Beyond the Dust Bowl: Peanut Production Challenges from the Ground Up

The Omni Oklahoma City
Oklahoma City, Oklahoma
July 9-11, 2024

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Gunter Peanut Company, Binger, OK
TOUR LUNCH SPONSORED BY HELENA

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56th ANNUAL MEETING of the
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Oklahoma City, Oklahoma
July 9-11, 2024

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Monday - July 8, 2024

Optional Tour

8:30 am Depart Omni Hotel, OKC (Meet in hotel lobby)

9:30 am Arrive at Schantz Farms, Hydro, OK (Welcome—Merlin Schantz-owner/operator, Les Crall – OPC Chairman and NPB Alternate, David Nowlin- OPC Executive Director)

10:45 am Depart Schantz Farms

11:15 am Arrive at Birdsong Peanuts Buying Point, Eakly, OK

12:00 pm Depart Birdsong Peanuts Buying Point, Eakly, OK

12:30 pm Arrive at Oklahoma State University's Caddo Research Station, Ft. Cobb, OK

Sponsored lunch (Helena) and field tour (Speakers from Oklahoma State University: Dr. Scott Senseman, Associate Vice President, Division of Agricultural Sciences and Natural Resources; Dr. Wade Thomason, Department Head, Plant and Soil Sciences; Dr. Justin Talley, Department Head, Entomology and Plant Pathology; Wes Lee, Oklahoma Mesonet)

2:15 pm Depart OAES Caddo Research Station, Ft. Cobb, OK

2:45 pm Arrive at Gunter Peanut Company, Binger, OK

3:30 pm Depart Gunter Peanut Company, Binger, OK

4:30 pm Arrive at Omni Hotel, OKC

5:00 - 7:00 - Meet & Greet Happy Hour Social…………………………………… Social Capital OKC

Tuesday - July 9, 2024

7:30 - 5:00 - APRES Registration/Poster Setup .... Oklahoma Station Prefunction Area
8:00 - 5:00 - Presentation Practice Room .... Paseo
8:00 - 10:00 - Seed Summit .... Oklahoma 3
9:00 - 5:00 - Spouse Hospitality Room .... Deep Deuce
12:00 - 1:15 - Lunch .... *(On your own)*

Committee Meetings
10:00 - 12:00 - Crop Germplasm Committee .... Oklahoma 3
1:15 - 2:15 - Public Relations Committee .... Mistletoe
1:15 - 2:45 - Peanut Quality Committee .... Oklahoma 3
2:45 - 3:45 - Publications and Editorials Committee .... Pinion
2:45 - 3:45 - Associate Editors, *Peanut Science* .... Mistletoe
2:45 - 3:45 - Site Selection Committee .... Bricktown
4:00 - 5:00 - Bailey Award Committee .... Pinion
4:00 - 5:00 - Finance Committee .... Oklahoma 2

Technical Sessions
1:15 - 4:45 - Joe Sugg – Masters Competition I *(Sponsored by NC Peanut Producers)* .... Route 66
3:00 - 3:15 - Break *(Sponsored by Premium Peanut)* .... Oklahoma Station Prefunction Area
3:15 - 5:00 - Extension Techniques I .... Oklahoma 3
5:00 - 6:00 - Board of Directors .... Mistletoe

6:00 - 8:00 - "Welcome to Oklahoma" Ice Cream Social .... Scissortail Terrace

Wednesday - July 10, 2024

7:00 - 5:00 - APRES Registration/Poster Setup .... Oklahoma Station Prefunction Area

8:00 - 5:00 - Spouse Hospitality Room .... Deep Deuce

8:00 - 5:00 - Presentation Practice Room .... Paseo

Sessions

8:00 - 10:00 - General Session – *Beyond the Dust Bowl: Peanut Production Challenges from the Ground Up*.. Oklahoma 1-3

10:00 - 10:15 - Break *(Sponsored by FMC)*.. Oklahoma Station Prefunction Area

10:15 - 11:30 - Joe Sugg – Masters Competition II *(Sponsored by NC Peanut Growers)* .... Route 66

10:15 - 11:30 - Weed Science & Entomology .... Oklahoma 1

10:15 - 11:45 - Breeding/Biotechnology/Genetics I .... Oklahoma 3

12:00 - 1:30 - Lunch.. *(on your own)*

1:30 - 4:00 - The Inaugural Charles Simpson Wild Arachis Species Session .... Oklahoma 3

1:30 - 3:45 - Plant Pathology & Mycotoxins .... Oklahoma 1

2:15 – 5:00 - Joe Sugg – PhD Competition I *(Sponsored by National Peanut Board)*........................ Route 66

2:45 - 3:00 - Break *(Sponsored by FMC)*.. Oklahoma Station Prefunction Area

6:00 - 8:00 Savor & Connect Dinner (Sponsored by BASF and Bayer) .... Oklahoma 4

*Poster presentations open all day

Thursday - July 11, 2024

6:00 - 7:45 - Fun Run..Omni Lobby

7:00 - 5:00 - APRES Registration/Poster Viewing .... Oklahoma Station Prefunction Area

8:00 - 5:00 - Spouse Hospitality Room..Deep Deuce

8:00 - 5:00 - Presentation Practice Room ....Paseo

Sessions

8:00 - 9:00 - Food Science, Harvest, Shelling, Storage and Handling ....Oklahoma 3

8:00 - 9:15 - Production Technology and Economics ....Oklahoma 1

8:00 - 9:30 - Joe Sugg – PhD Competition II *(Sponsored by National Peanut Board)*........................Route 66

9:15 - 9:45 - Break *(Sponsored by Fine Americas)* .... Oklahoma Station Prefunction Area

9:45 - 12:10 - Flavor Symposium..Oklahoma 1-3

12:10 - 1:30 - Graduate Student Luncheon *(Sponsored by Syngenta)*..Mistletoe

12:10 - 1:30 - Lunch..(on your own)

1:30 - 2:30 - Physiology and Seed Technology ....Oklahoma 1

1:30 - 2:30 - Joe Sugg – PhD Competition III *(Sponsored by National Peanut Board)* ....Route 66

1:45 - 3:15 - Breeding/Biotechnology/Genetics II ....Oklahoma 3

3:00 - 3:15 - Break *(Sponsored by HudsonAlpha)* .... Oklahoma Station Prefunction Area

3:15 - 5:00 - Poster Session (Authors Present) .... Oklahoma Station Prefunction Area

5:00 - 6:00 - APRES 56th Business Meeting and Awards Ceremony ....Oklahoma 1-3

6:00 - 7:30 Awards Reception (Sponsored by Corteva Agriscience) .... Oklahoma 4

*Poster presentations open all day

1:15 – 4:45	**Joe Sugg MS Competition I** Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
1:15	**Utilizing Grading Factors to Predict Loose Shell Kernel Generation under a Harsh Harvest Process** **L.C. ICHAZO-RIBERA***, B.L. TILLMAN, M.D. GOYZUETA, M.W. GOMILLION, North Florida REC, Agronomy Department, University of Florida. Marianna, FL 32446.	1
1:30	**Peanut Leaf Spot Disease Progress in Different Peanut Genotypes Based on Lesion Incidence and Percent Defoliation** **F.A. SILVA*,** A.K. CULBREATH, R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; S. LEAL-BERTIOLI, Department of Plant Pathology, University of Georgia, Athens, GA 30602; E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA 31793.	2
1:45	**Coordinated Hydraulic Traits Confer Drought Tolerance in Peanut** **L. TORRES*,** G. SAPES, W.M. HAMMOND, Agronomy Department University of Florida/IFAS, Gainesville, FL 32611; C. ICHAZO, M. GOMILLION, B. TILLMAN, North Florida Research and Education Center, Marianna, FL 32446.	3
2:00	**Developing a Pheromone Trap Based Economic Threshold for Lesser Cornstalk Borer in Peanut** **M. LANE*,** M. ABNEY, Department of Entomology, University of Georgia, Tifton Campus, Tifton, GA 31793.	4
2:15	**An Evaluation of Prohexadione Calcium Formulation on Yield of Peanut (*Arachis hypogaea L.*)** **K. MORGAN,** Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31794; S. MONFORT, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31794.	5
2:30	**Exploring Peanut Root-Knot Nematode Resistance in *Arachis cardenasii* Introgressed Cultivated Peanut Lines** **S. BOTTON***, Department of Horticulture and Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton GA, USA; W. KORANI, Hudson-Alpha Institute for Biotechnology, Huntsville, AL; J. CLEVENGER, Hudson-Alpha Institute for Biotechnology, Huntsville AL; L. SCHUMACHER, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; P. TIMPER, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; Y. CHU, Department of Horticulture, University of Georgia, Tifton, GA; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; P. OZIAS-AKINS, Department of Horticulture and Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA.	6
2:45	**Harnessing Genetics: Improving Resistance to Tomato Spotted Wilt Virus in Cultivated Peanut** **S. WEBB***, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA; Y. CHU, Department of Horticulture, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; J. CLEVENGER, W. KORANI, HudsonAlpha Institute for Biotechnology, Huntsville, AL; B. GUO, USDA-ARS, Crop Genetics and Breeding Research , Tifton, GA; A. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA; P. OZIAS-AKINS, Department of Horticulture, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA.	7
3:00	**BREAK**	

1:15 – 4:45	**Joe Sugg MS Competition I continued** Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
3:15	**Influence of Adjuvant and Size on Texas Panicum Control** **A. CLOBAS-CELIZ*,** M.W. MARSHALL, Edisto Research and Education Center, Clemson University, Blackville, SC 29817.	8
3:30	**Characterizing Rootworm Feeding and Its Impact on Peanut Pod Yield** **J. ROYSTON***, M. ABNEY, Department of Entomology, University of Georgia, Tifton Campus, Tifton, GA 31793.	9
3:45	**Effects of Planting Date and Fungicide Spray Initiation on Leaf Spot Diseases of Peanut** **A.G. ATKINSON***, A.K. CULBREATH, R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698.	10
4:00	**Evaluation of Different Zone-Based Soil Sampling Strategies for Variable-Rate Lime Application in Peanut Fields** **J.D. BEASLEY*,** S.S. VIRK, G.M. HARRIS, L.M. BASTOS, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; A.R. SMITH, Department of Agricultural and Applied Economics, University of Georgia, Tifton, GA 31793.	11
4:15	**Assessing Plant Densities and Fungicide Programs for Interactions on Peanut Disease Incidence and Yield** **L. FRAPOLI*,** R.S. TUBBS, Department of Crop and Soil Sciences, University of Georgia, Tifton Campus, Tifton, GA 31793; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton Campus, Tifton, GA 31793.	12
4:30	**Analyzing the Effects of Differing Seeding Rates on Thrips Infestation and Tomato Spotted Wilt Virus Incidence** **M. CAVASSA***, S. GRAHAM, A. STRAYER-SCHERER, Entomology and Plant Pathology Department, Auburn University, Auburn, AL 36849.	13

Utilizing Grading Factors to Predict Loose Shell Kernel Generation under a Harsh Harvest Process

L.C. ICHAZO-RIBERA*, B.L. TILLMAN, M.D. GOYZUETA, M.W. GOMILLION, North Florida REC, Agronomy Department, University of Florida. Marianna, FL 32446.

Peanut harvest is an intricate operation since it involves digging, followed by field drying, and carefully harvesting the pods to safeguard the seed from biological or physical damage. Generation of Loose Shell Kernels (LSK) during harvest increases the probability of the seeds to be exposed to mycelia or spores during the post-harvest handling, especially if storage conditions are not optimal; therefore, LSK are a risk factor for aflatoxin contamination. This fact led to the hypothesis that LSK are highly correlated to physical characteristics of the pods, such as Hull Thickness (HT), Total Sound of Mature Kernels (TSMK), and Seed Weight (SW), and that a predictive model for LSK could be developed using these grading factors. This study utilizes data from two years (2022 and 2023). Nine different advanced genotypes were grouped into three categories based on their HT. Experimental plots were harvested on two different dates using a harsh harvest method. LSK percentage was calculated from a through sorting after the harvest, and a 200g subsample was collected from each plot for grading. Initially, Pearson correlation coefficients were calculated using the CORR procedure of SAS statistical software, and highly correlated variables to LSK were selected to be used for model development. To avoid overfitting the models, Mallows' Cp coefficient and Adjusted R2 were used to determine the best models to predict LSK generation in each harvest. Once the models were established regressions were calculated by using the REG procedure of SAS. All the variables from grading were correlated to LSK except for Sound of Mature Kernels ($p>0.05$). Nevertheless, only Meats, Seeds Weight, and TSMK were selected to create the LSK prediction models for each harvest. For both years, the best model for the 1st Harvest included Meats and SW (Adj R2= 0.36: Cp=2.87); for the 2nd Harvest, the best model included Meats, SW, and TSMK (Adj R2= 0.40: Cp=4.00). In conclusion, LSK can be predicted using variables measured during grading; the grading information provides a valuable tool for predicting LSK from a harsh harvest process; at the same time, we believe that the prediction models can be improved by hull calcium content.

Peanut Leaf Spot Disease Progress in Different Peanut Genotypes Based on Lesion Incidence and Percent Defoliation

F.A. SILVA*, A.K. CULBREATH, R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; S. LEAL-BERTIOLI, Department of Plant Pathology, University of Georgia, Athens, GA 30602; E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA 31793.

The study was conducted to determine the different responses of selected peanut genotypes to peanut leaf spot disease based on lesion development and resultant defoliation. Field experiments were conducted in 2023 at the University of Georgia in two locations (Lang and Black Shank Farms) in Tifton, GA. The genotypes included three susceptible cultivars (TUFRunner '511', Georgia-13M and Georgia-06G), five genotypes with resistance chromosome segments from *Arachis cardenasii* (CB1, CB2, CB7, TBI_S11, and IAC 322) and three genotypes with resistance chromosome segments from *Arachis stenosperma* and *Arachis batizocoi* (170_A_9, 95_C_9, and 158_B_10). Disease ratings per genotype replicate were done based on the estimated percentage of leaves with at least one lesion and percent defoliation. The disease progress curves (DPC) and the calculated area under the disease progress curve (AUDPC) were based on the disease ratings at 106,114,122,130 and 138 days after planting. Across locations, AUDPC values of both lesion and defoliation ratings were significantly higher in the cultivars TUFRunner'511', Georgia-13M, and Georgia-06G compared to the other genotypes ($p<0.001$). Based on the lesion ratings, AUDPC values of the resistant genotypes range from 358 to 1710 with IAC 322 having the lowest AUDPC (LSD = 462). Based on the defoliation ratings, AUDPC values of the resistant genotypes range from 217 to 710, with IAC 322 and TBI_S11 having significantly lower AUDPC than others (LSD = 186). Genotype response to peanut leaf spot based on lesion and defoliation ratings followed similar trends ($r=0.8$, $p<0.001$). These results indicate that all the genotypes identified as leaf spot resistant in previous studies suppressed epidemic development by reducing lesion incidence and leaf defoliation percentage as compared to the three cultivars used as standards.

Coordinated Hydraulic Traits Confer Drought Tolerance in Peanut

L. TORRES*, G. SAPES, W.M. HAMMOND, Agronomy Department University of Florida/IFAS, Gainesville, FL 32611; C. ICHAZO, M. GOMILLION, B. TILLMAN, North Florida Research and Education Center, Marianna, FL 32446.

Climate change will increase the duration, intensity, and frequency of droughts in many regions. Peanuts (*Arachis hypogaea*) are a widely cultivated crop in the tropics and warm areas worldwide and drought stress is one of the major limitations of their production. Identifying drought tolerance traits could improve the selection of genotypes for this climatic context. This study aims to assess physiological trait coordination across different peanut genotypes. In this experiment we phenotyped 10 genotypes at three water stress intensities: Turgor loss point (TLP), xylem tension at 50% loss of hydraulic conductivity (P50), and xylem tension at 88% loss of conductivity loss (P88)). Before the onset of the stress, we measured TLP, xylem vulnerability curves, and leaf thermal limits. During drought experiment we measured predawn water potentials, maximum quantum yield of the PSII (Fv/Fm) daily, and midday stomatal conductance during the stress and recovery periods. Additionally, we recorded measurements of leaflet angle change and percentage of dead leaf tissue. We found high variation between genotypes. Turgor loss points averaged -1.55 MPa (range: -1.95 MPa and -1.11 MPa). P50 averaged of -6.11 MPa (range: -3.04 Mpa to -8.1 Mpa). Safety margins defined as the difference between P50 and TLP explained why some plants were able to recover after severe stress, and why other genotypes could not. Safety margins were on average -3.30 MPa (range: -1.63 to -6.14). The critical temperature, which represents the beginning of damage to the photosynthetic system, had an average of 46.84 °C and varied between 45.47 °C and 48.66 °C between genotypes. In the drought experiment, water potential gradually declined as drought duration increased. Stomatal conductance declined at different rates among genotypes, which was related to their vulnerability to embolism, with the most vulnerable genotypes showing a faster decline" or something. Fv/Fm also declined at all stress levels. Some genotypes modified the angle of their leaflets during drought stress, reducing the area of water loss. After rehydration, plants were able to restore both water potential and stomatal conductance. However, Fv/Fm did not fully recover in any of the treatments after rehydration, indicating a legacy of dysfunction. The variation in drought tolerance trait combinations we observed deserves further investigation, the measurement of different responses allows us to identify possible tolerance traits.

Developing a Pheromone Trap Based Economic Threshold for Lesser Cornstalk Borer in Peanut

M. LANE*, M. ABNEY, Department of Entomology, University of Georgia, Tifton Campus, Tifton, GA 31793.

Lesser Cornstalk Borer (LCB), *Elasmopalpus lignosellus* (Zeller), is an economically important pest of peanut, *Arachis hypogaea,* causing damage to stem, pegs, and pods. Lesser cornstalk borer outbreaks primarily occur in hot, dry conditions where peanuts are grown in sandy soils. Current economic thresholds are based on larval abundance, but due to their cryptic behavior, LCB can be very difficult to monitor. Scouting for LCB is time consuming and expensive, and errors can lead to significant economic losses. A threshold based on moth captures in pheromone traps would provide significant cost savings to growers and reduce the likelihood of management mistakes. This study was designed to determine the relationship between LCB moth capture rates and: 1. larva abundance, 2. incidence of damage, and 3. number of moths observed in flush counts. Commercial peanut fields in Georgia were sampled weekly from May until September using pheromone traps, pitfall traps, whole plant examinations, and flush counts. Data will be used to determine if moth numbers in traps can be used to accurately predict larval infestation. The ultimate goal of this project is to develop an economic threshold for LCB in peanut based on pheromone trap captures.

An Evaluation of Prohexadione Calcium Formulation on Yield of Peanut (*Arachis hypogaea L.*)

K. MORGAN, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31794; S. MONFORT, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31794.

Arachis hypogaea, the cultivated peanut, is characterized into four selections of market types: Virginia, Spanish, Valencia, and Runner. Runner market type peanuts are the most dominant type grown in the United States. Runner peanut cultivars are low growing with moderate growth habits. With this in mind, Prohexadione Calcium has commonly utilized in Virginia type peanut crops to regulate excessive vine growth and enhance digger efficiency. Over the past 5 to 10 years, there has been a gradual increase in the vigorous growth habit of runner type cultivars, sparking a renewed interest in growth regulators. Previous research has shown promise for managing vine growth and enhancing yield with reduced rates on runner-type peanut cultivars. In 2023, evaluations in Georgia were conducted to further assess the response of runner cultivars at reduced rates and application timings of Prohexadione Calcium in a large plot of replicated trials. Prohexadione Calcium applications commenced when 50% of lateral vines from adjacent rows were in touching. Treatments and application timings included: 1.) Untreated Check, 2.) 2 oz/A at 45, 60, 75, and 90 days after planting (DAP), 3.) 2 oz/A at 45 DAP followed by 4 oz/A at 60 and 75 (DAP), 4.) 4 oz/A at 65 AND 75 DAP, 5.) 7.5 oz/A at 60 DAP and 4 oz/A at 75 DAP, and 6.) 4 oz/A at 60, 75, and 90 DAP. Cultivar and treatment responses were assessed based on, main stem height, internodal length, and node to height ratio, and yield. Treatments of Prohexadione Calcium at all rates reduced main stem heights and node to height ratio 6 weeks from initial applications. Yield was significantly higher for all treatments except for the Kudos at 7.5 oz/A 60 DAP followed by 4 oz/A at 75 DAP treatment when compared to the untreated check. This research supports other research where reduced rates manage vines similar to higher rates while increasing yield.

Exploring Peanut Root-Knot Nematode Resistance in *Arachis cardenasii* Introgressed Cultivated Peanut Lines

S. BOTTON*, Department of Horticulture and Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton GA, USA; W. KORANI, Hudson-Alpha Institute for Biotechnology, Huntsville, AL; J. CLEVENGER, Hudson-Alpha Institute for Biotechnology, Huntsville AL; L. SCHUMACHER, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; P. TIMPER, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; Y. CHU, Department of Horticulture, University of Georgia, Tifton, GA; C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research, Tifton, GA; P. OZIAS-AKINS, Department of Horticulture and Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA.

Peanut root-knot nematode (*Meloidogyne arenaria*; PRKN*)* is a microscopic roundworm that preys on the roots of many crops, including cultivated peanut (*Arachis hypogaea).* Without mitigation, these roundworms can lead to major yield losses for growers. In 2020, PRKN was responsible for a 3% reduction in the peanut crop value in the state of Georgia. To combat this pest, strong genetic resistance from a wild relative (*A. cardenasii)* was introgressed into peanut in the 1990's. Genetic studies revealed that this introgression covers ~92% of chromosome A09 in cultivated peanut. It was also revealed that the upper portion of the introgression was responsible for strong resistance while the lower portion yielded a moderate resistance. Beyond this analysis, little is known about the exact locations of the responsible resistance genes. The objective of this study was to perform PRKN greenhouse assays on recombinant peanut lines. Results from these trials hopefully will bring further understanding of this introgression that will help breeders develop improved cultivars that have a stable and strong resistance.

Harnessing Genetics: Improving Resistance to Tomato Spotted Wilt Virus in Cultivated Peanut

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Cultivated peanut (*Arachis hypogaea*) is an important crop in the U.S. and around the world. Tomato spotted wilt virus (TSWV) can cause significant yield loss in infected peanut fields. An increased loss from TSWV has occurred in recent years. Genetic resistance is the favorable method of yield protection for producers. Breeders and pathologists have spent many years evaluating the available resistance sources to provide the best combination of genetics against TSWV. PI 203396 has been used since the mid-1990s as a successful source of resistance and more recently, PI 576638 (also known as SSD6) has been introduced as a second source of genetic resistance in peanuts. A quantitative trait locus (QTL) related to TSWV resistance was identified on chromosome A01 in NC94022, a highly resistant offspring of SSD6. The presence of favorable alleles near this QTL were confirmed to result in a significant increase in TSWV resistance when evaluated using eight populations from our breeding program. These populations were developed from a recombinant inbred line (RIL) progeny of SSD6 x Tifrunner crossed with eight unique female parents of advanced breeding lines or elite varieties. In 2023, we continued evaluating these populations for their improved TSWV resistance and agronomic traits. When compared to TSWV susceptible lines, our populations showed significant improvement in their TSWV resistance. They were on average more resistant than control varieties with resistance from PI 203396 alone but were more susceptible than resistant check NC94022. This result indicates an improvement in TSWV resistance when using SSD6 as a genetic source and confirms that there is more resistance to be obtained. Under the high TSWV pressure seen in this field, our populations showed high average yields when harvested from replicated small plots. More genetic evaluation and larger field trials are necessary to continue screening advanced lines from these populations. Current results are promising for the future of peanut varieties with improved resistance to important peanut diseases while maintaining expected yields and quality.

Influence of Adjuvant and Size on Texas Panicum Control

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Texas panicum (TP) is a warm-season grass that competes with the peanut (*Arachis hypogaea* L.) for water, nutrients, and light, resulting in productivity losses. In-season residual herbicides typically provide short-term suppression of TP. Therefore, postemergence grass herbicides like clethodim are used to control later flushes. The efficacy of clethodim is impacted by growth stage and relative stress level at the time of application. If timely herbicide applications are delayed due to weather conditions, then the larger TP plants are more difficult to control compared to the smaller ones. Therefore, studies were initiated to evaluate the efficacy of clethodim at various TP growth stages and to evaluate different adjuvant combinations on small and large TP. In study 1, TP was sprayed with clethodim at 0.105 kg ha-1 at four different growth stages ranging from 10 to greater than 30 cm. In addition, a sequential clethodim application was applied two weeks after the first application for the 10-15, 15-20, 20-30, and >30 cm TP heights. In study 2, the following adjuvants with clethodim were evaluated NIS at 0.25% v/v, COC at 1% v/v, MSO at 1% v/v, and COC and MSO with AMS at 0.25% v/v. Clethodim at 0.105 kg ha-1 was applied at the 10-15 and 20-30 cm TP heights. Percent visual TP injury ratings and weed height were collected 14 days after each application (DAA) timing. At 21 DAA timing, TP plants were clipped at the soil surface, and dry biomass was determined. In study 1, clethodim provided good TP control (87%) when applied at a single application at the 10-15 cm growth stage. Sequential applications improved TP control (100% and 97%) at the 10-15 cm and 15-20 cm growth stages compared to the single application (87% and 74%), respectively. In addition, control was better with the sequential application of clethodim at the 20-30 cm growth stage (85% versus 64%). At the larger growth stage (>30 cm), a sequential application of clethodim at 0.140 kg ha-1 improved control to 74% compared to the single herbicide application (61%). However, TP control declined as weed size increased in both the single and sequential applications. In study 2, adjuvant was an important factor in the efficacy of clethodim on TP. Clethodim plus COC and COC+AMS provided the highest level of TP control (91% and 92%, respectively) at the 10-15 cm growth stage, followed by clethodim plus MSO+AMS with 88% TP control. Clethodim activity decreased as weed size increased. TP control using NIS and MSO was significantly lower compared to the COC. AMS did improve MSO activity on TP but not with COC. TP weed size played a role in the efficacy of clethodim with better activity on smaller weeds. In addition, adjuvant greatly influenced clethodim activity on TP. In summary, growers should spray TP at the 5-15 cm growth stage and use either COC or AMS plus MSO.

Characterizing Rootworm Feeding and its Impact on Peanut Pod Yield

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Two rootworm species are commonly found in peanut in Georgia. While the southern corn rootworm (SCR), *Diabrotica undecimpunctata*, is recognized as a serious pest of peanut, the pest status of the banded cucumber beetle (BCB), *D. balteata*, a native of the neotropics, is less well understood. Recent studies show that BCB now outnumbers SCR in Georgia peanut fields and occurs in areas of the state where there is no history of rootworm infestation. The purpose of this study is to characterize rootworm feeding in terms of feeding site preference (i.e. fruiting structures) and time of feeding as well as determine the effect of feeding injury on seed yield and quality. A small-plot, replicated field study was conducted in 2022 and 2023 at the UGA Southwest Research and Education Center in Plains, GA. Peanut treated with an experimental insecticide to reduce rootworm infestation was planted adjacent to non-treated peanut in a RCB design. Plants were sampled weekly in each plot beginning at pegging; all fruiting structures were removed, counted, measured, assessed for feeding injury, and dried and weighed. Seed yield and quality was assessed at harvest. Rootworm injury severity varied by year, but non-treated plants tended to have more fruiting structures but lower overall pod dry weight than treated plants. This work indicates that BCB presents a significant economic threat to peanut production in GA, and the development of effective IPM tactics is a priority.

Effects of Planting Date and Fungicide Spray Initiation on Leaf Spot Diseases of Peanut

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Early and late leaf spot diseases, caused by the pathogens *Passalora arachidicola* and *Nothopassalora personata,* can cause severe defoliation and yield loss if left untreated, and can be economically devastating on organic peanut production. Peanut planting date has been shown to have an effect on leaf spot severity, with late planting dates typically resulting in more severe leaf spot epidemics than early planting dates. The purpose of this research was to determine if using early planting dates can allow delayed initial fungicide application. In 2023, we conducted two similar trials, with peanut cultivar Georgia-16HO in one and Georgia-12Y in the other at the UGA Lang Farm in Tifton, Georgia. Both trials were conducted using a randomized block design with four replications in factorial arrangement. Two planting dates, May 4 and June 1 and five 14-day interval fungicide initiation treatments, starting on 33, 44, 58, 72, and 86 days after planting (DAP) were investigated. A nontreated control was also included. The respective treatments resulted in 7, 6, 5, 4, and 3 applications in the Georgia-16HO trial and 8, 7, 6, 5, and 4 total applications in the Georgia-12Y trial per planting date. For all fungicide applications, a mixture of 0.56 kg/ha of Nordox 75W (0.47 kg/ha elemental copper) + 2.8 kg/ha of Microthiol Disperss (2.2 kg elemental sulfur/ha) was used. The plots were rated weekly using visual estimates of percent defoliation. For Georgia-16HO, six ratings were conducted in the early planted plots, and nine in the late planted plots. For Georgia-12Y there were seven ratings for the early planted plots and ten for the late planted plots. Data was analyzed by trial using Proc Mixed, where planting dates and fungicide treatments were fixed effects and replication was considered a random effect. Fisher's LSD was calculated for mean comparisons. The Georgia-16HO final percent defoliation for the non-treated control and treatments receiving 7, 6, 5, 4, and 3 sprays, were 78.8%, 5.9%, 3.4%, 10.6%, 9.7%, and 13.4%, respectively for early planting, and 97.5%, 14.4%, 15.3%, 56.3%, 77.8%, and 95% respectively for late planting. For the Georgia-12Y trial, final percent defoliation for the nontreated control and treatments receiving 8, 7, 6, 5, and 4 sprays, were 80.6%, 27.5%, 35.0%, 31.3%, 36.9%, and 64.1%, respectively for early planting and 98%, 62.5%, 75.9%, 80.6%, 87.2%, and 93.5%, respectively for the late planting. In both trials, all treatments provided control of leafspot that was significantly different than their respective nontreated controls. Notably, with both Georgia-16HO and Georgia-12Y early planting with fungicide applications beginning at 86 DAP were comparable to fungicide applications beginning at 33 DAP for late planting.

Evaluation of Different Zone-Based Soil Sampling Strategies for Variable-Rate Lime Application in Peanut Fields

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Precision soil sampling strategies are commonly used to determine areas in the field for site-specific application of soil amendments and nutrients. Grid-based soil sampling is a predominant practice in the southeastern US and research has shown that the nutrient application accuracy decreases significantly for grid sizes greater than 2.5 ac. Precision soil sampling on grids, especially on 1.0 and 2.5 ac, incurs considerable soil sampling and analysis costs. Thus, there has been an increased interest among consultants and growers recently in understanding the potential of zone-based soil sampling methods to lower some of the soil sampling costs while maintaining high application accuracy. Currently, many precision ag companies offer zone-based soil sampling services that combine homogeneous areas of the field and present information on zones for soil sampling. To better understand the potential of different zone-based soil sampling methods for variable-rate liming in peanut fields, a study was conducted in three fields in South Georgia using three different zone-based soil sampling methods. Soil samples were also collected on 0.25 ac grids for the assumed ground truth to use as a reference for application accuracy. The first strategy (S1) utilized SSURGO data, elevation, and aerial imagery to create management zones while the second approach (S2) used a combination of soil CEC, soil EC, and topographic layers to create management zones for collecting soil samples. The third strategy (S3) used several years of historical data as well as the previous layers to delineate MZs. The soil sampling based on each of the three strategies was conducted in Spring 2024 and all the soil test results along with the economics of each method are being analyzed. Variable-rate lime application maps (lime) based on each strategy will be created and compared to the reference map generated from the 0.25 ac grid sampling method. The results of this study will focus on understanding the application accuracy associated with different zone-based soil sampling methods as compared to the traditional grid-based soil sampling approach for variable-rate lime application in peanut fields.

Assessing Plant Densities and Fungicide Programs for Interactions on Peanut Disease Incidence and Yield.

L. FRAPOLI*, R.S. TUBBS, Department of Crop and Soil Sciences, University of Georgia Tifton Campus, Tifton, GA 31793; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia Tifton Campus, Tifton, GA 31793.

Peanut (*Arachis hypogaea* L.) production in the southeastern US relies heavily on fungicide application, to control dangerous pathogens such as early (*Passalora arachidicola*) and late (*Nothopassalora personata*) leaf spot, white mold (*Agroathelia rolfsii*) and tomato spotted wilt virus (TSWV; *Orthotospovirus*). The aim of this experiment is to find a possible interaction between the factors of plant population density and fungicide input program, in order to calibrate treatments based on the corresponding risk level of each plant population density. Three populations were studied: 5.0 plants/m 8.3 plants/m and 11.6 plants/m in a factorial arrangement with three fungicide input programs ranging from low to medium to high risk level (according to PEANUT Rx). The experiment was conducted in 2021, 2022, and 2023 in Tifton, GA. No interactions occurred between tested variables. Pod yield showed differences in 2023 with the sparsest population having 14% and 21% less yield than the mid and denser populations, respectively. Leaf spot was consistently significant concerning fungicide program. The high risk program did not protect as well as the medium risk program, which performed best. Leaf spot incidence was also significant in 2021 concerning plant population density with 5.0 plants/m population having the least disease incidence and 11.6 plants/m the most. TSWV showed an increasing incidence with a decreasing population in 2022. No differences were found for white mold. Fungicide programs are still vital for crop protection and plant density can affect different pathogens in different ways.

Analyzing the Effects of Differing Seeding Rates on Thrips Infestation and Tomato Spotted Wilt Virus Incidence.

M. CAVASSA*, S. GRAHAM, A. Strayer-Scherer, Entomology and Plant Pathology Department, Auburn University, Auburn, AL 36849.

Thrips are a common pest of row crops throughout the southeast, including being a pest of peanuts. There are nine species of Thrips transmitting *tomato spotted wilt virus*. It is vital that growers have some options to combat thrips infestation. One possible cultural tool to deter thrips from feeding on peanuts is increasing peanut seeding rates. Higher field populations of peanuts could be less attractive to thrips as they are not able to identify plants against the contrasting background of the soil. Fields with uneven, or sporadic stands of peanuts may be more visible to thrips while they are flying and looking for hosts. The test consists of thirty-foot plots of Georgia06-G peanuts. Georgia06-G was selected because of its moderate tolerance of *tomato spotted wilt virus.* The test plots will have varying seeding rates of three, six, and nine seed per row foot randomized in a block. There are two planting dates of the test. To increase the likelihood of seedling peanuts encountering thrips. Thrips injury ratings as well as thrips counts will be taken at 14, 21, 28 days after planting. The test is replicated at the Wire Grass Research and Extension Center in Headland Alabama, as well as the E.V Smith Research Center – Plant Breeding Unit in Tallassee Alabama.

3:15 – 5:00	**Extension Techniques I** Meeting Room: Oklahoma 1 *Moderator: David Jordan, North Carolina State University*	Pres. #
3:15	**Using the Fieldprint Calculator to Measure On-Farm Sustainability When Incorporating Irrigation Scheduling Methods on Cotton and Peanut Crops in Georgia** **K.R. Reagin***, W.M. PORTER, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793 0748; A. ALESSO, E.C. CORONEL, Field to Market, Washington D.C., 20002.	14
3:30	**Cook County Peanut Fungicide Trial Results** **T. PRICE*,** University of Georgia, Cook County, Adel, GA 31620; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; B. REEVES, University of Georgia, Berrien County, Nashville, GA 31639.	15
3:45	**Peanut Variety Response to Growth Regulator** **W. PARKER***, University of Georgia, Statesboro GA 30458; S. MONFORT, University of Georgia, Tifton, GA 31793; S. POWELL, University of Georgia, Soperton, GA 30457; S. TANNER, University of Georgia, Swainsboro, GA 30401.	16
4:00	**Evaluating Fungicides for Reducing White Mold in Peanuts in Bulloch County, Georgia** **W.G. TYSON***, Bulloch County Cooperative Extension, University of Georgia, Statesboro, GA 30458; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31794.	18
4:15	**Survey of Peanut Farmer Practices Used to Protect Peanut from Injury Caused by Thrips in the Virginia-Carolina Region** **B. PENDLETON***, B. BARROW, C. ELLISON, L. GRIMES, A. COLF, R. GURGANUS, M. STRICKLAND, L. MILES, M. CARROLL, D. KING, S. JALAI, P. SMITH, B. PIKE, B. PARRISH, T. BRITTON, D. LILLEY, H. WALLACE, L. CHILDERS, J. MORGAN, J. KENNEDY, M. WATERS, M. HUFFMAN, M. SEITZ, J. HARRELL, M. SMITH, A. GROVE, M. MALLOY, R. WOOD, D. ANDERSON, T. BATTS, J. ANDERSON, Z. PARKER, R. BRANDENBURG, D. REISIG, and D.L. JORDAN, NC State Extension, Raleigh, NC 27695; L. PREISSER, S. REITER, E. COOPER, S. RUTHERFORD, N. CLARK, and S. MALONE, Virginia Cooperative Extension Service, Blacksburg, VA; J. CROFT, J. VARN, R. GIBSON, M. MIKELL, D, DEWITT, C. DAVIS, and D. ANCO, Clemson Cooperative Extension Service, Clemson, SC 29634.	19
4:30	**Thrips and Nematode Suppression with Vydate: Results from On-Farm and Research Station Trials** **C. ELLISON*,** R. BRANDENBURG, B. ROYALS, E. FOOTE, D. LILLEY, P. SMITH, D.L. JORDAN, North Carolina State University, Raleigh, NC 27695.	20
4:45	**On-Farm Testing Results in North Carolina from Peanut Trials in 2021-2023** **M. STRICKLAND***, B. BARROW, C. ELLISON, L. GRIMES, L. MILES, D. KING, P. SMITH, B. PIKE, T. BRITTON, D. LILLEY, D. ANDERSON, R. BRANDENBURG, M. LEARY, E. FOORE, D.L. JORDAN, North Carolina State Extension, Raleigh, NC 27695.	21

* Presentation #17 withdrawn prior to meeting

6:00 - 8:00 Ice Cream Social - Scissortail Terrace

Using the Fieldprint Calculator to Measure On-Farm Sustainability When Incorporating Irrigation Scheduling Methods on Cotton and Peanut Crops in Georgia

K.R. REAGIN*, W.M. PORTER, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793 0748; A. ALESSO, E.C. CORONEL, Field to Market, Washington D.C., 20002.

It is estimated that approximately 600,000 row crop hectares are under an irrigation system in Georgia. Various irrigation systems are utilized with the hopes of improving seasonal crop productivity, however, many systems have been utilized in a way that would be considered environmentally unsustainable. To potentially improve the environmental footprint, the implementation of irrigation scheduling methods can be utilized. A study conducted by Porter et al. (n.p), evaluated the effect of various irrigation scheduling methods on cotton and peanut yield. The scheduling methods included: UGA checkbook method, Irrigator Pro application, and Watermark® soil moisture sensors. All methods were compared to a dryland control. To measure the environmental impact of these scheduling methods on cotton and peanut crops, an in-silico experiment was conducted where production simulations were ran using the Field to Market Fieldprint Calculator. Four base crop production scenarios were built within the Calculator and were based off UGA Enterprise Budgets, they included: irrigated – conventional tillage, irrigated – strip-tillage, dryland – conventional tillage, and dryland – strip-tillage.
Irrigation amounts and yield results from the irrigation scheduling study were applied to the base scenarios. Results from the simulations were applied to 234 real fields under a cotton-peanut rotation under varying weather conditions from 2014 to 2018. The eight Field to Market sustainability metrics were evaluated for trends, however, only the irrigation water use, soil conservation, soil carbon, greenhouse gas emission, and energy use metrics were reported. There was little variation across the irrigation scheduling treatments, however, the interaction between type of tillage utilized and irrigation impact all metrics apart from the soil-based metrics.

Cook County Peanut Fungicide Trial Results

T. PRICE*, University of Georgia, Cook County, Adel, GA 31620; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; B. REEVES, University of Georgia, Berrien County, Nashville, GA 31639.

Peanut production in Cook County, Georgia comprised $ 11,125,000 of the county's total $147 million-dollar farm-gate value in 2022. White Mold (WM) (*Sclerotium rolfsii*) is considered by growers to be the most destructive disease in peanut production. To generate local data for peanut growers upon which to base their disease management decisions and to increase economic returns on production investments, Cook County Extension, a local grower, and a UGA Extension Plant Pathologist collaborated to establish a trial evaluating peanut fungicide programs for WM and leafspot (LS) control. Ten fungicide programs were tested in the irrigated replicated trial using programs common among peanut producers in the southeastern United States. Disease ratings and yields for each treatment were recorded. Local Agri-suppliers provided data on costs of fungicides. WM total percent infection varied from 3% to 35% among treatments. LS severity in the trial was low (LS < 2) and was assessed using the Florida 1 to 10 scale (1 = no disease, 10 = complete defoliation). The Tebuconazole/Bravo treatments showed the highest average WM percent infection (33%). The Umbra/Tebuconazole showed lowest percent infection (5%) however statistically equal was Elatus/Tebuconazole (6%) and Convoy/Elatus (7%). Harvest weights per treatment were averaged among the three replications. The Tebuconazole/Bravo treatment showed lowest yield (4,092 lbs./A) in the trial while Elatus/Tebuconazole yielded the highest (5,834 lbs./A). Umbra/Tebuconazole yield (5615 lbs./A) was statistically equal to Elatus/Tebuconazole treatments. The least expensive program in the trial was the Tebuconazole/Bravo ($39/A) and showed the lowest profit ($685/A) while the Elatus/Tebuconazole was the most expensive ($130/A) and showed the highest profit ($903/A) among all treatments. The Umbra/Tebuconazole treatment cost ($99/A) which was the third least expensive in the trial and was ranked second in profit per acre ($894/A).

Peanut Variety Response to Growth Regulator

W. PARKER*, University of Georgia, Statesboro GA 30458; S. MONFORT, University of Georgia, Tifton, GA 31793; S. POWELL, University of Georgia, Soperton, GA 30457; S. TANNER, University of Georgia, Swainsboro, GA 30401.

Growth regulator use in peanuts were readily used in the 70's and 80's production systems. Many varieties exhibited heavy vine growth, which made overall management difficult, especially harvesting. Current or newly released varieties have demonstrated excessive vine growth in certain production environments, which has resulted in a demand increase for growth regulator usage. A research trial was conducted to measure variety response to the application of the growth regulator Kudos. Each variety consisted of treated vs. untreated plots, replicated four times in a randomized complete block design. Varieties assessed included: AUNPL-17, Georgia-06G, Gerogia-12Y, Georgia-16HO, and Georgia-18RU. The trial was planted on May 11 and harvested on October 24. The trial averages in terms of yield were 5,832 lbs./A and 5,296 lbs./A for the treated and untreated respectively. AUNPL-17, GA-12Y, and GA-16HO were all statistically different when comparing their treated vs. untreated yields. GA-12Y exhibited the most yield response with 1,079 lbs./A over the untreated. GA-06G had the least yield response with the untreated yielding 5 lbs./A over the treated. The results of this trial support the fact the new peanut varieties, not including GA-06G, responded positively to a growth regulator program. More work will be conducted in the future to solidify this concept.

Evaluating Fungicides for Reducing White Mold in Peanuts in Bulloch County, Georgia

W.G. TYSON*, Bulloch County Cooperative Extension, University of Georgia, Statesboro, GA 30458; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31794.

White mold is a critical problem for peanut producers in Bulloch County and must be addressed with additional on-farm research to establish “best management” practices. The producers’ current best line of defense to combat the problem involves selection of more-resistant varieties and judicious use of fungicides. Further research is needed to provide recommendations to growers regarding the use of newer fungicides and application strategies for the management of white mold. In this demonstration conducted in 2023, the effectiveness of ten different fungicide programs was evaluated. The experimental design was a complete block design with four replications. Data collected throughout this study included severity of leaf spot and incidence of white mold. Means were separated using Fisher’s protected LSD. From this research, the effectiveness of the fungicide treatments in reducing the incidence of white mold was evaluated as part of a disease management program to improve yield and quality. This data will play an important role in recommendations for future use of peanut fungicide selection to reduce white mold in Bulloch County and the Southeast.

Survey of Peanut Farmer Practices Used to Protect Peanut from Injury Caused by Thrips in the Virginia-Carolina Region

B. PENDLETON*, B. BARROW, C. ELLISON, L. GRIMES, A. COLF, R. GURGANUS, M. STRICKLAND, L. MILES, M. CARROLL, D. KING, S. JALAI, P. SMITH, B. PIKE, B. PARRISH, T. BRITTON, D. LILLEY, H. WALLACE, L. CHILDERS, J. MORGAN, J. KENNEDY, M. WATERS, M. HUFFMAN, M. SEITZ, J. HARRELL, M. SMITH, A. GROVE, M. MALLOY, R. WOOD, D. ANDERSON, T. BATTS, J. ANDERSON, Z. PARKER, R. BRANDENBURG, D. REISIG, and D.L. JORDAN, NC State Extension, Raleigh, NC 27695; L. PREISSER, S. REITER, E. COOPER, S. RUTHERFORD, N. CLARK, and S. MALONE, Virginia Cooperative Extension Service, Blacksburg, VA; J. CROFT, J. VARN, R. GIBSON, M. MIKELL, D, DEWITT, C. DAVIS, and D. ANCO, Clemson Cooperative Extension Service, Clemson, SC 29634.

A survey of practices associated with insect management, tillage systems, and freeze damage in peanut was conducted in 2024 at county production meetings for the 2023 cropping cycle in North Carolina (150 respondents representing 43% of acreage in the state) and statewide production meetings in Virginia (41 respondents representing 37% of acreage in the state) and South Carolina (6 respondents representing 1,200 acres in the state). In North Carolina and Virginia, the most popular in-furrow insecticide was imidacloprid (64% and 76% of growers, respectively) followed by AgLogic and acephate (14% to 20% of growers). Phorate was the most popular in-furrow insecticide in South Carolina. Sixty to 68% of growers reported that they made routine applications of acephate after peanuts emerged in North Carolina and Virginia, with 33% of growers doing so in South Carolina. In North Carolina, more growers indicated that thrips were more difficult to control now than in the past (57%) compared with those indicating that difficulty in controlling thrips had not changed (35%). In Virginia and South Carolina, the percentage of growers for these categories was similar. In North Carolina, Virginia, and South Carolina, 19%, 3%, and 17% of growers, respectively, indicated that they had damage from burrower bug in 2023. Incidence of tomato spotted wilt was 9% to 12% across the three states. A higher percentage of growers in Virginia used reduced tillage (49%) compared with North Carolina (24%) and South Carolina (33%). Growers were asked how many hours separated digging and a freeze or frost event when they had freeze damage. When 24, 48, 72, and 96 hours separated digging and the freeze or frost event, two, 3, 1, and 4 percent of growers reported freeze damage at these respectivel intervals.

Thrips and Nematode Suppression with Vydate: Results from On-Farm and Research Station Trials

C. ELLISON*, R. BRANDENBURG, B. ROYALS, E. FOOTE, D. LILLEY, P. SMITH, D.L. JORDAN, North Carolina State University, Raleigh, NC 27695.

Injury to peanut caused by thrips can decrease peanut yield in North Carolina. Growers often apply systemic insecticides in the seed furrow at planting to suppress this insect pest. Regardless of the in-furrow insecticide treatment, acephate is often applied postemergence to provide addition control of thrips. Control of thrips by imidacloprid has become inconsistent in North Carolina. While aldicarb and phorate are available for use in peanut, these insecticides are formulated as granular products, and many growers who adopted use of imidacloprid continue to prefer this insecticide because it is a liquid that can applied in-furrow with inoculant for used for biological nitrogen fixation. In cases where imidacloprid is less effective now than in the past, many growers are interested in an alternative insecticide that is formulated as a liquid rather than using a granular product (e.g., AgLogic or Thimet). Vydate (oxamyl) has been commercially available for use in peanut during the past two growing seasons in North Carolina. Large-plot, on-farm trials and small-plot, research station trials were conducted in 2022 and 2023 to determine efficacy of Vydate against thrips compared with other in-furrow insecticides. Thrips control with Vydate was similar to control by aldicarb, imidacloprid, and phorate in several trials. In some trails, Vydate was more effective than imidacloprid. Vydate was compatible with inoculant applied for biological nitrogen fixation. Although additional research is needed to confirm efficacy over a broader range of conditions, these data indicate that Vyrdate is a reasonable alternative to imidacloprid for growers who prefer a liquid product to apply in the seed furrow when imidacloprid is only marginally effective. Results relative to suppression of plant parasitic nematodes by Vydate were inconclusive.

On-Farm Testing Results in North Carolina from Peanut Trials in 2021-2023

M. STRICKLAND*, B. BARROW, C. ELLISON, L. GRIMES, L. MILES, D. KING, P. SMITH, B. PIKE, T. BRITTON, D. LILLEY, D. ANDERSON, R. BRANDENBURG, M. LEARY, E. FOORE, D.L. JORDAN, North Carolina State Extension, Raleigh, NC 27695.

In 2021, ten trials were conducted on farms with direction from NC State Extension agents to compare yield and market grades for the varieties; and response to the number of applications of Apogee, response to seeding rates. No difference in yield was noted when comparing Bailey II, Emery and Sullivan in two trials and Bailey II, Emery, Sullivan, Wynne and Walton in one trial. Peanut yield at seeding rates of 4, 5, and 6 seed per foot did not differ in one trial or when seeded at 5.1, 5.5, and 6 seed per foot in a separate trial. Two applications of Apogee increased peanut yield in two trials. Digging at 4.0 mph with a KMC digger resulted in lower yields compared with digging at 2.6 mph in a trial in Columbus County. In 2022, twelve trials were conducted on farms with direction from NC State Extension agents and on research stations to compare yield and market grades for the varieties; response to Apogee or Kudos; response to seeding rates; response to the combination of AgLogic and inoculant; and yield of peanuts expressing nutrient deficiency. No difference in yield was noted when comparing: Bailey II, Emery, and Sullivan in two trials; Bailey II, Emery, Sullivan, and Walton in four trials; and Bailey II, Emery, Sullivan, Walton, and Tif-NV HOL Jumbo) in one trial. Peanut yield at seeding rates of 4, 5, and 6 seed per foot did not differ in one trial. Apogee or Kudos did not increase yield in two trials. No difference in yield was noted when comparing AgLogic and inoculant treatments in one trial. Yield of peanuts expressing nutrient deficiencies was similar to peanuts not expressing a deficiency in one trial. In 2023, thirty trials were conducted on farms with direction from NC State Extension agents and on research stations to compare yield and market grades for the varieties; peanut response to single and twin rows; response to the number of Apogee or Kudos sprays; response to combinations of AgLogic and inoculant; efficacy of Steward to suppress southern corn rootworm; effectiveness of Vydate in suppressing thrips compared with commercial standards; peanut response to zinc; and response to ammonium sulfate and KMag applied early in the growing season after peanuts emerged; and to compare leaf spot control with microionized sulfur and chlorothalonil and timing of follow up applications of fungicide in Miravis-Elatus programs. Yield of Bailey II, Emery, and Sullivan was similar in 7 of 12 trials. Walton yielded as well as Bailey II, Emery, and Sullivan in 6 trials. Tif Jumbo yielded less than these varieties in 1 of 2 trials. Apogee increased yield in 1 of 3 trials. No difference in yield was noted when peanut was planted in twin rows compared with single rows or when ammonium sulfate or KMag was applied to peanut early in the season. Applying chlorothalonil for the first and last spray protected peanut from leaf spot more effectively than microionized sulfur as the first and last spray. Yield was lower when sulfur was used in place of chlorothalonil. No difference in leaf spot control or peanut yield was observed when the interval between Miravis plus Elatus sprays and follow up fungicides was compared (2, 3, and 4 weeks.) Steward applied three times beginning in late June protected peanut from rootworm scarring in three of five experiments. However, no difference in yield was observed in trials with a difference in pod scarring. Vydate suppressed thrips as well as AgLogic in one experiment and more effectively than imidacloprid in three experiments.

8:00 – 10:00	**General Session – *Beyond the Dust Bowl: Peanut Production Challenges from the Ground Up*** Meeting Room: Oklahoma Station Ballroom 1-3 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
8:00	**Welcoming Remarks** **B. ARTHUR***, Oklahoma Commissioner of Agriculture and the President of the Oklahoma State Board of Agriculture, Oklahoma City, OK 73105.	22
8:10	**Welcoming Remarks** **J. LUSK*,** Vice President and Dean, Division of Agricultural Sciences & Natural Resources, Oklahoma State University, Stillwater, OK 74078.	23
8:20	**Climate-Proof Your Farm: Catching the Raindrop Where It Falls** **J. EMMONS*,** Oklahoma Farmer, and Senior Vice President of Climate-Smart Programs, Farm Journal. Leedey, OK 73654.	24
8:45	**Considerations to Maximize Soil Health Benefits of Conservation Practices in the Southeast U.S.** **K.S. BALKCOM*,** USDA-ARS, National Soil Dynamics Laboratory, Auburn, AL 36832.	25
9:10	**USDA Climate Hubs: Supporting Climate-Informed Decision Making to Reduce Agricultural Production Risk** **A.F. CIBILS***, USDA-ARS, USDA Southern Plains Regional Climate Hub, Oklahoma & Central Plains Agricultural Research Center, El Reno, OK 73036.	26
9:35	**Aquifer Health and Irrigation Prospects in the Southern High Plains, Southeast, and Mid Atlantic** **S.R. EVETT*,** USDA-ARS, Conservation & Production Research Laboratory, Bushland, TX 79012.	27

Considerations to Maximize Soil Health Benefits of Conservation Practices in the Southeast U.S.

K.S. BALKCOM*, USDA-Agricultural Research Service, National Soil Dynamics Laboratory, Auburn, AL 36832.

Degraded soils across the Southeast typically have low organic matter contents and are susceptible to soil erosion. High temperatures, rainfall, and humidity do not allow surface residues to persist for long periods of time; therefore, these soils are susceptible to degradation (i.e. erosion). In addition, conventional tillage buries residue that speeds up their decomposition, leaving soils unprotected to erosive forces, such as water and wind. Conservation practices, such as high residue cover crops combined with conservation tillage can offset these negative effects and improve soil health that can potentially increase soil productivity. However, growers adopting these practices are not always prepared for the time and management needed to obtain the benefits, control the costs, all the while maximizing their return on investment (ROI). Management factors, such as planting date, seeding rate, and N fertilization each affect cover crop performance. An understanding of how these management factors affect cover crop biomass production and relate to soil and crop benefits is critical for growers to decide how they invest their resources into conservation practices, such as cover crops. Planting cover crops early, identifying the lowest effective seeding rate necessary, and timely N fertilizer applications all promote biomass production, but their effect on a grower’s ROI impacts their decision to adopt conservation practices long-term. Evaluations of interactions among these factors ensure incorporating these production practices into existing crop production systems, such as peanut are justified.

USDA Climate Hubs: Supporting Climate-Informed Decision Making to Reduce Agricultural Production Risk

ANDRES F. CIBILS, USDA Southern Plains Regional Climate Hub. USDA ARS OCPARC, 7727 West Cheyenne Street, El Reno, OK 73036.

Temperature and precipitation patterns across much of the peanut growing region of the US have changed detectably over the last century. Data reported in the latest National Climate Assessment of the United States (NCA5) suggest that the frequency of severe heavy precipitation events has increased compared to the 1950s, and that annual number of large extreme weather events that cause losses exceeding $ 1 billion, such as hurricanes, have increased several-fold since the 1980s. The latest Climate Coupled Model Intercomparison (CMIP6) predicts future increases of 3 to 7oF in annual average temperatures and a 5-10% increase in annual precipitation across the region in coming decades. Projected impacts of climate change on agricultural yields range between a 20% increase to a 60% decrease depending on local conditions across the Southeastern US states. The USDA Climate Hubs were created 10 years ago to develop and deliver science-based, region-specific information and technologies to farmers and ranchers. This network of 10 regional Hubs, plus a recently created International Climate Hub, works closely with federal, state, and tribal partners to fulfill their mission. Their work focuses on supporting climate-informed decision making to reduce production risk and build resilience in the agricultural sector. As part of their mission, the Climate Hubs are actively engaged in co-developing decision support applications to help mitigate production risk associated with climate variability. Tools such as *Agro*Climate developed by a consortium of universities and supported by the Southeast Climate Hub will be discussed. Challenges associated with the co-development and maintenance of online digital toolsheds for climate adaptation of the peanut industry will be examined.

Aquifer Health and Irrigation Prospects in the Southern High Plains, Southeast, and Mid Atlantic

S.R. EVETT*, USDA-ARS, Conservation & Production Research Laboratory, Bushland, Texas 79012

Although two thirds of U.S. peanut acreage is grown without irrigation, irrigation does provide much of the highest quality and quantity of production. Net returns above variable production cost average $278 for irrigated versus $109 for non-irrigated peanuts and yields average 4,700 lbs/acre for irrigated compares with 3,400 lbs/acre for non-irrigated peanuts. With climate change there is an increase in long term and flash droughts in the Southwest, Southeast and Mid-Atlantic regions for which irrigation is an effective mitigation strategy. Aquifer declines are, however, becoming important limitations on irrigation water supplies. Wells in the southern Ogallala aquifer region that flowed at 1,000 gpm when drilled are now delivering 100 to 150 gpm if they have not gone dry. Declines in the Pennsylvanian and Southeastern Coastal Plain aquifer systems are affecting water supplies in the Southeast and Mid-Atlantic regions, and inter-state surface water disagreements are bringing curtailment to surface water supplies in some areas. Nonetheless, improvements in peanut genetics and management, including irrigation management and technologies, have substantially increased the crop water productivity of peanut production systems, and have the potential to reduce aquifer withdrawals when combined with effective public policy.

10:15–11:30	**Joe Sugg MS Competition II** Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
10:15	**Varietal Response of Peanut to Disease Pressure in a Mid-South Growing Environment** **B. BULLOCK***, B. ZURWELLER, B. PIERALISI, D. DODDS, Department of Plant and Soil Science, Mississippi State University, Mississippi State, MS 39762; T. WILKERSON, Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State Delta Research and Extension Center, Stoneville, MS 38776.	28
10:30	**Impact of Storage Conditions on Peanut Seed Viability** **S.J. BOWEN***, T. GREY, W.S. MONFORT, C. PILON, N.L. HURDLE, Department of Crop and Soil Sciences, University of Georgia, Tifton Campus, Tifton, GA 31793; K. EASON, USDA-ARS, Southeast Watershed Research Unit, Tifton, GA 31793.	29
10:45	**Modeling the Relationship Between Peanut Yield and Sclerotinia Blight Severity in Oklahoma** **L. MÜLLER***, M.R. DUFFECK, J. DAMICONE, K. JACKSON, Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078; R. BENNETT, and K. CHAMBERLIN, USDA-ARS, Peanut and Small Grains Research Unit, Stillwater, OK 74075.	30
11:00	**Sensory Profiles and Volatile Compounds of Spanish, Valencia, and Runner Peanut Market-Types** **L.K. DEXTER-BOONE***, Food Science, Bioprocessing, and Nutrition Department, North Carolina State University, Raleigh, NC 27606; L.L. DEAN, S.D. JOHANNINGSMEIER, USDA-ARS, Food Science and Market Quality & Handling Research Unit, Raleigh, NC 27695.	31
11:15	**Relative Vigor of Peanut Cultivars and Susceptibility to Rhizopus Seed and Seedling Rot** **L. MCEACHIN***, M. AKTARUZZAMAN, Plant Pathology Department, The University of Georgia, Tifton, GA 31794, T. BRENNEMAN, Plant Pathology Department, The University of Georgia, Tifton, GA 31794, C. PILON, Crop and Soil Science Department, The University of Georgia, Tifton, GA 31794.	32

Varietal Response of Peanut to Disease Pressure in a Mid-South Growing Environment

B. BULLOCK*, B. ZURWELLER, B. PIERALISI, D. DODDS, Department of Plant and Soil Science, Mississippi State University, Mississippi State, MS 39762; T. WILKERSON, Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State Delta Research and Extension Center, Stoneville, MS 38776.

Disease pressure has been a determining factor for reducing yields and increasing input costs on peanuts in the Mid-South. Many popular varieties are susceptible to disease. Early Leaf Spot, Southern Blight, and Late Leaf Spot are examples of yield limiting diseases. One way to combat disease is varietal selection. There has been little research done to evaluate disease resistance among new varieties. An experiment was conducted in Starkville, Mississippi at the R.R. Foil Plant Science Research Center and Stoneville, Mississippi at the Delta Research and Extension Center in 2023 to evaluate different varieties resistance to diseases; furthermore, both locations have had peanuts grown for many years and Southern Blight is prevalent at both locations. Six varieties were planted in a randomized complete block: GA-06G, GA-21GR, TIFNV-HG, FloRun 52N, FloRun T61, and UF 11x23. Visual checks were conducted in accordance with the Florida Leaf Spot 1-10 scale at 105, 120 and 135 days after planting and Southern Blight ratings were taken at hits per foot after digging. All data were subjected to ANOVA using PROC GLM in SAS® 9.4. Means were separated using Fisher's LSD Alpha 0.05.

Impact of Storage Conditions on Peanut Seed Viability

S.J. BOWEN*, T. GREY, W.S. MONFORT, C. PILON, N.L. HURDLE, Department of Crop and Soil Sciences, University of Georgia Tifton Campus, Tifton, GA 31793; K. EASON, Agriculture Research Service, United States Department of Agriculture, Tifton, GA 31793.

Achieving optimal peanut germination is crucial for a successful growing season. Improper storage conditions, such as fluctuating temperatures and high humidity, can negatively impact peanut germination and seedling vigor after planting. Experiments were designed to determine the decreases in phenotypical parameters various peanut cultivars experience when exposed to multiple storage environments. In Spring 2022, peanut cultivars GA-16HO and GA-06G were planted and maintained under UGA agronomic recommendations. Following harvest, in-shell peanuts were transferred to a forced air dryer where they were dried to a 10 to 12% moisture level prior to shelling in Jan 2023. Seed were then separated by size (medium and jumbo) and allowed to air dry so each cultivar could obtain two moistures: 6 and 9%. Harvested seed were then stored for monitoring in 2023. Vacuumed sealed seed packets were placed in two storage locations regulated at 10 and 35°C. During the last week of each subsequent month (twelve total), two sub-samples from each cultivar-moisture content-storage location combination (160 total each month) were sampled to conduct seed germination testing. Laboratory germination testing was conducted at the UGA Weed Science Annex using growth chambers, and the other set was sent to the Georgia Department of Agriculture Seed Laboratory. Overall, when comparing cultivars across all conditions, GA-06G exhibited greater germination than GA-16HO. Data were analyzed with ANOVA to establish the influence of main effects (cultivar, time, temperature and moisture combination, and testing locations), and their potential interactions. There were no consistent trends observed across all storage conditions. However, there was a notable trend indicating that seeds stored at 10°C and 6% moisture had germination rates that extended further over the course of 12 months than those stored at 30°C and 9% moisture. These data indicate that improved germination and vigor can be extended by proper moisture and temperature regulation over time for peanut.

Modeling the Relationship Between Peanut Yield and Sclerotinia Blight Severity in Oklahoma

L. MÜLLER*, M.R. DUFFECK, J. DAMICONE, K. JACKSON, Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078; R. BENNETT, K. CHAMBERLIN, USDA-ARS, Peanut and Small Grains Research Unit, Stillwater, OK 74075.

Peanuts are an important field crop in Oklahoma, acting as a profitable option in rotation with cotton and other crops. However, yield losses caused by Sclerotinia blight (SB) (*Sclerotinia minor*) can be devastating under disease-conducive environmental conditions. Accordingly, a meta-analysis was conducted to explore the relationship between SB severity (%) and peanut yield (kg ha-1) using data from fungicide trials performed in small plots between 1990 and 2019 in OK. A total of 112 studies met the criteria for inclusion in the analysis: SB severity ≥ 10% in the untreated check and number of treatments per study ≥ 4. Yield class (low = ≤ 2,881 and high = > 2,881 kg/ha) was included as categorical moderator. A random-coefficient model was successfully fitted to the data using maximum likelihood. The estimates of population-average of the intercept and slope were $\hat{\beta}_0$ = 4,435.5 kg ha-1 (SE = 74.2) and $\hat{\beta}_1$= 30.0 kg ha-1 %-1 (SE = 0.9), respectively. A Wald-type test showed that including the yield class in the model affected the estimation of the population-average intercepts but not the slopes. The estimated study-specific intercepts for the high and low yield classes were $\hat{\beta}_{0H}$= 5,049.8 kg ha-1 (SE = 107.5) and $\hat{\beta}_{0L} =$ –730.5 kg ha-1 (SE = 158.0), respectively, with a study-specific slope of $\hat{\beta}_1$= 27.7 kg ha-1 %-1 (SE = 1.8). Due to that, the calculated damage coefficients for high and low yield classes were 0.54%-1 and 0.64%-1, respectively. These results indicate that yield losses due to SB in OK are greater in low-yield environments than in high-yield environments.

Sensory Profiles and Volatile Compounds of Spanish, Valencia, and Runner Peanut Market-Types

L.K. DEXTER-BOONE*, Food Science, Bioprocessing, and Nutrition Department, North Carolina State University, Raleigh, NC 27606; L.L. DEAN, S.D. JOHANNINGSMEIER, USDA-ARS, Food Science and Market Quality & Handling Research Unit, Raleigh, NC 27695.

Roasted peanut flavor drives American consumption of peanuts and peanut products. U.S. peanut crops have an important economic value to growers with a crop production value of 1.5 billion USD. To preserve the economic value of the peanut crop, new cultivars should possess desirable sensory profiles when roasted. The objective of this research was to determine sensory profiles and volatile compound compositions of roasted peanut seeds of Spanish Valencia, and runner market-types. A SpectrumTM trained panel evaluated the roasted peanut samples of various sizes for sensory attributes. Volatile organic compounds (VOCs) were separated and tentatively identified using comprehensive two-dimensional gas chromatography with a time-of-flight mass spectrometer. Hierarchical cluster analysis (HCA) provided insight on the relative abundance of the volatile compounds in each market-type, and partial least squares regression (PLS-R) was used for modeling volatile compounds with the sensory attribute 'roasted peanutty'. The Spanish-type peanuts had the highest intensities of 'roasted peanutty', 'sweet aromatic', and sweet taste, while the runner-type had the lowest ($p < 0.05$). HCA showed that the Spanish-type peanuts had generally lower relative abundance of the VOCs whereas runner and Valencia-types were higher in VOCs, but clearly differed from each other. In the model, 252 VOCs with VIP scores greater than 0.8 were considered influential. Several compounds, including p-xylene, 4-methyl-2-pentanol, and 1-methyl-1H-pyrrole, contributed positively to the prediction of 'roasted peanutty', whereas 2,3-dihydrobenzofuran contributed negatively to the prediction. This research suggests that a complex mixture of volatile compounds modulate the perception of 'roasted peanutty' flavor.

Relative Vigor of Peanut Cultivars and Susceptibility to Rhizopus Seed and Seedling Rot

L. MCEACHIN*, MD. AKTARUZZAMAN, Plant Pathology Department, The University of Georgia, Tifton, GA 31794, T. BRENNEMAN, Plant Pathology Department, The University of Georgia, Tifton, GA 31794, C. PILON, Crop and Soil Science Department, The University of Georgia, Tifton, GA 31794.

Rhizopus seed and pre-emergence seedling rot is a serious disease associated with poor plant stands wherever peanuts are grown. However, it is often not recognized because the plants fail to emerge, and the rotting seeds are rapidly degraded. Because the pathogen is commonly seed-borne, sixteen lower-quality, commercial seed lots from Georgia were evaluated from 2020-2023 (70-80% germination) and detected *Rhizopus* at an average incidence of 53%, with some as high as 100%. The detailed phylogeny of this pathogen is not well understood, and much of the basic biology was studied many years ago. Three major species (*R. arrhizus, R. oryzae,* and *R. stolonifer*) have been reported in early publications, but the number and identity of current species are unknown. Nineteen isolates were speciated and found sixteen to be *R. delemar* and three *R. arrhizus*. Further work is underway to identify a larger set of isolates and characterize them concerning various attributes, including pathogenicity and fungicide response. An *in vitro* inoculation method has been developed, resulting in a consistently high level of infection and seed/seedling mortality. Another unknown is the susceptibility of currently grown cultivars to *Rhizopus*. As seedling vigor is an important consideration, the relative vigor of thirteen commercial cultivars was evaluated first. To minimize background infection of the seed, the seeds were planted in a field tarped and fumigated with 300 lb/A of chloropicrin before planting. To minimize seed infection, the crop was grown, harvested, and stored under ideal conditions. Fifty-one seeds per cultivar were then bio-assayed on PDA for the presence of seed-borne fungi. By day twelve, GA-19HP showed the highest *Rhizopus* infection (13.7%), whereas Florun-T61 and TifNV-High O/L had the lowest (5.8%) The relative vigor of these cultivars was also evaluated in the lab using a standard Peanut Seed Vigor Test, and differences were observed. By day five, radicle protrusion ranged from a high of 92.7% for GA-20VHO to a low of 42.7% for GA-19HP (LSD=12.6). By day seven, radicle protrusion was ≥ 93.3% for all cultivars. The relative susceptibility of these cultivars to *Rhizopus* is currently being determined, and studies are planned to further characterize the pathogen. Overall, this research aims to refresh the existing data regarding the epidemiology and management practices of *Rhizopus* spp. in peanut fields.

10:15–11:30	**Weed Science and Entomology** Meeting Room: Oklahoma 1 *Moderator: Scott Tubbs, University of Georgia*	Pres. #
10:15	**Weed Escapes Following Vegetative Injury in Peanut at Different Growth Stages and Varying Intensity.** **R.S. TUBBS*,** H.B. GODWIN, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793; J. HOUX, M.E. ZARNSTORFF, National Crop Insurance Services, Overland Park, KS 66210.	33
10:30	**Impact of Environmental Factors on Burrower Bug Injury and Aflatoxin on Georgia Peanut** **K. SUTTON***, M. ABNEY, Department of Entomology, University of Georgia, Tifton Campus, Tifton, GA 31793; C. PILON, G. VELLIDIS, M. SYSSKIND, Department of Crop and Soil Sciences, University of Georgia, Tifton Campus, Tifton, GA 31793.	34
10:45	**Peanut Residual Herbicide Registrations in the US, a Review of Their Soil Chemistry Behavior** **T.L. GREY***, Crop and Soil Sciences Department, University of Georgia, Tifton Campus, Tifton, GA 31793; K.M. EASON, USDA-ARS, Southeast Watershed Research Unit, Tifton, GA 31793.	35
11:00	**Peanut and Weed Response to Repeated Organic Herbicide Applications** **K. EASON***, USDA-ARS, Southeast Watershed Research Unit, Tifton, GA 31793; S. BOWEN, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793.	36
11:15	**Caparol® (Prometryn) or Reglone® (Diquat) for Weed Control in Peanut?** **E.P. PROSTKO*,** N.J. SHAY, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793.	37

Weed Escapes Following Vegetative Injury in Peanut at Different Growth Stages and Varying Intensity.

R.S. TUBBS*, H.B. GODWIN, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793; J. HOUX, M.E. ZARNSTORFF, National Crop Insurance Services, Overland Park, KS 66210.

In-season physical injury of crop vegetation can lead to increased pest incidence. This can result from events like hail damage, animal feeding, etc. One issue is potential for weed escapes when the crop canopy is reduced and the soil surface is disturbed. Knowing the timing and intensity of vegetative injury in peanut (*Arachis hypogaea* L.) may help determine the most effective herbicides and rates to target specific weed species that are problematic at certain periods in the year. Experiments were conducted in Tifton, GA in 2018-2020 to assess weed species that proliferated after vegetative injury to peanut was administered. A rotating weed trimmer with flexible rubber impact points was used to remove leaf material and crush vines of peanut plants at approximately 30, 60, 90, and 120 days after planting (DAP). At each timing, vegetative injury was implemented at 33, 66, and 99% damage. A non-injured check was included. Weed escapes across years varied slightly, but several were consistent in all years. Nutsedges (yellow [*Cyperus esculentus*] + purple [*Cyperus rotundus*]) were mostly present when 99% injury occurred at 30, 60, and 90 DAP, although 66% injury at 90 DAP also caused escapes in 2018. Carpetweed (*Mollugo verticillata*) was most notably present with later season injury, primarily escaping when injury occurred at 90 DAP, likely due to reduced residual herbicide activity on broadleaf weeds by that time. Grass species (varied by year) typically were most troublesome when 99% injury occurred at 60 and 90 DAP, yet also at 30 DAP in 2018. Other notable weed escapes included annual sedge (*Cyperus compressus*) in 2019 and Florida beggarweed (*Desmodium tortuosum*) in 2020. Annual sedge was present after 60 and 90 DAP injury at all intensities, albeit proliferating with increasing intensity. Beggarweed was only problematic at 99% intensity at 30 or 60 DAP injury, and at 33% injury at 60 DAP. The presence of certain weeds at the end of the season may be dependent on either reduced competition from peanut vegetation when reduced, or from waning residual herbicide activity from the at-plant chemistries. Identifying weed escapes to correspond with when and how much vegetation loss occurs will help with management decisions on which in-season herbicide applications may be more beneficial to suppress growth of escaped weeds.

Impact of Environmental Factors on Burrower Bug Injury and Aflatoxin on Georgia Peanut

K. SUTTON*, M. ABNEY, Department of Entomology, University of Georgia, Tifton Campus, Tifton, GA 31793; C. PILON, G. VELLIDIS, M. SYSSKIND, Department of Crop and Soil Sciences, University of Georgia, Tifton Campus, Tifton, GA 31793.

The peanut burrower bug, *Pangaeus bilineatus* (Say), is a native pest of peanut in Georgia. Although the insect is commonly present in peanut fields, economic injury is sporadic. Nevertheless, low levels of feeding injury (>3.5%) result in severe economic loss. There are currently no effective chemical tools to manage burrower bug in peanut. Peanut is also susceptible to Aflatoxin contamination. Aflatoxin is a carcinogenic metabolite of the fungus *Aspergillus flavus,* and peanut with >20 ppb aflatoxin cannot be used for human consumption. Preventing aflatoxin contamination in peanut is critical to preserve crop value. Chapin et al. (2004) reported that aflatoxin incidence in peanut increased with increased burrower bug injury. The mechanisms that cause burrower bug infestations are not fully understood. Data collected in 2023 will be used to examine the relationship between burrower bug injury and aflatoxin contamination on peanut. Studies were designed to determine the effect of field level environmental factors on presence and abundance of burrower bug nymphs, adults, and injury to peanut at harvest. Peanuts were stored in a small-scale research warehouse to determine the effect of time and storage conditions on the relationship between burrower bug injury and aflatoxin levels.

Peanut Residual Herbicide Registrations in the US, a Review of Their Soil Chemistry Behavior

T.L. GREY*, Crop and Soil Sciences Department, University of Georgia, Tifton Campus, Tifton, GA 31793; K.M. EASON, USDA-ARS, Southeast Watershed Research Unit, Tifton, GA 31793.

Residual herbicides are a key component of successful peanut production in the US. With distinct regional production in multiple locations, including the southeast, VC region, and the southwest, soils types and environmental factors are key components of registrations when developing labels. Depending on the specific herbicide chemistry family, variations in soil residual activity can vary with respect to region. A review of the residual herbicides will be presented.

Peanut and Weed Response to Repeated Organic Herbicide Applications

K. EASON*, USDA-ARS, Southeast Watershed Research Unit, Tifton, GA 31793; S. BOWEN, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793.

Management of weeds in organic peanut requires a system approach that typically relies on cultural and mechanical control methods rather than chemical control. There are an extremely limited number of organic herbicides available for use that allows producers to maintain their organic certification. Even if these products are listed with OMRI, they still require evaluation for their effectiveness in runner-type peanut. From 2022-2024, field and greenhouse experiments were conducted to determine if timely applications of organic herbicides would improve in-row weed control without reducing yield. Tifton loamy sand (Fine-loamy, kaolinitic, thermic Plinthic Kandiudults) was the soil type for all field sites located in Tifton, GA. Herbicide treatments consisted of plant oils ((clove + cinnamon (45% + 45% v/v) and d-limonene (70% v/v)) and acids ((acetic (20% v/v) and caprylic + caprice (47% + 32% v/v)). Treatments included 1, 3, 5, and 7 repeated applications of each herbicide. All treatments were applied before lapping occurred (approx. 50-65 days after planting). Georgia-06G, TifNV-High O/L, Georgia-16HO, and Georgia-12Y were the runner-type peanut cultivars used. Across cultivars, peanut was able to recover quickly from any phytotoxic burn or stunting however there were inconsistent trends in pod yield from the repeated applications. This combined with high input costs warrants further evaluation of how to best utilize these products in organic peanut.

Caparol® (Prometryn) or Reglone® (Diquat) for Weed Control in Peanut?

E.P. PROSTKO*, N.J. SHAY, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793.

Due to the limited number of peanut acres in comparison to other major agronomic crops such as field corn, soybean, and wheat in the U.S., there is not much incentive for agricultural chemical companies to develop new herbicides for use in peanut. Caparol® (prometryn) and Reglone® (diquat) are older herbicides which might have some potential to be used in peanut. Therefore, the objective of this research was to determine the potential for either Caparol® or Reglone® to be used as part of a peanut weed management program. Irrigated, small-plot field trials were conducted in 2022-2023 at the University of Georgia Ponder Research Farm near Ty Ty, Georgia. The soil types at this location were either a Tifton or Dothan sand (0.62% OM, 94% sand, 4% silt, 2% clay, 6.0 pH, and 2.7 CEC). Caparol® 4L (24 or 32 oz/A) was applied preemergence in combination with either Prowl® (pendimethalin) or Sonalan® (ethalfluralin) and Strongarm® (diclosulam) and compared to similar treatments that included Valor® (flumioxazin). Reglone® 2SL (8.6 oz/A) was applied early-postemergence in combination with Storm (acifluorfen + bentazon) and Dual Magnum® (*S*-metolachlor) and compared to similar treatments that included Gramoxone® (paraquat). All herbicides were applied with a CO2-powered backpack sprayer calibrated to deliver 15 GPA (38 PSI, 3.5 mph, 11002AIXR nozzles). Data collected included peanut injury (leaf necrosis/stunting), weed efficacy ratings, and yield. All data were subjected to ANOVA and means separated using Fisher's Protected LSD Test ($P<0.10$). Generally, Caparol® treatments were less injurious and provided more variable weed control (Palmer amaranth, wild radish, annual grasses) than similar Valor® treatments. In 2022, Caparol® treated plots had lower peanut yields than Valor® treated plots but this yield difference was not observed in 2023. Peanut response, weed control, and yield with Reglone® treatments were similar to treatments that included Gramoxone®.

10:15–11:45	**Breeding, Biotechnology, and Genetics I** Meeting Room: Oklahoma 3 *Moderator: John Cason, Texas A&M University*	Pres. #
10:15	**Effect of G x E Interaction on Oil and Oleic Fatty Acid Contents of Peanuts** H. ZHANG, Department of Crop Science and Technology, College of Agriculture, South China Agricultural University, Guangzhou, China; Y. YU, **C. CHEN***, Department of Crop, Soil, and Environmental Sciences, Auburn University, Auburn, AL 36849, USA; M. WANG, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223, USA; P. DANG, USDA-ARS National Peanut Research Laboratory, Dawson, GA 39842, USA.	38
10:30	**Progress in Breeding for Resistance to Leaf Spot in Florida** **B.L. TILLMAN***, M. GOYZUETA, M. GOMILLION, University of Florida, North Florida Research and Education Center, Marianna, FL 32351, S. TYLER THORNTON, Pioneer.	39
10:45	**The 1,000 *Aspergillus flavus* Genomes Initiative: Investigating the Genetic Diversity of *A. flavus* Isolates Associated with Georgia Peanuts** **A. ADAMS***, S.E.A. JOSON, J. FOUNTAIN, Department of Plant Pathology, University of Georgia, Griffin, GA 30223; J. CLEVENGER, Z. MYERS, W. KORANI, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; R. HOLTON, Institute of Plant Breeding, Genetics, and Genomics (IPBGG), University of Georgia, Tifton, GA 31793; Premium Peanut LLC., Douglas, GA 31535,; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; S. LU, Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State University, Mississippi State, MS 39762; H.K. ABBAS, USDA-ARS, Biological Control of Pests Research Unit, Stoneville, MS 38776.	40
11:00	**A New Peanut Cultivar with Resistance to White Mold** **C.C. HOLBROOK***, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793; T.B. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; P. OZIAS-AKINS, Department of Horticulture, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA 31793; A. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; Y. CHU, Department of Horticulture, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA 31793.	41
11:15	**Validation of Two QTL Associated with Sclerotinia Blight Resistance in Peanut** **K.D. CHAMBERLIN***, R.S. BENNETT, USDA-ARS, Peanut and Small Grains Research Unit, Stillwater, OK 74075; J.P. CLEVENGER, W. KORANI, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806.	42
11:30	**Evaluation of Seed Quality Traits among 13 Peanut Genotypes Challenged to a Naturally Occurring Late-Season Drought** **P.M. DANG***, R.B. SORENSEN, E.R. BUCIOR, M.C. LAMB, USDA-ARS National Peanut Research Lab, Dawson, GA 39842; C.Y. CHEN, Auburn University, Auburn, AL 36849.	43

Effect of G x E Interaction on Oil and Oleic Fatty Acid Contents of Peanuts

H. ZHANG, Department of Crop Science and Technology, College of Agriculture, South China Agricultural University, Guangzhou, China; Y. YU, **C. CHEN***, Department of Crop, Soil, and Environmental Sciences, Auburn University, Auburn, AL 36849, USA; M. WANG, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223, USA; P. DANG, USDA-ARS National Peanut Research Laboratory, Dawson, GA 39842, USA.

Twenty-seven genotypes were grown in two locations in three years to estimate the effects of G x E interaction on oil and oleic fatty acid contents of cultivated peanuts. Oil and oleic fatty acid contents 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 that there is a significant G x E interaction for oleic fatty acid content. Non correlation between oil content and FAD2A and FAD2B genes was found. The FAD2B gene had a larger additive effect than FAD2A gene.

Progress in Breeding for Resistance to Leaf Spot in Florida

B.L. TILLMAN*, M. GOYZUETA, M. GOMILLION, University of Florida, North Florida Research and Education Center, Marianna, FL 32351, S. TYLER THORNTON, Pioneer.

Peanut breeders in the southeastern USA have been working to develop leaf spot resistant cultivars since the 1970's at least. In the University of Florida peanut breeding program, meaningful resistance has been found, and cultivars such as Southern Runner, Florida-MDR98, York, and DP-1 were developed. However, these cultivars carried deleterious traits that prevented market acceptance including late maturity, and poor seed germination and vigor. Subsequent research into the seed germination issues revealed that the seed calcium uptake of the late maturing cultivars was lacking. Further efforts selected for both leaf spot resistance and higher seed calcium uptake from which new lines were identified and used in new crosses to develop leaf spot resistant cultivars. Other approaches with different germplasm were also employed and several new lines have resulted from both projects. In particular, five new lines from three different crosses and backgrounds showed improved resistance to late leaf spot in 2023 in a test where no fungicides were sprayed. In a test with sixteen cultivars or advanced breeding lines, these five lines had lower leaf spot rankings (between 4.5 and 6.5) on the Florida 1-10 scale that were lower than the ratings of the susceptible cultivars FloRun T61 (rating 9), FloRun 52N (rating 8.3), and Georgia-20VHO (rating 8) ($p<0.05$ in all cases). The cultivars Georgia-12Y (rating 4.5) and Tif-CB7 (rating 6.5) were the only commercial cultivars with lower ratings than the three susceptible cultivars and they were similar to the five breeding lines. The pedigrees of the five new lines contain lines and/or cultivars with know leaf spot resistance including Georgia-12Y, TUFRunner 727, a line from the calcium/leaf spot project, and York.

The 1,000 *Aspergillus flavus* Genomes Initiative: Investigating the Genetic Diversity of *A. flavus* Isolates Associated with Georgia Peanuts

A. ADAMS*, S.E.A. JOSON, J. FOUNTAIN, Department of Plant Pathology, University of Georgia, Griffin, GA 30223; J. CLEVENGER, Z. MYERS, W. KORANI, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; R. HOLTON, Institute of Plant Breeding, Genetics, and Genomics (IPBGG), University of Georgia, Tifton, GA 31793; Premium Peanut LLC., Douglas, GA 31535,; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; S. LU, Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State University, Mississippi State, MS 39762; H.K. ABBAS, USDA-ARS, Biological Control of Pests Research Unit, Stoneville, MS 38776.

This initiative is to collect and sequence at least 1,000 *Aspergillus flavus* isolates associated with Georgia peanuts to build reference genomes as a resource to explore *A. flavus* genetic and species diversity in relation to traits hindering yield and quality. In the first year so far, we've collected and received donations of *A. flavus* isolates, completing at least 20% of our goal. To obtain isolates representing the geographical distribution of *A. flavus* across Georgia, in-shell peanut samples were collected from 12 buying points (representing 27 individual counties) operated by Premium Peanut in Fall 2023. Peanut sampling will continue in Fall 2024 with additional buying points, increasing geographical coverage of Georgia. In addition, dozens of isolates were donated from collaborators from UGA and the USDA-ARS. Among these is a collection of 78 *A. flavus* isolates from 2020 peanut seed lots in South Georgia with a range of sensitives to several fungicides, including Fluopyram, Fludioxonil, and Azoxystrobin. 90 of the donated *A. flavus* isolates were sent for whole genome re-sequencing (WGRS). These isolates generated 95,395 SNPs when aligned to the *A. flavus* AF13 reference genome. PCA analysis using these SNPs revealed possible sub-populations in the collection, suggesting genetic diversity among seed lots. Future work will include correlating the genetic information to phenotypic data (i.e., aflatoxin and fungicide sensitivity), such as performing GWAS and generating phylogenetic trees. By the end of this initiative, we hope to have assembled genomes representing the diversity of *A. flavus* associated with Georgia peanuts that will reveal new insight into, but limited to, *A. flavus'* mycotoxin production abilities, mechanisms of fungicide resistance, use as a biocontrol, and host specificity.

A New Peanut Cultivar with Resistance to White Mold

C.C. HOLBROOK*, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793; T.B. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; P. OZIAS-AKINS, Department of Horticulture, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA 31793; A. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; Y. CHU, Department of Horticulture, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA 31793.

Cultivated peanut (*Arachis hypogaea*) is an important crop in the U.S. and around the world. White mold (or stem-rot), caused by the soilborne pathogen *Agroathelia rolfsii*, has been imposing severe yield losses in many peanut-growing regions worldwide including the United States for over a century. In Georgia, stem rot resulted in a 5% reduction in peanut yield in 2021, leading to a total economic loss of $73.7 million, including expenses incurred for controlling the fungal pathogen. Host resistance to white mold is highly desirable to manage this fungal pathogen. We made a complex cross which included the cultivars Florida-07 and Georgia-07W. Both cultivars have been reported to have a moderate level of resistance to white mold. Late generation breeding lines (including 17-223) were selected for further evaluation. Field studies were conducted for 3 years to evaluate the level of resistance to white mold in 17-223. Flagged plants were inoculated by placing a potato dextrose agar plug with *A. rolfsii* at the base of the plant. In two of the three years, 17-223 exhibited significantly higher resistance to white mold in comparison to Georgia-12Y which is the current standard resistant check. For the third year, 17-223 exhibited resistance that was at least as good as Georgia-12Y but there was not a significant difference. We tested 17-223 in numerous yield trials in Georgia and Alabama with minimal white mold pressure. In all trials, 17-223 was among the top yielding genotypes. Based on % TSMK and % kernels, 17-223 was also among the top for grade. 17-223 is a high oleic cultivar.

Validation of Two QTL Associated with Sclerotinia Blight Resistance in Peanut

K.D. CHAMBERLIN*, R.S. BENNETT, USDA-ARS, Peanut and Small Grains Research Unit, Stillwater, OK 74075; J.P. CLEVENGER, W. KORANI, Hudson Alpha Institute for Biotechnology, Huntsville, AL 35806.

Sclerotinia blight, caused by *Sclerotinia minor* Jagger, is a fungal disease of peanut that is widespread throughout the cooler peanut-growing regions of the U.S. and causes yield losses up to 50%, threatening sustainable peanut production. Few cultivars with acceptable resistance have been developed due to a limited understanding of the inheritance of the trait. Previously, evaluation of data collected from a RIL mapping population (Tamrun OL02 x PI 497429) revealed two QTL potentially associated with Sclerotinia blight resistance. In this work, previously genotyped members from a validation RIL population (Okrun X PI 497429) were phenotyped in 2023 for resistance under heavy disease pressure. Correlation of phenotypic and genotypic data validated the two QTL associated with resistance to Sclerotinia blight on chromosomes 5 and 15. These results will be used to develop and deploy markers for screening breeding populations and germplasm collections, as well as aid in the selection of advanced breeding lines for development of Sclerotinia-resistant cultivars.

Evaluation of Seed Quality Traits among 13 Peanut Genotypes Challenged to a Naturally Occurring Late-Season Drought

P.M. DANG*, R.B. SORENSEN, E.R. BUCIOR, M.C. LAMB, USDA-ARS National Peanut Research Lab, Dawson, GA 39842; C.Y. CHEN, Auburn University, Auburn, AL 36849.

Drought can reduce peanut yield and seed quality depending on intensity and duration of the drought stress. A panel of 13 peanut genotypes ranging from tolerant to drought susceptible lines were evaluated in the field under irrigated and dryland treatments for the 2023 growing season. The goal was to identify and verify drought tolerant lines, with high yield, good agronomic qualities and mitigate potential aflatoxin contamination. Physiological measurements such as leaf chlorophyll content, nitrogen and nutritional leaf content, gas exchange and photosynthesis were measured in both treatments over the season. Harvest index, a ratio of above ground biomass to pod yield, was measured to determine effectiveness above ground energy conversion to production. Clean pod yield was determined, followed by determination of shelling characteristics for seed size distribution of jumbos, mediums, and ones. Germination efficiency of harvested seeds was also determined. Correlation of measured traits will be utilized to identify drought tolerant peanut genotypes. Multiple growing seasons will be used to identify drought tolerant genotypes that may be utilized in peanut breeding programs.

1:30 - 4:00	**Charles Simpson Wild Arachis Species Session** Meeting Room: Oklahoma 3 *Moderator: Shyam Tallury, USDA-ARS*	Pres. #
1:30	**Travels with Charlie** **D.E. WILLIAMS***, Agriculture, Natural Resources and Climate Change Program, Inter-American Institute for Cooperation on Agriculture (IICA), San José, Costa Rica (retired).	44
2:00	**Reassessing Yield Drag Associated with Peanut Root Knot Nematode Resistance Introgressed from TxAG-6 Near-Isogenic Lines** **N. BROWN***, W.D. BRANCH, Institute of Plant Breeding, Genetics, and Genomics, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; T.B. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.	45
2:15	**Incorporating Genotype-Environment Association Methods and Disease Resistance into Peanut Pre-breeding** **A.N. MASSA***, R.S. ARIAS, V.S. SOBOLEV, P.C. FAUSTINELLI, M.C. LAMB, USDA-ARS, National Peanut Research Laboratory, U.S. Department of Agriculture, Dawson, GA 39842.	46
2:30	**Genomics Resources Supporting the USDA *Arachis* Germplasm Collection** Y. CHU, P. OZIAS-AKINS, Horticulture Department, University of Georgia, Tifton Campus, Tifton, GA 31793; S. BOTTON, Institute of Plant Breeding, Genetics, & Genomics, University of Georgia, Tifton Campus, Tifton, GA 31793; T.G. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; B. SCHEFFLER, C. YOUNGBLOOD, USDA-ARS, Genomics Bioinformatics Research Unit, Starkville, MS 39759; **J. CLEVENGER***, W. KORANI, Z. MYERS, L. GRIFFIN, P. SANMARTIN, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; S. TALLURY, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223.	47
2:45	**The Integrated *Arachis* Pangene Resource at PeanutBase** **S. DASH***, C. CAMERON, A. CLEARY, A.D. FARMER, S. REDSUN, S. HOKIN, National Center for Genome Resources, Santa Fe, NM 87505; J.D. CAMPBELL, S. CANNON, W. HUANG, S. KALBERER, N.T. WEEKS, USDA-ARS, Corn Insects and Crop Genetics Research Unit, Ames, IA 50011.	48
3:00	**Widening the Genetic Base of Peanut Using Wild Species – Success Stories** **D.J. BERTIOLI*** (on behalf of the Wild Peanut Lab) Department of Crop and Soil Sciences/Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602.	49
3:15	**The Migrations of *Arachis stenosperma* – from the Brazilian Far West to Multi-resistant Peanuts in Three Continents** **S.C.M. LEAL-BERTIOLI*,** Institute of Plant Breeding, Genetics & Genomics and Department of Plant Pathology, The University of Georgia, Athens, GA 30602; C.E. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX 76401; M.C. MORETZSOHN, J.F.M. VALLS, Embrapa Genetic Resources and Biotechnology, Brasilia, Brazil 70770-917; D.J. BERTIOLI Institute of Plant Breeding, Genetics & Genomics and Department of Crop & Soil Sciences, The University of Georgia, Athens, GA 30602.	50
3:30	**International Treaties and the USDA Peanut Germplasm Collection** **S.P. TALLURY*,** N.E. STIGURA, USDA-ARS, Griffin, GA 30223; C.E. SIMPSON, Texas A&M AgriLife Research, College Station, TX 77843; D.J. BERTIOLI, Department of Crop and Soil Sciences, University of Georgia, Athens, GA 30602; G.J. SEIJO, Northeast University, Corrientes, Argentina.	51
3:45	**Closing Remarks**	

Travels with Charlie

D.E. WILLIAMS*, Agriculture, Natural Resources and Climate Change Program, Inter-American Institute for Cooperation on Agriculture (IICA), San José, Costa Rica (retired).

During his extraordinarily productive career, now spanning nearly six decades, Charles E. Simpson has made major contributions to the advancement of peanut science. Outstanding among these contributions are his numerous explorations in South America for wild *Arachis* species, his tireless commitment to the maintenance of a large and diverse collection of wild peanut germplasm, and his pioneering achievements in the introgression of valuable wild traits into improved peanut varieties. Of the 28 peanut explorations led or co-led by Dr. Simpson, the author shares some personal anecdotes from his participation in two of those, carried out in the Bolivian and Paraguayan portions of the Gran Chaco. The presentation concludes with some reflections regarding Simpson's enduring impact on the conservation of wild peanut species, their taxonomy and genetics, and their successful utilization in peanut breeding.

Reassessing Yield Drag Associated with Peanut Root Knot Nematode Resistance Introgressed from TxAG-6 Near-Isogenic Lines

N. BROWN*, W.D. BRANCH, Institute of Plant Breeding, Genetics, and Genomics, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; T.B. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

Anecdotal evidence has pointed to potential yield linkage drag associated with peanut root knot nematode (RKN) resistance on A09 sourced from TxAG-6. Several RKN-resistant cultivars have been released since the development of TxAG-6, a tri-species interspecific hybrid. Cultivars have included COAN, NemaTAM, Tifguard, Georgia-14N, TifNV-High O/L, Georgia-19HP, and others. Earlier cultivars were lower-yielding than RKN-susceptible cultivars. Linkage drag was evaluated by other researchers previously without showing a significant effect. 'Georgia-17SP', a cultivar released several years ago, had a mixture of resistant and susceptible plants, and thus presented an opportunity to evaluate yield drag from RKN-resistance in a near-isogenic form. Individual plants were genotyped for the presence or absence of the RKN-resistance segment, and the phenotypes were confirmed in an RKN-infested field. Five RKN-resistant near-isogenic lines and five RKN-susceptible near-isogenic lines were tested along with relevant checks in replicated yield trials during 2020, 2021, and 2023 at Tifton, GA. Yield and grade qualities were evaluated to assess potential linkage drag.

Incorporating Genotype-Environment Association Methods and Disease Resistance into Peanut Pre-breeding

A.N. MASSA*, R.S. ARIAS, V.S. SOBOLEV, P.C. FAUSTINELLI, M.C. LAMB, USDA-ARS, National Peanut Research Laboratory, U.S. Department of Agriculture, Dawson, GA 39842.

The allelic variation found in natural populations of wild peanut species, which evolved through natural selection, is an important source of genetic diversity for disease resistance and environmental adaptation. In this study, the association between genetic diversity and disease level, the impact of environmental factors, and the responses to early (ELS) and late (LLS) leaf spot diseases were evaluated in 33 accessions of *Arachis duranensis* from the USDA peanut germplasm collection. Using latent factor mixed models, the analysis of natural populations revealed significant associations between genotypes and environments, predominantly with temperature-related bioclimatic variables on chromosomes A02 and A08. Field-based disease screening combined with association analyses for ELS and LLS led to the identification of genomic regions and candidate single nucleotide polymorphisms (SNPs) significantly associated with resistance to the diseases on chromosomes A02, A03, A04, and A06. These findings, along with more than 160k high-confidence transcriptome-based SNPs for aflatoxin resistance from our earlier studies, enabled the detection of novel alleles for marker development. Our results suggest that the allelic variation uncovered by association analyses in *A. duranensis* has the potential to be utilized for marker-assisted introgression and gene pyramiding.

Genomics Resources Supporting the USDA *Arachis* Germplasm Collection

Y. CHU, P. OZIAS-AKINS, Horticulture Department, University of Georgia, Tifton Campus, Tifton, GA 31793; S. BOTTON, Institute of Plant Breeding, Genetics, & Genomics, University of Georgia, Tifton Campus, Tifton, GA 31793; T.G. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; B. SCHEFFLER, C. YOUNGBLOOD, USDA-ARS, Genomics Bioinformatics Research Unit, Starkville, MS 39759; **J. CLEVENGER***, W. KORANI, Z. MYERS, L. GRIFFIN, P. SANMARTIN, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; S. TALLURY, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223.

The curator of the USDA *Arachis* germplasm collection, Shyam Tallury, has led two projects that develop genomic resources for the support of the collection and to elevate the utility of the collection for peanut improvement. For the first project, we set out to sequence the genomes of species representing sections Trierectoides, Erectoides, Extranervosea, Heteranthae, Procumbentes, Rhizomatosae, and Triseminatae. We observed a significant difference in genome size, prompting the sequencing of Hi-C libraries for scaffolding information. The comparative genomics between the different sections of *Arachis* will be discussed. The second project is focused on sequencing and genotyping the germplasm collection. The first year, we focused on accessions that were collected in Argentina. In the second year, we have begun sequencing the accessions that were collected in Brazil and Bolivia. Results on genetic diversity and potential redundancy will be discussed.

The Integrated *Arachis* Pangene Resource at PeanutBase

S. DASH*, C. CAMERON, A. CLEARY, A.D. FARMER, S. REDSUN, S. HOKIN, National Center for Genome Resources, Santa Fe, NM 87505; J.D. CAMPBELL, S. CANNON, W. HUANG, S. KALBERER, N.T. WEEKS, USDA-ARS, Corn Insects and Crop Genetics Research Unit, Ames, IA 50011.

One of the primary roles of PeanutBase (PB) is to make the genomic data from the International Peanut Genome Initiative useful for peanut improvement programs. This activity is an ongoing process at PB and has resulted in the development of many tools to visualize and analyze integrated genomic and genetic data. Currently PB has multiple genome assemblies and annotation data from both cultivated tetraploid and wild diploid lines from *Arachis* species. A pangene set (version pan2) has been computed spanning three species (*A. hypogaea*, *A. duranensis*, and *A. ipaensis*) and six annotation sets (four annotation sets from *A. hypogaea* and one each from *A. duranensis* and *A. ipaensis*). A pangene set is the collection of corresponding genes among different accessions, annotations, and species. The Arachis pangenes were calculated using the Pandagma software, which uses similarity and synteny to identify corresponding genes. The data is now available for download at the PB DataStore and has also been integrated into the data warehouse ArachisMine. A more recent version (pan3) that also includes annotation from *A. stenosperma* is in the process of refinement and integration into PB.Using the pangene correspondences, gene models from *Arachis* species can now be used to identify alleles across sequenced Arachis annotations and species,and enables characterization of presence/absence and copy number variations. This will aid in candidate gene search for improvement of traits such as climate resilience, pest and disease resistance, product quality, etc. These pangene sets have also been used at the Legume Information System as part of a new build of gene families, capturing homology relationships among genes related by both speciation and gene duplication events, extending back to the hypothesized base of the legume clade. Using gene families, orthologs of peanut genes can be identified in other legume species, enabling researchers to more directly utilize the extensive research that has been conducted in species such as soybean, *Medicago*, and common bean. These relationships can be used to help narrow down candidate genes for agronomic traits and to identify markers for breeding work.

Widening the Genetic Base of Peanut Using Wild Species – Success Stories

D.J. BERTIOLI* (on behalf of the Wild Peanut Lab) Department of Crop and Soil Sciences/Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602.

Peanut has undergone severe bottleneck during domestication and selection, resulting in a substantial reduction of genetic diversity. It has a recent origin, and it is sexually incompatible with its wild relatives, which have high levels of genetic diversity and a range of adaptative traits that are of agricultural relevance (resistance to pests and diseases, tolerance to abiotic stresses, broader range of environment adaptation). The use of wild species for peanut breeding is not trivial task: they are difficult to propagate, are not compatible with peanut, produce few seeds in greenhouse and can have specific soil requirements. To add to these difficulties, the transfer of wild species from their countries of origin has been restricted by the Biological Diversity and Nagoya protocol. These factors lead to the very limited utilization of wild species by the peanut community. Despite that, A. cardenasii has been of tremendous success to produce resistant cultivars and several other species are not in the pipeline for cultivar release. In the Wild Peanut Lab at UGA we have created a pipeline to characterize wild species, render them into a tetraploid, peanut-compatible form, introgress and genetically characterize the segments that confer resistance to the crop. These tetraploid lines (induced allotetraploids) are being deposited in the USDA/NPGR gene banks, so they are preserved and available to breeders in the USA and worldwide.

The Migrations of *Arachis stenosperma* – from the Brazilian Far West to Multi-resistant Peanuts in Three Continents

S.C.M. LEAL-BERTIOLI*, Institute of Plant Breeding, Genetics & Genomics and Department of Plant Pathology, The University of Georgia, Athens, GA 30602; C.E. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX 76401; M.C. MORETZSOHN, J.F.M. VALLS, Embrapa Genetic Resources and Biotechnology, Brasilia, Brazil 70770-917; D.J. BERTIOLI Institute of Plant Breeding, Genetics & Genomics and Department of Crop & Soil Sciences, The University of Georgia, Athens, GA 30602.

Peanut, *Arachis hypogaea,* has 82 known wild relatives classified into nine botanical sections. The section *Arachis* has peanut, its wild progenitors and species that are more closely related to it, including *A. stenosperma. Arachis stenosperma* is an A-genome diploid species endemic to Brazil, with its center of origin in one of the westernmost areas of Brazil: the state of Mato Grosso. Seeds of this species have been carried all over by the hunters and gatherers as a food source and transported all the way to the Atlantic Forest coastal areas of Brazil. Recently, a genome-wide genotyping scheme revealed the genetic relationships of the species and confirmed its origin and migration routes. In total, 53 accessions of *A. stenosperma* have been collected in Brazil but only a fraction is available at the USDA/PGRCU: since the Convention of Biological Diversity, sharing of endemic species has become almost impossible. The accession V 10309, collected in Rondonopolis, MT, prior to the convention, has been deposited in the USDA/PGRCU under the PI 666100. This accession has been crossed with various non-A genome accessions and incorporated into peanut-compatible allotetraploids (e.g. BatSten1, ValSten1, MagSten1, MagSten2, MagSten3, IpaSten1, and others). These induced allotetraploids have been used in breeding programs in the USA, Brazil, Uganda, Haiti, Nicaragua and Senegal, generating advanced lines with strong resistances to leaf spots, rust, Root-knot nematode, and with superior agronomic traits such as yield and grain size. *Arachis stenosperma* V10309 is the wild accession that shows the most promise for the incorporation of multispectral resistance in peanut in the next generation of cultivar releases in various countries.

International Treaties and the USDA Peanut Germplasm Collection

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The USDA peanut germplasm collection was accumulated over eight decades and is securely managed at the National Plant Germplasm System (NPGS) genebank in Griffin, GA, with a back-up collection at the National Laboratory for Genetic Resources Preservation (NLGRP) in Fort Collins, CO. This germplasm is regularly requested by researchers within the US and across the globe and is distributed free of charge for research use. The collection contains about 9,000 cultivated species accessions and 550 wild species accessions. It is considered a National Treasure and has contributed to the development of several important peanut cultivars in the US. The germplasm collection is a testimony to the vision and dedication of several prominent national and international collectors with funding support from the United States Department of Agriculture (USDA), the International Board for Plant Genetic Resources (IBPGR) and logistic support from the host countries. Germplasm accessions collected were freely shared among the collaborative parties until the Convention on Biological Diversity (CBD) came into force in December, 1993 to prohibit the free exchange. Additionally, the exclusion of peanut from the annex 1 list of crops of the Plant Treaty practically shut the door for new germplasm access from South America. These two events combined with global climate change and other human activities are endangering the native populations in South America with irreparable loss of valuable peanut genetic diversity.

1:30 – 3:45	**Plant Pathology Nematology, and Mycotoxins** Meeting Room: Oklahoma 1 *Moderator: LeAnn Lux, North Carolina State University*	Pres. #
1:30	**Withdrawn**	52
1:45	**Field Evaluation of Trebuset Peanuts®: a Novel Seed Treatment from Syngenta** **W.H. FAIRCLOTH***, H. MCLEAN, Syngenta Crop Protection, LLC, Greensboro, NC 27409; W.S. MONFORT, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; K.B. BALKCOM, Department of Crop, Soil, and Environmental Science, Auburn University, Auburn, AL 36849.	53
2:00	**Assessing Spray Deposition and Efficacy of Peanut Fungicide Applications with Drone and Ground Sprayers** **J.C. HANCOCK*,** S.S. VIRK, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; C.W. BYERS, R. MEENA, College of Engineering, University of Georgia, Tifton, GA 31793; A.K. CULBREATH, R.C KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.	54
2:15	**Mixtures of a Phosphite Fungicide and Micronized Sulfur for Control of Late Leaf Spot of Peanut** **A.K. CULBREATH***, T.B. BRENNEMAN, R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793-5766; E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698.	55
2:30	**Management of Peanut Leaf Spot and Rust in Nicaragua using Fungicides with and without Micronized Sulfur** **T. BRENNEMAN***, A. K. CULBREATH, Plant Pathology Department, The University of Georgia, Tifton, GA 31794, and D. FRANCISCO, La Asociación de Agricultores de Chinandega (ADACH), Chinandega, Nicaragua.	57
2:45	**Break**	
3:00	**New Approaches to Utilizing Afla-Guard to Minimize Aflatoxin in Peanut** **M.C. LAMB***, R.B. SORENSEN, C.L. BUTTS, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.	58
3:15	**Suppression of Sclerotinia Blight with Co-Application of Pydiflumetofen, Azoxystrobin, and Benzovindiflupyr in North Carolina** **L. LUX***, E. FOOTE, D.L. JORDAN, North Carolina State Extension, Raleigh, NC 27695.	59
3:30	**Evaluation of Different Fungicide Programs across Five Virginia-type Peanut Varieties** **M.B. DA SILVA***, M. BALOTA, D. LANGSTON, Tidewater Agricultural Research and Extension Center, Virginia Polytechnical Institute and State University, Suffolk, Virginia 23437.	60

*Presentation #56 withdrawn prior to meeting

Field Evaluation of Trebuset Peanuts®: a Novel Seed Treatment from Syngenta

W.H. FAIRCLOTH*, H. MCLEAN, Syngenta Crop Protection, LLC, Greensboro, NC 27409; W.S. MONFORT, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; K.B. BALKCOM, Department of Crop, Soil, and Environmental Science, Auburn University, Auburn, AL 36849.

Trebuset Peanuts (Syngenta Crop Protection, LLC) is a new seed treatment that combines liquid active ingredients with a unique polymer to coat peanut seeds prior to planting. Trebuset Peanuts replaces Dynasty® PD, a dust treatment, with a more robust fungicide package, more accurate application equipment, and a cleaner treating environment. Previous field studies have demonstrated the efficacy of Trebuset Peanuts against various pathogens that attack seed, including *Aspergillus niger* and *Rhizoctonia solani*. In 2023, field studies were conducted to evaluate seed treatments applied to two seed lots. One lot had high germination (95%) and one lot was intentionally selected for low germination (69%). The following six treatments were applied to seed at the Syngenta Seedcare Institute within each seed lot: Dynasty PD, Trebuset Peanuts, Syngenta Exp, Rancona® V PD (UPL), Rancona® V PL (UPL), and nontreated seed. Both seed lots were planted at three locations and data collected to include stand counts over time, dead plants from *A. niger*, TSWV incidence, tap root counts, and yield. Results will be presented by those locations. In Lumber City, GA, peanut emergence in the low germination seed lot was less than 50% of the high germination lot, averaging only 2.4 plants/ft at 30 days after planting (DAP). In both high and low germination seed lots, seed treatments were not statistically different from each other for stand counts, however all treated seed were greater than the nontreated. The only other significant differences observed in either seed lot were dead plant counts at 42 DAP, suggesting the presence of *A. niger* at this location. Within the high germination lot, both Trebuset Peanuts and Rancona V PD were different from the nontreated having fewer dead plants, while Dynasty PD had higher dead plants count in the low germination lot. In Tifton, GA, Dynasty PD had higher stand counts at 22 DAP versus Trebuset Peanuts in the low and high germination lots. All seed treatments were significantly greater than the untreated. In the high germination lot, Rancona V PL had significantly lower stand count that other treated seed. A yield response was observed in the high germ. lot, with Syngenta Exp having a lower yield than the highest yielding treatment of Trebuset Peanuts; all treated seed were greater than the untreated. In the low germ. lot, all treated seed yielded greater than untreated. Headland, AL, had the highest germination of all locations averaging 5.5 plants/ft for treated seed in the high germ. lot 21 DAP. This was reflected in highest yields as well. Regardless of the data collected in the high germ. lot, the only significant differences were between treated seeds and untreated. Within the low germ. seed lot, Syngenta Exp had slower emergence versus other seed treatments, but no yield differences were significant, with the exception of any seed treatment vs untreated. Based on these data, Trebuset Peanuts can be used confidently by peanut seedsmen across a range of growing and seed conditions.

Assessing Spray Deposition and Efficacy of Peanut Fungicide Applications with Drone and Ground Sprayers

J.C. HANCOCK*, S.S. VIRK, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; C.W. BYERS, R. MEENA, College of Engineering, University of Georgia, Tifton, GA 31793; A.K. CULBREATH, R.C KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

Fungicide applications are an integral and important component of peanut production to prevent the devastating impacts of diseases such as white mold, leaf spot, and Rhizoctonia. The traditional application method used for applying fungicides in peanuts has been with a ground sprayer; however, with advancements in unmanned aerial application systems, also commonly called drone sprayers/spray drones, there has been an interest among growers and commercial applicators in understanding the efficiency and efficacy of spray drones for pesticide applications to agricultural crops. A study was conducted in 2023 to assess and compare spray deposition and penetration into the peanut canopy, and efficacy of fungicide applications with a ground sprayer and a drone sprayer. The ground sprayer applications were made with a 6-row boom sprayer (19.5 ft; 18-in. nozzle spacing) using a spray volume of 15 gallons per acre (GPA) whereas the aerial applications were made with a DJI T30 spray drone (Hexcopter configuration, 16 nozzles) using a spray volume of 5 GPA. The study was organized as a factorial arrangement of application method by spray volume and was implemented in 6-row plots that measured 18 ft wide and 100 ft long. Spray deposition was assessed by placing water-sensitive paper at three different heights (top, middle and bottom) within the peanut canopies during fungicide applications. Applications were performed every two weeks starting at 30 days after planting and spray deposition data was collected during applications at 45, 60, 90, and 120 days after planting. Canopy measurements were recorded throughout the season whereas disease (leaf spot and white mold), and yield was collected by harvesting the center two rows in each plot. The results indicated an increased coverage at the top of the canopy for the ground sprayer compared to drone sprayer that was primarily due to the differences in the spray volume between two application methods. For both methods, the spray coverage was greatest at the top of the canopies and reduced coverage at the middle and bottom canopies. The application uniformity across the swath (18 ft) was greater for the ground sprayer (CV=7%) than the drone sprayer (CV=27%) across all canopy positions. The application efficacy was similar between both methods whereas leaf spot was significantly greater in the control (untreated) plot. The study findings showed that drone sprayer is another potential tool for timely application of fungicides in peanut; however proper calibration and swath testing is important for effective applications.

Mixtures of a Phosphite Fungicide and Micronized Sulfur for Control of Late Leaf Spot of Peanut

A.K. CULBREATH*, T.B. BRENNEMAN, R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793-5766; E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698.

Control of early leaf spot (*Passalora arachidicola*) and late leaf spot (*Nothopassalora personata*) of peanut (*Arachis hypogaea*) in the southeastern U.S. is heavily dependent on the use of fungicides. Concerns about resistance to demethylation inhibiting (DMI) (FRAC Group 3), succinate dehydrogenase inhibiting (SDHI) (FRAC Group 7), and quinone outside inhibiting (QoI) (FRAC Group 11) fungicides and regulatory issues with chlorothalonil (FRAC Group M6), have prompted interest in finding alternatives to these fungicides for management of leaf spot. Micronized elemental sulfur has been shown to be an excellent mixing partner with several fungicides although in most cases it does not provide adequate leaf spot control when applied alone. Phosphite fungicides (FRAC Group P07) are effective against numerous diseases in other crops, but their effects on leaf spot diseases of peanut have not been thoroughly characterized. The objectives of this study were to determine the effect of the phosphite fungicide Kphite 7 LP alone and in combination with micronized sulfur on leaf spot diseases. Field experiments were conducted in Tifton, GA in 2022 and 2023. Cultivar Georgia-18RU was used in both years. Treatments consisted of Kphite 7LP (2.3 L/ha), Microthiol 80W sulfur (3.4 kg/ha), mixtures of the same rate of Kphite with 3.4 kg/ha of Microthiol, and with 3.8 L/ha of Drexel Suffa 6F). Treatments also included chlorothalonil (Bravo WeatherStik 720) (1.75 L/ha) and a nontreated control. All treatments were applied full-season (7 total applications) at ca. 14-day intervals with initial applications ca. 30 days after planting. Leaf spot intensity was evaluated using the Florida 1-10 scale. Late leaf spot was predominant in both years. Across years, final leaf spot ratings were 5.1, 4.7, 3.1, and 2.9 for Kphite alone, Microthiol alone, Kphite plus Microthiol, and Kphite plus Suffa, respectively, compared to 4.2 for the chlorothalonil standard and 7.8 for the nontreated control (LSD = 0.7). These results indicate that at the rates used in this study, the phosphite fungicide Kphite alone was inferior to the industry standard chlorothalonil. However, combinations of Kphite with either the Microthiol or Suffa micronized sulfur products provided better leaf spot control than the chlorothalonil standard.

Management of Peanut Leaf Spot and Rust in Nicaragua using Fungicides with and without Micronized Sulfur

T. BRENNEMAN*, A. K. CULBREATH, Plant Pathology Department, The University of Georgia, Tifton, GA 31794, and D. FRANCISCO, La Asociación de Agricultores de Chinandega (ADACH), Chinandega, Nicaragua.

Peanut is an important crop in the far western region of Nicaragua around Chinandega and Leon where the climate and fertile volcanic soils are favorable for production. With very little irrigation available, the crop is planted near the start of the traditional rainy season, and harvested at the start of the dry season. Many of the fields have been in continuous peanut production for years, so disease pressure can be severe from rust, leaf spot and white mold. Growers rely heavily on fungicides including chlorothalonil and various solo or combination products from FRAC groups 3, 7 and 11. Reduced efficacy on leaf spot in recent years lead to evaluation of new actives as well as the addition of micronized sulfur (Kumulus 80WG) to improve control. Kumulus alone had some effect on leaf spot at rates of 2.6 lb/A or above, but no effect on rust or white mold. The addition of Kumulus with other fungicides (Amistar Extra – azoxystrobin + cyproconazole, Opera – pyraclostrobin + epoxiconazole, and Orius - tebuconazole) reduced leaf spot ratings with all products, and in some cases resulted in modest but significant reductions in rust severity. All three fungicides reduced white mold incidence, but Orius had significantly less control, and none of the three were affected by the addition of Kumulus. All three fungicides increased yield compared to the nontreated control, but Orius was lower than the others. Kumulus alone more than doubled pod yield which was similar to Orius alone, but less than yield from the Opera or Amistar Extra treatments. The addition of Kumulus to the other products resulted in numerically but not significantly higher yields. Additional trials showed promising control of foliar diseases with Score (difenoconazole), Crelyon (mefentrifluconazole + pyraclostrobin), Orkestra Ultra (fluxapyroxad + epoxiconazole + pyraclostrobin) and Acapela (picoxystrobin), and improved control when they were applied with Kumulus. Elatus (benzovindiflupir + azoxystrobin) was tested in 2023 only and had significantly lower levels of both leaf spot and rust than all other treatments. These newer fungicides combined with micronized sulfur have great potential for peanut disease management in Nicaragua.

New Approaches to Utilizing Afla-Guard to Minimize Aflatoxin in Peanut

M.C. LAMB*, R.B. SORENSEN, C.L. BUTTS, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.

Aflatoxins are toxic secondary metabolites produced by *Aspergillus flavus (Link)* and *A. parasiticus (Speare)* that contaminate staple crops like peanut (groundnut), maize, sorghum, pearl millet, chilies, pistachio, cassava, etc. Strict mandatory guidelines are imposed to prevent contaminated products from entering the edible food supply. A study was conducted during the 1993-1996 crop years to quantify the cost of aflatoxin to the southeastern region of US. The average net cost to this region was $25.9 million per annum with a range of $10.1 to $43.8 million. An updated study was conducted for the 2017-2019 crop years showing that the annual cost of aflatoxin had increased to $84.1 million. Afla-Guard® is a registered biological control to reduce aflatoxin contamination in US peanuts and was originally applied using hulled barley as the carrier applied over the row at 60-80 days after planting. However, results were not consistent mainly due to environmental factors after application. A new delivery method for Afla-Guard®, which is incorporating Afla-Guard® spores onto peanut seed with a polymer coating was developed and tested. Field trials were conducted under non-irrigated, irrigated up to 80 days after planting, and full irrigated regimes. The same irrigation strategies were employed at the NPRL Environmental Control Plot Facility where rainfall late season rainfall was prevented. No aflatoxin resulted in the field trials due to rainfall. However, significant reductions in aflatoxin were associated with Afla-Guard® as a seed treatment and over the row applications compared to the untreated plots.

Suppression of Sclerotinia Blight with Co-Application of Pydiflumetofen, Azoxystrobin, and Benzovindiflupyr in North Carolina

L. LUX*, E. FOOTE, D.L. JORDAN, North Carolina State Extension, Raleigh, NC 27695.

Sclerotinia blight of peanut, caused by the soil-borne fungal pathogen *Sclerotinia minor*, is a significant disease of peanut in North Carolina. The pathogen, *S. minor* can persist for long periods of time in the soil and spread rapidly upon infection. Consequently, the sporadic occurrence of Sclerotinia blight can make this disease difficult to manage and cause substantial yield loss. In 2023, high levels of Sclerotinia blight occurred within research trials at the Peanut Belt Research Station (Lewiston-Woodville, NC) and were reported in other peanut production areas across North Carolina. Severity of the disease in 2023 could have been due to several factors including favorable environmental conditions as well as traditional leaf spot spray programs using the broad-spectrum fungicide product, chlorothalonil. Objectives of field experiments at the Peanut Belt Research Station consisted of evaluating the efficacy of the fungicide tank mixture, pydiflumetofen (Miravis®), azoxystrobin, and benzovindiflupyr (Elatus®), at different timings within peanut fungicide programs. All three fungicide program experiments were conducted in a randomized complete block design containing four replications on one Virginia-type peanut variety, Bailey II. Data collected consisted of Sclerotinia blight hits (hits per 60 feet), leaf spot (*Nothopassalora personata*) incidence (0-100%), leaf spot defoliation (0-100%), and peanut yield (kg/ha). Leaf spot control was similar for all timings of Miravis® plus Elatus® while Sclerotinia blight control was slightly higher when applications were made closer to harvest when the pathogen was most active under cooler and moist soil conditions. In these experiments, a single application of Miravis® plus Elatus® decreased Sclerotinia Blight by 20% compared with non-treated peanut while two sequential applications spaced 3 weeks apart decreased Sclerotinia blight by 75%. In this experiment, two treatments without Miravis® plus Elatus® included 3 to 5 sprays of chlorothalonil alone or with tebuconazole. Applying three or more sprays of chlorothalonil increased Sclerotinia Blight by 22% compared with non-treated peanut. Peanut yield often reflected differences observed for Sclerotinia blight control. Results from these experiments indicate that Miravis® plus Elatus® is effective in controlling leaf spot and Sclerotinia blight in North Carolina. Although well known, these results remind researchers and practitioners that multiple applications of chlorothalonil can increase incidence of Sclerotinia blight.

Evaluation of Different Fungicide Programs across Five Virginia-type Peanut Varieties

M.B. DA SILVA*, M. BALOTA, D. LANGSTON, Tidewater Agricultural Research and Extension Center, Virginia Polytechnical Institute and State University, Suffolk, Virginia 23437.

Late leaf spot (LLS), caused by *Nothopassalora personata*, is a significant foliar disease that impacts peanut production in Virginia. While Bailey II, Emery, NC 20, and Sullivan exhibit partial resistance to early leaf spot, they do not demonstrate resistance to LLS. This study evaluated the impact of different fungicide spray programs on LLS across five Virginia-type peanut cultivars. In 2022 and 2023, three spray programs across peanut varieties Bailey II, Emery, NC 20, Sullivan, and Walton at two locations per year. The programs were as follows: Full program - Miravis 3.4 fl oz + Elatus 9.5 oz wt/A (60 DAP), Miravis 3.4 fl oz + Elatus 9.5 oz wt + Provost Silver 13 fl oz/A (90 DAP), Provost Silver 13 fl oz/A (105 DAP), and Bravo 24 fl oz/A (120 DAP); Advisory program - Bravo 24 fl oz/A (60 DAP), Provost Silver 13 fl oz/A rotated with Bravo 24 fl oz/A according to LESP, and Omega 16 fl oz/A according to Sclerotinia advisory; and leaf spot only program - Bravo 24 fl oz (60 DAP) rotated with Provost Silver 13 fl oz/A on a 14-day schedule. The experimental design followed a split-plot arrangement where main plots represented spray programs with varieties as subplots. In 2022, location 1 exhibited no differences in LLS among varieties, but all spray programs resulted in a lower area under the disease progress curve (AUDPC) compared to the untreated check. Conversely, location 2 showed no effect of spray programs on disease, but Sullivan, NC 20, and Walton displayed lower AUDPC values compared to Bailey II. Both full and advisory spray programs increased yield by approximately 300 lb/A in location 1 in 2022. In 2023, all spray programs effectively controlled LLS in both trials. NC 20 and Walton consistently showed lower AUDPC values than Bailey II across both trials. The advisory program improved yield by ca. 1,200 lb/A at location 1 while the full program improved yield by ca. 1000 lb/A at location 2. NC 20 and Walton varieties exhibited superior tolerance to LLS, and may allow for fewer fungicide inputs.

2:15–5:00	**Joe Sugg Ph.D. Competition I** Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
2:15	**Elucidating Physio-Genomic Responses of Peanut to Heat and Drought Stress Conditions** **R.R. VENNAM***, M. BALOTA, Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437; K.M. BEARD, D.C. HAAK, School of Plant and Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.	61
2:30	**Implications of Planting Date on Sicklepod (*Senna obtusifolia* L.) and Benghal Dayflower (*Commelina benghalensis* L.) Management in Peanut** **O.S. DARAMOLA***, G.E. MACDONALD, B.L. TILLMAN, H. SINGH, P. DEVKOTA, Department of Agronomy, University of Florida, Gainesville, FL 32611; R. KANISSERY, Department of Horticulture, University of Florida, Immokalee, FL 34142.	62
2:45	**Unraveling Photosynthetic Thermotolerance in Wild Genotypes and Cultivated Peanuts** **K.J. AWORI*,** C. PILON, J.L. SNIDER, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793; S. BERTIOLI, Department of Plant Pathology, The University of Georgia, Athens, GA 30602; D. BERTIOLI, Department of Crop and Soil Sciences, The University of Georgia, Athens, GA 30602; V. TISHCHENKO, Department of Crop and Soil Sciences, The University of Georgia, Griffin, GA 30223.	63
3:00	**Evaluating Leaf and Canopy Photosynthetic Responses to Drought in Peanut Grown under Field Conditions** **S. HANIF***, C. CHEN, Department of Crop, Soil and Environmental Science, Auburn University, AL 36849; W. BATCHELOR, Biosystem Engineering, Auburn University, AL 36849; P.M. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; A. SANZ-SAEZ, Department of Crop, Soil and Environmental Science, Auburn University, AL 36849.	64
3:15	**Using Analytical Techniques to Quantify Imazapic Soil Dissipation** **A.E. MCEACHIN***, T.L. GREY, Department of Crop & Soil Sciences, University of Georgia, Tifton, GA 31793; K.M. Eason, USDA-ARS, Southeast Watershed Research Unit, Tifton, GA 31793.	65
3:30	**Break**	

2:15–5:00	Joe Sugg Ph.D. Competition I continued Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
3:45	**Understanding Physiological Responses in Peanut Reproductive Tissues under Co-Occurring Heat and Drought Stress** **K.M. BEARD***, R.R. VENNAM, School of Plant and Environmental Sciences, Virginia Polytechnical Institute and State University, Blacksburg, VA 24060; M. BALOTA, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, VA 23437; D.C. HAAK, School of Plant and Environmental Sciences, Virginia Polytechnical Institute and State University, Blacksburg, VA 24060.	66
4:00	**Searching for Stem Rot Resistance: Could *A. microsperma* Have a Macro Impact?** **D.J. MATUSINEC***, M.H. ALYR, M.S. HOPKINS, Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602; Y.C. TSAI, Department of Plant Pathology, University of Georgia, Athens, GA 30602; S.C.M. LEAL-BERTIOLI, Institute of Plant Breeding, Genetics & Genomics, Department of Plant Pathology, University of Georgia, Athens, GA 30602; D.J. BERTIOLI, Institute of Plant Breeding, Genetics & Genomics, Department of Crop & Soil Sciences, University of Georgia, Athens, GA 30602.	67
4:15	**Genome-Wide Association Study Reveals Genetic Insights into TSW and Leaf Spot Disease Resistances in Peanut** **J. ZHANG ***, C. CHEN, Department of Crop, Soil, and Environmental Sciences, Auburn University, Auburn, AL 36849; K. CHAMBERLIN, USDA-ARS, Peanut and Small Grains Research Unit, Stillwater, OK 74074; J. CLEVENGERD, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; M. WANG, USDA-ARS, Plant Genetic Resources Conservation, Griffin, GA 30223; P. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.	68
4:30	**XtendFlex® and Enlist® Volunteer Cotton Control in Peanuts** **M. SMITH*,** Department of Entomology and Plant Pathology, Oklahoma State University, Altus, OK 73521; T. BAUGHMAN, Z. TREADWAY, J. DUDAK, Department of Plant and Soil Sciences, Oklahoma State University, Ardmore, OK 73401.	69
4:45	**Seeds of Trust: A Study of the Purity of Harvested Peanut Grain** **S. LAMON***, B.D. TONNIS, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30602; R. HOLTON, Premium Peanut, Douglas, GA 31535; S.C.M. LEAL-BERTIOLI, Department of Plant Pathology, University of Georgia, Athens, GA 30602; D.J. BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30602.	70

6:00 - 8:00 Savor & Connect Dinner (Sponsored by BASF and Bayer) .... Oklahoma 4

Elucidating Physio-Genomic Responses of Peanut to Heat and Drought Stress Conditions

R.R. VENNAM*, M. BALOTA, Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437; K.M. BEARD, D.C. HAAK, School of Plant and Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Heat and drought stress represent significant abiotic factors that negatively affect peanut (*Arachis hypogaea* L.) production in the United States including the Virginia-Carolina peanut belt. While individual heat and drought have been documented to affect peanut physiological responses, the combined effect of these stressors remains largely unexplored. It was hypothesized that the interactive effects of heat and drought stress have a greater impact on peanut physiology than individual stresses. A study was conducted using growth chambers at Virginia Tech's School of Plant and Environmental Science in Blacksburg, VA. Five Virginia-type peanut cultivars were used, i.e., Bailey II, Emery, N.C.20, Sullivan, and Walton. The cultivars were grown under optimal temperature and well-watered conditions during the initial 30 days after planting, after which they were evaluated under four conditions, control (30 oC, well-watered), heat stress (40 oC, well-watered), drought stress (30 oC, drought), and combined heat and drought stress (40 oC, drought). Fourteen days after stress, stomatal conductance was reduced by 47% under heat (p<0.001), 63% under drought (p<0.001), and 72% under combined heat and drought stress (p<0.001) compared to the control. Findings from this study demonstrate a significant impact of combined stresses on peanut and establish a foundation for future rainout shelter field studies. To further elucidate the molecular and genetic mechanisms underlying heat, drought, and combined stress tolerance, RNA was extracted from leaf tissue. Random quality checks showed that the RNA integrity number ranged between 6.6 and 8.4 ensuring the samples were suitable for gene sequencing. The sequencing data will be used to compare gene expression across different treatments and to identify novel genes associated with combined heat and drought tolerance across cultivars.

Implications of Planting Date on Sicklepod (*Senna obtusifolia* L.) and Benghal Dayflower (*Commelina benghalensis* L.) Management in Peanut

O.S. DARAMOLA*, G.E. MACDONALD, B.L. TILLMAN, H. SINGH, P. DEVKOTA, Department of Agronomy, University of Florida, Gainesville, FL 32611; R. KANISSERY, Department of Horticulture, University of Florida, Immokalee, FL 34142.

Sicklepod and Benghal dayflower are weeds of economic importance in peanut in the southeastern United States due to their extended emergence pattern and limited effective herbicides for control. Field studies were conducted near Jay FL in 2022 and 2023 to evaluate the effect of planting date and herbicide programs on Benghal dayflower and sicklepod control in peanut. Peanut planted in June was exposed to a higher Benghal dayflower density than peanut planted in May. Sicklepod density was similar between May and June planting dates at 4 and 8 wks after planting (WAP) but greater by 32% in peanut planted in June 14 WAP. Preemergence followed by (fb) early postemergence (EPOST) application of S-metolachlor or diclosulam plus S-metolachlor controlled Benghal dayflower 84% to 93% 28 days after EPOST in peanut planted in May but control reduced to 58% to 78% in in peanut planted in June. Preemergence fb S-metolachlor or diclosulam plus S-metolachlor EPOST provided <80% sicklepod control 28 d after EPOST. Mid-postemergence (MPOST) application of imazapic plus dimethenamid-p plus 2,4-DB improved Benghal dayflower control to at least 94% 28 d after MPOST but sicklepod control was not >85%. Regardless of the planting date, paraquat plus bentazon plus S-metolachlor EPOST was required for ≥95% sicklepod control. However, herbicide programs that included paraquat plus bentazon plus S-metolachlor reduced peanut yield when planting date was delayed to June. It is recommended that peanut should be planted in early May in fields infested with Benghal dayflower and sicklepod to minimize the potential impact of these weeds and increase peanut yield. Late planted peanut required intensive herbicide programs for increased peanut yield than early planted peanut.

Unraveling Photosynthetic Thermotolerance in Wild Genotypes and Cultivated Peanuts

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With the ongoing rise in global temperatures, peanut plants are increasingly susceptible to heat stress, posing a significant threat to crop yields. Developing new cultivars with enhanced heat tolerance presents a promising solution to mitigate this challenge. Unlike commercially grown peanuts, which often lack heat tolerance, wild peanut varieties are naturally adapted to hot and arid environments, offering a broader genetic diversity. Leveraging this genetic diversity, this research aimed to identify heat-tolerant peanut varieties. The specific objectives included validating chlorophyll *a* fluorescence as an indicator of heat stress and developing an automated model for ranking genotypes based on photosynthetic data. Conducted in growth chambers at the University of Georgia, the study utilized 19 peanut genotypes, comprising three cultivated and 16 wild varieties. Heat stress, set at 35 °C, was induced 60 days after planting and lasted for seven days. Photosynthetic measurements of gas exchange and fluorescence were taken using the LI-6800 Portable Photosynthesis System, while ex-situ efficiencies and quantum yields, crucial for determining electron transport rate in photosynthesis, were measured using a Modulated Chlorophyll Fluorometer OS5p. Measurements were recorded a day before stress, on the final day of stress, and seven days post-stress to evaluate genotype recovery. Dark-adapted leaves were measured on a thermo-block with temperatures ranging from 25 to 50 °C in 5 °C increments to assess efficiencies and quantum yields. The findings revealed a strong correlation between net photosynthesis and electron transport rate. The temperature at which a 15% decline in efficiencies and quantum yield parameters occurred (T15) was calculated. Variations were observed among genotypes for maximum quantum yield for primary PSII photochemistry and quantum yield for electron transport from Quinone A to Plastoquinone during heat stress and recovery periods. Notably, wild genotypes IpaCor1 and IpaVillo1 exhibited superior heat tolerance. These data are currently being utilized to develop a mathematical model for ranking genotypes based on photosynthetic thermotolerance.

Evaluating Leaf and Canopy Photosynthetic Responses to Drought in Peanut Grown under Field Conditions

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Peanuts are a significant cash crop cultivated across continents in semi-arid tropics. Approximately 65% of the peanuts planted in the United States are grown in dryland where it is exposed to drought stress due to uneven rainfall during different growth stages and due to sandy soils. Peanuts can withstand early drought stress, but as they approach the reproductive stage, they become more vulnerable to drought stress. Sustainable peanut cultivation requires cultivars that can endure drought while maintaining acceptable yields. The purpose of this study was to evaluate cultivars based on their photosynthetic efficiency at leaf and canopy levels under mid-season drought stress. Field trials conducted in the rainout shelter facility located at the EV-Smith Research Center (Shorter Alabama) with five cultivars showing different drought tolerance mechanisms (i.e. water savers or water spenders). Plants were grown under drought during pod filling 70-110 days after planting. Leaf level diurnal photosynthesis and stomatal conductance were measured using the Licor-6800 five times each day for six weeks and canopy photosynthesis was also measured once each week. Data regarding harvest index, biomass and yield was also collected at maturity. Cultivar response to drought depended on the drought tolerance mechanisms. Water spender cultivars showed higher photosynthesis and stomatal conductance both at leaf and canopy levels compared with water saver cultivars along with higher yield. For in-depth investigation of different stress tolerance mechanisms, root physiological and anatomical traits will be explored in order to correlate with the photosynthetic parameters collected in the current research.

Using Analytical Techniques to Quantify Imazapic Soil Dissipation

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In 2018, over 29,000 kilograms of imazapic were applied in US peanut production. Previous research indicates imazapic dissipation rate increased as moisture, temperature, and soil pH increased, and as soil organic matter content decreased. Herbicide carryover residues can damage susceptible crops planted the following year. However, residual herbicide carryover can be highly variable depending on soil type, application timing, and multiple environmental factors including rainfall, irrigation, and temperature. Quantifying the dissipation rate of imazapic can assist peanut growers in understanding their rotational options. Experiments were conducted in 2022 to evaluate imazapic variable rates and timings in peanut field trials in Tifton GA. Soil samples taken at 0, 1, 7, 14, 21, 28, 58, 88, 118, and 148 days after planting (DAP) were examined for carryover potential in an oat and canola bioassay study. Data indicated that soil herbicide concentration decreased with time. To quantify changes in soil imazapic concentration over time, imazapic was extracted using a Milestone Inc. ETHOS X microwave lab station and analyzed via liquid chromatography. A method for extraction and analysis with a Waters Acquity Arc Ultra-High Performance Liquid Chromatograph will be presented.

Understanding Physiological Responses in Peanut Reproductive Tissues under Co-Occurring Heat and Drought Stress

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Crop production worldwide has faced a plethora of novel challenges in recent decades with the increasing severity of global climate change. One of the most prevalent challenges faced by warm season crops such as corn (*Zea mays* L.), cotton (*Gossypium hirsutum* L.), soybean (*Glycine max* L.), and peanut (*Arachis hypogaea* L.), has been heat stress. Significant inroads have been made in understanding the effects of extreme heat events on crop development and yield, but our interpretation of these responses becomes convoluted in the presence of co-occurring drought. Furthermore, the studies investigating these factors have focused primarily on vegetative growth, and less on the responses in reproductive tissues. These and other related research needs are the primary interests in an ongoing research project at the Virginia Tech Tidewater Agricultural Research and Extension Center in Suffolk, VA. Preliminary trials conducted in growth chambers and in the field in 2023 revealed changes in peanut pollen viability that shifted with the addition of drought as a factor. On this basis, a subsequent test was performed in environment-controlled growth chambers to investigate gene expression in floral organs under heat and drought stress, and how those transcripts differ when the stress occurs independently or jointly. In this study, reproductively mature plants of five virginia-type peanut cultivars (Bailey II, Emery, N.C. 20, Sullivan, and Walton) were randomized to four treatments representing a combination of two temperature (30/25oC or 40/35oC, day/night) and two soil moisture (80% or 40% field capacity) conditions. Whole flowers were excised over the course of a 40-day treatment period and used to extract RNA for sequencing. The results of this most recent study will not only provide a better understanding of the genetic responses to heat and drought co-occurrence, which will aid in the development of future climate-resilient cultivars, it will also make significant contributions to our comprehension of floral responses to these stressors. For the majority of crop species, the development of flowers and their potential for fertilization is directly related to yield, and therefore deserves an increase in efforts attempting to diagnose and address the factors which threaten these processes over the course of the growing season.

Searching for Stem Rot Resistance: Could *A. microsperma* Have a Macro Impact?

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Cultivated peanut (*Arachis hypogaea* L.) is an allotetraploid species with a narrow genetic base. Therefore, related diploid wild species are useful for introducing disease resistance traits to the cultivated peanut germplasm. *A. microsperma* is a wild species that has previously shown resistance to peanut stem rot, caused by the fungus *Athelia rolfsii*. Stem rot is currently the disease that costs peanut growers in Georgia the most each year, upwards of $80 million between the cost of damage and control. Two diploid species, *A. microsperma* and *A. valida*, were used to develop a novel allotetraploid that were then crossed with cultivated peanut and used to produce F2 mapping populations. One population was screened for stem rot resistance using a greenhouse bioassay method, while another population was screened for resistance in the field. A genetic map has been developed for the bioassay population, and some putative quantitative trait loci have been identified for both resistance and susceptibility. The analysis of the field population will be used to further investigate these and other potential QTL.

Genome-Wide Association Study Reveals Genetic Insights into TSW and Leaf Spot Disease Resistances in Peanut

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Peanut (*Arachis hypogaea* L.) is an important crop in the world. However, it confronts significant challenges from abiotic and biotic stress. Among these, TSWV (Tomato Spotted Wilt Virus), ELS (early leaf spot), and LLS (late leaf spot) are serious peanut diseases, detrimentally impacting peanut yield. In this study, we employed whole genome sequencing techniques to analyze 87 U.S. peanut mini-core collections. Utilizing the resultant genome-wide variation map, we conducted a comprehensive genome-wide association study (GWAS) focusing on these three prevalent diseases affecting peanuts. Through this approach, we successfully identified significant SNPs associated with ELS, LLS, and TSWV. Our findings represent a substantial advancement in understanding the genetic mechanisms underlying disease resistance in peanuts. Moreover, they furnish invaluable genomic resources poised to facilitate future peanut improvement efforts, offering prospects for enhanced yield and resilience against these debilitating diseases.

XtendFlex® and Enlist® Volunteer Cotton Control in Peanuts

M. SMITH*, Department of Entomology and Plant Pathology, Oklahoma State University, Altus, OK 73521; T. BAUGHMAN, Z. TREADWAY, J. DUDAK, Department of Plant and Soil Sciences, Oklahoma State University, Ardmore, OK 73401.

Growing peanuts in rotation with cotton is a popular crop rotation in Oklahoma's peanut growing areas. Consequently, volunteer cotton can be a troublesome weed in peanut production. Herbicide-tolerance traits, such as the XtendFlex® and Enlist® systems, can limit volunteer control options. Trials were conducted in Oklahoma at the Caddo Research Station near Fort Cobb in 2023 and 2024. The trials were arranged in a Randomized Complete Block Design with four replications. XtendFlex® cotton seed was planted in half of the treatments with the other half being planted with Enlist® cottonseed. Herbicide treatments were applied to peanuts containing cotton seed from both herbicide-tolerance systems. The herbicide treatments were Gramoxone at 8 oz/A, 2,4-DB at 24 oz/A, Anthem Flex at 3 oz/A, Aim at 1 oz/A, and Anthem Flex at 3 oz/A plus Aim at 0.6 oz/A. Peanut stunting and injury was highest two weeks after the volunteer cotton control application but no stunting or injury was observed four weeks after application. Treatments that included Aim controlled volunteer cotton better than all other treatments two weeks after application regardless of the cotton herbicide-tolerance technology. Four, six, and eight weeks after application XtendFlex® cotton was controlled at the highest rates by 2,4-DB, Aim, and Aim plus Anthem Flex. Enlist® cotton was controlled at the highest rates by Gramoxone, Aim, and Aim plus Anthem Flex at four, six, and eight weeks after application. Enlist® cotton was not controlled by 2,4-DB. Peanut producers need to apply the correct chemistries to control volunteer cotton issues.

Seeds of Trust: A Study of the Purity of Harvested Peanut Grain

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Peanut farming relies heavily on maintaining genetic purity and quality of seeds, with a rigorous process from breeder to certified seed. In brief, breeder seed, meticulously produced by plant breeders, gives rise to foundation seed, leading to the production of registered and ultimately certified seed, which is usually what farmers buy. Despite this care, a certain degree of mixture of seeds between cultivars and consequently, mistaken identity in harvested grain are inevitable due to the scale of seed production and the practice of some farmers saving part of their harvest for use as seed the following year. Here, we report a large-scale study of harvested peanut grain in Georgia and South Carolina. We focused on Georgia-06G, recognized as the most prevalent and successful peanut cultivar in the United States. Nationally, it constituted approximately 60% of all certified peanut hectares due to its consistent yield and relative tolerance to TSWV. We used the Axiom *Arachis*2 48K SNP array to characterize 293 individual peanuts sampled from the 90 Georgia-06G grain samples collected at peanut buying points across 84 farms spanning 36 counties. This sampling was supported by Premium Peanut. By comparing these genotypes with each other, and with other peanut cultivars, we determined the rate of seed mixture and mistaken identity within our genotyped grains. Our analysis revealed misidentification of harvested grain of only 0.68% - 4.43%, all of which derived from fields planted with farmer-saved seeds. This underscores the effectiveness of the industry's processes for maintaining seed purity and harvest traceability.

8:00 – 9:15	**Production Technology and Economics** Meeting Room: Oklahoma 1 *Moderator: Hardeep Singh, University of Florida*	Pres. #
8:00	**Response of Rainfed Peanut to Different Rates of Prohexadione Calcium Application** **H. SINGH***, K. SINGH, West Florida Research and Education Center, Department of Agronomy, University of Florida, Jay, FL 32565; M.J. MULVANEY, Department of Plant and Soil Sciences, Mississippi State University, Starkville, MS 39762; M. BASHYAL, School of Agricultural Sciences, Northwest Missouri State University, Maryville, MO 64468.	71
8:15	**Acquiring, Analyzing, and Visualizing Publicly Available Peanut Data** **T.W. GRIFFIN***, Department of Agricultural Economics, Kansas State University, Manhattan, KS 66506; J.K. WARD, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695.	72
8:30	**Evaluating Poultry Litter Amendments within a Peanut-Cotton Rotation** **B. ZURWELLER***, J. MAY, Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762.	73
8:45	**ARC and PLC Enrollment and Payments for Peanuts under the 2014 and 2018 Farm Bills and Potential Modifications for the Next Farm Bill** **N.B. SMITH***, Department of Agricultural Sciences, Clemson University, Clemson, SC 29634; S. BUCKELEW, Clemson Cooperative Extension, Clemson University Sandhill Research and Education Center, Columbia, SC 29229.	74
9:00	**New Information on Peanut Response to Freezing Temperatures before and after Digging** **D. JORDAN***, E. FOOTE, North Carolina State Extension, Raleigh, NC 27695; M. BRAKE, B. STEVENS, C. DEAL, I. LANIER, G. HOGGARD, North Carolina Department of Agriculture and Consumer Services, Raleigh, NC 27607.	75

Response of Rainfed Peanut to Different Rates of Prohexadione Calcium Application

H. SINGH*, K. SINGH, West Florida Research and Education Center, Department of Agronomy, University of Florida, Jay, FL 32565; M.J. MULVANEY, Department of Plant and Soil Sciences, Mississippi State University, Starkville, MS 39762; M. BASHYAL, School of Agricultural Sciences, Northwest Missouri State University, Maryville, MO 64468.

Prohexadione calcium is a growth regulator which manages excessive vine growth in peanuts (*Arachis hypogaea* L.) by reducing shoot internode length. To test the effect of prohexadione calcium on peanuts under rainfed conditions, a field experiment was conducted at the West Florida Research and Education Centre in Jay, FL during 2021 and 2022. The objective was to determine peanut response at different rates (untreated control, 70, 105, 140, and 175 g a.i. ha-1 of prohexadione calcium). Data were collected on yield, peg strength, above and below ground biomass, plant height, and total sound mature kernels. Additionally, return on investment for prohexadione calcium application was also calculated. Yield, NDVI and total sound mature kernels did not respond significantly to application rates of prohexadione calcium. Similarly, above and below ground biomass did not significantly differ between the 140 g a.i. ha-1 rate and untreated control. However, a numerical increase in below ground biomass of 31% and 6% was recorded in 2021 and 2022, respectively, using the 175 g a.i. ha-1 compared to the untreated control. Peg strength increased significantly at the 140 g a.i. ha-1 treatment compared to the untreated control. Plant height was significantly lower at all rates of prohexadione calcium than untreated control. The greatest return on investment ($39.73 ha-1) was observed with the 105 g a.i. ha-1 treatment. We conclude that reduced rates (105 g a.i. ha-1) of prohexadione calcium results in a similar yield increase as labeled rates (140 g a.i. ha-1) and greater return on investment.

Acquiring, Analyzing, and Visualizing Publicly Available Peanut Data

T.W. GRIFFIN*, Department of Agricultural Economics, Kansas State University, Manhattan, KS 66506; J.K. WARD, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695.

Data visualization is important to agricultural researchers, data scientists, and peanut specialists. Publicly available peanut data from the US Department of Agriculture (USDA) National Agricultural Statistics Service (NASS) are accessed and acquired via application programming interface (API) web services software tools for further analysis. Acquired data are evaluated and visualized including fieldwork probabilities during crop progress activities such as planting, pegging, and harvest for each peanut-producing state. The overall objective was to share techniques to easily access pertinent peanut data and to develop data visualization tools for further decision making. Analytic results are important for peanut machinery selection and acreage allocation.

Evaluating Poultry Litter Amendments within a Peanut-Cotton Rotation

B. ZURWELLER*, J. MAY, Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762.

Studies evaluating inorganic fertilizer applications to peanut have largely reported little crop response to these applications. Rationale for this is that the deep root system of peanut is effective at scavenging residual soil nutrients to satisfy its relatively low nutrient demand. The objective of this research is to compare soil fertility build up and yield responses of both peanut and cotton to poultry litter and similar inorganic fertilizer applications. A field trial was established in 2022 with cotton, and the subsequent crop was peanut in 2023. Experimental treatments for each crop consisted of: i) non-treated control (only N on cotton consisting of 100 lbs N/ac split at emergence and first square); ii) poultry litter applied to cotton and peanut each year at 2 tons/ac; iii) poultry litter only applied to cotton at 2 tons/ac; iv) inorganic fertilizer applied to cotton and peanut each year matching N-P-K amounts in poultry litter applied; v) inorganic fertilizer only applied to cotton each year matching N-P-K amounts in poultry litter applied. In 2023, poultry litter applications made prior to planting peanut increased peanut pod yield by 1,044 lbs/ac when compared to matching synthetic fertilizer amounts applied prior to planting peanut. Treatments that received poultry litter or synthetic fertilizer prior to peanut planting had increased pod yield when compared to the non-treated control. The treatment that only received poultry litter in the prior year before planting cotton had an increased pod yield of 562 lbs/ac when compared to treatment that only received the matching synthetic fertilizer in the prior year before planting cotton. These results demonstrate that peanut can be responsive to fertilization, even if soil test do not recommend fertilizer. Another rotation cycle will be implemented in 2024 and 2025 to continue examining soil fertility buildup and productivity responses to these fertilizer amendments.

ARC and PLC Enrollment and Payments for Peanuts under the 2014 and 2018 Farm Bills and Potential Modifications for the Next Farm Bill

N.B. SMITH*, Department of Agricultural Sciences, Clemson University, Clemson, SC 29634; S. BUCKELEW, Clemson Cooperative Extension, Clemson University Sandhill Research and Education Center, Columbia, SC 29229.

Over ninety percent of Title I program payments made to farms with peanut base were Price Loss Coverage (PLC) payments under the 2014 and 2018 Farm Bills. The two programs differ in that PLC is a price-based safety net and ARC is a revenue-based safety net. The ARC program has two enrollment options, county-based revenue and individual based revenue. Peanut farm operators across the peanut states have consistently enrolled in PLC while enrolling the other eligible grains and oilseed bases such as corn and soybeans in Agricultural Risk Coverage (ARC) between 2015 and 2023. A peanut PLC payment was triggered eight out of nine years beginning with the 2014 peanut marketing year. The PLC payment averaged $106 per ton during the eight years it triggered. The 2022 crop did not trigger a PLC payment and the 2023 crop is not expected to trigger a PLC payment. ARC County payments triggered each year between 2019 and 2022 but in most cases were less than PLC payments per acre. The 2018 Farm Bill was extended to September 30, 2024, by Congress during which time modifications to the ARC/PLC Program are considered. Alternatives and consequences discussed include increasing the PLC reference price, voluntary and mandatory reallocation of Base acres, increasing payment limits, and calculating payments on Base acres versus annual planted acres.

New Information on Peanut Response to Freezing Temperatures before and after Digging

D. JORDAN*, E. FOOTE, North Carolina State Extension, Raleigh, NC 27695; M. BRAKE, B. STEVENS, C. DEAL, I. LANIER, G. HOGGARD, North Carolina Department of Agriculture and Consumer Services, Raleigh, NC 27607.

Freeze damage can result in a designation of SEG II significant financial loss for farmers. Current recommendations in North Carolina are that peanuts should be dug no closer than 72 hours (3 days) prior to a frost or freeze event to prevent damage. There are no data available that support this recommendation. Additionally, farmers are encouraged to dig pods and invert vines within 5 days after above-ground damage from freezing temperatures. There is also no data available to support this recommendation. In 2023, a freeze was predicted for November 2 in central and northeastern North Carolina. In an effort to support or refute current NC State Extension recommendations, peanut was dug 24, 48, and 60 hours prior to freezing conditions and 12 hours after the freeze. A second freeze occurred the night following the first freeze. Drying conditions were good 60 hours prior to the freeze but not 48 or 24 hours prior to the freeze. When pooled over two locations, percent freeze damage averaged 1.8%, 3.1%, and 4.0% at these respective digging dates relative to the freeze event. When considering variation among the 10 replicates from two locations for each digging date, the highest amount of damage was 3.8% (60 hours), 5.1% (48 hours), and 6.0% (24 hours). Peanuts dug after the freeze event the night before but prior to a freeze event the following night was 2.5% with a high of 8.8% from one of the replications. Twenty-four hours prior to the freeze event, kernel moisture was 30 to 38% (dug 60 hours prior to the freeze), 36 to 40% (dug 48 hours prior to the freeze event), and 40-46% (dug 24 hours prior to the freeze event). Unfortunately, a 72-hour interval was no examined. However, these results indicate that when peanut is dug within 72 hours prior to a freeze, freeze damage exceeds 2.0% (when considering variation in replications). Based on these data, and given contracts can be forfeited when freeze damage is considerably below Federal-State Inspection Service designations for SEG II status, the recommendation for ceasing to dig peanut prior to a freeze event is now 96 hours with good drying conditions projected. A modest decrease in peanut yield was noted 5 and 12 days after the freeze when compared with digging prior to the freeze event. However, no difference in yield was noted when comparing digging 5 and 12 days after the freeze. These results suggest that while growers should pursue digging as soon as possible after a freeze, there is more latitude in timing of digging than previously recommended. Pod maturity, based on pod mesocarp color, was approximately 7 days away from digging to optimize pod yield throughout the period of time when the freeze event occurred.

8:00 - 9:00	**Food Science, Harvest, Shelling, Storage, Handling** Meeting Room: Oklahoma 3 *Moderator: Foy Mills, JLA*	Pres. #
8:00	**Degradation of Peanut Hull Integrity from Exposure to Rain While in Windrows** **J.S. MCINTYRE***, H.J. COOK, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; Q.D. READ, USDA ARS, Southeast Area, Raleigh, NC 27606; E.R. BUCIOR, R.B. SORENSEN, M.C. LAMB, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.	76
8:15	**Can Peanut Combines Influence Cotton Yields?** **J.S. CALHOUN***, A. CROSBY, Department of Plant Sciences and Technology, University of Missouri, Fisher Delta REEC, Portageville, MO 63873.	77
8:30	**Use of High-Oleic Peanuts and Peanut Skins as Alternative Poultry Feed Ingredients in Shell Egg Production** **O.T. TOOMER*,** T.C. VU, USDA-ARS, Food Science & Market Quality and Handling Research Unit, Raleigh, NC 27695; R. WYSOCKY, V. MORAES, R. MALHEIROS, K.E. ANDERSON, Prestage Department of Poultry Science, North Carolina State University, Raleigh, NC 27695.	78
8:45	**Peanut Composition as Affected by Seed Maturity** **L.L. DEAN***, K.W. HENDRIX, USDA-ARS, Food Science and Market Quality & Handling Research Unit, Raleigh, NC 27695-7624.	79

Degradation of Peanut Hull Integrity from Exposure to Rain While in Windrows

J.S. MCINTYRE*, H.J. COOK, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; Q.D. READ, USDA ARS, Southeast Area, Raleigh, NC 27606; E.R. BUCIOR, R.B. SORENSEN, M.C. LAMB, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.

Peanut pods in windrows can be exposed to rain while awaiting harvest. Peanut exposure to rain after digging may have a detrimental effect reducing peanut grade quality. Effects of rain exposure on pods was investigated on pods harvested in 2022 and 2023 from irrigated experimental plots of runner peanuts Georgia 06G cultivar. Experimental peanut plots were managed at four irrigation levels of 0% (dry land), 33%, 66%, and 100% of recommended irrigation. After digging, control samples of peanut pods from all irrigation treatments were harvested using a 2-row commercial peanut combine. Peanut left in windrows were exposed to 25mm (1in) of simulated rainfall by irrigation and then harvested one week later using an experimental peanut combine. Simulated rainfall was repeated three more times at one-week intervals. The final pods collected were exposed to 100mm (4in) of simulated rainfall plus any natural rainfall, over a four-week period after being inverted. After each sampling, peanut pods were dried using fan forced heated air to reduce moisture content below 10%. Pods chosen for hull integrity testing were photographed alongside a measurement scale so pod dimensions could be determined. Hull integrity was measured by compressing the pods between two metal plates in a universal mechanical testing machine to record the force required to rupture the pod suture/seam. Pods were oriented so the hull suture line was in contact with the plates and perpendicular to the surfaces of the plates. Stress on the peanut pod hull suture was calculated from measured pod dimensions and applied compression force. Force at rupture for 20 pods from each irrigation treatment and replication was recorded for a total of 2399 pods. The average stress at rupture on the sutures for control sample pods was 1,077 kPa (156 psi), 1,171 kPa (169.8 psi), 1,125 kPa (163.2 psi), and 1,064 kPa (154.3 psi) for the 0, 33, 66 and 100% irrigated treatments, respectively. Dryland (0% irrigated) peanut pods showed no statistically significant difference in the stress on the pod suture at rupture between the unexposed control pods and those exposed to any amount of simulated rainfall. Irrigated peanut pod suture stress at rupture significantly decreased on rainfall exposed peanut pods compared with control pods at the same irrigation level (F-statistic = 23.36; $P<0.001$). The average suture stress at rupture decreased after the first rain exposure by 224 kPa (32.5 psi), 233 kPa (33.8 psi), and 147 kPa (21.3 psi) for the 33, 66, and 100% irrigation level, respectively. No significant difference in suture stress at rupture was found between the first rain exposure and all other rain exposure treatments. The effect of irrigation level including all rainfall exposures on suture stress at rupture was statistically significant with a reduction of 52 kPa (7.5 psi) with an F-statistic of 3.87, p-value 0.009 between the 0 and 33% irrigated peanuts compared with 66 and 100% irrigated peanuts. The average suture stress at rupture including all rainfall exposures was 1,002 kPa (145.3 psi) and 988 kPa (143 psi) for the 0 and 33% irrigation treatment, respectively, and 950 kPa (137.8 psi) for both the 66 and 100% irrigated peanuts. Study results indicate peanut pod hull integrity can be significantly reduced by exposure to a single 25 mm (1 in) rainfall event followed by one week in a windrow. Pod integrity was not reduced with subsequent rainfall exposure. When the force needed to rupture pod sutures is reduced, the number of loose shelled kernels may increase which would decrease the grade and value of the crop. Study results indicate farmers need to consider weather forecasts when planning to dig peanuts so crop value can be preserved.

Can Peanut Combines Influence Cotton Yields?

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Peanut is a relatively new crop to the Missouri delta region that is becoming increasingly popular in rotation with cotton. Many producers have reported increased cotton yields by incorporating peanut into their system. One issue that has been discovered, however, is row-to-row variability in cotton growth, development, and yield relative to the peanut combine pass on the previous crop. On-farm research was conducted during the fall of 2023 to investigate the impact on peanut chaff distribution on nutrient return to the soil and its potential effect on subsequent crop yield. At multiple locations, separate leaf and vine samples were collected from peanut combine swaths. Samples were collected from a 0.09 m2 area at three positions relative to the peanut combine. These positions consisted of rows 1 and 2 (left), rows 3 and 4, (middle), and rows 5 and 6 (right) of a draw-type six-row peanut combine. A minimum of 3 replicates from each field was collected from multiple sites evaluating multiple combines and peanut varieties. Samples were air dried, weighed, and sent for nutrient analysis at a plant tissue testing laboratory. Dry weight and nutrient content data was subjected to ANOVA and means separated using Fisher’s Protected LSD (alpha=0.05) where significance was detected. Results indicate that combine position does not significantly affect peanut leaf distribution. However, it does impact vine distribution where the center position was significantly greater than the left or right positions. This impact leads to significant impacts of nitrogen and potassium returns to the soil.

Use of High-Oleic Peanuts and Peanut Skins as Alternative Poultry Feed Ingredients in Shell Egg Production

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Historically, agricultural research has focused on peanut production, oil extraction and the kernel of the peanut with little research focused on the use of agricultural by-products such as peanut skins. Peanuts skins contain viable residual nutrients, such as proteins, lipids and fiber that could be utilized as alternative livestock feed ingredients. Hence, we aimed to determine the dietary effects of high-oleic peanuts and peanut skins on layer performance, egg quality and egg chemistry. Two hundred hens were housed in floor pens and randomly assigned to four dietary treatments (5 reps/treatment) and provided feed and water freely for 8 weeks and fed a conventional corn/soy diet, 24% high-oleic peanut corn/soy diet (HOPN), 3% peanut skin (PN Skin) corn/soy diet, or 2.5% oleic acid (OA) corn/soy diet. All data were analyzed for variance at $P < 0.05$ significance level. There were no significant treatment differences in week 8 body weights, feed intake, or egg production ($P > 0.05$). Eggs produced from hens fed the HOPN diet had lower egg weights ($P \leq 0.001$) and greater shell strength ($P < 0.05$), relative to the controls. At week 8, eggs produced from hens fed the HOPN diet had significantly enhanced oleic acid levels ($P < 0.0001$) and reduced saturated fatty acid levels ($P < 0.0001$) as compared to the other treatment groups. These results suggest that HOPN and PN Skin might be suitable alternative poultry feed ingredients with potential positive economic impact to the peanut industry with newly identified uses and markets.

Peanut Composition as Affected by Seed Maturity

L.L. DEAN*, K.W. HENDRIX, USDA-ARS, Food Science and Market Quality & Handling Research Unit, Raleigh, NC 27695-7624.

It is well known that the peanut plant, due to the process of indeterminate flowering, continues to produce seeds over its growing season. At harvest, although the majority of the seeds will be in the last stages of maturation, there will still be seeds present in all the earlier stages. This has an effect on the yield and the crop grade as well as the overall seed quality. Although sizing to remove smaller seeds aids in removing low quality seeds, a seed can be to a larger size and still not be mature. In several research studies, the effects of the maturity of a peanut on its chemical and nutritional composition were investigated with a focus on the potential for desired flavor formation and human nutritional value. In one study, peanuts of the Virginia market type (Bailey II) were harvested over four different planting dates from mid-August to early October. Pods were separated into maturity classes using the hull scrape method. In another study, runner peanuts (GA06G and GA09B) were planted at three different dates from late April to late May. Analyses of total oil, protein, tocopherols, fatty acids, free amino acids and sugars were performed. Total oil and protein increased with maturity as sugars and free amino acid decreased. In the high oleic cultivars, the O/L ratio increased with maturity. In most cases, alpha tocopherol increased while the gamma form decreased. Many of these changes will have an effect on the overall quality of the peanuts as well as influence flavor formation.

8:00 - 9:30	**Joe Sugg Ph.D. Competition II** Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
8:00	**Application of Machine Learning for Selection for LLS Resistance in Peanut (*Arachis hypogaea* L.) Breeding** **I. CHAPU***, R.C.O, OKELLO, College of Agricultural and Environmental Sciences, Makerere University, Kampala Uganda; D.K. OKELLO, National Semi-Arid Resources Research Institute, Soroti, Uganda; A. CHANDEL, M. BALOTA, Virginia Tech, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia 23437.	80
8:15	**Conversion of Early Maturing Spanish-Type Peanut Variety to Resistance to Early Leaf Spot Using an *Arachis cardenasii* Derivative Line as Donor** **J. GOMIS***, A. KANE, Cheikh Anta Diop University of Dakar, Dakar-Fann, Senegal**;** A. SAMBOU, H. A TOSSIM, M. SEYE, R. DJIBOUNE, ISRA/CERAAS, Thiès, Senegal; D. BERTIOLI, S. BERTIOLI, University of Georgia, Athens, GA, USA; J.R. NGUEPJOP, J.F. RAMI, D. FONCEKA, CIRAD UMR AGAP, France.	81
8:30	**Wild Species *Arachis stenosperma* Provides a Novel Source of Root-Knot Nematode Resistance in High-Yielding Backcross Lines of Cultivated Peanut** **E.C. BARNES***, Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602; T. BRENNEMAN, S.C. LEAL-BERTIOLI, Department of Plant Pathology, University of Georgia, Athens, GA 30602; N. BROWN, D. BERTIOLI, Department of Crop and Soil Sciences, University of Georgia, Athens, GA 30602.	82
8:45	**Withdrawn**	83
9:00	**MAGIC Peanut and Pangenome Identify a Third *FAD*2 Gene Associated with High Oleic Acid Content in Peanut** **E. THOMPSON***, A.K. CULBREATH, University of Georgia, Department of Plant Pathology, Tifton, GA 31793; W. KORANI, J.P. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; B. TONNIS, M.L. WANG, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223; C.C. HOLBROOK, B. GUO, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.	84
9:15	**Expression of Resistance of the Peanut Line GP-NC WS 6 to *Meloidogyne hapla*** **E. FOOTE*,** J. DUNNE, A. GORNY, D. JORDAN, D. REISIG, North Carolina State University, Raleigh, NC 27695.	85

Application of Machine Learning for Selection for LLS Resistance in Peanut (*Arachis hypogaea* L.) Breeding

I. CHAPU*, R.C.O, OKELLO, College of Agricultural and Environmental Sciences, Makerere University, Kampala Uganda; D.K. OKELLO, National Semi-Arid Resources Research Institute, Soroti, Uganda; A. CHANDEL, M. BALOTA, Virginia Tech, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia 23437.

Late leaf spot is an important foliar disease of peanut, causing global yield losses. Breeding efforts have been made towards development of resistant varieties, however, the selection based on visual scores is subjective and laborious. Remote sensing and machine learning have been suggested as alternatives for selection for resistance. In this study, 200 genotypes of the African collection were evaluated in Serere and Nakabango Uganda, and data collected using visual scores and RGB images. Indices were derived from the images and used to model LLS scores using both statistical methods and machine learning methods. Classification and regression methods were also used. Results obtained indicate the Random forest, Artificial neural network, and K-nearest neighbors were the best performing algorithms for both regression and classification methods. The results provide a basis for application integration of remote sensing and machine learning methods for selection in peanut breeding.

Conversion of Early Maturing Spanish-Type Peanut Variety to Resistance to Early Leaf Spot Using an *Arachis cardenasii* Derivative Line as Donor

J. GOMIS*, A. KANE, Cheikh Anta Diop University of Dakar, Dakar-Fann, Senegal**;** A. SAMBOU, H. A TOSSIM, M. SEYE, R. DJIBOUNE, ISRA/CERAAS, Thiès, Senegal; D. BERTIOLI, S. BERTIOLI, University of Georgia, Athens, GA, USA; J.R. NGUEPJOP, J.F.RAMI, D. FONCEKA, CIRAD UMR AGAP, France.

Early leaf spot (ELS) is one of the most damaging diseases of peanut worldwide; without fungicide spray, yield losses can reach 70%. Cultivated varieties particularly Spanish-type short duration elites cultivars do not display high level of ELS resistance in contrast to peanut wild species. For example, *A. cardenasii interspecific introgression lines* have largely been exploited to develop resistant varieties mostly for late leaf spot diseases that are widely grown in several peanut producing countries in the word. In Senegal we also found that a *A. cardenasii* introgression line showed good resistance to ELS.In this study, we have generated seven highly backcrossed (BC4F5) and three recombinant inbred lines (F2:8) by crossing a derivative of *A.cardenasii* line (i.e CS16), which harbor QTLs of leafspot and rust resistance on chromosomes A02 and A03, with the Spanish-type short duration variety Fleur11. The main objective of this work was to combine short duration and yield performance of Fleur11 with resistance to ELS. The developed lines were evaluated for ELS resistance, yield and its components in 2022 and 2023 rainy-seasons under natural infection at Nioro du Rip (Senegal). The experimental designs were RCBD with three replications. Disease assessment was performed following the 1-9 scale method and the AUDPC was then calculated. Yield was estimated on 4m2 in 2022 and on 8m2 in 2023.A significant variation in disease resistance has been observed between lines. All lines outperformed the susceptible control and the recurrent parent, Fleur11, for early leaf spot resistance; but none was significantly more resistant than CS16. Two out of the three F2:8 lines showed comparable level of resistance to the donor parent CS16 and produced more haulm than the recurrent parent Fleur11. Three BC4F5 lines showed better resistance and hundred pods and seeds weight than Fleur11 although they were less resistant than CS16. These results demonstrate the positive impact of *A.cardenasii* alleles to improve early leaf spot resistance of cultivated varieties and pave the way to the release of new productive cultivars resistant to ELS

Wild Species *Arachis stenosperma* Provides a Novel Source of Root-Knot Nematode Resistance in High-Yielding Backcross Lines of Cultivated Peanut

E.C. BARNES*, Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602; T. BRENNEMAN, S.C. LEAL-BERTIOLI, Department of Plant Pathology, University of Georgia, Athens, GA 30602; N. BROWN, D. BERTIOLI, Department of Crop and Soil Sciences, University of Georgia, Athens, GA 30602.

Peanut root-knot nematode (PRKN, *Meloidogyne arenaria*) is a major pathogen of peanut that can incur yield losses in excess of 50% when not adequately managed. Currently, all PRKN-resistant peanut cultivars derive their resistance from an introgression from the wild peanut relative *Arachis cardenasii*. While this source of resistance has served growers well for nearly 30 years, the proactive introduction of new sources of resistance is crucial to preventing resistance breakdown. Previously, our lab has demonstrated a novel source of near-total RKN resistance from the wild species *A. stenosperma* in advanced backcross lines of cultivated peanut through controlled inoculation and *in vitro* bioassays. Presently, we sought to measure PRKN resistance in these backcross lines in field conditions while also testing lines for yield and agronomic performance. Through trials at three field locations in Georgia during summer 2023, we found that (1) the previously identified locus on chromosome A02 provides PRKN resistance as strong as that found in resistant cultivars available to growers today; (2) backcross lines significantly outperform common cultivars under PRKN infestation; (3) lines with the introduced locus exhibited yields that were comparable to the commercial cultivars tested in the absence of PRKN pressure; and (4) backcross lines were comparable to, and in some cases outperformed, commercial cultivars in agronomic traits including seedling vigor, stand rating, 100-seed weight, pod constriction, and canopy closure. The lines presented here are being used in the development of peanut cultivars that are stably high-yielding and agronomically acceptable with strong genetic protection against PRKN.

MAGIC Peanut and Pangenome Identify a Third *FAD*2 Gene Associated with High Oleic Acid Content in Peanut

E. THOMPSON*, A.K. CULBREATH, University of Georgia, Department of Plant Pathology, Tifton, GA 31793; W. KORANI, J.P. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; B. TONNIS, M.L. WANG, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223; C.C. HOLBROOK, B. GUO, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

Peanut oleic acid content is a crucial seed trait that determines the nutritional quality and shelf-life of peanut products. The high oleic acid trait is controlled by two fatty acid desaturase (FAD2) genes in peanut, *FAD2A* and *FAD2B*, but in recent years there have been discussions within the peanut industry and scientific community about the possibility of more than two genes controlling high oleic acid trait. Therefore, the objective of this study was to fine map the high oleic genes using MAGIC Peanut and its pangenome. MAGIC Peanut is a multiparental advanced generation intercross population constructed from eight founders and composed of 2,775 RILs. We quantified the oleic acid content for 310 MAGIC lines, named MAGIC Core, for two years and sequenced these lines at low coverage. Then we sequenced the eight peanut founders using long high-quality sequencing to assemble reference quality genomes and to construct the MAGIC Peanut pangenome. The MAGIC Peanut pangenome serves as a reference that stores all possible genomic variation within the population and the origin of the variant. Using the MAGIC Pangenome and MAGIC Core sequencing data we identified 463,273 SNP and InDel markers with founder origin. MAGIC Core 2-year oleic contents show a normal distribution of low and mid-oleic contents with a separate peak of high oleic contents. GWAS analysis has identified three locations significantly associated with oleic content, two align with the known *FAD2A* and *FAD2B* locations. Within the third location another *FAD2* gene was identified and is expressed in the low oleic content founder Tifrunner. Marker genotyping of MAGIC Core for *FAD2A* and *FAD2B* shows that these markers are not sufficient to select for high oleic content. Marker validation is currently underway to confirm the necessity of the third *FAD2* gene throughout the population and in other populations.

Expression of Resistance of the Peanut Line GP-NC WS 6 to *Meloidogyne hapla*

E. FOOTE*, J. DUNNE, A. GORNY, D. JORDAN, D. REISIG, North Carolina State University, Raleigh, NC 27695.

Evaluating pest resistance traits and developing resistance cultivars is important for addressing changing pest dynamics in peanut production systems. *Meloidogyne hapla,* also known as northern root-knot nematode, can reduce quality and yield of peanut in North Carolina and other states with significant peanut production. Management options for plant-parasitic nematodes are limited, and there is no known root-knot nematode resistance in Virginia market-type peanut cultivars grown commercially in North Carolina. Resistance to nematodes has been incorporated into runner market-type cultivars and in one Virginia market type cultivars through efforts by USDA-ARS in Georgia. The runner market-type cultivar, TifNV-High O/L, and the Virginia market type cultivar TifNV-Jumbo have displayed resistance to root-knot nematode. However, yield in these cultivars is often lower than yield of commercially-available cultivars that are susceptible to nematodes. This trait comes from a large introgression on chromosome 9 from *Archis cardenasii*. Previous work has identified a similar segment of the DNA on chromosome 9 from *A. cardenasii* in a line developed in the North Carolina State University Peanut Breed Program, GP-NC WS 06. The segment in GP-NC WS 06 contains a smaller part of the gene compared to TifNV-High O/L. Research was conducted in the greenhouse to confirm the performance of GP-NS WS 06 resistance to northern root-knot nematode infection, compared to cultivars Bailey II and TifNV-High O/L. A single plant of Bailey II, TifNV-High O/L, and GP-NC WS 06 was planted in a 6 in diameter pot and inoculated with 10,000 eggs per plant 2 weeks after planting. A non-inoculated control was included. Bailey II is a known susceptible cultivar. Plants and nematodes were allowed to grow 60 days after inoculation. At that time plants were removed from the soil and cleaned. Galling on roots were rated on a 0 to 100% scale where 0% = no galling and 100% = full galling of the roots. Eggs were extracted from the roots using diluted bleach and washed with water to collect the eggs on sieves. Eggs were collected on a screen with a pore size of 25 µm. Reproductive factor was determined by finding the ratio of final egg populations to initial egg populations. Root galling rating, total number of root-knot nematode eggs, number of root-knot nematodes eggs per gram of root, and reproductive factor were subject to an ANOVA using the SAS v9.4. PROC GLIMMIX procedure in SAS v9.4. Cultivar and inoculation treatments were considered a fixed effect. The separate runs of the experiment and replications within experiments were considered random effects. Means were separated using Tukey's Honestly Significant Difference at a significance level 0.05. Main effects for inoculation and cultivar and their interaction were significant for gall rating, total number of nematode eggs, number of eggs per g of root, and reproductive factor. When pooled over cultivars, increased root galling, total number of eggs, number of eggs per g of root, and reproductive factor were observed on the inoculated plants compared to the non-treated plants. When pooled over nematode inoculation treatments, greater root galling, total number of eggs, number of eggs per g of root, and reproductive factor were observed on the cultivar Bailey II compared with TifNV-High O/L or GP-NC WS 06. There was no significant difference between TifNV-High O/L and GP-NC WS 06 for these measurements. Inoculated plants of Bailey II showed significantly greater root galling, total number of eggs, number of eggs per g of root, and reproductive factor than any of the other combinations of cultivar and nematode treatment. No other significant differences were observed in the interaction of cultivar and nematode treatment. Performance of the test line GP-NC WS 06 was found not to be significantly different from TifNV-HighO/L, but significantly less infection than Bailey II, so therefore resistance is confirmed. Although not confirmed, it is postulated that transfer of this trait into cultivars may be more effective because the DNA sequence is smaller than that of TifNV-High O/L.

9:45 – 12:10	**Flavor Symposium** Meeting Room: Oklahoma Station Ballroom 1-3 *Moderator: Chris Liebold, JM Smucker*	Pres. #
9:45	**Flavor Development and Measurement in Peanuts** **L.L. DEAN***, USDA-ARS, Food Science and Market Quality & Handling Research Unit, Raleigh, NC 27695.	86
10:10	**Improving Tomato Flavor Using Biochemistry, Genomics and Breeding** **D.M. TIEMAN***, Horticultural Science Department, University of Florida, Gainesville FL 32611.	87
10:35	**Improving Roast Peanut Flavor through Near-Infrared Spectroscopy and Genomic Selection** **J.C. DUNNE***, R.J. ANDRES, A.T. OAKLEY, N.K. GARRITY, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695.	88
11:00	**Break**	
11:10	**Development of a Breeder Focused On-Demand Training Program for Peanut Flavor Screening** **L.C. STAPLETON*,** G.V. CIVILLE, J. SELTSAM, Sensory Spectrum, Inc., New Providence, NJ 07978.	89
11:30	**Industry Panel Discussion** **J. DUNNE** (Moderator), Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695; **L. BASHORE**, Research Scientist for Planters & Corn Nuts, Hormel Foods, Northbrook, IL 60062; **J. DAVIS**, Director of Technical Services, JLA, Albany, GA 31721; **C. DORSETT**, Vice President, Food Safety & Sustainability, Premium Peanut, Douglas, GA 31535; **E. DOWD**, Senior Manager for Mints, Nuts, Flavor, Mars-Wrigley, Chicago, IL 60642; **C. LIEBOLD**, R&D Manager, Nut Spreads, J.M. Smucker, Alexandria, VA 22314; **W. PEARCE**, Commercial Manager, Golden Peanut, Alpharetta, GA 30022.	90

Flavor Development and Measurement in Peanuts

L. L. DEAN*, Food Science and Market Quality & Handling Research Unit, USDA, ARS, SEA Raleigh, NC 27695-7624.

The superior flavor of USA peanuts is an important market driver globally. One of the current goals of the Peanut Foundation is for varieties developed with markers for improved, or at least conserved, positive flavor qualities and/or fewer negative flavor qualities. To respond to this challenge a consensus needs to be made as to the definition of flavor qualities and how to measure them in a consistent way. The current understanding of the chemistry of peanut flavor dates to the 1960's when gas chromatography became more readily available for the determination of volatile and semi volatile compounds in extracts from foods. Since that time, instrumentation has become increasingly more sophisticated and widely used resulting in the identification of hundreds of compounds that could contribute to the human sensory experience of roasted peanut flavor. In addition, related studies have concentrated on the identification of compounds that could be responsible for undesirable flavors. What is needed now is to determine the precursors and the metabolism of the flavor compounds. From this, a better idea of control, be it through genetics, growing conditions, and/or environmental impacts is possible.

Improving Tomato Flavor Using Biochemistry, Genomics and Breeding

D.M. TIEMAN*, Horticultural Science Department, University of Florida, Gainesville FL 32611.

Modern fresh market tomatoes have been bred for agronomic traits such as shelf life, disease resistance and yield; however, consumers prefer the taste of locally produced heirloom varieties. Tomato flavor deficiency is due to a cumulative loss of superior flavor alleles while breeding for other traits. It is extremely difficult to breed for flavor because of the genetic complexity of the flavor phenotype as well as a lack of a simple assay to define consumer preferences. Tomato flavor is a result of interactions between sugars, acids and aroma volatiles, with volatile compounds giving the tomato fruit its characteristic aroma and flavor. We have measured 68 flavor-associated chemicals in over 700 tomato varieties, including modern, heirloom and ancestral tomato accessions. Over 150 of these varieties were evaluated in large consumer panels for overall liking and sweet and sour intensity. The biochemical and consumer data permitted us to determine which flavor compounds correlate with consumer preferences. In addition, Genome Wide Association Studies (GWAS) identified loci associated with altered levels of acids, sugars and aroma volatiles. We are using marker-assisted breeding to introgress flavor-associated loci from heirloom parents into modern tomato varieties. Introduction of several flavor loci into a modern tomato variety has resulted in improved flavor as assessed by consumers.

Improving Roast Peanut Flavor through Near-Infrared Spectroscopy and Genomic Selection

J.C. DUNNE*, R.J. ANDRES, A.T. OAKLEY, N.K. GARRITY, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695

When evaluating roast peanut flavor as a value-added, quality trait for commercial release of peanut varieties, peanut breeding materials are routinely screened using a trained sensory panel to assess the roast flavor quality; however, the use of the flavor panel can be time consuming, expensive, and limited to the number of samples that can be evaluated. In addition, the inefficiency, and subsequent costs of using sensory panel-derived data, results in samples being evaluated towards the end of the breeding pipeline. While peanut flavor content is reported to be heritable, the lack of prior economic justification for flavor selection has led to stagnant or negative progress among peanut market-types. Recently, consumer packaged goods companies have expressed interest in developing innovative flavors and quality to appeal to shifting consumer demand and improve sales thereby providing the motivation to improve the selection methods for flavor. Developing a reasonably efficient and cost-effective strategy for selecting improved roast peanut flavor during the breeding process would lead to tremendous genetic gains towards the trait. Therefore, the long-term objective of this work aims to 1. Develop a proxy-screening method for roast peanut flavor using near-infrared spectroscopy (NIR) and 2. Train a predictive genomic selection (GS) model using this screening method for the selection of peanut breeding lines showing improvement in roast peanut flavor. To accomplish this work, a training population comprised of 200-300 peanut varieties spanning all market-types will be subjected to sensory panels for roast flavor content and sensory composition evaluations. The sensory panel will summarize the scores across several sensory factors, including but not limited to roast peanut, sweetness, sweet aromatic, bitterness, cardboard, etc. These scores will provide the basis for clustering each line into a categorical classification of flavor ranks e.g. Good, Fair and Poor. At the time of sensory panel evaluations, NIR spectroscopy will be collected on post-roast paste samples to help develop machine learning models for predictive phenotyping capabilities among the flavor categories. Using this flavor panel proxy-screening model, late generation materials in peanut breeding programs can be characterized prior to advance testing. Paired with GS, genetic gain for roast peanut flavor can be further improved. Regardless of the method, late generation materials evaluated using a flavor panel or screened using NIR requires the destruction of the sample, sample prep time, trained personnel, and specialized equipment. Most breeding programs are genotyping advanced materials regularly, providing a means to initiate genomic selection by compiling necessary data for a training population. Collected data can be used to estimate accurate breeding values (categorical flavor ranks) that will then be used to compare and select novel late-generation family lines currently in the final stages of advancement based on their molecular information alone. If done accurately, evidence of selection through frequency changes of alleles relative to the training/base population will help elucidate the genetic-basis for improved flavor content.

Development of a Breeder Focused On-Demand Training Program for Peanut Flavor Screening

L.C. STAPLETON*, G.V. CIVILLE, J. SELTSAM, Sensory Spectrum, Inc. 554 Central Avenue, New Providence, NJ 07978

The peanut industry has long embraced highly trained panels using the published Peanut Flavor Lexicon as the gold standard for assessment of the flavor characteristics of peanuts. Select manufacturers, universities, and businesses provide trained peanut panel services to document peanut flavor profiles and assess quality. The expense, time required, and need for a group of trained panelists restricts the use of descriptive sensory analysis for the plant breeding community. With a focus of The Peanut Research Foundation's 2024 Research Plan targeted toward development of varieties with maintained or improved flavor, it is important to first think of highly trained panels as the right assessment tool. Likewise, it's reasonable to wonder "Is it possible to bring this rich tool to the breeder?" The answer is yes…with some practical tweaks. By developing a targeted training program that leverages the strength of the Peanut Flavor Lexicon coupled with a streamlined scope and evaluation process, Breeders and others can be taught how to identify key flavor characteristics so they can screen for selection of promising cultivars to be sent for more complex evaluation. This presentation outlines a development approach for creation and implementation of a video-on-demand flavor training module for breeders, similar to screening approaches currently in use by other high value commodities such as coffee, chocolate, and wine.

1:30 – 2:30	**Physiology and Seed Technology** Meeting Room: Oklahoma 1 *Moderator: Timothy Grey, University of Georgia*	Pres. #
1:30	**Oxidative Stress in Peanut Genotypes Caused by Heat at Peak Flowering** K.J. AWORI, **C. PILON*** Crop and Soil Sciences Department, The University of Georgia, Tifton Campus, Tifton, GA 31793; S. LEAL-BERTIOLI, Plant Pathology Department, The University of Georgia, Athens Campus, Athens, GA 30602; D. BERTIOLI Crop and Soil Sciences Department, The University of Georgia, Athens Campus, Athens, GA 30602.	91
1:45	**Heat Stress Tolerance of Photosynthesis and Respiration in Peanut** **V. PARKASH***, K.J. AWORI, I.B. ALMEIDA, J. SNIDER, C. PILON, N. BROWN, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31793.	92
2:00	**Prohexadione Calcium Effect on Yield, Kernel Size, and Peanut Maturity-Second Year** **M. BALOTA***, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia 23437; P. JJAGWE, A. CHANDEL, Biological Systems Engineering Department, Virginia Polytechnical Institute and State University, Blacksburg, Virginia 24060; M. CHAPPELL, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia 23437.	93
2:15	**Lipid Remodeling Contributing to Heat Stress Adaptation in Peanut** **S. NARAYANAN*,** W.W. SPIVEY, Department of Plant and Environmental Sciences, Clemson University, Clemson, SC 29634; Z.S. ZOONG LWE, Department of Biochemistry and Molecular Biophysics, Kansas State University, Manhattan, KS 66506; S. RUSTGI, Department of Plant and Environmental Sciences, Clemson University, Clemson, SC 29634; R. WELTI, Division of Biology, Kansas State University, Manhattan, KS 66506; M. BUROW, Department of Plant and Soil Sciences, Texas Tech University, Lubbock, TX 79409, and Texas A&M AgriLife Research, Lubbock, TX 79403.	94

Oxidative Stress in Peanut Genotypes Caused by Heat at Peak Flowering

K.J. AWORI, **C. PILON*** Crop and Soil Sciences Department, The University of Georgia, Tifton Campus, Tifton, GA 31793; S. LEAL-BERTIOLI, Plant Pathology Department, The University of Georgia, Athens Campus, Athens, GA 30602; D. BERTIOLI Crop and Soil Sciences Department, The University of Georgia, Athens Campus, Athens, GA 30602.

Heat can severely impact plant growth by causing oxidative stress in cells due to excess formation of reactive oxygen species (ROS). The response of plant defense systems against ROS are activated by multiple nonenzymatic and enzymatic antioxidants. Different species use different pathways as cellular detoxification mechanism. This research aimed to assess enzymatic pathways associated with ROS detoxification in peanut (*Arachis* ssp.) genotypes as well as to identify the role of antioxidant enzymes contributing to heat tolerance. Sixteen peanut genotypes, including eight commercial cultivars and eight genotypes selected at the Wild Peanut Lab with introgression of different wild relatives of peanut were planted under controlled conditions in growth chambers as part of the University of Georgia, Griffin Campus in 2022. Plants were grown under optimal conditions (30/20 °C day/night) until 60 days after planting (DAP). Subsequently, plants were exposed to heat stress (35/22 °C day/night) for seven days. After the heat stress period, chamber temperature was adjusted to optimal conditions until final samples were collected. Leaf samples were collected at 59, 67, and 74 DAP and immediately frozen using liquid nitrogen for further analysis. These dates were selected to verify enzymatic activity before heat stress, after a 7-d period of heat, and 7-d of recovery. Laboratory analyses included quantification of hydrogen peroxide as well as the enzymes superoxide dismutase (SOD), catalase (CAT), and ascorbate peroxidase (APX). Genotypes responded distinctly to heat at different sampling times. Overall, heat caused an imbalance between synthesis and detoxification of ROS, and the genotypes used different mechanisms to cope with increased production of ROS. Catalase was the main enzyme contributing to ROS detoxification, but APX also increased activity in some genotypes as a response to heat stress. The identification of genotypes with improved mechanism to scavenger ROS can assist in preventing damage in cellular lipids, nucleic acids, and proteins in peanut plants.

Heat Stress Tolerance of Photosynthesis and Respiration in Peanut

V. PARKASH*, K.J. AWORI, I.B. ALMEIDA, J. SNIDER, C. PILON, N. BROWN, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31793.

Heat stress negatively affects the net photosynthetic rate (AN) of peanut but the relative heat sensitivities of photosynthetic component processes and carbon loss mechanisms remain relatively unexplored. Therefore, the objective of this study was to compare the heat stress tolerance of photosynthesis, its component processes, and carbon loss processes in peanut. Peanut was exposed to three temperature regimes (30/20 ˚C day/night temperature, 30/25 ˚C day/night temperature, and 40/30 ˚C day/night temperature) for four weeks, beginning at planting. Data for plant growth, leaf traits, gas exchange, and chlorophyll fluorescence was collected at the end of four-week period. Net photosynthetic rate and maximum rate of Rubisco Carboxylation were substantial lower in 35/25 ˚C, and 40/30 ˚C treatments, when compared to 30/20 ˚C. Total electron transport rate, electron flux to CO2 assimilation, and stomatal conductance were significantly lower only in 40/30 ˚C compared to 30/20 ˚C. Photorespiration was significantly higher in high temperature treatments. However, dark respiration, intercellular CO2 concentration, mesophyll conductance, CO2 concentration in the chloroplast, and maximum rate of RuBP regeneration were not impacted by the high temperature treatments (35/25 ˚C, and 40/30 ˚C). Overall, decline in net photosynthetic rate was mainly due to decrease in Rubisco carboxylation under high temperature conditions.

Prohexadione Calcium Effect on Yield, Kernel Size, and Peanut Maturity-Second Year

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In peanut (*Arachis hypogaea* L.) production, prohexadione calcium (PC) is largely used to control vine growth for guided digging. Whether PC may affect plant physiological and agronomic characteristics is inconclusive. Early results in 2022 at the Tidewater AREC using four virginia-type cultivars, 'Bailey II', 'Emery', 'N.C. 20', 'Sullivan', and 'Walton' showed that yield was not significantly affected by PC, but seed weight was reduced (*P=0.0784)*. In particular for the large-seeded Emery, PC produced a significant (*P=0.0369*) reduction in 100-seed weight. The test was repeated in 2023, when 7.25 oz/A of PC as Apogee with 16 oz UAN and crop oil were applied at vine touching and 14 days after the first application. Applications were performed on 5-row strips randomly selected to receive or not PC within two-acre large fields planted with the individual cultivars. In each field, 4 strips, the length of the entire field (over 100 feet long) received and 4 did not the growth regulator. At 120, 127, 134, 141, 149, and 162 days after planting (DAP) approximately 2-200 pod samples were collected in each strip and maturity was determined via the pod mesocarp color method. Pod maturity index (PMI) was calculated as the ratio of orange, brown, and black pods from all pods. At the physiological maturity (162 DAP), yield and 100-seed weight were recorded. At any of the sampling time, PC-treated pods were not significantly different for maturity from the non-treated pods. Consistent with the results from 2022 trial, yield was significantly (*P<0.0001*) affected by cultivar and field (each cultivar was planted in a different field), but it was not significantly affected by the PC application. Unlike last year, however, the cultivar × PC interaction was significant (P=0.0283) showing that PC did not significantly change yield for Emery, Sullivan, Walton, and N.C. 20, but it increased yield significantly for Bailey II (5911 lb./A with *vs*. 5005 lb./A without PC).

Lipid Remodeling Contributing to Heat Stress Adaptation in Peanut

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Regionally adapted high-yielding peanut varieties that possess genetic resistance to environmental stress will play a pivotal role in successful peanut production under future climatic conditions. These improved varieties can reduce production costs, thereby improving on-farm profitability as yields are maintained under environmental stress conditions. Heat stress is one of the major factors that limit peanut yield and profitability. A significant gap in understanding the molecular factors contributing to heat stress tolerance/susceptibility in peanuts has hindered progress in the development of climate-resilient varieties. At the cellular level, membrane damage is a fundamental cause of yield loss in plants exposed to high temperatures. Our investigations on a subset of a peanut recombinant inbred line population identified peanut lipidome alterations that help maintain optimal membrane fluidity and minimize membrane damage when peanuts are grown at high temperatures. A major alteration in the leaf lipidome at high temperatures was the reduction of lipid unsaturation levels, primarily through the reduction of 18:3 fatty acid chains of the plastidic and extra-plastidic diacyl membrane lipids. We found evidence showing that transferring 18:3 fatty acid chains from membrane diacyl lipids to triacylglycerols and sterol esters was a key mechanism for reducing the levels of 18:3 fatty acid chains in membrane lipids. Further, in our investigations with six selected genotypes that possess varying heat responses, we found that the expression of *FATTY ACID DESATURASE 3-2* (*FAD3-2*; converts 18:2 fatty acids to 18:3) decreased under high temperatures in the heat-tolerant genotype but not in the susceptible genotype. This result suggests that reducing *FAD3* expression for decreasing the levels of 18:3 fatty acids is likely a heat-acclimation mechanism in peanuts. Finally, QTL-seq revealed a genomic region associated with heat-adaptive lipid remodeling, which would be useful in identifying molecular markers for heat tolerance. These results provide novel information about high-temperature responses in peanuts and will aid in breeding heat-tolerant varieties.

1:45 – 3:15	**Breeding, Biotechnology, and Genetics II** Meeting Room: Oklahoma 3 *Moderator: Naveen Puppala, New Mexico State University*	Pres. #
1:45	**Release of Tamrun OL18L and Tamrun OL19 Runner Peanut** **M.D. BUROW***, Texas A&M AgriLife Research, Lubbock, TX 79403, and Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409; M.R. BARING, Texas A&M AgriLife Research, College Station, TX 77843; J. CHAGOYA, Y. LÓPEZ, Texas A&M AgriLife Research, 1102 East FM 1294, Lubbock, TX 79403; C. SIMPSON, J. CASON, Texas A&M AgriLife Research, Stephenville, TX 76401.	96
2:00	**Allelic Specific Anchors for Marker Assisted Selection by Kompetitive Allele Specific PCR (KASP™)** **J. THOMAS***, J. MARSHALL-DRAKE, Department of Chemistry and Biochemistry, Lubbock Christian University, Lubbock, TX 79407.	97
2:15	**Withdrawn**	98
2:30	**Withdrawn**	99
2:45	**Integrating Phenomics and Genomics Tools for Isolating a Major QTL for Iron Uptake Potential in Peanut** N. LEVITAN, S. KUNTA, Y. LEVY, **R. HOVAV***, Department of Field Crops, Institute of Plant Sciences, Agriculture Research Organization - the Volcani Center, Rishon LeZiyyon, Israel; T. PAZ-KAGAN, T. CARAS, The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Israel; A. CHEN, MIGAL - Galilee Research Institute, Kiryat-Shemona, Israel; J. CLEVENGER, Z. MYERS, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806, USA.	100
3:00	**Transcriptomic Analysis in Peanut Seeds Reveals Genes with Potential to Improve Peanut Resistance to Aflatoxin Contamination** **C. CARDON*,** C. SPRUEILL, C. CHAVARRO, S. JACKSON, P. OZIAS-AKINS, Horticulture Department, Institute of Plant Breeding Genetics and Genomics, University of Georgia, Tifton Campus, Tifton, GA 31793.	101

* Presentation #95 moved to M.S. Poster Competition

Release of Tamrun OL18L and Tamrun OL19 Runner Peanut

M.D. BUROW*, Texas A&M AgriLife Research, Lubbock, TX 79403, and Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409; M.R. BARING, Texas A&M AgriLife Research, College Station, TX 77843; J. CHAGOYA, Y. LÓPEZ, Texas A&M AgriLife Research, 1102 East FM 1294, Lubbock, TX 79403; C. SIMPSON, J. CASON, Texas A&M AgriLife Research, Stephenville, TX 76401.

Tamrun OL18L and Tamrun OL19 are high-yielding, high oleic, early-maturing runner-type peanut cultivars. Yield of Tamrun OL18L was numerically the highest over several years and locations of testing. Statistically, yields were similar to Georgia-09B, FloRun 107, and TUFRunner 511, but were higher than Tamnut OL06 and Tamrun OL11. Maturity of Tamrun OL18L was similar to Tamrun OL12, approximately 2 weeks earlier than Tamrun OL07; maturity of Tamrun OL19 was intermediate between the two other cultivars. Grades of Tamrun OL18L and Tamrun OL19 were intermediate but not statistically different from Tamrun OL07 and Tamrun OL12, lower than Tamrun OL11 but similar to Georgia-09B, FloRun 107, and TUFRunner 511. Tamrun OL18L had a larger seed (75g/100 SMK) than most cultivars tested; seed of Tamrun OL19 was somewhat smaller (69g/ 100SMK). No differences in flavor were noted between Tamrun OL18L, Tamrun OL19, and check cultivars, and no significant off-flavors were detected. Both cultivars are expected to provide growers high-yielding, earlier-maturing runner options.

Allelic Specific Anchors for Marker Assisted Selection by Kompetitive Allele Specific PCR (KASP™)

J. THOMAS*, J. MARSHALL-DRAKE, Department of Chemistry and Biochemistry, Lubbock Christian University, Lubbock, TX 79407.

The cultivated peanut originates from two parental diploid ancestors which merged into the tetraploid genome of current cultivars. One of the biggest issues in screening for SNPs in polyploidy systems is the homologous nature of the genomes, resulting in highly similar sequences repeated in multiple locations or genomes. Anchoring Kompetitive Allele Specific PCR (KASP™) assays allowed for the discrimination between two highly similar sequences for SNP identification when the target sequence for the assay is not unique within the genome or when genotyping allopolyploid organisms. Capture-seq probes were created to target regions of interest using bioinformatic data. Using the probes and next-generation sequencing (NGS) libraries, the target sequences were screened then sequenced using NGS. Freebayes and GATK HaplotypeCaller were used to call SNPs. Sequences of interest were aligned using DNASTAR and Benchling against all four market types, Tifrunner, Bailey II, Shitouqi, and Fuhuasheng. Desired SNPs were selected, and sequences flanking the SNPs were sent to Rapid Genomics, a division of LGC Biosearch Technologies. Anchor primer design was done using proprietary software and validation was completed by LGC against samples with a known phenotype. The anchor technique allowed for the amplification of the specific region of interest resulting in the generation of the fluorescent signal for the discrimination of samples using an accessible, cost effective, and high throughput method.

Integrating Phenomics and Genomics Tools for Isolating a Major QTL for Iron Uptake Potential in Peanut

N. LEVITAN, S. KUNTA, Y. LEVY, **R. HOVAV***, Department of Field Crops, Institute of Plant Sciences, Agriculture Research Organization - the Volcani Center, Rishon LeZiyyon, Israel; T. PAZ-KAGAN, T. CARAS, The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Israel; A. CHEN, MIGAL - Galilee Research Institute, Kiryat-Shemona, Israel; J. CLEVENGER, Z. MYERS, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806, USA.

Iron deficiency chlorosis (IDC) is prevalent in peanuts grown in calcareous soils due to elevated pH levels and increased bicarbonate ion concentrations. Although earlier studies indicated genetic involvement in peanut IDC, the specific genetic mechanisms remained unclear. Our initial investigation into IDC genetics involved analyzing a Recombinant Inbred Line population derived from two Virginia-type peanut cultivars, 'Hanoch' (sensitive) and 'Harari' (tolerant). Evaluation of RILs in two diverse environments employed various phenotyping tools, including SPAD chlorophyll meter, visual assessments (VCR), LI-600 Porometer, and direct iron measurements, complemented by multi-temporal UAV remote-sensing techniques integrating multispectral, thermal, and LIDAR imaging. The remote sensing data analysis comprised nine stages, including calculating yellowing-related indices and developing machine-learning models correlating with field measurements. High to moderate correlations were found between the Green and Red ratio Vegetation Index (GRVI), Iron Oxide (IO), and Vegetation Cover Assessment and the “land” measurements, indicating that they optimally represent the chlorosis phenomenon (R2=0.96). Two models, “SPAD” and “Vpref”, were found to be the most suitable for the prediction of IDC and, therefore, were taken for the genetic mapping together with other indices/sensing indices (E, OI, and GRVI and VCR). The genetic mapping was based on an existing genetic map. A significant locus, *qIRONB03*, was identified for GRVI, “SPAD”, and VCR on chromosome B03 (between B03:3,164,157- B03:6,154,707), explaining between 8-19% of the total variation. Further analysis of *qIRONB03* was performed on 35 BC3F3 Near Isogenic Lines (NIL). NIL were genotyped by a short read low-pass sequencing and Khufu analysis. The NIL phenotyping was performed in a similar manner as the RIL. A substantial genetic effect was found for the NIL population (R2 = 0.37-0.4), indicating a major effect and a promising prospect for successful introgression into IDC sensitive germplasm. Additionally, the NIL analysis facilitated the reduction of the introgressed segment to 1.6Mbp and identified candidate genes belonging to ion binding and transfer. These findings hold significant implications for understanding the genetic control of iron deficiency chlorosis in peanut.

Transcriptomic Analysis in Peanut Seeds Reveals Genes with Potential to Improve Peanut Resistance to Aflatoxin Contamination

C. CARDON*, C. SPRUEILL, C. CHAVARRO, S. JACKSON, P. OZIAS-AKINS, Horticulture Department, Institute of Plant Breeding Genetics and Genomics, University of Georgia, Tifton Campus, Tifton, GA 31793.

A. flavus or *A. parasiticus* are the two main strains that produce aflatoxin. Peanut/groundnut is contaminated through pod/seed colonization during maturation in the field or during post-harvest storage. The seed coat and pericarp are important barriers to protect the seed from diverse external factors. The study of expressed genes in different parts of the seed will help find genes that can act against *Aspergillus flavus* infection and aflatoxin contamination and provide a foundation for metabolic engineering. Our study analyzed the embryo, seed coat, and pericarp RNA sequences from one *Arachis hypogaea* ssp. hypogaea cultivar (Tifrunner) and one mixed subspecies cultivar (NC 3033) from seeds at R4-5, R6, and R7 stages of development. Among the 5% most highly expressed genes (2271 genes across both genotypes), we found different genes related to response to stress in Tifrunner and NC3033, 30 and 26 genes in embryo, 27 and 29 genes in the seed coat, 19 and 20 genes in the pericarp, respectively. GO enrichment analysis identified terms associated with plant response to biotic stress for highly expressed genes unique to the pericarp tissues. Comparing genotypes, NC 3033 showed more terms for response to fungus and up-regulated genes associated with anthocyanin biosynthesis in the seed coat than Tifrunner. In addition, looking for specific promoters for gene engineering in localized tissue types, we found 19, 54, and 49 genes expressed uniquely in embryo, pericarp, and seed coat, respectively. Seed tissue-specific promoters and pathways that could be enhanced or diverted to alter the metabolome are being explored.

1:30 – 2:30	**Joe Sugg Ph.D. Competition III** Meeting Room: Route 66 *Moderator: Bob Kemerait, University of Georgia*	Pres. #
1:30	**Peanuts vs. Leaf Spot: Growing Our Defenses with Wild Species** **A.K. DONG***, M.S. HOPKINS Department of Plant Pathology, University of Georgia, Athens GA 30602; D.J. BERTIOLI Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621; S.C.M. LEAL-BERTIOLI Department of Plant Pathology, University of Georgia, Athens GA 30602.	102
1:45	**Evaluating the Potential of Inoculation with ACC Deaminase-Containing Rhizobia to Improve Peanut Drought Tolerance** **Q. ZHANG*,** O. ADENIJI, Y. FENG, C. CHEN, A. SANZ-SAEZ, Crop, Soil and Environmental Sciences, Auburn University, AL 36849; S. WANG, Y. WANG, Biosystem Engineering, Auburn University, AL 36849; P. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.	103
2:00	**Peanut Response to Delayed Timings of Fluridone (Brake®) and Trifludimoxazin (Rexovor®)** **N.J. SHAY***, E.P. PROSTKO, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31794.	104
2:15	**Magnitude of Fungicide Resistance in *Agroathelia rolfsii* from Georgia Peanut Felds and Its Phenotypic and *In Planta* Effects** **J. BELL*,** A. CULBREATH, J. OLIVER, T. BRENNEMAN, Plant Pathology Department, University of Georgia, Tifton, GA 31794.	105

Peanuts vs. Leaf Spot: Growing Our Defenses with Wild Species

A.K. DONG*, M.S. HOPKINS Department of Plant Pathology, University of Georgia, Athens GA 30602; D.J. BERTIOLI Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621; S.C.M. LEAL-BERTIOLI Department of Plant Pathology, University of Georgia, Athens GA 30602.

Early leaf spot, a fungal disease caused by the pathogen *Passalora arachidicola*, is a major concern that threatens peanut (*Arachis hypogea*) production. This disease causes severe defoliation in fields and can account for large yield losses. Through the domestication of peanut, a bottleneck of diversity was created resulting in a loss of resistance to early leaf spot in the cultivated peanut germplasm. In previous studies, high levels of resistance to peanut diseases have been identified in wild *Arachis* relatives and their derived tetraploid hybrids (also called allotetraploids). The objective of this study is to identify early leaf spot resistance in thirteen wild peanut genotypes and eight nascent wild derived allotetraploids. Phenotypic disease was evaluated with in-vitro detached leaf bioassays. Disease resistance was then determined by evaluating the total number of lesions and sporulating lesions per leaf area developed over time. High levels of resistance were found on four wild hybrids and their parental lines. The potential for wild peanut disease resistance introgressions is promising and they can be used as donors in peanut breeding programs to lower yield losses due to early leaf spot.

Evaluating the Potential of Inoculation with ACC Deaminase-Containing Rhizobia to Improve Peanut Drought Tolerance

Q. ZHANG*, O. ADENIJI, Y. FENG, C. CHEN, A. SANZ-SAEZ, Crop, Soil and Environmental Sciences, Auburn University, AL 36849; S. WANG, Y. WANG, Biosystem Engineering, Auburn University, AL 36849; P. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.

In Alabama, the second-largest peanut production state in the United States, drought severely impacts peanut yield due to its unique geographical and climatic conditions. While improvements in management practices are recognized as the most effective means other than breeding to enhance crop yield under abiotic stress, the high cost of irrigation facilities necessitates the exploration of alternative, economical methods. There is evidence that aminocyclopropane-1-carboxylic acid (ACC) deaminase-containing rhizobia have positive effects on plant growth and biological nitrogen fixation in other crops under drought stress. However, little research has been done on the impact of ACC deaminase activity in *Rhizobium* on peanut growth under drought. This study investigated the potential of inoculating peanuts with rhizobial strains with varying ACC deaminase activities to improve drought tolerance. Two rhizobial mutant strains, one with ACC deaminase gene knocked out and the other over-expressed, as well as the wild-type strain (*Bradyrhizobium japonicum* strain 9) were inoculated into the drought-sensitive peanut cultivar AP-3. We evaluated the effects of these strains on peanut physiological characteristics and biomass under drought and well-watered conditions using a complete randomized block design in greenhouse experiments. Our results showed that drought stress significantly reduced pod biomass, root biomass, nitrogen derived from atmosphere, leaf water content, Δ13C, and gas exchange measures in peanuts. Surprisingly, the inoculation effect was not significant. Further research on crosstalk between plant hormones is needed to explain these findings and develop effective drought tolerant strategies for peanut cultivation.

Peanut Response to Delayed Timings of Fluridone (Brake®) and Trifludimoxazin (Rexovor®)

N.J. SHAY*, E.P. PROSTKO, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31794.

The intensive use of herbicides to manage troublesome weeds in peanut producing regions threatens their long-term efficacy and can further exacerbate previously documented resistant biotypes. The small pool of available herbicide options makes it difficult to diversify within an integrated weed management portfolio. Thus, it is critical to explore both new and repurposed chemistries with different modes of action including fluridone (Brake®, SePro, Carmel, IN) and trifludimoxazin (Rexovor®, BASF, Florham Park, NJ). Trifludimoxazin is still in the early development phase so its potential label parameters are still under investigation. The current fluridone label recommends a preemergence (PRE) application within 36 hours of planting. However, field access during this short application window can be limited by multiple factors such as unfavorable environmental conditions and equipment breakdowns. Little research has investigated peanut response to scenarios whereby PRE applications of fluridone or trifludimoxazin were delayed. Therefore, the objective of this research was to determine the tolerance of peanut to PRE applications at multiple timings after planting. Small-plot, replicated field trials were conducted at the University of Georgia Ponder Research Farm from 2022-2023. Treatments were arranged in a randomized complete block design with a 3 (herbicide) by 4 (timing) factorial arrangement. Herbicides were fluridone at 126 g ai/ha, trifludimoxazin at 37 g ai/ha, and a non-treated control (NTC). Application timings were 1, 3, 5, 7 days after planting (DAP). All data were subjected to ANOVA using PROC GLIMMIX and means were separated using Fisher's protected LSD test ($P = 0.10$). When averaged over timing, fluridone caused a 7% reduction in peanut stand (density). Trifludimoxazin had no effect on peanut stand. When averaged over herbicide, timing had no effect on peanut stand. Results indicated that there was a significant herbicide-by-timing interaction for stunting 13 DAP. Fluridone caused 5%-11% stunting with the highest stunting occurring at the 5 DAP and 7 DAP timings. Trifludimoxazin caused 13%-19% stunting with the highest stunting at the 7 DAP timing. Fluridone caused significant foliar bleaching ranging from 5%-20% with the highest bleaching at 5 DAP and 7 DAP timing. Trifludimoxazin caused an 8% increase in foliar leaf necrosis when averaged over all timings. Fluridone had no effect on peanut plant heights when observed at 30 DAP but trifludimoxazin reduced heights by 5%. When averaged over herbicide, timing had no effect on plant height. By 80 DAP, there was no effect on peanut height regardless of herbicide or timing. Peanut yields were not reduced by any timing of fluridone or trifludimoxazin with yields ranging between 5311 to 5499 kg/ha. Fluridone and trifludimoxazin applied as late as 5 to 7 DAP will result in greater peanut injury but the crop will recover without negative yield effects.

Magnitude of Fungicide Resistance in *Agroathelia rolfsii* from Georgia Peanut Felds and Its Phenotypic and *In Planta* Effects

J. BELL*, A. CULBREATH, J. OLIVER, T. BRENNEMAN, Plant Pathology Department, University of Georgia, Tifton, GA 31794.

Managing *Agroathelia rolfsii* in peanut is largely dependent on fungicides. For 30 years, DMIs and SDHIs have been heavily used, increasing the risk of fungicide resistance development. Therefore, 256 *A. rolfsii* isolates were collected from 14 fields across southern Georgia where disease control was less than expected, and the *in vitro* sensitivity was assessed using discriminatory doses of tebuconazole, mefentrifluconazole, flutolanil, and benzovindiflupyr. The EC50 values of the 5 most sensitive (MS) and least sensitive (LS) isolates to each fungicide were determined, showing significant differences in the MS and LS groups for flutolanil and benzovindiflupyr only ($p < 0.001$). MS and LS attributes were characterized *in vitro* by assessing growth rate, sclerotial production, and virulence on excised stems by measuring mycelium growth and oxalic acid bleaching. Observed differences were not consistent across fungicides. Overall, 37.50% of the fungicide-attribute combinations showed the LS population being less fit than the MS, which could be due to a fitness cost if resistance mutations are present, whereas 18.75% showed the LS population being more fit, and 43.75% showed no differences in fitness. Almost all differences were minor and could be due to the intrinsic nature of the isolates measured. To determine if differences seen *in vitro* have any impact on the level of disease control in the field, two of the MS and LS isolates for each fungicide were used to inoculate field plots. Half of the inoculated plots received the corresponding fungicide sprays at the labeled rates, and the other half remained unsprayed. For each SDHI, disease levels in the sprayed plots were reduced similarly for both the MS and LS isolates, thus *in vitro* sensitivity did not affect field efficacy. For each DMI, there were no significant reductions in disease with either the MS or LS isolates. Since even the MS isolates were not controlled, it is likely that the lack of control was due to confounding factors in the field, such as retention of sprays on the upper canopy due to minimal washoff from inadequate irrigation.

3:15 – 5:00 Poster #	**General Poster Session** Meeting Room: Oklahoma Station Prefunction Area	Pres. #
1	**Genome-Wide Association Study of Smut Resistance in a New Core Population from Argentina** **E.A. ROSSI***, Instituto de Investigaciones Agrobiotecnológicas, UNRC-CONICET, Argentina; S. MAGALLANES, A. FALCO, M. CAVIGLIASSO, DRS – MANIAGRO SA, Argentina; N. BONAMICO, Instituto de Investigaciones Agrobiotecnológicas, UNRC-CONICET, Argentina; M. BALZARINI, Unidad de Fitopatología y Modelización Agrícola, CONICET, Argentina.	106
2	**Withdrawn**	107
3	**Do Damaged Pods from a Harsh Harvest Process Increase the Probabilities of Fungal Contamination in Peanut Seeds?** **L.C. ICHAZO-RIBERA***, B.L. TILLMAN, J.O. ODUOR, M.D. GOYZUETA, M.W. GOMILLION, North Florida REC, Agronomy Department, University of Florida, Marianna, FL 32446; I. SMALL, North Florida REC, Plant Pathology Department, University of Florida, Quincy, FL 32341; S. DA SILVA, Plant Pathology Department, University of Florida. Gainesville, FL 32611; F. IRIARTE, Plant Disease Diagnostic Clinic, North Florida REC, Quincy, FL 32351; N. DUFAULT, Plant Pathology Department, University of Florida. Gainesville, FL 32611.	108
4	**Evaluating Applications in Peanut Breeding for NIR-Based High Throughput Phenotyping of Seed Compositional Traits** **J. ADAMS***, University of Georgia, Crop and Soil Department, Peanut Breeding, Tifton, GA 31793; B. DAVIS, J. DAVIS, JLA Global, Albany, GA 31721; N. BROWN, University of Georgia, Crop and Soil Department, Institute of Plant Breeding, Genetics, and Genomics, Tifton, GA 31793.	109
5	**Withdrawn**	110
6	**Withdrawn**	111
7	**High-Throughput Phenotyping of High Oil USDA Organic Peanuts under Field Drought Stress** **W.S. RAVELOMBOLA***, A. MANLEY, Department of Soil and Crop Sciences, Texas A&M AgriLife Research, Vernon, TX 76384; J. CASON, Texas A&M AgriLife Research, Stephenville, TX 76401; M.D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409; H. PHAM, Texas A&M AgriLife Research, Lubbock, TX 79403.	112

3:15 – 5:00 Poster #	**General Poster Session continued** Meeting Room: Oklahoma Station Prefunction Area	Pres. #
8	**Transpiration Efficiency and GWAS in the U.S. Peanut Minicore Collection** **H. PHAM*,** J. CHAGOYA, Texas A&M AgriLife Research, Lubbock, TX 79403; R. CHOPRA, V. BELAMKAR, Texas Tech University, Dept. of Plant and Soil Science, Lubbock, TX 79409; C. SIMPSON, J. CASON, Texas A&M AgriLife Research, Stephenville, TX 76401; M.D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Texas Tech University, Dept. of Plant and Soil Science, Lubbock, TX 79409.	113
9	**High Throughput Phenotyping Strategies for Peanut Improvement in Africa** **M. BALOTA***, Virginia Tech, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437, USA; R. OTENG-FRIMPONG, CSIR-Savanna Agricultural Research Institute, Tamale, Ghana; I. CHAPU, D.K. OKELLO, National Semi-Arid Resources Research Institute, Soroti, Uganda; E.K. SIE, CSIR-Savanna Agricultural Research Institute, Tamale, Ghana; I. FAYE, Senegalese Agriculture Research Institute, Bambey, Senegal; A. CHANDEL, Virginia Tech, TAREC, Suffolk, Virginia 23437, USA; J.M.M. CHINTU, Department of Agricultural Research Services, Chitedze, Malawi S.K. BONSU, CSIR-Savanna Agricultural Research Institute, Tamale, Ghana; M. MBAYE, Senegalese Agriculture Research Institute, Thiès, Senegal; E. KAPEWA, Department of Agricultural Research Services, Lilongwe, Malawi; D. HAAK, School of Plant and Environmental Sciences, Blacksburg, VA 24060, USA; D. HOISINGTON, J. RHOADS, Feed the Future Innovation Lab for Peanut, Athens, GA 30602, USA.	114
10	**Improved Valencia Cultivars for Production in New Mexico** **N. PUPPALA***, M. OJHA, Agricultural Science Center at Clovis, New Mexico State University, Clovis, NM 88101.	115
11	**Effects of Seed Treatments on Peanut Yield and Grade** **M. OJHA*,** N. PUPPALA Agricultural Science Center at Clovis, New Mexico State University, Clovis, NM 88003.	116
12	**Evaluation of Spanish and Spanish-Runner Hybrids in Northeast Arkansas and Southwest Missouri** **J.M. CASON***, Texas A&M AgriLife Research, Texas A&M University System, Stephenville, TX, 76401; T.R. FASKE, University of Arkansas, Division of Agriculture, Lonoke, AR 72086; D. WANN, International Peanut Group, Brownfield, TX 79316; K. MOORE, Ag Research Consultants, Sumner, GA 31789; M.D. BUROW, Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX 79403 and Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; F.D. MILLS, JR., JLA, Abilene, TX 79606; D. DESHAZO, JLA, Keller, TX 76248; B. DAVIS, E. JACKSON, JLA, Albany, GA 31721.	117
13	**Insect Management Practices in Georgia Peanut** **M.R. ABNEY***, Department of Entomology, University of Georgia, Tifton, GA 31793; J.E. BENNETT, D. BOWEN, W. BROWN, D.S. CARLSON, B. CARTER, C. CLOUD, B.G. CREWS, M. DOWDY, M. FRYE, B. HAYES, S. INGRAM, J. KICHLER, S. MCALLISTER, J. MILLER, C.S. MOON, K. POST, B.L. REEVES, J.P. SAPP, P. SAPP, J. SHEALY, A. SHIRLEY, A. SMITH, L. STANLEY, S. TANNER, W. TYSON, University of Georgia Cooperative Extension.	118
14	**Effects of Landscape Structure on Thrips Population Dynamics and Tomato-Spotted Wilt Virus Incidence** **I.L. ESQUIVEL***, Department of Entomology & Nematology, University of Florida, North Florida Research and Education Center, Quincy, FL 32351; E. CARTER, University of Florida Extension, Jackson County Extension, Marianna, FL 32448; K. WYNN, University of Florida Extension, Hamilton County Extension, Jasper, FL 32052; D. LEONARD, University of Florida Extension, Calhoun County Extension, Blountstown, FL 32424.	119
15	**Efficacy of Foliar-Applied Insecticides to Reduce Pod Damage Caused by Southern Corn Rootworm** **R. BRANDENBURG***, B. ROYALS, D. REISIG, E. FOOTE, C. ELLISON, B. BARROW, M. STRICKLAND, P. SMITH, D.L. JORDAN, North Carolina State University, Raleigh, NC 27695.	120

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17	**Polyphenolic Content and Antioxidant Activity of Peanut Shell Extracts as Potential Feed Additive in Animal Nutrition** **M. LARRAURI*,** N.R. GROSSO, National Scientific and Technological Research Council (CONICET), Multidisciplinary Institute of Plant Biology (IMBIV), Argentina; B.L. TILLMAN, M.D. GOYZUETA, L.C. ICHAZO-RIBERA, Agronomy Department, North Florida REC, University of Florida, Marianna, FL 32446; N. DILORENZO, Animal Sciences Department, North Florida REC, University of Florida. Marianna, FL 32446.	122
18	**The Groundnut Improvement Network for Africa (GINA)** D. FONCEKA, S. CONDE, A. SAMBOU, M. SEYE, Y.R. DIJBOUNE, H.A. TOSSIM, ISRA/Centre d'Etudes Régional pour l'Amélioration de l'Adaptation à la Sécheresse (CERAAS), Thiès, Senegal; I. FAYE, ISRA, Institut Sénégalais de Recherches Agricoles (ISRA), Centre National de Recherche Agronomique, Bambey, Senegal; D.K. OKELLO, National Semi-Arid Resources Research Institute-Serere, Kampala, Uganda; R. OTENG-FRIMPONG, Council for Scientific and Industrial Research (CSIR)-Savanna Agricultural Research Institute, Tamale, Ghana; J.Y. ASIBUO, Council for Scientific and Industrial Research-Crops Research Institute (CSIR-CRI), Kumasi, Ghana; L. MAKWETI, Zambia Agriculture Research Institute (ZARI), Chipata, Zambia; A. MUITIA, Mozambique Agricultural Research Institute (Instituto de Investigação Agrária de Moçambique), Nampula Research Station, Nampula, Mozambique; J. CHINTU, Chitedze Agricultural Research Service, Lilongwe, Malawi; D. SAKO, Institut d'Economie Rurale (IER), Centre Régional de Recherche Agronomique (CRRA), Kayes, Mali; A.M. COULIBALY, Institut National de Recherche Agronomique du Niger (INRAN), Maradi, Niger; A. MININGOU, INERA, CREAF, Ouagadougou, Burkina Faso; M. KONATE, INERA, DRREA-Ouest, Bobo Dioulasso, Burkina Faso; E.M. BANLA, Institut Togolais de Recherche Agronomique (ITRA), Lome, Togo; S.N. SYLLA, Département de B.V., Université Cheikh Anta Diop, Dakar, Senegal; J.F. RAMI, UMR AGAP, CIRAD, Montpellier, France; J. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806, USA; Y. CHU, P. OZIAS-AKINS, Institute of Plant Breeding Genetics and Genomics and Department of Horticulture, University of Georgia, Tifton, GA 31793, USA; S. TALLURY, Plant Genetic Resources Conservation Unit, Griffin, GA 30223, USA; **D. HOISINGTON***, Feed the Future Innovation Lab for Peanut, The University of Georgia, Athens, GA 30602, USA.	123
19	**Feed the Future Innovation Lab for Peanut - Working along the Peanut Value Chain to Increase Quality Production and Solve Problems Facing Smallholder Farmers** D. HOISINGTON, **J. RHOADS***, J. MARTER-KENYON, M. THIAM, K. MCHUGH, A. STRIPLING, A. FLOYD, Feed the Future Innovation Lab for Peanut, The University of Georgia, Athens, GA 30602, USA; V. GUWELA, Feed the Future Innovation Lab for Peanut, Lilongwe, Malawi.	124
20	**Development of Single Kernel NIR Calibrations for Rapid and Real-Time Oil and Protein Analysis of Peanut Kernels Using the QSorter Explorer** **C.B. AGRAZ***, B.I. DAVIS, J.P. DAVIS, Technical Services, JLA International, Albany, GA 31721, USA; S. YAN, P. ARMSTRONG, USDA-ARS, Stored Product Insect and Engineering Research Unit, , Manhattan, KS 66502, USA; N. WOZNICA, J. KLEIN, R. TEDIOSI, QualySense-Ferrum AG, Schafisheim, Switzerland; R. HOLTON, Premium Peanut, Douglas, GA 31535, USA; P. TSATSOS; MARS-Wrigley, Chicago, IL 60642, USA.	125

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22	**Effect of Varying Disease Management Programs and Digging Dates on Disease Severity and Yield of Peanut in North Carolina** **L. LUX***, E. FOOTE, D.L. JORDAN, North Carolina State Extension, Raleigh, NC 27695.	127
23	**Assessment of Peanut Fungicide Programs and Sulfur in Irwin County, GA, 2020-2023** **P. EDWARDS***, H. ANDERSON, K. BELL, W. POPE, UGA Extension, Ocilla, GA 31774; J. BENNETT, UGA Extension, Rochelle, GA 31079; S. CARLSON UGA Extension, Sylvester, GA 31791; G. HANCOCK, UGA Extension, Ashburn, GA 31714; B. REEVES UGA Extension, Nashville, GA 31639; A. CULBREATH, R. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.	128
24	***In-Vitro* Evaluation of BC3F6 Peanut Genotypes for Resistance to *Aspergillus flavus* Infection and Aflatoxin Accumulation** D.N. NDELA, Department of Crop Science, Faculty of Agriculture, Food and Consumer Sciences, University for Development Studies, Nyankpala Campus, Tamale, Ghana; **T.K. TENGEY***, Council for Scientific and Industrial Research-Savanna Agricultural Research Institute (CSIR-SARI), Tamale, Ghana; F. KANKAM, Department of Agriculture Biotechnology, Faculty of Agriculture, Food and Consumer Sciences, University for Development Studies, Box TL 1882, Nyankpala Campus-Tamale, Ghana; R. OTENG-FRIMPONG, Council for Scientific and Industrial Research-Savanna Agricultural Research Institute (CSIR-SARI), Nyankpala, Tamale, Ghana; C. SIMPSON, J. CASON, Texas A&M AgriLife Research, Stephenville, TX 76401, USA; M.D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409, USA.	129
25	**Towards Efficient Phenotyping for Peanut Smut Resistance: Line-Scan X-ray Imaging of Faux-Infected Pods** **R.S. BENNETT***, USDA-ARS, Stillwater, OK 74075; N. WANG, P. WECKLER, Y. ZHANG, Department of Biosystems and Agricultural Engineering, Oklahoma State University, Stillwater, OK 74078; M.E. PAYTON, Department of Biomedical Sciences, Rocky Vista University, Englewood, CO 80112; J. BALDESSARI, Instituto Nacional de Tecnología Agropecuaria, Manfredi, Córdoba, Argentina; K.D. CHAMBERLIN, USDA-ARS, Stillwater, OK 74075.	130
26	**Susceptibility of Runner Peanut Cultivars to Sclerotinia Blight in Arkansas** B. BAKER, M. EMERSON, **T.R. FASKE***, University of Arkansas – Division of Agriculture, Lonoke Extension Center, Lonoke, AR 72086.	131
27	**Compatibility of Kudos OD with Fungicides Applied to Peanut in North Carolina** **D. JORDAN***, E. FOOTE, North Carolina State Extension, Raleigh, NC 27695.	132
28	**Fungicide and Growth Regulator Research in Louisiana Peanut** **P. PRICE***, LSU AgCenter, Macon Ridge Research Station, Winnsboro, LA 71295; B. PADGETT, LSU AgCenter, Dean Lee Research and Education Center, Alexandria, LA 71302.	133

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30	**Examining Heat Tolerance in Wild and Cultivated Peanuts: Insights from Photosynthesis** **K.J. AWORI*,** C. PILON, J.L. SNIDER, G.A. COMITRE, V.S. TREVISAN, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793; S. BERTIOLI Department of Plant Pathology, The University of Georgia, Athens, GA 30602; D. BERTIOLI, Department of Crop and Soil Sciences, The University of Georgia, Athens, GA 30602.	135
31	**Exploring the Feasibility of High Throughput Phenotyping Technology to Enhance Peanut Physiological Resilience for Heat and Drought Tolerance** **R.R. VENNAM***, A.K. CHANDEL, M. BALOTA, Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA 23437; K.M. BEARD, School of Plant and Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.	136
32	**Methods for Screening Resistance to Pythium Pod Rot** **N.M. WEERASURIYA*,** USDA-ARS, Peanut and Small Grains Research, Stillwater, Oklahoma 74075 and Department of Entomology & Plant Pathology, Oklahoma State University, Stillwater, Oklahoma, 74078; R.S. BENNETT, Peanut and Small Grains Research, USDA-ARS, Stillwater, Oklahoma 74075; S.M. MAREK, Department of Entomology & Plant Pathology, Oklahoma State University, Stillwater, Oklahoma 74078; K.D. CHAMBERLIN, USDA-ARS, Peanut and Small Grains Research, Stillwater, Oklahoma 74075.	137
33	**Functional Physiology for Informed Decision Making** **E.R. BUCIOR***, L. HALL JR., R.B. SORENSEN, USDA-ARS, National Peanut Research Laboratory, Dawson, Georgia 39842.	138
34	**Influence of Seeding Rate on Ecosystem Water-Use Efficiency and Yield of Peanut** **G. ZHANG***, M.Y. LECLERC, K. POUDEL, Department of Crop and Soil Sciences, University of Georgia, Griffin Campus, Griffin, GA 30223; R.S. TUBBS, W.S. MONTFORT, Department of Crop and Soil Sciences, University of Georgia, Tifton Campus, Tifton, GA 31793.	139

Genome-Wide Association Study of Smut Resistance in a New Core Population from Argentina

E.A. ROSSI*, Instituto de Investigaciones Agrobiotecnológicas, UNRC-CONICET, Argentina; S. MAGALLANES, A. FALCO, M. CAVIGLIASSO, DRS – MANIAGRO SA, Argentina; N. BONAMICO, Instituto de Investigaciones Agrobiotecnológicas, UNRC-CONICET, Argentina; M. BALZARINI, Unidad de Fitopatología y Modelización Agrícola, CONICET, Argentina.

Peanut smut caused by *Thecaphora frezii* is the most important disease of peanut in Argentina. The most economical and environmentally friendly method for controlling this disease is smut genetic resistance. The goal of this research was to identify molecular markers associated to peanut smut resistance for use marker-assisted selection. A mapping population of 344 F2:3 families derived of six biparental populations, was evaluated for GWAS in DRS MANIAGRO. Peanut smut incidence was evaluated in General Cabrera, central Argentina during crop year 2023-2024. The field design consisted of two rows-plots planted on an augmented experimental design. Fifteen check-lines with eight repetitions each were used. Elite cultivars were used as susceptible check-lines and accessions of mini-core of the US Peanut germplasm collection as resistance check-lines. The genotyping of the population was performed by the 2.5K Groundnut DArTag SNP panel. Multiple mixed models for GWAS were compared using GAPIT package on the R software. The most suitable model was then selected and applied to identify marker-trait associations. The results showed wide variability for smut incidence on the evaluated population. The model that incorporates principal components for population stratification and associated markers as covariates to reduce false positives was the most suitable model. GWAS allowed us to identify two SNPs associated to smut disease incidence on chromosomes A03 and B02 with statistically significant LOD scores. Although these associated markers should be validated, the results are promissory for forward marker-assisted selection on the DRS MANIAGRO breeding program.

Do Damaged Pods from a Harsh Harvest Process Increase the Probabilities of Fungal Contamination in Peanut Seeds?

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Peanut (*Arachis hypogaea L.)* is a crop susceptible to *Aspergillus spp.* infection, notorious for producing aflatoxins, a mycotoxin that threatens human and animal health. Developing crop resistance to *Aspergillus* spp. would be a resource to reduce aflatoxin contamination in peanuts. Breeding for resistance has focused on crop traits to create a physical barrier to *Aspergillus* spp., such as the seed coat and pod shell. Loose shell kernels (LSK) are more susceptible to *Aspergillus* spp. infection and are a risk factor for aflatoxin contamination on the seeds. This study hypothesizes that intact pods (IP) (those with no visible damage or breach) could reduce the fungal infections on peanut seeds at harvest, thereby decreasing the risk of *Aspergillus* spp. infection. Damaged pods (DP) and IP were selected from the harvest of nine different genotypes and two harvest dates. Half of the IP were sterilized in a 10% NaOCl solution. A total of three pod treatments were tested for this experiment: IP, DP, and sterilized IP. Seeds from DP, Intact not Sterilized Pods (INS), and Intact Sterilized Pods (ISP) were placed in an *Aspergillus* differentiation agar and incubated at 37 Celsius for seven days. The Area Under the Colonized Progress Curve (AUDPC) of seed contamination was quantified, and data was analyzed with the GLIMMIX Procedure. Furthermore, means differences were identified with LSD – Fisher's test using the SAS statistical software. There was a statistical difference ($P<0.05$) between the genotypes and the pod treatment; seeds from ISP exhibited less fungal contamination than seeds from DP on Day 7 of the incubation period. These findings encourage breeding efforts to enhance the shell integrity of peanuts to mitigate *Aspergillus* spp. infection and reduce aflatoxin contamination in peanut crops.

Evaluating Applications in Peanut Breeding for NIR-Based High Throughput Phenotyping of Seed Compositional Traits

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The peanut industry requires peanut cultivars with a range of seed compositional traits to satisfy specific product requirements. For instance, candy and snack manufacturers require high oleic acid concentration in the oil for improved shelf stability, whereas other parts of the industry prefer lower or “normal” oleic acid concentration. The use of non-destructive seed analysis is an advantage for peanut breeding programs. Near-infrared spectroscopy (NIR) is a non-destructive method that is currently used for indirect measurement of seed compositional traits such as oleic acid concentration, oil and protein percentage. However, the platforms that were available until recently were too slow for processing a large number of samples. The QSorter Explorer, recently developed by Ferrum, measures several traits including NIR-reflectance of individual kernels and allows sorting of seeds in real-time based on trait threshold values at speeds of 10-20 seeds per second. Calibrations for oleic acid concentration in peanut are well established for the device, however, sorting thresholds have not been optimized for the purpose of peanut breeding. Additionally, calibrations for oil and protein percentages have not been fully developed. Optimizing thresholds for oleic acid concentration will standardize the method used within our breeding program, and provide empirical data to inform other peanut breeding programs. Developing and validating calibrations for oil and protein percentage will help accelerate improvement for those traits. High throughput phenotyping of seed compositional traits will assist in the efficient development of improved peanut cultivars for Georgia and beyond.

High-Throughput Phenotyping of High Oil USDA Organic Peanuts under Field Drought Stress

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The demand for organic peanuts is increasing nationally. Improving high oil trait will increase the marketability of organic peanuts. In this study, we tested the feasibility of unoccupied aerial (UAS) to phenotype drought stress of five high oil plant introductions (PI) from the United States Department of Agriculture (USDA). The experiments were established on a certified organic research plot managed by the Texas A&M AgriLife Research-Vernon during the summers of 2022 and 2023. For each year, the study was laid out in a split plot design with irrigation levels as whole plot and PI as subplot. The irrigation level consisted of 100% evapotranspiration (ET), 50% ET, and 25% ET replacement. The treatment combination irrigation by PI was replicated four times. UAS data were collected on July 28, 2022; September 17, 2022; July 12, 2023; and September 5, 2023. A total of 23 vegetation indices were calculated using spectral band values obtained from UAS. Results showed a significant reduction in plant biomass due to drought stress. A high correlation between normalized vegetation indices (NDVI) and plant biomass was found ($r>0.61$).

Transpiration Efficiency and GWAS in the U.S. Peanut Minicore Collection

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Transpiration efficiency (TE) is a crucial component of yield under drought stress. Ninety-nine accessions of the U.S. minicore collection plus 7 check varieties were evaluated for TE in pots in a rainout shelter or greenhouse conditions at Texas A&M AgriLife Research in Lubbock, TX in two years. Pots were well-watered until 49 days after planting (DAP) when two plants were harvested and averaged to assess pre-stress biomass, and drought stress was then imposed. Each pot was placed in a 1.5 mil polyethylene bag and tied at the base of the remaining plant to prevent evaporative water loss. Specific leaf area (SLA), SPAD chlorophyll meter reading (SCMR), shoot and root biomass, and visual wilting ratings were recorded during the experiment. When the plants had reached their permanent wilting point (PWP), the experiment was terminated. TE was calculated as dry matter accumulation divided by total water loss. Significant differences were observed among genotypes for TE, SLA, SCMR, and wilting. Four minicore accessions and a check variety showed the stay-green trait (no wilting) 119 days after imposition of drought. This trait can potentially be used for breeding for drought tolerance. The data obtained in this experiment were compared to previous simple sequence repeat (SSR) marker data for the minicore collection and analyzed by GWAS. At least four markers had significant associations with TE in this experiment and could potentially be used for marker-assisted selection. SNP chip data are being used to identify additional markers for response to water deficit.

High Throughput Phenotyping Strategies for Peanut Improvement in Africa

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Further improvement in breeding efficiency will only be possible if phenotyping can be streamlined and become more efficient, accurate and uniform. This can be accomplished through the development and use of selection methods that require less time and manpower, are more accurate, and can be used in connection with digitized methods of analysis and selection decision tools. This requires a high-throughput approach, which is the core objective of The USAID Peanut Innovation Lab proposal "*Adoption of High Throughput Phenotyping (HTP) in Varietal Development Throughout the Groundnut Improvement Network for Africa (GINA)*". Precisely, this project is aimed at the development and use of high throughput phenotyping methods (HTP) to enhance breeding selection that are superior to the traditional methods and allow integrated data collection, management, and analysis across the Groundnut Improvement Network for Africa (GINA). Results from the first phase (2018-2023) of the project and objectives of the new phase (2023-2027) will be addressed.

Improved Valencia Cultivars for Production in New Mexico

N. PUPPALA*, M. OJHA, Agricultural Science Center at Clovis, New Mexico State University, Clovis, NM 88101.

The field experiments were conducted at four locations; in a research farm of USDA Lubbock, Texas, and a commercial peanut grower's field in, Morton, and Plains Texas. Soil type in USDA Lubbock has a brown and sandy loams, with smaller areas of grayish-brown, silty clay loams and elevation is 2900 feet. The soil type of Morton, and Plains is an Amarillo-Acuff-Olton, Amarillo loamy fine sand, and sandy soil respectively. In each locations the experimental trials were conducted using randomized complete block design with three replications. Eleven peanut genotypes and one check cultivar (Valencia-C) were planted on April 27 at USDA Lubbock, May 3 at Morton, and April 25 at Plains Texas. Plots were planted with a John Deere Max Emerge planter fitted with cone metering units at a seed rate of five seeds/foot. Each plot has two rows which were 40 inch wide and 12 feet long at Lubbock and Morton. In Plains, plots were 36 inch wide and 12 feet long. All the experimental trial was planted in a conventional tillage system. Intercultural operations were done when necessary for the normal growth and development of the crop. The crop received 1.5 inches of water per week except at planting when 3 inches of water was applied through central pivot system. M-6 has both the highest grade (59.2%) and Shelling Percentage (SP; 64.4%). In Morton, M-2 was the highest yielding variety (3309.3 lb/ac) with a net return USD 1199.6. There was a significant differences among 12 varieties of peanut for both grade and SP. The highest grade (67.47%) was of H&W108 followed by 308 (67.45%) and KC-5 varieties (67.37%) compared to check cultivar Valencia C (63.83%). M-7 has the highest SP (70.76%) followed by H&W-108 (70.66%).Although no significant differences was observed in pod yield at Plains, 309 (1865.4lb/ac) has numerically higher pod yield with a net return of USD 687.5 followed by M-2 (1744.4lb/ac) with net return USD 642.6. The grade and SP of 12 Valencia varieties was significantly different. The grade (68.97%) of M-7 variety was higher than others. Average pod yield, grade, SP, and net return of all location differed significantly. Performance of Valencia varieties was dependent on location but average across locations, M-2 has higher yield (2083.3lb/ac), net return (USD 740.2), and grade (64.6%). The pod yield of M-2 was 24.8% greater than the control variety Valencia C.

Effects of Seed Treatments on Peanut Yield and Grade

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The increasing demand for organic peanuts is regarded as the fastest growing sector in the United States. Growers are attracted towards organic peanut production because of higher price premiums for certified organic over conventional peanut. Organic peanut production is traditionally confined in the southwest part of the US, however, significant research and efforts have been made to convert conventional farms to organic farms. Many growers are interested in growing certified organic peanut for organic processed peanut foods but the wide range of biotic and abiotic stress affects its production. Two treatments of liquid soil-applied in-furrow treatments from CERTIS bio were applied. The application rate for Double Nickel @ 4.75 litres/ha and SoilGard 5.7 kg/ha was applied on 64 days after planting. The planted variety was IPG-1288, a runner market-type peanut. A backpack sprayer was used. Care was taken to direct the spray at the base of the plant. Weed control was challenging as no synthetic herbicides were applied in the field. Plots were kept weed-free by doing hand weeding throughout the growing season. The mean pod yield for the trial was 3449 kg per hectare. The highest pod yield was recorded when the soil was sprayed with CERTIS fungicide Double Nickel (3559 kg/ha), which was 197 kilogram more than the control treatment (3362 kg/ha), which resulted in a 6% increase in yield or a $ 104 increase in net return over the control treatment. The second-best treatment was fungicide sprayed with SoilGard (3427 kg/ha), which resulted in a 2.0% increase in yield or a $ 65 increase in net return over the control treatment. There was no significant difference between treatments for Total Sound Mature Kernel (TSMK) and Net Return.

Evaluation of Spanish and Spanish-Runner Hybrids in Northeast Arkansas and Southwest Missouri

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A study was conducted in the South-Central/Delta Region, specifically in Northeast Arkansas, to evaluate the performance of Spanish and Spanish-runner hybrid cultivars. The aim of the study was to examine the yield, grade, and seed quality characteristics of these peanuts. In year one (2023), a field experiment was implemented using an eight-entry randomized complete block design. Each two-row plot measured 1.83 meters by 2.44 meters. Cultivars were harvested 130 days after planting with a 2-row Lilliston digger inverter. Following harvest, peanuts were bagged, dried to 10.5% moisture, and threshed with a Kincaid plot thrasher. Yield and grade data were collected in Stephenville, TX, while seed composition, oil chemistry, descriptive sensory evaluation, and physical appearance of seed were assessed at the JLA laboratory in Albany, GA. Findings from this comprehensive analysis will be presented. A second year of testing is planned.

Insect Management Practices in Georgia Peanut

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Insects pose a significant economic threat to peanut production in Georgia, and effective insect management depends on proper knowledge of the pests and the tactics used for their control. A ten-question survey instrument was administered to Georgia peanut producers by UGA ANR agents at maturity clinics from 2021 to 2023. Questions were designed to identify the most common pest issues in each year and identify grower practices that might lead to sub-optimal pest management outcomes. Over 340,000 peanut acres were surveyed over the three-year period. Notable among the results, the survey revealed an increase in acres treated with phorate for thrips, while acres treated with imidacloprid declined from 2021 to 2023. The use of diflubenzuron for foliage feeding caterpillar management on surveyed acres increased in each year and reached 43% in 2023. Sixty percent of surveyed acres were scouted for insect pests in 2023; though still less than ideal, this represents the highest level of scouting recorded in the three years of the survey. This information will be useful in the design of future research plans and in the development of Extension education programming for peanut producers.

Effects of Landscape Structure on Thrips Population Dynamics and Tomato-Spotted Wilt Virus Incidence

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Tobacco thrips are an important generalist herbivore that causes direct economic injury to host crops and transmits viruses that can reduce plant health. *F. fusca* overwinters in the larval or adult stage on weeds and winter crops TSWV infection causes spotted wilt disease, a plant disease characterized by chlorosis, stunting, and death, significantly affecting yield. The severity of this disease is highly variable in individual peanut fields, perhaps due to the sensitivity of the vector population to changing weather patterns. Peaks in dispersing *F. fusca* adults caught on yellow sticky traps during May or early June, although the numbers of *F. fusca* varied among locations and years have been observed. Winter and spring weather conditions are important factors determining *F. fusca* population growth rates. Temperature accumulation from November through May is the primary abiotic factor that affects population growth rates. The total amount and frequency of precipitation events also affect *F. fusca* with persistent wet conditions in the spring, resulting in population suppression. Although the development of *F. fusca* populations in peanuts has been well documented, we do not know how the configuration or composition of the surrounding landscape can affect the magnitude of population immigration and development in peanut fields. Nor has the within-field variation of thrips populations been well documented. Here, we show the variability of F. fusca and corresponding TSWV incidence across the Florida panhandle. Jackson Co., FL, has the highest overall thrips populations and TSWV incidence, even though thrips were present across all fields and counties sampled. Exploring these relationships deeper will provide insight into early-season drivers of *F. fusca* and their spatial dynamics within peanut fields and corresponding TSWV incidence.

Efficacy of Foliar-Applied Insecticides to Reduce Pod Damage Caused by Southern Corn Rootworm

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Southern corn rootworm can damage peanut pods and reduce yield. Historically, chlorpyrifos was applied at pegging as a granular product to suppress this pest and protect yield. Tolerances for chlorpyrifos in peanut were revoked in 2021. Currently, there are no chemical alternatives to chlorpyrifos that suppress this insect. Thirty trials were conducted in North Carolina during 2022 and 2023 to determine if three bi-weekly sprays of bifenthrin (Brigade at 6.0 oz/acre) versus indoxacarb (Steward at 11 oz/acre) in 15 trials or indoxacarb only in 15 trials decreased the percentage of pods with scarring when sprays were initiated during the last week of June. A non-treated control was included. These experiments were conducted in fields with moderate to high risk for damage caused by southern corn rootworm damage based on the current NC State Extension southern corn rootworm index. Results for trials were grouped by treatment design or year. In 2022, pod scarring in trials with bifenthrin and indoxacarb was 9% or less in nine trials for the non-treated control regardless of location or tillage system (e.g. conventional tillage, strip tillage, and no tillage or presence of a cereal rye cover crop). When these insecticides were compared in 2023, pod scarring was also 9% or less in the non-treated control in four trials. However, in two trials, pod scarring was 3 to 24% and 5 to 15% in the non-treated control. In a group of five trials in farmer fields, pod scarring ranged 8 to 19%, 6 to 23%, 4 to 9%, 0 to 1%, and 0 to 3% in the non-treated control. In two industry sponsored trials, pod scarring in the non-treated control ranged from 12 to 25% (2022) and 0 to 3% (2023). In a final group of trials with eight combinations of year, location, and cover crop treatments, pod scarring was 7% or less in four trials and 0 to 34% in the other four trials. Based on ranges of pod scarring in non-treated controls, only 9 of 30 trials likely had adequate pod scarring (10% or greater) to determine if insecticides affected southern corn rootworm damage. In 3 of these 9 trials, indoxacarb decreased pod scarring compared with non-treated peanut. Bifenthrin was not applied in these three trials. Pod yield was determined in 28 of the 30 trials. In 2 of the 3 trials where indoxacarb decreased pod scarring, no difference in peanut yield was observed when insecticides were applied compared with non-treated peanut. One of the three trials was not harvested. In the remaining 27 trials, pod yield was similar for non-treated peanut and peanuts treated with insecticides. These results indicate that in many fields pod scarring from southern corn rootworm is relatively low even though risk to southern corn rootworm was moderate to high based on the current NC State Extension risk index for this pest. In the few instances where a significant difference in pod scarring was observed, there was no differences in yield. Lack of a difference in yield when comparing treated and non-treated peanuts was the result of relatively low level of pod scarring. Previous research has shown that a minimum of 25% pod scarring is needed to result in adequate puncturing of pods by southern corn rootworm to reduce peanut yield.

Peanut Cultivar Response to Fluridone

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Field experiments were conducted in south Texas, the Texas High Plains, and in southwestern Oklahoma during the 2023 growing season to evaluate cultivar response of the runner peanut cultivars (Georgia-09B, Lariat), Spanish cultivars (Ole, Span 17) and the high oil content Diesel Nut breeding line (31-08-05-03) for tolerance to fluridone at either 0.126, 0.168, or 0.336 kg ha-1 applied preemergence (PRE). On the Texas High Plains, fluridone at 0.126 and 0.168 kg ha-1 resulted in 2 to 14% leaf chlorosis 4 weeks after planting with Georgia-09B and Diesel Nut. This injury persisted throughout the growing season. Stunting was < 4% at all evaluations. No difference in yield with either cultivar or fluridone rate was noted when compared to the untreated check. Fluridone at 0.168 and 0.336 kg ha-1 resulted in 1 to 3% stunting 4 weeks after planting (WAP) in Oklahoma with the Spanish varieties Ole and Span17 and 5% stunting when using Lariat. No stunting was noted with any cultivar 10 WAP. Chlorosis ranged from 6 to 10% with all cultivars 4 WAP. When evaluated late-season, fluridone at 0.168 kg ha-1 exhibited no late-season chlorosis; however, fluridone at 0.336 kg ha-1 exhibited 3 to 4% chlorosis on all cultivars. No yield differences were noted between the untreated check and any fluridone rate or cultivar. At the south Texas location, when using fluridone at either 0.126, 0.168, or 0.336 kg ha-1 on Georgia- 09B, chlorosis increased from 3 to 10% (2 WAP) as the rate increased. At the 4 WAP evaluation, only fluridone at 0.336 kg ha-1 exhibited any chlorosis (4%). No other evaluations were taken due to white-tail deer (*Odocoileus virginianus*) which moved into the test plots due to the extremely dry conditions and completely decimated the plots. In conclusion, although fluridone did result in some peanut stunting and chlorosis, no negative yield response was observed with any fluridone rate when using any of the cultivars evaluated.

Polyphenolic Content and Antioxidant Activity of Peanut Shell Extracts as Potential Feed Additive in Animal Nutrition

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Peanut shells contain plant secondary metabolites called polyphenols which are an excellent raw material to produce phenolic compounds with antioxidant, antibacterial and antifungal properties. These compounds are categorized as GRAS (Generally Recognized as Safe) which are innocuous for those who consume them. For this reason, they are a valuable resource for use as feed additives in livestock feeding because they can improve ruminal fermentation by stimulating microbial metabolism, increasing nutrient digestibility, mitigating methane production and activating the immune system through antioxidant activity. The objective of this study was to determine the content of polyphenols and antioxidant activity of peanut shell extracts from the commercial cultivar Georgia-06G (G) and from the UF experimental line Black Pod (BP). The pods were collected at harvest, dried to 10% moisture content and each cultivar was separated in whole pod (WP), exocarp (EX), and mesocarp (MS). The extracts were obtained by solid-liquid extraction from ground peanut shells using 70% ethanol as extraction solvent. Total phenolic and flavonoid content, and free-radical scavenging activity (DPPH) were analyzed in the extracts. Statistical analysis was performed using InfoStat software. Peanut shells from BP had the greatest total phenols content in WP, EX, and MS (32.35, 21.63 and 14.35 mg gallic acid/g dry matter, respectively). In contrast, G-WP exhibited greater phenolic content than G-EX (10.93 and 7.02 mg gallic acid/g dry matter, respectively), while G-MS had the least phenolic content (4.40 mg gallic acid/g dry matter). The greatest flavonoid content was found in BP-WP and G-WP (34.94 and 17.70 mg quercetin/g dry matter). The results of the antioxidant activity (DPPH) were expressed as IC50 which is a measured of scavenging activity of sample concentration required to inhibit 50% radical. The greatest DPPH was exhibited by BP in WP, EX, and MS (IC50 = 3.05, IC50=15.57 and IC50=27.69, respectively) and it was associated with the highest phenol content. Peanut shell extracts have high phenolic and flavonoid content with remarkable antioxidant activity. These compounds can be used as natural feed additives in livestock diets to improve animal health and performance, while promoting a profitable circular economy where a low-value component of peanut production could instead add more value to the crop.

The Groundnut Improvement Network for Africa (GINA)

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Speciation of cultivated peanut reduced its genetic diversity, leading to challenges with crop yield. The Groundnut Improvement Network in Africa (GINA) assembled a collection of 1049 peanut breeding lines, varieties, and landraces from nine African countries and used a high-density SNP array to analyze the genetic structure of the collection and quantify levels of genetic diversity. After assembling a core collection of 300 lines based on breeding traits and genetic diversity, partners shared it as a resource for breeding and discovery purposes. Numerous field trials have been conducted across Africa to identify traits and genes that can be used to develop and release improved varieties. In some cases, lines that perform across several environments have been identified and provide possible materials for addressing current and future climates faced by farmers worldwide.

Feed the Future Innovation Lab for Peanut - Working along the Peanut Value Chain to Increase Quality Production and Solve Problems Facing Smallholder Farmers

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Extended for an additional five years, the Feed the Future Innovation Lab for Peanut (Peanut Innovation Lab), managed by the University of Georgia and involving many US and international public and private partners, is scaling research findings during the first five-year phase to impact farmers everywhere. The lab is supporting the Groundnut Improvement Network for Africa (GINA) to assess diversity, incorporate large-scale phenotyping and genotyping approaches, and develop and release improved varieties across Africa. Optimized production packages are being evaluated at scale by farmers, while the packages are being further enhanced through on-station and on-farm agronomy trials to identify the most effective inputs. Mechanization options such as threshing and shelling are being designed and tested, an options for local manufacturing explored. The entire value chain is being enhanced via expert visits by US and international experts to assist in research design, analysis of the results, and consulting on solutions to problems faced by partners.

Development of Single Kernel NIR Calibrations for Rapid and Real-Time Oil and Protein Analysis of Peanut Kernels Using the QSorter Explorer

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Oil (%) and protein (%) are fundamental to peanut quality. Environmental conditions, maturity, and genetics can cause these components to vary in peanut kernels. Oil and protein analyses are typically carried out on bulk samples resulting in overall average values rather than information on the single kernel distributions within the lot. Furthermore, standard wet chemistry methods are destructive to the samples. With continued breeding of specialized peanut cultivars, and the natural variation in these components, largely due to kernel maturity profiles in a given sample, there is a need to efficiently and non-destructively measure oil and protein content in single kernels. The QSorter Explorer (QSE) is a high-speed (≈20 kernels/second) single kernel measurement and sorting instrument developed to nondestructively evaluate peanut quality. The QSE includes an optical camera for measuring physical parameters and a near-infrared (NIR) spectrophotometer for chemical measurements. Novel oil (%) and protein (%) calibrations by NIR were developed for the QSE using partial least squares (PLS) regression. The calibration included 205 peanut kernels strategically sourced for broad chemical ranges and model robustness to cover multiple peanut market types, cultivars, growing regions, grades, and crop years. Peanuts with different levels of moisture were used to account for this strong variable in NIR calibrations, making the models robust over the expected range of moisture in raw peanuts. Approximately one-third of the kernels were artificially hydrated, and spectra were collected on both hydrated and dried variations of the same kernels, providing 70 additional unique reference data points. Spectra were collected in triplicate for each kernel. The reference analyses for single kernels were nuclear magnetic resonance (NMR) spectroscopy for oil (%), which was validated against solvent extraction, followed by Kjeldahl for total protein (%, wet basis). A Kjeldahl factor of 5.46 was applied to convert percent nitrogen to percent protein. The performance of the PLS models was assessed by the root mean squared error of prediction (RMSEP) and R2 for calibration, cross validation, and for independent validation sets. The protein cross validation RMSEP was 1.4% and covered a range of 10-35%. The oil cross validation RMSEP was 2.3% and covered a range of 28-61%. Single kernel validation data was acquired on multiple QSEs (3), and combined, the resulting RMSEP was 1.6% for protein prediction and 2.3% for oil prediction. These and other performance data suggest the QSE oil and protein calibrations are robust, transferable, and will be a useful tool for profiling the unique chemical distributions in peanut samples (seed or edible) on a single-kernel basis.

Influence of Variety Selection on Leaf Spot Management with Various Fungicide Programs in North Carolina

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Determining effectiveness of fungicide programs based on cultivar resistance to pathogens is important is establishing recommendations to farmers. Research was conducted in North Carolina during 2021 and 2022 at three locations to compare leaf spot incidence (percentage of leaves with lesions), canopy defoliation caused by leaf spot disease, and yield of the Virginia market type cultivars Bailey II, Emery, and Sullivan when five fungicide programs for leaf spot and southern stem rot were used. Fungicide programs included: 1) non-treated control, 2) chlorothalonil followed by (fb) Miravis plus Elatus (4 weeks of control) fb Provost Silver fb chlorothalonil, 3) bi-weekly applications of chlorothalonil fb Provost Silver fb Revytek fb Lucento fb chlorothalonil, 4) bi-weekly applications of chlorothalonil fb chlorothalonil plus tebuconazole (3 bi-weekly sprays) fb chlorothalonil, and 5) chlorothalonil fb chlorothalonil plus tebuconazole 4 weeks later fb chlorothalonil 4 weeks later. Visual estimates of percent leaf spot incidence and defoliation caused by leaf spot were recorded 3-5 times prior to digging and vine inversion using a scale of 0 to 100%, where 0% = no canopy incidence or defoliation and 100% = full canopy incidence or defoliation. Pod yield was also recorded. Area under disease progress curve (AUDPC) was calculated using R Studio Agricolate Package. The test design was a split-plot design with cultivars as the whole and fungicide treatment as the subplot. AUDPC for leaf spot incidence and defoliation and yield were subject to PROC GLIMMIX in SAS v9.4 with a Tukey Honestly Significant mean separation test at a significance level of 0.05.

Each year and location combination were analyzed as separate tests due to differences in year, location, and initial inoculum on disease progression. Across all year and location combinations, applying fungicide increased control of leaf spot and protected yield compared with non-treated peanut. Generally, Bailey II was affected less by leaf spot than Sullivan, and both Bailey II and Sullivan expressed greater resistance to leaf spot than Emery. As expected, the least effective fungicide program (treatment 5 listed above) was when chlorothalonil was applied alone or with tebuconazole when the interval between sprays was 4 weeks rather than 2 weeks. In contrast, the fungicide program that included chlorothalonil alone or with tebuconazole was the most effective fungicide program when fungicides were applied bi-weekly (treatment 4 listed above). Fungicide programs including Miravis (treatment 2 listed above) or Revytek and Lucento (treatment 3 listed above) suppressed leaf spot and protected yield but not as well as the chlorothalonil/tebuconazole bi-weekly program. No significant differences were observed in yield when considering cultivars for any year and location combination. At all year and location combinations, except one, fungicide treatments were significant for yield. Generally, bi-weekly applications of chlorothalonil most protected yield compared to other fungicide treatments. Generally, yield was similar for treatments programs 2,3, and 5. Interaction of cultivar and fungicide program were only significant for one year and location combination.

Effect of Varying Disease Management Programs and Digging Dates on Disease Severity and Yield of Peanut in North Carolina

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The timing of digging dates relative to optimum maturity is critical in peanut and can have a major impact on pod yield, pod quality, and overall economic return. Digging date decisions can be challenging and can be heavily influenced by disease severity at the time of digging and vine inversion as high disease pressure can cause pod shedding and yield loss. This makes digging date decisions difficult as producers choose digging dates that risk yield loss deciding to dig prior to optimum maturity or waiting until optimum maturity. Previous research results recommend digging earlier than optimum maturity due to the pod shed that occurs with disease presence. The objective of this study was to evaluate the effect of varying fungicide programs and digging dates relative to optimum maturity. Research was conducted at one location to determine incidence of late leaf spot, canopy defoliation caused by this disease, and pod yield when peanut was dug 1 week prior to optimum maturity, at optimum maturity, and at 1, 2, 3, and 4 weeks after optimum maturity. For each digging date, fungicide program consisting of: A) no fungicide during the cropping cycle; B) a program of chlorothalonil followed by Miravis plus Elatus, followed by Provost Silver, and a final application of chlorothalonil; C) a three-spray program of chlorothalonil alone or with tebuconazole; D) the spray program listed in program C with a “rescue” application of Provost Silver plus microionized sulfur one week prior to optimum maturity when disease incidence was approximately 20%. Pod yield deceased rapidly for the non-treated control as digging was delayed (5,770 lbs/acre at optimum maturity and 1,250 lbs/acre at the final digging date. Yield decreased when fungicides were applied but at a less dramatic rate than non-treated peanut. Yield for peanut at the final digging date ranged from 4,440 to 5,430 lbs/acre when fungicides were applied. The rescue treatment of Provost Silver plus microionized sulfur had less disease when digging was delayed compared with other treatments. However, yield did not differ compared with the program containing Miravis plus Elatus and Provost Silver applied prior to optimum maturity. These results are designed to provide growers and their advisors with information on yield loss with various levels of disease at optimum maturity should digging be delayed due to weather conditions or logistical challenges. Temperature was relatively cool during the period of time when digging dates were compared and rainfall was not intense. Future research under warmer and wet conditions may have different results.

Assessment of Peanut Fungicide Programs and Sulfur in Irwin County, GA, 2020-2023

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Disease management is essential for profitable peanut production in Irwin County; however, cost of fungicide programs is among the greatest expenses for our farmers. The objective of this study was to provide peanut growers with supplemental results from local research trials to assist in their development of most-appropriate fungicide programs. A replicated, large-plot, on-farm fungicide study was conducted in Irwin County, GA annually in 2020, 2021, 2022 and 2023 to assess the efficacy of commercially available fungicide programs for the management of late leaf spot (*Nothopassalora personata*) and southern stem rot (*Athelia rolfsii*). The fields selected were planted to a typical cotton, cotton, peanut rotation. Each trial was planted to 'Geogia-06G' in May, inverted in late Oct, and harvested soon thereafter. Plots were 18-rows wide by the length of the field and were arranged in a randomized complete block design with four replications. Plots were rated for severity of leaf spot disease and incidence of stem rot. Fungicide treatments included: 1) – Priaxor (6 fl oz/A) – Umbra/Echo (36 fl oz/A, 1 pt/A) – Muscle ADV (2 pt/A) – Umbra/Echo-Muscle ADV; 2) - Priaxor-Umbra/Microthiol Disperss (5 lb/A)-Muscle ADV – Umbra/Microthoil Disperss – 3) - Priaxor – Convoy/Echo (32 fl oz/A, 1.5 pt/A) - Muscle ADV – Convoy/Echo- Muscle ADV and 4) – Lucento (5.5 fl oz/A) – Elatus (9.5 oz/A) – Lucento (5.5 fl oz/A) – Convoy/Equus (21 fl oz/A, 1.5 pt/A) – Muscle ADV. Fungicides were applied on a 14-day interval beginning approximately 45 days after planting. Leaf spot ratings (FLA 1-10 scale) were made the day prior to inverting the peanuts, and stem rot ratings (hits per 200 ft) were made the day of inverting for the following: (treatment 1, Umbra program), (treatment 2, Umbra sulfur program), (treatment 3, Convoy/Echo program), and (treatment 4, Lucento/Elatus/Convoy program) for 2020, 2021, 2022, and 2023 respectively. From the results of this study, it is apparent that peanut growers have multiple programs of similar efficacy from which to choose for management of leaf spot and stem rot diseases and that efficacy of each program can vary from year to year. Perhaps of greatest interest, these results further confirm that growers can substitute sulfur (5 lb/A) for Echo (1.0 pt/A) and maintain yield, reduce cost while slightly improving leaf spot control.

***In-Vitro* Evaluation of BC3F6 Peanut Genotypes for Resistance to *Aspergillus flavus* Infection and Aflatoxin Accumulation**

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Aspergillus flavus infection and subsequent aflatoxin accumulation in peanut pose significant threats to the peanut industry, causing severe economic losses and health risks. This study aimed to assess the resistance of BC3F6 peanut genotypes derived from the cross between Florunner and TxAG-6 to *A. flavus* infection and aflatoxin accumulation through *in vitro* evaluation. A total of 191 BC3F6 peanut genotypes were evaluated under controlled laboratory conditions where seeds were inoculated with *A. flavus* conidial suspension (2 x 106 spores/mL) and incubated under optimal conditions for fungal growth. The external seed infection was measured by visual inspection using the percent seed infection index (PSII) procedures after 7 days of inoculation. The *in vitro* seed colonization results indicated a highly significant (*P < 0.001*) genotypic variation in resistance to *A. flavus* infection among the BC3F6 genotypes. Peanut genotypes were classified based on their infection levels to *A. flavus* and aflatoxin accumulation. Three genotypes (52-10-05-02, 60-02-06-01 and 63-04-02-01) showed high resistance to *A. flavus* infection with no or 0% fungal growth. Five genotypes (50-07-06-01, 52-10-03-02, 63-06-06-01, 26-10-08-03 and 50-07-08-01) were resistant to *A. flavus* infection with fungal growth less than 5% whereas 20 genotypes were identified to be moderately resistant to *A. flavus* infection with less than 10% colonization. The remaining genotypes were classified as susceptible to *A. flavus* infection. The identified genotypes with enhanced resistance trait could serve as valuable genetic resources for peanut breeding programme aimed at developing varieties with improved resistance to *A. flavus* infection and aflatoxin contamination.

Towards Efficient Phenotyping for Peanut Smut Resistance: Line-Scan X-ray Imaging of Faux-Infected Pods

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A major roadblock in breeding for peanut smut resistance is the practice of manually opening pods to rate disease. This method, currently used by colleagues in Argentina, is slow and labor intensive. To address this problem, we are evaluating a line-scan X-ray imaging system as a potential alternative to hand-opening pods. Since the peanut smut pathogen, *Thecaphora frezzii,* is not present in the U.S., a suitable test phantom was developed to emulate the infected pods. Faux-infected pods were generated by replacing all or some seeds from both Virginia and runner pods with coffee and corn starch as a proxy for *T. frezzii* teliospores. A limited number of pods were also filled with teliospores of the corn smut fungus, *Ustilago maydis*. The following three "healthy" pod types were made: 1) normal, pods opened and reglued; 2) empty, pods with all seeds removed; and 3) half-seed, two-locule pods with one seed removed. "Unhealthy" pod types included: 4) full coffee, all seeds replaced by coffee; 5) half coffee, one seed replaced by coffee; 6) full corn starch, all seeds replaced by cornstarch; 7) half corn starch, one seed replaced by cornstarch; 8) half corn smut, one seed replaced by corn smut teliospores; and 9) corn smut sorus, one seed with a faux sorus made with Parafilm and *U. maydis* teliospores. After presenting three raters with a training set of healthy (normal) and "unhealthy" (faux-infected) images, the raters were asked to classify three randomized sets of 72 images as healthy or unhealthy. Rater accuracy varied from 83-87%, and overall, the three raters correctly classified 85% of the 216 images. Raters had the most difficulty in distinguishing between the normal and corn smut sorus pod types, only correctly classifying 64% and 31%, respectively. Raters correctly classified the other pod types >90% of the time, with most pod types correctly rated >95% of the time. These preliminary results indicate that X-ray imaging may be useful for peanut smut phenotyping, however, the system needs to be tested in Argentina with pods grown in *T. frezzii*-infested fields.

Susceptibility of Runner Peanut Cultivars to Sclerotinia Blight in Arkansas

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Seventeen runner-type peanut cultivars and four advanced peanut germplasm lines were evaluated for susceptibility to Sclerotinia blight (caused by *Sclerotinia minor*) in Arkansas. A selected group of entries were evaluated in 2022 and 2023 in a field with a history of Sclerotinia blight at the Jackson County Extension Center near Newport, Arkansas. Disease incidence was greater in 2022 (avg. 25%) than 2023 (avg. 2%) due to cooler weather conditions in September. In 2022, Georgia 20VHO, Tamrun OL19, Georgia 18RU and Georgia 16HO were more susceptible than AG18 and two germplasm lines from Oklahoma (ARSOK R96-8 and R95-1). A greater yield was observed on AG18 and Georgia 09B than Tamrun OL19, Tamrun OL18L, ARSOK R93-1, and Georgia 20VHO. While in 2023, Georgia 20VHO and Georgia 16HO were more susceptible than an advanced line from Texas (TX 100212-03-03), however, Georgia 16HO had a greater yield compared to Georgia 20VHO. These data are useful for selecting the least susceptible cultivar for peanut production in fields where Sclerotinia blight occurs in Arkansas and the South-Central peanut production region.

Compatibility of Kudos OD with Fungicides Applied to Peanut in North Carolina

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Prohexadione calcium is used to minimize excessive vine growth of peanut and to facilitate efficient digging and vine inversion. Historically, dry formulations of prohexadione calcium (Apogee, Kudos, Cryova) have been used in peanut for this purpose. A new formulation, Kudos OD, is now registered for use in peanut. Preliminary research in North Carolina suggests that some fungicides co-applied with Kudos OD can increase leaf burn. Although variation in response was observed in these trials, Provost Silver and Miravis plus Elatus caused significant leaf burn while other fungicides caused relatively low but noticeable leaf burn (chlorothalonil plus tebuconazole, Lucento, Revytek). Additional research is needed to define interactions of Kudos OD with fungicides, insecticides, herbicides, and foliar-applied micronutrients. This is especially the case regarding adjuvant selection for this liquid formulation.

Fungicide and Growth Regulator Research in Louisiana Peanut

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At the request of growers and with funding from the National Peanut Board, we have been conducting fungicide application timing and efficacy trials and determining growth regulator effects in Louisiana peanut. On-farm efforts at 5 locations during 2021 and 2022 included comparisons of two applications of tebuconazole (7.2 fl oz/A) against one application of Elatus (9.5 oz/A) for stem rot management. Two applications of the growth regulator, Kudos (5.4 oz/A), also were compared to non-treated plots. Results indicate similar significant reductions of stem rot with both fungicides compared to the non-treated plots. Plots treated with Kudos had significantly higher row definition than non-treated plots. Yields were significantly higher than non-treated controls in plots treated with Elatus only or Kudos only. Small plot fungicide and growth regulator efficacy trials were conducted in Winnsboro and St. Joseph, LA during the 2021 and 2022 growing seasons. Eleven labeled fungicides were applied to GA-06 plots at both locations. Stem rot incidence and severity was low and highly variable at both locations; therefore, results were inconclusive. Five rates of Kudos ranging from 1.8 to 9.0 fl oz/A were applied twice to GA-06 at both locations. In St. Joseph, row definition significantly increased with growth regulator rate, and in Winnsboro data trended the same. Unfortunately, harvest was unsuccessful at both locations due to equipment issues. Small plot research will continue during the 2024 season.

Evaluation of Root-Knot Nematode (RKN) Resistant Peanut Varieties and a Plant Growth Regulator (PGR) in Southwest Georgia

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Root-knot nematodes (RKN) are a common problem in Southwest Georgia row crop fields, particularly in those with lighter, sandy soils. RKN feed on plant roots which leads to a decline in plant death and in severe infestations, a decrease in peanut yield. Planting RKN-resistant peanut varieties is the most economical method to combat this pest, but oftentimes the resistant varieties do not yield as well as the traditional susceptible varieties such as Georgia 06-G. Additionally, many of the RKN-resistant varieties exhibit excessive vine growth, leading to an increase in interest in the use of plant growth regulators (PGRs). In this study, four RKN-resistant peanut varieties (Georgia 22-MPR, TifNV-HG, TifNV-hiol, and Georgia 14N) were evaluated for yield, tomato spotted wilt virus (TSWV) incidence, and taste. In addition, the effects of the PGR product Kudos on the yield of the susceptible variety Georgia 06-G was evaluated. The RKN-resistant TifNV-HG variety out yielded all other varieties (5,958 lbs/acre), including the susceptible Georgia 06-G (5,023 lbs/acre) and the older RKN-resistant variety Georgia 14N (5,165 lbs/acre). The application of the PGR product Kudos did alter the growth habit of the plants (mainstem height and height-to-node ratio), but did not result in increased yield. Further development and testing of RKN-resistant varieties will be of paramount importance in the future as Georgia peanut growers continue to battle Root-knot nematodes.

Examining Heat Tolerance in Wild and Cultivated Peanuts: Insights from Photosynthesis

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Increasing occurrences of heat waves present a significant threat to peanut crops, emphasizing the necessity for heat-resistant varieties. Unlike many cultivated peanuts, wild genotypes possess potential heat tolerance attributed to their broader genetic diversity and adaptation to high-temperature environments. Our study aimed to 1) identify whether heat primarily affected net photosynthesis or respiration processes and 2) assess various peanut genotypes for their heat tolerance based on photosynthetic activity. Conducted at the University of Georgia, Tifton campus, the research utilized seven genotypes, comprising three cultivated and four wild-derived types, within a randomized complete block experimental design with six replications. Rainout shelters were deployed to elevate temperatures and induce heat stress from 60 days after planting (DAP) until 74 DAP. Sensors placed both inside and outside the shelters recorded temperature fluctuations, with internal temperatures reaching up to 10 °C higher than ambient conditions. Measurements were taken before stress onset, seven and 14 days into stress, as well as seven and 21 days post-stress to evaluate recovery. Gas exchange measurements for photosynthesis were conducted between 1200 and 1500 hours, while dark respiration measurements occurred between 2300 and 0200 hours using the LI-6800 Portable Photosynthesis System. Yield data were collected upon harvest. Initial midday measurements indicated no genotype variations prior to heat stress initiation. However, genotypic differences emerged seven and 14 days into stress and persisted seven days post-recovery, with the wild genotype 17 396-70-MR-MR demonstrating superior thermotolerance. Dark respiration rates did not exhibit significant differences among genotypes. Notably, considerable yield variations were observed across genotypes. These findings underscore the significance of incorporating wild genotypes into breeding programs to develop heat-tolerant peanut cultivars, offering crucial insights for sustainable agriculture amidst climate adversities.

Exploring the Feasibility of High Throughput Phenotyping Technology to Enhance Peanut Physiological Resilience for Heat and Drought Tolerance

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Peanut (*Arachis hypogaea* L.) is a major legume crop grown in the Virginia-Carolina peanut belt, where production is often impacted by elevated temperatures and sporadic rainfall, as 85% of cultivation relies on rainfed systems. These environmental stresses significantly impact peanut physiology, growth, development, and yield, underscoring the need for stress-tolerant cultivars. Because traditional phenotyping methods are slow and inefficient, this study is aimed at the development of high-throughput methods for breeding stress-tolerant cultivars. In 2023, a preliminary field study was conducted using multispectral imagery including red, green, blue, red-edge, and near-infrared bands to evaluate the relationship between canopy temperature and flower production under controlled heat and drought stress conditions using a rainout shelter facility at the Virginia Tech' s Tidewater Agricultural Research and Extension Center in Suffolk, VA. Results showed 33% increase in canopy temperature at 28 days after stress (DAS) compared to 14 DAS. This coincided with a significant decline of flower production. Fifteen vegetation indices (VIs) were calculated and extracted from the images to assess changes in canopy reflection under stress, with the Visible Atmospherically Resistant Index showing significant correlations with canopy temperature (r=-0.86) and flower count (r=0.58). Correlation analysis between ground truth data and VIs from multispectral imagery indicated that elevated canopy temperature due to changes in physiology under stress affected growth and reproductive development in peanuts. These preliminary findings suggest that integrating remote sensing technologies with other breeding selection techniques can enhance the identification and development of peanut genotypes with improved resilience to heat and drought stress.

Methods for Screening Resistance to Pythium Pod Rot

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Most peanut cultivars grown in Oklahoma are susceptible to pod rot caused by the oomycete *Pythium myriotylum* Dresch. Pythium pod rot can greatly reduce yields and result in discolored pods that are unsaleable for the inshell market. Our overall goal is to identify genetic markers for resistance to Pythium pod rot, and to this end, we are evaluating different methods for assaying germplasm for resistance in the greenhouse. A *Pythium myriotylum* isolate from an infected pod in Fort Cobb, OK will be used to infect susceptible and resistant genotypes using previously published methods of inducing *P. myriotylum* infection. Since Jones and Woodward (1983) reported that seedling resistance to Pythium wilt is correlated with pod rot resistance, we will evaluate methods on both seedlings and pods since seedling assays are more efficient. Susceptible and resistant genotypes will be infected at the V-1 growth stage for the seedling assay, or the R3 growth stage for the pod rot assay. Different *P. myriotylum* inoculum, including zoospores and sorghum seeds colonized with oospores, will be evaluated. This information will be critical to evaluating peanut germplasm collections and recombinant inbred line populations.

Functional Physiology for Informed Decision Making

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Numerous studies across diverse ecosystems and plant species collect extensive data to understand plant functioning, predominantly focusing on quantifying physiological efficiencies and classifying plant functional types. They explore patterns in growth, survival, and reproduction within specific contexts such as habitat, environment, and species composition. Researchers have correlated physiological metrics with morpho-anatomical traits and chemical composition to unveil trade-offs and cooperative processes within broader ecological frameworks. In our study we aim to simplify these complexities to document insights into plant performance within the framework of crop phenotyping. We conducted comprehensive assessments encompassing physiological, morphological, and chemical parameters across 175 Peanut mini-core accessions; a subset that represents the entire range - variations within the peanut community. Photosynthesis, transpiration, and stomatal conductance were measured on apical meristems at 90 days. At 100 days plants were destructively sampled to calculate total canopy area, specific leaf area, leaf dry matter content, as well as leaf carbon, nitrogen, and phosphorus content. These measured traits, drawn from cited literature, play pivotal roles in productivity, biomass production, carbon sequestration, nitrogen utilization, and nutrient cycling. We used this data set to compare multiple structural equation models and delineate any intricate interrelationships. Upon identifying the most closely correlated model, we applied this framework to distinct plant functional groups, characterized by observational data sourced from the GRIN database. Through these analyses, we gained greater insight into potential indicators for plant performance, representing the complex and compensatory nature of plant functioning.

Influence of Seeding Rate on Ecosystem Water-Use Efficiency and Yield of Peanut

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Seeds represent some of the most expensive variable inputs in peanut (*Arachis hypogaea* L.) production, constituting approximately 18% of the variable cost. Given the increased climatic variability and both increased drought frequency and pressure for water resources in the Southeast, the role of seeding rate on water use and conservation in peanut production is of seminal importance. The present study determines the impact of seeding rate on both peanut ecosystem water-use efficiency and yield. Experiments were conducted over a three-year period (2020-2022) with three different seeding rates each year. The eddy-covariance method was used to continuously measure CO2 and H2O fluxes at the field scale to estimate the ecosystem water-use efficiency. Water-use efficiency was evaluated in both day and night and the different analysis methods compared and discussed.

3:15 – 5:00 Poster #	**MS Poster Competition** Meeting Room: Oklahoma Station Prefunction Area	Pres. #
35	**Next-Generation Sequencing in an Elite Peanut Population Reveals a Major Seed Size QTL on Chromosome B06 and a Few Other Minor QTLs** **A. POKHAREL***, Institute of Plant Breeding Genetics and Genomics, University of Georgia, Tifton, GA 31793; Z. MYERS, W. KORANI, J. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806; N. BROWN, Institute of Plant Breeding Genetics and Genomics, University of Georgia, Tifton, GA 31793.	140
36	**Characterization of the Shell-Novel Pan-Genes Revealed by Pan-GWAS Analysis in Relationship with Aflatoxin Biosynthesis** **S. ASIJA***, R.C. KEMERAIT, University of Georgia, Department of Plant Pathology, Tifton, GA 31793, USA; S.S. GANGURDE, M.K PANDEY, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; C.C. HOLBROOK, B. GUO, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793, USA.	141
37	**Assessment of Reactive Oxygen Species in Response to *Nothopassalora personata* Infection in Peanut** **E. ASIEDU***, E.G. CANTONWINE, A. LOKDARSHI, Department of Biology, Valdosta State University, Valdosta, GA 31698.	142
38	**Enhancing Peanut Peg Strength and Yield with Prohexadione Calcium** **S. SINGH***, H. SINGH, M. THOMS, K. SINGH, N.J. MWOSU, West Florida Research and Education Center, Agronomy Department, University of Florida, WFREC, Jay, FL 32565.	143
39	**Developing a Microtiter Plate Assay to Rapidly Assess Early and Late Leaf Spot Pathogen Biomass** **G. EFFI*,** E.G. CANTONWINE, A. LOKDARSHI, Department of Biology, Valdosta State University, Valdosta, GA 31698; A.K. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.	144
40	**Developing Primers to Detect Mating Type Genes in *Passalora arachidicola* and *Nothopassalora personata*** **G.A. ROBERSON***, E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698; R.S. ARIAS, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; S.K. GREMILLION, Department of Biology, Georgia Southern University Armstrong Campus, Savannah, GA 31419.	145

3:15 – 5:00 Poster #	**MS Poster Competition continued** Meeting Room: Oklahoma Station Prefunction Area	Pres. #
41	**Utilizing Computer Vision for Laboratory Evaluations of Electric Seed Meters for Peanut Seed Singulation** **M. BLASER*,** W. PORTER, S. VIRK, G. RAINS, Crop and Soil Sciences Department, University of Georgia, Tifton Campus, Tifton, GA 31793, USA; T. BOURLAI, School of Electrical & Computer Engineering, University of Georgia, Athens, GA 30605, USA; A. KOLLER, Lucerne University of Applied Sciences and Arts, Lucerne, Switzerland.	146
42	**Quantification of Gene Expression of Aflatoxin Type B1 Produced by *Aspergillus flavus* in Different Cultivars of *Arachis hypogaea* Seeds** **G. PAREDES*,** S.M. MAREK, Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078; R.S. BENNETT, USDA-ARS, Peanut and Small Grains Research Unit, Stillwater, OK 74075; M.D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409.	147
43	**Exploratory Breeding of *Arachis vallsii* and a *Procumbentes* Hybrid for Wild Species Introgression into Cultivated Peanut (*Arachis hypogaea*, L.)** **E.N. GREEN*,** J.P. MUIR, D.B. MURRAY, Wildlife and Natural Resources Department, Tarleton State University, Stephenville, TX 76402; J.M. CASON, C.E. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX 76401.	148
44	**Evaluation of the Need for Calcium Applications in MO Peanut** **C. SHERWOOD***, J.S. CALHOUN, A. CROSBY Department of Plant Sciences and Technology, University of Missouri, Fisher Delta REEC, Portageville, MO 63873.	149
45	**Correlating High Throughput Phenotyping and Ground Truthing Measurements for Response to Water Deficit in Peanut** **M.M. YERRA***, Department of Soil and Crop Sciences, Texas A&M University, College Station, TX,77843; W. GUO, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409 and Texas A&M AgriLife Research, Lubbock, TX, 79403; N. RAJAN, Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, 77843; J. CASON, Texas A&M AgriLife Research and Extension Centre at Stephenville, Stephenville, TX,76401; A. YOUNG, Y. EMENDACK, USDA-ARS, Cropping Systems Research Laboratory, Lubbock, TX, 79415; J. MENDEZ, D. VALDEZ, Texas A&M AgriLife Research, Lubbock, TX, 79403. M. BUROW Texas A&M AgriLife Research, Lubbock, TX, 79403, and Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409.	95

Next-Generation Sequencing in an Elite Peanut Population Reveals a Major Seed Size QTL on Chromosome B06 and a Few Other Minor QTLs

A. POKHAREL*, Institute of Plant Breeding Genetics and Genomics, University of Georgia, Tifton, GA 31793; Z. MYERS, W. KORANI, J. CLEVENGER, Hudson Alpha Institute for Biotechnology, Huntsville, AL 35806; N. BROWN, Institute of Plant Breeding Genetics and Genomics, University of Georgia, Tifton, GA 31793.

In the peanut industry, seed size influences product end-use, consumer preference, processing efficiency, seed quality and yield potential. An F2 mapping population was developed to investigate the genetics of seed size by crossing peanut cultivars, ‘Georgia-11J’ and ‘Tifguard’. Phenotypic data was collected on pod samples from F2 individual plants and using their leaf samples, DNA was sequenced and analyzed at HudsonAlpha. Initial mapping analysis indicated statistically significant, large-effect QTL for pod and seed size on chromosome 16 (B06); testa color on Chr. 6 (A06); and potential small-effect QTL for individual plant pod weight, seed weight, and sound mature kernel weight on several chromosomes. Individual plants were selected from segregating F2:3 lines to validate the markers and QTL regions identified. Heterozygous individuals from these segregating F3 lines were identified for potential fine mapping of the QTL of interest. The effect of these QTLs will be quantified in replicated trials in the coming seasons. Successfully mapping genes controlling seed and shelling characteristics will be of great benefit for incorporation into marker-assisted breeding programs.

Characterization of the Shell-Novel Pan-Genes Revealed by Pan-GWAS Analysis in Relationship with Aflatoxin Biosynthesis

S. ASIJA*, R.C. KEMERAIT, University of Georgia, Department of Plant Pathology, Tifton, GA 31793, USA; S.S. GANGURDE, M.K PANDEY, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; C.C. HOLBROOK, B. GUO, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793, USA.

Aflatoxin contamination is a major threat to agricultural produce globally due to its carcinogenic properties. *Aspergillus flavus* produces mycotoxin along with some other secondary metabolites for industrial use. Large differences in gene contents can occur among genomes of *A. flavus* isolates, with only a portion of genes being universal, or core, to all genomes. Therefore, to capture the species level diversity, a pangenome for *A. flavus* (AflaPan) was developed using 346 *A. flavus* isolate-genomes. AflaPan uncovered novel or non-reference gene clusters that were not annotated in the existing reference genomes of *A. flavus* isolates AF13 and NRRL3357. Further, Pan-GWAS analysis identified a total of 391 orthogroups from AflaPan were significantly associated with aflatoxin production. Of these 391, a total of 91 orthogroups were not annotated either with NCBI blast or InterProScan. Surprisingly, of the 369 shell genes, there were 256 shell-novel orthogroups that were not annotated and may be absent in the AF13 reference assembly. These 256 shell-novel pan-genes could be important targets for developing aflatoxin mitigation strategies using gene silencing or genome editing approaches. Therefore, we aim to functionally validate these new genes and identify the target genes. Additionally, delineating the secondary metabolite pathways in which these new genes participate and how those secondary metabolites interact with the aflatoxin biosynthesis will shed light on the potential targets for intervention strategies aimed at mitigating aflatoxin contamination.

Assessment of Reactive Oxygen Species in Response to *Nothopassalora personata* Infection in Peanut

E. ASIEDU*, E.G. CANTONWINE, A. LOKDARSHI, Department of Biology, Valdosta State University, Valdosta, GA 31698.

Reactive oxygen species (ROS) frequently over accumulate in plants after pathogen perception and are considered an integral part of the plant's defense response by inducing resistance genes or triggering a hypersensitive response. This study seeks to evaluate the responses of two peanut genotypes, Georgia-13M (Susceptible) and CB-7 (Resistant), against *Nothopassaora personata,* the fungal pathogen responsible for late leaf spot disease. A previous study with these genotypes found that fungal hyphae and haustoria extended farther in Georgia-13M than CB-7 when lesions were small. This study tests the hypothesis that the limitation of hyphae and haustoria by the resistant genotype is associated with a regulated production of ROS. If this hypothesis holds true, ROS will be more elevated and less localized in the susceptible genotype, leading to reduced plant cell viability. An experiment is underway to inoculate greenhouse grown plants of Georgia 13M and CB7 with spores of *N. personata* to induce disease. At 9, 12, 15, and 18 days, leaflets will be processed using a biochemical assay to assess ROS quantity, and microscopical staining to assess ROS localization and plant cell viability. Observations will be correlated to symptoms and colonizing structures of the pathogen stained with cotton blue. The findings of this study will provide valuable insights into the cellular and biochemical basis of resistance.

Enhancing Peanut Peg Strength and Yield with Prohexadione Calcium

S. SINGH*, H. SINGH, M. THOMS, K. SINGH, N.J. MWOSU, West Florida Research and Education Center, Agronomy Department, University of Florida, WFREC, Jay, FL 32565.

Prohexadione calcium is a plant growth regulator used to control plant height of peanut by decreasing shoot internode length. The translocation of photosynthetic resources from vegetative to reproductive parts, specifically pegs, may improve peanut peg strength and pod yield. A field experiment was conducted in Jay, FL at the West Florida Research and Education Centre in 2023, aimed to evaluate the impact of different application rates of prohexadione calcium on plant height, peg strength, digging efficiency, and pod yield. Treatments ranged from 0% (untreated control) to 175 g a.i. ha-1 (125% of labelled rate), including 140 g a.i. ha-1 (100% of labelled rate) of prohexadione calcium. Moreover, the impact of single and split applications of these rates were examined. Results from this experiment showed a significant decrease in plant height under all prohexadione calcium treatments compared to untreated control. While a 14% yield increase was found at the 100% application rate as compared to untreated control, the difference was not significant. Although single applications of these rates were more helpful than split applications in reducing plant height, they had a negative effect on the pod yield. Peg strength notably improved under the 140 g a.i. ha-1 rate of application compared to other application rates. Similarly, the digging efficiency was increased by 3-5% under prohexadione calcium treatments compared to untreated control. These results suggest that prohexadione calcium can be used for peanut vine management and pod yield. Further trials are required to better understand prohexadione calcium response in Florida’s peanut production, considering these single year results and the dry conditions of 2023.

Developing a Microtiter Plate Assay to Rapidly Assess Early and Late Leaf Spot Pathogen Biomass

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Early and late leaf spots are diseases of peanut (*Arachis hypogaea*) caused by *Passalora arachidicola* and *Nothopassalora personata*, respectively. Because these pathogens grow slowly and lack typical radial colony development, in vitro studies of *P. arachidicola* and *N. personata* have been limited. Experiments were conducted to evaluate how rapidly a 96-well microtiter plate assay can be used to estimate pathogen growth and biomass. Conidia from sporulating isolates of *N. personata* were rinsed with 0.05% (v/v) Tween 20 and standardized at 2.5x 104 propagules/ml with a hemocytometer to establish the high inoculum treatment. Four additional inoculum treatments were created at 20%, 40%, 60%, and 80% concentrations using 0.05% (v/v) Tween 20. The experiment was conducted in microtiter plates, with each well containing 50 µl of inoculum, and 150 µl potato dextrose broth (PDB), incubated at 25°C on a shaker at 150 rpm. Absorbance readings at a wavelength of 570 nm were taken at 2, 4, 6, 8, 10, 12, and 14 days after incubation. There was a positive linear relationship between absorbance and spore concentration on day 2 and 4, but by day 6, no differences in absorbance were noted for some of the concentrations. For each spore concentration, the greatest change in absorbance occurred between days 4 and 6. These results suggest that for *N. personata*, 4 days of incubation is the optimal time to evaluate treatment effects, such as fungicide sensitivities, on growth using this assay at this wavelength. Experiments are underway using *P. arachidicola* conidia and additional wavelengths are currently being assessed.

Developing Primers to Detect Mating Type Genes in *Passalora arachidicola* and *Nothopassalora personata*

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Two of the most devastating peanut foliar pathogens are *Passalora arachidicola,* the cause of early leaf spot, and *Nothopassalora personata,* the cause of late leaf spot. Recent studies have characterized the genomes of these pathogens; however, little is known about the MAT1 genes associated with mating. For most ascomycete fungi, the MAT1 locus consists of two idiomorphs, MAT1-1 and MAT1-2. Both idiomorphs are present in isolates of homothallic species, while those of heterothallic species have one. This study evaluated previously published mating type specific degenerative primers developed for *Mycosphaerella* species, including *Dothistroma* and *Cercospora* species, and primers developed in this study using predicted MAT1-1 and MAT1-2 regions from previously published genomes. PCR product bands were detected for MAT1-1 and MAT1-2 in *P. arachidicola* using the degenerative primers, however the primers failed to produce a band for *N. personata* under the same PCR conditions. A PCR product band was detected using the *N. personata* specific MAT1-2 primers, but species specific MAT1-1 primers have yet to be tested. Sequencing of PCR products to confirm MAT1 gene region amplification is underway. Once developed, these new primers will be used to test pathogen populations to determine if each species is homothallic or heterothallic and if sexual reproduction is likely in US populations.

Utilizing Computer Vision for Laboratory Evaluations of Electric Seed Meters for Peanut Seed Singulation

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The main goal of this study was to develop a computer vision system to evaluate and measure the performance of electric seed metering systems and advanced peanut seed plates for peanut seed singulation under laboratory conditions. Due to limited research compared to major crops like corn and soybeans, achieving reliable seed singulation for peanuts necessitates lower ground speeds, consequently reducing field efficiency. With a need to optimize economic, ecological, and time efficiency, there is a significant demand for developing methods to plant peanuts at higher ground speeds and accuracy. To assess the efficiency of the seed singulation process, a computer vision algorithm was designed and applied. This entailed employing a camera to capture the position, and presence of individual peanut seeds on the seed plate as it functioned at operational speed. This task was accomplished by training a deep learning state-of-science "YOLO V10" computer vision algorithm to distinguish the peanuts and empty cells on the rotating seed plate. This performance monitoring system was developed to collect data on seed meter performance under laboratory conditions on a seed meter test stand. In general, a computer vision algorithm was created to oversee the seed singulation process of an electric vacuum seed meter. In a future study, this performance monitoring system will be applied during field conditions and will help to improve the peanut seeding process.

Quantification of Gene Expression of Aflatoxin Type B1 Produced by *Aspergillus flavus* in Different Cultivars of *Arachis hypogaea* Seeds

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The Food and Agriculture Organization of the United Nations has reported that approximately 25% of the global food crops supply is contaminated with aflatoxins, resulting in the destruction or diversion of an estimated 100 million tons of food annually. Aflatoxins pose significant health risks to both animals and humans due to their immunosuppressive, cytotoxic, and mutagenic effects, highlighting the critical need for their quantification during storage. Additionally, addressing the need for breeding resistance to aflatoxin in food crops is essential to mitigate the impact of aflatoxin contamination. In this study, we aimed to quantify the expression of aflatoxin type B1 and related genes in *Aspergillus flavus* AF36 to identify peanut genotypes with aflatoxin resistance. Three peanut cultivars, Southwest Runner, FloRun '107', and ACI 080, with and without seed coats, were used to develop a protocol. Seeds were sterilized with a 50% sodium hypochlorite solution, and assays were conducted three times, using 30 seeds of each cultivar for each assay. Specific primers were designed for aflatoxin genes including *aflA, aflC, aflD, aflE, ord-A, nor-A*, and *aflR*, and beta-tubulin and actin primers were designed to serve as housekeeping genes controls for the fungus and seed, respectively. Infection was induced using a suspension of AF36 spores at a concentration of 5x105 spores ml-1, and incubation was carried out for 12 days before RNA extraction. Positive controls were established through cloning of the amplicons of each gene with competent *E. coli* DH5α. Quantitative analysis revealed 45% more fungal growth in seed samples without seed coats compared to seeds with coats, until six days after inoculation. Growth on samples with and without seed coats were similar by day 12 after inoculation. Negative controls exhibited no contamination, validating the efficacy of the sterilization protocol. Additional work will be conducted to determine if there are significant differences in aflatoxin production among the three peanut cultivars. This study provides valuable insights into the genetic mechanisms underlying peanut resistance to aflatoxin production, offering potential avenues for the development of more resilient peanut cultivars and enhanced food safety measures.

Exploratory Breeding of *Arachis vallsii* and a *Procumbentes* Hybrid for Wild Species Introgression into Cultivated Peanut (*Arachis hypogaea*, L.)

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Peanut (*Arachis hypogaea*, L.) displayed many traits preferable for cultivation when its progenitors *A. duranensis* and *A. ipaënsis* fused genomes. However, the new autopolyploid lost direct access to the rich gene pool found in its wild relatives. Some of this genetic variation can be reintroduced to combat the stressors found in present-day production. This study aims to explore the novel introgression pathway using germplasm from the *Arachis* and *Procumbentes* sections to increase the availability of advantageous traits for cultivar improvement. A complex hybrid will be developed using *A. vallsii* Krapov. & W.C. Greg (accession VSW 9902-1) as the female and an interspecific hybrid involving *A. jacobeninses* Valls & Simpson (accession VSGr 6340) x *A. subcoriacaea* Krapov. & W.C. Greg. (accession KG 30037) as the male. The F1 seeds produced will be treated with a 0.02% colchicine solution for approximately eight hours to double the chromosome complement. Identification of successful hybridizations will be determined through Raman Spectroscopy, pollen counts, and physical observations of flower and leaf morphology. True hybrids will continue forward and be crossed with elite cultivars.

Evaluation of the Need for Calcium Applications in MO Peanut

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Peanut is a relatively new crop to the Missouri delta region. Because of its novelty, producers of this crop are subject to getting information from other extension systems or from product retailers. This has led to the application of products that may not be necessary for the region. One of these is calcium (Ca). In 2023 and 2024, studies were conducted in the Missouri delta, to 1.) evaluate the regional need for applications of Ca and 2.) determine yield response to Ca. To determine the regional need, multiple on-farm field sites where identified and composite soil samples (0-15.24 cm) were taken across the entire field site. These samples were then sent to the MU Soil Testing Laboratory where analysis for potassium and Ca were conducted. To test Ca rate response, four small-plot sites were established (2 per year) where varying rates of pelletized gypsum (22% Ca) was applied in a randomized complete block design with four replications per location. Treatments of 280, 560, 840, and 1,121 kg/ha was applied to individual experimental units using hand-driven rotary spreaders. A non-treated check was also included for comparison. At peanut maturity, the center two rows of each four-row experimental unit were harvested, weighed, and yield calculated. Yield was subjected to ANOVA and means separated using Fisher's Protected LSD (alpha=0.05) where significance was detected. Results indicate all locations surveyed tested above 500 ppm Me-III Ca and no Ca:K ratio was less than 3:1. Therefore, no Ca applications would be recommended according to other university extension systems. Additionally, results from small plot studies show no yield response from any application of gypsum.

Correlating High Throughput Phenotyping and Ground Truthing Measurements for Response to Water Deficit in Peanut

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The use of ground-based measures for response to water deficit have been time consuming and are limiting factor in peanut improvement. High-throughput phenotyping has evolved into a pivotal instrument for assessing crop responses to environmental stresses such as drought. This research was conducted for developing high throughput phenotyping methods for analysis of peanut response to water deficit in Texas. Two populations, a breeding line population and a subset of the US peanut minicore collection were cultivated under water-deficit conditions. Two types of HTP methodologies were used: Unmanned Aerial Vehicles (UAV) and pole-mounted camera systems. Drones had multispectral, infrared, and RGB cameras. The pole-mounted cameras were RGN and OCN and can be a valuable alternative where UAV operations are restricted, especially near airports. Images were stitched together using PIX-4D software to create the reflectance maps. Significant differences were observed in ground truthing data, and work is in progress to correlate aerial images and ground truthing data.

3:15 – 5:00 Poster #	**PhD Poster Competition** Meeting Room: Oklahoma Station Prefunction Area	Pres. #
46	**Smartphone-Based Thermal-RGB Imaging Tool to Quantify Crop Water Stress in Peanuts** **P. JJAGWE***, Biological Systems Engineering Department, Virginia Tech, Blacksburg, Virginia 24060; R.R. VENNAM, School of Plant and Environmental Sciences Department, Virginia Tech, Blacksburg, Virginia 24061; S. RAYMOND, Biological Systems Engineering Department, Virginia Tech, Blacksburg, Virginia 24060; K. BEARD, School of Plant and Environmental Sciences Department, Virginia Tech, Blacksburg, Virginia 24061; M. BALOTA, D. HAAK, School of Plant and Environmental Sciences Department, Virginia Tech, Blacksburg, Virginia 24061; A. CHANDEL, Biological Systems Engineering Department, Virginia Tech, Blacksburg, Virginia 24060, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437.	150
47	**Non-Invasive Peanut Maturity Mapping Using Aerial Spectral Imaging and Artificial Intelligence Techniques** **S. RAYMOND***, Department of Biological Systems Engineering, Virginia Tech, Blacksburg, VA 24060; P. JJAGWE, Department of Biological Systems Engineering, Virginia Tech, Blacksburg, VA 24060; M. BALOTA, M. CHAPPELL, School of Plant and Environmental Sciences Department, Virginia Tech, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, VA 23437; A. CHANDEL, Department of Biological Systems Engineering, Virginia Tech, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, VA 23437.	151
48	**Development of Drought and Salinity Tolerant High-Oil Peanut (*Arachis hypogaea L.*) for Biodiesel Production** **Y. PANKAJ*,** Texas A&M, Department of Soil and Crop Sciences, College Station, TX 77843; J. CASON, , C. SIMPSON, Texas A&M AgriLife Research, Texas A&M University System, Stephenville, TX 76401; D. KUROUSKI, Texas A&M, Department of Biochemistry and Biophysics, College Station, TX 77843; D. STELLY, Texas A&M, Department of Soil and Crop Sciences, College Station, TX 77843; H. PHAM Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX 79403; M.D. BUROW, Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX 79403 & Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409.	152
49	**Assessment of Root Nodule Bacteriomes in Peanut Genotypes with Different Levels of Drought Tolerance** **W. SAJID*,** A. SANZ-SAEZ, C. CHEN, Y. FENG, Department Crop, Soil and Environmental Sciences, Auburn University, Auburn, AL 36849.	153
50	**Investigating Xylem Plasticity Associated with Drought Tolerance Mechanisms in Peanut Cultivars** **S. HANIF***, C. CHEN, Crop, Soil and Environmental Science, Auburn University, AL 36849; W. BATCHELOR, Biosystem Engineering, Auburn University, AL 36849; P.M. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; C. DEVEAU, - A. SANZ-SAEZ, Crop, Soil and Environmental Science, Auburn University, AL 36849.	154
51	**Root Hairs Quantification in Peanut Cultivars: A Key to Drought Tolerance** **F. PIERRE**, C. CHEN, A. SANZ-SAEZ, Crop, Soil and Environmental Science, Auburn University, AL 36849; W. BATCHELOR, Biosystem Engineering, Auburn University, AL 36849; P. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.	155

3:15 – 5:00 Poster #	**PhD Poster Competition** Meeting Room: Oklahoma Station Prefunction Area	Pres. #
52	**Secondary Metabolites Present in Peanut Seedcoat Inhibit *A. flavus* Growth and Reduce Aflatoxin Contamination** **L. COMMEY***, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; Y. MECHREF, Department of Chemistry and Biochemistry, Texas Tech University, Lubbock, TX 79409; M.D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; V. MENDU, Department of Plant and Plant Pathology, Montana State University, Bozeman, MT 59717.	156
53	**Utilization of Plant Growth-Promoting Rhizobacteria as a Potential Biocontrol of *Rhizoctonia solani* in Peanuts** **K.N. SULLINS***, A.L. STRAYER-SCHERER, D.W. HELD, Department of Entomology and Plant Pathology, Auburn University, Auburn, AL 36849.	157
54	**Financial Returns of Input Packages Under Three – Year Peanut – Cereal Cropping Systems in Ghana** **S. ARTHUR***, G. BOLFREY-ARKU, M.B. MOCHIAH, J.Y. ASIBUO, A.G. GYIMAH, V. KLUTSE, M. YORKE, Council for Scientific and Industrial Research - Crops Research Institute, Kumasi, Ghana; J. SARKODIE-ADDO, R. AKROMAH, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; G. MAHAMA, J. NBOYINE, A. SEIDU, Council for Scientific and Industrial Research-Savanna Agricultural Research Institute, Wa, Ghana; D.L. JORDAN, R.L. BRANDENBURG, North Carolina State University, Raleigh, NC 27695, USA; and D. HOISINGTON, J. RHOADS, Feed the Future Innovation Lab for Peanut, University of Georgia, Athens, GA 30602, USA.	158
55	**Improving Ability of Farmers to Provide Higher Quality Peanut for Enhanced Markets in Ghana** **A. SEIDU***, Department of Crop Science, Faculty of Agriculture, Food and Consumer Sciences, University for Development Studies, Nyankpala, Tamale, Ghana, and Council for Scientific and Industrial Research-Savanna Agricultural Research Institute, Nyankpala, Tamale, Ghana; I.K. DZOMEKU, Department of Crop Science, Faculty of Agriculture, Food and Consumer Sciences, University for Development Studies, Nyankpala, Tamale, Ghana; J.A. NBOYINE, I. SUGRI, G.Y. MAHAMA, Council for Scientific and Industrial Research-Savanna Agricultural Research Institute, Nyankpala, Tamale, Ghana; D.L. JORDAN, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695, USA.	159
56	**Evaluating Diverse Peanut Genotypes for Feeding Injury of Field Pests** **R. HOLTON***, Institute of Plant Breeding, Genetics, and Genomics, University of Georgia, Tifton, GA 31794, Premium Peanut, Douglas, GA 31535, P. OZIAS-AKINS, Institute of Plant Breeding, Genetics, and Genomics, University of Georgia, Tifton, GA 31794, K. SUTTON, M. ABNEY, Department of Entomology, University of Georgia, Tifton, GA 31794, C.C. HOLBROOK, United States Department of Agriculture-Agricultural Research Service, Tifton, GA 31793.	160

6:00 - 7:30 Awards Reception sponsored by Corteva Agriscience .... Oklahoma 4

Smartphone-Based Thermal-RGB Imaging Tool to Quantify Crop Water Stress in Peanuts

P. JJAGWE*, Biological Systems Engineering Department, Virginia Tech, Blacksburg, Virginia 24060; R.R. VENNAM, School of Plant and Environmental Sciences Department, Virginia Tech, Blacksburg, Virginia 24061; S. RAYMOND, Biological Systems Engineering Department, Virginia Tech, Blacksburg, Virginia 24060; K. BEARD, School of Plant and Environmental Sciences Department, Virginia Tech, Blacksburg, Virginia 24061; M. BALOTA, D. HAAK, School of Plant and Environmental Sciences Department, Virginia Tech, Blacksburg, Virginia 24061; A. CHANDEL, Biological Systems Engineering Department, Virginia Tech, Blacksburg, Virginia 24060, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437.

Quantifying crop water stress in peanuts is critical for the peanut breeders that strive to develop drought tolerant cultivars as well as for the growers to identify irrigation water requirements. Conventional techniques to quantify water stress are destructive, time-taking, and expensive. Therefore, this study tests and evaluates a thermal-RGB camera integrable to smartphones to quantity water stress at hand and in real time. Smartphone based thermal-RGB images were captured at three instances for five different peanut cultivars planted under rain exclusion shelters that induced water stress. In tandem, crop leaves were also collected to extract relative water content (RWC) using oven drying method. Convolutional neural network-based analytical methods are being developed to process thermal-RGB images and compute crop water stress index (CWSI) using Jackson’s method (1981). The computations from imagery data will be compared with the RWC and canopy-temperature-deficit measurements. These findings will be shared during the meeting. Keywords: Smartphone-based thermal-RGB imaging, peanut breeding, crop water stress index, deep learning, precision irrigation

Non-Invasive Peanut Maturity Mapping Using Aerial Spectral Imaging and Artificial Intelligence Techniques

S. RAYMOND*, Department of Biological Systems Engineering, Virginia Tech, Blacksburg, VA 24060; P. JJAGWE, Department of Biological Systems Engineering, Virginia Tech, Blacksburg, VA 24060; M. BALOTA, M. CHAPPELL, School of Plant and Environmental Sciences Department, Virginia Tech, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, VA 23437; A. CHANDEL, Department of Biological Systems Engineering, Virginia Tech, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, VA 23437.

Accurate assessment of peanut maturity is crucial for optimizing harvest timing and ensuring crop quality. Traditional methods often involve invasive sampling, leading to labor-intensive and time-consuming procedures. In this study, we propose a non-invasive approach to quantify peanut maturity using aerial multispectral imaging and artificial intelligence (AI)-based machine learning. Two years of multispectral imaging has been conducted over five different cultivars. In tandem, peanut samples were collected to quantify peanut maturity index using conventional pod-blasting method. Collected aerial spectral imagery is currently being processed using advanced machine learning algorithms that include; Partial Least Squares Regression (PLSR), K-Nearest Neighbors (KNN), Random Forest (RF), Support Vector Regression (SVR), Extreme Gradient Boosting (XG Boost), and Artificial Neural Networks (ANN). So far, an R2 value of 0.74 and root mean squared error of 24% has been observed with the RF model. Further extensive evaluations are underway in this direction. The best performing model will be deployed over field scale to map geospatial peanut pod maturity. This will aid growers in identifying optimum maturity and developing prescriptions for precision harvest management.

Development of Drought and Salinity Tolerant High-Oil Peanut (*Arachis hypogaea L.*) for Biodiesel Production

Y. PANKAJ*, Texas A&M, Department of Soil and Crop Sciences, College Station, TX 77843; J. CASON, , C. SIMPSON, Texas A&M AgriLife Research, Texas A&M University System, Stephenville, TX 76401; D. KUROUSKI, Texas A&M, Department of Biochemistry and Biophysics, College Station, TX 77843; D. STELLY, Texas A&M, Department of Soil and Crop Sciences, College Station, TX 77843; H. PHAM Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX 79403; M.D. BUROW, Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX 79403 & Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409.

This work aims to increase the oil content of Spanish peanuts by incorporating high oil content from runner types, enhancing drought and salinity tolerance, and leveraging Raman spectroscopy and near-infrared for selection. Our approach involves (1) assessing 20 high-oil runner breeding lines under drought conditions across two locations in West Texas, (2) advancing the crossing program to introduce high oil content into Spanish-type peanuts, and (3) establishing Raman spectroscopy analysis for analyzing seed oil content on introgression lines and utilizing modern molecular tools to identify genes related to high oil content. Despite challenging water deficit and heat stress conditions in the year 2023, harvested Diesel Nut plots did not exhibit statistically significant yield variations. To combine the high oil content trait of runner-type peanuts with the Spanish-type, a series of crosses were attempted. A total of 10 crosses each for high oil drought tolerant and salinity tolerant Spanish populations were developed successfully. Each F1 seed is being grown in a greenhouse environment to facilitate generation advancement. Also, we have retrieved a total of 240 gene sequences from the glycerophospholipid pathway of peanuts that could be used for the development of high-oil molecular markers. We are currently working on the use of Raman spectroscopy to identify high-oil peanuts and molecular tools to identify high-oil genes, providing valuable insights for enhancing biodiesel production through targeted breeding programs.

Assessment of Root Nodule Bacteriomes in Peanut Genotypes with Different Levels of Drought Tolerance

W. SAJID*, A. SANZ-SAEZ, C. CHEN, Y. FENG, Department Crop, Soil and Environmental Sciences, Auburn University, Auburn, AL 36849.

Rhizobia are known to nodulate peanut (*Arachis hypogaea L*.), but they are not the only inhabitants in the root nodules. Although the roles of these nonrhizobial populations in the nodules are not well understood, it has been suggested that they may enhance legume survival under environmental stress. A potential stress relief mechanism involves breaking down 1-aminocylcopropane-1-carboxylic acid (ACC) by the ACC deaminase present in many bacteria, thereby reducing the production of plant stress hormone ethylene. The objectives of this study were to investigate the diversity of bacteria in the root nodules of peanut genotypes with different levels of drought tolerance and quantify the ACC deaminase encoding gene, *acdS*, in the nodules. The field experiment was established under rain-fed and irrigated conditions using nine peanut genotypes. Bacterial communities in peanut nodules were analyzed using amplicon sequencing targeting the 16S rRNA genes. A SYBR green-based quantitative PCR assay was used to determine the *acdS* gene copies. 16S rRNA gene amplicon sequencing revealed the presence of diverse bacterial communities in peanut root nodules, with the two most abundant phyla being Actinobacteriota and Proteobacteria and the two most abundant genera being *Amycolatopsis* and *Bradyrhizobium*. The *acdS* gene was detected in the nodules of all peanut genotypes regardless of watering regimes; however, there was no significant interaction between water treatments and genotypes (p=0.09). The *acdS* gene copies under rainfed and irrigated treatments were significantly different only in two drought-tolerant genotypes. Further research is needed to better understand the roles of nodule bacterial communities in peanut drought tolerance.

Investigating Xylem Plasticity Associated with Drought Tolerance Mechanisms in Peanut Cultivars

S. HANIF*, C. CHEN, Crop, Soil and Environmental Science, Auburn University, AL 36849; W. BATCHELOR, Biosystem Engineering, Auburn University, AL 36849; P.M. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; C. DEVEAU, - A. SANZ-SAEZ, Crop, Soil and Environmental Science, Auburn University, AL 36849.

Peanuts are generally cultivated across the globe in semi-arid climates, and they are quite vulnerable to abiotic stresses, causing reductions in yield. Peanut production in the United States is losing 20% yield due to drought stress at different developmental stages. Drought stress tolerance is critical for long-term viability of U.S. peanut production. The purpose of this study is to identify mechanisms of drought tolerance based on xylem characteristics in drought tolerant water saver and water spender peanut cultivars. Xylem plasticity influences the overall plant transpiration efficiency, internal CO2 and photosynthetic efficiency and has been identified as a potential drought tolerance trait. Greenhouse trials were conducted to study xylem characteristic response of five peanut cultivars. Roots were collected after 3 weeks of drought. Secondary root were used to prepare slides with toluene blue which were scanned using an Olympus Slide View VS200 microscope to obtain xylem images. Those images were run through CVAT utilizing Segment Anything for semi-automatic measurement of xylems in each picture. Photosynthetic and transpiration measurements were used to confirm the effects of drought on plant physiology. We observed that drought decreased the number and size of xylem vessels, but this effect was different depending on the cultivar.

Root Hairs Quantification in Peanut Cultivars: A Key to Drought Tolerance

F. PIERRE, C. CHEN, A. SANZ-SAEZ, Crop, Soil and Environmental Science, Auburn University, AL 36849; W. BATCHELOR, Biosystem Engineering, Auburn University, AL 36849; P. DANG, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.

Peanut (*Arachis hypogea*, L.) cultivation is significantly reduced by drought. Most U.S. peanuts are produced under rain-fed conditions and sandy soils and therefore are significantly affected by drought. However, root hairs can significantly increase root surface area, leading to a positive effect on plants nutrient uptake and water use efficiency. This study aimed to evaluate if there are cultivar variations in root hair characteristics in a set of cultivars previously selected for drought tolerance and drought sensitivity. A controlled environment growth chamber experiment was conducted at Auburn University using eleven peanut cultivars known for their drought tolerance or sensitivity. The seeds were sterilized, germinated in germination paper, and grown for fifteen days. Then, the tap and first order lateral roots were collected and placed in 20% ethanol and stored in the refrigerator. The roots were then dyed and imaged using a camera-mounted microscope (Nikon, Prime Cam HD12 Pro). The images were analyzed using Image J, a free image analysis program from the NIH. The length and density of the root hairs were measured using Image J. The results of this study could provide valuable insights into the role of root hairs in drought tolerance in peanuts, potentially informing future breeding programs for drought-resistant traits. This study could represent a significant step towards understanding the complex relationship between plant root hairs characteristics and drought tolerance.

Secondary Metabolites Present in Peanut Seedcoat Inhibit *A. flavus* Growth and Reduce Aflatoxin Contamination

L. COMMEY*, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; Y. MECHREF, Department of Chemistry and Biochemistry, Texas Tech University, Lubbock, TX 79409; M.D. BUROW, Texas A&M AgriLife Research, Lubbock, TX 79403, and Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; V. MENDU, Department of Plant and Plant Pathology, Montana State University, Bozeman, MT 59717.

The peanut seed coat acts as a physical and biochemical barrier against *A. flavus* infection; however, there is no comprehensive information on the nature and quantity of seed coat metabolites. The aim of the current investigation is to identify and characterize metabolites in the peanut seed coat that inhibit *A. flavus* growth and aflatoxin contamination. Peanut accessions PI544346, 55-437, BC3-43-09-03-02, BC3-60-02-03-02, TMV-2 and Schubert grown under well-watered and water deficit conditions and assayed for *A. flavus* resistance using the *in-vitro* seed colonization assay. Peanut seed coat metabolites were identified using Liquid Chromatography-Mass Spectrometry (LC-MS). Comparative metabolomic analysis using Principal Component Analysis (PCA) and identification of compounds in the KEGG phenylpropanoid reference analysis revealed metabolites possibly contributing to inhibition of *A. flavus* growth. Ten of these metabolites were selected, and the radial growth bioassay demonstrated that some of metabolites in the peanut seed coat inhibited *A. flavus* growth as strongly as nystatin did, which is a well-known fungicide used as a positive control. One of the inhibitory metabolites reduced aflatoxin contamination to 1ppb. Scanning electron micrographs showed distorted hyphae and conidiophores in cultures of *A. flavus* inoculated with metabolites.

Utilization of Plant Growth-Promoting Rhizobacteria as a Potential Biocontrol of *Rhizoctonia solani* in Peanuts

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Peanut (*Arachis* hypogaea L.) production in the United States is estimated to be around 3 million tons per year, with Georgia, Texas, and Alabama being amongst the major peanut producing states. Diseases induced by *Rhizoctonia solani*, a soil borne pathogen, have been known to reduce germination resulting in stand and yield losses. The primary management strategies for *R. solani* include avoidance of excessive fertilizer applications or irrigation, and preventative fungicide treatments, such as Rancona seed treatments or Abound in-furrow applications at planting. With the negative impacts of chemical applications in the agricultural industry becoming more apparent, finding biological alternatives for disease management is imperative. Plant growth-promoting rhizobacteria (PGPR), a biological management tool, enhance growth promotion of crops through mechanisms such as biofertilization and biocontrol of soil borne pathogen. The creation of blends of PGPR strains can target multiple factors within a crop system with a single application. In previous studies, strains of PGPR from the collections at Auburn University have proven effective at increasing growth promotion of a number of crops. Those strains are now being utilized to build a blend to potentially increase yield and quality of peanut crops while managing *R. solani* populations within the soil. In-vitro experiments were conducted on 150 strains of PGPR to determine their ability to biologically fix nitrogen, produce siderophores, solubilize phosphorous, and antagonize *R. solani.* Of the strains that were tested, ~12% exhibited some antagonistic effects on *R. solani* isolated from peanuts, with ~2% showing good antagonism (restricting growth by $\geq$85%). A follow up greenhouse study was conducted to determine which of those strains caused direct growth promotion of peanut plants. The results of the in-vitro and greenhouse experiments allowed for the creation of two blends of PGPR strains that will target *R. solani*, while inducing nutrient uptake to increase growth in peanuts. These blends were then analyzed in a second greenhouse study on peanut plants that were inoculated with *R. solani* to observe disease progression and growth. Treatments included PGPR blends applied with and without Rancona treated seeds, Abound with Rancona, Rancona, and two untreated. All treatments were inoculated with *R. solani* except one nontreated group. Disease ratings and growth measurements are to be presented. Follow-up field studies are to be conducted.

Financial Returns of Input Packages Under Three – Year Peanut – Cereal Cropping Systems in Ghana

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Highly adoptable agricultural technologies do not only target increase in crop yields, but also financial profitability and sustainability. To assess the economic potential of crop production input packages applied in peanut-cereal cropping systems, two similar but separate split plot experiments were conducted in Tamale and Wa in the Northern and Upper West Regions of Ghana respectively from 2019 - 2021. Main plots consisted of two levels of three – year crop rotation systems [Peanut – Corn – Peanut (P-C-P) and Corn – Corn – Peanut (C-C-P)], and Sub plots, three levels of pest and crop management input packages [low input package (LIP), medium input package (MIP) and high input package (HIP)]. The LIP comprised high quality seed, timely planting, and 1 manual weeding, the MIP comprised high quality seed, timely planting, 2 manual weeding, 2 or 3 applications of local soap and fertilizer (15:15:15, N-P2O5, K2O) applied at 3 weeks after planting (3WAP). The HIP comprised high quality seed, timely planting, pre emergence application of Pendimethalin followed by 1 manual weeding, 2 applications of fungicide (azoxystrobin + difenoconazole), and application of the previously described fertilizer and calcium fertilizer at 6 WAP. The integrity of plots was maintained to allow rotations and the application of same input package on designated plots. The cost of each production activity, all inputs and the cost of labor for their application were computed for each input system per hectare as the cost of production in each year. The fiscal value of crop yields were computed as the gross income for each input system per hectare, considering the market price of the produce. Net returns (NR) and partial budget analysis (PBA) were computed after the values for all three years have been summed for each parameter. In both locations, the cost of production and NR were high for the P-C-P rotation than C-C-P rotation. They were also high for the HIP followed by the MIP and then the LIP. The NR of the P-C-P rotation was GH₵ 18,346 (USD 1,835) or GH₵ 21,100 (USD 2,110) in Tamale or Wa, respectively, and were 50% and 23% more than the NR of the C-C-P rotation. The NR of production under the HIP (GH₵ 28,033, USD 2,803) was 101% or 627% more than production under the MIP or LIP system respectively in Tamale. In Wa, the NR of production under the HIP (GH₵ 33,421, USD 3,342) was 70% or 668% more than the MIP or LIP system respectively. The PBA indicated that, for each extra GH₵ 10 (USD 1) invested in implementing the P-C-P rotation over the C-C-P rotation, additional GH₵ 243 (USD 24) and GH₵ 166 (USD 17) were gained in Tamale and Wa, respectively. Also, for every extra GH₵ 10 (USD 1) invested for implementing the MIP over the LIP, extra GH₵ 212 (USD 21) or 310 (USD 31) was gained in Tamale or Wa, respectively. Additional GH₵ 357 (USD 36) and GH₵ 415 (USD 42) were gained for every additional GH₵ 10 (USD 1) invested in implementing the HIP system over the MIP. For high financial returns, small-scale farmers may adopt the HIP or MIP if they would cultivate land sizers within the limits they could afford.

Improving Ability of Farmers to Provide Higher Quality Peanut for Enhanced Markets in Ghana

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Knowledge and access to resources is limited for many farmers in northern Ghana relative to peanut production and marketing. Savanna Agricultural Research Institute (SARI), in partnership with the Feed the Future Innovation Lab for Peanut (PIL) provided training programs in 2023 to enhance knowledge to members of the Out Grower Businesses and their service providers (OBSP) network associated with Ghana Market Systems and Resilience (MSR). Training sites for OBSP was established at three research stations of SARI at Nyankpala in the northern region, Manga in the Upper East region and Wa in the Upper west region. These training site consisted of seven experiments: 1) varietal trial with four varieties; 2) seed quality trial with four different seed quality treatments with two varieties; 3) plant density trial at with four plant spacings with two varieties; 4) harvest timing comprising of five harvest dates with two varieties; 5) fertility trial with two fertilizer levels and three varieties; 6) fungicide trial with four levels of fungicide application with two varieties; and 7) weed management trial with seven levels of weed management using two varieties. Trials were then replicated three times at three locations. OBSP attended training events during the cropping cycle and one follow up training is planned that summarized results from farmer surveys and data collected at training sites. In addition, field data such as pest infestation, damage caused by pests, yield, and yield-related parameters were documented. Based on those results, expansion of training beyond SARI research stations was then proposed for 2024. A set of general recommendations for peanut farmers was established and will be developed into an abbreviated production guide and poster and distributed across to the OBSP network provided by MSR. The OBSP network will distribute educational materials to farmers and share information they learned to farmers from the SARI-led training sessions.

Evaluating Diverse Peanut Genotypes for Feeding Injury of Field Pests

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There are several economically important arthropod pests of peanut. Of these, pests which compromise peanut hull and skin integrity pose the most serious threats to growers and shellers. The result of even relatively low feeding injury by pests such as burrower bug (*Pangaeus bilineatus*) and rootworm (*Diabrotica* spp.) is a reduction in the price growers will receive for their peanuts. Damaged hulls and kernels also pose a risk in warehouse storage as they are more susceptible to fungal colonization and aflatoxin proliferation prior to shelling. Research regarding these pests is becoming more critical as regulations on crop protectants such as chlorpyrifos become more stringent. Here we examine feeding injury of both burrower bug and rootworm on various peanut genotypes in naturally infested fields and present phenotyping methods for assessing damage. Abundance data were collected on pests throughout the season as an indicator of pest pressure at different field locations. Our analyses identified some peanut genotypes which may be more susceptible to feeding injury.

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Hotel Meeting Space Floor Plans

LEVEL TWO