren	1974
Edwin L. Sexton	1973
Olin D. Smith	1972
William T. Mills	1971
J.W. Dickens	1970
David L. Moake	1969
Norman D. Davis	1968

ANNUAL MEETING SITES

1969 - Atlanta, GA
1970 - San Antonio, TX
1971 - Raleigh, NC
1972 - Albany, GA
1973 - Oklahoma City, OK
1974 - Williamsburg, VA
1975 - Dothan, AL
1976 - Dallas, TX
1977 - Asheville, NC
1978 - Gainesville, FL
1979 - Tulsa, OK
1980 - Richmond, VA
1981 - Savannah, GA
1982 - Albuquerque, NM
1983 - Charlotte, NC
1984 - Mobile, AL
1985 - San Antonio, TX
1986 - Virginia Beach, VA
1987 - Orlando, FL
1988 - Tulsa, OK
1989 - Winston-Salem, NC
1990 - Stone Mountain, GA
1991 - San Antonio, TX
1992 - Norfolk, VA
1993 - Huntsville, AL
1994 - Tulsa, OK
1995 - Charlotte, NC
1996 - Orlando, FL
1997 - San Antonio, TX
1998 - Norfolk, VA
1999 - Savannah, GA
2000 - Point Clear, AL
2001 - Oklahoma City, OK
2002 - Research Triangle Park, NC
2003 - Clearwater Beach, FL
2004 - San Antonio, TX
2005 - Portsmouth, VA
2006 - Savannah, GA
2007 - Birmingham, AL
2008 - Oklahoma City, OK
2009 - Raleigh, NC
2010 - Clearwater Beach, FL
2011 - San Antonio, TX
2012 - Raleigh, NC
2013 - Young Harris, GA

1969-1978: American Peanut Research and Education Association (APREA)
1979-Present: American Peanut Research and Education Society, Inc. (APRES)

APRES Committees

Finance Committee
Todd Baughman, Chair (2014)
Kelly Chamberlin (2014)
Darlene Cowart (2015)
George Musson (2015)

Nominating Committee
Michael Baring, Chair (2013)
Nathan Smith (2013)
Corley Holbrook (2014)
Scott Monfort (2014)
Victor Nwousu (2014)

Program Committee
Tim Brenneman, chair (2013)
John Beasley, Local Arrangements (2013)
Scott Tubbs, Technical Program (2013)
Julie Rucker, Spouses Program (2013)

Peanut Quality Committee
Jim Elder, Chair (2014)
Barry Tilman (2013)
Brent Besler (2015)
Dell Cotton (2015)
Darlene Cowart (2015)
Michael Franke (2015)
Tim Sanders (2015)

Publications and Editorial Committee
Diane Rowland, Chair (2014)
Wilson Faircloth (2013)
James Grichar (2013)
Calvin Trostle (2015)

Public Relations Committee
Ryan Lepicier, Chair (2014)
Richard Rudolph (2013)
Kelly Chamberlin (2015)
Shelly Nutt (2015)

Site Selection Committee
John Beasley, Chair (2013)
Peggy Ozias-Akins (2013)
Todd Baughman (2014)
Jason Woodward (2014)
David Jordan (2015)
Thomas Stalker (2015)
Nick Dufault (2016)
Barry Tillman (2016)

Bailey Award Committee
Naveen Puppala, Chair (2014)
Austin Hagan (2013)
Mehboob Sheikh (2013)
Noelle Barkley (2015)
Kelly Chamberlin (2015)
Shyam Tallury (2015)

Dow AgroSciences Awards Committee
Eric Prostko, Chair (2014)
Barbara Shew (2013)
Rich Wilson (2013)
James Hadden (2014)
Carroll Johnson (2014)

Fellows Committee
John Damicone, Chair (2014)
Kira Bowen (2013)
Scott Tubbs (2013)
Albert Culbreath (2014)
Peter Dotray (2014)

Coyt T. Wilson Distinguished Service Award Committee
Jack Davis, Chair (2013)
Kim Moore (2013)
Tom McKemie (2014)
Nathan Smith (2015)

Joe Sugg Graduate Student Award Committee
Robert Kemerait, Chair (2014)
Maria Balota (2013)
Emily Cantowine (2014)
Nicholas Dufault (2015)
Jason Woodward (2015)

FELLOWS

Dr. Jay W. Chapin	2013	Dr. Timothy H. Sanders	1997
Dr. Barbara B. Shew	2013	Dr. H. Thomas Stalker	1996
Mr. Howard Valentine	2013	Dr. Charles W. Swann	1996
Dr. Kelly Chenault	2012	Dr. Thomas B. Whitaker	1996
Dr. Robin Y.Y. Chiou	2012	Dr. David A. Knauft	1995
Dr. W. Carroll Johnson III	2012	Dr. Charles E. Simpson	1995
Dr. Mark C. Black	2011	Dr. William D. Branch	1994
Dr. John P. Damicone	2011	Dr. Frederick R. Cox	1994
Dr. David L. Jordan	2011	Dr. James H. Young	1994
Dr. Christopher L. Butts	2010	Dr. Marvin K. Beute	1993
Dr. Kenneth J. Boote	2009	Dr. Terry A. Coffelt	1993
Dr. Timothy Brenneman	2009	Dr. Hassan A. Melouk	1992
Dr. Albert K. Culbreath	2007	Dr. F. Scott Wright	1992
Mr. G.M. "Max" Grice	2007	Dr. Johnny C. Wynne	1992
Mr. W. James Grichar	2007	Dr. John C. French	1991
Dr. Thomas G. Isleib	2006	Dr. Daniel W. Gorbet	1991
Mr. Dallas Hartzog	2006	Mr. Norfleet L. Sugg	1991
Dr. C. Corley Holbrook	2006	Dr. James S. Kirby	1990
Dr. Richard Rudolph	2005	Mr. R. Walton Mozingo	1990
Dr. Peggy Ozias-Akins	2005	Mrs. Ruth Ann Taber	1990
Mr. James Ron Weeks	2004	Dr. Darold L. Ketring	1989
Mr. Paul Blankenship	2004	Dr. D. Morris Porter	1989
Dr. Stanley Fletcher	2004	Dr. Donald J. Banks	1988
Mr. Bobby Walls, Jr.	2003	Mr. J. Frank McGill	1988
Dr. Rick Brandenburg	2003	Dr. Donald H. Smith	1988
Dr. James W. Todd	2002	Dr. James L. Steele	1988
Dr. John P. Beasley, Jr.	2002	Mr. Joe S. Sugg	1988
Dr. Robert E. Lynch	2002	Dr. Daniel Hallock	1986
Dr. Patrick M. Phipps	2001	Dr. Olin D. Smith	1986
Dr. Ronald J. Henning	2001	Dr. Clyde T. Young	1986
Dr. Norris L. Powell	2001	Mr. Allen H. Allison	1985
Mr. E. Jay Williams	2000	Dr. Thurman Boswell	1985
Dr. Gale A. Buchanan	2000	Mr. J. W. Dickens	1985
Dr. Thomas A. Lee, Jr.	2000	Dr. William V. Campbell	1984
Dr. Frederick M. Shokes	1999	Dr. Allen J. Norden	1984
Dr. Jack E. Bailey	1999	Dr. Harold Pattee	1983
Dr. James R. Sholar	1998	Dr. Leland Tripp	1983
Mr. William M. Birdsong, Jr.	1998	Dr. Kenneth H. Garren	1982
Dr. Gene A. Sullivan	1998	Dr. Ray O. Hammons	1982

BAILEY AWARD RECIPIENTS

2013	A.M. Stephens and T.H. Sanders
2012	D.L. Rowland, B. Colvin. W.H. Faircloth, and J.A. Ferrell
2011	T.G. Isleib, C.E. Rowe, V.J. Vontimitta and S.R. Milla-Lewis
2010	T.B. Brenneman and J. Augusto
2009	S.R. Milla-Lewis and T.G. Isleib
2008	Y. Chu, L. Ramos, P. Ozias-Akins, and C.C. Holbrook
2007	D.E. Partridge, P.M. Phipps, D.L. Coker, and E.A. Grabau
2006	J.W. Chapin and J.S. Thomas
2005	J.W. Wilcut, A.J. Price, S.B. Clewis, and J.R. Cranmer
2004	R.W. Mozingo, S.F. O'Keefe, T.H. Sanders and K.W. Hendrix
2003	T.H. Sanders, K.W. Hendrix, T.D. Rausch, T.A. Katz and J.M. Drozd
2002	M. Gallo-Meagher, K. Chengalrayan, J.M. Davis and G.G. MacDonald
2001	J.W. Dorner and R.J. Cole
2000	G.T. Church, C.E. Simpson and J.L. Starr
1998	J.L. Starr, C.E. Simpson and T.A. Lee, Jr.
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. Ketring 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 T.B. Whitaker
1975	R.E. Pettit, F.M. Shokes and R.A. Taber

JOE SUGG GRADUATE STUDENT AWARD RECIPIENTS

2013	A. Fulmer
2012	R. Merchant
2011	S. Thornton
2010	A. Olubunmi
2009	G. Place
2008	J. Ayers
2007	J.M. Weeks, Jr.
2006	W.J. Everman
2005	D.L. Smith
2004	D.L. Smith
2003	D.C. Yoder
2002	S.C. Troxler
2001	S.L. Rideout
2000	D.L. Glenn
1999	J.H. Lyerly
1998	M.D. Franke
1997	R.E. Butchko
1996	M.D. Franke
1995	P.D. Brune
1994	J.S. Richburg
1993	P.D. Brune
1992	M.J. Bell
1991	T.E. Clemente
1990	R.M. Cu
1989	R.M. Cu

COYT T. WILSON DISTINGUISHED SERVICE AWARD

2013	Dr. John P. Beasley, Jr.
2012	Dr. Patrick M. Phipps
2011	Mr. W. James Grichar
2010	Dr. Albert K. Culbreath
2008	Dr. Frederick M. Shokes
2007	Dr. Christopher L. Butts
2006	Dr. Charles E. Simpson
2005	Dr. Thomas B. Whitaker
2004	Dr. Richard Rudolph
2003	Dr. Hassan A. Melouk
2002	Dr. H. Thomas Stalker
2001	Dr. Daniel W. Gorbet
2000	Mr. R. Walton Mozingo
1999	Dr. Ray O. Hammons
1998	Dr. C. Corley Holbrook
1997	Mr. J. Frank McGill
1996	Dr. Olin D. Smith
1995	Dr. Clyde T. Young
1993	Dr. James Ronald Sholar
1992	Dr. Harold E. Pattee
1991	Dr. Leland Tripp
1990	Dr. D.H. Smith

DOW AGROSCIENCES AWARD FOR EXCELLENCE IN RESEARCH

2013	No Nominations Received
2012	Timothy H. Sanders
2011	Timothy Grey
2010	Peter A. Dotray
2009	Joe W. Dorner
2008	Jay W. Chapin
2007	James W. Todd
2006	William D. Branch
2005	Stanley M. Fletcher
2004	John W. Wilcut
2003	W. Carroll Johnson, III
2002	Harold E. Pattee and Thomas G. Isleib
2001	Timothy B. Brenneman
2000	Daniel W. Gorbet
1999	Thomas B. Whitaker
1998	W. James Grichar
1997	R. Walton Mozingo
1996	Frederick M. Shokes
1995	Albert Culbreath, James
1994	Todd and James Demski
1993	Hassan Melouk
1992	Rodrigo Rodriguez-Kabana

*1998 Changed to Dow AgroSciences Award for Excellence in Research

DOW AGROSCIENCES AWARD FOR EXCELLENCE IN EDUCATION

2013	Peter A. Dotray
2012	Todd A. Baughman
2011	Austin K. Hagan
2010	David L. Jordan
2009	Robert C. Kemerait, Jr.
2008	Barbara B. Shew
2007	John P. Damicone
2006	Stanley M. Fletcher
2005	Eric Prostko
2004	Steve L. Brown
2003	Harold E. Pattee
2002	Kenneth E. Jackson
2001	Thomas A. Lee
2000	H. Thomas Stalker
1999	Patrick M. Phipps
1998	John P. Beasley, Jr.
1996	John A. Baldwin
1995	Gene A. Sullivan
1993	A. Edwin Colburn
1992	J. Ronald Sholar

1992-1996	DowElanco Award for Excellence in Extension
1997	Changed to DowElanco Award for Excellence in Education
1998	Changed to Dow AgroSciences Award for Excellence in Education

PEANUT RESEARCH AND EDUCATION AWARD RECIPIENTS

2013	John Beasley
2012	Tom Isleib and Corley Holbrook
2011	No Nominee
2010	P. Ozias-Akins
2009	A. Stephens
2008	T.G. Isleib
2007	E. Harvey
2006	D.W. Gorbet
2005	J.A. Baldwin
2004	S.M. Fletcher
2003	W.D. Branch and J. Davidson
2002	T.E. Whitaker and J. Adams
2001	C.E. Simpson and J.L. Starr
2000	P.M. Phipps
1999	H. Thomas Stalker
1998	J.W. Todd, S.L. Brown, A.K. Culbreath and H.R. Pappu
1997	O.D. Smith
1996	P.D. Blankenship
1995	T.H. Sanders
1994	W. Lord
1993	D.H. Carley and S.M. Fletcher
1992	J.C. Wynne
1991	D.J. Banks and J.S. Kirby G. Sullivan
1990	R.W. Mozingo
1989	R.J. Henning
1987	L.M. Redlinger
1986	A.H. Allison
1985	E.J. Williams and J.S. Drexler
1984	Leland Tripp
1983	R. Cole, T. Sanders, R. Hill and P. Blankenship
1982	J. Frank McGill
1981	G.A. Buchanan and E.W. Hauser
1980	T.B. Whitaker
1979	J.L. Butler
1978	R.S. Hutchinson
1977	H.E. Pattee
1976	D.A. Emery
1975	R.O. Hammons
1974	K.H. Garren
1973	A.J. Norden
1972	U.L. Diener and N.D. Davis
1971	W.E. Waltking
1970	A.L. Harrison
1969	H.C. Harris
1968	C.R. Jackson
1967	R.S. Matlock and M.E. Mason
1966	L.I. Miller
1965	B.C. Langleya
1964	A.M. Altschul
1963	W.A. Carver
1962	J.W. Kickens
1961	W.C. Gregory

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

ABSTRACTS

Symposium – Historic Advancements for Yield Gain in Peanut

(1) A Roller Coaster Ride Through Peanut Yield History; 1951 - 1982. J. F. MCGILL. Brooks Distinguished Professor of Agronomy (Emeritus), The University of Georgia Tifton Campus, Tifton, GA 31793.

Thirty-one years with UGA's Cooperative Extension Service was indeed a wonderful challenge with many ups and downs; it was a roller coaster ride from 1951-1982. The forerunner of an effective Extension Peanut Program has to be an aggressive Peanut Research Program. For many years, peanut research in Georgia had been treated like a "red-headed stepchild". The average peanut yield per acre for Georgia in 1951 was 900 lbs/ac, lower than several other peanut producing states. In 1951, the Extension Service formed the GA Ton Per Acre Peanut Club, supervised by county Extension Agents. Its purpose was to stimulate interest in production practices being used by a limited number of peanut growers who were adoptees of Georgia's fragmentary research. County Agents had already verified a few growers with yield approaching 2000 lbs/ac. The vast majority of Georgia's peanut growers did not believe such yields could be achieved. In 1952, County Agents across Georgia's peanut belt submitted a total of 28 peanut growers with confirmed yield and acreage records who became members of the first GA Ton Per Acre Club. Several of these achievers were reluctant about going public with their yield records due to public ridicule and disbelief. The top yield record was 2800 lbs/ac, achieved in Bullock County. The vast publicity created by this Extension tool was phenomenal, actually exceeding our original expectation. A statewide awards banquet was held in Tifton to appropriately recognize these growers. Their production practices were widely publicized by radio, press and farm magazines. During this and succeeding years, it shaped the mentality of peanut growers who began to press for more and more peanut technology, whether from peanut research or farmer experience. During the next 10 years, GA peanut growers became more aggressive in their expectations for increased support of peanut Research and Extension. A testimony of support was the formation of the Georgia Peanut Commission in 1959. All of these developments paved the way for an explosion of new peanut technology that emerged from Georgia from the early 1960s through the 1970s. By 1982, average peanut yield in Georgia had reached 3215 lbs/ac. At that time, my erroneous conclusion was that my time to live and serve was the most fluid of any 31-year period in Georgia's peanut history. However, 31 years later (2012) by comparison, makes my time period look like a Sunday School picnic!

(2) Genetic Contributions to Yield Gains in U. S. Peanut Production. C. C. HOLBROOK*[1], H. T. STALKER[2], and Y.CHU[3]. [1]USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793; [2]Department of Crop Science, NC State University, Raleigh, NC 27695; [3]Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793.

Average yields of peanut in the U.S. set an all-time record of 4,695 kg/ha in 2012. This far exceeded the previous record yield of 3,837 kg/ha in 2008. Favorable weather conditions undoubtedly contributed to the record yields in 2012; however, these record yields would not have been achievable without numerous technological advances that have been made in peanut production. The cumulative effect of these technologies caused U.S. yields to increase six fold from 739 kg/ha in 1909 to 4,695 kg/ha in 2012. If we disregard the record yield of 2012, the average gain from 1909 to 2011 was 29.9 kg/ha/yr. These yield gains are due to improved cultivars, advances in agronomic practices, improvements in practices and chemistries for control of weeds and diseases, and increased use of precision agriculture, particularly for the digging and harvesting of the crop. Modern peanut cultivars have much higher yield potentials, however, because of the synergism between production systems and plant breeding, it is difficult to precisely quantify the amount of the yield gains that are due to improved cultivars. In addition to yield per se, cultivar development has also resulted in improved resistance to important yield-limiting diseases. This has had important economic impacts on U.S. peanut production.

(3) Contributions of Peanut Disease Management to Increasing Yields. T. B. BRENNEMAN*, Department of Plant Pathology, University of Georgia, Tifton, GA 31794.

Peanut is very susceptible to many diseases, particularly since it fruits below-ground exposing the pods to direct attack from potential pathogens in the soil. Diseases have had a major influence on peanut yields and production practices for many years. Early management efforts were directed toward foliar diseases such as early (*Cercospora arachidicola*) and late (*Cercosporidium personatum*) leaf spots, and utilized sulfur or copper sulfur compounds applied by hand or 2-row, mule-drawn applicators. These treatments reportedly increased yields by 20-25%. Tractor applicators improved the ease of application, but sulfur dust had limited efficacy and was easily washed off. The introduction of chlorothalonil (Bravo) and benomyl (Benlate) ushered in a new era of spraying versus dusting, and lead to dramatic improvements in control of foliar diseases during the 1970s. This technology paved the way for the widespread utilization of the cultivar Florunner, which had great yield potential but was very susceptible to the leaf spot diseases. Another chemical input that had a profound effect

on peanut yields were seed treatments. These were widely accepted because of their obvious benefit of improved plant stands. Early treatments relied on mercury as the active ingredient. The industry currently uses wettable powder mixtures (versus liquid treatments which often damage the fragile seed coat) containing multiple fungicide classes. These treatments are very effective, and recent trials in Georgia show yield increases often in excess of 1000 kg/ha compared to nontreated seed. Soilborne diseases such as stem rot (or white mold), caused by *Sclerotium rolfsii,* have caused severe losses in peanut for many years, with nearly 50% plant mortality reported in 1944 in North Carolina. Stem rot is currently the most damaging peanut disease in Georgia, but in the last 40 years other diseases such as Sclerotinia blight (*Sclerotinia minor*), Cylindrocladium black rot (*Cylindrocladium parasiticum*), and Rhizoctonia limb rot (*Rhizoctonia solani* AG-4) have also become severe in some areas. Tebuconazole (Folicur), registered in 1994, offered greatly improved chemical control for soilborne diseases, and was followed by other effective fungicides such as azoxystrobin (Abound), flutolanil (Moncut or Convoy), prothioconazole (Proline and Provost), and penthiopyrad (Fontelis). These products, as well as application strategies such as night spraying to improve efficacy on soilborne diseases, have greatly reduced yield losses. Simultaneous with these developments was the continued improvement in yield potential of new peanut cultivars. Some of these had improved resistance to various diseases. Examples include Southern Runner (leaf spot), York (leaf spot and stem rot), and Bailey (stem rot). However, peanut growers have historically chosen to grow the highest yielding cultivars available regardless of disease resistance, as long as fungicides are cost effective. Most currently grown varieties are very susceptible to multiple diseases. The exception to this rule has been tomato spotted wilt, a virus disease which nearly wiped out peanuts in the southeast. An integrated management plan that relied heavily on disease-resistant cultivars was instrumental in saving the peanut industry. Excellent resistance is also now available to root-knot nematode and is widely employed in the cultivar Tifguard. Rapid progress is being made in identifying other resistance genes, and advancing technology makes this the new frontier in disease management. Chemical controls are still indispensable to this industry, and the combined improvements in fungicides and disease resistance will be the foundation of our disease management programs in the future.

(**4) <u>Yield Advances in Peanut – Weed Control Effects</u>.** W. C. JOHNSON, III*, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

Improvements in weed management are a contributing factor to advancements in peanut yield. Uniformity in stand, narrow row patterns, and optimal seeding rates are cultural practices that affect weed management in peanut. Vacuum planters are readily accepted by growers and allow precise metering of seed, which is essential when peanut are seeded in narrow row patterns. Widespread use of vacuum planters and increased acceptance of narrow row patterns enhance weed control by lessening bareground caused by skips and promoting quick canopy closure. Cultivation was traditionally an integral component in peanut weed management. New herbicide developments improved overall weed control and cultivation is no longer needed. This directly addresses the susceptibility of peanut to infection by soil-inhabiting fungi. There is a direct correlation between incidence of stem rot and displaced soil thrown on peanut plants from cultivation. Not needing to cultivate lessens disease epidemics and protects peanut yield. In 2013, 21 herbicide active ingredients were registered in the U.S. for weed control in peanut. In contrast, there were 12 herbicide active ingredients registered for use on peanut in 1980. Recently developed herbicides are more consistent, versatile, and have a broader-spectrum than earlier herbicides. Of these, four active ingredients (diclosulam, flumioxazin, imazapic, and imazethapyr) have superior residual weed control properties that were previously unavailable. There were no selective postemergence herbicides registered in 1980 that controlled emerged grasses. In 2013, there were three postemergence herbicides registered for use on peanut to control annual and perennial grasses; sethoxydim, clethodim, and fluazifop. Annual and perennial grasses are among the most competitive weeds. Registrations of these herbicides were major weed control milestones in peanut production and have largely eliminated yield losses from grasses that escaped earlier control efforts. Despite the broad-spectrum of weeds controlled by the recently developed herbicides, no single herbicide adequately controls all species. Herbicide Application Decision Support System (HADSS) is an expert system developed by North Carolina State University to help peanut growers correctly choose herbicides based on weed species present. HADSS has been validated for use in other peanut producing locations and improves weed control efficiency. Overall, weed management in peanut has improved in recent years. However, weed species diversity is constantly changing due to selection pressure from all aspects of crop production. Changes in weed species diversity and weed resistance to herbicides are continual research topics in peanut to ensure peanut yield advances are maintained.

(5) <u>The Role of RTK-GPS -Based Autoguidance on Peanut Production in Georgia and Alabama</u>. B. V. ORTIZ*, G. VELLIDIS, K. B. BALKCOM, L. DUZY, J. BEASLEY, E. VAN SANTEN, R. HILL, H. STONE, H. BRANNEN. Agronomy and Soils Department, Auburn University, Auburn, AL 36849; and Crop and Soil Sciences Department, The University of Georgia, Tifton, GA 31793.

The use of GPS guidance systems for agricultural operations, such as planting, spraying, fertilizer spreading, tillage, and harvest, has resulted in substantial economic and environmental benefits. On peanut production, the use of high accuracy GPS could minimize damaged pods and yield losses by increasing peanut (*Arachis hypogea* L.) digger efficiency through an accurate placement of the implement over the target rows. Two studies were conducted to evaluate the benefits of Real Time Kinematics (RTK) GPS-based autoguidance systems for planting and digging peanut fields with straight and contoured rows. Study 1 was conducted in Alabama between 2005 and 2007 evaluated the effect of row deviation on straight rows. The study consisted of a randomized complete block design of tillage (conventional and strip tillage), row patterns (single and twin) and row deviation (0 inches, 3.5 inches and 7 inches). Study 2 was conducted in Alabama and Georgia during 2010 and 2011 on six peanut fields under conventional and conservation tillage having contour rows and rolling terrain. The fields were planted and inverted in utilizing two treatments: with RTK GPS-based auto-guidance and without auto-guidance

(Manual-MAN). For Study 2, treatment differences were calculated by comparing yields from replicated strips. Results from Study 1 indicated that for every 0.8 inches row deviation (under straight row conditions), an average of 166 lbs/acre yield loss can be expected. Yield losses for the straight row-conventional tillage treatment were higher as the row deviation increased compared with the twin row-conventional tillage treatment. Results from Study 2, on farm study under rolling terrain conditions, showed significant yield differences between the manual and RTK guidance treatments on two out of the six fields of this study. For the fields located in Georgia, RTK guidance outperformed manual guidance by 516 lbs/acre in 2010 and 402 lbs/acre in 2011. Overall, the RTK guidance treatment out-yielded the manual guidance treatment in five out of six fields.

(6) <u>International Peanut Yield Gains</u>. H.T. STALKER*,D epartment of Crop Science, NC State University, Raleigh, NC 27695; and C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793
Peanut is grown in more than 100 countries, with China, India, the U.S., Nigeria, and Indonesia being the largest producers. Peanut production systems range from very primitive with only hand labor and few inputs of fertilizer or chemical controls for weeds or diseases to other systems that are highly technical and mechanized. A large percentage of the crop is crushed for oil, but there is an increasing trend for small farmers to supply local markets or for family subsistence. Thus, one strategy for increasing yields will not work in all cropping systems due to constraints of labor; funds to purchase fertilizers and chemicals for weed, disease and pest controls; and the inability to acquire improved seeds by many farmers in lesser developed countries. Global peanut yields have increased during the past half-century at about 1.5%/year, in large part because of improved cultivars and production technologies. However, yields across sub-Sahara Africa remain extremely low due the lack of an agricultural infrastructure, water deficit, and lack of disease resistance in cultivars. Thus, the two greatest needs for increasing yields in the low-input systems is for cultivars to be developed with higher drought tolerance (or shorter maturity to avoid droughts), and incorporation of high levels of disease resistance. Government incentives to increase production have been a key ingredient for increasing yields and export markets in several countries such as China and Egypt. Peanut has great potential for additional yield increases at the global level, but a comprehensive production system must be put in place at the local levels to suppress constraints to achieving yield potentials.

(7) <u>Potential Impact of Genomics to Future Peanut Yield Gains.</u> P. OZIAS-AKINS*, Y. CHU, Department of Horticulture and Institute of Plant Breeding, Genetics & Genomics, The University of Georgia Tifton Campus, Tifton, GA 31793; and C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793.
Peanut breeding up to now has relied primarily on phenotypic selection methods, which have resulted in significant yield gains. Commercial breeding in other crops now depends heavily on the application of molecular tools. DNA sequence enables marker-assisted selection (MAS) in breeding and whole genome sequences have recently become available for several legume species including soybean, *Medicago truncatula* and *Lotus japonicus*. The most straightforward implementation of MAS is marker-assisted backcrossing which has been successfully applied in peanut breeding for a couple of traits, nematode resistance introgressed from a wild species and high oleic acid in seeds. While the markers for high oleic acid are single nucleotide polymorphisms in fatty acid desaturase homoeologs, and are functional markers, markers for nematode resistance are linked DNA sequences. Since the resistance gene(s) have not been identified, markers for resistance have the potential to recombine at a low frequency. Recognizing the potential for utilizing molecular markers in breeding for even more complex traits, the possibility to identify additional functional markers, and the limited amount of peanut DNA sequence available, peanut genome sequencing was initiated in 2012 by an international consortium. Association of markers with traits has required a parallel phenotyping effort. Peanut breeding is poised to make even more rapid yield gains when molecular tools can be applied on a larger scale. Examples from a related crop, soybean, and factors underlying yield gain where molecular markers can have an impact will be presented to illustrate this potential.

(8) <u>It All Came Together for Record Yields in 2012</u>. J.P. BEASLEY, JR.* Crop and Soil Sciences Department, The University of Georgia, Tifton, GA 31793-5766.
A combination of improved genetics and close to ideal environmental conditions (rainfall and temperatures) in 2012 resulted in statewide average peanut yields in 7 of the 10 peanut producing states to tie or exceed previous record yields. The average yield for the U.S. in 2012 was 4,192 lbs/acre, smashing the previous record of 3,426 lbs/acre in 2008 by over 700 pounds. All four states in the Southeastern production region set state record yields, eclipsing previous records by 400 pounds in Mississippi and Florida, 500 pounds in Alabama, and by 925 pounds in Georgia. In the Virginia-Carolina region, North Carolina exceeded their previous record by 400 pounds and Virginia exceeded their previous record from 2011 by 100 pounds. South Carolina averaged 3,800 lbs/acre in 2012, just 100 pounds below their previous record of 3,900 in 2008. In the Southwest region, Oklahoma set a new statewide average yield record with 3,800 lbs/acre. Texas and New Mexico did not break records but still had very good yields in 2012. Producers in Texas averaged 3,500 compared to their state record of 3,750 in 2005. The last year in which rainfall and temperatures in Georgia were similar to 2012 was in 2003, a year in which a statewide average yield record was set at 3,450 lbs/acre. The 2012 record yield of 4,550 lbs/acre compared to the 2003 record of 3,450 lbs/acre can be attributed to the improved genetics and yield potential in today's cultivars.

JOE SUGG GRADUATE STUDENT COMPETITION

(9) Dicamba and 2,4-D Impact on Peanut Yield. B.H. BLANCHETT*, T.L. GREY, E.P. PROSTKO, The University of Georgia, Tifton GA, 31793; and T.M. WEBSTER, USDA-ARS, Tifton GA 31793

Peanut (*Arachis hypogaea* L.) is an important crop in the southern US. Peanuts are often grown in close proximity to other row crops. The use of herbicide-resistant crops and repeated applications of glyphosate and ALS herbicides have contributed to an increase in the evolution of herbicide-resistant weeds. Agricultural chemical and seed companies have responded with new technologies to help solve the problem of herbicide-resistant weeds. Monsanto and BASF have developed programs that use dicamba in combination with resistant crop cultivars for POST weed control. Dow AgroSciences has developed glyphosate + 2,4-D programs that will allow POST applications to resistant crops. It is predicted that these two systems will eventually be available in field corn, cotton, and soybean within the near future. There is concern that these auxin herbicides will increase the occurrence of accidental crop injury to sensitive species when used at amplified quantities and throughout the growing season. Thus, field trials were conducted in Georgia at two locations in 2012 to determine yield loss from various rates of dicamba and 2,4-D on peanut (cv. Georgia-06G). Dicamba (35-560 g ae/ha) and 2,4-D (67-1066 g ae/ha) were applied pre-emergence (PRE), 10, 20, or 30 d after planting (DAP). Both herbicides caused yield loss at the 20 and 30 DAP treatments and greater yield loss at the highest rates. 2,4-D caused no yield loss when applied PRE or 10 DAP. These data indicate that growers should be cautious when applying dicamba and 2,4-D in the proximity of peanuts, especially during R1 stages of reproductive growth.

(10) Characterization of Gynophore Calcium Uptake of Five Cultivars of Peanut (Arachis hypogaea L.) under Differing Gypsum Treatments. S. THORNTON*, D. ROWLAND, Agronomy Department, The University of Florida, Gainesville, FL 32611-0300; and B. TILLMAN, North Florida Research and Education Center, University of Florida, Marianna FL, 32446-8091

Despite the fact that calcium is critical for peanut fruit development, and that calcium absorption has been studied since the 1940s and earlier, there remain several gaps in our knowledge of calcium uptake in peanut. One area that has not been extensively researched is calcium absorption by the peg prior to entering the soil. In order to study the uptake of calcium by pegs, and to determine the effect of cultivar and gypsum treatment on peg uptake, a two year study was conducted using five commercial varieties (Florida 07, Georgia 06G, York, DP-1, and AP-3) were planted at Citra, Florida under 5 different gypsum treatments, with three replications per cultivar by treatment combination. The 5 gypsum treatments were: no gypsum, 2000 lb/acre at plant, 2000 lb/acre at 30 days after planting (DAP), a split application of 1000 lb/acre at plant and 1000 lb/acre at 30 DAP, and a second split application of 1000 lb/acre each at 30 and 60 DAP. Yield, grade, peg and seed calcium, and soil emergence data were collected for each plot and analyzed using SAS Proc MIXED. Cultivar and treatment were found to have significant effects on all variables, and there was a significant correlation between seed and peg calcium.

(11) Effects of Application Method on Efficacy of Early Prothioconazole Sprays to Single and Twin Row Peanut. Y. TSAI* and T. B. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31794.

Early season, banded sprays of prothioconazole have reduced stem rot in single-row peanuts, but adaptation to twin-row plantings is needed. The efficacy of early-season prothioconazole sprays in different spray volumes and banding patterns was evaluated in 2011 and 2012 on twin row peanuts, and compared to banding on a single-row pattern. Plots were either in single (36 inch) or twin row spacing (36 inch outside rows, 8 inches between twin rows). Prothioconazole (5.7 fl oz/A) was applied at 21 days after planting (DAP) in 40 gallons per acre (GPA) on the single rows in a narrow band the width of the small plants. Similar timing and fungicide rate was used for applications to twin rows in 40 GPA banded over both twin rows, 20 GPA banded over both twin rows, 20 GPA banded over each twin row (40 GPA total volume), or 10 GPA banded over each twin row (20 GPA total volume). All plots received chlorothalonil for leaf spot control. Final stem rot incidence of the non-treated plots for single row and twin row spacing was 44.3 and 40.6% in 2011, 48.3 and 36.0% in 2012, respectively. The yield of non-treated twin row plots was higher by 847lb/A in 2011, and 627 lb/A in 2012 compared to the single row spacing. Banded sprays increased yield significantly ($P<0.05$) by an average of 982 lb/A in single row plots both years. All twin-row banded sprays increased yield in 2011 versus the nontreated (836 lb/A average), but none of them did in 2012. The mean stem rot incidence of the treated plots with twin row spacing was 26.4% in 2011 and 34.7% in 2012; all were significantly less than the nontreated in 2011, but none of them were in 2012. Overall, all application strategies gave similar results in twin row peanuts, and the greater yield response in 2011 was probably due to the earlier onset of disease that year.

(12) Evaluating the Effect of Plant Population and Replant Method on Peanut Seeded in Twin Rows. J.M. SARVER*, R.S. TUBBS, J.P. BEASLEY, JR., A.K. CULBREATH, N.B. SMITH, The University of Georgia, Tifton, GA 31793; and D.L. ROWLAND, The University of Florida, Gainesville, FL 32611.

The University of Georgia Extension recommendation for optimum plant stand in peanut seeded in twin rows (*Arachis hypogaea* L.) is 14.8 plants/m. The unpredictable and often extreme weather and the ubiquity of pathogens in the region often contribute to poor emergence and resultant plant stand below optimum. When plant stand is adversely affected, a point is reached where replanting the field becomes economically viable. The objectives of this study were to i) determine the plant stand at which peanut fails to maintain yield and economic viability in a twin row pattern, (ii) determine if replanting is a viable option in a field with a below adequate stand and, iii) determine the best method for replanting peanut when an adequate stand is not achieved. Two field trials (one irrigated and one non-irrigated) were established at the Lang-Rigdon farms in Tifton, GA in 2012 to evaluate peanut production at four plant stands (7.4, 9.8, 12.3, and 14.8 plants/m) and five replant methods (no replant, destroy the original stand and replant at a full seeding rate, add a reduced rate of seed to supplement the original stand between original rows, supplement next to original rows, and supplement both between and next to original rows) in a randomized complete block design. There were no significant differences in yield between the plant stands in either trial, although yield showed a strong positive linear trend (R2=0.996) as plant stand increased in the irrigated trial. No yield benefit was observed by replanting in the irrigated trial, while yield gains were observed in the non-irrigated trial when supplementing between (+855 kg/ha), beside (+533 kg/ha), and both between and beside (+408 kg/ha) the original row at an original stand of 2.25 plants/m. A full replant of the original stand was never advantageous when compared to the no replant and supplemental replant treatments.

(**13)** **Influence of Planting Date, Plant Population, and Cultivar Selection on Management of Spotted Wilt in Peanut (*Arachis hypogaea* L.).** J.L. MCKINNEY*, Agronomy Department, The University of Florida, Gainesville, FL 32611; and B.L. TILLMAN, North Florida Research and Education Center, Agronomy Department, Marianna, FL 32446.

Spotted wilt, caused by *Tomato spotted wilt virus* (TSWV), is a major disease that has impacted peanut production for growers in the southeastern United States since the mid-late 1990s. Currently, there is no single control measure that manages spotted wilt in peanut sufficiently; however, collaborative research has identified several management factors that, when used together, can minimize losses due to the disease. Three of the essential cultural practices used to reduce incidence and severity of spotted wilt in peanut are date of planting, seeding density, and cultivar selection. New peanut cultivars with improved resistance to spotted wilt have been developed in the Southeast peanut production areas, but even the most resistant cultivars are at risk for spotted wilt when planted in April at lower seeding densities. The effects of planting date, plant population and cultivar in management of spotted wilt were assessed in a field experiment over three consecutive years (2010-2012) near Marianna, Florida. Data collection included three measures of visual disease symptoms (two foliar and one seed), ImmunoStrip (ELISA) testing of root crowns for presence or absence of TSWV, pod yield, and grade. There was no effect of planting date on spotted wilt symptoms or TSWV infection. However, viral infection varied among genotypes. Assessment of spotted wilt just prior to harvest indicated traces of the disease in all peanut cultivars with little variation among cultivars. However, ImmunoStrip results revealed that viral infection differed widely among cultivars. Viral infection was lower in cultivars Florida EPTM ‘113’ and UFT312 compared to Georgia Green and Florida-07. Foliar assessed spotted wilt symptoms were highly correlated with each other (r=0.73), however, only symptoms on the seed were highly correlated with TSWV infection (r=0.77). This result indicates that foliar symptomology is not as reliable in assessing genotype resistance as is TSWV infection, especially in seasons when disease pressure is low. However, the strong correlation between seed coat symptomology and virus infection indicates that seed inspection may be a good predictor in identifying resistant cultivars, and is much less expensive than ImmunoStrip testing. New genotypes demonstrated a higher level of TSMK than Florida-07, suggesting major improvements have been achieved in this very important agronomic trait. Results from this experiment illustrate that in years when less severe epidemics of spotted wilt occur, the impact of planting date and seeding rate effects on spotted wilt are minimal. Cultivar resistance is the primary means of control. The cultivars Florida EPTM ‘113’ and UFT312 display a new level of resistance that could possibly override other factors such as planting date and seeding density.

(14) **Screening Twenty Peanut Cultivars for Yield and Genotype by Environment Stability in Multi-location Trials in Ghana and Burkina Faso.** S. NARH*, K.J. BOOTE, Agronomy Department, University of Florida, Gainesville, FL 32611-0001; J. B. NAAB, M. ABUDULAI, CSIR-Savanna Agricultural Research Inst., Nyankpala, Tamale, GHANA; P. SANKARA, M. BERTIN, University of Ouagadougou, Burkina Faso; M. BUROW, Texas A &M; R. BRANDENBURG, N. Carolina State University.

Yield trials over space and time are an integral part of any plant breeding program and are used to evaluate the yield potential, adaptability and stability of selected lines. In general, genotype by environment (G × E) interactions are considered a hindrance to crop improvement in a target environment because such effects may contribute to temporal and spatial instability of crop yields. Significant G × E interaction of a quantitative trait like yield can seriously limit efforts in selecting superior genotypes for both new crop introduction and improved cultivar development. The objective of this study was to evaluate yield potential, G × E interactions and range of adaptability of different peanut genotypes on the basis of yield stability. To determine the possible effects of environments and genotypic differences on yield, 20 peanut genotypes were tested at two sites in Ghana and two sites in Burkina Faso in 2010 and 2011. The experimental design was a randomized complete block design with three replicates. Genotype, location, and genotype x environment interactions were highly significant ($P < 0.05$) indicating genetic variability among genotypes over changing environments. Stability analysis showed that genotypes ICGV(FDRS)-20 × F-MIX 39, GUSIE BALIN (92099), ICGV-IS 92093, and ICGV-IS 96814 were lines with broad adaptability, as they produced above average mean yield across sites and a stability regression coefficient close to 1.0. Among these four genotypes, ICGV-IS 96814 was considered the best because it demonstrated broad adaptation across environments. It produced the highest pod yield (1755 kg/ha) over all environments and had a regression coefficient close to unity (b =1.06). Therefore, genotype ICGV-IS 96814 is less responsive to varied environmental and soil conditions and can be grown over a range of environments in West Africa. However, released cultivar NKATESARI was considered equivalent in some respects because it had pod yield equal to ICGV-IS 96814, but with a higher regression coefficient. Genotype G122TX95 was the poorest with a mean yield of 824 kg/ha and a stability regression coefficient of 0.70. Three short-season check cultivars, Chinese, TS 32-1, and Doumbala, had low pod yields, ranging from 889 to 979 kg/ha.

(15) **Quality Evaluation of Peanut Ice Cream made from an Instant Mix.** V. K. YEMMIREDDY*, Y.-C. HUNG, Department of Food Science and Technology, The University of Georgia, Griffin, GA 30223-1797.
Peanuts in the form of partially defatted peanut flour are rich source of protein and essential vitamins. The natural nutty flavor of the peanuts is already used in various ice cream and dessert formulations. However, no ready-made peanut ice cream instant mix products were available in the market. The main goal of this research was to develop a nutrient dense peanut ice cream instant mix formulation and determine its quality attributes. Through a number of preliminary experiments a dry formulation of chocolate ice cream was developed and used as a control. Partially defatted peanut flour with different degrees of roasting (light and dark) and levels of fat content (12% or 28%) were used to replace chocolate in the control formulation. The prepared peanut ice cream samples containing 12% or 18% peanut flour were tested for various physical properties such as viscosity, yield, melting rate, and hardness. Viscosity values increased with increasing the peanut flour concentration. The total yield of peanut ice creams is not significantly different from the control (89.7%). Melting profiles of peanut ice cream samples were comparable with that of control. Hardness values of peanut ice creams ranged from 1.8 to 15.7 N while the control has hardness of 21.1 N. The results showed that the quality of the peanut ice cream samples was comparable to the control. The effect of degree of roasting, percent fat content and level of replacement on the physical properties showed variable trend among the samples. The developed peanut ice cream formulation has shown promise to improve the nutritional quality of regular ice creams without affecting the eating quality.

(16) **Evaluation of Peanut Rx to Predict Epidemics of Early and Late Leaf Spot.** A. FULMER*, and R. KEMERAIT, JR., Department of Plant Pathology, The University of Georgia, Tifton, GA 31793
The efficacy of prescription fungicide programs, based upon Peanut Rx, has been demonstrated to reduce the combined effects of early (ELS) and late leaf spot (LLS), caused by *Cercospora arachidicola* and *Cercosporidium personatum*, respectively. Although ELS remains predominant in Georgia, LLS resurgence has been observed since 2003. Field trials were conducted at multiple research stations in Georgia during 2011 and 2012, and at Marianna, Florida in 2012, to determine the appropriateness of Peanut Rx to predict the development of ELS and LLS. Each year, plots were planted to runner (‘Georgia-06G’) and Valencia market types, and the risk of leaf spot for each field/variety combination was calculated with Peanut Rx. Five main stems were destructively sampled from untreated plots on a bi-weekly basis, and the number of missing leaflets and sporulating ELS and LLS lesions per leaf were counted. Herbicide injury confounded early ratings in one irrigated field in Georgia, and the severity of both diseases was less than expected in high risk, dryland fields in 2011 – likely due to drought conditions. Otherwise, across market types, onset of ELS ranged from 43 to 73 days after planting (DAP), and 61to104 DAP, in 2011 and 2012, respectively, and was positively correlated to risk (P=<0.0001); however, LLS was observed no sooner than 89 and 101 DAP in 2011 and 2012, respectively, and was not correlated to risk (P=<0.8316). When combined, the standardized AUDPC of both leaf spots was not correlated to risk within nor across years and market types, but the individual standardized AUDPC values for ELS and LLS were positively and negatively correlated (P=0.0001) to risk, respectively. When defoliation was assessed prior to 145 DAP, estimates were positively correlated to risk for each variety across years. From this study, Peanut Rx is less accurate in predicting the behavior and intensity of leaf spot under drought conditions or when LLS is the predominant disease.

(17) **Developing Pyroxasulfone for Use in Peanut.** P.M. EURE*, E.P. PROSTKO, and R.M. MERCHANT; Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793-5737.
Pyroxasulfone is a residual herbicide currently registered for use in field corn and soybean. Little is known about peanut tolerance to pyroxasulfone. Therefore, a series of field trials were conducted in Georgia from 2009 through 2012 to evaluate peanut tolerance to pyoxasulfone and its potential use in weed management systems. All trials were conducted on a loamy sand soil type and traditional small-plot techniques were used. Visual estimates of peanut injury and yield (adjusted to 10% moisture) were recorded.

To determine peanut tolerance to PRE applied pyroxasulfone, field trials was conducted during 2012 and 2013. The design was a strip-plot consisting of three pyroxasulfone 85WG rates (0, 2, and 4 oz/A) and three peanut cultivars (GA-06G, Georgia Greener, and Tifguard). Pyroxasulfone caused significant stunting 8 days after planting (DAP), with injury ranging from 38 to 55%. By 119 DAP; peanut had recovered substantially from PRE applied pyroxasulfone with injury ranging from 4 to 7%. Regardless of peanut cultivar or pyroxasulfone rate, peanut yield was not influenced (5,610 to 6,885 lbs/A).

In a second set of field trials conducted during 2010 and 2011, peanut tolerance to POST applied pyroxasulfone was evaluated. Treatments were arranged in a factorial design that included four application timings [11, 30, 60, and 90 days after planting (DAP)] and three pyroxasulfone 85WG rates (0, 4, and 8 oz/A). The plot area was maintained weed-free throughout the season. Pyroxasulfone applied 11 DAP at 4 and 8 oz/A resulted in 10 and 27% stunting 24 DAP, respectively. However, peanut recovered fully by 99 DAP. Applications of pyroxasulfone at 30, 60, and 90 DAP at both rates did not result impact peanut growth (0-2%). Peanut yields were not influenced by pyroxasulfone timing or rate. A third set of field trials were conducted during 2010 and 2011 to assess peanut tolerance to POST applied pyroxasulfone in tank-mixtures with commonly applied foliar herbicides used in peanut. Herbicide treatments included a factorial arrangement of pyroxasulfone 85WG rate (0 and 4 oz/A) and tank-mix partner (none, paraquat 2SL at 8 oz/A; paraquat 2SL at 12 oz/A + bentazon 4SL at 8 oz/A; paraquat 2SL at 12 oz/A + acifluorfen/bentazon 4SL 1.5 pt/A; imazapic 2AS at 4 oz/A; and lactofen 2SC at 12.5 oz/A). In 2010, the addition of pyroxasulfone (4 oz/A) to herbicide systems increased peanut stunting 6 days after treatment (DAT) by 8%. However, peanuts recovered by 29 DAT. In systems where paraquat (12 oz/A) was included, 30 to 43% peanut stunting was observed 2-6 DAT. Peanut recovered completely by 69 DAT. Regardless of tank-mix partner, the addition of pyroxasulfone to herbicide systems did not negatively influence peanut yield. In a final set of field trials conducted during 2011 and 2012, pyroxasulfone weed management systems were compared to current standard systems. Four standard systems including pendimethalin 3.8SC (34 oz/A) plus diclosulam 84WG (0.23 oz/A) plus flumioxazin 51WG (3 oz/A) PRE or paraquat 2SL (12 oz/A) plus bentazon/acifluorfen 4SL (16 oz/A) plus *S*-metolachlor 7.62EC (16 oz/A) EPOST (20 DAP) and/or POST (41 DAP) were compared to five systems with pyroxasulfone 85WG (1 or 1.5 oz/A) and flumioxazin PRE or *S*-metolachlor replaced with pyroxasulfone 85WG (1 or 1.5 oz/A) in standard EPOST or POST systems. All systems included imazapic 2SL (4 oz/A) POST. Visual estimates of Palmer amaranth control were recorded throughout the season. In these trials, pyroxasulfone systems had similar injury, Palmer amaranth control (>95%), and yield to standard systems (4,900 to 5,500 lb/A). In summary, peanut tolerance to POST applied pyroxasulfone is excellent and pyroxasulfone weed management systems are comparable to standard systems. Further research should be conducted to better understand peanut tolerance to PRE applied pyroxasulfone.

(18) Effect of Gypsum Application Rate on Seed Vigor of Large and Medium Seed Sized Runner Type Peanut Cultivars. J.A. ARNOLD, III *, J.P. BEASLEY, JR. , T.L. GREY, G. HARRIS. Department of Crop and Soil Sciences, University of Georgia, Tifton, Georgia 31793.

Seed samples were collected from field trials where Geogia-06G, a large-seeded runner cultivar, and Georgia Greener, a medium-seeded runner cultivar, were subjected to four application rates (0, 560, 1121, 1680 kg/ha) of gypsum ($CaSO_4$). Seed from each plot were evaluated using a continuous temperature gradient ranging from 14 to 24˚C using a thermal gradient table. Seed were randomly distributed on moistened germination paper and placed in Petri dishes with 10 seed per Petri dish. Seventeen Petri dishes were placed at 0.6˚C increments along the length of the table. Beginning 24 hours after seeding, germination was counted daily for seven days. A seed was considered germinated when the radicle extended more than 5mm, upon which it was removed from the dish. Maximum and minimum temperatures were recorded and used to calculate growing degree days for each temperature increment. A logistics growth curve with three parameters was used compare growth between gypsum application rates to each cultivar: $Y= a/1+[((a-b1)/b1)*e(-b2X)]$, where parameter *a* is the height of the horizontal asymptote at a very large *X*, *b1* is the expected value of *Y* at time *X=0,* and *b2* is the measure of growth rate. The 95% confidence limits of the three parameters were used to determine significant differences among the models of each gypsum rate applied to each cultivar. Comparison of the 95% confidence limits of the three parameters of the logistics growth curve of each model showed that parameter *a*, an indicator of maximum germination, was significantly different between gypsum rates for Georgia Greener and Georgia-06G. For parameters *b1* and *b2*, a significant difference between gypsum rates was observed for Georgia Greener, but no difference was observed for Georgia-06G. Besides maximum germination rate, another indicator of seed vigor obtained from the equation is GDD value at 85% germination (85% GDD). The smaller the 85% GDD, the stronger the seed vigor. For Georgia Greener, plots that received no gypsum (0 kg/ha) produced the strongest seed with 85% GDD of 28. The plots receiving 560, 1121, and 1680 kg/ha gypsum produced seed with 85% GDD of 34, 29, and 33, respectively. For Georgia-06G, plots receiving 1121 kg/ha of gypsum had the strongest seed with 85% GDD of 29 followed by 85%GDD of 31, 33, and 38 for 0 , 560, and 1680 kg/ha gypsum rates.

(19) Evaluation of New Insecticides in Selected Peanut Cultivars: Effects on Thrips' (*Frankliniella fusca* Hinds) Feeding Behavior and Transmission of *Tomato spotted wilt virus* (TSWV). K. MARASIGAN*, R. SRINIVASAN, M. TOEWS, Department of Entomology, The University of Georgia, Tifton, GA 31793; and R. KEMERAIT, Department of Plant Pathology, The University of Georgia, Tifton, GA 31793.

Peanut varieties that display field resistance to *Tomato spotted wilt virus* are critical for management of TSWV. However, planting of TSWV-resistant cultivars alone is not enough for suppressing virus incidence. Chemical management still plays a major role in TSWV management. Older insecticides such as aldicarb and phorate are still used extensively. Both aldicarb and phorate exhibit broad-spectrum toxicity, and the usage of the former will be phase out soon. In this study, several new insecticides as alternatives to aldicarb and phorate were evaluated against thrips and transmission of TSWV on two peanut cultivars (GA-Green and GA-06G) under greenhouse conditions. Feeding and transmission assays indicated that majority of the selected insecticides reduced thrips feeding and TSWV transmission (<40%). These results are in accordance with the results obtained from the field trials. Selected alternative insecticides were also compatible with the commonly practiced cultural tactics involving row and tillage patterns, and seeding rates. TSWV incidence prior to harvest in plots treated with candidate insecticides (≤8%) was comparable to TSWV incidence in phorate and aldicarb treated plots (≤5%). TSWV reduction with selected alternative insecticides was more pronounced in GA-06G than in Georgia Green. GA-06G is more recently released cultivar (2006) with greater magnitude of field resistance to TSWV than Georgia Green. Almost all the newly released peanut cultivars possess a greater degree of field resistance to TSWV than Georgia Green. Thus, these new cultivars might provide us with more flexibility in transitioning from using older insecticides to newer insecticides with narrow non-target effects and without compromising on yields.

(20) Evaluating the Relationship between Drought Tolerance and Aflatoxin Contamination in Different Peanut Genotypes. J.M. LUIS*, Department of Plant Pathology, The University of Georgia Tifton Campus; C.C. HOLBROOK, Crop Genetics and Breeding Research Unit, USDA-ARS Tifton; P. OZIAS-AKINS, Department of Horticulture, The University of Georgia Tifton Campus, and R.C. KEMERAIT, JR., Department of Plant Pathology, The University of Georgia Tifton Campus, GA 31793.

Drought enhances aflatoxin contamination of peanuts (*Arachis hypogaea* L.), especially when it occurs during the last three to six weeks of the growing season. Identification of drought tolerant genotypes may aide the development of aflatoxin resistance in peanuts. The objective of this study was to evaluate the performance of potentially resistant genotypes under drought and irrigated conditions through four assessments. These evaluation methods included measurement of chlorophyll fluorescence using performance index (PI_{ABS}), SPAD chlorophyll meter reading (SCMR), canopy reflectance through normalized difference vegetation index (NDVI), and visual ratings. Six peanut genotypes (Tifguard, Tifrunner, C76-16, Florida-07, 554CC and A72) were planted in a randomized complete block and a split plot design in two separate rain-out shelters in Tifton, GA during the summer of 2012. At midbloom, the plots were inoculated with *Aspergillus flavus* (NRRL 3357) and *A. parasiticus* (NRRL 299) strains. The plants were grown with sufficient water for 100 days before drought treatments (T_0 = irrigated, T_1 = drought stress in the pod-zone only, and T_2 = whole-plant stress) were implemented. Results showed that Tifguard and Tifrunner had the highest PI_{ABS}, SCMR, NDVI and lowest visual ratings ($P \leq 0.05$). On the other hand, Florida-07, 554CC and A72 had low PI_{ABS}, SCMR, NDVI and high visual ratings ($P \leq 0.05$). Measurement of aflatoxin contamination after harvest showed that Tifguard and Tifrunner had low contaminations, while contaminations for C76-16, 554CC and A72 were high. Florida-07, however, had the lowest aflatoxin contamination despite showing indications of being drought stressed. Reason for this should be investigated in future studies. The overall results suggested that aflatoxin contamination of the different genotypes, except Florida-07, were associated with the evaluated drought tolerance responses.

PHYSIOLOGY AND SEED TECHNOLOGY

(21) CruiserMaxx Peanut: A New Seedcare Package from Syngenta. W. FAIRCLOTH*, H. MCLEAN, S. MARTIN, V. MASCARENHAS, and S. MORSELLO, Syngenta, Greensboro, NC 27409.

CruiserMaxx Peanuts® is a novel seed care product from Syngenta that includes both a fungicide and insecticide component as opposed to fungicide-only products that have been the industry standard to date. CruiserMaxx Peanuts® incorporates the neonicotinoid insecticide thiamethoxam, which has activity on a broad range of sucking and chewing pests and is rapidly systemic in seedling plants as they germinate from treated seed. Thiamethoxam is active on several species of thrips including tobacco thrips [*Frankliniella fusca* (Hinds)] and western flower thrips [*Frankliniella occidentalis* (Pergande)], both of which can stunt early peanut growth and could play a role in development of Tomato Spotted Wilt (tospovirus) later in the season. Professionally treated seed allow very low use rates (0.25 mg a.i./seed for thiamethoxam) meaning CruiserMaxx Peanuts® is part of an integrated pest management solution and provides a safer alternative to handling hopperbox insecticides, of which phorate is the most commonly used in peanut to control thrips. A summary of 12 field trials from 2010-2012 in Georgia and Alabama indicated plants germinating from CruiserMaxx Peanuts treated seed showed a 76% decrease in visual damage of thrips feeding versus plants arising from untreated seed. These same trials showed a 36% decrease in the number of immature thrips found on a per leaf basis versus the untreated, indicating reduced reproduction as a result of CruiserMaxx Peanuts® treatment. Peanut yields similarly showed a 770 kg/ha increase for CruiserMaxx Peanuts® as compared to the untreated. When compared to a standard protocol of fungicide-only seed treatment in combination with phorate in-furrow, CruiserMaxx Peanuts® demonstrated equal performance in the assessments of visual thrips damage, thrips counts, TSWV incidence, and yield. These field trials indicate that CruiserMaxx Peanuts will perform equal to industry standard insecticide treatments while offering growers a convenient seed care product.

(22) Development of Lipid Components of High- and Normal-Oleic Peanuts. L. L. DEAN*, K. W. HENDRIX, J. P. DAVIS, T. H. SANDERS, Market Quality and Handling Research Unit, USDA, ARS, Raleigh, NC 27695-7624: and C. M. KLEVORN, Department of Food, Bioprocessing, and Nutrition Sciences, North Carolina State University, Raleigh, NC 27695-7624.

The need to segregate high- and normal-oleic peanut seeds has lead to investigations into potential sources of mixing. Previous work in our lab has shown that, at harvest, a single peanut plant from a high oleic cultivar will be populated with seeds with a range of oleic to linoleic ratios (O/L) due to the indeterminate nature of peanut flowering. A study was conducted to determine the weekly changes in single seed fatty acid profiles (FAP) of two cultivars, Spain (high-oleic) and Bailey (normal-oleic) over the course of plant growth from 62 days after planting (DAP) until harvest at 148 DAP. At each sampling, all seeds were removed from 5 plants. Pods and seeds (>0.1g) were weighed, and moisture content and FAP determined. At final harvest, pods from a separate 4500-kg sample was sorted according to maturity prior to seed sizing and single seed FAP analyzed. At a subset of times, selected seeds were also analyzed for phytosterol and tocopherol contents to determine their developmental course over time. It was found that the FAP of an individual peanut seed was highly correlated with seed size, but not pod size or pod maturity. Pods can be of marketable size but still be developing small seeds with low O/L ratios at the end of the growing season on high-oleic plants. Sizing seeds reduced the number of low O/L seeds found in Spain but without some type of sorting mechanism that can detect lipid quality, it will be impossible to guarantee lots to be 100 % segregated regardless of handling strategies. As expected, all the seed on a high-oleic plant were on track to express the trait, however, normal-oleic plants, identical to Spain in above-ground morphology were observed. Thus, impure or segregating lines, as well as normal high-oleic development may lead to low O/L contamination in high O/L lots.

(**23) Visualization of Peanut Nodules and Seasonal Nodulation Pattern Using a Minirhizotron System.** D.L. ROWLAND*, C. SMITH, A. COOK, A. MASON, and J. BENNETT, Agronomy Department, University of Florida, Gainesville, FL 32611.

Nodulation is essential for providing the nitrogen needs of peanut, but little is known about the time course of nodule development with soil depth in a field production system. A minirhizotron system allows for in situ, non-destructive, periodic digital imaging of the crop root system, including the associated nodules. Analysis of images from minirhizotron tubes provides a means of examining nodulation patterns at various soil depths. Individual nodule development and senescence can be followed throughout the growing season because the system allows imaging at the same location over time. A study was conducted in 2012 in Citra, FL using a minirhizotron to observe and describe peanut nodule development in a sod-based production system managed with both conservation and conventional tillage. Images were taken to a soil depth of one meter on four dates during the growing season. Nodule number, area, growth, and senescence were determined. Time course analyses revealed the period during the season when primary nodule development occurred and the typical life span of single nodules. Most nodules were seen at relatively shallow depths from 5-30 cm; however, nodules were noted as deep as 90 cm. This study gave a unique visual assessment of nodule development for field grown peanut over time and provided data that has rarely been reported.

(**24)** **<u>Physiological, Metabolic, and Agronomic Characteristics of the Virginia-Type Peanut Grown in Rainfed and Irrigated Environments</u>.** D. SINGH*, M. BALOTA, E. COLLAKOVA, Dept. of Plant Pathology, Physiology, and Weed Science, Virginia Tech, Blacksburg, VA 24061, G. WELBAUM, Horticulture Dept., Virginia Tech, Blacksburg, VA 24061; and T.G. ISLEIB, Dept. of Crop Science, N.C. State University, Raleigh, 27695

Water deficit is the major limiting factor for peanut production in the Virginia-Carolina region. We evaluated several agronomic, physiological, and metabolic characteristics of eight virginia-type peanut cultivars and advanced breeding lines at three growth stages (R1, beginning flower; R3, beginning pod, and R5, beginning seed) in rainfed and irrigated field trials for two consecutive years. Visible symptoms of water-deficit stress were observed at stages R1 and R3 in 2011 and at stage R1 in 2012. Inconsistencies in these observations can be attributed to temperature and rainfall differences between these two years. Significant ($p \le 0.05$) variations in yield, extra large kernel content, sound mature kernel content, physiological characteristics, and the levels of polar and non-polar metabolites were observed in response to different water regimes, growth stages, and genotype in both years. In 2011, rainfed peanut plants experienced higher membrane injury than irrigated plants at R1 stage. On the other hand membrane injury was significantly less in rainfed than irrigated plants at stage R5, suggesting possible adaptation responses to early season water deficit. Rainfed plants had increased specific leaf area than the irrigated plants in 2011 (135 *vs*. 131 cm^2/g).). In contrast, rainfed plants exhibited smaller specific leaf area than the irrigated plants in 2012(133 *vs*. 144 cm^2/g). Among the cultivars and breeding lines tested, SPT 06-07 was the greenest and N04074FCT was the least green in both years and at all growth stages. In general, rainfed plants showed greater decline of the chlorophyll fluorescence measured as F_v/F_m ratio than the irrigated plants at stages R1 and R3, and N04074FCT and N05024J consistently showed more decline in the F_v/F_m ratio than other genotypes. Total organic acid levels decreased, and the levels of sugars and sugar alcohols increased in the leaves of rainfed relative to irrigated peanut plants. Principal component analysis of the physiological characteristics and metabolites revealed that specific leaf area, SPAD chlorophyll reading, sucrose, succinate, maleic acid, citrate, quinic acid, and saturated fatty acids were correlated the best. This correlation explained the largest proportion of the variance between growth stages in the leaves of rainfed plants. Hierarchical clustering of genotypes was conducted after selecting the most important traits using a multivariate step-wise variable selection analysis. Cultivars and peanut lines grouped in distinct clusters based on common responses to stresses: Cluster 1 included, Bailey and CHAMPS; Cluster 2, N05024J and N05008; and Cluster 3, SPT06-07 and N05006. With a few exceptions, fatty acid levels decreased or were unchanged in rainfed leaves. Regardless of the water regime, lower levels of saturated fatty acids and sugars ($p < 0.05$) and higher levels of unsaturated fatty acids and sugar alcohols were associated with higher pod yield in both years.

(25) **<u>The Effect of Fatty Acid Profile and Year on Virginia-Type Peanut Seed Germination</u>.** M. BALOTA*, Tidewater Agric. Res. & Ext. Center, Virginia Tech, Suffolk, VA 23437-7099; T.G. ISLEIB, Department of Crop Sciences, North Carolina State University, Raleigh, NC 27695-7629; and B.L. TILLMAN, North Florida Res. & Educ. Center, University of Florida, Marianna, FL 32446.

Fatty acids represent an important energy source for germinating seedlings, and previous research showed that increased oleic to linoleic fatty acid (O/L) ratio decreased the ability of spanish-type peanut to germinate at low (14 to 20ºC) temperatures. In this experiment, we examined the germination of five peanut genotypes with high O/L ratios and five with low O/L ratios at eight temperatures ranging from 12 to 30ºC in temperature controlled incubators. We used seed produced under the same conditions at the Tidewater Agric. Res. & Ext. Center in 2009 and repeated the experiment using seed produced under the same conditions in 2010, a drier year than 2009. Year had the strongest effect on germination, followed by temperature and genotype. Germination averaged 83% for the 2009 seed and only 45% for seed produced in 2010. Average germination was 71 % at 14ºC and 89 % at 16ºC for 2009 seed, and only 18% at 14ºC and 20 % for 2010 seed. At 28 and 30ºC, germination exceeded 81% in both years. Contrary to reports in the literature, in both years genotypes with high O/L ratios germinated better at lower temperatures than the genotypes with low O/L ratios. For example, germination of seed from 2009 of the low O/L ratio genotypes at 12ºC was 34%, less ($p = 0.013$) than the 49% measured for the high O/L ratio genotypes. At 14ºC and higher temperatures, there were no significant differences due to the fatty acid profile. On average, across years and temperatures, Bailey and Gregory (low O/L ratio) and Florida Fancy (high O/L ratio) had significantly lower germination than all other genotypes. Because germination differences among the genotypes in this study could be related to other genetic traits beside the fatty acid profile, we will expand the germination comparison between high and low O/L ratio to include a larger number of genotypes for clearer conclusions on the effect of the fatty acid content on germination.

(26) Assessment of Fluopyram for Management of the Peanut Root-Knot Nematode, *Meloidogyne arenaria*.
R. C. KEMERAIT*, J.T. WALLS, T.B. BRENNEMAN, K. RUCKER and D. HUNT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793, and Bayer CropScience, Tifton, GA 31793.
Management of the peanut root-knot nematode, *Meloidogyne arenaria*, is of critical importance to peanut producers in the southeastern United States. Tactics to manage the peanut root-knot nematode have included crop rotation and use of nematicides such as 1,3-dicholorpropene and aldicarb. In recent years growers have planted the root-knot nematode resistant cultivar 'Tifguard' but have lost use of aldicarb. Aldicarb had been widely used both in-furrow and as an over-the-top application during "pegging time" in the peanut field. In this study fluopyram (either alone or formulated with prothioconazole or imidacloprid) was assessed in 2011 and 2012 for management of *M. arenaria* in naturally infested field on the University of Georgia's Coastal Plain Experiment Station in Tifton. End-of-season counts (juveniles/100cc soil) in 2011 and 2012 ranged between 4.2 and 7.9 times and between 18.6 and 34.8 times greater than the University of Georgia's threshold level for *M. arenaria* in the fall of the year (10 juveniles/100c soil). The objective of this study was to assess the efficacy of fluopyram, fluopyram + prothioconazole (Propulse) and fluopyram + imidacloprid (Velum Total) as compared to aldicarb (Temik 15G, 10 lb/A) for management of the peanut root-knot nematode. Plots were planted primarily to "Georgia-06G"; Tiguard was planted alongside Georgia-06G in one trial in 2011. Fungicide treatments were applied either as seed treatments, in-furrow-at-plant, at pegging-time, or in a combination of timings. Thrips were managed using aldicarb, phorate or imidacloprid. Data collection included nematode counts from soil, root-gall ratings, above-ground symptoms of stunting and necrosis, and yield. In trials conducted, the most promising results were obtained when an in-furrow at-plant treatment that included fluopyram was applied. Where damage from *M. arenaria* was most severe, in-furrow applications of fluopyram were more associated with numeric reduction in root-gall ratings, reduced above-ground stunting, and increased yield than were applications of aldicarb, seed-treatment use of fluopyram, or pegging-time applications or fluopyram. At the Gibbs Farm in 2011 this trend was not observed and damage from nematodes was mild. Research will continue to determine how fluopyram, marketed with imidacloprid, as Velum Total, can be of benefit to peanut producers.

(27) Recent Occurrences of *Rhizoctonia solani* AG-4 and AG-1 on Peanut in Georgia.
T. B. BRENNEMAN*, R. C. KEMERAIT and T. MOORE, Department of Plant Pathology, University of Georgia, Tifton, GA 31794, and UGA Cooperative Extension Service, Colquit, GA 39837.
The soilborne fungus *Rhizoctonia solani* is well known as a pathogen of many crops, including peanut. Rhizoctonia limb rot, caused by *R. solani* AG-4, has been one of the most damaging diseases of irrigated peanuts in Georgia. The introduction and widespread use of highly effective fungicides in the 1990's greatly decreased the impact of this disease, and it is now seldom seen at damaging levels. Significant limb rot was observed in one field in Colquit County in 2011, and a highly managed field of Tifguard peanut in Miller County developed a severe epidemic in 2012. A replicated, large plot comparison was made of two applications of either Convoy (32 fl oz/A) or tebuconazole (7.2 fl oz/A) in the Miller County site, with other fungicides applied uniformly both before and after. The pod yields were 6742 and 5839 lb/A for the Convoy and tebuconazole, respectively. Tebuconazole is widely used due to its low cost, but other programs may be required for maximum control of limb rot. In addition, another field in Miller County exhibited widespread symptoms of a foliar blight affecting primarily the peanut leaves, and to a lesser degree the stems. The pathogen involved was *R. solani* AG-1, and lesions were more tan and water-soaked than dark brown as generally seen with limb rot. Field inoculations of currently grown cultivars showed FloRun 107, Georgia-09B and Florida-07 to be the most susceptible, but symptoms and yield losses were relatively mild on all entries. Rhizoctonia species are not as damaging to peanuts in Georgia as they used to be, but they are still present and need to be recognized.

(28) Effects of Host Resistance to *Tomato spotted wilt virus* on the Virus itself and its Vector.
R. SRINIVASAN*, Department of Entomology, University of Georgia, Tifton GA 31793; A. CULBREATH and R. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton GA 31793; and R.S. TUBBS, Department of Crop and Soil Sciences, University Of Georgia, Tifton, GA 31793.
Planting *Tomato spotted wilt virus* (TSWV)-resistant peanut genotypes has been the most important management tactic against the virus for more than two decades. These genotypes are known to exhibit field resistance, and the magnitude of resistance has steadily increased over time. However, these genotypes have not been extensively evaluated in the greenhouse and/or in the laboratory against thrips and TSWV. Although it is widely believed that the resistance imparted is only against the virus and not its vector, mechanism/s of resistance is unknown. We investigated the recently developed second-generation TSWV-resistant peanut genotypes against thrips and TSWV by thrips-mediated and mechanical transmission assays. Both assays indicated that TSWV-resistant genotypes could get infected with TSWV, and the incidence of infection was up to 85%. The amount of virus accumulation in host plants varied with the inoculation procedure. However, the viral loads in some resistant genotypes were less than in susceptible genotypes. TSWV is a RNA virus and is prone to selection pressure, which might potentially lead to development of more virulent or resistance breaking strains. Development of such strains might reduce the usefulness of resistant cultivars. We collected numerous TSWV isolates from resistant and susceptible peanut genotypes from ten peanut producing counties in Georgia in 2010 and 2011. The isolates were partially sequenced and compared with sequences of TSWV isolates obtained from the same locations in Georgia 12 and 13 years ago. Results indicated that the sequences did not vary consistently between resistant and susceptible genotypes. But, consistent differences were noticed over time. To further follow up, a series of population genetics tests were conducted using the same sequences. There were evidences for positive selection at the codon levels, but they were

not significant enough to exert positive selection pressure. On the contrary, the TSWV populations seem to be rather shaped by purifying selection, genetic expansion, population differentiation, and recombination events. Such events are typical among virus populations when there is no substantial selection pressure. These results suggested that even though the virus had undergone some consistent changes, they seem to be influenced temporally rather than the selection pressure induced by host resistance against TSWV in peanut genotypes. This indicated that the magnitude of resistance in peanut genotypes might not be strong enough to induce heavy selection pressure. Therefore, resistance breakdown in peanut genotypes exhibiting field resistance to TSWV is not an immediate threat. Additionally, on the contrary to the common notion that TSWV-resistant genotypes do not influence thrips populations, we found that TSWV-resistant genotypes differentially influenced thrips feeding patterns and fitness parameters. Thrips feeding and fitness were negatively affected on some TSWV-resistant genotypes.

(29) Enhancement of Peanut Disease Control with Tank Mixes of Cyproconazole and Azoxystrobin in Disease Management Programs. H. S. MCLEAN*, A. H. TALLY, W.H. FAIRCLOTH, V.J. MASCARENHAS, J. F. HADDEN, and S. C. MORSELLO, Syngenta Crop Protection, LLC., 410 Swing Road, Greensboro, NC 27409.
Early development and testing of cyproconazole in peanut indicated excellent activity on early leafspot, late leafspot, peanut rust, Southern stem rot, and Rhizoctonia limb rot. Cyproconazole is rapidly absorbed by peanut foliage and is very acropetally systemic. Relatively low rates of cyproconazole in peanut have curative as well as protective activity on foliar diseases while higher rates are needed to obtain satisfactory control of the soil borne diseases. Recent registration for soybean rust (and other diseases and crops) opened up the possibility of successful registration of cyproconazole in peanut using limited rates and application timings. Research was undertaken to explore opportunities to utilize the strengths of cyproconazole to improve disease management programs in peanut within the given regulatory constraints (or 'within the current label regime?'). Early testing indicated that the best fit is as a tank mix with azoxystrobin (Abound®) and especially in systems where disease pressure was high during the middle of the season when the applications were made. This was especially true when the application timings were extended for azoxystrobin such as the Peanut Rx regime and weather conditions favorable for an epidemic. University cooperator and internal trials have been conducted in GA, AL, VA, NC, and TX since 2009. Across the years and locations, results indicate that on average tank mixing cyproconazole at a rate of 40 grams active ingredient per hectare to a normal program including two applications azoxystrobin can increase control of foliar diseases of peanut and improve yield and maintain excellent Southern stem rot and Rhizoctonia limb rot control.

(30) Using Remote Sensing and GIS Technologies to Improve Production Forecasting and Crop Auditing within the Australian Peanut Industry. A.J. ROBSON*, Department of Agriculture, Forestry and Fisheries, Queensland and G.C. WRIGHT, Peanut Company of Australia, Kingaroy, Queensland, Australia, 4610.
Research undertaken within the Australian Peanut industry has identified remote sensing, in particular satellite imagery, as an accurate within season predictor of peanut production. At the crop level this information has allowed growers to identify poor performing crop regions that have corresponded with incidences of pest, disease and poor management. With this information, growers have undertaken remedial action and segregated areas for harvesting based on maturity and aflatoxin risk. At the regional level, accurate predictions of crop production (area x pod yield) can assist with harvest scheduling, storage and forward selling decisions. The supervised classification of SPOT5 imagery has also been effected in defining peanut crops growing within a region, which can greatly assist crop auditing. Similar research undertaken within the Australian sugar industry has combined image based cane yield predictions with comprehensive Geographical Information System (GIS) updated annually for each growing region. The GIS files define the location and area of each crop as well as additional information such as cultivar, crop class, date planted etc... . The combination of both the GIS databases and satellite imagery has enabled the rapid derivation and distribution of yield maps using softwares Starspan GUI and GoogleEarth. These surrogate yield maps effectively identify productivity trends extending across individual crops, farms, and entire growing regions. When generated annually, these maps can provide some insight into seasonal variability, information that can guide the optimal planting locations of specific cultivars or cropping in general. The methodologies developed for sugar cane could be effectively transitioned to suit the peanut industry.

Symposium - Recent Developments in US and International Peanut Markets

(31) Trends in World Peanut Trade. W. GEORGE*, Foreign Agriculture Service, Washington, D.C. 20250.
Since 2002, China's share of world peanut exports has fallen from near 50 percent to 22 percent in CY2012. The decline centered on raw shelled peanuts and occurred while exports of processed peanuts continued to rise. Price analysis indicated that the decline was mostly lower priced, and presumed lower quality peanuts with India and Argentina offsetting the lower export volume. In recent years, declines in exports of processed and inshell peanuts have been observed as further reductions in raw shelled peanuts appear limited due to their already reduced export volume.

The recent rise in peanut prices led to a surge in India's peanut exports. As these have tapered off, they were replaced by additional sales of U.S. peanuts in 2012/13. Most of the additional sales from both India and the U.S. were shipped to Vietnam where they are presumably targeted to meet growing demand for crush in China. As world prices continue to decline, the volume of trade to Vietnam has also fallen.

Trade trends suggest a continuing decrease in China's peanut exports, possibly moving more towards processed and in-shell peanuts. Further exports to Vietnam are likely to decline as peanut prices return to more normal levels. Continued growth in peanut and peanut oil demand in China will pressure exports, particularly if China's peanut production fails to keep pace.

(32) U.S. Export Market Development: An Overview of the Export Market and APC's Efforts to Boost Exports. P. ARCHER*, American Peanut Council, Alexandria, VA 22314.

U.S. peanut exports now make 20% of the crop in volume and even more in value. In 2013, increased exports are vital to the U.S. industry with the largest crop in history, far outstripping domestic demand. India, which traditionally provides China with additional peanuts, especially for its growing crushing market, was off the market and provided an opportunity for the U.S. to fill some of that void with its large and competitively priced crop. Activities by domestic traders in China caused the Chinese Government to shut down imports from Vietnam where most U.S. peanuts were being transshipped which put a halt to U.S. imports and dimmed prospects for the anticipated 300,000 tons of exports from the U.S. to China.

Exports have surged in 2013 and are 175% higher than 2012 which was especially low due to the smaller and poorer crop. With a large surplus of high quality peanuts, the U.S. has regained lost market share in Europe and maintained or expanded market share in Canada and Mexico. We are supplying new markets for the first time such as Algeria, Indonesia and the Ukraine. Customers such as Russia and Japan are also buying much higher quantities than in past years. The outlook for 2014 is clouded by the uncertainties in Argentina, India and the eventual size of the U.S. crop. APC continues to promote U.S. peanut exports and work with its customers in its key markets of Canada, Mexico, European Union, and Japan while looking at new opportunities in China, Russia, Colombia and South Korea.

(33) Thinking Globally, Acting Locally. K. LUTT*, Golden Peanut Company, Alpharetta, GA 30022.

Golden Peanut is a leading shelling company in the United States and Argentina. Today's customers are increasingly interested in food safety, including residuals and microbiology. Additionally customers are interested in how do they increase their ability to manage risk and volatility. The interests create opportunities, among those are improvements in non-yield characteristics, increasing collaboration with customers, and improving farmer's stock quality. From a marketing perspective the markets continue to work through the large 2012 crop, and the upcoming 2013 crop.

(34) How Changes in Exports Affect the U.S. Farmer. D. KOEHLER*, Georgia Peanut Commission, Tifton, GA 31793.

The prospect for market growth lies largely in the predicted increase in world population. Much of that growth will be in developing countries with limited resources and with tastes quite different from the Western World. This puts pressure on all facets of research. Economists will have to give critical information to facilitate trade. Food scientists will have to identify potential products which will fit these growing markets, and a one-size-fits-all strategy cannot be followed. But, we cannot ignore the need for continued production research to help us reduce unit cost and to help make the U.S. farmer competitive in this new and interesting market place.

(35) India, China, and the USA – Balancing the Global Peanut Market. J. MOORE*, JRJ Brokerage Co, Inc., Albany, GA 31707.

From 2002-2011/12, India increased their peanut (groundnut) export volume by 1,173% as China became a regular importer of Indian peanuts. In 2011 China imported approximately 300,000 metric tonnes of peanuts (groundnuts) from India, in 2012 China did not import peanuts from India due to India's 20% drop in production and quality/aflatoxin issues with the crop. Peanut exports from India have been adversely affected due to new regulations by Agricultural and Processed Food Products Export Development Authority (APEDA). Through the first two months of 2013 Indian peanut exports declined 48% versus January-February 2012 and half of the 5,000 shelling operations in Gujarat have ceased operations. India's declining production and inconsistent quality creates the opportunity for the United States to export significant peanut volume to China when oversupplied.

PATHOLOGY, NEMATOLOGY, ENTOMOLOGY, MYCOTOXINS - II

(36) Curative Activities of Systemic Fungicides Applied during the Incubation Period of Early Leaf Spot. R.C. JOHNSON and E.G. CANTONWINE*, Department of Biology, Valdosta State University, Valdosta, GA 31698.

A detached leaf, inoculation experiment was used to characterize the curative activities of penthiopyrad, pyraclostrobin, and prothioconazole applied before and after pathogen penetration and symptom development. Peanut leaves, inoculated with spores of *Cercospora arachidicola*, were exposed to each fungicide at 3, 5, 7, 9, 11, or 13 days after inoculation (dai). Non-treated, inoculated leaves and chlorothalonil-treated, inoculated leaves were included as positive and eradicative controls, respectively. The experiment was conducted twice, with 4 replications each. Percent pathogen penetration was estimated for each spray day using microscopy. At 3 dai, the estimated proportion of penetrating spores was 0.06-0.11, increasing to 0.54 and 0.74 for trials 1 and 2, respectively, at 5 dai, and 0.77 and 1.0, respectively, at 7 dai. Fungicide treatments did not affect mean incubation period, which was 12.1 dai in trial 1, and 11.6 dai in trial 2. Infection frequencies, measured 26-28 dai, were reduced by >94% for all fungicide treatments applied 3 dai. The systemic treatments resulted in significantly lower infection frequencies than the chlorothalonil and non-treated controls at 5 and 7 dai ($P<0.01$), but not at 9 dai or later ($P\geq0.26$). Lesion diameter was significantly reduced for all leaves treated with a systemic fungicide regardless of spray day ($P<0.01$). The systemic fungicides provided similar effects on the dependent variables evaluated. These results suggest that the curative activities of the systemic fungicides tested extend 2-4 days beyond pathogen penetration, and can restrict pathogen growth even after symptom development begins.

(37) Effect of In-Furrow and Early Postemergence Applications of Fungicides on Disease Progress of Early Leaf Spot. A.K. CULBREATH*, T.B. BRENNEMAN, and R.C. KEMERAIT, Dept. of Plant Pathology, Univ. of Georgia, Tifton, GA 31793-5766.

In-furrow (IF) and early postemergence (POST) applications of the fungicide prothioconazole (Proline 480 SC) can be useful for management of peanut (*Arachis hypogaea*) diseases, Cylindrocladium black rot, caused by *Cylindrocladium parasiticum*, and stem rot, caused by *Sclerotium rolfsii*. Prothioconazole also has excellent activity against early leaf spot, caused by *Cercospora arachidicola,* and late leaf spot, caused by *Cercosporidium personatum.* However, the effects of IF or early POST applications on leaf spot epidemics have not been thoroughly characterized. The purpose of this study was to compare the effects of IF applications of prothioconazole and banded early POST applications of prothioconazole or pyraclostrobin (Headline 250 SC) on early season leaf spot development in peanut plants exposed to heavy levels of natural inoculum. A field experiment was conducted in Tifton, GA in 2012 using the cultivar Georgia-09B. Plots were 1.8 m wide by 10 m long and were bordered on each side by nonsprayed rows of Georgia-09B. Border beds were planted on 21 May 2012. Plots were planted on 15 August 2012 after a severe epidemic of early leaf spot was evident in the border rows. Treatments consisted of: 1) nontreated control; 2) IF at planting application of 0.10 kg ai/ha; 3) IF at planting application of 0.20 kg ai/ha of prothioconazole; 4) early POST application of 0.20 kg ai/ha of prothioconazole; and 5) early POST application 0.16 kg ai/ha of pyraclostrobin. Early POST applications were made 23 DAP in a 30 cm wide banded spray. The full broadcast rate of each fungicide was concentrated in the band. Leaf spot incidence (percentage of leaflets with early leaf spot lesions) was evaluated 27, 29, 33, 43, and 56 DAP. Incidence of leaf spot for the five respective treatments was 43.0, 28.5, 9.4, 27.0, and 20.2% (LSD = 7.2) for the 29 DAP evaluation. After 29 DAP, incidence of leaf spot increased rapidly in both IF treatments and very little in either POST treatment. Incidence of leaf spot for the five respective treatments was 74.0, 52.0, 32.5, 27.5, and 22.0% (LSD = 7.8) for the 33 DAP evaluation. At 43 DAP, incidence was 19.0% for the POST prothioconazole treatment and 13.7% for the POST pyraclostrobin treatment (LSD = 5.4). At that time incidence of either IF treatment was similar to that of the control (77%). Incidence in both POST treatments increased to 77% by 53 DAP, but that was noticeably lower (LSD = 5.3) than the 88% or higher in the other three treatments. Both IF and POST applications of prothioconazole provided control of early leaf spot under intense disease pressure. The duration of control provided by banded applications of prothioconazole or pyraclostrobin at 23 DAP indicates that application of subsequent fungicides for leaf spot could be delayed until 43 DAP, even under extreme disease pressure.

(38) Multi-State Evaluation of a Seed Treatment and In-Furrow Granular Insecticide for Thrips and TSWV Management in Virginia and Runner-Type Peanut. W. S. MONFORT*, Edisto REC, Clemson University, Blackville, SC 29817; A. HERBERT, Tidewater AREC, Virginia Tech, Suffolk, VA 23437; D. JORDAN, Dept. of Crop Science, North Carolina State University, Raleigh, NC 27695; R. BRANDENBURG, Dept. of Entomology, North Carolina State University, Raleigh, NC 27695; J. BEASLEY, Dept. of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; R. SRINIVASAN, Dept. of Entomology, University of Georgia, Tifton, GA 31793; and A. CULBREATH, Dept. of Plant Pathology, University of Georgia, Tifton, GA 31793.

Thrips and *Tomato spotted wilt virus* (TSWV) comprise one of the major economically important pest–pathogen complexes throughout the eastern peanut belt in the United States. With the loss of aldicarb for use in peanut, there is a need to evaluate alternatives for both efficacy against thrips and the effects on incidence of TSWV. For the first time, an insecticide (seed treatment), Cruiser Maxx Peanut (thiamethoxam, Syngenta Crop Protection, Inc.) is now commercially available to peanut growers. Previous field studies by the co-authors have demonstrated that although CruiserMaxx Peanut does provide control of thrips, results are often variable. A multi-state project was initiated with cooperators in some of the major peanut growing states in the eastern US (VA, NC, SC, GA) with the objective of evaluating the efficacy of CruiserMaxx Peanut seed treatment on selected Virginia and runner type peanut cultivars for management of thrips and TSWV. Experiment treatments included: 1.) Untreated check; 2.) Thimet 20G at 5.5 oz/1000 row feet; and 3.) CruiserMaxx Peanut at 0.318 mg ai/seed. All insecticide treatments were evaluated on three Virginia and three runner type cultivars with varying levels of field resistance to TSWV. Experimental design was a randomized complete block with 4 replications. Data collected included seedling stand counts, visual ratings of plant injury caused by direct thrips feeding on a scale of 0=no injury to 10=dead plants, numbers of thrips adults and immatures per 10 terminal leaflets per plot, number of TSWV hits per plot, and pod yields at harvest (TBD). Initial results showed that both CruiserMaxx Peanut and Thimet provided good levels of thrips control compared with the untreated check with lower thrips numbers and plant injury ratings. CruiserMaxx Peanut generally resulted in more plant injury compared with Thimet. Incidence of TSWV was reduced by both insecticides compared with the untreated check, and Thimet tended to have lower levels of TSWV compared with CruiserMaxx Peanut treatments. Yield data are forthcoming.

(39) CruiserMAXX Seed Dressing Compared with Soil Insecticides for Thrips Protection, TSWV Incidence and Yield Response on Three Runner Peanut Varieties. A. K. HAGAN, H. L. CAMPBELL*, K. L. BOWEN, Auburn University, AL 36849; and L. WELLS, Wiregrass Research and Extension Center, Headland, AL 36345.

The insecticide/fungicide seed dressing CruiserMAXX and recommended soil insecticides were compared for their impact on TSWV incidence, thrips protection, and impact on yield on Florida 07, Georgia-06G, Georgia-09B, and Georgia Green at the Wiregrass Research and Extension Center in Headland, AL. On May 17, peanuts were sown at a rate of 6 seed /ft using conventional tillage practices in a Dothan fine sandy loam (OM<1%) soil on a site maintained in a one year out peanut-cotton rotation. Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. The study was irrigated as needed. A factorial design was arranged in a split plot with peanut variety as the main plot and insecticide treatment as the split plot, which consisted of four 30-ft rows spaced 3-ft apart. CruiserMAXX insecticide/fungicide and Dynasty PD fungicide seed dressing were custom applied at 4 oz/100 lb to seed with mechanical seed treatment equipment. Thimet 20G at 5 lb/A and Temik 15G at 7 lb/A were applied in-furrow at planting. Dynasty PD fungicide seed dressing alone alone served as the negative control. Stand counts were made on June 3 from the second row of each plot as the actual number of plants emerged. Thrips damage (TDR) on the leaves was assessed on June 19 on a 0 to 10 scale where 0 = no visible leaf scarring, 1=10% leaf area scarred, 2=20% leaf area scarred, 3=30% leaf area scarred, 4=40% leaf area scarred, etc., to 10=100% leaf area affected and plants near death. Tomato spotted wilt (TSWV) loci counts (1 locus was defined as $\leq$ 1 ft of consecutive severely TSWV-damaged plants per row) were made on July 19 and September 19. Stem rot loci counts (1 locus was defined as $\leq$ 1 ft of consecutive stem rot-damaged plants per row) were made immediately after plot inversion on October 4. While not impacted by insecticide treatments, stand density was higher for Georgia Green than Florida 07 or Georgia-06G. Overall TSWV activity was low and no differences in disease incidence were noted between peanut varieties. Stem rot incidence was higher in Georgia Green than Florida 07 but not Georgia-06G, which had an intermediate disease rating. Yield for Florida 07 was higher than Georgia 06G and Georgia Green with the latter having the lowest pod yield. Despite low TSWV pressure, incidence of this disease was higher for the Dynasty PD than for the CruiserMaxx seed dressing and the two in-furrow insecticide treatments, all of which had similar TSWV indices. Stem rot incidence was lower for the CruiserMAXX than Dynasty PD seed dressings, while the ratings for the in-furrow insecticides were intermediate. Yield response for the CruiserMAXX and Dynasty PD seed dressing alone or in combination with Thimet 20G and Temik 15G were similar. Thrips damage ratings were higher for the Dynasty PD fungicide seed dressing controls for all three varieties as compared with both Temik 15G and Thimet 20G in-furrow and the CruiserMAXX seed dressing. Thimet 20G and Temik 15G gave better protection from thrips feeding damage than CruiserMAXX. On Georgia-06G but not the other varieties, Temik 15G reduced the level of thrips damage as compared with Thimet 20G.

(40) Concentration of Abound FL on Peanut Leaves, Soil, and Pods with a Standard Field Application. T. A. WHEELER*, Texas A&M AgriLife Research, Lubbock, TX 79403, M.G. ANDERSON, Texas A&M AgriLife Extension Service, Seminole, TX 79360; J.E. WOODWARD, Texas A&M AgriLife Extension Service, Lubbock, TX 79403; and S.A. RUSSELL, Texas A&M AgriLife Extension Service, Brownfield, TX 79316.

A field trial was conducted in 2012 to examine the effect of azoxystrobin application timing (earliness) on chemical residue present on foliage, soil, and pods. To accomplish this, each treatment occurred at a different week of the season, with the first application made on 9 July and the last application made on 17 August. Fungicide applications were made at 20 gal/acre and 30 PSI. There were six treatments with a single application made at a different time during the summer, a non-treated check, and a well-treated check where two applications of azoxystrobin were made (19 July and 17 August). Samples were collected for chemical concentration analysis on 17 and 31 July and 15 August. The fungicide was at similar concentrations in the soil throughout the sampling time and between all treatments, regardless of application time. This indicated that some concentration of the fungicide remained from an at-plant application in the soil (made by the producer), and that subsequent applications during July and August were not successful at increasing the concentration in the soil. For the 17 July, 31 July, and 15 August sampling dates, 91, 98, and 98% of the total concentration of azoxystrobin measured in a sample was found on the foliage at 6-7 days after application (as opposed to on pods and soil). The fungicide concentration on foliage declined at a rate of 0.1217 ppm/day, or at a rate of 4.2%/day. Pod rot control is dependent on better methods to get fungicide concentration to the soil.

(41) Predicting Aflatoxin Occurrence in Peanuts. K. L. BOWEN*, H. L. CAMPBELL, A. K. HAGAN, Dept. Entomology and Plant Pathology, Auburn University, Auburn, AL, U.S.A.

Peanuts are one of the commodities that can be affected by aflatoxin contamination. Reliable prediction of aflatoxin occurrence in peanuts is needed so that growers can make appropriate management decisions when contamination risk is high. The importance of high temperatures and dry conditions during the last 4-6 weeks of peanut growth on aflatoxin accumulation has long been known from work done in controlled-environment plots. However, conditions during peanut growth are more variable in growers' fields than occur in those plots. We monitored aflatoxin concentrations in rainfed peanut plots over 6 years at the Wiregrass REC; in each year, 4 planting dates subjected the crop to different temperature and rainfall patterns. The first planting in each year was late April with subsequent plantings about every 14 days. Daily maximum temperatures averaged over the final 42 days prior to inversion and the number of 3-day intervals with less than 0.25 cm rainfall ('dry periods') for 28 days prior to inversion were found to be better related to aflatoxin concentrations than were many other variables including dry periods over shorter or longer intervals, other temperature variables, and rain days or rain amounts. Further, we found that maximum temperature averages defined risk groups for aflatoxin concentrations, while dry intervals provided predictive precision within each risk group. When higher daily maximum temperatures prevailed (>31.1°C), 15 dry periods could result in unacceptable aflatoxin concentrations (> 19 ppb); with cooler maximum temperatures, more than 20 dry periods were needed during the 28 days prior to inversion.

(42) Weed Management Systems with Warrant in Texas Peanut. M. R. MANUCHEHRI*, R. M. MERCHANT, The Department of Plant and Soil Science, Texas Tech University, Lubbock, TX, 79409-2122; P. A. DOTRAY, Texas A&M AgriLife Research and Extension Service, Lubbock, TX, 79403; and W. J. GRICHAR, Texas A&M AgriLife Research, Corpus Christi, TX, 78406.

Warrant, a relatively new formulation of acetochlor, is an encapsulated preemergence (PRE) and postemergence (POST) herbicide labeled for use in corn (*Zea mays* L.), cotton (*Gossypium hirsutum* L.), grain sorghum (*Sorghum bicolor* L.), and soybean (*Glycine max* L.) and may be available for use in peanut as early as the 2014 growing season. The use of Warrant in peanut would be a valuable weed management tool for peanut growers due to its residual control of several small-seeded broadleaf and grass weeds and its ability to be "activated" with less rainfall/irrigation. In 2012, three field trials were conducted in Texas to evaluate the control of Palmer amaranth (*Amaranthus palmeri* S. Wats.), devil's-claw (*Proboscidea louisianica* Mill.), Texas millet (*Urochloa texana* Buckl.), smellmelon (*Cucumis melo* L.), and pitted morningglory (*Ipomoea lacunose* L.) as well as peanut response to Warrant applications at various timings under weed-free conditions. Treatments for the systems trials included PRE applications of Prowl H_2O (0.95 lb ai/A), Valor SX (0.096 lb ai/A), Dual Magnum (1.27 lb ai/A), and Warrant (1.13 lb ai/A) alone or in a tank-mix combination and POST applications of Cadre (0.063 lb ai/A + COC), Cobra (0.195 lb ai/A + COC), Cobra+Dual Magnum, or Cobra+Warrant following Prowl H_2O applied PRE. Control of Palmer amaranth and devil's-claw 28 and 42 days after treatment (DAT) for all PRE applications was similar; however, control of both species for Prowl H_20 alone was less than all other PRE treatments. Palmer amaranth and devil's-claw control 28 days after POST applications was at least 25% greater when Cadre was applied compared to all other POST treatments. Smellmelon control 26 days after PRE treatment was 100% for Prowl+Dual Magnum while Prowl H_2O, Valor SX, Dual Magnum, and Warrant applied alone was no better than 88%. Texas millet control 115 days after PRE treatment was 96% for Prowl H_2O+Valor SX and Prowl H_2O+Dual Magnum followed by Cadre or Cobra while Prowl H_2O alone provided 82% control. In the crop response trial, treatments included Warrant at 1.13 and 2.25 lb ai/A and Dual Magnum at 1.27 lb ai/A applied preplant incorporated (PPI), PRE, early-postmergence (EPOST), or mid-postemergence (MPOST). Cobra alone and Cobra+Warrant also were applied MPOST. Visual injury (8%) was observed 21 days after planting (DAP) for Warrant applied at 2.25 lb ai/A compared to Warrant applied at 1.13 lb ai/A PPI and PRE, Warrant applied 2.25 lb ai/A PRE, and Dual Magnum applied PPI and PRE. However, 28 DAP, injury (7%) was observed for Dual Magnum applied PRE compared to Warrant applied PPI and PRE at 1.13 and 2.25 lb ai/A. Increased injury (7%) was also observed 42 DAP for Dual Magnum applied PPI compared to Warrant applied at 1.13 and 2.25 lb ai/A PPI. Injury (8%) was observed 56 DAP for Dual Magnum and Warrant applied at 2.25 lb ai/A EPOST compared to Warrant applied at 2.25 lb ai/A PRE. Visual injury assessments did translate into yield losses for Warrant applied EPOST at 2.25 lb ai/A compared to Dual Magnum applied PPI and EPOST. Additionally, there was a decrease in yield for Warrant applied PRE at 2.25 lb ai/A compared to Warrant applied MPOST at 1.13 lb ai/A. Overall, Warrant was effective in managing Palmer amaranth, devil's-claw, Texas millet, smellmelon, and pitted morningglory in Texas peanut and did not result in any visual injury or yield reduction when applied at the recommended rate.

(43) Uptake, Translocation, and Dose Response of Post Emergence Applied Diclosulam to Bristly Starbur (*Acanthospermum hispidum*) DC. T.L. GREY*, Crop and Soil Science Department, University of Georgia, 2360 Rainwater Rd. Tifton, GA 31793.

Laboratory studies were conducted to evaluate uptake and translocation of 14C-diclosulam in bristly starbur. Separate greenhouse studies evaluated bristly starbur growth response of POST applied diclosulam at doses of 6.5, 3.3, 1.6, 0.8, 0.4, 0.2 and 0 g ai/ha. Bristly starbur seed were collected from two Georgia locations and then hand cleaned, and grown in the greenhouse. Bristly starbur was then foliar treated with diclosulam when plants were in the 4 to 6 leaf stage of growth. Initial trials indicated no differences in seed quality and plant establishment in greenhouse experiments. 14C-diclosulam was applied to a single non-treated most fully developed bristly starbur adaxial leaf, after the rest of the plant was foliar treated with 0.8 g ai/ha. At 48 hours after treatment, 14C-diclosulam was translocated to bristly starbur plant apex, with very low movement to the lower plant parts including the stem and roots. Based on dose response studies, bristly starbur I_{50} for diclosulam was approximately 1 to 2 g ai/ha. Based on the data, bristly starbur susceptibility to diclosualam is its inability to metabolize the herbicide.

(44) Influence of Simulated 2,4-D and Dicamba Drift on Peanut Growth and Yield. D.E.P. TELENKO*, B. BRECKE, R. LEON, West Florida Research and Education Center, University of Florida, Jay, FL 32565; and J. FERRELL, Agronomy Department, University of Florida, Gainesville, FL 32611.

New cotton cultivars are being developed that will tolerate postemergence applications of 2,4-D or dicamba in response to the ever increasing list of broadleaf weeds that have developed resistance to glyphosate. As these new herbicide tolerant cotton cultivars become available the potential for one or both of these herbicides to drift on to peanuts in fields adjoining cotton will greatly increase. It is important to have some understanding of the impact of these herbicides on peanuts so that when herbicide drift does occur the potential for yield loss can be predicted. Field studies were conducted on the West Florida Research and Education Center, Jay, FL and Plant Science Research and Education Unit in Citra, FL. Dicamba and 2,4-D were each applied at five rates (full use rate, 0.5, 0.25, 0.125 and 0.0625 of full rate) and these treatments were compared to a non-treated check. Each herbicide by rate treatment was applied 21 or 42 days after peanut planting. Foliar injury was visually evaluated during the growing season and peanut yields determined at termination of the experiment at both sites. In both locations dicamba was more injurious to peanut foliage then 2,4-D. However, the foliar injury and yield loss were much greater at Citra than was observed at

Jay. At Jay, while yield reduction was similar (46 and 43%) for both herbicides at the highest application rate, much less yield loss was observed for lower rates of 2,4-D compared to dicamba. When averaged over all rates and timings, dicamba caused 30% loss while 2,4-D caused less than 20%. In general, applications at 21 days after planting (DAP) caused less visible damage to the foliage and reduced yield less than the 42 DAP treatments (14% yield loss for 14 DAP vs. 31% reduction for 42 DAP). When applied 14 DAP, 2,4-D reduced yield 10% or less and averaged 25% for dicamba while injury was greater 42 DAP especially at the higher rates of application averaging 20% for 2,4-D and 40% for dicamba. In many instances foliar injury ratings at Citra were nearly double those recorded for the same treatment at Jay. When averaged over rates and times of application dicamba caused a 55% yield loss at Citra compared with 30% at Jay. 2,4-D caused 30% yield reduction at Citra and 20% loss at Jay. While both 2,4-D and dicamba caused more injury when applied 42 DAP than 21 DAP at Jay, dicamba damage was similar for both application timings at Citra (55% yield loss averaged over all rates). 2,4-D injury was less when applied 42 DAP than 21 DAP (30 vs. 15% yield loss) at Citra, opposite from what was observed at Jay. Overall these results indicate that dicamba at rates as low as 1 oz./A can cause significant peanut yield loss (15 to 35% reduction) while 2,4-D at 2 to 8 oz./A had much less effect on peanut (0 to 20% yield reduction). It appears that peanut growers will need to be much more concerned about dicamba drift than about 2,4-D drift from adjoining fields.

(45) Zidua: A potential new tool for weed control in peanut. R. M. MERCHANT*, Texas A&M Agrilife Research, Lubbock, TX 79403; P. A. DOTRAY, Texas Tech University, Texas A&M AgriLife Research, and Texas A&M AgriLife Extension Service, Lubbock, TX 79409-2122; M. R. MANUCHEHRI, Texas Tech University, Lubbock, TX 79409-2122.

Zidua (pyroxasulfone) is a broad-spectrum herbicide that controls several grass and broadleaf weeds in corn (*Zea mays* L.), wheat (*Triticum aestivum* L.), and soybeans (*Glycine max* [L.] Merr.). Some weed species particularly susceptible to Zidua are Palmer amaranth (*Amaranthus palmeri* S. Wats.) and devil's-claw (*Proboscidea louisianica* [P.Mill.] Thellung), two common and troublesome weeds in peanut (*Arachis hypogaea* L.) on the Texas High Plains. The objective of this study was to determine Palmer amaranth and devil's-claw control and peanut response when using several Zidua-based weed management systems for season-long control. Zidua (1.0, 1.5, or 2.0 oz/A) was applied alone, in tank-mixture, or followed by (fb) Gamoxone Inteon (12 oz/A), Storm (24 oz/A), and/or Cadre (4 oz/A). Treatments excluding Zidua were included also so that comparisons could be made to existing herbicide programs. When Zidua at 1.5 or 2.0 oz/A was applied PRE fb Gramoxone Inteon at-crack (AC) fb Storm POST, Palmer amaranth was controlled completely four, five, and six weeks after peanut emergence. Similar control was achieved when Dual II Magnum was used in lieu of Zidua. Devil's-claw was controlled up to 80% when evaluated four, five, and six weeks after emergence following Zidua at 2.0 oz/A applied PRE. The use of Zidua at either rate PRE improved control of Palmer amaranth and devil's-claw over systems relying solely on Gramoxone Inteon applied AC fb Storm POST and caused no visible injury during the 6 weeks after emergence evaluation period. When used AC and tank-mixed with Gramoxone Inteon fb Storm, Zidua controlled Palmer amaranth at least 97% four, five, and six weeks after emergence regardless of rate. When Dual II Magnum was used in place of Zidua AC, Palmer amaranth control was 10% less when evaluated four and five weeks after emergence. Without a PRE herbicide option, devil's-claw was controlled ≤70%. When used AC with Gramoxone Inteon and Storm fb Cadre POST, Palmer amaranth and devil's-claw were controlled at least 99% four, five, and six weeks after emergence. This system did cause visible peanut injury up to five weeks after emergence (≤7%); however, by six weeks injury was no longer detectable. Zidua at 1.0 oz/A also was applied POST as part of two different systems. Palmer amaranth and devil's-claw were controlled at least 98%, but up to 10% visual injury was observed. The use of Zidua-based control systems potentially could provide effective broadleaf weed control in peanut with low risk of injury.

(46) Impact of Dual Magnum on Peanut Yields in Georgia. E.P. PROSTKO* and T.L. GREY, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793.

Dual Magnum (*s*-metolachlor) has become a popular herbicide in Georgia due to its effectiveness in controlling Palmer amaranth (*Amaranthus palmeri*) and Benghal dayflower (*Commelina benghalensis*). Despite numerous published studies that indicate peanut tolerance to this herbicide is excellent, there is still some concern at the grower level that Dual Magnum can negatively impact peanut yield. Therefore, numerous small-plot, replicated, field trials were conducted in Georgia from 2010 to 2012 to determine the effect of labeled rates of Dual Magnum alone and in combination with Cadre (imazapic) or Gramoxone (paraquat) + Storm (acifluorfen + bentazon) on peanut yield. 'Georgia-06G' was planted in all studies and grown under weed-free conditions. Preplant incorporated (PPI), preemergence (PRE), and early-postemergence (EPOST) applications of Dual Magnum had no effect on peanut yield. In 1 of 4 trials, Dual Magnum applied postemergence (POST) resulted in an 8.1% yield loss. POST mixtures of Cadre + Dual Magnum had no effect on peanut yield. In 1 of 5 trials, EPOST combinations of Gramoxone + Storm + Dual Magnum resulted in a 9.6% yield loss. In 1 of 2 trials, Gramoxone + Storm + Dual Magnum (EPOST) followed by Cadre + Dual Magnum (POST) resulted in a 7.1% yield loss.

BREEDING, BIOTECHNOLOGY, AND GENETICS - I

(47) Breeding for High Blanchability in Peanuts. G.C. WRIGHT*, Peanut Company of Australia, Kingaroy, Queensland, Australia, 4610; D. O'CONNOR, The University of Queensland, Queensland, Australia, 4072; and D.B. FLEISCHFRESSER, AgriSciences Queensland, Department of Agriculture, Fisheries and Forestry, Kingaroy, Queensland, Australia, 4610.

With a large proportion of the Australian peanut crop sold as blanched (skin removed from kernel by heating followed by abrasion) product, it is essential that new varieties have a high level of skin removal, or blanchability. The costs associated with blanching are extremely high for peanut processors, and are comparable with the costs of growing or shelling the crop. Earlier research in Australia has shown that blanchability is under strong genetic control, and while being affected by environmental factors (e.g. drought and maturity), the ranking of genotypes is not substantially affected. A number of near to release lines have been rejected from the Australian peanut breeding program owing to their poor blanching characteristics. It is therefore essential that we better understand the genetic control and breeding potential for the blanching trait in order to better select parents for the breeding of improved blanchability. We have conducted small scale blanchability tests on a wide range of peanut germplasm, including local breeding material, the USA mini-core collection, and a wide cross section of elite USA varieties/lines. Approximately 40% of the mini-core collection and 20% of the USA material had poor levels of blanchability (<80%), and surprisingly a number of these lines had levels <50%. The Australian breeding program is currently exploring options for early generation selection for this trait; however the need for a significant quantity of seed limits the possibility of single plant selection. Phenotyping techniques that use a smaller kernel sample for blanching tests are also being assessed, which when combined with SNP marker discovery using next generation sequencing technologies may allow more efficient selection for this important quality trait.

(48) Effects of G x E Interaction on Oil Content and Fatty Acid Composition of Cultivated Peanuts. C.Y. CHEN*, Department of Agronomy and Soils, Auburn University, Auburn, AL 36849; M.L. WANG, N.A. BARKLEY, and B. TONNIS, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223.
Twenty-nine entries of varieties and advanced breeding lines were grown in two locations in three years with three replications to estimate the effects of G x E interaction on oil content and fatty acid composition of cultivated peanuts. Oil content and fatty acid composition were quantified by NMR and GC, respectively. The tested lines were genotyped with functional SNP markers from the *FAD2A* and *FAD2B* genes using real-time PCR and classified into four genotypes. Additive Main Effects and Multiplicative Interaction (AMMI) model which combines the conventional analyses of variance for additive main effects with the principal components analysis (PCA) for the non-additive residuals was applied to estimate additive effects from *FAD2A* and *FAD2B* genes and G x E interaction. The results indicated significant G x E interactions for oil content and oleic acid. No correlations between oil content and *FAD2A* and *FAD2B* genes were found. The *FAD2B* gene had a larger additive effect than the *FAD2A* gene. The results from this study may be useful not only for peanut breeders, but also for food processors and product consumers to select suitable cultivars.

(49) Field Resistance vs. Marker Assisted Selection for Root-Knot Nematode Resistance in Peanut: "Bad News" and "Good News". W. D. BRANCH*, Dept. of Crop and Soil Sciences, T. B. BRENNEMAN, Dept. of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793; and G. HOOKSTRA, Eurofins STA Laboratories, Genetic Services, Longmont, CO 80504.
A common set of 13 advanced Georgia peanut (*Arachis hypogaea* L. subsp. *hypogaea* var. *hypogea*) breeding lines that were derived from 'COAN' cross combinations were compared with three check cultivars for root-knot nematode (RKN) [*Meloidogyne arenaria* (Neal) Chitwood race 1] resistance. These 15 genotypes were all grown in highly RKN populated field tests using a randomized complete block design with three replications for two years (2011-12). The "bad news" was that the two molecular markers (SCAR 197/909 and SSR-GM 565) did not agree with gall ratings for four out of the 15 genotypes (26.7%). These results were however the same each year with the same four genotypes being incorrectly identified, suggesting possible genetic differences. The "good news" will be presented to explain this lack of 100% accurately differentiating resistant and susceptible RKN breeding lines when using marker assisted selection.

(50) Identification of Orthologous QTLs for Resistance to the Root-knot Nematode *(Meloidogyne arenaria* (Neal) Chitwood) in Peanut (*Arachis hypogaea* L.). M. D. BUROW*, Texas A&M AgriLife Research, 1102 East FM 1294, Lubbock, TX 79403; Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; J. L. STARR, Department of Plant Pathology and Microbiology, Texas A&M University, Peterson Building, College Station, TX 77843; C. E. SIMPSON, Texas AgriLife Research, Texas A&M System, Stephenville, TX 76401; C-H. PARK, National Institute of Crop Science, Seodun-Dong, Suwon Republic of Korea; and A. H. PATERSON, Plant Genome Mapping Laboratory, University of Georgia, Athens, GA 30602.
Resistance to root-knot nematodes is needed for cultivation of peanut in several major peanut-growing areas, but significant resistance is lacking in the cultivated species. Markers for one or perhaps two closely-linked resistance genes have been introgressed from wild species and used for marker-assisted breeding. Here, to improve sensitivity to small-effect QTLs, an advanced backcross population from a cross between Florunner and the synthetic amphidiploid TxAG-6 [*A. batizocoi* x (*A. cardenasii* x *A. diogoi*)]4x was screened for response to root-knot nematode infection. Composite interval mapping results suggested a total of 7 QTLs plus three putative QTLs. These included the known major resistance gene plus a second QTL on LG1, and an orthologous B-genome QTL on LG1. Additional orthologs were identified on LG8 and LG18, plus a QTL on LG9.2 and putative QTLs on LG9.1 and 19. A QTL on LG15 had no identified ortholog. Contrary to expectations, two introgressed QTLs were associated with susceptibility, and QTLs at some orthologous loci were found to confer opposite phenotypic responses. Significance to peanut breeding will be discussed.

(51) <u>Webb, a New High Oleic and Rootknot Nematode Resistant Runner Peanut.</u> C.E. SIMPSON*, Texas A&M AgriLife Research, Stephenville, TX 76401; J.L. STARR, Plant Pathology and Microbiology Dept. Texas A&M University, College Station, TX 77843; M.R. BARING, Soil & Crop Science Dept. Texas A&M University, College Station, TX 77843; M.D. BUROW, Texas A&M AgriLife Research and Crop and Soil Science Dept., Texas Tech University, Lubbock, TX 79403; J. M. CASON, Texas A&M AgriLife Research, Stephenville, TX 76401; and J.N. WILSON, Soil & Crop Science Dept. Texas A&M University, College Station, TX 77843.

'Webb' peanut variety (PI 667551) was released by Texas A&M AgriLife Research, College Station, TX 77843, on August 31, 2012. Webb has been accepted into the Texas Seed Certification program and will be marketed by variety name only under the three classes of the certification program. The variety is the third in a series that AgriLife has released which contains the gene for rootknot (RK) nematode resistance that was introgressed into *Arachis hypogaea* L. from the wild peanut species *A. cardenasii* Krapov. and W.C. Gregory. Webb has resistance to RK equal to COAN and NemaTAM, the two previous varieties in this series. Webb is a larger seeded variety with seed weight averages ranging from 63 to 66 g/100, depending on location. Yields are higher than most check varieties tested without nematode infestations and are significantly higher than all varieties including NemaTAM under nematode infestation. Shelling characters of Webb have been acceptable and blanching and flavor components are within acceptable ranges. The O/L ratio for Webb tested to be 21.7:1 in our test samples. All the aforementioned tests were conducted by a commercial laboratory. Webb has a modest level of resistance to Sclerotinia blight but there has been no opportunity to evaluate the variety for tomato spotted wilt virus.

(52) <u>Progress in Breeding for Grade (TSMK%) in the University of Florida Peanut Breeding Program</u>. B.L. TILLMAN* and G. PERSON, North Florida REC, Agronomy Department, University of Florida, Marianna, FL 32446.

The percentage of total sound mature kernels (TSMK) is the basis of valuing farmer stock peanuts in the USA. The value of each percentage point of TSMK is about $4.85 (2008- $4.842; 2009- $4.852; 2010 $4.85). As typified by Florida-07, several UF cultivars had lower TSMK which placed them at a competitive disadvantage in the marketplace. Therefore, TSMK is an important target for peanut breeding efforts. Over 2000 samples are graded to determine TSMK each year in the UF program. To track progress, we examined TSMK data from evaluations during 2008 through 2012 and compared data from recent releases and advance lines with past cultivars. We also tracked TSMK from preliminary through advanced stages of testing. We will present results from these analyses to assess progress in breeding for improved TSMK.

BREEDING, BIOTECHNOLOGY, AND GENETICS - II

(53) <u>Optimization of a Direct Organogenesis System from the Cotyledonary Node Explants of Peanut (*Arachis hypogaea* L.).</u> Y-F. HSIEH, M. JAIN, J. WANG*, Plant Molecular and Cellular Biology Program, Agronomy Department, University of Florida, Gainesville, FL; and M. GALLO, Molecular Biosciences and Bioengineering Department, University of Hawaiʻi at Mānoa, Honolulu, HI.

Cultivated peanut (*Arachis hypogaea* L.) is the second most important food and oilseed legume in the world. Published direct regeneration protocols for transgenic improvement in peanut are highly genotype-dependent and have provided limited utility for peanut cultivar development. An alternative repetitive somatic embryogenesis system is suitable only for biolistic gene delivery and requires prolonged *in vitro* subculturing. We have optimized a facile and rapid method for obtaining direct shoot organogenesis from cotyledonary node (CN) explants excised from peanut seedlings germinated on cytokinin-supplemented Murashige and Skoog (MS) basal salt medium. A mass of multiple shoot-initials formed at the axillary bud region of CN explants derived from seedlings germinated in the presence of 4 mg/l 6-benzylaminopurine (BAP) within three weeks of culture on the same cytokinin-containing medium. Adventitious shoots elongated rapidly over the next three weeks, and rooted efficiently on MS medium supplemented with 1 mg/l α-naphthaleneacetic acid (NAA). Although adequate initiation of adventitious shoot buds was also observed from the CN explants in the presence of another commonly used cytokinin, thidiazuron (TDZ), the elongation of shoot buds was negatively impacted, thus compromising overall regeneration potential. Starting from mature seed, the described protocol yielded rooted plantlets within 12-15 weeks, in contrast to 15-18 months required for initiating and regenerating somatic embryogenic cultures. This procedure is highly reproducible and worked for several peanut genotypes tested.

(55) <u>Biotic and Abiotic Resistant Tetraploid Peanut Germplasm Lines Derived From *Arachis cardenasii* Krapov.</u> <u>& W. C. Gregory.</u> S.P. TALLURY*, T.G. ISLEIB, S. C. COPELAND, P. R. ANDERSON and H. T. STALKER, Dept. of Crop Science, N.C. State University, Raleigh, NC 27695-7629; and D. SINGH and M. BALOTA, Virginia Polytechnic Inst. and State Univ., Tidewater Agric. Res. and Ext. Ctr., Suffolk, VA 23437.

Two tetraploid peanut germplasm lines, SPT 06-06 and SPT 06-07, derived from interspecific hybridization were developed in the peanut genetics program at N.C. State Univ., Raleigh, NC. These two lines were tested extensively by the N C Agric. Res. Serv., (NCARS) from 2006-2012 in disease evaluation tests. They have unique alleles introgressed from the diploid wild species, *Arachis cardenasii* Krapov. & W. C. Gregory (GKP 10017; PI 262141). The germplasm lines are also unique in that they exhibited multiple disease resistances superior to the earlier released germplasm lines derived from *A. cardenasii*. Although SPT 06-06 and SPT 06-07 were initially developed for resistance to early leafspot, both lines were also evaluated for resistance to other diseases commonly observed in the Virginia-Carolina peanut production region. Resistance to multiple diseases included early leaf spot (ELS), Cylindrocladium black rot (CBR), Sclerotinia blight (SB), and tomato spotted wilt (TSW). Defoliation of these two lines was significantly less than the mean of the resistant checks (2.9 vs. 4.5, P<0.01). Both lines have significantly less CBR incidence than the CBR resistant cultivar, Perry (0.17 and 0.13 vs. 0.32, P<0.01). Neither of these two germplasm lines had lower Sclerotinia blight resistance than the most resistant check, N96076L or the multiple disease resistant cultivar Bailey. However, these two checks are considered resistant to Sclerotinia blight and consequently SPT 06-06 and SPT 06-07 also can be considered as being resistant to SB. The two germplasm lines had significantly lower TSW incidence than any of the cultivar checks except Bailey (0.17 and 0.17 vs. 0.20) but were not different from resistant *hirsuta*-type check PI 576636, which also had a mean TSWV incidence of 0.17. Additionally, SPT 06-07 exhibited resistance to abiotic stress in field and greenhouse tests in 2011 and 2012 with superior physiological and metabolic activity during the water deficit stress. It exhibited the greatest maintenance of healthy leaves under severe water-deficit which presumably may result in greater initial recovery of physiological function after re-watering. It also had the lowest epidermal conductance in field tests indicating that it could be well suited for severe drought environments. SPT 06-07 also maintained the highest SPAD chlorophyll reading, specific leaf area, fatty acid content, and efficiency of the photosystem II (least F*v*/F*m* ratio decrease) compared to the other cultivars and experimental lines in rainfed field trials. Thus, these two tetraploid peanut germplasm lines derived from *A. cardenasii* have multiple biotic stress resistances, specifically for ELS, CBR, SB, and TSW. SPT 06-07 also has drought resistance. These two lines should provide unique, improved germplasm for breeders interested in multiple disease resistance and also to expand the germplasm pool of *A. hypogaea*.

(56) Progress on Genotyping and Phenotyping Recombinant Inbred Line Populations of Peanut. Y. CHU*, P. OZIAS-AKINS, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793; C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793; T. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; B. TILLMAN, Agronomy Department, North Florida Research and Education Center, The University of Florida, Marianna, FL 32446; M. BUROW, Soil and Crop Sciences Department, Texas A&M University, Lubbock TX 77843; T. BRENNEMAN, and A. CULBREATH, Department of Plant Pathology, The University of Georgia Tifton Campus, Tifton, GA 31793.

Sixteen structured RIL populations from a 2 x 8 (common x unique) factorial nested association mapping design have been developed, and four have been advanced to F6:7 or F6:8 generations. The two common female parents are Tifrunner and Florida-07 and the unique male parents include N08082olJCT (a Bailey derived high oleic breeding line), C76-16, NC 3033, SPT 06-06, SSD 6 (PI 576638), OLin, New Mexico Valencia A, and Florunner. Twenty-four simple sequence repeat (SSR) primer pairs were applied to all parental lines, and we observed that New Mexico Valencia A was genetically most distant from the female runner-type cultivars. A group of 310 SSR primer pairs was screened against parents of Tifrunner x NC3033 and Florida 07 x SPT06-06 populations of which 129 (42%) and 87 (28%) detected polymorphism, respectively. Genotyping of both populations with SSR markers is underway. Phenotyping of late leaf spot was performed with the Florida 07 x SPT06-06 population and the disease resistance was found to be quantitatively inherited among the RIL lines. The population, Florida 07 x NC3033, has the potential to segregate for resistance to CBR according to the result of a greenhouse inoculation study. Parental lines of all populations were phenotyped for growth habit, maturity, seed germination and seed and pod traits. Significant phenotypic variation was documented among these parental lines indicating which RIL populations might be most useful for QTL mapping of these traits.

(58) Contributions of Plant Introductions to the Ancestry of Current U.S. Peanut Cultivars. T.G. ISLEIB*, Dept. of Crop Science, N.C. State Univ., Raleigh, NC 27695-7629; and N.A. BARKLEY, USDA-ARS Plant Genetic Resource Conservation Unit, Griffin, GA.

Plant introductions (PIs) have been used in peanut (*Arachis hypogaea* L.) improvement in the U.S.A. since the inception of peanut breeding there in the 1930s. One might think that the era of screening collections of PIs for pest resistances or other economically important traits then crossing selected PIs with existing cultivars was over and that breeders would now mark economically important segments of chromosomes for incorporation into new cultivars, incorporate known DNA sequences into genomes or employ directed mutation of existing cultivars to produce new improved lines. An effort was made to ascertain the proportion of ancestry of modern US peanut cultivars that was derived from PIs. The Association of Official Seed Certifying Organizations (AOSCA) maintains a record of certified acreage of all peanut cultivars in the U.S.A., an approximate indicator of which cultivars will be planted in which proportionate areas in the following year. The 2011 record was consulted to determine the distribution of cultivars in U.S. production regions for 2012. Pedigrees of lines used were traced to PIs and previously existing cultivars to determine the contributions of PIs to the ancestries of existing cultivars, assuming the contribution of each parent to be 50% in their offspring. The contribution of a given PI to the 2012 crop was estimated as the sum of cross products of the percentage of the crop occupied by a cultivar times the ancestral contribution of the PI to that cultivar. Overall, PIs contributed 20.6% of the ancestry of cultivars grown in 2012, 22.5% of the ancestry of cultivars of the runner market type (occupying 77.2% of the total acreage), 12.0% of the ancestry of cultivars of the virginia market type (occupying 20.5% of the total acreage), 14.4% of the ancestry of cultivars of the spanish market type (occupying 1.9% of the total acreage), and 100.0% of the ancestry of cultivars of the valencia market type (occupying 0.5% of the total acreage). PI 203396, the source of TSWV resistance in Southern Runner, Georgia Green, and C-99R was the PI most commonly found in the ancestry of all cultivars (16.1% of all U.S. acreage). This PI was collected in Brazil and contributed critical resistance genes in many current runner market-type cultivars developed by the Universities of Georgia and Florida. PI 121067 was a distant second (1.0% of all U.S. acreage), figuring most prominently in the ancestry of virginia-type cultivars from NCSU. PI 109839 was third (0.7% of all acreage), occurring through runner-type cultivars from Texas AgriLife Research. A substantial and important part of the ancestry of current U.S. peanut cultivars could be ascribed to PIs that are maintained in the USDA-ARS collection at Griffin, GA.

(59) <u>Interaction Between Genotypes and the NCSU Advanced Yield Test and Multi-State Peanut Variety and Quality Evaluation Testing Programs</u>. S.C. COPELAND and T.G. ISLEIB*, Dept. of Crop Science, N.C. State Univ., Raleigh, NC 27695-7629; and M. BALOTA, Va. Polytechnic. Inst. and State Univ., Tidewater Agric. Res. and Ext. Ctr., 6321 Holland Rd., Suffolk, VA 23437.

Breeding lines developed by the N.C. State Univ. (NCSU) peanut breeding program must perform well for at least two years in the program's three-location in-state Advanced Yield Test (AYT) test series conducted at the Peanut Belt Res. Stn. (PBRS) in Lewiston, NC, the Upper Coastal Plain Res. Stn. (UCPRS) at Rocky Mount, NC, and the Border Belt Tobacco Res. Stn. (BBTRS). At that point, lines are eligible to "graduate" to the Peanut Variety and Quality Evaluation (PVQE) test series conducted at a total of five locations in Virginia, North and South Carolina (Tidewater Agric. Res. & Ext. Ctr., Suffolk, VA, Martin Co., NC, UCPRS, Rocky Mount, NC, Bladen Co., NC, Edisto Res. & Educ. Ctr., Blackville, SC). Lines are retained as entries in the AYT series while they are tested in the PVQE series. It is a common phenomenon to find that a line whose performance in the AYT has warranted its advancement then exhibits mediocre performance in the PVQE. In order to confirm and quantify the existence of interaction between genotypes and testing programs, genotype- by-program means for lines retained in the PVQE program for at least two years were analyzed, extracting the main effects of genotypes and testing programs as well as their interaction. Genotype-by-testing-program interaction was tested statistically for agronomic characters including yield, fancy and jumbo pod contents and brightness, using F-ratios whose denominators were the residual variance remaining after removing the main effect and interaction sums of squares. From a breeding standpoint, the most serious manner in which interaction can arise is if there is less than perfect correlation between means of genotypes measured in the two testing programs ($\rho_{12}<1$), *i.e.*, widespread and large changes in rank of genotypes in the two. Less serious is a difference in variance among genotypes in the two testing programs ($\sigma_1 2$ and $\sigma_2 2$). Interaction was significant for all traits and its variance can be partitioned into a part ascribable to $(\sigma_1-\sigma_2)2/2$ and another due to $(1-\rho_{12})\sigma_1\sigma_2$. Using two-tailed F-tests of variation among genotypic means as a measure, genotypic variances were found to be heterogeneous for foreign material, loose shelled kernels, jumbo pod brightness, fancy pod content, fancy pod brightness, jumbo-to-fancy ratio, sound split seed content, other kernel content, support price, pod yield and value per acre. For those traits, correlations between genotypic means from the two testing programs were large (r>0.8) for only three traits (fancy pod content, fancy pod brightness, and jumbo-to-fancy ratio) suggesting that the observed interaction in those cases arose from the heterogeneity of variances. For the other traits exhibiting heterogeneity, correlations range from r=-0.066 to r=0.670, suggesting that the interaction could have arisen from both sources. Variances were homogeneous for farmer stock fancy pods (the sum of jumbo and fancy pod contents), weighted average brightness of farmer stock fancy pods, jumbo pod content, extra large kernel content, sound mature kernel content, and meat content, indicating that the interaction observed was due more to changes in rank than to heterogeneous genotypic variances in the two testing programs. The part of the interaction variance arising from changes in rank was substantially larger than the part due to heterogeneous variances for all traits except farmer-stock fancy pods and jumbo-to-fancy ratio.

PRODUCTION AND POST-HARVEST TECHNOLOGIES

(60) <u>Comparative Proteomic Analysis of Peanut Seed and Seed Coat.</u> B.L.WHITE*, T.H. SANDERS, J.P. DAVIS, Market Quality and Handling Research Unit, USDA ARS, North Carolina State University, Raleigh, NC 27695; and A.I. NEPOMUCENO, D.C. MUDDIMAN, W.M. Keck Fourier Transform Mass Spectrometry Laboratory, Department of Chemistry, North Carolina State University, Raleigh, NC 27695.

Peanut (*Arachis hypogaea* L.) is grown extensively worldwide for its edible seed and oil. In a peanut, within the hull and encasing the cotyledon is the seed coat, which is commonly referred to within the peanut industry as the skin. The seed coat is a distinct plant structure critical for seed development, regulation of nutrient uptake, and defense against various environmental stresses such as fungal invasion. Recently, proteomics has become a powerful tool in plant research; however, studies involving legumes, and especially peanuts, are in their infancy. Furthermore, protein expression in the peanut seed coat has never been explored. Accordingly, a comparative proteomic study of blanched peanut seed and corresponding seed coats was performed using nanoLC-MS/MS sequencing. A phenol-based extraction procedure was necessary to extract seed coat proteins, as seed coats are naturally high in polyphenolic compounds that readily bind and precipitate proteins. Seed coats contained many known peanut allergens (Ara h 1) in addition to 38 proteins not identified in the seed, which included several defense proteins with antifungal activity. Western blotting using sera of peanut allergic patients revealed that seed coat proteins bound peanut-specific IgE when isolated from polyphenolic compounds, but not when these compounds were present. These findings have important implications for the potential allergenicity and food uses of peanut skins (processing by-product) and provide a first step towards understanding their biochemical function. Related, research is ongoing to identify proteins in the seed and seed coat that are differentially expressed in response to drought, as this information will aid efforts at developing drought/aflatoxin resistant cultivars. Additionally, proteomics can be used to understand roasting induced protein modifications, information with important implications for allergenicity. To this end, proteins from raw and variably roasted peanuts were compared. Roasted samples contained several proteins with modified lysine residues (carboxyethyllysine, carboxymethyllysine, and pyralline), indicative of Maillard browning. This research demonstrates the utility of proteomics to evaluate protein expression and modifications in peanuts and peanut by-products with important implications for both agronomics and food science.

(61) Flavor Comparisons Among Roasted Large Kernels from 11 Cultivars Grown in the United States. D.A. SMYTH*, A. BROWN, A.A. CARDONA, Kraft Foods, PLANTERS Research & Development, 200 DeForest Ave., East Hanover, NJ 07936.

Recent research by others has suggested that volatile analysis on roasted peanut seeds (*Arachis hypogaea* L.) by gas chromatography can be used to identify the flavor chemicals important in the roasted peanutty attribute in peanut snack nuts. Runner and virginia type cultivars from the 2010 U.S. crop were evaluated to see whether determinations of roasted peanut flavor by descriptive sensory methods could be correlated with concentrations of flavor chemicals. Cultivars tested included ACI 149, Florida Fancy, Tamrun OL-07, Red River Runner, Georgia 06-G, Georgia 09-B, Florida 07, Champs, Phillips, Perry, and Titan. Large kernels were collected on a 7.3 mm x 19.2 mm slotted screen, blanched with abrasive rollers to remove the seed coat, and then dry roasted 8 to 12 minutes in a forced air oven heated to 160° C. Roast performance was measured by CIE L* value and moisture content. Sensory assessments were based on attributes defined in the Spectrum technique. A thermal desorption method was used to identify flavor volatiles by gas chromatography and mass spectrometry. Cultivar ACI 149 grown in west Texas was the most reactive in achieving good scores in the positive sensory attributes of roasted peanutty and sweet/aromatic with 8 minutes of roasting, as well as corresponding high relative concentrations (6 µg/kg) of the corn roast aroma of 2-Acetyl-1-pyrroline and carmel-like Furaneol (125 µg/kg), and substantial amounts of the dark roast dimethyl pyrazines (1049 µg/kg), malty 2-Methylbutanal (1377 µg/kg) and honey-like Phenylacetaldehyde (99 µg/kg). Cultivar Florida Fancy took 10 minutes of roasting to get relatively high sensory scores for peanut flavor, while still showing that seed grown in the Texas area was more reactive than those grown in Florida with roast color of CIE L* 65 versus 68, and twofold or higher flavor increases in the Florida seed of compounds such as 2-Methylpropanal, 3-Methylbutanal, Phenylacetaldehyde, pyrazines, 2-Acetyl-1-pyroline, 2-Phenylethanol, and Furaneol. One concern was that approximately half of the cultivars tested here took 12 minutes of roasting to develop adequate roasted peanutty flavor, but this roast time also was associated with excessive dark roast and burn, as well as some loss of crunchiness. Replicate analysis on cultivar Georgia 06-G seed showed that seed flavor analysis has considerable variation, and that this factor must be accounted for in any conclusions. The results discussed here suggest that flavor analysis can be useful in understanding what makes a superior peanut seed in terms of eating quality, but certainly studies must take account of the natural variation in the seed population and cultivar differences in factors such as seed size and moisture content.

(62) Peanut Skin Characteristics May Affect Shelf Life of Peanut Paste and Peanut Butter. C.S. HATHORN, Department of Food, Bioprocessing and Nutrition Sciences, NC State University, Raleigh, NC 27695; K.W. HENDRIX, L.O. DEAN, and T. H. SANDERS*, USDA, ARS, Market Quality and Handling Research Unit, Raleigh, NC 27695.

Peanut skins contain high levels of phenolic antioxidant compounds. Milled peanut skins were added to peanut paste and peanut butter in concentrations of 0.0, 3.0, 10.0% (w/w) and samples were stored at 30°C for 24 wks. Oxygen radical absorbance capacity (ORAC) and oxidative stability index (OSI) of all skin concentrations decreased at similar rates over 24 weeks. Peroxide values (PV) of the products containing 10% skins were higher than 0 and 3 % skin products after 16 weeks. An examination of peanut skins revealed that skins contained approximately 12 % oil and fatty acid composition of oil in peanuts and peanut skins were similar. However, OSI of skin oil was very low (1.5-4.1 hrs) compared to peanut oil (14.0-16.2 hrs). Tocopherol analysis indicated a lack of alpha tocopherol in skin oil compared to peanut oil and skins also contained high levels of Cu (55.6 ppm) and Fe (181.8 ppm). The lack of alpha tocopherol in skin oil and high Cu and Fe concentrations in the skins likely contributed to the low OSI of skin oil. All of these factors contributed to increases in PV in peanut butter and peanut paste containing 10% skins at 16 and 24 weeks in the study. The lack of antioxidant protection from the high phenolic content of skins was attributed to the low solubility of phenolic compounds in the oil matrix of the peanut products.

(63) Peanut Oil Stability and Physical Properties Across a Range of Industrially Relevant O/L Ratios. J.P.DAVIS*, K.M. PRICE, L.L. DEAN, USDA ARS, Market Quality and Handling Research Unit, Raleigh, NC 27695; D.S. SWEIGART, J. M. COTTONARO, Technical Center, The Hershey Company, Hershey, PA 17033; T.H. SANDERS, Market Quality and Handling Research Unit, Raleigh, NC 27695

High oleic cultivars are becoming increasingly prevalent in the peanut industry due to their increased shelf life compared to conventional cultivars. High oleic peanuts are typically defined as having oleic acid/linoleic acid (O/L) ratios ≥ 9, whereas most traditional varieties have O/L ratios near 1.5-2.0. In practice, this ratio can vary substantially among commercial material; accordingly, the goal of this study was to better understand the shelf life and physical properties of 16 model oil blends with O/L ratios systematically prepared from 1.3 – 38.1. Across these samples, % oleic acid, % linoleic acid, refractive index, density and dynamic viscosity were all highly (R2 > 0.99) linearly correlated. Increasing concentrations of oleic acid and concomitant decreases in linoleic acid were associated with decreasing oil density, decreasing refractive index, and increasing viscosity. Oxidative stability index (OSI), an established method for predicting relative oil shelf life, had a seven-fold increase as O/L ratio increased from 1.3 to 33.8 and this response was well described by a 2nd order polynomial. Oil stability was also assessed by storing oil blends at 24°C/50% R.H. for 24 weeks and periodically sampling these oils to measure peroxide value (PV) and describe oil flavor via sensory analysis. Excellent correlations were observed among: off-flavor (oxidized/cardboard/rancid) development during storage; PV development during storage; O/L ratio and OSI. While viscosity was greatest for high oleic samples when comparing fresh oils, after storage under abusive conditions viscosity increased exponentially with decreasing O/L ratio due to oxidation/polymerization reactions. Overall, these data will aid processors in selection of high O/L peanuts for various food applications and better determine final product shelf life.

(64) **Variation of Farmer Stock Grade Factors in Semi-Drying Trailers.** C.L. BUTTS*, M.C. LAMB, USDA, ARS, Dawson, GA 39842, Z. ABDO, USDA, ARS, Athens, GA 30605.

Peanuts are increasingly being loaded into flat bottom semi-drying trailers in the field and transported to peanut buying points for curing, grading, and marketing. Conveyances in excess of 15 t are probed 15 times using the pneumatic sampler requiring considerable time for probing and reducing the resulting sample to two 1800-g samples. The goal of this study is to determine if number of probes can be reduced while maintaining the accuracy of the current sampling plan. During the harvest and marketing of the 2012 peanut crop, inspectors from the Alabama Federal-State Inspection Service (FSIS) selected 18 loads of farmer stock peanuts from all peanut production areas in Alabama. Inspectors selected the loads at random from semi-drying trailers following conventional marketing without regard to the official grade of the load. Each load was divided into a grid consisting of three (3) cells across the width of the trailer and 15 cells along the length for a total of 45 cells. Each cell was probed one time using the pneumatic probe resulting in a sample weighing approximately 3-4 kg each. Each sample was then divided using the farmer stock riffle divider into two official-sized grade samples. Each grade sample was identified by load number, column (1, 2,3), row (1-15), and sub-sample (A or B) then evaluated according to standard FSIS farmer stock grading procedures to determine the percent foreign material (FM), loose shelled kernels (LSK), sound mature kernels (SMK), sound splits (SS), other kernels (OK), damaged kernels (DK), and hulls. Contour maps of each load were developed to visualize the variation of grade factors by position. Adequate representation of the grade consists of an accurate mean plus or minus a similar expected error (variance) of each grade factor. Average grade factors were determined by averaging the data from cells used in the conventional 15-probe pattern. Probe patterns consisting of data from 12 and 9 cells were used to determine 12- and 9-probe grades. Using standard T-tests to determine differences among mean grade factors for each load, there was no significant difference in the mean grade factors for each load using 15, 12, or 9 probes. For the comparison of variances due to number of probes, it was assumed that the variance using data from all 45 cells from each load was the "true" variance of the grade factors for each load. For the purpose of variance comparison, composite samples were generated from the original data by randomly selecting cells until the desired number of probes had been achieved, then the grade data averaged and repeated 1000 times for each load and each number of probes. The variance of these randomly-generated grades were compared to the actual variance of the load. The variance of the percent SMK, TSMK, estimated the actual variance as long as at least 12 probes were used. The variance estimated for the percent hulls and SS compared favorably when 15 probes or more were used. However, when 15 probes were used to estimate FM and LSK, the variance for 8 and 7 loads, respectively, underestimated the true variance. Similar underestimation of the variance for moisture content, OK, and DK for at least 5 loads when using a 15-probe sampling protocol. The authors gratefully acknowledge the Alabama Federal-State Inspection Service for collecting and processing all of these samples for this study.

(65) **Calcium Fertilizer Sources and Timing of Application for High-Yield Peanut Production.** G.H. HARRIS*, J.P. BEASLEY, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793; and J.A.HOWE, Auburn University, Auburn, AL.

Calcium sulfate (gypsum or landplaster) applied at bloom time, has been the traditional source and timing of application to provide calcium to the pegging zone of peanut. Over time, new sources of calcium sulfate have become available to peanut growers in the Southeast US. In addition, the use of agricultural limestone applied at planting has also been adopted as a method of providing calcium to developing peanut pods. Finally, with a renewed interest in applying fertilizers through center pivot irrigation, clear liquid/highly soluble calcium fertilizers such as calcium chloride and calcium thiosulfate applied with irrigation during peak pod fill are being investigated. Replicated field trials comparing sources and timing of application of calcium fertilizers are currently being conducted in Georgia and Alabama. All plots are measured for yield, grade, germination and most importantly, calcium content in harvested seed. Timing of the different sources of calcium is critical based on the solubility of the calcium in the source. For example, the calcium in calcium sulfate is more soluble than the calcium in lime, and the calcium in calcium chloride and calcium thiosulfate is the most soluble of all.

(66) **Effects of Fertilization, Tillage, and Phorate on Thrips and TSWV Incidence in Early Planted Peanuts.** R.S. TUBBS*, Crop and Soil Sciences Dept., University of Georgia, Tifton, GA 31793; K.S. BALKCOM, USDA-ARS NSDL, Auburn, AL 36832; M.D. TOEWS, and R. SRINIVASAN, Entomology Dept., University of Georgia, Tifton, GA 31793.

Thrips feeding is usually more prevalent in early planted peanuts (*Arachis hypogaea* L.), which often directly results in higher incidence of tomato spotted wilt virus (TSWV). Several management tools are available to reduce thrips feeding and/or the threat of TSWV in early planted peanuts, including fertilization which could help plants grow out of thrips damage more rapidly, tillage method (surface residues in reduced tillage systems disrupt thrips feeding on peanut foliage), and use of phorate insecticide. However, current peanut cultivars exhibiting excellent field resistance/tolerance to TSWV may not require thorough management of thrips for control of TSWV as in the past when more susceptible cultivars were being grown and TSWV pressure was more severe. Trials were established in Tifton, GA and Headland, AL in 2011 to assess early season thrips populations and whether they were viruliferous or not, TSWV incidence, and yield potential for Georgia-06G peanut planted in late April using factorial combinations of starter fertilizer (16.7 L/ha 10-34-0 vs. none), tillage (conventional deep-turn vs. strip-till), and phorate (5.6 kg/ha vs. none). Starter fertilizer had no effect on yield, grade, thrips numbers, or TSWV incidence. Conventional tillage resulted in approximately twice as many adult tobacco thrips (*Frankliniella fusca*) than strip-till management at 21 days after planting (DAP) and four times as many immature thrips at 28 DAP in both locations. There was likewise more than twice as much TSWV in conventional till plots as a result of heavier feeding. However, this did not adversely affect production, as conventional tillage had 7% higher yield and 1.2% improved grade over strip till. The inclusion of phorate reduced adult thrips by 50% at 14 and 21 DAP at both locations, and there were approximately 75% fewer immatures with phorate than without the treatment at 28 DAP in both locations. There was likewise a resulting 15% increase in yield where phorate was used. Management decisions including tillage and/or phorate in-furrow have a much more significant effect on thrips management and peanut production than starter fertilizer.

(67) Assessment of Runner and Virginia-type Genotypes in the High Plains and Rolling Plains of Texas. J.H. RAMIREZ, Texas A&M AgriLIFE Extension Service, Vernon, TX 76384; J.E. WOODWARD*, Texas A&M AgriLIFE Extension Service and Texas Tech University, Lubbock, TX 79403; T.A. BAUGHMAN, Institute of Agricultural Biosciences, Oklahoma State University, Ardmore, OK 73401; and M.R. BARING, Texas A&M AgriLIFE Research, College Station, TX 77843.

Peanut production occurs in several distinct geographic locations in the state of Texas. Management practices between two of the larger regions, the Southern High Plains and Rolling Plains can differ dramatically within a given year with cultivar selection being one of the most important decisions producers can make. The deployment of genotypes with the ability to perform consistently under varying conditions is important in the sustainability of production. Flavor Runner 458 has served as the commercial standard Runner cultivar in west Texas, because of its high yield potential and ability to grade well. The Virginia cultivar Jupiter has routinely been grown in this area as well. Performance of these cultivars may vary in fields with a disease history or limited irrigation capacity. Several cultivars including ACI-149, Tamrun OL07, and Tamrun OL11 have performed equal to or better than Flavor Runner 458 in field studies conducted over the past five years. Cultivars developed in the southeast, such as Florida 07, FloRun107, Georgia-09B and McCloud have exhibited on average a yield advantage of 836.1 kg/ha over Flavor Runner 458 in the High Plains. The performance of FloRun 107 and Gerogia-09B have been more inconsistent in the Rolling Plains yielding 236.5 and 399.4 kg/ha, respectively less than Flavor Runner 458 during 2012. Yields for the Virginia cultivars AT-07V, AU-1101, Florida Fancy, Gregory, Perry and Suggs were 1380, 1582, 1581, 1023, 945, 1416, 721 and 1224 kg/ha greater than Jupiter in 2012 High Plains trials. In the 2012 Virginia trial in the Rolling Plains, pod yields averaged 3881 kg/ha. Yields were greatest for AT-07V, the breeding line NC08070OLJC and Gregory (4864, 4524 and 4120 kg/ha, respectively) and lowest for Jupiter (2401 kg/ha). When comparing Runner and Virginia genotypes in the Rolling Plains, yields were slightly higher for AU-1101 and AT-07V (4303 and 3797 kg/ha, respectively) than Tamrun OL07, Flavor Runner 458 and McCloud (3593, 3580 and 3564 kg/ha, respectively). These results demonstrate that several genotypes with higher yield potential than the commercial standard cultivars Flavor Runner 458 and Jupiter are available. Utilization of these genotypes should be based on yield goal, irrigation capacity, and disease pressure. Furthermore, additional studies evaluating the performance of Virginia genotypes in the Rolling Plains are warranted.

BAYER EXCELLENCE IN EXTENSION AND EXTENSION TECHNIQUES

(68) Differences in Emergence, Yield, Quality and Net Returns of Peanut Market-types for Reduced Seeding Rates. J.E. WOODWARD*, Texas A&M AgriLIFE Extension Service and Texas Tech University, Lubbock, TX 79403; and T.A. BAUGHMAN, Institute of Agricultural Biosciences, Oklahoma State University, Ardmore, OK 73401.

Peanut producers are hesitant to reduce seeding rates, because of the increased risk of losses incurred by *Tomato spotted wilt tospovirus* (TSWV); however, seed cost is often the single highest expenditure. In Texas, production occurs in areas where TSWV is not an issue, thus the utilization of lower seeding rates could be used to maximize profitability. A total of twenty-one field studies (one Spanish, one Valencia, eight Virginia and eleven Runner) comparing seeding rates of one to six seed/ft were conducted in 2010 and 2012 in the High Plains and Rolling Plains. Similar results were observed among cultivars and market-types with regard to stand establishment, where higher seeding rates resulted in greater stands. However, emergence was negatively correlated with higher seeding rates (R2=0.9685; $P<0.001$). Yields were positively correlated with increased seeding rates (R2=0.8419; $P<0.001$). Grades were typically not different among seeding rates, except in one Runner trial in 2010, where grades for the one seed/ft rate were lower than all other seeding rates tested. Net returns above seed cost did not differ among seeding rates between three and six seed/ft. Results from these studies indicate that reduced seeding rates can be utilized in areas with a decreased risk of TSWV without negatively affecting yield or profitability. Additional studies evaluating seeding rates under varying environmental conditions are needed, as well as monitoring the development of diseases caused by fungal pathogens.

(69) Evaluation of Early Emergence and Early Season Applications of Fungicides in Managing Soilborne Diseases in Peanuts. P.M. CROSBY* Georgia Cooperative Extension Service, University of Georgia, Swainsboro, GA 30401 and R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

Management of soilborne diseases in peanuts has long been a major challenge for producers across Southeast Georgia. Management strategies vary based on variety, rotation, crop and environmental conditions and RX disease programs. Fungicide programs targeting the suppression of Southern stem rot are typically initiated 60 days after planting following the current recommendation of the University of Georgia. Extremely hot soil temperatures in May of 2010 and warmer average temperatures following planting required reexamination of the soilborne disease management strategy. Georgia 06-G peanuts were planted on May 24th, 2012 at the Southeast Georgia Research and Education Center (SEREC) in Midville, Georgia.

Using randomized, complete block design with 4 replications, a research protocol was established to evaluate soilborne fungicides applied at 30 and/or 45 days after planting verses the traditional 60 day window. Plots (with exception of Early Emergence applications) were sprayed using a tractor mounted sprayer that covered 4 rows. Plots were 2 rows wide by 40 feet long. At 60 and 90 days after planting all plots (except the untreated check) were sprayed with 18.5 ounces of Abound. One applications of Bravo completed the fungicide treatments. Peanuts were inverted on October 15th and roots and pods were evaluated to determine the number of hits per 80 foot of row. The center 2 rows were harvested, bagged and weighed on October 23rd.

(70) Survey of Growers in North Carolina with Respect to Integrated Pest Management Strategies in Peanut.

R. THAGARD*, D.L. JORDAN, R.L. BRANDENBURG, and B.B. SHEW, North Carolina Cooperative Extension Service, Raleigh, NC 27695; and D. SANDE and D. SETH CARLEY, Center for Integrated Pest Management, North Carolina State University, Raleigh, NC 27606.

A survey of 27 growers representing 12 counties in North Carolina was conducted during spring 2012, reflecting the 2011 peanut crop, to determine grower adoption and use of IPM principles, sources of pest management information, and specific management practices and inputs. Eighty-one percent of growers wanted additional information on IPM, with 63%, 52%, and 22% currently receiving information from print, direct contact, and computer/network sources, respectively. Seventy-eight percent of growers received information from the Cooperative Extension Service peanut production guide. Sixty-seven, 26, 37, and 67 percent of growers listed consultants, other growers, company representatives, and agribusiness dealers as sources of information, respectively. Using safer pesticides, pesticides less prone to develop resistance, sprayer calibration, applying correct pesticide rates, applying pesticides only if needed, keeping records, and training workers were listed as components of pest management by 89, 78, 96, 96, 96, 93, and 89 percent of growers, respectively. Twenty-two, 79, 26, and 78 percent of growers soil sampled for nematodes, monitored for leaf spot, used the Sclerotinia blight advisory, and monitored for other soil borne diseases, respectively. Although growers scouted for insects (74 to 85%) and 63% used action thresholds, only 18% used the southern corn rootworm advisory while only 22% used the tomato spotted wilt index. The percentage of growers scouting the previous fall for weeds and scouting in season was 48% and 96%, respectively. Ninety-six percent of growers rotated peanut with other crops, with cotton, corn, and tobacco included by 74, 70, and 26 percent of growers, respectively. Only 11% included soybean in their peanut rotations. Twenty-two percent irrigated peanut. The varieties Bailey, CHAMPS, and Perry were the top three varieties planted in 2011. Tillage operations including disk, chisel plow, moldboard plow, rip and bed, bed, and strip till were performed by 76, 20, 8, 37, 36, and 19 percent of growers, respectively. Important weeds in peanut, listed in order of mention by growers, included sicklepod, morningglory, common lambsquarters, Palmer amaranth, common ragweed, common cocklebur, nutsedge, broadleaf signalgrass, and fall panicum. *S*-metolachlor (Dual Magnum) and flumioxazin (Valor SX) were the most popular residual herbicides applied at planting (74 and 59% of growers, respectively). The most popular postemergence herbicides included 2,4-DB, acifluorfen plus bentazon, clethodim, and imazapic. Chlorothalonil, prothioconazole plus tebuconazole, and pyraclostrobin were the top three fungicides used to manage leaf spot and stem rot disease. Aldicarb was applied in the seed furrow by 59% of growers with phorate and acephate applied about equally by the balance of growers. Prothioconazole was applied in the seed furrow by 37% of growers while only 11% of growers fumigated with metam sodium. Thirty-seven percent of growers applied chlorpyrifos to control southern corn rootworm. Seventy-five percent of growers inoculated peanut with *Bradyrhizobia* while 19% applied prohexadione calcium to manage peanut vine growth.

(71) Changing Demographics of Peanut Production in Northeastern North Carolina. A.J. WHITEHEAD, JR.*, C. ELLISON, D.L. JORDAN, B.B. SHEW, and R.L. BRANDENBURG, North Carolina Cooperative Extension Service, Raleigh, NC 27695.

During the 1990speanut production in Halifax and Northampton counties in North Carolina approached 30,000 acres each approaching 50% of the state's production. While value of peanut in the previous quota system prior to 2003, coupled with relatively low commodity prices during that period, made peanut attractive. However, the relatively high amount of quota in these counties and in some portions of the county where soils were not ideal for peanut often resulted in planting peanut on more acres to achieve quota production. In some cases this resulted in less effective rotations (shorter rotations) and planting peanut on lower-yielding (primary soils that were more prone to digging losses with poorer drainage. The situation was compounded by the presence of erodible areas, especially in Halifax county, and challenges with complying with NRCS requirements and maintaining yield. Ultimately, this situation resulted in stagnant and in some cases declining yields, creating a less competitive environment for some growers. When farm program changes in 2003, peanut acreage in these counties decreased substantially. Although during the first few years after the program change farm income was most likely lower due to less peanut production and depressed grain and cotton prices, by the latter portion of the decade grain prices strengthened, resulting in alternatives to peanut in many sections of these counties that are more effective. Although peanut acreage decreased over the past decade, average yield per acre during 2009-2012 in these two counties was 3,830 pounds/acre; average yield was 2,640 pounds/acre from 1999-2002. Improved varieties, longer rotations, production on soils more conducive for peanut, advances in crop protection products, and management contributed to the higher yields. During 1999-2002, concerns in this region of the state included potential loss of the peanut program and high support prices, management of CBR, the impact of short rotations on pest management costs and yield, the need for varieties with better and broader pest resistance, more effective control options for Sclerotinia blight, and issues associated with control of southern corn rootworm. In 2013, primary concerns include consistency of contract prices and the amount of production associated with contracts, the need to consistently produce 4,000 pounds per acre to make peanut attractive compared to other crops as a result of low prices for peanut and high input costs, loss of aldicarb and inconsistent thrips control by other options, presence of resistant weeds such as Palmer amaranth and the challenge in controlling these weeds, continued expense of controlling Sclerotinia blight even though effective options are available, and the high price of land rent.

(72) <u>Impact of In-furrow and Topical Prothioconazole Treatments on Severity of Cylindrocladium Black Rot and White Mold Diseases of Peanut</u>. W.G. TYSON*, University of Georgia Cooperative Extension, Effingham County, Springfield, GA 31329, and R.C. KEMERAIT, University of Georgia, Department of Plant Pathology, 4604 Research Way, Tifton, GA 31794.

The impact of soilborne diseases on peanut production in Effingham County has been a problem that needs to be addressed with additional on-farm research. Peanut acreage has increased in the county over the past several years and the problems associated with peanut production have become more widespread, due in part to shorter rotations between peanut crops. The producers' current best line of defense to combat these problems involves selection of more-resistant varieties, judicious use of fungicides, and soil fumigation with metam sodium to reduce severity of Cylindrocladium black rot (CBR). In on-farm research demonstrations (2008-2012), the effectiveness of prothioconazole (Proline) applied in-furrow at planting and over-the-top after emergence was evaluated for the management of peanut diseases. Provost (prothioconazole + tebuconazole) and Artisan (flutolanil + propiconazole)/chlorothalonil were evaluated with Proline (prothioconazole) to assess the best program for overall disease protection. Data collected in this study included severity of leaf spot diseases, White mold, and Cylindrocladium black rot. As an in-furrow fungicide with known activity against Cylindrocladium black rot and over-the-top activity against white mold may also improve seedling health as well, it was hoped that this practice would not only improve control of CBR and White mold, but possibly seedling disease and TSWV as well. Because use of prothioconazole is a relatively new practice for our peanut growers, there is a serious lack of data on this type of application in the southeast that has been collected in large-plot, on-farm trials. The data will exhibit the effectiveness of prothioconazole on improving control of CBR and White mold soilborne diseases that negatively impact yield and quality. This data will play an important role in recommendations for future use of prothioconazole in Effingham County and the Southeast.

(73) <u>Extension Peanut Educational Efforts.</u> P. EDWARDS*, Cooperative Extension, University of Georgia, Ocilla, GA 31774.

Recent Extension educational efforts in Irwin County, Georgia have addressed numerous production issues. These efforts are accomplished through numerous varied techniques including on-farm demonstrations, production meetings, maturity clinics and other methods. Irwin County, Georgia has a long history of high yields and quality peanuts. Over the past five years annual peanut acreage has averaged around 20,000 acres. Increasing profitability and quality is a constant goal. Efforts to educate farmers through on- farm trials have primarily included variety trials. However studies have been completed comparing twin and single row configurations, seed spacing trials, burrower bug studies, fungicide comparisons and other trials. Farmers seek out the help of Extension on numerous subjects like variety selection, production issues, fungicide programs, maturity determination, crop budgeting, pesticide usage, and irrigation scheduling among many others. The county agent's objective is to meet farmer needs through many various methods. Many of the day to day educational efforts are still achieved through one on one contact either by phone, office or farm visits. Information is still presented to farmers via newspaper articles. Newer methods are being used to reach farmers with the broad use of smart phone such as text messages and email newsletters farmers can pull up on their phones. The email newsletters reach 340 farmers, agribusinesses and area agents. Currently 150 farmers and agribusinesses are sent information via text messages. Other media, like television, radio and video, are also utilized. Methods of educating farmers continue to change and the combination of traditional methods and use of our new technologies presently are still most effective way to for Extension to educate farmers.

POSTERS

(76) <u>Evaluation of Burrower Bug (*Pangaeus bilineatus*) Incidence and Damage Compared to Subsequent Aflatoxin Contamination in Peanuts (*Arachis hypogaea*) in the Southeastern United States.</u> R. PREVATT, III*, K.L. BOWEN, and D.W. HELD, Entomology and Plant Pathology, Auburn University, Auburn, AL 36849; and J.A. HOWE Agronomy and Soils Department, Auburn University, Auburn, AL 36849.

Peanuts are a staple crop of the southeastern United States. Although a minor pest of peanuts, burrower bug damage to seed has been linked to increased aflatoxin contamination in peanuts in South Carolina. Studies conducted in South Carolina indicate that burrower bugs are found more often in peanuts strip-tilled into killed wheat than rye. In 2011 and 2012, burrower bug counts were made weekly in peanut over an 11-wk period at the Wiregrass Research and Extension Center in South Alabama. Effects of strip-tilling peanuts into terminated rye, wheat, or oats, as well as a conventional tillage with no winter cover crop, on burrower bug damage levels and aflatoxin content were also assessed. We evaluated four planting dates, at 2-wk intervals, to determine their influence on burrower bug damage and aflatoxin content. Peanuts were harvested at maturity and shelled. After eliminating moldy and undersized kernels (overall size < 30% of average), one hundred kernels were counted from each shelled sample, and burrower bug damage on individual kernels assessed. Another 200 g of each shelled sample was ground and assayed for aflatoxins. No difference in the number of burrower bugs collected between years or between the conservation-tilled plots were found, and the number of burrower bugs in these plots was generally higher (4-7 bugs collected) than those found in the conventionally-tilled plots (3-4 bugs collected). No differences in aflatoxin content were found between years; there was also no overall difference between cover crops. Aflatoxin contents were very low during both years; however, we did find higher aflatoxin concentrations in burrower bug-damaged kernels (1.89 ppb) compared to non-damaged kernels (1.17 ppb) across the years, and when compared by cover crop, there was a difference in the aflatoxin content of damaged kernels and the aflatoxin content of non-damaged kernels between years.

(77) <u>Correlations Between Leafspot Resistance, Sclerotinia Resistance, Yield, Total Sound Mature Kernels, and O/L Values in a Segregating F_2 Derived Peanut Population.</u> M.R. BARING* and J.N. WILSON, Soil and Crop Sciences Department, Texas AgriLife Research, College Station, TX 77843-2474; C.E. SIMPSON and J.M. CASON, Soil and Crop Sciences Department, Texas AgriLife Research Center, Stephenville, TX 76401.

A cross was made between peanut cv. Tamrun OL07 and breeding line Tx964117 in 2007 at College Station, Texas. Tamrun OL07 is a high yielding, high oleic, runner-type peanut with moderate resistance to *Tomato spotted wilt virus* and *Sclerotinia*. Line Tx964117 has a high level of resistance to early and late leafspot, but has average yield potential, normal oleic fatty acid chemistry and low levels of resistance to either TSWV or *Sclerotinia*. Ninety individual F_2 seeds from a single F_1 plant were tested for O/L and increased as individual lines to the $F_{2:4}$ generation. These ninety lines were yield tested in replicated trials at three locations across Texas in 2010 as $F_{2:5}$ progeny and again in 2012 as $F_{2:6}$ progeny. The study was conducted in an attempt to determine whether there were any correlations between leafspot resistance and yield, grade, O/L values, or *Sclerotinia* resistance in this population. Results indicate that there were correlations, both positive and negative between the traits measured in this study. There was a positive correlation between resistance to leafspot and resistance to Sclerotinia blight indicating that resistance to the two diseases could be selected for simultaneously. There was no correlation between leafspot resistance and yield or leafspot resistance and O/L indicating that there was no linkage between low yield and leafspot resistance or low O/L values and leafspot resistance for this cross. There was a negative correlation between percent Total Sound Mature Kernels (TSMK) and leafspot resistance indicating that there may be a strong linkage between leafspot resistance and the low grading leafspot resistant parent used in this cross. Several lines were identified with various combinations of the measured traits such as; high oleic with good leafspot ratings, or high yielding with good leafspot ratings, or high yielding with poor leafspot ratings etcetera. Only one breeding line out of the original ninety was determined to be high oleic, and performed equal to Tamrun OL07 for yield and value/ha under *Sclerotinia* incidence as well as performing equal to Tx964117 for leafspot ratings.

(79) <u>The Variation in Virulence of *Sclerotium rolfsii* Isolates from Florida Peanut Using a Greenhouse Assay.</u> K. KHATRI*, and N.S. DUFAULT, Department of Plant Pathology, The University of Florida, Gainesville, FL 32611-0300.

Stem rot, caused by *Sclerotium rolfsii*, is a devastating disease of peanuts that can cause substantial yield losses as high as 80%. The primary objective of this study was to assess the variation in virulence of isolates of *S. rolfsii* from different regions in Florida. Thirteen isolates of *S. rolfsii* were collected from different peanut fields throughout Florida during the 2012 growing season. These isolates were inoculated 45 days after planting onto the peanut cultivars Georgia 06-G and a resistant line from the University of Florida in the greenhouse. Visual disease assessments were done 5 days after inoculation and were assessed on 3 day interval for a total of 8 assessments. It was hypothesized that these isolates vary in their ability to and the magnitude at which they cause disease on peanuts. This study is the first in a series of experiments designed to assess the diversity of *S. rolfsii* in Florida with future studies including a field virulence trial, mycelia compatibility group assay, and a fungicide sensitivity test. Ultimately, further studies will be done to survey the diversity of this pathogen throughout the entire southeastern peanut region.

(80) <u>Influence of Seeding Rate and Planting Date on Diseases and Yield of Three Peanut Cultivars in an Irrigated Production System.</u> H.L. CAMPBELL*, A.K. HAGAN, and K.L. BOWEN, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849; and L. WELLS, Wiregrass Research and Extension Center, Headland, AL 36345.

In 2010, 2011, and 2012 a study was conducted at the Wiregrass Research and Extension Center in Headland, AL to evaluate the influence of seeding rate and planting date on three peanut cultivars. A split-split plot design was used with planting date as whole plot, peanut cultivar as the split plot, and seeding rate as the split-split plot. Florida 07, Georgia 06G, and Georgia Green peanut cultivars were evaluated each year and the seeding rates were 2, 3, 4, and 6 seed/row ft. Planting dates were in mid-April and in mid-May. Whole plots were randomized in four complete blocks with 4 replications. Each plot consisted of four 30-ft rows spaced 36-in apart. Plots were irrigated as needed. Disease evaluations were made for *Tomato spotted wilt virus* (TSWV), early and late leaf spot, and stem rot in addition to yield in each plot. Stand counts were made from the second row of each plot at 14 days after planting and TSWV ratings were made 6 weeks after planting and again just prior to inversion. Leaf spot intensity was assessed just prior to inversion and stem rot incidence was determined immediately after plot inversion. In 2010, planting date had a significant impact on stand count and leaf spot. Stand counts were higher for the April than May planted peanuts. Leaf spot ratings were higher among all peanut cultivars and seeding rates planted in May planting date compared with those planted in April. Although TSWV incidence was low, the impact of planting date differed among the three peanut cultivars. Higher TSWV counts were recorded for Georgia Green for the April compared with the May planting date while TSWV incidence was equally low for Florida 07 and Georgia 06G at both planting dates. Planting date significantly impacted the yield of Florida 07 but not Georgia 06G or Georgia Green with yield of Florida 07 higher with the April planting date. TSWV was impacted by seeding rate with incidence higher at 3, 4, and 6 seed per foot of row compared to 2 foot of row. While leaf spot intensity, stem rot incidence and stand density increased with increasing seeding rates, yields were similar across seeding rates. In 2011, impact of planting date on TSWV incidence differed significantly among cultivars. Incidence was equally low for Florida 07 and Georgia 06G at both planting dates but higher TSWV counts were recorded for Georgia Green at the May planting date. Leaf spot disease ratings were higher with the May planting date for Georgia 06G and Georgia Green but not for Florida 07. Georgia Green

had higher leaf spot ratings than did Florida 07 and Georgia-06G at the May date but not the April date. Stem rot incidence was lower for Florida 07 than Georgia-06G or Georgia Green. Higher yields were reported for May-compared with the April planted peanuts. Among the cultivars, Florida 07 and Georgia-06G had significantly higher yields compared with Georgia Green. Seeding rate had no effect on TSWV or stem rot incidence as well as yield but leaf spot intensity was significantly impacted by seeding rate at the May but not at the April planting date. Seeding rate had no influence on leaf spot intensity on Florida 07 or Georgia-06G but was lower on Georgia Green at 2 seed per foot compared to the higher seeding rates. In 2012, TSWV incidence was not influenced by planting date however higher disease levels were recorded for Florida 07 and Georgia Green than Georgia 06G. Leaf spot intensity was higher on all cultivars with May-compared with April planting. Stem rot incidence was not impacted by planting date but did differ between cultivars where disease indices were higher for Georgia Green than Florida 07 and Georgia-06G. Yield was not influenced by planting date, but Georgia Green yielded less than Florida 07 and Georgia-06G. Seeding rate had little influence on leaf spot intensity as well as TSWV and stem rot incidence. Yield was impacted by seeding rate with lower yields recorded at 2 compared with 4 seed per foot. While planting date had some impact on disease and yield, seeding rate was not shown to have a significant impact on diseases or yield in an irrigated production system when compared over all three years.

(82) Agronomic Behavior of Bunch Growth Habit Peanut Breeding Lines. S.SANCHEZ-DOMINGUEZ*, Departamento de Fitotecnia, Universidad Autónoma Chapingo, Chapingo Méx. C.P.56230; T.G. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, USA; and A. CHONG E. Departamento de Fitotecnia, UACH, Chapingo Méx.. 56230.

Peanut is an important legume crop in southern Mexico. However average pod yield there is poor (1360 kg/ha) due to cultivation of peanut landraces under rainfed conditions by peasant farmers. In 2002 the best peanut varieties, selected during 1994-2000 period, were crossed at N.C. State Univ. with other virginia-type peanut varieties like Perry. Some segregating F_2 populations were received and increased in Mexico in 2003, plant selections made and progenies evaluated on campus from 2004 to 2006. In those trials, two growth habits were observed. From 2007 to 2009 two trials per year were conducted in different localities of State of Morelos. Results are reported for thirteen peanut breeding lines from experiments carried out during 2011 and 2012 in Cuauchichinola, Morelos, Mexico. Data were collected from 3.0 x 0.80 m plots.. Although peanut pod yield and another yield components were recorded, only peanut pod yield and pod number are presented for 2011 and 2012 trials. In 2011, 12-06 Ch, Rojo de Cuauchi, and N-C-17 UACH averaged 16.0, 11.5, and 11.1 pods per plant, respectively. These three cultivars ranked in the same order when ranked according to pod yield. In 2012 due to the experiment was conducted in a very rich sandy-clay soil, the average pod yield of the experiment was 2201 kg/ha. The highest yielding cultivar, 8-06CH, yielded 2695 kg/ha. Ter-Sal, a Spanish peanut type, had the poorest yield with 1858 kg/ha. While differences were not statistically significant, the pod yields of other cultivars were numerically superior to the national average peanut yield. It is clear that genotype per environment interaction exists. This is because in different years the best variety or breeding line varied.

(83) Response of Peanut to Interactions of Gypsum and Chlorpyrifos. P.D. JOHNSON* and D.L. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; and R.L. BRANDENBURG and B.M. ROYALS, Department of Entomology, North Carolina State University, Raleigh, NC 27695.

Gypsum and chlorpyrifos often are applied in late June or early July to Virginia market type peanut to ensure proper kernel development and control southern corn rootworm, respectively. Concern about interactions of these materials has been expressed due to several instances of poor performance by chlorpyrifos. In addition to presence of gypsum (calcium sulfate) in the pegging zone and zone where control of southern corn rootworm is important, soil pH often decreases for several weeks after application of gypsum. The role of pH on performance of chlorpyrifos has not been evaluated for Virginia market type peanut. Research was conducted from 2006-2010 to determine if peanut yield response to application of chlorpyrifos for control of southern corn rootworm was affected by gypsum rate. Treatments included no chlorpyrifos or granular chlorpyrifos at the manufacturer's suggested use rate either preceding or following application of gypsum (85% calcium sulfate) at 0, 600, 1200, 1800, or 2400 pounds/acre. The manufacturer’s recommended rate for this product is 600 pounds/acre. There was not interaction of gypsum rate and chlorpyrifos rate for scarring associated with southern corn rootworm feeding or pod yield. While pod yield was not affected by gypsum rate, yield increased 219 pounds/acre when chlropyrifos was applied. Although not recorded in all experiments, pod scarring decreased by 2% when chlorpyrifos was applied (11% vs. 9%). These data suggest that growers can apply both gypsum and chlorpyrifos without concern that gypsum will adversely affect performance of chlorpyrifos.

(84) Response of the Cultivars CHAMPS and Perry to Planting and Digging Dates in North Carolina. P.D. JOHNSON and D.L. JORDAN*, North Carolina State University, Raleigh, NC 27695; and T. CORBETT, North Carolina Department of Agriculture and Consumer Services, Lewiston-Woodville, NC 27849.

Research was conducted from 2009-2012 in North Carolina to compare peanut yield and market grade characteristics of the Virginia market type cultivar CHAMPS and Perry planted approximately May 5, May 25,and June 8 when dug approximately September 5 and 25 and October 5 and 20. When dug at optimum maturity, as reflected in the highest yield among the four digging dates, yield and market grades generally varied little when peanut was planted in early or late May. In 3 of 4 years (2009-2011) peanut yield was lower when peanut was planted June 8 and dug October 20 compared with earlier plantings and digging at optimum maturity. However, in 2012 yield was highest when peanut was planted in early June and dug in late October compared with the other planting dates. While surprising, these results most likely can be explained by weather conditions during the growing season in 2012 relative to other years. Hot and dry conditions were noted during much of 2012 in June and early July compared with greater rainfall during this period of time during 2009-2011. This weather pattern during 2012 most likely reduced the number of flowers produced when peanut was planted earlier in the season compared with the later-planted peanut. Peanut planted during early June was in the vegetative stage during the hot and dry conditions of June and early July. In mid-July rainfall and temperature patterns changed significantly in favor of both vegetative and reproductive growth and remained this way for most of the remainder of the growing season. While results from this experiment generally show that yield of peanut in the Virginia-Carolina region are optimal when planting in May, in some instances weather patterns may favor later-planted peanut. These results also indicted that exhibiting patience in the fall in terms of digging can result in higher peanut yields.

(85) <u>Response of the Cultivar Gregory to Interactions of Disease Management and Digging Date.</u> D.L. JORDAN*, B.B. SHEW, and P.D. JOHNSON, North Carolina State University, Raleigh, NC 27695.

Digging date can have a major impact on yield and market grade characteristics of peanut. Several factors including soil conditions at digging, heat unit accumulation, and disease can influence peanut response to digging date. Research was conducted in North Carolina at one location from 2003 to 2012 (17 experiments total) to determine the optimum digging date of the Virginia market type peanut cultivar Gregory when dug on five dates beginning in mid-September through mid-October. Peanut pod yield, percentages of extra large kernels (%ELK) and total sound mature kernels (%TSMK), days from seedling emergence to digging, and heat unit accumulation (DD_{56}) were determined. The interaction of experiment by digging date was significant for all parameters. However, pod yield was influenced most by this interaction compared with market grade characteristics. When pooled over all 17 experiments, the optimum digging date for pod yield occurred 138 days after peanut emergence (DAE) corresponding to 2798 heat units (DD_{56} calculation). The greatest increase in yield was noted when peanut was dug 128 DAE compared with 122 DAE (16% increase in yield as digging was delayed) while yield at 128, 138, and 145 DAE varied by less than 3%. Digging 153 DAE compared with 145 DAE resulted in a yield decrease of 13%. Percentages of ELK and TSMK increased as digging was delayed regardless of digging date. In a separate experiment conducted at the same location from 2005 through 2012 (8 experiments), the cultivar Gregory was exposed to three fungicide regimes including no fungicide for leaf spot and stem rot, two early season sprays for these diseases, and five sprays throughout the season. Beginning in late September, peanut was dug at three intervals spaced 7-10 days apart. Percent canopy defoliation, pod yield, and market grade characteristics were determined. In 2 of 8 experiments, disease was relatively low regardless of fungicide regime and therefore data from these experiments were not included in the analysis. Percent canopy defoliation and pod yield was poorly correlated (R2 = -0.27, $p \leq 0.0001$) most likely due to interactions of increased maturity when digging was delayed and less canopy defoliation resulting in pod shed and lower yield when peanut was dug earlier. The interaction of digging date and fungicide regime was significant for canopy defoliation, pod yield, and %ELK. In absence of fungicides, defoliation increased from 22% to 38% and 38% to 57% as digging was delayed from late September to early October and early October to mid-October, respectively. While two early season sprays decreased canopy defoliation compared with non-treated peanut, canopy defoliation increased from 9 to 15% and 15 to 41% at these respective digging dates. Four percent or less canopy defoliation was noted when peanut was treated with five fungicide sprays. When disease was poorly controlled, delaying digging to mid-October resulted in a decrease in yield compared with early digging. When moderate disease control was achieved, there was no difference in response to digging date. When a successful spray program was implemented which essentially eliminated canopy defoliation, delaying digging from late-September to early or late October increased yield. The higher yields at the last two digging dates combined with almost complete disease control exceeded that of the other two fungicide regimes irrespective of digging date. Results for these two studies emphasize the value of timely digging under disease-free conditions. These results also suggest that under conditions where disease is poorly controlled, peanut yield is often similar when peanut is dug earlier than typically expected based on mesocarp color determination, most likely because of pod shed in presence of disease. Protecting peanut from disease and delaying digging until optimum pod maturation occurs continues to be effective in obtaining the highest pod yield.

(86) <u>Weed Management Trials in North Carolina with Promising New Herbicide Options.</u> D.L. JORDAN* and P.D. JOHNSON, North Carolina State University, Raleigh, NC 27695.

Weeds continue to cause yield reductions of peanut through interference and loses during digging and vine inversion. Presence to ALS-resistant weeds, primarily Palmer amaranth, has increased challenges in controlling weeds in peanut and the need to find new herbicides to complement herbicides currently used routinely in this crop. Research was conducted in North Carolina during 2011 and 2012 to compare weed control with acetachlor (Warrant), pyroxasulfone plus flumioxazin (Fierce), pyroxasulfone (Zidua), and pyraflufen ethyl (ET) with commercial standards in small-plot trials. Experiments with acetachlor were conducted in cooperation with researchers at the University of Georgia. Peanut tolerance to acetachlor and pyroxasulfone appeared to be adequate when applied at planting. Although pyroxasulfone plus flumioxazin injured peanut significantly within the first few weeks after application, peanut recovered quickly. Pyraflufen ethyl injured peanut considerably within the first week after application, and although peanut recovered, visible injury in the form of stunted plants persisted into the season. In 2011, acetachlor alone was more effective than *S*-metolachlor or pendimethalin applied preemergence (PRE) in controlling Palmer amaranth. Also, when applied in mixture with paraquat plus bentazon or lactofen control was slightly better than with the other mixtures. In 2012, Palmer amaranth was controlled more effectively by *S*-metolachlor than by acetachlor or pendimethalin. Rainfall was very different within the first few weeks after planting when comparing years. In 2011, peanut had to be irrigated within 5 days after planting to ensure germination and stand establishment. In 2012, a rainfall event of 4 inches occurred the night after PRE applications. Common ragweed, entireleaf morningglory, Palmer amaranth, pitted morningglory, and smooth pigweed control by pyroxasulfone plus flumioxazin was similar to that with flumioxazin alone. In one experiment, pyraflufen ethyl reduced injury caused by paraquat but did not affect injury by imazapic compared with with these herbicides alone. No difference in injury by these herbicide treatments was observed at a second location. Pyraflufen ethyl did not affect control of Texas panicum or common ragweed by paraquat or imazapic, Palmer amaranth or entireleaf morningglory control by paraquat, or broadleaf signalgrass and Palmer amaranth control by imazapic.

(87) Annual and Perennial Peanut Forage. W. F. ANDERSON*, C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793; A. CULBREATH, and J. BERNARD, University of Georgia, Tifton, GA 31793.

Peanut hay can be a valuable feed for livestock in the Southeast. Perennial peanut (*Arachis glabrata* Benth.) cultivars have been developed and are grown on limited acres in Georgia and Florida. The cost and time for establishment of this vegetatively propagated crop can be prohibitive to some growers. As an alternative, annual peanut hay may be a more viable option. However, the residual vines that are harvested from the peanut crop have undesirable characteristics such as high ash content from attached soil, a large proportion of stems, and the use of fungicides that are not cleared for livestock consumption. However, new cultivars that have high disease and pest resistance may have utility as forage if harvested prior to digging. We will look at the advantages and disadvantages of the annual and perennial peanut as forage and the where genetic and management improvements are needed. Data from recent studies will be presented.

(88) Advances in Peanut Improvement in West Africa. B-R- NTARE*, F-WALIYAR, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) BP 320, Bamako, Mali

Peanut (*Arachis hypogaea* L.), is an important legume and a major source of calories and income for smallholder farmers in West Africa. ICRISAT and partners have developed a range of varieties and crop management technologies to enhance peanut productivity and quality. Among these are short-duration varieties to escape from end-of- season drought, high-yielding dual-purpose varieties (fodder/grain and confectionary types) of various maturity groups (early, medium and late) with resistance/tolerance to major peanut diseases; including rosette virus, foliar diseases, and aflatoxin contamination. From regional trials conducted over the years, recommended varieties have increased from 13 to 47 and more than 20 of these released in the major peanut growing countries of West Africa. Through a network of farmer participatory variety selection trials and seed production schemes, improved varieties are being adopted and grown by smallholder farmers in Ghana, Mali, Niger, Nigeria and Senegal. With the largest peanut germplasm collection and use of genomic tools to enhance breeding efficiency at ICRISAT, new breeding lines with multiple attributes are being developed.

(90) Is β-Carotene-Rich Orange-Fleshed Sweet Potato (OFSP) an Excellent Source of Pro-vitamin A. M. JOSEPH, A. KAAYA, The School of Food Technology, Nutrition and Bio-engineering. Makerere University, Kampala, Uganda and N. PUPPALA*, Agricultural Science Center at Clovis, New Mexico State University, Clovis, New Mexico, USA, 88101.

Although peanuts are an excellent source of nutrients such as fats, and proteins, they are inadequate in one of the essential vitamins, vitamin A which is essential in the diet for maintaining epithelial tissues. Lack of Vitamin A leads to a condition called Vitamin A deficiency (VAD). We evaluated Pro-vitamin A carotenoids amongst the different samples of fortified peanut butter [sample A (0% OFSP flour), sample B (5%OFSP flour), sample C (10%OFSP flour) and sample D (15% OFSP flour)] was determined according to Harvestplus (2004) method. All samples showed some level of beta-carotene which was increasing with increasing levels of OFSP flour used to fortify the peanut butter (2.44±0.116 μg/g of peanut butter, 7.95±1.115μg/g of peanut butter, 10.41±0.368μg/g of peanut butter, and 13.88±0.007μg/g of peanut butter respectively). During time of storage, it was observed that more detrimental effects occurred in sample A since it had less amount of beta-carotene, high values of peroxides were noted and highly reduced levels of beta-carotene. Sample C and D did not register significant detrimental effects in the fat quality as it is stated that the beta-carotene has antioxidative effect and also there was some beta-carotene that was retained in the sample at the end of the five months of storage which can provide the requirements for children below age of 5 years. So it would be best to use high levels of OFSP flour to fortify peanut butter to be stored to the period of five months.

(91) Genotypic Diversity of Traits Related to Nitrogen Fixation in Valencia Peanut Germplasm. S. MAHAKOSEE, S. JOGLOY, N. VORASOOT and A. PATANOTHAI, Department of Plant Science and Agricultural Resources, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand. N. PUPPALA*, Agricultural Science Center at Clovis, New Mexico State University, Clovis, New Mexico, USA, 88101

The objective of this investigation was to understand whether Valencia peanut accessions have sufficient variations in traits related to nitrogen fixation (biomass production and nodule dry weight). One hundred and twenty five accessions of Valencia peanut from New Mexico State University and International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT) and three peanut varieties commercially available in Thailand were evaluated in a randomized complete block design with three replications for two years during February to June 2011 and 2012. There were significant variations among peanut accessions for nodule dry weight, biomass production, pod yield and seed size. PI475925, PI493501, Valencia – C, PI501269, PI493518, PI501985, PI476089, Rossita, NM 052565 and PI576604 had high nodule dry weight in 2010, whereas PI493660, PI502023, PI576604, PI476078, PI493566, PI493415, ICG 14710, ICG 111444 and PI501293 had high nodule dry weight in 2011. The correlation coefficients between biomass and pod yield were positive and significant in both years ($r = 0.50^{**}$ and $r = 0.32^{**}$ respectively). However, the correlation coefficients between nodule dry weight and pod yield were not significant. The correlation coefficients between nodule dry weight and biomass production with seed size were also not significant in both years. Low correlations indicate that selection for high nodulation of peanut genotypes to improve pod yield may not have any effect.

(92) <u>Various Methods to Break Peanut Seed Dormancy Soon After Harvest.</u> M.W. GOMILLION*, B. L. TILLMAN, and G. PERSON, Agronomy Department, The University of Florida NFREC, Marianna, FL 32446.

Peanut seeds go through a period of dormancy soon after harvest. Planting a winter nursery requires planting soon after harvest and dormancy can reduce plant stand. This study was conducted to determine if dormancy could be broken by using dry heat or ethephon treatments applied directly to the seeds. In August 2012, we tested field emergence of three cultivars using freshly harvested seed which had been dried to 10% moisture. Treatments were 1) control, 2) dry heat 38ºC for 10 days, 3) ethephon-applied in lab at 1 oz., 4) ethephon at 1 oz. applied in furrow, and 5) ethephon (1 oz.) + Abound applied in furrow at planting in a field emergence test. Analysis of the 14 day emergence count showed that all treatments emerged better than the control indicating that that all treatments succeeded in breaking dormancy. In a second test, a fresh supply of Florida-07 was harvested twice within a week during October 2012. Both seed sources were dried to 10% moisture and placed into a germinator for germination tests at day 20/27, day 31/38, & day 46/53. Treatments were 1) control, 2) dried, and ethephon-applied at the 1 oz., 2 oz., and 3 oz. rates. Seed germination within the rag-doll tests showed that dry heat and ethephon treatments performed similarly and better than the control. Ethephon treatments improved germination in seeds less than 30 days old, but became less significant in older seeds. In all three rag-doll germination tests, the dry heat treatment performed better than any other treatment. However, in the field emergence tests, the ethephon applied in the furrow, performed the best. For practical reasons ethephon applied in-furrow would seem to be the easiest way to break dormancy when dealing with treating a large volume of peanut seed.

(93) <u>Use of EST-SSR Loci Flanking Regions for Phylogenetic Analysis of Genus *Arachis*.</u> G.H. HE*, Tuskegee University, Tuskegee, AL; N.A. BARKLEY, USDA-ARS, Griffin, GA; Y.L. ZHAO, Tuskegee University, Tuskegee, AL; M. YUAN, Shandong Peanut Research Institute, Qingdao, China; and C.S. PRAKASH, Tuskegee University, Tuskegee, AL.

All wild peanut collections in the genus *Arachis* were assigned to nine taxonomy sections on the bases of cross-compatibility and morphologic character clustering. These nine sections consist of 80 species from the most ancient to the most advanced, providing a diverse genetic resource for phylogenetic study in *Arachis*. However, limited information on phylogenetic relationships among these species from all nine sections at the molecular level is available. In this study, seven gene-based markers (EST-SSRs) were employed to assess divergence and genome affinities between 17 *Arachis* species drawn from nine taxonomic sections, to infer phylogenetic relationships and elucidate the genome evolution in the genus *Arachis* by comparative analysis of gene sequence data. Sequences of seven gene homologs showed that variations within SSR and flanking region provide informative data on reconstructing the phylogeny of *Arachis*. The analysis revealed the concatenated gene tree was generally congruent with the *Arachis* species tree. The section *Arachis* formed a single group in which *A. glandulifera* with DD genome and *A. ipaensis* with BB genome clustered together forming one subgroup, while *A. duanensis*, *A. diogoi*, and *A. stenosperma* with AA genome were clustered into another subgroup. Species from other sections were grouped coincidently with cross-compatibility, suggesting their genome affinities.

(94) <u>Massively Parallel Transcriptome Sequencing of Eighteen Cultivated and Wild Peanuts for SNP Discovery.</u> R. CHOPRA, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; G. BUROW, USDA-ARS-CSRL, Lubbock, TX 79415; A. FARMER, National Center for Genome Resources, Santa Fe, NM 87505; J. MUDGE, National Center for Genome Resources, Santa Fe, NM 87505; C. E. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX 76401; T. A. WILKINS, Department of Plant and Soil Science, Tech University, Lubbock, TX 79409; and M. D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409.

The complex genome of peanut is not well understood despite the growing concerns of crop productivity masked by biotic and abiotic stress. A good assessment of sequence variation can help in understanding the molecular genetics and improve the efforts in breeding purposes. In this study, we used a diverse panel of 18 *Arachis* accessions representing seven *Arachis hypogaea* botanical types, A- genome, B- genome, K- genome, synthetic amphidiploid and tetraploid wild species to sequence the whole transcriptome for polymorphism detection and genotyping. Leaf, root and pod (yellow, brown and black stages) samples from 9 different plants per genotype were used for RNA isolation to mask the differences in gene expression. Sequencing of these 18 genotypes was carried out using an Illumina Hiseq 2000 using 2X50bp chemistry. Averages of 20 million raw reads from each diploid genotype and 25-30 million per tetraploid were obtained from sequencing. This comprehensive sequencing data for wild and cultivated peanut transcriptomes is one of the largest peanut sequence collections available to date and represents a notable sample of species diversity. This data will serve as a valuable resource for creating a catalog of allelic variants of peanut genes and it will also aid in future studies of population genetics, marker-assisted breeding, and gene identification aimed at developing better varieties.

(95) <u>Towards Achieving Dense Genetic Maps and Detecting Disease Resistance QTLs Using a Recombinant Inbred Line (RIL) Population in Peanut (*Arachis hypogaea* L.).</u> M. PANDEY, L. QIAO*, H. WANG, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA; M. PANDEY, R. VARSHNEY, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; S. FENG, Qiongzhou University, Sanya, China; C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA; and B.Z. GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Dense genetic maps constructed using recombinant inbred lines (RILs) have several applications in genetic and breeding approaches including their use in identification of consistent QTLs using multi-environment phenotyping data. Realizing the serious threat from Tomato spotted wilt virus (TSWV) and leaf spots (LS) for sustainable peanut production, one RIL population derived from the cross of Tifrunner × GT-C20 (T-population) segregating for several important traits including disease resistance (TSWV, LS, and aflatoxin contamination) was used for genetic mapping and QTL analysis. Initially, parental polymorphism survey and genotyping of a subset of RILs with 158 individuals (TRIL158) was used for construction of a genetic map with 239 marker loci distributed on 26 linkage groups (LGs) with total map distance of 1,213.4 cM (Qin et al. 2012. TAG). Presence of large phenotypic and genotypic diversity in this parental combination prompted us to genotype the whole population (245 RILs) and conduct multi-season phenotyping (each with 3 replications) on disease resistance, morphological descriptors, oil quality and yield components. As a result, a genetic map (TRIL245) with 159 marker loci covering a 2261.9 cM genome (20 LGs) could be constructed so far along with continued improvement in marker numbers and genotyping by sequencing of a subset of 113 RILs. QTL analysis using the above mentioned two maps (TRIL158, TRIL245) using multiseason phenotyping data resulted in identification of a single QTL for thrips (5.86% PVE), nine for TSWV (5.20–14.14% PVE) and 13 for LS (5.95–21.45% PVE) resistance with the TRIL158 map while six QTLs for TSWV (5.71–15.24% PVE) and 21 for LS (4.21–22.71% PVE) resistance were identified with the TRIL245 map. Thus, highly dense genetic maps based on SSRs and genotyping by sequencing will facilitate identification of QTLs with more resolution for diseases resistance, morphological descriptors, oil quality and yield components.

(97) Towards Identification of SSR Markers Linked to TSWV Resistance in Peanut (*Arachis hypogaea* L.).

Y-C. TSENG*, B. L. TILLMAN and J. WANG, Department of Agronomy, University of Florida, Gainesville, FL32610

Spotted wilt caused by tomato spotted wilt virus (TSWV) is one of the major diseases affecting peanut (*Arachis hypogaea* L.) production in the Southeastern USA. Occurrence, severity, and symptoms of spotted wilt disease are highly variable from season to season making it difficult to efficiently evaluate breeding populations for resistant line selection. Molecular markers linked to spotted wilt resistance could overcome this problem and allow selection of resistant lines regardless of seasonal conditions. The objective of this study is to identify the simple sequence repeat (SSR) markers linked to TSWV resistance in peanut through 1) evaluating the TSWV reaction of the F_2 and $F_{2:3}$ populations; 2) screening polymorphic SSR markers between the two parental lines of the F_2 population, and mapping the TSWV resistance loci using SSR genotyping of the F_2 population. A total of 199 F_2 progeny derived from the cross between Florida-EPTM'113', a TSWV resistant variety and Georgia Valencia, a highly susceptible cultivar were evaluated by ELISA (enzyme-linked immunosorbent assay) for the presence of TSWV. The $F_{2:3}$ population were further phenotyped using a visual 1 to 10 scaling method on both canopy and seed coat and ELISA Immunostrip. The ELISA and Immunostrip results confirmed that most of the symptomatic plants were infected by TSWV with some exceptions, which didn't display visual symptoms but exhibited positive ELISA reactions. This result indicates that ELISA and Immunostrip may be a better method for phenotyping TSWV infection in peanut. For genotyping, a total of 2000 SSR markers with high polymorphic information content or mapped on peanut linkage groups were screened against the two parental lines of the F_2 segregating population. Totally, 70 polymorphic SSR markers were screened, which will be used to map the TSWV resistance conferred by Florida-EPTM'113' and to identify the flanking markers linked to spotted wilt resistance.

(98) Genetic Mapping and QTL Analysis for Disease Resistance Using F_2 and F_5 Mapping Populations Derived from the Same Cross in Peanut (*Arachis hypogaea* L.). H. WANG*, M. PANDEY, L. QIAO, A. CULBREATH, Department of Plant Pathology, the University of Georgia, Tifton, GA; M. PANDEY, R. VARSHNEY, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; H. QIN, Hubei Academy of Agricultural Sciences, Wuhan, China; C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA; G. HE, Tuskegee University, Tuskegee, AL; and B.Z. GUO, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA.

Achieving a highly dense genetic map in peanut is very challenging due to availability of limited genomic resources, low polymorphism and a large genome. Realizing the importance of dense genetic maps in several genetic and breeding applications, a mapping population derived from Tifrunner × GT-C20 (T population) has been developed which has shown great potential in dealing with the challenges along with identification of QTLs for important diseases such as Tomato spotted wilt virus (TSWV) and leaf spot (LS) along with several other important traits. Both F_2 generation and $F_{5:6}$ (recombinant inbred line-RIL) mapping populations with 94 (TF2) and 158 (TRIL158) individuals were used for construction of genetic maps with 318 and 239 marker loci, respectively. Higher map density could be achieved with the TF2 population (5.3 loci/cM) as compared to TRIL158 (5.7 loci/cM) with genome coverage of 1,674.4 cM and 1,213.4 cM, respectively. In order to check the utility of these two genetic maps, QTL analysis was conducted using multi-environment (E) phenotyping data for disease resistance such as thrips (1 E), TSWV (4 E) and LS (10 E) generated each with three replications. A total of 54 QTLs were detected in the TF2 population which include two QTLs for thrips (12.14 – 19.43% PVE), 15 for TSWV (4.40–34.92% PVE) and 37 for LS (6.61–27.35% PVE). Similarly for the TRIL158 map, a total of 23 QTLs could be identified which include single QTL for thrips (5.86% PVE), nine for TSWV (5.20 – 14.14% PVE) and 13 for LS (5.95–21.45% PVE). Thus, these populations have shown great

MINUTES
BOARD OF DIRECTORS MEETING
45th Annual Meeting
Young Harris, GA
11 July 2013

President Ames Herbert called the meeting to order at 3:30 PM and welcomed everyone. Attending the meeting were A. Herbert, J. Starr, H. Valentine, T. Brenneman, T. Grey, C. Butts, D. Rowland, P. Dotray, R. Kemerait, J. Beasley, N. Puppala, S. Tubbs, J. Marsh, K. Rucker, T. Isleib, E. Prostko, J. Davis, and M. Baring.

Pres. Herbert called on J. Starr, Executive Officer, to present the minutes of the last Board of Directors meeting, conducted at the 2012 Annual Meeting held in Raleigh, NC. *The minutes as reported in the 2012 Proceedings, vol. 44, were approved.*

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

Executive Officer Report –
Jim Starr reported 2013 Annual Meeting registrations should be 160+ registrants along with 70+ spouses, children, and guests. The APRES fiscal year has officially been changed to January 1-Dec. 31 as directed by the Board. This change will make it easier to get a full picture of APRES operations as membership/annual meeting income will not be divided over two fiscal years. Also, it will make financial planning easier to undertake. A credit card payment system has been put into place via the APRES website to handle membership and annual meeting registrations. Jim stated that the conclusion of this Annual Meeting marks the end his tenure as Executive Officer. He, along with a search committee, undertook the task of hiring a new Executive Officer and Kim Cutchins was brought on Board in May to take over after the Annual Meeting. Jim introduced Kim and then expressed his appreciation of his years spent as the Executive Officer, stating he will serve in an official advisory role until October. President Herbert thanked Jim for his service and welcomed Kim to the organization.

Finance Committee –
Members of the Finance Committee were unable to attend the APRES meeting and Executive Officer Jim Starr gave the following report. As mentioned previously, the APRES fiscal year was changed to Jan1-Dec. 31. The books were closed out on December 31 showing income of $47,283 and $58,734 in expense and a year-end net income of ($11,451) for the 6-month fiscal year. At year-end, APRES assets & liabilities were $216,371. As of July 2, 2013, APRES assets & liabilities are $252,223. Assets are distributed between 3 checking accounts with balances of $78,143, $12, 283, and $47,995 for a total of $138,421. An additional $113,802 is distributed among 6 CDs.

With the adoption of this new fiscal year (where the majority of income and expense will be received within the same fiscal year), the Board requested that it receive more detailed income and expense reports (current and last fiscal year, along with budgeted amounts) as well as provide an historical perspective on membership income and annual meeting expenses.

The Board asked the Finance Committee to establish a budget for the next fiscal year and forward to the Board for their approval.

Additionally, Keith Rucker asked the Board to consider having an audit conducted as a standard procedure whenever a change in Executive Officer occurs. This action would officially mark the changeover in leadership and give a level of comfort to both the outgoing and incoming Executive Officer. *It was moved by Tim Brenneman, seconded by Howard Valentine, that this policy be adopted and an audit of APRES financial records be conducted.*

Jim suggested that the Board ask the Finance Committee to investigate and report on the potential of adopting additional investment practices beyond money market accounts and CDs for APRES assets. The current rates for money market accounts and CDs which are the two investment methods currently approved are earning about 1%. *The Board tasked the Finance Committee to investigate additional options and report at the next Board meeting.*

Nominating Committee –
Chairman Michael Baring reported the following individuals were nominated to fill the Board of Directors positions that are rotating vacant after the 2013 APRES Annual Meeting:

President Elect:	Naveen Puppala, New Mexico State University
University Rep – VC Region:	David Jordan, North Carolina State University *(3-year term)*
University Rep – SE Region:	Barry Tillman, University of Florida *(3-year term)*
USDA Rep:	Noelle Barkely, USDA *(3-year term)*
Sheller's Rep:	Darlene Cowart, Birdsong Peanuts *(3-year term)*

Additionally, a 1-year term is needed for vacancies in the following seats:

University Rep – SW Region:	Peter Dotray *(1-year term)*
Manufacturer's Rep:	Doug Smyth *(1-year term)*

These nominations were accepted by the Board and will be presented to the members for a vote at the Friday morning Business meeting.

Program Committee –
Chairman Tim Brenneman reported 181 registered participants for the meeting plus 53 spouses/guests and 40 children. This year's program of 90 presentations included 19 poster presentations, 13 invited symposia and 58 oral. Presentations covered the following topics: Breeding, Biotechnology, and Genetics; Production and Post-Harvest Technologies; Physiology, and Seed Technology; Weed Science; Economics; Plant Pathology, Nematology; Entomology; Mycotoxins; the Bayer Excellence in Extension and Extension Techniques session and the Joe Sugg Graduate Student Competition. Additionally, there were two special symposia entitled "Recent Developments in US and International Peanut Markets" and Historic Advancements for Yield Gain in Peanuts".

Site Selection Committee –
Chairman John Beasley reported that the 2014 APRES Annual Meeting will be held July 8-10 at The Menger Hotel in San Antonio, TX. The 2015 Annual Meeting will be held at the F. Marion Hotel in Charleston, SC from July 14-16. Barry Tillman and Nick Dufault will be contacting the Southern Peanut Growers Conference about having a joint meeting in the Southeast in 2016. Mike Baring and Naveen Puppala have agreed to find a site for the 2017 meeting. *The Board suggested that the Committee negotiate a specific rate for USDA in future contracts, increase the flow of information on program participants and attendees, and to lock down contracts 2 years in advance of a meeting to ensure the best rates and locations.*

Publications and Editorial Committee –
Chairman Diane Rowland reports the Committee discussed organizing and publishing an updated version of the general peanut compendiums—Peanuts: Culture and Uses (1973); Peanut Science and Technology (1982) and Advances in Peanut Science (1995). She anticipated 10-13 possible chapters and would seek industry support to help in getting it published. Currently, APRES has no copies of the original book Peanut Science and Technology left in print and two boxes of Advances in Peanut Science. Peanut Science is currently operating in the black. The Committee will be conducting a historical search of the costs of printing the original books and sales of the books as well as investigate the potential of publishing the book on-line. A proposal will be brought to the Board for discussion.

Public Relations Committee –
The Committee offered three resolutions honoring the contributions and lives of three recently deceased members of the Society, namely Max Grice, Bill Dickens, and Max Bass.

Editor of Peanut Science –
***Peanut Science* received** 20 submissions this year. Growth of the journal is stagnant and the committee suggested the cause may be related to the page charges; decreased number of scientists; or competition from other journals. A subcommittee of Mike Baring, Graeme Wright, Diane Rowland, David Jordan and Tim Grey has been formed to study the issue of Open Access and other options to increase submissions. Over the past year, *Peanut Science* has operated with co-editors--Chris Butts and Tim Grey. This made for a great transition as Chris retires as editor following this meeting. The Board thanked Chris for his 6 years as editor of *Peanut Science*, acknowledging his contribution of 11 volumes of *Peanut Science* from Volume 2 in 2007 to Volume 2 2012, or 114 peer-reviewed articles.

Peanut Quality –
Chairman Jim Elder stated that interest in this committee continues to grow and asked the Program Committee to provide a larger room next year and additional meeting time in order to cover their agenda.

Tim asked if Mars is still experiencing the black kernel issue and if they have identified the cause. Victor mentioned that they are but at much lower concentrations and was attributed to Aspergillus contamination. Doug mentioned that Kraft was experiencing some similar issues but were attributed to high moisture and high dryer temperatures. Howard highlighted the tote breathability changes and study that Chris Butts will be completing. Victor raised awareness of the importance of completing a transport study with the new totes.

Review of New Business:
Jim reviewed an issue Smucker's is experiencing with higher fat content peanuts that is related to the very mature crop. The high fat content is causing higher meal levels and resulting in more frequent cleaning of the bag houses and smoldering fire risk. Howard mentioned that it is likely that the level will drop to more historical levels with this upcoming year's crop. A consensus was drawn to wait and reassess fat content from this year's crop to determine if this is true.

Tom Isleib summarized the recent UPPT data for 19 Runner- and Virginia-type lines. Overall, Runner-type peanuts were more intense in flavor than Virginia's. Sweet sensory attribute intensity did not correlate strongly with sucrose content. Tom speculates that something is counteracting sweetness and we may need to look at multiple attributes such as bitter or dark roast to understand more fully.

Mark elaborated on the high oleic purity issue that Hershey's is experiencing. Victor mentioned that Mars has also experienced purity issues. A discussion ensued regarding supply regeneration from Breeder's seed and increased testing frequency. Bill remarked that he planted GA-09B in a field that had not grown peanuts for 4 years and still observed volunteers growing. Barry mentioned use of FTIR and GC for purity confirmation in his breeding program. Tim mentioned that Lisa Dean would be presenting research on purity later in the week.

Bailey Award Committee –
Nominations were received from all six eligible sessions. Five manuscripts were received and accepted for evaluation from the 2012 APRES meeting for award consideration. Based on the committee's review, A.M. Stephens and T.H. Sanders have been selected as the 2013 Bailey Award Winners for their paper, ***Effects of Peanuts and Fat-Free Peanut Flour on the Reversion of Atherosclerosis in Male Golden Syrian Hamsters.***

Coyt T. Wilson Distinguished Services Award Committee –
The Coyt T Wilson Service Award Committee has reached a unanimous recommendation for the 2013 award: Dr. John Beasley.

Dow Agrosciences Awards Committee –
The committee received no nominations for the Dow AgroSciences research award and Peter Dotray will receive the Dow AgroSciences Education award. *Chairman Eric Prostko asked that the APRES staff increase the publicity surrounding these awards for 2014.*

Fellows Award Committee –
The Board approved the recommendation of the committee that Jay Chapin, Barbara Shew, and Howard Valentine be named as Fellows of APRES.

Joe Sugg Graduate Student Award Committee –
Score sheets were sent out ahead and 12 entries were received. Jason Woodward will announce the winner at the Business Meeting. No Items for Board approval or action.

Other Business –
Tom Isleib related to the Board the effects federal budget issues are having on attendance of federal employees to peanut meetings. He suggested that APRES send a letter to USDA reminding them of the importance of federal employees participating in the research process, including industry meetings. In particular, he noted Board member Noelle Barkley’s inability to attend due to sequestration. *It was moved by Tom Isleib, seconded by Howard Valentine, and carried to write a letter of support to USDA for Noelle Barkley’s travel for research and participation in the APRES Annual Meeting as USDAs representative on the APRES Board of Directors.*

BUSINESS MEETING AND AWARDS CEREMONY

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Brasstown Valley Resort
Young Harris, Georgia
August 10, 2013

1.**President'sReport**...Ames Herbert

2. **Reading of Minutes of Previous Meeting**

3. **Awards Presentation**
   - a. Coyt T. Wilson Distinguished Service Award …………………………..…….. Jack Davis
   - b. Dow AgroSciences Awards for Research and Education …………….………Eric Prostko
   - c. Bailey Award ……………………………………………………….……Naveen Puppala
   - d. Joe Sugg Graduate Student Competition………………………….………Robert Kemerait
   - e. Fellows Awards……………………………………………………………John Damicone
   - f. Past President's Award…………………………………………………..Ames Herbert

3. **New Business**

   (a) Nominating Committee .... Michael Baring
   (b) Finance Committee.. Jim Starr
   (c) Public Relations Committee .... Charles Simpson
   (d) Peanut Quality Committee .... …….……..…..Jim Elder
   (e) Site Selection Committee.. John Beasley
   (f) Publications and Editorial Committee .... Diane Rowland
   (g) Program Committee...Tim Brenneman
   (h) Other Business

4.**Installation of New Officers** **…………………………………………………**Ames Herbert

5. Adjourn…………………………………………………………...……………….. Tim Brenneman

MINUTES

BUSINESS MEETING AND AWARDS CEREMONY
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Brasstown Valley Resort
Young Harris, Georgia
July 10, 2013

President's Report – President Ames Herbert called the meeting to order and presented the annual President's report, recognizing members of the various committees responsible for organizing the meeting.

Presentation of Awards:

Joe Sugg Graduate Student Competition-
Twelve M.S. and Ph.D. degree students gave outstanding presentations. This year's competition winners are:

First Place – Abraham Fulmer, The University of Georgia
"Evaluation of Peanut Rx to Predict Epidemics of Early and Late Leaf Spot"
(Dr. Bob Kemerait, major professor)

Second Place – Peter Eure, The University of Georgia
"Developing Pyroxasulfone for Use in Peanut".
(Dr. Eric Prostko, major professor)

The Bailey Award –
The Bailey Award for the best paper from the 2012 Annual Meeting went to:

A.M. Stephens and Dr. Tim Sanders of USDA-ARS in Raleigh, NC
"Effects of Peanuts and Fat-Free Peanut Flour of the Reversion of Atherosclerosis in Male Golden Syrian Hamsters".

Dow AgroSciences Awards –
Education Award – Dr. Peter Dotray
Research Award – No Nominations

Fellows of the Society -
Dr. Jay Chapin, Clemson University
Dr. Barbara Shew, North Carolina State University
Mr. Howard Valentine, Peanut Foundation

Past President's Award –
Todd Baughman *(in absentia)*

Peanut Science Editor –
A special award was given to Chris Butts, Editor of Peanut Science for the past 6 years.

Executive Officer Recognition
Dr. Jim Starr of Texas A&M, was given a standing ovation and a plaque in appreciation for his 8 years service as the Executive Officer of APRES.

Committee Reports

Public Relations Committee –
Three deceased members of the Society were recognized for their contributions to the peanut industry during their lifetime. A resolution recognizing their lifetime contributions was read, followed by a moment of silence for Max Bass, Bill Dickens, and Max Grice. Each resolution is published in the 2013 Proceedings.

Nominating Committee –
The following slate of candidates was presented to the membership for voting:

President Elect:	SW-Region - Naveen Puppala
University Reps:	VC-Region – David Jordan (3 yr term)
	SE-Region – Barry Tillman (3 yr term)
	SW-Region – Peter Dotray (1 yr term) *to fill the spot vacated by Chad Godsey*
USDA Rep:	Noelle Barkley (3 yr term)
Sheller's Rep:	Darlene Cowart (3 yr term)
Manufacturers' Rep:	Doug Smyth (1 yr term) *to fill the spot vacated by Pat Donahue*

There being no additional nominations from the floor, the candidates were accepted with a unanimous vote.

Other Committee Reports -
Full reports of the remaining committees are published in the 2013 Annual Proceedings.

Ames Herbert recognized the new President, Tim Brenneman, who adjourned the meeting.

APRES COMMITTEE REPORTS

FINANCE COMMITTEE REPORT –

Members of the Finance Committee were unable to attend the APRES meeting and Executive Officer Jim Starr gave the following report. As mentioned previously, the APRES fiscal year was changed to Jan1-Dec. 31. The books were closed out on December 31 showing income of $47,283 and $58,734 in expense and a year-end net income of ($11,451) for the 6-month fiscal year. At year-end, APRES assets & liabilities were $216,371. As of July 2, 2013, APRES assets & liabilities are $252,223. Assets are distributed between 3 checking accounts with balances of $78,143, $12, 283, and $47,995 for a total of $138,421. An additional $113,802 is distributed among 6 CDs. *(Graphs of this information are displayed below.)*

With the adoption of this new fiscal year (where the majority of income and expense will be received within the same fiscal year), the Board requested that it receive more detailed income and expense reports (current and last fiscal year, along with budgeted amounts) as well as provide an historical perspective on membership income and annual meeting expenses.

The Board asked the Finance Committee to establish a budget for the next fiscal year and forward to the Board for their approval.

Additionally, Keith Rucker asked the Board to consider having an audit conducted as a standard procedure whenever a change in Executive Officer occurs. This action would officially mark the changeover in leadership and give a level of comfort to both the outgoing and incoming Executive Officer. *It was moved by Tim Brenneman, seconded by Howard Valentine, that this policy be adopted and an audit of APRES financial records be conducted as quickly as possible.*

Jim suggested that the Board ask the Finance Committee to investigate and report on the potential of adopting additional investment practices beyond money market accounts and CDs for APRES assets. The current rates for money market accounts and CDs which are the two investment methods currently approved are earning about 1%. *The Board tasked the Finance Committee to investigate additional options and report at the next Board meeting.*

Assets & Liabilities	Dec 31, 12
ASSETS	
Current Assets	
Checking/Savings	
Cash - Checking	43,914.81
Cash - MMA	47,946.86
Cash - CD #3	13,506.65
Cash - CD #4	17,575.70
Cash - CD #6	19,424.17
Cash - CD #7	16,831.99
Cash - CD #8	13,102.88
Cash - CD #10	31,791.15
Cash - Bayer	12,276.40
Total Checking/Savings	216,370.61
Total Current Assets	216,370.61
TOTAL ASSETS	**216,370.61**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Other Current Liabilities	
FICA/FWH Payable	626.10
Total Other Current Liabilities	626.10
Total Current Liabilities	626.10
Total Liabilities	626.10
Equity	
Restricted Fund Balances	222,171.00
Unrestricted Fund Balances	5,024.85
Net Income	-11,451.34
Total Equity	215,744.51
TOTAL LIABILITIES & EQUITY	**216,370.61**

Income & Expense – July 1-December 31, 2012

	Jul - Dec 12
Ordinary Income/Expense	
Income	
Annual Dues	16,660.00
Contribution - Bayer Fund	20,748.72
Contributions - General	1,000.00
Meeting Registration	5,125.00
Page Charges	3,620.00
Total Income	47,153.72
Expense	
Contract Labor	550.00
Dues and Subscriptions	60.00
Webpage Maintenance	5,148.91
Accounting	850.00
Annual Meeting	
Awards	4,607.43
Meals	466.57
Program	660.00
Program Spouse	571.51
Rooms	26,686.57
Supplies/Equip/AV	1,844.37
Total Annual Meeting	34,836.45
Bank Charges	1.75
Credit Card Charges	1,233.45
Office Expenses	395.81
Peanut Science Publishing	2,035.28
Postage	206.44
Taxes - Payroll	780.30
Travel - Bayer Prog Ext Agents	1,858.18
Travel - Officer	577.38
Wages - Executive Officer	10,200.00
Total Expense	58,733.95
Net Ordinary Income	-11,580.23
Other Income/Expense	
Other Income	
Interest Income	128.89
Total Other Income	128.89
Net Other Income	128.89
Net Income	**-11,451.34**

Assets & Liabilities 2012 & 2013 Comparison – Jan.1-Aug.31

	Aug 31, 13	Aug 31, 12
ASSETS		
Current Assets		
Checking/Savings		
Cash - Checking	52,051.84	36,691.85
Cash - MMA	48,009.94	47,899.74
Cash - CD #3	13,655.36	13,506.65
Cash - CD #4	17,733.59	17,575.70
Cash - CD #6	19,480.76	19,424.17
Cash - CD #7	16,978.96	16,831.99
Cash - CD #8	13,174.85	13,102.88
Cash - CD #10	32,068.73	31,791.15
Cash - Bayer	12,284.64	9,023.11
Total Checking/Savings	225,438.67	205,847.24
Total Current Assets	225,438.67	205,847.24
TOTAL ASSETS	**225,438.67**	**205,847.24**
LIABILITIES & EQUITY		
Liabilities		
Current Liabilities		
Other Current Liabilities		
FICA/FWH Payable	448.20	626.10
Total Other Current Liabilities	448.20	626.10
Total Current Liabilities	448.20	626.10
Total Liabilities	448.20	626.10
Equity		
Restricted Fund Balances	216,604.22	227,195.85
Unrestricted Fund Balances	0.00	-49,869.45
Net Income	8,386.25	27,894.74
Total Equity	224,990.47	205,221.14
TOTAL LIABILITIES & EQUITY	**225,438.67**	**205,847.24**

Income & Expense 2012 & 2013 Comparison – Jan.1-Aug.31

	Jan - Aug 13	Jan - Aug 12
Ordinary Income/Expense		
Income		
Annual Dues	19,995.00	26,960.00
Contribution - Bayer Fund	0.00	12,202.72
Contribution - Dow	5,000.00	5,000.00
Contributions - General	7,950.00	5,600.00
Meeting Registration	38,305.00	39,304.00
Page Charges	4,970.00	5,705.00
Peanut Science Journal	1,415.00	1,500.00
Total Income	77,635.00	96,271.72
Expense		
Contract Labor	348.75	550.00
Dues and Subscriptions	275.00	335.00
Webpage Maintenance	770.00	5,205.21
Accounting	840.00	857.00
Annual Meeting		
Entertainment	240.00	0.00
Awards	3,260.19	4,593.75
Meals	26,530.50	25,252.42
Program	620.60	660.00
Program Spouse	1,647.23	571.51
Rooms	3,155.37	1,900.72
Supplies/Equip/AV	822.22	1,844.37
Total Annual Meeting	36,276.11	34,822.77
Bank Charges	2.75	10.75
Corp Registration Fees	0.00	50.00
Credit Card Charges	2,007.00	1,931.83
Office Expenses	0.00	1,704.45
Peanut Science Publishing	11,983.94	7,673.80
Postage	135.50	124.79
Taxes - Payroll	1,146.83	1,190.40
Taxes - Payroll OK	0.00	-150.00
Travel - Bayer Prog Ext Agents	482.99	1,858.18
Travel - Officer	646.92	1,161.58
Wages - Executive Officer	14,442.08	13,600.00
Total Expense	69,357.87	70,925.76
Net Ordinary Income	8,277.13	25,345.96
Other Income/Expense		
Other Income		
Interest Income	109.12	2,548.78
Total Other Income	109.12	2,548.78
Net Other Income	109.12	2,548.78
Net Income	**8,386.25**	**27,894.74**

PUBLIC RELATIONS COMMITTEE REPORT –

The Committee offered three resolutions honoring the contributions and lives of three recently deceased members of the Society, namely Dr. Max H. Bass, Bill Dickens, and Max Grice.

Resolution Honoring Life of APRES Member:

Dr. Max H. Bass

Whereas, Dr. Bass was born in 1934 in Pike County, Alabama, and grew up in Troy. He received his B.S. degree from Troy University and his M.S. and Ph.D. degrees from Auburn University. He met Merle Findley, of Andalusia and they were married in 1956, and

Whereas, during his career Dr. Bass served on faculty at Auburn University and later became professor and department head of entomology at the University of Georgia Coastal Plain Experiment Station in Tifton. Before his retirement from UGA he served as Resident Director of the Coastal Plain Experiment Station, and

Whereas, during his career he published 120 refereed scientific articles, two book chapters and one book. While at A.U. he was major professor for 35 successful graduate students and was the State Coordinator for the IR-4 regional research project.

Whereas, after returning to Auburn in retirement, Dr. Bass was active in the First Baptist Church, where he served on many committees as well as serving as a Deacon and assistant treasurer.

Whereas, he died in May 2013, be it resolved that the American Peanut Research and Education Society remembers and honors Dr. Max H. Bass' life and contributions to the peanut industry; and,

Resolution Honoring Life of APRES Member:

James William "Bill" Dickens

Whereas, James William "Bill" Dickens was born in Nash Co., NC on September 28, 1925, he served in the U.S. Navy, and later received bachelor and masters degrees in Agriculture Engineering from North Carolina State University. He was preceded in death by his wife of 50 years, Mellie Christine Dickens, and

Whereas, he joined USDA/ARS in 1957 and devoted much of his professional career to solve problems related to improving the quality of peanuts and the management of aflatoxin. During Mr. Dickens 33 years with USDA/ARS, he developed equipment to more effectively and more accurately measure grade of farmer's stock and milled peanuts, and

Whereas, he was also a pioneer in developing methods to manage aflatoxin in peanut industry. Bill developed the visual A. flavus inspection method that led to the Seg 3 peanut category and designed a subsampling mill to grind kernel samples and automatically subsample the ground sample for aflatoxin analysis, and

Whereas, he served as president of the American Peanut Research and Education Society in 1970 and earned many awards and honors throughout his career, including the American Peanut Council's Golden Peanut Research award for 1962, and

Whereas, he died November 14, 2012, be it resolved that the American Peanut Research and Education Society remembers and honors James William Dickens' life and contributions to the peanut industry; and,

Resolution Honoring Life of APRES Member:
Gerald M. "Max" Grice

Whereas, Gerald M. "Max" Grice was born in Gorman, Texas on March 18, 1942 and in 1965, Mr. Grice married Janice Lynn Brown, and in addition to his wife, he is survived by two children and three grandchildren, and

Whereas, Mr. Grice served as vice president of Birdsong Peanuts and as General Manager of Birdsong's Southwest Division operations where he worked for more than 40 years, including the day he died, and

Whereas, Mr. Grice was a guiding force on the Southwest Peanut Shellers Association and was a member of their board from the 1980's and was president or vice president of that board for more than 15 years and also Mr. Grice served on the Texas Foundation Seed Committee, a part of Texas A&M University System and was also a member of the Texas Seed Trade Association, and

Whereas Mr. Grice served a total of 28 years as a member of The American Peanut Research and Education Society, serving 24 of those years on major committees and was on the Board of Directors for nine years, providing leadership for the industry and the society, and

Whereas Mr. Grice was a deacon at First Baptist Church of Brownfield and Stephenville, Texas; He was a member of the Gorman Masonic Lodge, Sunday School Director at First Baptist Church Brownfield, he was past president of the Brownfield Development Board, and

Whereas, Mr. Grice died May 28, 2013, be it resolved that the American Peanut Research and Education Society remembers and honors Gerald M. "Max" Grice's life and his contributions to the peanut industry.

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT –

The committee met on 09 July 2013 at the Brasstown Valley Resort at 1 pm. No current members attended except for Diane Rowland, chair. Nick Dufault, who will be rotating onto the committee in 2014, attended and discussion ensued concerning organizing and publishing an updated version of the general peanut compendiums, "Peanuts: Culture and Uses" (published 1973); "Peanut Science and Technology" (published 1982); and most recently "Advances in Peanut Science" (published 1995). We discussed an outline of chapters and preliminary identification of authors. I subsequently sought the permission of the Board of Directors who agreed that Dr. Dufault and I should move forward on outlining the publication and pursue investigation into the costs and logistical details of publication. Kim Cutchins agreed to provide some assistance in researching our publication options. An oral summary report was provided to the membership during the Business Meeting on 11 July 2013.

On 09 July 2013 at 2 pm, Tim Grey held a meeting for the Associate Editors and discussed the status of the society's publication, *Peanut Science* (see separate report). It was decided to form a subcommittee to address moving *Peanut Science* to Open Access publication in an effort to improve its circulation and citation frequency. It was agreed that the subcommittee would:

1. Research the logistics of Open Access publishing
2. Consider the economics of reducing page costs or eliminating them altogether
3. Form a plan for improving the uniformity of submission format
4. Research the feasibility of paying the Editor

It was agreed that the subcommittee would submit their results and options to the Board. Tim Grey formed the subcommittee and the members include: Tim Grey, Diane Rowland, Graeme Wright, Michael Baring, and David Jordan.

PEANUT SCIENCE EDITOR'S REPORT –

The Associate Editors of *Peanut Science* meeting is set for Tuesday, July 9th, 2013 at the Annual APRES meeting in Brasstown Valley Resort, Young Harris, GA. Timothy Grey assumed co-editor duties with Editor Chris Butts beginning July 1, 2012 and will assume full duties July 1, 2013. Volume 39-2 was published online in March 2013. Volume 40-1 is scheduled to be released online July 3, 2013 via AllenPress. Dr. Grey has been responsible for manuscripts submitted following the annual meeting and Dr. Butts continues to manage the final manuscripts submitted under his tenure as editor.

AllenPress has been working with APRES to make *Peanut Science* available online to a greater number of clients via EBSCO information services. In Feb 2013 we submitted to BioOne.org for inclusion in their database of journals. Peanut Science was not accepted for 2013 but was requested to resubmit for 2014, by the BioOne and AllenPress staff. If you go to Google.com and enter '*Peanut Science'*, the journal is the first return and listed returns for *Peanut Science* are the first 4 websites along with APRES (#4). At Googlescholar.com the request for *Peanut Science* returns 288,000 hits, with many journal articles, and Dr. Boote's 'Growth Stages of Peanut' from 1982 listed first if sorted by relevance. The goal of APRES is to continue the promotion of Peanut Science to a wider audience, improve the number of submissions, and increase the relevance of the journal. For 2013-2014 the editor plans to submit the journal to other online databases for further promotion.

Various journal performance statistics are shown in Tables 1 to 3 for the 12-month time period from July 1, 2012 to June 30, 2013 for manuscripts assigned to Dr. Grey as editor. Also below are submissions by year from 2010 to 2013 by month along with the associate editors and guest associate editors for the 2012 symposium.

(Peanut Science statistic graphs follow)

Table 1. Average time required to complete various stages of manuscript review from submission to final decision, July 1, 2012 to June 30, 2013.

Initial submission

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision	Without Peer Review
Accept w/Major Revision	5	45.5%	115.6	0
Accept w/Minor Revision	4	36.4%	86	0
Reject	2	18.2%	66	0
Total Editor Decisions	11	100%	95.8	0

Revision 1

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision	Without Peer Review
Accept	6	85.7%	15.3	5
Accept w/Minor Revision	1	14.3%	42	1
Total Editor Decisions	7	100%	19.1	6

Revision 2

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision	Without Peer Review
Accept	1	50%	7	1
Accept w/Minor Revision	1	50%	0	1
Total Editor Decisions	2	100%	3.5	2

Revision 3

Editor Decision Term	Total Decisions	Frequency of Decision	Average Time to Decision	Without Peer Review
Accept	2	100%	0.5	2
Total Editor Decisions	2	100%	0.5	2

Table 2. Performance statistics of reviewers for articles submitted to Peanut Science between 01 July 2012 and 30 June 2013.

Reviewer Performance Metric	Measure
Number of invitations	67
Number of Reviews	42
Number of Reviews declined	9
Un-invited before agreeing	13
Days to Respond to Invitation	3.47
Days to Complete Review (from Date Invited)	30.7
Number of Reviews per Reviewer	1.4
Number of Late Reviews	15
Average Days Late	2.06
Average Days Early	24.9

Table 3. Submissions by year

Month	2010	2011	2012	2013
Jan	0	2	2	2
Feb	2	2	2	2
Mar	1	1	1	4
Apr	1	2	0	0
May	4	0	3	1
Jun	0	2	0	1
Jul	8	0	1	
Aug	1	2	3	
Sep	3	3	1	
Oct	2	3	2	
Nov	0	4	3	
Dec	1	1	2	
Totals	**23**	**22**	**20**	**10**

For the calendar year 2012, there were 13 manuscripts accepted, 4 rejected, and 3 with decisions still in process.

Associate editors

Christ Butts	USDA/ARS, Dawson GA	
Albert Culbreath	UGA, Tifton GA	
Jack Davis	USDA/ARS, Raleigh NC	
Peter Dotray	TX Tech, Lubbock TX	
Wilson Faircloth	Syngenta, Albany GA	
Chad Godsey	Oklahoma St, Stillwater OK	
Ames Herbert	VPI, Suffolk VA	(ending in 2013)
Yen-Con Hung	UGA, Griffin GA	
Michael Marshall	Clemson, Blackville SC	
Paxton Payton	USDA/ARS, Lubbock TX	
Naveen Puppala	New Mexico St, Clovis NM	(ending in 2013)
Diane Rowland	UFL, Gainesville FL	
Nathan Smith	UGA, Tifton GA	
Jason Woodward	TX A&M, Lubbock TX	
H. Thomas Stalker	NC State, Raleigh NC	

Guest associate editors for APRES 2012 Genomics Symposium

Peggy Ozias-Akins	UGA, Tifton GA
Corley Holbrook	USDA/ARS, Tifton GA

There is always a need for more reviewers and replacements of associate editors, please check the website for entering of new reviewers.

NOMINATING COMMITTEE REPORT –

The 2013 nominating committee was chaired by myself, Michael Baring with the following members serving on the committee; Victor Nwosu, Corley Holbrook, Nathan Smith, and Scott Monfort. There were four Board of Director Representative terms expiring in 2013 which were; University Reps for the VC-Region and SE-Region, USDA Rep, and the Sheller's Rep. Additionally, there were two other BOD Representative positions needing to be filled for a 1 year term and they were; University Rep SW-Region which was vacated by Chad Godsey and Manufacturers' Rep which was vacated by Pat Donahue. In addition to these positions as always the committee also needed to nominate a President-elect.

The past two Southwest Region APRES meetings had presidents from the states of Texas and Oklahoma, so we felt it only fair to nominate Naveen Puppala as president elect from the state of New Mexico. We nominated David Jordan for the VC-Region University rep, Barry Tillman for the SE-Region University rep, and Peter Dotray for the SW-Region University rep. Noelle Barkely agreed to serve as the USDA rep, Darlene Cowart as the Sheller's rep, and Doug Smyth as the Manufacturers' rep.

I contacted each of our nominees to make certain that they were willing to serve in the position for which we were nominating them before finalizing our recommendations in a letter to the BOD.

I sent a letter of recommendations for each of the positions to the BOD on June 20, 2013 with the consent of each of the members of the nominating committee.

Sincerely,
The Nominating Committee: Michael Baring (Chair)
Victor Nwosu
Corley Holbrook
Nathan Smith
Scott Monfort

FELLOWS COMMITTEE REPORT –

Business of the Fellows Committee (J. Damicone, Chair (2014), Kira Bowen (2013), Scott Tubbs (2013), Albert Culbreath (2014), and Peter Dotray (2014)). was conducted by e-mail in 2013. The committee received and reviewed nominations for APRES Fellow in 2013. The committee recommended to the Board of Directors that Jay Chapin, Barbara Shew, and Howard Valentine be named APRES Fellows in 2013. The committee appreciates the efforts of the nominators in developing the award applications and encourages the continued nomination of disserving members.

Jay W. Chapin

Dr. Jay Chapin received a B.S. in Biology from Dickinson College in 1970, an M.S. in Biology from East Carolina University in 1975, and a Ph.D. in Entomology from Clemson University in 1978. Since 1979, he was employed by Clemson Univerity as an Assistant Professor, Associate Professor, and Professor of Entomology and Extension Specialist, at the Edisto Research and Education Center in Blackville, South Carolina.

Dr. Chapin served as an Extension Specialist for more than 32 years, with peanut being a large part of his responsibilities. His primary role from 1979 to 1991 was as the Extension Entomologist for the Savannah Valley region where he worked extensively with cotton and soybeans. Eventually he concentrated on peanut, cotton, and small grains. In the 1990's as the peanut program changed and South Carolina began to grow more peanuts, Dr. Chapin answered the need for local research and extension work. His most significant research contributions have been work on the effect of kernel feeding by the burrower bug on aflatoxin and kernel damage, and the regional peanut germplasm testing program for virginia and runner types which evaluated disease resistance and agronomic performance traits for identification of locally adapted varieties. He has conducted many fungicide and harvest date tests that directly impact growers by providing appropriate crop management options. Dr. Chapin's "Peanut Money Maker" publication became the reference for peanut production in South Carolina and surrounding areas. He also supported growers by providing the up-to-date information via numerous weekly newsletters, phone calls, field visits, production meetings, and an annual State Peanut Meeting. In addition to work on peanut, he has also contributed significantly to the extension and research efforts in other crops like soybean, cotton, small grains and sunflower in both insect and disease management. He is well known for his work on Hessian fly on small grains. Dr. Chapin has published more than 18 research articles and more than 36 abstracts on his applied research since the 1990s.

Dr. Chapin's service to APRES includes membership on the Site Selection, Fellows, Dow AgroSciences, Finance, and Publication and Editorial Committees, and a term on the Board of Directors. He received the Research and Education Award from the American Peanut Council in 2009, the Dow AgroSciences Award for Education in 2008, and the Bailey Award in 2006.

Dr. Barbara Shew

Dr. Barbara Shew received a B.S. in Plant Pathology from Colorado State University in 1976, an M.S. in Plant Pathology from North Carolina State University in 1980, and a Ph.D. in Plant Pathology from North Carolina State University in 1983. Her professional career in Plant Pathology has been at North Carolina State University where she was a Research Associate from 1994 to 1996, Senior Researcher from 1996 to 2002, Research Assistant Professor and Extension Specialist from 2002 to present, and Director, Plant Disease and Insect Clinic from 2009 to present.

Dr. Shew's research has improved understanding of the epidemiology and management of economically important diseases in peanut including leaf spot diseases, *Cylinrocladium* black rot, and Sclerotinia blight. Her efforts have helped lead to release and popular acceptance of improved peanut varieties, refinement and adoption of weather-based advisories and other decision-support systems, and integration of strategies to manage diseases. She has published 47 refereed journal articles, 21 technical publications, 103 abstracts and proceedings, and 2 book chapters.

Dr. Shew has compiled results from her research into recommendations for a broad clientele in North Carolina, the Virginia-Carolina production region, and US peanut production areas as a whole. As Extension Specialist, she is involved in field days and demonstrations, in-service agent training sessions, grower meetings, and preparation of educational materials. In cooperation with the State Climate Office, Dr. Shew provides disease advisories to county agents and growers by e-mail every day from 12 weather stations located in NC peanut counties. She has published numerous popular articles and extension publications.

Dr. Shew's course 'Epidemiology and Control of Plant Diseases" has contributed a great deal to preparing graduate students for careers in plant pathology and other related fields. She has served as major professor and committee member for several graduate students.

Dr. Shew's service to APRES includes membership on numerous committees and the Board of Directors, Chair of the Annual Meeting Technical Program, Associate Editor of *Peanut Science*, and APRES President. She received the Dow Agrosciences Award for Excellence in Research in 2008 and the Bailey Award 1996.

Howard Valentine

Howard Valentine received a B.S. in industrial engineering from Auburn University in 1968. He was a project manager for Texas instruments from 1968 to 1971, Director of Engineering from 1971 to 1977, Vice President Operations from 1977 to 1982, and Vice President Sales and Procurement from 1982 to 1987 for Columbian Peanut Company/Archer Daniels Midland, and Vice President Marketing for Golden Peanut Company from 1987 to 1997. Since 1997, he has served as Director of Research and Technology for the American Peanut Council, and Executive Director of the Peanut Foundation.

Howard Valentine has over 40 years of dedicated service to the peanut industry. His most notable contribution has been in his roles with The Peanut Foundation and The American Peanut Council where his insight into the needs of the industry and the potential to address these needs through research, has led to the formation of linkages between industry and academic research that have had industry-wide impact. He developed the first general manufacturing practice manual for the peanut industry. This has been often revised and is still in use today as the Good Manufacturing and Industry Best Practices for peanut product manufacturers. He played a key role in the formation and function of the Multi-Crop Aflatoxin Working Group, serving as Chairman from 1989 to 1992. This group's objective was to develop research strategies for the elimination of aflatoxin in many crops. They have been successful in obtaining funding of over $350 million dollars to support aflatoxin research. Valentine has also been influential in international trade. He has participated in trade missions to numerous countries, increasing the overall use of peanuts grown in the U.S. Valentine has served as a member of the Legume Genome Project and organized the Peanut Genomic Initiative in 2012 whose objective is to sequence the peanut genome. The initiative includes over 135 researchers located around the world. Through his leadership, the Peanut Genomic Initiative has currently been funded at a level of over $6,000,000 and already is stimulating new discoveries.

Howard has served on the Coyt T. Wilson Distinguished Service Award and Peanut Quality Committees, and the Board of Directors for many years. He has always provided key administrative oversight to many critical areas of peanut research and education that have and will continue to impact the peanut industry.

GUIDELINES for AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
FELLOW ELECTIONS

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

Eligibility of Nominators
Nominations may be made by an active member of the Society. A member may nominate only one person for election to fellowship in any one year.

Eligibility of Nominees
Nominees must be active members of the Society at the time of their nomination and must have been active members for a total of at least five (5) years. The nominee should have made outstanding contributions in an area of specialization whether in research, extension or administration and whether in public, commercial or private service activities. Members of the Fellows Committee are ineligible for nomination.

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

Format. Organize the nomination in the order shown in the "Format for Fellow Nominations." The body of the nomination, excluding publications lists and supporting letters, should be no more than eight (8) pages.

Supporting letters. The nomination shall include a minimum of three supporting letters (maximum of five). Two of the three required letters must be from active members of the Society. The letters are solicited by, and are addressed to, the nominator, and should not be dated. Those writing supporting letters need not repeat factual information that will obviously be given by the nominator, but rather should evaluate the significance of the nominee's achievements.

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

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

Processing of Nominations
The Fellows Committee shall evaluate the nominations, assign each nominee a score, and make recommendations regarding approval by April 1. The President of APRES shall mail the committee recommendations to the Board of Directors for election of Fellows, maximum of three (3), for that year. A simple majority of the Board of Directors must vote

in favor of a nominee for election to fellowship. Persons elected to fellowship, and their nominators, are to be informed promptly. Unsuccessful nominations will be reconsidered the following year and nominators will be contacted and given the opportunity to provide a letter that updates the nomination. After the second year unsuccessful nominations will be reconsidered only following submission of a new, complete nomination package.

Recognition

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

Distribution of Guidelines

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

BAILEY AWARD COMMITTEE REPORT –

The committee's business related to the 2013 Bailey Award winner was conducted by email, prior to the annual meeting. Nominations were received from all six eligible sessions of the 2012 annual meeting, and nominees were notified shortly after the meeting. Five manuscripts were received and accepted for final evaluation by the committee. The winning paper is to be presented the Bailey Award at the Thursday afternoon awards ceremony.

The winning paper is from a presentation titled "Effects of Peanuts and Fat-Free Peanut Flour of the Reversion of Atherosclerosis in Male Golden Syrian Hamsters" by Stephens, A.M and Sanders, T. H. Stephens, A.M. presented this paper and therefore, will receive the 2013 Bailey Award.

The chair would like to thank the committee for serving as reviewers and for their timely responses.

2012-13 Bailey Award Committee:
Naveen Puppala, Chair (2014)
Mehboob Sheikh (2013)
Austin Hagan (2013)
Shyamalrau Tallury (2015)
Kelly Chamberlin (2015)
Noelle Barkley (2015)

Respectfully Submitted by:
Naveen Puppala, 2012 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 –
Twelve M.S. and Ph.D. degree students gave outstanding presentations. This year's competition winners are:

First Place – Abraham Fulmer, The University of Georgia
"Evaluation of Peanut Rx to Predict Epidemics of Early and Late Leaf Spot"
(Dr. Bob Kemerait, major professor)

Second Place – Peter Eure, The University of Georgia
"Developing Pyroxasulfone for Use in Peanut".
(Dr. Eric Prostko, major professor)

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT –

Committee members for 2013 were Ames Herbert, Nathan Smith, Kim Moore, and Jack Davis, Chair. Tom McKemie was originally on the committee but had to drop off due to a job change and Ames Herbert filled his position. All business for this committee was conducted electronically. After reviewing all nominations, the committee unanimously recommended that the 2013 Coyt T. Wilson Distinguished Service Award be presented to Dr. John Beasley, University of Georgia. The committee also met on the afternoon of July 9 2013 (present were Jack Davis, Kim Moore and Ames Herbert) to discuss the 2014 award. All committee members agreed to encourage colleagues to nominate qualified individuals for this award.

Dr. John P. Beasley
2013 Recipient

The APRES Coyt T. Wilson Award recognizes an individual who has contributed two or more years of distinguished service to the American Peanut Research and Education Society. It is given annually in honor of Dr. Coyt T. Wilson who contributed freely of his time and service to the organization in its formative years.

The unanimous selection for this year's award, Dr. John P. Beasley, Professor and Extension Specialist at the University of Georgia, exemplifies this spirit of service. Dr. Beasley has been a member of APRES for 34 years and during this time he has only missed 1 meeting and that was due to illness. Dr. Beasley's has given freely of his time and talents to APRES, having served on numerous committees in addition to chairing eight, including: Public Relations, Bailey Award, Fellows, Finance, Site Selection, and Local Arrangements. His service and leadership to the society were readily apparent during the 2013 meeting, as he chaired both the Site Selection and Local Arrangement committees which were pivotal to the outstanding success of our society's most recent meeting. Dr. Beasley has served on the APRES board of directors and he was elected an APRES fellow in 2002.

Dr. Beasley was born in Dothan, AL and he earned a B.S. (1979) in agronomy and soils from Auburn University, a Masters (1981) in Agronomy from Oklahoma State University, and a Ph.D. (1985) in Crop Science from Louisiana State University. He accepted a faculty position at the University of Georgia immediately after his PhD, and he has climbed the ranks of the professorship including Associate (1991) and Full (1996).

Dr. Beasley has had a distinguished career in research and extension with a focus on peanut production in Georgia. To say that Dr. Beasley has excelled in extension work with the peanut industry would be an understatement. The following is a small sampling of his more recent extension awards:

- **Award of Excellence for Senior Scientist - Extension**, presented by the Faculty and Staff of the University of Georgia - Tifton Campus, 2005.
- **D.W. Brooks Award of Excellence** presented by UGA-College of Agricultural and Environmental Sciences, 2006
- **Georgia Peanut Distinguished Service Award** – awarded by Georgia Agricultural Commodity Commission for Peanuts, 2007
- **President's Award** – awarded by National Peanut Buying Points Association, 2010
- **Distinguished Service Award** - presented by the Georgia Crop Improvement Association for dedicated service to the Georgia Certified seed program, 2011
- **Distinguished Service Award -** presented by the National Association of County Agricultural Agents, 2011
- **Specialist of the Year Award –** presented by the Georgia Association of County Agricultural Agents, 2012

The following are quotes from two of his peers who were involved with his nomination:

> “Dr. Beasley is an excellent scientist and mentor. He contributes time and energy to development of young faculty associated with the American Peanut Research and Education Society, Cooperative Extension Service agents in Georgia, and graduate students. John has a keen sense of how to take pertinent scientific based information to the farmer and supporting industries. He has made this a focus in his career, and his numerous achievements on the professional level, and on the practical level at the farm, are testaments to his abilities.”
>
> “I might add that John is also well known for doing things right; if he was involved with a committee or activity, you could be assured he was actively involved and not just drifting along”.

APRES is clearly a better society due to Dr. Beasley’s numerous and unselfish contributions to the organization. These outstanding contributions make him highly deserving of the 2013 APRES Coyt T. Wilson Distinguished Service Award. Please join the committee in congratulating Dr. Beasley.

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.

III. Re-consideration of nominations.

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

Award and Presentation

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

Dow Agrosciences Awards Committee –
Chairman: Eric Prostko
Committee Members: Barbara Shew, Carroll Johnson, James Hadden, Rich Wilson
All committee correspondence was conducted via e-mail. No nominations were received for the Research Award. Peter Dotray was selected to receive the Education Award.

PETER DOTRAY
2013 DOW AGROSCIENCES AWARD FOR EXCELLENCE IN EDUCATION RECIPIENT

Peter Dotray is a Professor and Extension Weed Specialist with Texas Tech University, Texas A&M AgriLife Research, and Texas A&M AgriLife Extension Service - Lubbock. He is a native of Minneapolis, Minnesota, and received his B.S. degree in Agronomy from the University of Minnesota at St. Paul and his M.S. degree in Agronomy from Washington State University at Pullman. He received a Ph.D. in Agronomy from the University of Minnesota and started his three-way appointment in Lubbock in 1993.

Peter conducts weed control research in several crops including cotton, peanut, corn, grain sorghum, and sesame. In addition to weed control responsibilities, Peter has responsibilities in teaching weed science classes and serves as an Extension Weed Specialist in District 2, which contains 20 counties on the Texas Southern High Plains.

Peter has served as the major advisor or co-advisor of 33 graduate students, has served 29 graduate committees, and has four graduate students in progress. He has authored or coauthored 325 abstracts and proceedings, 59 journal articles, 174 technical publications and popular articles, seven book chapters, and has given 84 presentations at professional meetings and over 615 seminars and presentations at grower meetings.

Peter Dotray has been very active in the American Peanut Research and Education Society. He has served as Chair of the Technical Program Committee (2004) and Local Arrangements Committee (2011); and has served on the Joe Sugg Graduate Student Awards Committee, Site Selection Committee, Finance Committee, and Fellows Committee; and is currently serving a second term as Associate Editor of Peanut Science. He has received a number of awards including the American Peanut Research and Education Society Dow AgroSciences Award for Excellence in Research in 2010.

GUIDELINES for
DOW AGROSCIENCES AWARDS FOR EXCELLENCE IN RESEARCH AND EDUCATION

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

Eligibility of Nominees
Nominees must be active members of the American Peanut Research and Education Society and must have been active members for the past five years. The nominee or team must have made outstanding contributions to the peanut industry through research projects. An individual may receive either award only once as an individual or as a team member. Members of the Dow AgroSciences Awards Committee are ineligible for the award while serving on the committee.

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

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

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

Nomination Procedures
Nominations will be made on the Nomination Form for Dow AgroSciences Awards. Forms are available from the Executive Officer of APRES. A nominator's submittal letter summarizing the significant professional achievements and their impact on the peanut industry must be submitted with the nomination. Three supporting letters must be submitted with the nomination. Supporting letters may be no more than one page in length. Nominations must be postmarked no later than March 1 and mailed to the committee chair. Unsuccessful nominations will be reconsidered the following year and nominators will be contacted and given the opportunity to provide a letter that updates the nomination. After the second year unsuccessful nominations will be reconsidered only following submission of a new, complete nomination package.

Dow AgroSciences Awards Committee

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

PEANUT QUALITY COMMITTEE REPORT –

The meeting was called to order by Chairman Jim Elder at 2:00 pm. Those in attendance were the following: J. Elder, M. Kline, K. Cutchins, J. Marshall, T. Sanders, T. Isleib, D. Smyth, C. Chen, C. Holbrook, M. Lamb, F. Mills, H. Valentine, V. Nwosu, B. Branch, B. Guo, B. Tillman, M. Burow, J. Cottonaro, D. Sweigart.

Review of 2012 minutes:
The membership was asked to approve the 2012 meeting minutes. The meeting minutes were approved.

Review of Old Business:
Tim asked if Mars is still experiencing the black kernel issue and if they have identified the cause. Victor mentioned that they are but at much lower concentrations and was attributed to Aspergillus contamination. Doug mentioned that Kraft was experiencing some similar issues but were attributed to high moisture and high dryer temperatures. Howard highlighted the tote breathability changes and study that Chris Butts will be completing. Victor raised awareness of the importance of completing a transport study with the new totes.

Review of New Business:
Jim reviewed an issue Smucker's is experiencing with higher fat content peanuts that is related to the very mature crop. The high fat content is causing higher meal levels and resulting in more frequent cleaning of the bag houses and smoldering fire risk. Howard mentioned that it is likely that the level will drop to more historical levels with this upcoming year's crop. A consensus was drawn to wait and reassess fat content from this year's crop to determine if this is true.

Tom Isleib summarized the recent UPPT data for 19 Runner- and Virginia-type lines. Overall, Runner-type peanuts were more intense in flavor than Virginia's. Sweet sensory attribute intensity did not correlate strongly with sucrose content. Tom speculates that something is counteracting sweetness and we may need to look at multiple attributes such as bitter or dark roast to understand more fully.

Mark elaborated on the high oleic purity issue that Hershey's is experiencing. Victor mentioned that Mars has also experienced purity issues. A discussion ensued regarding supply regeneration from Breeder's seed and increased testing frequency. Bill remarked that he planted GA-09B in a field that had not grown peanuts for 4 years and still observed volunteers growing. Barry mentioned use of FTIR and GC for purity confirmation in his breeding program. Tim mentioned that Lisa Dean would be presenting research on purity later in the week.

Meeting was adjourned at 3:00 pm.

Respectively submitted,
Jim Elder, Chair

PROGRAM COMMITTEE REPORT –

There were 181 registered participants for the meeting plus 53 spouses/guests and 40 children. There were 90 presentations including 19 posters, 13 invited symposia, and 58 oral. The presentations covered the following topics: Breeding, Biotechnology, and Genetics; Production and Post-Harvest Technologies; Physiology and Seed Technology; Weed Science; Economics; Plant Pathology; Nematology; Entomology; Mycotoxins; the Bayer Excellence in Extension and Extension Techniques session and the Joe Sugg Graduate Student Competition. Additionally, there were two special symposia entitled "Recent Developments in US and International Peanut Markets" and "Historic Advancements for Yield Gain in Peanut".

SITE SELECTION COMMITTEE REPORT –

The APRES Site Selection Committee met at 3:00 PM on Tuesday, July 9, 2013 in the Cedar Knob Room at the Brasstown Valley Resort near Young Harris, GA.

Members present were:

John Beasley (GA) – 2013 – Chair
Peggy Ozias-Akins (GA) – 2013
Jason Woodward (TX) – 2014
David Jordan (NC) – 2015
Tom Stalker (NC) – 2015
Nick Dufault (FL) – 2016
Barry Tillman (FL) – 2016

(Todd Baughman (OK) – 2014 was unable to attend)

Additional attendees were:

Mike Baring (TX) and Naveen Puppala (NM), appointees to the committee representing the Southwest (SW) region, with terms beginning at the conclusion of the 2013 meeting and expiring in 2017;
Ames Herbert, APRES President
Kim Cutchins, Executive Officer

The following sites (properties) have been contracted for upcoming APRES meetings:
2014 – Menger Hotel, San Antonio, TX, July 8-10
2015 – Francis Marion Hotel, Charleston, SC, July 14-16
(a week later than normal because July 4th falls on a Saturday)

Future meeting rotation includes:
2016 – TBD in SE – Nick Dufault and Barry Tillman will talk with the leadership of the Southern Peanut Farmers Federation about the possibility of a joint meeting at one location (APRES would meet Tuesday – Thursday and the Southern Peanut Growers Conference would meet Thursday – Saturday).

2017 – TBD in SW – Naveen Puppala and Mike Baring will begin evaluating potential sites

Two specific issues that were addressed by the committee were:
1) Committee members that are requesting a proposal from a site need to be sure and ask for a group of rooms that are designated at the USDA rate.

2) New members of the committee, especially those that have not served on this committee in the past, need to work closely with the Executive Officer on the specific time table needed for obtaining a signed contract with a property in their region at least two years prior to the meeting.

Since appointments to the committee are made three years out, the recently appointed committee members need to be informed they have approximately one year to evaluate potential meeting locations, discuss those options with the other Site Selection Committee members, then have the Chair of the Committee submit the proposal to the Board of Directors for approval. These steps can be handled via e-mail and in a timely manner so that the Executive Officer has time to negotiate a contract two years in advance, preferably prior to the annual meeting.

Jason Woodward agreed to serve as Chair for the 2014 Site Selection Committee.

The meeting was adjourned at 3:50 PM.

Respectfully submitted,
John Beasley, Chair

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

ARTICLE I. NAME

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

ARTICLE II. PURPOSE

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

ARTICLE III. MEMBERSHIP

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

a. Individual memberships:

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

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

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

b. Sustaining memberships:
Industrial organizations and others that pay dues as fixed by the Board of Directors. Sustaining members are those who wish to support this Society financially to an extent beyond minimum requirements as set forth in Section 1c, Article III. Sustaining members may designate one representative who shall have individual member rights. Also, any organization may hold sustaining memberships for any or all of its divisions or sections with individual member rights accorded each sustaining membership.

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

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

3. *Platinum Level*, the person designated by the sustaining member would be entitled to a 100% discount on annual meeting registration. This benefit cannot be transferred to anyone else. Section 2. Any member, participant, or representative duly serving on the Board of Directors or a committee of this Society and who is unable to attend any meeting of the Board or such committee may be temporarily replaced by an alternate selected by such member, participant, or representative upon appropriate written notice filed with the president or committee chairperson evidencing such designation or selection.

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

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

ARTICLE IV. DUES AND FEES

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

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

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

ARTICLE V. MEETINGS

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

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

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

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

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

ARTICLE VI. QUORUM

Section 1. Those members present and entitled to vote at a meeting of the Society, after proper notice of the meeting, shall constitute a quorum.

<u>Section 2.</u> For meetings of the Board of Directors and all committees, a majority of the members duly assigned to such board or committee shall constitute a quorum for the transaction of business. The Board of Directors and all committees may conduct meetings and votes by conference call or by electronic means of communication as needed to carry out the affairs of the Society.

ARTICLE VII. OFFICERS

<u>Section 1.</u> 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.

<u>Section 2.</u> 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.

<u>Section 3.</u> 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.

<u>Section 4.</u> 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.

<u>Section 5.</u> 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.

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

<u>Section 7.</u> (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.

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

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

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

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

4. Supervise Administrative/Editorial assistant in:

a. Preparing routine correspondence with authors to provide progress report of manuscripts.

b. Preparing invoices and collecting page charges for accepted manuscripts.

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

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

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

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

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

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

11. Ensure timely progression of journal publication process including:

a. Development and review of galley proofs of individual articles.

b. Development and review of the journal proof (proof of all revised articles compiled in final publication format with tables of contents, page numbers, etc.)

c. Final publication and distribution to members and subscribers via electronic format.

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

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

ARTICLE VIII. BOARD OF DIRECTORS

Section 1. The Board of Directors shall consist of the following:
a. The president
b. The most recent available past-president
c. The president-elect

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

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

f. Three Industry representatives - these directors are (1) the production of peanuts; (2) crop protection; (3) grower association or commission; (4) the shelling, marketing, and storage of raw peanuts;(5) the production or preparation of consumer food-stuffs or manufactured products containing whole or parts of peanuts.

g. The President of the American Peanut Council or a representative of the President as designated by the American Peanut Council.

h. The Executive Officer - non-voting member of the Board of Directors who may be compensated for his services on a part-time or full-time salary stipulated by the Board of Directors in consultation with the Finance Committee.

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

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

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

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

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

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

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

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

ARTICLE IX. COMMITTEES

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

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

a. Finance Committee: This committee shall consist of four members that represent the diverse membership of the Society, each appointed to a three-year term. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendations as they deem necessary or as requested or directed by the Board of Directors. The term of the chairperson shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given on the work of the Finance Committee under his/her leadership, whichever is later.

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 by June 15 prior to that year's annual meeting. The president will then distribute those nominations to the Board of Directors for their review. The committee shall, insofar as possible, make nominations for the president-elect that will provide a balance among the various segments of the industry and a rotation among federal, state, and industry members. The willingness of any nominee to accept the responsibility of the position shall be ascertained by the committee (or members making nominations at the annual business meeting) prior to the election. No person may succeed him/herself as a member of this committee.

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

c. Publications and Editorial Committee: This committee shall consist of four members that represent the diverse membership of the Society and who are appointed to three-year terms. The members may be appointed to two consecutive three-year terms. This committee shall be responsible for the publication of Society-sponsored publications as authorized by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

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

e. Public Relations Committee: This committee shall consist of four members that represent the diverse membership of the Society and are appointed for a three-year term. The primary purpose of this committee will be to publicize the meeting and make photographic records of important events at the meeting. This committee shall provide leadership and direction for the Society in the following areas:

1. Membership: Development and implementation of mechanisms to create interest in the Society and increase its membership. These shall include, but not be limited to, preparing news releases for the home-town media of persons recognized at the meeting for significant achievements.

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

3. Necrology: Proper recognition of deceased members.

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

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

g. Fellows Committee: This committee shall consist of four members that represent the diverse membership of the Society and who are themselves Fellows of the Society. Terms of office shall be for three years. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. From nominations received, the committee shall select qualified nominees for approval by majority vote of the Board of Directors.

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

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

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

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

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

ARTICLE X. AMENDMENTS

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

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

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

Amended at the Annual Meeting of the
American Peanut Research and Education Society
14 July 2011, San Antonio, Texas

MEMBERSHIP (1975-2006)

	Individuals	Institutional	Organizational	Student	Sustaining	Total
1975	419	--	40	--	21	480
1976	363	45	45	--	30	483
1977	386	45	48	14	29	522
1978	383	54	50	21	32	540
1979	406	72	53	27	32	590
1980	386	63	58	27	33	567
1981	478	73	66	31	39	687
1982	470	81	65	24	36	676
1983	419	66	53	30	30	598
1984	421	58	52	33	31	595
1985	513	95	65	40	29	742
1986	455	102	66	27	27	677
1987	475	110	62	34	26	707
1988	455	93	59	35	27	669
1989	415	92	54	28	24	613
1990	416	85	47	29	21	598
1991	398	67	50	26	20	561
1992	399	71	40	28	17	555
1993	400	74	38	31	18	561
1994	377	76	43	25	14	535
1995	363	72	26	35	18	514
1996	336	69	24	25	18	472
1997	364	74	24	28	18	508
1998	367	62	27	26	14	496
1999	380	59	33	23	12	507
2000	334	52	28	23	11	448
2001	314	51	34	24	11	434
2002	294	47	29	34	11	415
2003	270	36	30	23	10	369
2004	295	43	22	19	11	390
2005	267	38	28	15	8	356
2006	250	33	27	25	7	342

MEMBERSHIP (2007-2013)

	2007	2008	2009	2010	2011	2012	2013
Individual, Regular	228	185	184	172	162	204	238
Individual, Retired	13	13	14	13	10	9	9
Individual, Post Doc/Tech Support	6	9	7	11	4	5	3
Individual, Student	20	16	28	22	14	30	26
Sustaining, Silver	7	8	6	9	6	9	11
Sustaining, Gold	1	2	3	5	3	2	2
Sustaining, Platinum	1		1	1	2	1	1
Institutional	6	21	21	19	21	23	24
TOTAL	**280**	**254**	**264**	**252**	**215**	**283**	**314**

Author Index