Proceedings of the 55th ANNUAL MEETING

Scanning the Horizon

The DeSoto Hotel
Savannah, Georgia
July 10-13, 2023

Editor: R. Scott Tubbs

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(at time of press)

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Univ. of Georgia Southeast Georgia Research and Education Center, Midville, GA
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55th ANNUAL MEETING of the
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Savannah, Georgia
July 10-13, 2023

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Program Highlights

Monday - July 10, 2023

8:30 am - Depart DeSoto Hotel........ DeSoto Hotel Lobby
10:30 am - Field Tour .... UGA SE Georgia Research and Education Center
(9638 Highway 56 South, Midville, Georgia 30441)
12:30 pm - Lunch (RSVP) .... UGA SE Georgia Research and Education Center
1:30 pm - Farm Visit........ Lamar Black Farm
(932 Tilmanstone Rd, Millen, GA 30442)
4:00 pm - Arrive DeSoto Hotel........ DeSoto Hotel Lobby
6:00 pm - Dinner sponsored by Corteva Agriscience (RSVP)........ UGA Coastal GA Botanical Gardens
(2 Canebrake Rd, Savannah, GA 31419)

Tuesday - July 11, 2023

8:00 - 5:00 - APRES Registration/Poster Setup ....Madison
9:00 - 1:00 - Spouse Hospitality Room ....Chippewa (2nd Floor)
8:00 - 5:00 - Practice Room........ Reynolds (2nd Floor)
8:00 - 5:00 - Presentation Uploading ....Madison
8:00 - 9:55 - Seed Summit........Cumberland

Committee Meetings

10:00 - 11:55 Peanut Germplasm Committee........Sapelo
10:00 - 10:55 Public Relations Committee ....Cumberland
10:00 - 10:55 Site Selection Committee ....Monterey (2nd Floor)
10:00 - 10:55 Bailey Award Committee........ Harborview (15th Floor)
11:00 - 11:55 Finance Committee........Monterey (2nd Floor)
11:00 - 11:55 Publications and Editorials Committee........ Harborview (15th Floor)
1:00 - 2:55 Peanut Quality Committee........Sapelo
11:00 - 11:55 Associate Editors, *Peanut Science* ....Cumberland
11:00 - 11:55 Program Committee (Local Arrangements + Tech. Program + Moderators)........ Pulaski

Technical Sessions

1:15 - 3:00 - Joe Sugg – PhD Competition sponsored by National Peanut Board .... Pulaski
1:15 - 3:00 - Extension Techniques I........Cumberland
3:00 - 3:15 - Break **–** *Sponsored by Fine Americas* ....Madison
3:15 - 5:00 - Joe Sugg – PhD Competition sponsored by National Peanut Board .... Pulaski
3:30 - 5:00 - Food Science, Harvest, Shelling, Storage and Handling........Cumberland
5:00 - 6:00 - Board of Directors ....Monterey (2nd Floor)

6:00 - 8:00 "Welcome to Georgia" Ice Cream Social........ Pool Deck*
(Harborview on 15th Floor if rain)

Program Highlights

Wednesday - July 12, 2023

8:00 - 5:00 - APRES Registration/Poster Setup....................Madison

8:00 - 10:00 - Spouse Hospitality Room....................Chippewa (2nd Floor)

3:00 - 5:00 - Spouse Hospitality Room....................Chippewa (2nd Floor)

8:00 - 5:00 - Practice Room.................... Reynolds (2nd Floor)

8:00 - 5:00 -Presentation Uploading.................... Madison

Sessions

7:15 - 7:50 - Joe Sugg – MS Competition sponsored by North Carolina Peanut Growers Assoc. .... Pulaski

8:00 - 9:45 - General Session – Scanning the Horizon.................... Oglethorpe/Cumberland

9:45 - 10:00 – Break – *Sponsored by FMC*....................Madison

10:00 - 12:00 - Joe Sugg – MS Competition sponsored by North Carolina Peanut Growers Assoc. .. Pulaski

10:00 - 12:00 - Breeding/Biotechnology/Genetics I....................Oglethorpe/Cumberland

12:00 - 1:00 - Lunch....................on your own

1:00 - 3:00 - Joe Sugg – MS Competition sponsored by North Carolina Peanut Growers Assoc. .... Pulaski

2:00 - 3:00 - Weed Science and Entomology....................Oglethorpe/Cumberland

3:00 - 3:15 - Break - *Sponsored by FMC*....................Madison

3:15 - 5:00 - Joe Sugg – MS Competition sponsored by North Carolina Peanut Growers Assoc. .... Pulaski

3:15 - 5:00 - Production Technology and Economics....................Oglethorpe/Cumberland

6:00 - 9:00 Riverboat Cruise/Dinner sponsored by BASF and Bayer….River Street Landing

*Poster presentations open all day

Program Highlights

Thursday - July 13, 2023

6:30 - 7:45 - Fun Run - *Sponsored by JLA* ....DeSoto Lobby

8:00 - 5:00 - APRES Registration/Poster Viewing..Madison

8:00 - 10:00 - Spouse Hospitality Room ....Chippewa (2nd Floor)

3:00 - 5:00 -Spouse Hospitality Room ....Chippewa (2nd Floor)

8:00 - 1:30 - Practice Room.. Reynolds (2nd Floor)

Sessions

8:30 - 9:45 - Symposium – Opportunities/Challenges Facing US Peanuts in Int'l Markets....... Cumberland

9:45 - 10:00 - Break – *Sponsored by Birdsong Peanuts* ....Madison

10:00 - 11:45 - Plant Pathology/Nematology .... Ossabaw

10:00 - 11:45 - Breeding/Biotechnology/Genetics II ....Sapelo

12:00 - 1:30 - Graduate Student Luncheon sponsored by Syngenta .... Harborview (15th Floor)

12:00 - 1:30 - Lunch.. on your own

1:30 - 3:00 - Breeding/Biotechnology/Genetics III ....Sapelo

1:45 - 3:00 - Physiology and Seed Technology.. Pulaski

1:45 - 3:00 - Extension Techniques II... Ossabaw

3:00 - 3:15 - Break – *Sponsored by Birdsong Peanuts* ....Madison

3:15 - 5:00 - Poster session (Authors Present)..Madison

5:00 - 6:00 - APRES Business Meeting and Awards Ceremony ....Oglethorpe/Cumberland

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

*Poster presentations open all day

1:15 – 5:00	**Joe Sugg PhD Competition** Meeting Room: Pulaski *Moderator: Bob Kemerait, Univ. of Georgia*	Pres. #
1:15	**On-farm test of the Optimized Shrubs System of *Piliostigma reticulatum* on Crops performance (Millet and Peanut) in sudano-sahelian agroecosystems of the south Peanut Basin of Senegal: case of Nioro.** **M. M. DIONE***, I. DIEDHIOU, K. TOURE, École National Supérieure d'Agriculture (ENSA), Thiès, Senegal, O. DIATTA, Department of Geosciences and Natural Resource Management, University of Copenhagen, Rolighedsvej 23, 1958 Frederiksberg C, Denmark, A. L. DAVEY, R.P. DICK, School of Environment and Natural Resources, The Ohio State University, Columbus, OH, United States.	1
1:30	**Diversifying Sources of Resistance to Leaf Spot Diseases in Cultivated Peanut *A. hypogea* using the Wild Species *A. correntina* as Donor** **J. GOMIS***, A. KANE: Cheikh Anta Diop University of Dakar, P.O Box 5005 Dakar-Fann, Senegal**;** A. SAMBOU, H. A TOSSIM, M. SEYE, R. DJIBOUNE: Regional center for drought adaptation improvement (CERAAS), P.O. Box 3320 Thies, Senegal; D.BERTIOLI, S. BERTIOLI: University of Georgia, 111 Riverbend Road, Athens, GA, USA; J.R. NGUEPJOP; D. FONCEKA: CIRAD UMR AGAP, TA A-108/03 Agropolis avenue Montpellier Cedex 5, France	2
1:45	**Identification and study of loci associated with early leaf spot (ELS) and late leaf spot (LLS) in allotetraploid and their introgression into cultivated peanut** **N. MAHARJAN*,** Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30602, C. BALLÉN-TABORDA, Plant and Environmental Sciences Department, Clemson University, Florence, SC 29506, M. HOPKINS, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30602, D.J. BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, Department of Crop and Soil Science, University of Georgia, Athens, GA 30602; and S.C.M. LEAL-BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, Department of Plant Pathology, University of Georgia, Athens, GA 30602.	3
2:00	**Peanut Post-Reference Genomic Era: Application of High-Quality Genome Sequencing in Genetic and Genomic Functional Characterization** **E. THOMPSON***, S. GANGURDE, A.K. CULBREATH, University of Georgia, Department of Plant Pathology, Tifton, GA; W. KORANI, J.P. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL; B. GUO, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA.	4
2:15	**Response of different peanut seed color genotypes under irrigated conditions and water deficit conditions to *A. flavus* and aflatoxin contamination.** **L. COMMEY***, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; H. SUDINI**,** International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; H. FALALOU**,** International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Niamey, Niger; T.K. TENGEY, CSIR-Savanna Agricultural Research Institute (CSIR- SARI), Nyankpala, Ghana; 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 Soil Science, Texas Tech University, Lubbock, TX, and Department of Plant Science and Plant Pathology, Montana State University, Bozeman, MT.	5
2:30	**Variation in Pollen Viability Responses to Elevated Temperature Between Five Commercial Peanut Cultivars Grown in Southeastern Virginia** **K. M. BEARD***, D. C. HAAK, School of Plant and Environmental Sciences, Virginia Polytechnical Institute and State University, Blacksburg, Virginia 24060; and M. BALOTA, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437	6
3:00	**BREAK**	

3:15	**Analytical analysis of flutolanil dissipation to determine if enhanced biodegradation acts as a dissipation mechanism in Georgia peanut soil** **J. BELL***, T. BRENNEMAN, Plant Pathology Department, University of Georgia, Tifton, GA 31793-0748; T. GREY, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793-0748.	8
3:30	**Using Analytical Techniques and Bioassay Responses to Quantify Imazapic Soil Dissipation** **A.E. MCEACHIN***, T.L. GREY, University of Georgia, Dept. of Crop & Soil Sciences, Tifton, GA; and K.M. Eason, United States Department of Agriculture, Agriculture Research Service, Tifton, GA	9
3:45	**Evaluating the Effect of Cover Crops on Soil Moisture Retention and Sustainability in Peanut** **K.R. REAGIN***, M.L. TOSTENSON, W.M. PORTER, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793-0748; and P. SAPP, University of Georgia Extension, Waynesboro, GA 30830-0300.	10
4:00	**Comparison of Pest Management Practices in Peanut Planted into a Cereal Rye Cover Crop** **E. FOOTE***, D.L. JORDAN, J. DUNNE, A. GORNEY, and D. RESISIG, North Carolina State University, Raleigh, NC 27695	11
4:15	**Paraquat Effects on the Growth and Yield of Peanut in the Southwestern United States** **Z.R. TREADWAY***, J.L. DUDAK, T.A. BAUGHMAN, Oklahoma State University, Ardmore, OK 73401, P.A. DOTRAY, Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX 79409, W.J. GRICHAR, Texas A&M Agrilife Research, Yoakum, TX 77995	12
4:30	**Utilizing POST Herbicide Applications to Manage Volunteer Cotton in Peanut** **J.L. DUDAK***, T.A. BAUGHMAN, Z.R. TREADWAY, Oklahoma State University- Institute of Agriculture Biosciences, Ardmore, OK 73401	13
4:45	**Isoxaflutole Tank Mixtures Efficacy on Volunteer Peanut and Weed Control** **L. PEREIRA*,** R. LANGEMEIER, J. MCCAGHREN, and S. LI, Department of Crop, Soil, and Environmental Sciences, Auburn University, Auburn, AL. M. W. MARSHALL, Plant, and Environmental Sciences Department, Clemson University, Blackville, SC, P. DEVKOTA, West Florida Research and Education Center, University of Florida, Milton, FL	14

On-farm test of the Optimized Shrubs System of *Piliostigma reticulatum* on Crops performance (Millet and Peanut) in sudano-sahelian agroecosystems of the south Peanut Basin of Senegal: case of Nioro.

M. M. DIONE *, I. DIEDHIOU, K. TOURE, École National Supérieure d'Agriculture (ENSA), Thiès, Senegal, O. DIATTA, Department of Geosciences and Natural Resource Management, University of Copenhagen, Rolighedsvej 23, 1958 Frederiksberg C, Denmark, A. L. DAVEY, R.P. DICK, School of Environment and Natural Resources, The Ohio State University, Columbus, OH, United States.

Significant efforts have been undertaken in the Peanut Basin to restore degraded soils and increase yields. In this context, the Optimized Shrub System (OSS) has emerged as a promising agroforestry solution. OSS involves increasing the density of shrubs (*Guiera senegalensis* and *Piliostigma reticulatum*) (~1200 shrubs/ha), cutting and chopping the shrub biomass, and incorporating it into the soil (~3 T biomass/ha/year). This contrasts with the traditional shrub management system (TS) where shrub density is generally low (0-350 shrubs/ha), and the cut shrub biomass is burned. However, little on-farm research has been done on OSS. This study aims to determine the effect of the OSS of *Piliostigma reticulatum* on the performance of groundnut (*Arachis hypogaea* L.) and millet (*Pennisetum glaucum* L.) under on-farm conditions. It was carried out at Nioro area from 2020 to 2022. The trial is a randomized block design with 15 replications and two treatments. Measurements were made on height, LAI, NDVI and crop yield components. Results showed that OSS improved crop growth in all stages and years. For groundnut, height was improved by 17.6%, NDVI by 14.2% and LAI by 20.1%. Millet height was improved by 15.8% in 2020 and 20.9% in 2022. Millet NDVI was improved during the tillering stage by at least 24.07% and LAI by 3.8%. OSS increased crop yield components. For millet, all yield components were increased, including dry biomass weight (+33.4%), ear weight (+29.3%), and grain weight in 2022 (+54.1%). For groundnut, all yield components were significantly increased ($P \leq 0.00595$), especially pod weight (+28.08%). Overall, compared to TS in on-farm conditions, OSS improved crop performance in Nioro. OSS of *Piliostigma reticulatum* can help strengthen crop yields and food security of local populations.

Diversifying Sources of Resistance to Leaf Spot Diseases in Cultivated Peanut *A. hypogea* using the Wild Species *A. correntina* as Donor

J. GOMIS*, A. KANE: Cheikh Anta Diop University of Dakar, P.O Box 5005 Dakar-Fann, Senegal**;** A. SAMBOU, H. A TOSSIM, M. SEYE, R. DJIBOUNE: Regional center for drought adaptation improvement (CERAAS), P.O Box 3320 Thies, Senegal; D.BERTIOLI, S. BERTIOLI: University of Georgia, 111 Riverbend Road, Athens, GA, USA; J.R. NGUEPJOP; D. FONCEKA: CIRAD UMR AGAP, TA A-108/03 Agropolis avenue Montpellier Cedex 5, France

Early and late leaf spot diseases are among major biotic constraints of peanut production worldwide and can cause yield losses to up to 50% without repetitive fungicide spray. In order to promote a more safefull and inexpensive method of control, several resistant lines have been developed. However, almost all of them are derived from the same wild species *Arachis cardenasii*. Thus, sources of resistance need to be diversified.

In our study, we have developed an ABQTL mapping population of 220 lines by crossing the cultivated variety fleur11 and the amphidiploid IpaCor (*A. ipaensis* x *A. correntina*)^{x4}. The main objective is to identify new wild alleles of resistance on *A. correntina* genome. Three years of field evaluation for leaf spot resistance under natural infection was performed on BC1F4:7 and BC2F3:6 individual and the AUDPC was calculated. Genotyping was done with the Axiom_Arachis 58k array.

A significant variation in disease severity has been observed between lines at 5%. A genetic map with 2329 SNPs markers on 20 linkage groups covering 1965.44 cM has been developed and QTLs mapping has revealed several minor QTLs of resistance on A04, B04, A02, A03, A08 and B09 chromosomes explaining 2.2 to 9.5 phenotypic variation. On chromosome A02, a co-location between QTL of resistance and total plant biomass and haulm weight QTLs has been detected. These results showed *A. correntina* as a promising candidate for new sources of resistance to leaf spot diseases.

Identification and study of loci associated with early leaf spot (ELS) and late leaf spot (LLS) in allotetraploid and their introgression into cultivated peanut

N. MAHARJAN*, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30602, C. BALLÉN-TABORDA, Plant and Environmental Sciences Department, Clemson University, Florence, SC 29506, M. HOPKINS, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30602, D.J. BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, Department of Crop and Soil Science, University of Georgia, Athens, GA 30602; and S.C.M. LEAL-BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, Department of Plant Pathology, University of Georgia, Athens, GA 30602.

Peanut is highly susceptible to several fungal diseases, including Early Leaf Spot (ELS) and Late Leaf Spot (LLS). Fortunately, several wild species of peanut like *A. stenosperma* have been identified to have strong resistance to these diseases and can be used as a source of resistance alleles in peanut breeding. This study uses the backcross population derived from a cross between cultivated peanut and BatSten1, an induced allotetraploid developed by crossing two wild diploids [*A. batizocoi* K9484 x *A. stenosperma* V10309]$^{(2n=4x=40)}$). Originally, these lines were selected for the peanut root knot nematode (PRKN). However, preliminary evaluations of the advanced backcrossed lines exhibited varying levels of resistance against leaf spot diseases. This study aims to identify novel loci associated with ELS and LLS resistance in these advanced backcrossed peanut lines and develop allele-specific markers that can help to introgress the novel loci into elite peanut lines. Four advanced backcross families (three BC_3F_3s and one BC_3F_4s) were evaluated using detached leaf bioassay, and Axiom_Arachis v02 SNP array genotyping was conducted on the selected lines. Association analysis was then performed to identify loci associated with leaf spot disease resistance in peanut. The study identified four QTLs associated with ELS and LLS resistance. We are currently validating the QTLs using independent BC_3F_2 progenies derived from BatSten1. Once validated, the segment will be introgressed into cultivated peanuts, leading to development of peanut cultivars with durable resistance to ELS and LLS. This will reduce the cost of cultivation for farmers and ensuring sustainable peanut production.

Peanut Post-Reference Genomic Era: Application of High-Quality Genome Sequencing in Genetic and Genomic Functional Characterization

E. THOMPSON*, S. GANGURDE, A.K. CULBREATH, University of Georgia, Department of Plant Pathology, Tifton, GA; W. KORANI, J.P. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL; B. GUO, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA.

Sequencing a complex genome such as peanut used to be a difficult and expensive undertaking, which required a collaborative effort to achieve. The genomes of two wild diploid peanuts, *Arachis duranensis* and *Arachis ipaensis*, and cultivated tetraploid peanut *A. hypogaea* cv. Tifrunner were sequenced in 2016 and 2019, respectively. These reference genomes only captured the sequences of these individuals, which will not represent the diversity of peanut as a species, with broad genetic and phenotypic variation. Therefore, the objectives of this study are two folds: (1) assemble high quality genomes of the parental lines of two mutant populations and (2) functionally characterize the genes regulating the traits of interest. We have sequenced and assembled two EMS Tifrunner (resistant to leaf spot) mutant lines, 71-2 (susceptible) and 90-1 (resistant), the spontaneous mutant GT-C20D and the parent GT-C20, using PacBio Sequal II and deep sequences. Two mutant populations, derived from Tifrunner x 71-2 (TL) and GT-C20 x GT-C20D (C20D), have also been genotyped using whole genome re-sequencing. The “TL” population has identified a significant late leaf spot resistance association on chromosome Ah04 from 118-120 Mb using GWAS and haplotype analysis. The “C20D” population has identified a significant association for seed coat pigmentation on chromosome Ah03 from 127-130 Mb using GWAS and haplotype association. We are still in data analyses for 71-2, GT-C20, and GT-C20D in addition to continual phenotypic evaluation. With the reference quality genomes, we will characterize and identify the functional genes causing the mutations in associated genomic regions. In the “post-genomic” era, generating high quality genome sequencing data is fast and steadily growing, which will play a significant role in functional genetics and genomics.

Response of different peanut seed color genotypes under irrigated conditions and water deficit conditions to *A. flavus* and aflatoxin contamination.

L. COMMEY*, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409; H. SUDINI, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; H. FALALOU, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Niamey, Niger; T.K. TENGEY, CSIR-Savanna Agricultural Research Institute (CSIR- SARI), Nyankpala, Ghana; 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 Soil Science, Texas Tech University, Lubbock, TX, and Department of Plant Science and Plant Pathology, Montana State University, Bozeman, MT.

Drought impairs plant defense and favors aflatoxin production coupled with the germplasm lines reported to be resistant to *A. flavus* and aflatoxin contamination been limited. There is a need therefore, to identify more resistant lines under both irrigated and water deficit conditions based on their seed coat color due to the difference in polyphenol content in different seed coat color and the role of polyphenols in *A. flavus* and aflatoxin contamination. Forty peanut genotypes with different seed coat colors (tan, red, black and mixed) obtained from irrigated and water deficit conditions were used in the study. Two hundred and fifty (250) seeds of genotypes from both conditions were screened for *A. flavus* resistance using the *in vitro* seed colonization assay. Inoculated seeds were later ground and 40g of ground paste will be used to estimate the aflatoxin content using Vicam immunoassay strips. Results showed that there were significant differences between the degree of *Aspergillus* infection of peanuts grown under irrigated and water deficit conditions PI 337394 and PI 590469 had less than 10% *Aspergillus* infection under irrigated conditions, whereas 20-25% of seed obtained under water deficit conditions were infected.

Variation in Pollen Viability Responses to Elevated Temperature Between Five Commercial Peanut Cultivars Grown in Southeastern Virginia

K. M. BEARD*, D. C. HAAK, School of Plant and Environmental Sciences, Virginia Polytechnical Institute and State University, Blacksburg, Virginia 24060; and M. BALOTA, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437

Rising global temperatures are impacting crop production worldwide. Peanut (*Arachis hypogaea* L.), an important crop in the American South, is already facing yield reductions attributed to heat stress and this is likely to continue to be a problem as temperatures continue to rise. In addition to the stress on vegetative stages of development, heat stress can have serious negative impacts on reproductive development. Prolonged exposure to elevated temperature can significantly impact timing and production of flowers, as well as pollen development and viability, threatening fruit-set and ultimately yield. The objective of this study was to investigate the changes in pollen viability occurring at super-optimal temperature in five commercial virginia-type cultivars (Bailey II, Emery, N.C. 20, Sullivan, and Walton). Six replicates of each variety were randomly assigned to an optimal (30 ^{o}C/25 ^{o}C, day/night) or elevated (40 ^{o}C/35 ^{o}C, day/night) temperature regimen in environmental growth chambers. Daily flower production per plant was recorded for 43 days and all flowers (as many as ten per plant) were collected and frozen. Pollen viability was calculated as the proportion of viable grains from the total counted – as determined by viability staining with lactophenol-aniline blue. A significant impact of temperature on pollen viability ($\alpha = 0.01$) was identified for Emery, Sullivan, and Walton, but not for Bailey II and N.C. 20. N.C. 20 displayed high viability (> 0.85) for both treatments, which was significantly higher than Emery and Bailey II and comparable to Sullivan and Walton. High overall viability and no significant loss of viability under heat stress conditions could potentially indicate thermotolerance in this cultivar, though further testing in the field would be necessary to make this conclusion.

Analytical analysis of flutolanil dissipation to determine if enhanced biodegradation acts as a dissipation mechanism in Georgia peanut soil

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The Group 7 fungicides are widely used on many crops, and for 28 years the SDHI flutolanil has been heavily used on peanut for soilborne pathogens. Over the past few years, chemical control with SDHIs has been less than expected in a number of peanut fields in southern Georgia. In order to assess whether this is attributed to enhanced biodegradation associated with repeated use of the chemistry, an *in vitro* assay was conducted. Soil samples were taken from two nearby fields with loamy sand—one with repeated flutolanil exposure and one with no exposure history. Half of the soil from each field was autoclaved in order to kill all microbes. Samples were treated with approximately 2 ppm of flutolanil on day 0, with a repeat application on day 64, and then incubated in the dark for the duration of the experiment. On days 1, 7, 30, 63, 65, 71, 92, and 122, each sample was subsampled and the flutolanil was extracted via the QuEChERS method. Samples were quantified on an LC/MS/MS, and percent flutolanil remaining was calculated based on levels at day 1 or 65. The experiment was duplicated and results combined since similar trends were observed across experiments. An ANOVA by day showed that for days 7, 30, 63, and 122, the autoclaved treatments had the least dissipation compared to the non-autoclaved, suggesting the occurrence of biodegradation. It further demonstrated that for the first flutolanil spike period, days 7 and 30 had significantly less dissipation in the previously exposed soil treatments compared to the unexposed treatments. However, after the second spike, days 71, 92, and 122 showed that there was significantly more dissipation in the exposed soil treatments. This demonstrates that repeated exposure increases flutolanil dissipation in previously treated fields, further suggesting the occurrence of biodegradation. Linear regressions showed a gradual decline in the percent remaining flutolanil for each of the four treatments for the first spike period, whereas the second spike period showed a reduction in dissipation. Though dissipation was quickest during the first 63 days, it still demonstrates that flutolanil is relatively stable in the soil, resulting in its availability within the 30-40-day period to provide disease control in the field. Overall, flutolanil is quite stable in the soil environment, and biodegradation does not appear to be a major factor in observed differences in disease control.

Using Analytical Techniques and Bioassay Responses 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 analytically quantified for imazapic using ultra-high performance liquid chromatography to determine dissipation over time. Data indicated that soil herbicide concentration decreased with time. Imazapic soil detection was additionally evaluated by greenhouse bioassay. The intent was to quantify the relationship between soil herbicide concentration and carryover injury in oat and canola over time. Regression data indicated a significant reduction in shoot and root biomass at high herbicide concentrations, with a positive linear response over time.

Evaluating the Effect of Cover Crops on Soil Moisture Retention and Sustainability in Peanut

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Cover crops, though not a new agricultural practice, are not widely evaluated in peanut production systems. There are well documented benefits for implementing cover cropping techniques, such as reduced soil erosion rates, increased soil heath, and increased wildlife biodiversity; where all benefits aided in improving on-farm sustainability. The implementation of cover crops into a production system has the ability to increase soil organic matter, which correlated to an improvement of soil water holding capacity and water use efficiency. Adequate soil moisture is crucial for peanut growth and development to ensure optimum pod yields at the end of the growing season. However, in many peanut production scenarios, there is a hesitation to incorporate a cover crop in a strip-tillage environment due to potential loss of pod yield in comparison to those planted with conventional deep tillage. Therefore, the main objective of this research was to evaluate the effect cover crops in a strip-tillage system have on soil moisture retention while measuring on-farm sustainability using the Fieldprint Calculator in peanut. A six-year study was conducted at the University of Georgia's Southeast Research and Education Center in Midville, Georgia. A 1.21-hectare field was planted in a corn, peanut, cotton rotation; where peanut was planted in 2019 and 2022. Sixteen plots were established using a randomized complete block design with four cover crop treatments and four replications. The treatments included: no cover crop and conventionally tilled (control), rye monoculture, rye and crimson clover mixture, and a multi-species mixture. To measure soil moisture, 24 WaterMark tensiometer soil moisture probes were installed across the field and were placed based on treatment and management zones determined by soil electroconductivity levels. Throughout the growing season, soil moisture data was logged by REALM Flexes and was available for real-time viewing within the REALMFive user webpage. Once peanut harvest was completed in 2019 and 2022, the field management practices were logged and entered into the Field to Market Fieldprint Calculator for analysis of eight sustainability metrics which has the ability to identify changes across treatments and years.

Comparison of Pest Management Practices in Peanut Planted into a Cereal Rye Cover Crop

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Determining interactions among pest management practices, especially across disciplines, can be important in developing effective strategies for peanut production systems. Cereal rye has been shown to reduce weed populations in peanut and other crops and minimize injury from thrips. Leaf spot disease can also be lower when cereal rye is used as a cover crop compared with reduced tillage without a cover crop or conventional tillage. The effectiveness of a cereal rye cover crop on pests has not been determined in North Carolina. Research was conducted in 2022 to compare pest reaction, yield of the peanut cultivar Bailey II, and estimated financial return when peanut was grown with various levels of leaf spot, insect, and disease management in a desiccated cereal rye cover crop terminated in April or May. Treatments consisted of two levels of insect management (systemic insecticide for thrips control vs. systemic insecticide for thrips control and three applications of indoxacarb for suppression of spotted cucumber beetle, the adult stage of southern corn rootworm), two levels of leaf spot management (an inexpensive but risky three-spray fungicide program vs. an expensive three-spray program with fungicides containing a broader window of protection), and two levels of weed management (herbicides only vs. herbicides and hand-removal of escaped broadleaf weeds or clethodim to control escaped grass weeds).

Peanut leaf spot incidence and defoliation, southern corn rootworm pod damage, peanut wilting, peanut yield, and estimated net return on investment was affected by rye cover crop termination date, insecticide use, weed management measures, and fungicide use. Peanut plants wilted less in August and September when the cover crop was terminated in May compared with termination in May within two weeks prior to planting. At the location with the coarser-textured soil, termination in May had a lower leaf spot incidence and late season defoliation than termination in April. At this location, the less expensive fungicide program offered better protection from leaf spot incidence throughout the season and less defoliation by leaf spot in the later part of the season compared with the more expensive fungicide program. Three applications of indoxacarb and rye termination date had no effect on the damage from southern corn rootworm or peanut yield. Yield was lower when peanut was planted into rye that was terminated May compared with yield when rye was terminated in April, possibly due to greater early season interference of rye with peanut. Generally, there was no financial return on investment or a loss on investment for the three applications of indoxacarb or the additional weed control (hand weeding or clethodim application). There was a positive financial return when rye was terminated in April compared with termination in May, most likely due to differences in peanut yield due to rye termination date. Peanut yield and financial return were similar for the inexpensive fungicide program and the more expensive fungicide program.

Paraquat Effects on the Growth and Yield of Peanut in the Southwestern United States

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Peanut [*Arachis hypogaea* (L.)] producers are faced with the ever-growing issue of weed pressure. This is a problem that persists throughout the growing season. Peanut competes with weeds for sunlight, water, and nutrients, leading to plant stunting and yield loss. During harvest, increased weed density can have a negative effect on the entire harvest process from digging to theshing. yield losses in excess of 40% have been observed under heavy weed densities. Timely weed control is vital to maximum peanut yield. Paraquat is one option available to producers to control predacious weeds. Paraquat is labeled for application within 28 days after emergence, but no later, due to the risk of crop injury. Trials were conducted in 2021 and 2022 in Lubbock, Texas and Fort Cobb, Oklahoma and on 2021 in Yoakum, TX to evaluate the response of peanut to paraquat. Treatments included paraquat applied at either 10.8 fl oz/A or 21.6 fl oz/A alone or applied in combination with S-metolachlor (Dual Magnum) applied at either 1.33 pt/A or 2.66 pt/A. Treatments were applied 14 days after cracking (DAC), 28 DAC, or 14 DAC followed by 28 DAC. Stand reduction never exceeded 5% with any treatment at any location throughout the growing season in any year. Peanut injury primarily consisted of plant stunting and leaf necrosis. The only treatment applied 14 DAC that injured peanut less than 10% (6 weeks after crack) was Gramoxone alone (1X) both years at Fort Cobb and Lubbock in 2021. At 8 weeks after cracking, Gramoxone + Dual Magnum applied at a 2x rate at both timings caused over 50% injury in both years at Lubbock, and Gramoxone (2x) applied at both timings caused 60% injury in 2021 at Lubbock. This was greatest injury observed at any time throughout the study. The greatest injury levels at both Fort Cobb and Lubbock were observed with treatments applied at both timings. Yield was not affected by any treatment in Lubbock in either year, while the only treatment that negatively affected yield in both years at Fort Cobb was Gramoxone + Dual Magnum (2x) applied at both timings. This research highlights that visual injury of peanut does not always equate to a negative yield effect.

Utilizing POST Herbicide Applications to Manage Volunteer Cotton in Peanut

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Rotating peanut and cotton is a common crop production practice in regions of Oklahoma. Managing volunteer cotton is crucial to peanut yields and ease of harvest. This study identifies multiple postemergence (POST) herbicide options to control volunteer cotton in peanut fields. This trial was established near Eakly, Oklahoma in 2022 and at the Caddi Research Station near Fort Cobb, Oklahoma in 2023. Treatments include early postemergence (EPOST) tankmix applications of Anthem Flex (3-4 fl oz/A) applied alone or in combination with 2,4-DB (16 fl oz/A) with and without Select Max (12 fl oz/A) or Aim (1.5 fl oz/A) and Dual Magnum (22 fl oz/A) applied alone or in combination with 2,4-DB (16 fl oz/A) with and without Select Max (12 fl oz/A). In 2022, initial injury (7 DAT) was between 6 and 10% with all treatments (Table 6). Injury was slightly higher with Anthem Flex compared to Dual Magnum. This is to be expected due to the addition of Aim in the Anthem Flex herbicide. Injury was not visible by 16 DAT with any of the treatments. The only weed in a significant population was volunteer cotton. However, even this population was sporadic across the trial area. It was observed that the addition of Aim to Anthem Flex, equal to a total of 2.0 fl oz/A of Aim increased volunteer cotton control. Data for 2023 will be reported in the presentation. This may be a potential option where Enlist cotton was planted and a producer would prefer not to apply Gramoxone.

Isoxaflutole Tank Mixtures Efficacy on Volunteer Peanut and Weed Control

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The use of cotton-peanut rotation is common among growers in the southeastern U.S. due to increased yield and disease mitigation. However, volunteer peanuts can act as weeds, as well as reservoirs for disease and insects for future peanut crops. The future release of Axant Flex cotton, which is tolerant to isoxaflutole, dicamba, glyphosate, and glufosinate potentially allows for new volunteer peanut control and broadleaf weed control options. The objective of this study was to evaluate isoxaflutole preemergence tank mixtures efficacy on volunteer peanut and weed control in future Axant Flex cotton. The study was conducted at Henry County and Baldwin County, AL as well as Pickens County, SC and Santa Rosa County, FL during June and July of 2022. Treatments consisted of isoxaflutole in combination with dicamba and/or fomesafen. All treatments were applied preemergence using TeeJet TT 11002 nozzles for AL and FL sites and FLAEVE 8002 nozzles for SC site. The data collection consisted of peanut stand count, visual control, and broadleaf weed control at 14, 28, and 42 days after planting (DAP). At 42 DAP, data collection also included broadleaf weed counts, weed biomass by species, and peanut biomass. Results showed that the higher rates of isoxaflutole in combination with dicamba resulted in 85 - 90% visual peanut and morningglory (*Ipomea* spp.) control for all sites for all ratings. This was similar to isoxaflutole alone. Treatments that did not include isoxaflutole did not perform as well for volunteer peanut and broadleaf weed control across all sites and ratings. Peanut stand count in SC was not significantly different from the non-treated control for any rating. Baldwin Co. presented significant differences for peanut stand count at 14 and 28 DAP ratings, while Henry Co. presented significant differences for all ratings. At 42 DAP in Henry Co., treatments either with lower rates or without isoxaflutole showed a higher peanut population. Broadleaf weeds biomass presented no significant differences. However, at Henry Co., Baldwin Co. and Santa Rosa Co. treatments without isoxaflutole or the combination of isoxaflutole with dicamba and fomesafen resulted in higher biomass, while Pickens Co. showed no biomass significance. Isoxaflutole shows potential for growers to increase both broadleaf weed and volunteer peanut control. For volunteer peanut control higher rates of isoxaflutole with the addition of dicamba and/or fomesafen provided better control when compared to standard treatments.

1:15 – 3:00	**Extension Techniques I** Meeting Room: Sapelo *Moderator: David Jordan, North Carolina State Univ.*	Pres. #
1:15	**Summary of Production Practices by Top Growers in North Carolina in 2022** **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, J. WARD, D. ANDERSON, T. BATTS, J. ANDERSON, Z. PARKER, R. BRANDENBURG, D. REISIG, and D.L. JORDAN, NC State Extension, Raleigh, NC 27695	15
1:30	**Summary of Practices Associated with Key Pests and Digging Peanut in the Virginia-Carolina Region in 2022** **C. ELLISON***, A. COLF, B. BARROW, 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, L. GRIMES, M. WATERS, M. HUFFMAN, M. SEITZ, J. HARRELL, M. SMITH, A. GROVE, M. MALLOY, R. WOOD, J. WARD, D. ANDERSON, T. BATTS, J. ANDERSON, Z. PARKER, R. BRANDENBURG, D. REISIG, and D.L. JORDAN, NC State Extension, Raleigh, NC 27695; L. PREISSER, N. CLARK, E. COOPER, M. PARRISH, S. REITER, S. RUTHERFORD, M. BALOTA, D. LANGSTON, and S. MALONE, Virginia Cooperative Extension Service, Blacksburg, VA 24060; and D. ANCO, Clemson University, Blackville, SC.	16
1:45	**Summary of Large-Plot Trials in North Carolina in 2022** **L. GRIMES***, B. BARROW, C. ELLISON, D. ANDERSON, M. LEARY, and D.L. JORDAN, NC State Extension, Raleigh, NC 27695; B. STEVENS, M. BRAKE, S. DEAL, and L. RANSOM, North Carolina Department of Agriculture and Consumer Services, Raleigh, NC 27699	17
2:00	**Contrasting 2021 and 2022 Growing Seasons in Pitt County, North Carolina** **M. SMITH*** and D.L. JORDAN, North Carolina State University, Raleigh, NC 27695	18
2:15	**Fungicide Evaluation Using On-Farm Trials in North Florida** **K. WYNN***, University of Florida/Institute of Food and Agricultural Sciences, Jasper, FL 32052; and N. DUFAULT, University of Florida Associate Professor and Extension Specialist, Gainesville, FL 32611	19
2:30	**Peanut Related Extension Efforts in the Central Panhandle of Florida** **M.D. MAULDIN***, UF/IFAS Extension, Washington County, Chipley, FL 32428; E.T. CARTER, UF/IFAS Extension, NW District, Marianna, FL 32448; D.J. LEONARD, UF/IFAS Extension, Calhoun County, Blountstown, FL 32424; and K.M. WATERS, UF/IFAS Extension, Holmes County, Bonifay, FL 32425.	20
2:45	**On-Farm Peanut Variety Evaluation in Florida's Central Panhandle** **D.J. LEONARD***, UF/IFAS Calhoun County Extension, Blountstown, FL, 32424; K.M. WATERS, UF/IFAS Holmes County Extension, Bonifay, FL, 32425; M.D. MAULDIN, UF/IFAS Washington County Extension, Chipley, FL, 32428; E.T. CARTER, UF/IFAS Regional Crop IPM Agent, Marianna, FL 32446; B.L. TILLMAN, and M.W. GOMILLION, North Florida Research and Education Center, Marianna, FL 32446	21

Summary of Production Practices by Top Growers in North Carolina in 2022

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The North Carolina Peanut Growers Association recognizes peanut growers at county and state levels each year and NC State Extension based on a combination of yield per acre and points based on acres of production. Growers are required to complete a survey form along with their application relative to their production and pest management practices. Top growers often have relatively high seeding rates and high levels of input and management. Similarity of practices between growers adds strength to practices that are field proven and underscore adaptation of Extension recommendations. It also tracks variation between regions and soil types. Finally, it gives growers perspectives on their thoughts of what practices or decisions contributed most to their high yielding success. In 2022, tillage systems varied from conventional till (70%) to strip till (30%). None of the farmers completing surveys performed deep tillage in the form of moldboard plowing. Seeding rate ranged from 125 to 180 pounds per acre with 80% of peanut planted in single rows and 20% in twin rows. One grower planted on 30-inch spacing while all other growers were on a spacing of 36 to 38 inches. Bailey II was planted by all growers with a fraction of acres planted to Emery (30%) and Sullivan (20%). One grower planted Walton. Forty-percent of top growers irrigated a portion of their acres (20 to 60%.) Prohexadione calcium and manganese were applied by 70% of growers. All growers applied gypsum, inoculant for nitrogen fixation, and boron. Ninety percent of growers applied lime and fertilizer prior to planting in 2022. Ninety percent of growers applied imidacloprid alone or with fluopyram (30%) in the seed furrow at planting for thrips control. One grower applied aldicarb. Herbicide programs varied considerably across growers with metolachlor and flumioxazin applied PRE by 90% of growers. Seventy percent of growers applying imazapic and paraquat. The herbicide 2,4-DB was applied by all growers. Fungicide programs also varied across growers with Provost Silver, Miravis, and chlorothalonil among the most frequent fungicides used for leaf spot and stem rot control. Miravis alone or with Elatus were listed as being used for Sclerotinia blight control by 20% of growers. One grower fumigated for black root while 80% of growers applied insecticide for foliar-feeding insects. Spider mites were treated by 20% of growers. None of the farmers surveyed treated for southern corn rootworm. Digging and harvesting capacity was closely related to acreage (126 to 1,520 acres.) Growers mentioned that timeliness of management practices and good weather were factors contributing to their success in 2022.

Summary of Practices Associated with Key Pests and Digging Peanut in the Virginia-Carolina Region in 2022

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A survey of peanut growers in North Carolina and Virginia was conducted in February 2023 at county peanut production meetings (North Carolina) or the state peanut production meeting (Virginia). Fifty-two percent of growers indicated that they preferred to dig peanut before a hurricane if possible while 31% and 17% indicated that they would prefer to dig after the storm or both before and after, respectively. Growers were asked if they used Apogee or Kudos in 2022. Twenty-eight percent, 48%, and 29% indicated that they did not apply one of these plant growth regulators, made one application, and applied one of these products twice, respectively. None of the farmers surveyed indicated that they applied a plant growth regulators three times. Twenty-two percent of farmers stated that they had damage from southern corn rootworm while 3% indicated that they experienced damage for burrower bug. Growers on average estimated digging losses of 7.8%. The survey represented approximately 48,000 acres and the self-reported average yield was 4,746 pounds/acre from approximately 166 surveys.

Summary of Large-Plot Trials in North Carolina in 2022

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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 Bailey II, Emery and Sullivan (1 trial); Bailey II, Emery, Sullivan, and Walton (5 trials); Bailey II, Emery, Sullivan, Walton, and Tif-Jumbo H/O (1 trial); response to Apogee or Kudos (2 trials); response to seeding rates (1 trial); response to the combination of AgLogic and inoculant (1 trial); and yield of peanuts expressing nutrient deficiency (1 trial). One additional large-plot trial was established in Columbus County with a grower to compare the yield based on the number of Apogee applications but rainfall washed off the Apogee shortly after application. Two additional large-plot trials were established to compare nematode populations in soil after Propulse was applied earlier in the season in Bladen and Columbus counties. However, soil populations of nematodes were variable and low, and therefor yield data were not recorded.

Yield of Bailey II, Emery, Sullivan, and Walton was similar in all trials where these varieties were included. In the trial where Tif-Jumbo H/O was included with these four varieties, yield was similar for all varieties. In one of two trials where Bailey II, Emery, and Sullivan were compared, Emery yielded less than Bailey II and Sullivan: yield was similar for all three varieties in the other trial. Yield following application of Kudos was similar to non-treated peanut in one trial. In the trial comparing the number of applications of Apogee (1 vs. 2), yield was lower when two applications were made compared with non-treated peanut or when one application was made. This response seldom occurs and was most likely due to dry weather after the first application and essentially forcing the second application late in the season under dry conditions. In 2021 with the same farmer and treatments, yield following two applications of Apogee exceeded that of the non-treated control. Weather conditions in 2021 were more conducive to vine growth and need for Apogee than in 2022. No difference in yield due to seeding rate was observed (4, 5, and 6 seed per foot of row) in one trial. Although no statistical differences in yield were noted when comparing AgLogic and inoculant combinations, trends in the data indicated that each input alone was more effective than non-treated peanut and that the combination yielded the greatest. No difference in yield was noted when comparing peanut with a normal green cast to peanut expressing yellow foliage due to manganese deficiency.

Contrasting 2021 and 2022 Growing Seasons in Pitt County, North Carolina

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Six workshops conducted in September 2022 to assist Pitt County peanut farmers in determining optimal maturity provided grower perspectives on factors contributing to higher yields and the adoption of recommended cultural practices compared with 2021. Based on surveys representing 22 county peanut farmers, the average reported gain per acre was 372 pounds compared to the 2021 production year. The percentage of peanut farmers reporting improved crops versus 2021 was 63%. Among the factors that were perceived to contributing to higher yields was weather (63%), field selection (13%), rotation (13%), and digging at optimal maturity (13%). The average seeding rate reported among workshop participants increased by 11 pounds per acre for an average seeding rate of 142 pounds per acre. In 2022, approximately half of the growers attending pod maturity workshops changed the order of fields that needed to be dug first. This emphasizes the importance of checking maturity at least twice prior to digging peanut.

Fungicide Evaluation Using On-Farm Trials in North Florida

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Each year the predominant peanut foliar diseases that producers in Hamilton County Florida face are early leaf spot (*Passalora arachidicola*) and late leaf spot (*Nothopassalora personata*). To assist these producers with fungicide selection an annual fungicide on-farm trial was established in 2012. Recommended Peanut Disease Rx schedules provided by participating industry representatives were compared. This on-farm trial was a collaboration between a local peanut producer, a University of Florida Extension agent, and a University of Florida Plant Pathologist. Recently this trial has evolved into a program interested in combining products from different chemical companies rather than comparing them. The past 2 years the cooperating producer was encouraged to use their established fungicide application schedule as a check and three additional schedules were created by making small adjustments to the check. Plots consisted of 20 rows (2 acres) and were replicated 4 times. This resulted in a peanut on-farm trial consisting of 30 acres. The cooperating producer's equipment was utilized for planting, management, and harvest in which both yield and quality were recorded. Data collected from disease ratings and yields where used to generate fact sheets, publications, and presentations that were disseminated in production meetings throughout the state. Encouraging producers to modify their management programs to the pathogens present have economically benefited producers when incorporating novel fungicides into their existing programs.

Peanut Related Extension Efforts in the Central Panhandle of Florida

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In Florida's central Panhandle, peanuts are grown by more producers than any other agronomic crop. The operations on which peanuts are produced show great diversity in relation to their size, crop rotation, soil type, adoption of technology, and many other factors. The Extension Agents of Calhoun, Holmes, Jackson, and Washington Counties work both together and independently to provide support and education to the peanut producers in the area. In 2022, these four counties alone accounted for 52,630 acres of Florida's peanut production. The agents provide local support and education and extend the resources of UF/IFAS to peanut farmers in a variety of ways. The following data reflects aggregated efforts from 2022 across five areas. 1) Educational Events; The Panhandle Row Crop Short Course and the Peanut Field Day had a combined attendance of 119. 2) Individual Consultations, 301 field visits, phone consultations, emails, or text messages. 3) 76 samples were pod-blasted to determine maturity and optimize harvest timing. 4) In-county, on-farm variety trials were conducted in cooperation with the UF/IFAS Peanut Breeder in each of the four counties. 5) On-farm research projects are frequently carried out in one of more of the counties in cooperation with UF/IFAS State Specialists. Collectively these efforts address the educational needs of peanut producers in both proactively, via educational events and research efforts, and reactively via individual consultations and pod-blasting. These efforts ultimately increase the overall sustainability of peanut production in the central Panhandle.

On-Farm Peanut Variety Evaluation in Florida's Central Panhandle

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Variety selection is one of the most important decisions peanut growers face each season and a main yield and profitability determinant for the operation. Calhoun, Holmes, Jackson, and Washington counties have performed on-farm peanut variety demonstrations with the UF Peanut Breeding Program annually for the last several years and function as core data points for the region. The on-farm variety trial program was implemented for two seasons in these counties to demonstrate and compare variety performance for three newer UF varieties and grower-provided control varieties and to foster the Extension-grower relationship. Trial varieties varied by location, but all included TUFRunner™ '297', FloRun™ '331', FloRun™ 'T61', and a grower-provided control. Each location was planted after a two-year cotton rotation with a 36" twin row planter after May 10th (UF's recommended planting date) and was harvested in October/November based on maturity. The average yield across both years and all sites for each variety was 4,855 lbs/a for FloRun™ '331', 5,032 lbs/a for TUFRunner™ '297', and 5,040 lbs/a for FloRun™ 'T61'. Yields were statistically similar among UF varieties and between the UF varieties and grower-provided control varieties. While there was no statistical difference between variety yield, these trials show that growers have a suite of high-yield potential options to match their operations' specific goals (disease/nematode resistance, vine size, high-oleic acid content, etc.). These on-farm trials evaluating variety performance also assist participating growers in feeling connected to university research and support the surrounding agricultural community by providing data that can be utilized by other growers.

3:30 – 4:45	**Food Science, Harvest, Shelling, Storage, Handling** Meeting Room: Sapelo *Moderator: Lisa Dean,USDA-ARS*	Pres. #
3:30	**Runner Peanut Quality Parameters as a Function of Roast Times** J.R. WEISSBURG, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, NC 27695, **L.L. DEAN*** and K.W. HENDRIX, Food Science and Market Quality and Handling Research Units, USDA, ARS, SEA, Raleigh, NC 27695	22
3:45	**The Dietary Effects of Whole-In Shell High Oleic Peanuts on Layer Hen Performance and the Shell Egg Nutritional Chemistry and Quality** **O.T. TOOMER*,** T.C. VU, Food Science & Market Quality and Handling Research Unit, ARS, USDA, Raleigh, NC 27695; K.L. HARDING, R. WYSOCKY, R. MALHEIROS, K.E. ANDERSON, Prestage Department of Poultry Science, NC State University, Raleigh, NC 27695.	23
4:00	**Regulation of Gut Microbiome and Microbial Metabolome by Peanut Consumption in School Children Aged 6-9 years in Uganda.** Z. Li, K. S. XUE, L. TANG and **J-S. WANG*,** Department of Environmental Health Sciences, College of Public Health, University of Georgia, Athens, GA 30602, USA; J. SSEMPEBWA, G. W. MAINA and G. MUSINGUZI, Makerere University School of Public Health, Kampala, Uganda.	24
4:15	**Reducing the Number of Probes for a Farmers' Stock Grade for a Semi-Drying Trailer.** **C.L. BUTTS***, Full Moon Engineering LLC, Leesburg, GA, Q. READ, USDA, ARS, Raleigh, NC, J.S. MCINTYRE, and M.C. LAMB, USDA, ARS, Dawson, GA.	25
4:30	**Mechanical Testing as a Tool in Peanut Research.** **J.S. MCINTYRE***, H.J. COOK, National Peanut Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Dawson, GA 39842	26

Runner Peanut Quality Parameters as a Function of Roast Times

J.R. WEISSBURG, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, NC 27695, **L.L. DEAN*** and K.W. HENDRIX, Food Science and Market Quality and Handling Research Units, USDA, ARS, SEA, Raleigh, NC 27695

Dry roasting is one of the major unit operations for producing consumer products from peanuts. Currently, the industry uses the surface darkness to monitor roast completion, although this is not always indicative of optimal peanut flavor or quality, since peanut seeds within a lot can vary in composition even after being sorted for size due to maturity effects. An evaluation of the physical and chemical changes in runner peanuts at distinct times during the roasting process was performed. Runner peanuts from a single lot were divided into 105 aliquots and assigned to fifteen different roast times, ranging between 4 and 24 minutes, at 177 °C. The Hunter L, a, and b color of pasted seeds and of whole seed peanuts, moisture content, total lipid content, seed size, descriptive sensory analysis, free amino acid content, and carbohydrate content were determined on raw and roasted peanuts from each aliquot. Moisture content declined with increasing roast time, and ranged from 3.134% after 4 minutes, to 0.327% after 24 minutes of roasting. A trained descriptive sensory analysis panel reported an increase in roast peanutty until approximately 12 minutes, followed by a decline. When mathematically modeled, the peak roast peanutty score was at 12.15 minutes. The surface darkness of the seeds was equal to the internal seed darkness at 12.97 minutes, when the Hunter L-value of the pasted and whole seed roasted peanuts intersected. Seventeen free amino acids had significant declines with increased roast time. Glutamic acid and phenylalanine were consistently the most abundant FAA across roast times ($p < 0.05$). Correlations between L-value and several sensory characteristics were significant, indicating that the color measurement related to flavor properties of the peanuts. The function of specific flavor related compounds has been associated with the chemical components initially present in the raw peanuts which were altered by the heat treatments and associated with the color changes with roasting. The relationship between the moisture and these compounds was involved in optimizing roasted peanut flavor. This indicated that other parameters, especially moisture, may be better predictors of roasted peanut flavor than surface color alone.

The Dietary Effects of Whole-In Shell High Oleic Peanuts on Layer Hen Performance and the Shell Egg Nutritional Chemistry and Quality

O.T. TOOMER*, T.C. VU, Food Science & Market Quality and Handling Research Unit, ARS, USDA, Raleigh, NC 27695; K.L. HARDING, R. WYSOCKY, R. MALHEIROS, K.E. ANDERSON, Prestage Department of Poultry Science, NC State University, Raleigh, NC 27695.

Peanut and poultry production predominate within the US Southeast, with Georgia producing approximately 52% of the 2021 US supply of peanuts and NC farmers raising more than 500 million chickens and turkeys annually. Imported corn and soybean meal, the traditional primary feed stock rations for poultry, from South America and the US Midwest is costly. However, peanuts like soybeans are legumes and oilseeds rich in dietary protein and energy and could serve as a competitive poultry feed stock alternative, without hindering poultry production performance. Hence, in this study we aimed to determine the utilization of whole-in-shell high-oleic peanuts and/or unblanched high-oleic peanuts as an alternative feed ingredient to replace soybean meal in the diets of layer hens on production performance, egg quality and egg nutritional chemistry. To meet these objectives, 576 White Shaver hens were provided feed and water freely for 6 weeks and randomly assigned to 4 dietary treatments (4 replicates/treatment): Treatment 1 Conventional Control (C1) corn and soybean meal layer diet; Treatment 2-4% Whole in shell high oleic peanut (WPN) & corn layer diet; Treatment 3-8% Unblanched high oleic peanut (HOPN) & corn layer diet; Treatment 4-Control (C2)corn, soybean meal and soy protein layer diet. Hen body weights were recorded at week 0 and week 6, and feed weights were recorded bi-weekly. Shell eggs were collected daily and enumerated. Bi-weekly 120 eggs/treatment were collected for quality assessment and USDA grading, while 16 eggs/treatment were collected for nutritional chemical analysis. All data were analyzed for variance at $P < 0.05$ significance level. There were no significant differences in body weights or egg weights at week 6. Hens fed the C2 diet produced more total dozen eggs relative to C1 hens over the feeding trial ($P < 0.05$). Hens of treatment C1 and WPN had the best feed conversion ratio relative to the other treatment groups ($P < 0.0001$). Eggs produced from each treatment were USDA grade A (>96%), large shell eggs (>90%). There were no treatment effects on egg quality parameters measured. Eggs produced from the HOPN treatment had significantly reduced stearic and linoleic fatty acid levels relative to the other treatments ($P < 0.0001$), while eggs produced from hens fed the WPN diet had significantly greater beta-carotene content relative to the other treatment groups ($P < 0.05$). In summary, this study suggests that WPN and/or HOPN may be a suitable alternative layer feed ingredient and a dietary means to enrich the eggs produced while not adversely affecting hen production performance. This study supports the utilization of high-oleic peanuts and the market expansion of peanuts as a feed ingredient within the animal food production industry with potential positive economic impact to US peanut producer and the peanut industry.

Regulation of Gut Microbiome and Microbial Metabolome by Peanut Consumption in School Children Aged 6-9 years in Uganda.

Z. LI, K. S. XUE, L. TANG and **J-S. WANG*,** Department of Environmental Health Sciences, College of Public Health, University of Georgia, Athens, GA 30602, USA; J. SSEMPEBWA, G.W. MAINA and G. MUSINGUZI, Makerere University School of Public Health, Kampala, Uganda.

Peanuts are a good plant source of protein, fats, vitamins, and minerals, and has been used as supplement for intervention of malnutrition and various non-communicable diseases. It is well known that gut-microbiota profiles can be altered by host health, dietary patterns, and environmental inputs. Changes in the gut microbiome have been strongly associated to malnutrition, healthy growth, and immune response among children. To assess the regulatory effects of peanut consumption on the structural and functional changes of gut microbiome and effects on growth in school children, a 90-day supplementation study with roasted peanuts was conducted among primary school children aged 6-9 years in Uganda. Aside from biometrics measurements, fecal samples were collected during monthly follow-ups, plus an additional post-intervention follow-up, which were analyzed via next-generation sequencing and high-throughput analytical techniques. At 90-days, peanut consumption impacted some of the rare species in the supplemented group, with significantly lower abundance ($p = 0.039$ and 0.023 for rarity log-modulo skewness and rarity low abundance, respectively), while higher Fisher indexes and observed features ($p=0.021$, 0.021, respectively) among the supplemented group when compared to the control group. Specifically, some of the potentially harmful pathogenic bacteria were decreased in abundance, while some probiotic strains, particularly those supporting fermentation (including *Lactococcus lactis* and *Leuconostoc lactis*), were enriched. Ultra-high-performance-liquid chromatography (HPLC) analysis revealed that the concentration of acetic acid was significantly different in the supplemented group compared to the control group ($p = 0.0095$) after the 90-day peanut consumption and continues after 120 days ($p = 0.0063$). There is also a gradual increase in level over time, with a significant increase after 90 days compared to baseline ($p = 0.0071$), though the increase receded by day 120 ($p = 0.11$). No significances were found between gender and residential villages. To sum it up, the results showed that peanut supplementation via snacks can alter certain aspects of gut microbiota composition and diversity for a potentially more beneficial health outcome; however, the effect may not last after cessation of the supplementation, thus a continued supplementation regime may be recommended for improved health. For further study, detailed metabolomic analyses to evaluate additional biomarkers affected by the peanut supplementation. This study was supported by the USAID Feed the Future Peanut Innovation Laboratory under the Cooperative Agreement # 720-0AA-1-8C-A00003.

Reducing the Number of Probes for a Farmers' Stock Grade for a Semi-Drying Trailer.

C.L. BUTTS*, Full Moon Engineering LLC, Leesburg, GA, Q. READ, USDA, ARS, Raleigh, NC, J.S. MCINTYRE, and M.C. LAMB, USDA, ARS, Dawson, GA.

It is estimated that more than half the US peanut crop is harvested and delivered on flat-bottomed semi-drying trailers. Under the current instructions for official farmers' stock grade from a semi-drying trailer, the probe for the pneumatic sampler must be inserted into the trailer a minimum of 15 times to extract peanuts for the official sample. This extracts approximately 100 kg of peanut material from the trailer, that is then subsampled as it is emptied from the sample bin back onto the trailer. Sampling a semi-drying trailer takes a proficient sampler at least 30 minutes to properly probe the trailer and obtain the official farmers' stock grade sample. A study was conducted during the 2022 harvest to determine whether or not a representative sample could be obtained from a semi-drying trailer using fewer than 15 probes. To test the hypothesis, a trailer was selected at a buying point prior to the official grade being obtained. It was sampled according to current protocol using 15 probes to obtain the official sample. It was sampled a second time using 9 probes to obtain the sample and a third time using 6 probes to obtain a sample. The 15-, 9-, 6-probe sequence was repeated to obtain 2 replications for each number of probes. Each sample was evaluated using the official protocol for determining farmers' stock grades. Sampling and grading were carried out by Federal-State inspectors. Data that was recorded included, percent foreign material (FM), loose shelled kernels (LSK), sound mature kernels riding a prescribed screen (SMKRS), sound splits (SS), other kernels (OK), damaged splits, and total damaged kernels (TDK), and hulls. A paired T-test was used to compare the grade factors obtained using 15-, 9-, and 6-probe samples.

More than 30 peanut buying points across seven states participated in the study, grading 206 trailers in the study. Approximately 75 percent of the loads were graded in Georgia. Runner-type peanuts made up 97% of the loads graded. There were six virginia-type of 206 loads graded. No difference in the variability of repeated grades for the same trailer was found due to the number of probes. There was no bias found in the difference between the 15-probe and the 9-probe grades, nor between the 15-probe and 6-probe grades. Significant differences between the grade factors from the 15-probe and reduced-probe samples were observed. No differences were observed between the grade factors for the 9- and 6-probe samples. The largest difference was observed for the SMKRS and TSMK with the 15-probe values 0.7 to 1.0% less than the 9- and 6-probe samples. These differences resulted in a net farmers' stock loan value for the 15-probe value being approximately $3.40/ton lower than the 9- and 6-prove values.

Mechanical Testing as a Tool in Peanut Research.

J.S. MCINTYRE*, and H.J. COOK, National Peanut Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Dawson, GA 39842

Engineering instruments and methods used to precisely measure and test machine components and construction materials are being adapted to the study of peanuts. New insight into peanuts and peanut plants can be produced by relating the strength and elasticity of peanut plant materials such as roots, stems, leaves, pegs, and pods to plant genetic traits, growing conditions, treatment during harvest, and post-harvest processing and storage. A universal testing machine (UTM) used for engineering testing was used to test peanut materials. Mechanical testing of peanut materials poses many challenges because peanut materials have irregular shapes, wide variation in strength, and important measures related to peanut production require some materials be imbedded in soil. Challenges presented in testing peanut materials can be overcome by the addition of specialized holding devices to a UTM. The UTM has quick connect mounting points which allow for easy installation of specialized holding devices. The UTM currently in use at the National Peanut Research Laboratory can apply up to 5kN of force while measuring test positions to 0.01mm. The UTM has two load cells, a 5kN capacity cell and a 100N cell with resolutions of 0.04 N and 0.004 N, respectively. The UTM force and displacement is computer controlled allowing precise repetition of experimental loading. Force and position data is recorded by computer by sample. Initial experiments with the UTM measured the force and displacement required to crack open a peanut pod pressed between two metal plates. Pods were photographed before testing and the size and shape of the peanut pods were measured using image processing software. Pod thickness after cracking was recorded. Recorded measurements allowed stresses in the pods while cracking to be calculated. The pods were compressed at a rate of 5 mm/min while the force was recorded. The pod was considered to have cracked when the force surpassed 35 N and then decreased by 30% of the maximum force recorded. The test automatically ended after the pod cracked. Some pods exhibited force decreases less than 30% and the test continued to the secondary stop condition of 250 N force, the point when the peanut kernels began to be compressed. The measured forces and displacements to crack the pods could then be related to the growing and harvest conditions of the peanuts as well as other measures of peanut traits and properties. Pilot studies indicated the number of pods that needed to be tested from a test batch of peanuts to produce statistically valid results was 20 pods.

7:15 – 12:00	**Joe Sugg MS Competition I** Meeting Room: Pulaski *Moderator: Bob Kemerait, Univ. of Georgia*	Pres. #
7:15	**Opening Remarks – Bob Kemerait**	
7:20	**Reflecting Incentives and Disincentives for Youth Participation in Groundnut Value Chains using Photovoice in Tororo and Nwoya districts, Uganda** **D. KEMIGISHA***, S. LWASA and J. MUGISHA, Department of Agribusiness and Natural Resource Economics, Makerere University, Uganda; A. KAAYA and R.M. MIREMBE, Department of Food Technology and Nutrition, Makerere University, Uganda; D.K. OKELLO, National Agricultural Research Organization (NARO), NaSARRI, Uganda; D. MUSOKE, Department of Disease Control and Environmental Health, Makerere University, Uganda; T. GILL, D.R. ADER, A. CARTER and C.A. STEPHENS, Department of Agricultural Leadership, Education and Communications, the University of Tennessee, Knoxville, USA	27
7:35	**BREAK for General Session**	
10:00	**Alternatives to Chlorpyrifos for Control of Southern Corn Rootworm in Virginia Type Peanuts** **E. HOAR*,** Virginia Tech Tidewater Agricultural Research and Extension Center**,** A. RASHED, Virginia Tech Southern Piedmont Agricultural Research and Extension Center, M. BALOTA, Virginia Tech Tidewater Agricultural Research and Extension Center	29
10:15	**Irrigator Pro as an Adaptive Irrigation Decision Support System for Peanuts in the Southeast** **I.GALLIOS*,** G. VELLIDIS, Crop and Soil Department University of Georgia, Tifton, GA 31793, and C. BUTTS, National Peanut Research Laboratory, USDA, ARS, Dawson, GA 39842	30
10:30	**Developing a Mathematical Model for Detecting Aflatoxin Hotspots in Peanut Fields** **S. KUKAL*,** T. BOURLAI, R. KEMERAIT, A. PEDUZZI, C. PILON, G. VELLIDIS, University of Georgia, Tifton, GA 31793	31
10:45	**Evaluating the Impact of Irrigation Strategies on Peanut Yield Using Simulation Modelling** **M.D. DE VAL***, B.V. ORTIZ, F. MORLIN, R. PRASAD, A. NGUYEN, A. SHARMA, A. GAMBLE, Department of Crop, Soil, and Environmental Sciences, Auburn University College of Agriculture, Auburn, AL, USA, 36849	32
11:00	**Peanut Cultivar Response to Fluridone in the Southwest** **M. MILLS***, Texas Tech University, Lubbock, TX 79409; P. A. DOTRAY, Texas Tech University, Texas A&M AgriLife Research, and Texas A&M AgriLife Extension Service, Lubbock, TX 79409; K. L. LEWIS Texas A&M AgriLife Research, Lubbock, TX 79409; W. J. GRICHAR, Texas A&M AgriLife Research, Corpus Christi, TX 78406; T. A. BAUGHMAN, Oklahoma State University, Ardmore, OK 73401.	33
11:15	**Pursuit Tank-Mixes for Weed Control in Oklahoma Peanut** **K. BENETON***, Z. TREADWAY, J. DUDAK, and T. BAUGHMAN, Department of Plant & Soil Sciences, Oklahoma State University, Ardmore, OK 73401	35
11:30	**Cultivar and Soil Amendment Effects on Peanut Grown with Organic Practices in Florida** **S. VICTORES***, G. MACDONALD, J. WANG, Department of Agronomy, University of Florida, Gainesville FL 32611; G. MALTAIS-LANDRY, Department of Soil and Water Sciences, University of Florida, Gainesville, FL 32611; X. ZHAO, Department of Horticultural Sciences, University of Florida, Gainesville, FL 32611	36
11:45	**BREAK for Lunch**	

Reflecting Incentives and Disincentives for Youth Participation in Groundnut Value Chains using Photovoice in Tororo and Nwoya districts, Uganda

D. KEMIGISHA*, S. LWASA and J. MUGISHA, Department of Agribusiness and Natural Resource Economics, Makerere University, Uganda; A. KAAYA and R.M. MIREMBE, Department of Food Technology and Nutrition, Makerere University, Uganda; D.K. OKELLO, National Agricultural Research Organization (NARO), NaSARRI, Uganda; D. MUSOKE, Department of Disease Control and Environmental Health, Makerere University, Uganda; T. GILL, D.R. ADER, A. CARTER and C.A. STEPHENS, Department of Agricultural Leadership, Education and Communications, the University of Tennessee, Knoxville, USA

The unemployment rate for Ugandan youth is 13.3% despite several government efforts to attract them to agriculture. Groundnut is staple in Uganda, covering 4% of all arable land and could potentially employ many youths. However, there is little empirical knowledge on what drives youth participation in groundnut value chains. This paper set out to contribute to increasing youth participation in groundnut value chains by establishing the incentives and disincentives for youth participation in the groundnut value chain using photovoice, a community-based participatory research approach. Photovoice was used to collect qualitative data using photographs, captions and follow-up discussions. Fifteen youth, aged 20-29 years, were purposively selected per district (Nwoya and Tororo) and trained to take photos that captured the different groundnut value chain activities from which themes emerged using thematic content analysis in the Atlas ti software. These themes summarized the incentives of youth participation as: the benefits of farmer group membership, the influence of parents' occupation, a short payback period, collaborative farming with spouses, the desire to afford formal education, and good transport infrastructure. The study findings also indicated long and tedious labor hours, time poverty among women, poor yields, post-harvest losses, inadequate storage facilities, and unavailability of processing equipment in the communities. In conclusion, easing youth access to farmer groups, storage and processing facilities and training in agronomic practices are likely to drive youth to participate more in groundnut value chains.

Alternatives to Chlorpyrifos for Control of Southern Corn Rootworm in Virginia Type Peanuts

E. HOAR*, Virginia Tech Tidewater Agricultural Research and Extension Center**,** A. RASHED, Virginia Tech Southern Piedmont Agricultural Research and Extension Center, M. BALOTA, Virginia Tech Tidewater Agricultural Research and Extension Center

The Southern Corn Rootworm (SCRW) *Diabrotica Undecimpunctata Howardi Barber* is one the biggest pests in Virginia and North Carolina Peanuts. This pest feeds on the pod as it matures under the soil. The adults are not considered a pest, but the larvae are. When left untreated, fields can suffer major losses. The EPA has banned the use of Chlorpyrifos in crops as of 2022. As a result of this, farmers who struggle with Southern Corn Rootworm problems are looking for alternative ways to combat this pest. By looking at all varieties of Virginia Type Peanuts grown in the Southeast, we are looking for any preference of rootworms feeding. Different harvest dates are also being evaluated to see if maturity timings have a significant effect on the reduction of rootworm damage. To assess damage, we are picking 50 peanut pods that have been dug, and examining the shell for signs of rootworm feeding. The types of damage we are looking for is scarification and penetration into the pod itself. This is recorded along with the maturity of the same plot. This data will be analyzed and producers will see if there is any variety favored by Southern Corn Rootworm. This data will help farmers, who have issues with Southern Corn Rootworm, choose varieties that are fed on less. Farming varieties that are less palatable to larval feeding will keep yields up without the use of chemical control.

Irrigator Pro as an Adaptive Irrigation Decision Support System for Peanuts in the Southeast

I.GALLIOS*, G. VELLIDIS, Crop and Soil Department University of Georgia, Tifton, GA 31793, and C. BUTTS, National Peanut Research Laboratory, USDA, ARS, Dawson, GA 39842

Irrigator Pro is a public-domain irrigation scheduling model developed by the USDA-ARS National Peanut Research Laboratory. The latest version of the model uses either matric potential sensors to estimate the plant's available soil water or manual data input. In this project, a new algorithm is developed, which gives growers and consultants much more flexibility in feeding data to the model. The new version also runs with Volumetric Water Content (VWC) sensors, giving the opportunity for the grower to see the Available Water Content in real-time. The model will run as an irrigation decision support system on a daily interval and ask the grower to apply irrigation when necessary. For the evaluation of the model, five different irrigation scheduling treatments were applied on 35 plots in two locations: Rainfed, Irrigator Pro with matric potential sensors, Irrigator Pro with temperature readings, Irrigator Pro with VWC, and a grower standard method. The Sentek Drill and Drop VWC soil moisture probes with the AgSense Aquatrac Pro telemetry were used in the field testing, which provides readings for soil moisture and temperature at 4",8",12",16",20",24" at 30 minutes interval. The collected crop Evapotranspiration (ETc) data were later used for three different purposes. Firstly, the observed values were used in mapping the fields and depicting how the soil temporospatial variability affects the ETc throughout the growing season. In addition to that, the VWC readings provide information regarding the root activity at each depth. A second application of the collected on-field ETc data was the development of a Growing Degree Days-based crop coefficient curve. The next step was the conversion of the Irrigator Pro decision support system into an ET-based soil water balance model, which uses exclusively meteorological data and is a model-independent of soil moisture sensors. During the first two seasons, all irrigation treatments have no significant differences in yield while using less water to cover the plants' needs. That led to increased Irrigation Water Use Efficiency for the proposed treatments. Lastly, the ET-based model will be utilized by SmartIrrigation Apps for peanut fields and will be available in an online version and a smartphone application. This presentation will include data from the 2021-2022 seasons and the beta versions of the Applications to support the findings of this research.

Developing a Mathematical Model for Detecting Aflatoxin Hotspots in Peanut Fields

S. KUKAL*, T. BOURLAI, R. KEMERAIT, A. PEDUZZI, C. PILON, and G. VELLIDIS, University of Georgia, Tifton, GA 31793

The U.S. peanut industry is struggling with the problem of aflatoxin, a carcinogenic toxin produced by the soil borne fungi Aspergillus flavus and Aspergillus paraciticus (hereafter both referred to as A. flavus) under hot and dry conditions growing conditions. Aflatoxin contamination of peanut kernels has caused huge losses to the industry in terms of revenue and market share. The goal of this project is to develop a mathematical model to predict the likelihood of the occurrence of aflatoxin hotspots within peanut fields. Those areas can then be segregated during harvest. To train the model, we collected spatially explicit data sets of ECa, soil texture, soil moisture, elevation, spectral response of the plant canopy, plant physiological measurements including leaf temperature, stomatal conductance, and chlorophyll a fluorescence, precipitation, ambient and soil temperature, humidity, and solar radiation in rainfed peanut fields with high spatial variability of soils and terrain. Soil moisture was measured continuously from planting to harvest with a soil moisture sensor network. We collected hyperspectral imagery and lidar data derived from UAV platforms to identify sections of the electromagnetic spectrum that detected vegetation changes caused by A. flavus and to generate micro-relief elevation models. Beginning at 90 days after planting and on a biweekly schedule, we collected physiological measurements and plant samples on a dense sampling grid. Peanut kernels from the plant samples were analyzed for aflatoxin concentrations. A random forest machine learning model was developed which was designed to determine indicators of Aflatoxin presence from the pool of remotely and proximally collected field parameters. The model outputs a preliminary complex equation that roughly estimates Aflatoxin concentrations in the field. The deliverable of the project is that the model predicts the probability of the occurrence of aflatoxin hotspots within a peanut field with an accuracy of >75% after Year 1 and an accuracy of >95% after Year 3.

Evaluating the Impact of Irrigation Strategies on Peanut Yield Using Simulation Modelling

M.D. DE VAL*, B.V. ORTIZ, F. MORLIN, R. PRASAD, A. NGUYEN, A. SHARMA, and A. GAMBLE, Department of Crop, Soil, and Environmental Sciences, Auburn University College of Agriculture, Auburn, AL, USA, 36849

Evaluating irrigation management strategies is crucial in understanding the impact of irrigation on peanut yield and how to increase irrigation water use efficiency. This study aims to evaluate the impact of various soil water deficit levels on peanut yield using seasonal analyses with 30 years of weather data. To achieve this, the Peanut growth model in the Decision Support System for Agrotechnology Transfer (DSSAT) platform was calibrated and validated using on-farm experimental data collected in 2021 and 2022 from fields in Lee County, AL. Data used for model calibration were leaf area index, leaf and stem biomass, and peanut yield. Data of volumetric water content measured at 20, 40, and 60 centimeters soil depths was also used for calibration. The irrigation treatments evaluated consisted of four soil water deficit levels: 30, 50, 70, and 90% water depletion over the top 30 cm of soil depth. These deficit levels were imposed on the crop at the start of the flowering growth state and run to harvest. The impact of these soil water deficit levels on peanut yield was studied specifically on seven years when August rainfall was below peanut average water demand. The simulation results showed that yield increased as soil water depletion decreased in all years. A similar trend was observed for irrigation frequency. The 30% depletion treatment, which applied frequent irrigation events, resulted in greater peanut yield than the 50, 70, and 90% depletion, respectively. In some years, the 90% depletion treatment did not apply any irrigation, and therefore, it resulted in the lowest yield than the other treatments. In four years, 2022, 2014, 2011, and 2010 the yield between 30 and 50% depletion treatment did not show a significant difference, which means less irrigation without compromising the yield. These preliminary results suggest that implementing the optimal irrigation strategies, like the right amount, frequency, and timing of irrigation, significantly impacts peanut yield, particularly during the peak of peanut water use.

Peanut Cultivar Response to Fluridone in the Southwest

M. MILLS*, Texas Tech University, Lubbock, TX 79409; P. A. DOTRAY, Texas Tech University, Texas A&M AgriLife Research, and Texas A&M AgriLife Extension Service, Lubbock, TX 79409; K. L. LEWIS Texas A&M AgriLife Research, Lubbock, TX 79409; W. J. GRICHAR, Texas A&M AgriLife Research, Corpus Christi, TX 78406; and T. A. BAUGHMAN, Oklahoma State University, Ardmore, OK 73401.

Peanut tolerance to herbicides is based on differential uptake, translocation, metabolism, site of action sensitivity, herbicide placement, and a combination of these and other factors. Differential cultivar tolerance is not uncommon with some herbicides including diclosulam and chlorimuron-methyl. Fluridone (Brake®) has a supplemental label for use preemergence (PRE) in peanut (*Arachis hypogaea* L.) and is active on a range of annual grass and small-seeded broadleaf weeds including Palmer amaranth (*Amaranthus palmeri* S. Wats.). The supplemental label for peanut states that 0.10 lb ai/A may be applied in sand and loamy sand soils and 0.15 lb ai/A may be applied in all other soil types. Fluridone may not be applied to Spanish or Valencia market types. Fluridone may be applied preplant or at plant and cannot be applied postemergence as injury may occur. Several runner market-type cultivars are planted in Texas and Oklahoma and differential cultivar sensitivity to fluridone is unknown. Trials were established in west Texas, south Texas, and in Oklahoma using market-type cultivars appropriate for the area. Fluridone was applied PRE at the 1X rate (0.10 or 0.15 lb ai/A) depending on soil type as well as the 2X rate. Peanut stand, canopy height and width, and visual injury was recorded, and yield and grade determined at the end of the growing season. Plots will be kept weed-free for the duration of this experiment.

Pursuit Tank-Mixes for Weed Control in Oklahoma Peanut

K. BENETON*, Z. TREADWAY, J. DUDAK, and T. BAUGHMAN, Department of Plant & Soil Sciences, Oklahoma State University, Ardmore, OK 73401

Weed management is extremely important in challenging for Oklahoma peanut producers. A trail was established in 2022 at the Oklahoma State University Caddo Research Station near Fort Cobb, OK in 36-in rows with the Spanish peanut variety 'Ole' to evaluate various combinations of pendimethalin (Prowl H2O at 32 fl oz/A), imazethapyr (Pursuit at 4 fl oz/A) and flumioxazin (Valor EZ at 3 fl oz/A) for preemergence weed management in peanut. All PRE-treatments were followed with a POST application of 2,4-D and a POST application of clethodim. Peanut injury was less than 10% with all treatments applied. Initial control of Palmer amaranth (*Amaranthus palmeri*), Texas panicum (*Panicum texanum Buckl.*), and ivyleaf morningglory (*Ipomoea hederacea*) was at least 90% with all treatments 21-27 DAP. These same species were controlled 100%, 58 DAP with imazethapyr + flumioxazin together or in combination with pendimethalin. Peanut yield was over 5,100 lbs/A with the three-way combination of pendimethalin + imazethapyr + flumioxazin compared to 3,717 lbs/A when no PRE was applied. This trial was weed-free, irrigated and maintained throughout the growing season. Also, was visually evaluated for peanut response and weed control. Peanut crops were dug, field dried and harvested. A similar trial is being conducted in 2023.

Cultivar and Soil Amendment Effects on Peanut Grown with Organic Practices in Florida

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Conventional agriculture, which has significant chemical inputs, has negative environmental impacts that are becoming more apparent. Organic crop production has emerged as a possible solution to these issues. Organic agriculture avoids the use of synthetic pesticides and fertilizers and instead opts for composts, manures, crop rotations, intercropping, biological nitrogen fixation, and more to sustain the cropping system. Currently, peanut production in the southeastern United States is a majority conventional, due to concerns in organic production over loss in yields from nutrient source, weeds, pests, and disease. This research studied the feasibility of the production of peanuts with organic practices in Florida by testing five commercially available cultivars with three soil amendment treatments to see not only the overall success of the crop, but also which amendment and cultivar can provide the best results for producers. The three amendments are a control, Everlizer poultry manure fertilizer, and a mushroom compost. The cultivars included Georgia-06G, TUFRunner 297, FloRun 331, FloRun T61, and Tif NV Hi-OL. The success was measured based on multiple facets of the agricultural system, including pod weight, soil nutrition, plant nutrition, microbial diversity, and nematodes, gaining a well-rounded view of production of peanuts with organic practices and their benefits or drawbacks in Florida. Significant differences were found in the cultivar but not the amendment treatments. Pod weight to represent yield was highest in Georgia-06G, a commonly used variety for growers for the yield ability. Nitrogen, calcium, and phosphorous percentages in plant tissue all contained significant differences among cultivars, with TUFRunner297 consistently significantly lower than the other cultivars. Further research and replicated experiments are needed to solidify results and contribute to knowledge of organic peanut production in Florida.

1:00 – 5:00	**Joe Sugg MS Competition II** Meeting Room: Pulaski *Moderator: Bob Kemerait, Univ. of Georgia*	Pres. #
1:15	**Computer vision method for size characterization of pods in Peanut (*A. hypogaea*)** **N. GARRITY***, J. DUNNE, R. ANDRES, R. AUSTIN, D. JORDAN, Crop Science Department, North Carolina State University, Raleigh, NC 27695 and C. YENCHO, Horticulture Department, North Carolina State University, Raleigh, NC 27695	38
1:30	**Both Genotype and Harvest Time Affect Peanut Loose Shell Kernels and Mechanical Damage During Harvest.** **L.C. ICHAZO-RIBERA***, B.L. TILLMAN, M. GOYZUETA, M.W. GOMILLION, L. TORRES-DELGADO, North Florida REC, Agronomy Department, University of Florida. Marianna, FL 32446; and A. ARÉVALO-AYALA, Department of Plant Breeding, Universität Hohenheim. Stuttgart 70599, Germany.	39
1:45	**Characterization of *Arachis cardenasii* Introgression in Cultivated Peanut, *Arachis hypogaea*** **S. BOTTON***, Department of Horticulture and Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton GA, USA; Y. CHU, Department of Horticulture, University of Georgia, Tifton GA, USA; C. C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research, Tifton Ga, USA; P. OZIAS-AKINS, Department of Horticulture and Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton GA, USA.	40
2:00	**QTL in Action: Partitioning the effects of a QTL for Tomato Spotted Wilt Virus Resistance in *Arachis hypogaea*** **S. WEBB***, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Tifton, GA; Y. CHU, Department of Horticulture, University of Georgia, Tifton, GA; C. HOLBROOK, USDA-ARS, Tifton, GA; J. CLEVENGER, W. KORANI, HudsonAlpha Institute for Biotechnology, Huntsville, AL; B. GUO, USDA-ARS, Tifton, GA; A. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA; and P. OZIAS-AKINS, Department of Horticulture, University of Georgia, Tifton, GA	41
2:15	**Speed Breeding of Peanut for Faster Improvement in Cultivar Development** **T. SEELY***, J. DUNNE, D. JORDAN Crop and Soil Science Department, North Carolina State University, Raleigh, NC 27607; and R. FERNANDEZ Horticulture Department, North Carolina State University, Raleigh, NC 27606	42
2:30	**Expression Analysis of *Aspergillus flavus* in Response to Oxidative Stress** **S.E.A. JOSON***, Department of Plant Pathology, University of Georgia, Griffin, GA; J.P. CLEVENGER, HudsonAlpha Institute of Biotechnology, Huntsville, AL; J.N. VAUGHN, USDA-ARS Genomics and Bioinformatics Research Unit, Athens, GA; B. GUO, USDA-ARS Crop Genetics and Breeding Research Unit, Tifton, GA; and J.C. FOUNTAIN, Department of Plant Pathology, University of Georgia, Griffin, GA.	43
2:45	**Early and Late Leaf Spot Fungicide Treatments for Organic Peanut Production** **A.G. ATKINSON*,** A.K. CULBREATH, R.C. KEMERAIT, Department of Plant Pathology, Univ. of Georgia, Tifton, GA 31793-5766, and E.G. CANTONWINE, Department of Biology, Valdosta State Univ. Valdosta, GA.	44
3:00	**BREAK**	
3:15	**An Explanation for Reduced Defoliation Using Sulfur Synthetic Fungicide Mixtures Caused by Late Leaf Spot (LLS)** **K. TAYLOR***, E.G. CANTONWINE, Valdosta State University, Valdosta, GA 31698; and A. CULBREATH, University of Georgia Tifton Campus, 31793	45
3:30	**Peanut Leaf Spot Disease Progress based on Lesion Development** **F.A. SILVA*,** A.K. CULBREATH, R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA; S. LEAL-BERTIOLI, Department of Plant Pathology, University of Georgia, Athens, GA, E.G. CANTONWINE,	46

	Department of Biology, Valdosta State University, Valdosta, GA; and C.C. HOLBROOK, United States Department of Agriculture-Agricultural Research Service, Tifton, GA	
3:45	**Management of Aflatoxin Contamination in Peanut through an Integrated Approach** **L. PANDEY***, T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA, 31794; M.T. BREWER, Department of Plant Pathology, University of Georgia, Athens, GA, 30602; C. PILON, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31794; and R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA, 31793	47
4:00	**Field Evaluation of Selected Commercial Peanut Cultivars for Tolerance to Leaf Spot as Influenced by Varying Fungicide Inputs** **L. KAUR***, H.L. CAMPBELL, A. STRAYER-SCHERER, Auburn University, Department of Entomology and Plant Pathology, Auburn, AL; C. PARKER, Wiregrass Research and Extension Center, Auburn University, Headland, AL; and H.B. MILLER, Brewton Agricultural Research Unit, Brewton, AL.	48
4:15	***In-Vitro* Assessment of Commonly Used Fungicides for Controlling Southern Blight in Mississippi Peanuts.** **S. TRIPATHI*,** T.W. ALLEN, T.H. WILKERSON, A. CONNOR, Delta Research and Extension Center, Mississippi State University, Stoneville, MS 38776; A.M. JIMENEZ MADRID, Department of Plant Pathology, University of Georgia Tifton, GA 31793; and A. HENN, Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Starkville, MS 39762.	49
4:30	**Methods of Managing Tomato Spotted Wilt Virus in Field-Grown Peanuts.** **C.A. COOKE***, S.H. GRAHAM, Auburn University, Dept. of Entomology & Plant Pathology, Auburn, AL 36849; and K. B. BALKCOM Auburn University, Dept. of Crop, Soil & Environmental Sciences, Auburn, AL 36849	50
4:45	**Comparing *Nothopassalora personata*, Colonization, and Haustorial Characteristics Between Susceptible and Resistant Peanut Genotypes.** **D.A. CASTELLANO***, E.G. CANTONWINE, J.A. NIENOW, Valdosta State University, Valdosta, GA 31698; and C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793	51

Computer Vision Method for Size Characterization of Pods in Peanut (*A. hypogaea*)

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Size characterization of peanut pods is a crucial aspect of determining the market value of the crop. Currently, this task is performed using mechanical methods such as rollers and shakers, which are manual, time-consuming, and prone to errors. To address these issues, we propose a computer vision-based solution that can detect and quantify the size characteristics of peanut pods. In this study, we developed a computer vision algorithm trained on a dataset of peanut pod images that encompasses a wide range of genotypes and backgrounds. The images were labeled, and a Mask-RCNN model was trained to detect pods in the images. The output from this model was then used to extract features, such as size, of each pod in the image. We conducted a small trial with 25 genotypes replicated three times to verify the correlation between this new method and the previous mechanical method. Our results show that this computer vision-based method is much faster and provides more consistent size data compared to the previously used mechanical methods. Overall, our study demonstrates the potential of computer vision-based methods to improve the accuracy and efficiency of size characterization of peanut pods, which can have significant implications for the peanut industry and research.

Both Genotype and Harvest Time Affect Peanut Loose Shell Kernels and Mechanical Damage During Harvest.

L.C. ICHAZO-RIBERA*, B.L. TILLMAN, M. GOYZUETA, M.W. GOMILLION, L. TORRES-DELGADO, North Florida REC, Agronomy Department, University of Florida. Marianna, FL 32446; and A. ARÉVALO-AYALA, Department of Plant Breeding, Universität Hohenheim. Stuttgart 70599, Germany.

Peanut (*Arachis hypogaea L.)* is susceptible to *Aspergillus spp.* infection on pods and seeds. *Aspergillus spp.* are fungi that under certain environmental conditions produce aflatoxins, one of the most dangerous mycotoxins threatening human health. Irrigation and/or rainfall have been shown to mitigate aflatoxin contamination, but irrigation is not always available, and rainfall is sporadic. Achieving crop resistance to *Aspergillus spp.* would be a resource to minimize aflatoxin contamination in peanuts and there has been attempts to breed peanut for resistance. Breeding for resistance has focused on some characteristic of the crop 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* infection and are therefore a risk factor for aflatoxin. This fact let to the hypothesis, that the hull thickness could reduce the generation of LSK and mechanically damaged (MD) pods at harvest. Therefore, decreasing the risk to *Aspergillus spp.* infection. Nine genotypes were planted on May 2022 and divided into three categories based on their hull thickness: thin (20-21% shell), medium (22-23% shell), and thick (26-27% shell). LSK, MD pods, foreign material and yield were measured after harvest, data was analyzed with GLIMMIX Procedure, furthermore, means differences were identified with LSD – Fisher's test using the SAS statistical software. Genotypes varied for all three response variables ($P<0.05$), LSK, MD, and Yield. Harvest date varied ($P<0.05$) for LSK and MD but not Yield. The interaction between genotype and harvest date was statistically significant for LSK, but not MD or Yield. Overall, the Thick-shell category showed promising results for decreasing the LSK and MD percentage in the harvesting process, but their Yield results were the lowest among the genotypes. For LSK percentage genotype Thick 3 had the best result with 4.5% LSK compared to Thin 3 with 24.1% LSK on the first harvest. On the second harvest results were opposite for these two genotypes where Thick 3 had 15.7% compared to Thin 3 that had 20.7%. For MD, Thick 3 had the best result with 11.3 % compared to Medium 2 with 32 % of the total weight for the combined harvest dates. On the contrary, one of the Thin-shell varieties had the best Yield result with 4592 pounds per acre with a lower LSK of 9 %. Understanding the characteristics that reduce shell breakage during harvest, and therefore reduce LSK is the subject of further studies that will include measuring pod size and shell strength.

Characterization of *Arachis cardenasii* Introgression in Cultivated Peanut, *Arachis hypogaea*

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Peanut root knot nematodes (PRKN), *Meloidogyne arenaria,* are microscopic roundworms that infect peanut, *Arachis hypogaea.* To combat this pest, peanut growers can use both nematicides and crop rotation. A more desirable method would be to grow peanut cultivars that have resistance to PRKN. No strong resistance was discovered in cultivated peanut; however, strong resistance does exist in a wild relative, *Arachis cardenasii.* An interspecific cross made using this wild source as a donor for PRKN resistance led to the development of 'COAN' which has strong PRKN resistance but lacks tomato spotted wilt virus (TSWV) resistance, which is another significant problem in peanut. Cultivar improvement for the southeastern US resulted in the development of 'Tifguard' which is resistant to both PRKN and TSWV. 92% of chromosome A09 in Tifguard is derived from *A. cardenasii.* Prior studies have indicated that strong resistance is conferred by the top portion of this introgression and moderate resistance by the lower portion. The combination of introgressed regions potentially could impact durability of resistance. Further characterization of these introgressed regions has resulted in identification of additional recombinants that are being tested for PRKN resistance. The combination of genotypic and phenotypic data will guide the selection of markers for breeding to incorporate only essential portions of wild segments. Furthermore, the resistance genes for PRKN will potentially be discovered.

QTL in Action: Partitioning the effects of a QTL for Tomato Spotted Wilt Virus Resistance in *Arachis hypogaea*

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Tomato spotted wilt virus (TSWV) can be highly detrimental to susceptible *Arachis hypogaea* (cultivated peanut) cultivars in the field. Breeding for resistant varieties is a favorable way to reduce yield loss from this virus. PI203396 has been a source of resistance for many years. More recently, PI576638 (SSD6) was identified as another source of TSWV resistance. NC94022, a highly resistant offspring of SSD6, was used to produce a mapping population for identifying a quantitative trait locus (QTL) for TSWV resistance on chromosome A01. Two regions of interest within this QTL have been identified for further analysis. This study aimed to evaluate the influence of the A01 QTL regions on field resistance of eight F_2 populations derived from a recombinant inbred line containing the QTL as the male and eight unique female parents. F_2 seed was genotyped for presence of the QTL regions and selected individuals were observed for TSWV incidence in 2022. Individuals showing TSWV resistance and desirable agronomic traits were harvested as F_3 seed to be either advanced to the F_4 generation in the winter nursery or maintained as F_3 for further evaluation in 2023. A subset of advanced lines was further genotyped for other traits of interest potentially obtained from the maternal genotypes, including leaf spot and nematode resistances and high oleic acid. Current results show that individuals containing both regions of the QTL present significantly lower TSWV scores than those with only one. And individuals in these populations are likely to contain at least one other trait of interest for breeding. Ongoing evaluations will further confirm the QTL's influence on TSWV resistance and select germplasm useful for producing an improved peanut cultivar.

Speed Breeding of Peanut for Faster Improvement in Cultivar Development

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Arachis hypogaea 'Bailey II' was exposed to differing light intervals in order to examine whether photo-intensity has an effect on peanut pod set, seed count, and post-harvest germination percentage. Data is being utilized for application in a peanut speed breeding program, which aims to decrease time between generations, allowing for faster cultivar development and release. In a controlled environment (CE) trial using a randomized complete blocked design with four replications and two subplots, peanuts were evaluated at 0, 200, 400, and 600 umol//m^2/s of additional light provided by two LG LED panels over each treatment. Four harvest intervals (70, 80, 90, and 100 days after planting), were employed in each treatment to see whether photo-intensity influences maturity. Results of the CE study were used in the development of an applied application in working conditions. As supplemental light intensity increased, above ground biomass and flower, peg, pod and seed count increased; however, conditions governing seed weight did not follow this linear trend. Average seed weight was highest in the 400, 200, 0, and 0 umol treatments in the 70, 80, 90, and 100 day harvests, respectively. In this experiment, the lowest threshold for radical emergence was approximately 0.03g while leaf emergence was detected in seeds as little as 0.039g in weight. In early harvests, intermediate intensities (200 and 400) saw the greatest percentage of seeds root and form visible leaves. At 70 days, proximately 50% of seeds from the 200 and 400 umol treatments developed leaves after 14 days, while less than 40% developed leaves from the lowest ad highest intensity (0 and 400 umol). By the 100 day treatment, low-intensity treatments (0 and 200 umol) had, on average, a higher germination rate of approximately 70% compared to around 60% for 400 and 600 umol, however, there was significantly more seeds in the higher light treatments. This research will enable better usage of time and space to develop germplasm for breeding and improvement in the NCSU Peanut Breeding Program.

Expression Analysis of *Aspergillus flavus* in Response to Oxidative Stress

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Previous work has highlighted that aflatoxin production can be enhanced by drought-related oxidative stress pointing to the possible role of aflatoxin production in stress alleviation for *Aspergillus flavus* and other aflatoxin-producing fungi, and the possible role for oxidative stress in signaling during peanut-*A. flavus* interactions. By better understanding the relationship of *A. flavus* oxidative stress responses and aflatoxin regulatory pathways, novel regulators of aflatoxin production during interactions with drought stressed host plants may be identified. Therefore, here we investigated the transcriptomic responses of *A. flavus* AF13 to oxidative stress during active aflatoxin production by adding 30mM of H_2O_2 at 48h in culture and examining gene expression over time (0h, 3h, 6h, and 9h after treatment) followed by weighted gene co-expression network analysis. Overall, compared to the 0h control, H_2O_2 treated samples differentially expressed (LogFC>1.2; FDR<0.05) 1199, 582, and 267 genes at 3h, 6h, and 9h, respectively, while comparing treated and control samples differentially expressed 605, 120, and 0 genes at the same timepoints. Aside from a single alternative splicing factor in the 3h control, no other genes were differentially expressed when comparing the 0h control with 3h, 6h, and 9h controls. Besides the expected oxidative stress responses such as catalases and transporters when compared to the 0h control, top differential expression included genes that can potentially be associated with virulence, such as exo-beta-1,3-glucanase. Several genes within the aflatoxin biosynthetic cluster were also upregulated compared to the 0h control. In addition, a novel bZIP transcription factor recently discovered in AF13, *atfC,* did not show differential expression in response to H_2O_2 treatment, but was consistently expressed during the experiment. Finally, weighted gene co-expression analysis (WGCNA) revealed strong correlations between three modules (black, blue, and salmon) with the oxidative stress treatment. Gene ontology showed that these modules were highly enriched for metabolic processes, localization and transport, and enzymatic and catalytic activity. Interestingly, most of the aflatoxin biosynthetic genes grouped into a single distinct module with the exception of *aflF*, *aflU*, and *aflT* along with one of the major aflatoxin regulatory genes, *aflR* which were grouped into different modules. Network visualization analyses are underway to better understand the relationships between these genes, and to shed light on the interactions present in the data. These continued analyses will shed light on the underlying mechanisms linking oxidative stress responses and aflatoxin production regulation in *A. flavus.*

Early and Late Leaf Spot Fungicide Treatments for Organic Peanut Production

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Early leaf spot (*Passalora arachidicola*) and late leaf spot (*Nothopassalora personata*) are both important pathogens of peanut (*Arachis hypogaea*). In the southeastern U.S., control of both diseases is heavily dependent on fungicides. In organic peanut production, there are few effective fungicides available, and little information available on the and efficacy of mixtures of available fungicides. Cuprous oxide (NORDOX 75 WG) applied at 1.12 kg/ha (0.84 kg copper equivalent) has provided leaf spot control similar to that provided by 1.126 kg a.i./ha of the conventional fungicide chlorothalonil. Micronized elemental sulfur products (Microthiol Disperss 80 W and Suffa 6F) have been reported to enhance leaf spot control when mixed with conventional fungicides although the sulfur materials alone are not adequate. The purpose of this experiment was to determine the effect of a reduced rate of NORDOX (0.42 kg of Cu/ha) alone and in combination with two micronized sulfur fungicides (Microthiol Disperss and Suffa 6F) on leaf spot epidemics. Field experiments were conducted in 2022 in Tifton, GA and in Plains, GA. Treatments consisted of NORDOX 0.56 kg product/ha, Serenade ASO 2.3 l product/ha, mixtures of NORDOX + Serenade at those respective rates, each applied alone and in combination with Microthiol Disperss and Suffa (2.2 kg a.i./ha) resulting in 11 fungicide treatments and one nontreated control. In Tifton, the treatments were applied a total of five times over the course of the growing season, starting after the disease was detected at 44 days after planting (DAP). In Plains, the treatments were applied a total of three times over the growing season, starting at 60DAP. Applications were made approximately every 28 days in Plains and every 21 days in Tifton. Early leaf spot was the main foliar disease at both locations. Leaf spot severity was assessed for each plot using the Florida 1-10 scale. At Tifton, final leaf spot ratings were 8.9, 5.9, 8.3, 7.1, and 7.4 for the nontreated control, NORDOX, Serenade, Microthiol, and Suffa treatments alone (LSD = 1.1). There was no significant improvement in leaf spot control with the addition of Serenade, either sulfur product, or Serenade + sulfur compared to NORDOX alone. At Plains, final leaf spot ratings were 7.0, 5.8, 6.1, 6.3, and 5.9 for the nontreated control, NORDOX, Serenade, Microthiol, and Suffa treatments alone. Mixtures of NORDOX with Microthiol and Suffa had final ratings of 4.9 and 4.5 (LSD = 1.0) compared to the 5.8 for NORDOX alone. Effects of sulfur in mixtures with NORDOX at Tifton differed from notable improvements in leaf spot control observed with micronized sulfur mixed with DMI and QoI fungicides in previous studies. There was significant improvement in leaf spot control with Suffa + NORDOX compared to either treatment alone at Plains. Serenade showed little potential for use for leaf spot control alone or in mixtures with NORDOX or sulfur.

An Explanation for Reduced Defoliation Using Sulfur Synthetic Fungicide Mixtures Caused by Late Leaf Spot (LLS)

K. TAYLOR*, E.G. CANTONWINE, Valdosta State University, Valdosta, GA 31698 and A. CULBREATH, University of Georgia Tifton Campus, 31793

Mixing elemental sulfur with synthetic DMI and QoI fungicides has been documented to reduce defoliation due to late leaf spot (LLS) in the field. A field experiment was conducted to determine the mechanism behind reduced defoliation when sulfur and synthetic fungicides are mixed. The objective was to determine if effect was the result of fewer LLS infections, causing less defoliation, or similar LLS infections with plants holding on to their leaves longer. Lateral branches of peanut plants collected from the field study, conducted in Tifton, GA, in 2020 and 2021, were assessed to find LLS incidence, severity, and defoliation. Assessments were made weekly between 91 and 140 days after planting (DAP) in 2020 and 98 and 135 DAP in 2021. Field treatments included a nontreated control and applications of Microthiol sulfur, Tebuzol, sulfur mixed with Tebuzol, Abound, and sulfur mixed with Abound at recommended field rates. In 2020 a rust epidemic, caused by *Puccinia arachidis,* impacted the nontreated and sulfur-only treatments resulting in few assessments dates. Because of this, these treatments were analyzed separately from those with a synthetic. GLM univariate analysis of the synthetic and synthetic plus sulfur treatments showed significant reductions to LLS incidence ($p<0.01$), LLS severity ($p<0.01$), and defoliation ($p=0.02$) due to sulfur across years. There were no sulfur x synthetic x year interaction in these analyses ($p\geq0.08$). The type of synthetic fungicide, Tebuzol or Abound, did not significantly affect LLS incidence ($p=0.94$), LLS severity ($p=0.55$) or defoliation ($p=0.16$). When severity was added to the analysis as a covariate, the significant effect of sulfur on defoliation was lost ($p=0.62$). This suggests that the mechanism of reduced defoliation is due to fewer LLS infections rather than increased plant tolerance. More research is needed to determine whether reduced infections are the result of increased toxicity to the fungus, increased host resistance, or a combination of both.

Peanut Leaf Spot Disease Progress based on Lesion Development

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The objective of the study was to determine the effect of 15 peanut genotypes on the disease progress of peanut leaf spot diseases. Field experiments were conducted in 2022 at the University of Georgia Rigdon and Black Shank Farms in Tifton, GA. The genotypes include three susceptible cultivars (TUFRunner '511', Georgia-13M and Georgia-06G) and 12 breeding lines with wild species introgressions (CB1, CB2, CB7, IAC322, TBI_S11, BBI_S25_11, 170_A9, 95C9, 158_B_4, 158_B_10 and 158_B_6) that have been identified as resistant in previous studies. These breeding lines have varying resistance from multiple wild sources to one or both leaf spot diseases. Incidence of leaf spot lesions (percent leaflets with one or more lesions) was evaluated at 90, 98, 106 and 114 days after planting. In plots where defoliation occurred, abscised leaflets were included as leaflets with spots. Area under disease progress curve (AUDPC) was calculated for each plot and used for the comparisons. Genotype effects on leaf spot epidemics followed similar trends at both locations, and the interaction of location and genotype was not significant ($P > 0.10$). Across locations, AUDPC values were higher in cultivars TUFRunner '511', Georgia-13M, and Georgia-06G (AUDPC values of 1247, 1230, and 1166, respectively) than for other genotypes. Among the genotypes, AUDPC values ranged from 234 for IAC322 to 734 for 158_B_4. Seven genotypes had AUDPC values similar to those of IAC322. Only lines 95_C_9, 170_A_9 and 158_B_4 had AUDPC values higher than that of IAC322 (LSD = 320). These results indicate that all of the genotypes identified as leaf spot resistant in this study suppressed epidemic development as compared to the three cultivars used as standards. The result of this study supports previous evaluations based on detached leaf assays and field evaluations based on leaf defoliation ratings.

Management of Aflatoxin Contamination in Peanut through an Integrated Approach

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Aflatoxin contamination is a major concern in peanut production in Georgia, especially in the years with hot and dry growing seasons. Aflatoxin contamination is not only a significant health risk but also severely affects profitability and international trade within the US peanut industry. In this study, two-year (peanut growing season 2021 and 2022) field trials were conducted to determine the effect of two fungicides and different methods of application on the amount of pre-harvest aflatoxin contamination in peanuts grown under irrigated and non-irrigated conditions. In the non-irrigated trial, the efficacy of Afla-Guard GR was also assessed for the mitigation of aflatoxin. Both fungicides (Miravis and Propulse) were effective in reducing aflatoxin contamination. However, Miravis resulted in better control of aflatoxin than did Propulse for both irrigated and non-irrigated conditions. Under non-irrigated conditions, Miravis in combination with Afla-Guard GR resulted in the least amount of aflatoxin contamination. Depending upon the fungicide used, the method of fungicide application may or may not impact aflatoxin contamination. This study showed that the fungicide Miravis may be part of our improved solution for the management of aflatoxin contamination in peanuts and the combination of this fungicide with Afla-Guard GR provides promising results under non-irrigated conditions.

Field Evaluation of Selected Commercial Peanut Cultivars for Tolerance to Leaf Spot as Influenced by Varying Fungicide Inputs

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Early Leaf Spot (*Passalora arachidicola*) and Late Leaf Spot (*Nothopassalora personata*) are the most destructive, foliar fungal diseases of peanuts in Alabama, which can cause up to 50% yield losses if not controlled. Both diseases are managed by utilizing tolerant varieties and fungicide applications. The goal of this study was to assess the impact of cultivar selection on leaf spot severity and yield as influenced by two fungicide spray programs. In 2021 and 2022, trials were established at research stations in Headland (WREC) and Brewton (BARU), AL.Treatments were arranged in a split plot design with fourteen peanut cultivars (TUF 297, TUF 511, FloRun 331, FloTun T61, GA-06G, GA-09B, GA-12Y, GA-14N, GA-16HO, GA-18RU, GA-19HP, GA-20VHO, TifNVHiOL, and AU-NPL 17) as the main plot and two fungicide treatments along with nontreated control as the subplot. Low input fungicide program had 7 applications of Bravo WS or Oranil 6L or Equus 720 @ 24.0 fl oz/A and high input fungicide program included applications of Bravo WS or Oranil 6L or Equus 720 at 24.0 fl oz/A and high input spray program included Bravo WS or Oranil 6L or Equus 720 at 24.0 fl oz/A, Priaxor at 6 fl oz or Lucento at 5.5 fl oz, Provysol at 5.0 fl oz + Convoy at 32.0 fl oz, Priaxor at 8 fl oz or Muscle ADV at 32 fl oz. There was no significant difference among varieties and spray programs at WREC for both production years and at BARU for 2022. At BARU in 2021, the low input spray program had better control of leaf spot as compared to the high input spray program and GA-12Y and GA-14N with low input spray program performed best among all the treatments. Both the fungicide programs significantly reduced leaf spot severity when compared to the nontreated control at all site years except BARU-2022. Overall, GA-12Y, GA-14N, and AU-NPL 17 were best performers and TUFRunner 297, TUFRunner 511 had highest defoliation values. These results demonstrate the importance of cultivar and fungicide selection in managing leaf spot diseases in peanuts.

In-Vitro Assessment of Commonly Used Fungicides for Controlling Southern Blight in Mississippi Peanuts.

S. TRIPATHI*, T.W. ALLEN, T.H. WILKERSON, A. CONNOR, Delta Research and Extension Center, Mississippi State University, Stoneville, MS 38776; A.M. JIMENEZ MADRID, Department of Plant Pathology, University of Georgia Tifton, GA 31793; and A. HENN, Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Starkville, MS 39762.

Athelia rolfsii, the causal agent of southern blight (SB), is widely known to cause stem disease in peanuts (*Arachis hypogea*) worldwide. SB poses a significant challenge for peanut production in the southern US, causing up to 80% yield losses. The disease symptoms include plant wilting, yellowing, and in severe cases death. In addition, the fungus can produce white, cottony mycelia on infected tissues and brown to black, spherical sclerotia on plant debris or the soil surface. It is commonly observed in areas with heavy rainfall and irrigated fields. Fungicides have been a crucial management tool to control SB in the absence of resistant cultivars. The objective of this research was to assess the *in vitro* efficacy of five fungicides (prothioconazole, azoxystrobin, fluxapyroxad, fluazinam, and pyraclostrobin) with different modes of action. Six isolates were collected from peanut fields and cultured in PDA under dark conditions. Genomic DNA and PCR were used to confirm the isolates as AR. For the *in vitro* assay, a 5mm mycelial plug was placed on fungicide-amended plates with concentrations ranging from 10 to 0.001 μg ml^{-1}. After four days of incubation, colony diameter was measured, and percent inhibition was calculated. The experiment followed a completely randomized design, with three replicate plates per isolate and three repetitions of the experiment. Fluazinam had the lowest absolute mean EC_{50} value of 0.05 μg ml^{-1}, while azoxystrobin was less sensitive with an EC_{50} value of 3.35 to 8.41 μg ml^{-1}. Further research is needed to determine if fungicides are an effective method for managing SB in peanuts.

Methods of Managing Tomato Spotted Wilt Virus in Field-Grown Peanuts.

C.A. COOKE*, S.H. GRAHAM, Auburn University, Dept. of Entomology & Plant Pathology, Auburn, AL 36849; and K. B. BALKCOM Auburn University, Dept. of Crop, Soil & Environmental Sciences, Auburn, AL 36849

Tomato spotted wilt virus (TSWV) is a plant disease with an incredibly broad host range, infecting plants such as tomatoes, peppers, peanuts, and even some species of weeds. It is transmitted from plant to plant via thrips feeding. While thrips feeding alone can be highly damaging to seedling-stage plants, the addition of TSWV causes necrosis, leaf cupping, and stunted growth that persists throughout the growing season – even after thrips have gone, resulting in significant yield loss. This is why thrips management is essential to control TSWV. Some of the most beneficial mechanisms of control include selecting resistant peanut varieties, choosing planting dates that avoid thrips flights, and using insecticides. This project aims to utilize these three mechanisms to determine how well they control TSWV. Three planting dates were used; late April, mid-May, and mid-June, along with three different varieties of peanuts; GA12Y, GA06G, and AU17. These planting dates and varieties were then either treated or not treated in-furrow with 5 lb/A Thimet 20G (phorate). Data collected includes stand counts, thrips injury ratings (0-5 scale), peanut vigor ratings (0-10 scale), fractional green canopy closure, percent virus incidence, and yield.

Comparing *Nothopassalora personata*, Colonization, and Haustorial Characteristics Between Susceptible and Resistant Peanut Genotypes.

D.A. CASTELLANO*, E.G. CANTONWINE, J.A. NIENOW, Valdosta State University, Valdosta, GA 31698; and C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793

Nothopassalora personata, the fungal causative agent of late leaf spot in peanut, causes small necrotic lesions on leaves, stems and petioles, and premature defoliation if not controlled. *N. personata* is a hemi-biotroph that uses specialized hyphae called haustoria to absorb nutrients from plant cells during its biotrophic phase. A method, developed to characterize haustoria within epidermal tissues of leaves, was used to evaluate the colonization patterns of *N. personata* for GA13M, a susceptible peanut genotype, and three genotypes with high levels of resistance, CB7, CB18, and CS195. Two late leaf spot lesions sizes, 1 mm and 3 mm wide, of each genotype were collected from two to three field experiments. There were three replications per experiment. Colonizing mycelium extended 1.53-1.87 times farther than the farthest haustoria in all genotypes and lesion sizes. Smaller lesions had higher densities of haustoria (7.85 haustoria per 1.6x105 μm^2 area) than larger lesions (6.08 haustoria per 1.6x105 μm^2 area) ($P=0.011$). GA13M had significantly fewer haustoria per unit area in the larger lesions than the other genotypes ($P=0.026$), but not in the smaller lesions ($P=0.71$). Colonizing hyphae extended farther in GA13M than the more resistant genotypes in larger lesions ($P < 0.05$) and was the only genotype where colonizing hyphae extended beyond the chlorotic ring. It is likely that limitations to hyphal expansion within leaf tissues is a component of resistance. Our results suggest that *N. personata* hyphae may have biotrophic function. Although this study did not detect resistance components related to the frequency, location, or size of haustoria, it is possible that these differences may be present within the inner mesophyll tissues.

8:00 – 9:45	**General Session – Scanning the Horizon** Meeting Room: Oglethorpe/Cumberland *Moderator: Bob Kemerait, Univ. of Georgia*	Pres. #
8:00	**Call to Order, Opening Remarks, Acknowledgements** **MARK BUROW, APRES President**	
8:05	**Welcome to Georgia** **TYLER HARPER, Georgia Commissioner of Agriculture**	GS-1
8:15	**Changing Climatic Patterns and Impact on Production of Peanuts** **P.V. VARA PRASAD, Professor of Crop Ecophysiology/Director of Sustainable Intensification Innovation Lab, Kansas State Univ.**	GS-2
8:40	**The Impact of the Peanut Genomics Initiative on Cultivar Development** **C. CORLEY HOLBROOK, Supervisory Research Geneticist, USDA-ARS Crop Genetics and Breeding Research Unit, Tifton GA.**	GS-3
9:05	**Precision Ag in Peanut Production: From the Past to the Future** **BRIAN KELLEY, President, AgTechnologies LLC**	GS-4
9:30	**Announcements and Updates** **R. SCOTT TUBBS, Technical Program Chair; and SIMER VIRK, Local Arrangements Chair**	

APRES 55th Annual Meeting Morning - Wednesday, July 12

10:00 - 12:00	**Breeding, Biotechnology, and Genetics I** Meeting Room: Oglethorpe/Cumberland *Moderator: Shyam Tallury, USDA-ARS*	Pres. #
10:00	**USDA *Arachis* Wild Species Collection: Legacy of Dr. Charles Simpson.** **S. TALLURY***, USDA-ARS, PGRCU, Griffin, GA; J. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL; and M. BUROW, Texas Tech University, Lubbock, TX.	52
10:15	**Quantitative Trait Locus Mapping for Wild-derived Stem Rot Resistance in Peanut** **Y-C. TSAI***, Department of Plant Pathology, University of Georgia, Athens, GA 30605; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; D. GAO, Small Grains and Potato Germplasm Research Unit, USDA-ARS, Aberdeen, ID 83210; D. BERTIOLI Department of Crop and Soil Sciences, University of Georgia, Athens, GA 30605; F. DE BLAS, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30605, Institute of Botany of Northeast (IBONE), Corrientes, Argentina; Y. CHU, P. OZIAS-AKINS Department of Horticulture, University of Georgia, Tifton, GA 31793; and S. LEAL-BERTIOLI**,** Department of Plant Pathology, University of Georgia, Athens, GA 30605.	53

10:30	**Combining Wild Species Resistances to Early and Late Leaf Spots in Elite Genetics Peanut** M.C. GONZALES, S.C.M. LEAL-BERTIOLI, Department of Plant Pathology, The University of Georgia, Athens, GA. Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA, and **D.J. BERTIOLI*.** Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA, Department of Crop & Soil Sciences, The University of Georgia, Athens GA.	54
10:45	**Better Understanding Peanuts and its Relationship with the Wild Relatives** **F. J. DE BLAS*,** Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621, Institute of Botany of Northeast – IBONE, Corrientes, Argentina; D.J. BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621, Department of Crop and Soils Science, The University of Georgia, Athens, GA 30621; B. ABERNATHY, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621; and S.C.M. LEAL-BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621, Plant Pathology Department, University of Georgia Athens, Athens, GA 30602.	55
11:00	**Botanically Curated SNP Analyses of Wild Species of the *Arachis* Section Aids Genebank Curation and Peanut Pre-Breeding Programs** **S.C.M. LEAL-BERTIOLI*,** F. DE BLAS, M.C.C. CHAVARRO, Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA; S. TALLURY, Department of Agriculture-Agricultural Research Service, Griffin, GA; C.E. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX; G.J. SEIJO, Institute of Botany of Northeast, IBONE, Corrientes, Argentina; M.C. MORETZSOHN, J.F.M. VALLS, Embrapa Genetic Resources and Biotechnology, Brasilia, Brazil; H.T. STALKER, Crop and Soil Department, North Carolina State University, North Carolina, NC and D.J. BERTIOLI, Department of Crop & Soil Sciences and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens GA.	56
11:15	**Description and Characterization of Six Allotetraploids Derived from the Progenitors of Peanut *Arachis ipaensis* and *Arachis duranensis*** **M.S. HOPKINS***, J. LEVERTT Center for Applied Genetic Technologies and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602, USA, M. GONZALES, YUN-CHIN TSAI, 4Department of Plant Pathology, University of Georgia, Athens, GA, USA, D. GAO Small Grains and Potato Germplasm Research Unit, USDA ARS, Aberdeen, ID 83210, USA, D. J. BERTIOLI, and S.C.M. LEAL-BERTIOLI Center for Applied Genetic Technologies and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602, USA.	57
11:30	**Marker-Assisted Selection for the Investigation of Additional *A. cardenasii* Introgressions** **R.J. ANDRES*,** C.S. NEWMAN, A.T. OAKLEY, and J.C. DUNNE, Department of Crop and Soil Science, North Carolina State University, Raleigh, NC 27695	59

USDA *Arachis* Wild Species Collection: Legacy of Dr. Charles Simpson.

S. TALLURY*, USDA-ARS, PGRCU, Griffin, GA; J. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL; and M. BUROW, Texas Tech University, Lubbock, TX.

The *Arachis* wild species collection is maintained in the USDA-ARS managed genebank in Griffin. As of 2022, the wild species collection includes 536 accessions of which, 440 are available. They are maintained as active collections at 4C for distribution and as base collection at -18C for long-term storage. These are distributed free of charge for research use worldwide. The collection is a result of concerted exploration efforts in South America over many years by several national and international collectors. Prominent national collectors included Don Banks, Walton Gregory, Ray Hammons, Charles Simpson, and David Williams. Among them, Charles Simpson has been leading the effort to replenish and restore the USDA *Arachis* wild species collection since 1977. His impact goes beyond just the accumulation of the accessions in the genebank. His early research with *Arachis* species led to the taxonomic understanding of the genomes and development of different introgression pathways which led to the production of interspecific hybrid populations by several researchers later. One of his major contributions has been the release in 1993 of the tri-species derived amphidiploid with very high levels of Root Knot Nematode (RKN) resistance in peanut. Subsequently, a RKN resistant cultivar, COAN, was released by his group which was later used in other breeding programs to release additional cultivars with almost immunity to RKN. With the current genomic revolution efforts in peanut, characterization, and use of *Arachis* wild species for peanut improvement has been gaining prominence lately. These research efforts wouldn't have been possible without the genebank collection and Dr. Simpson's contribution of *Arachis* species accessions.

Quantitative Trait Locus Mapping for Wild-derived Stem Rot Resistance in Peanut

Y-C. TSAI*, Department of Plant Pathology, University of Georgia, Athens, GA 30605; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; D. GAO, Small Grains and Potato Germplasm Research Unit, USDA-ARS, Aberdeen, ID 83210; D. BERTIOLI Department of Crop and Soil Sciences, University of Georgia, Athens, GA 30605; F. DE BLAS, Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens, GA 30605, Institute of Botany of Northeast (IBONE), Corrientes, Argentina; Y. CHU, P. OZIAS-AKINS Department of Horticulture, University of Georgia, Tifton, GA 31793; and S. LEAL-BERTIOLI**,** Department of Plant Pathology, University of Georgia, Athens, GA 30605.

Stem rot disease (white mold), caused by the fungus *Athelia rolfsii* (*Sclerotium rolfsii*), is one of the most severe soil-borne diseases causing a tremendous loss in US peanut production. Cultivated peanut has a narrow genetic base, and commercial cultivars only harbor moderate to low resistance. Wild-derived species are a potential source of new resistance genes, which lifts the limitation of the low genetic diversity of cultivated peanut. A wild-derived genotype, ValSten1 (*A. valida* GK30011 x *A. stenosperma* V10309)^{4x}, showed resistance to stem rot. Here, quantitative trait loci (QTL) mapping was conducted in a ValSten1-derived F_2 population to understand the genomic regions that confer the resistance. The population was derived from a cross of *Arachis hypogaea* cv. TifGP-2 and the resistant donor, ValSten1. Stem rot among three hundred and twenty-five F_2 individuals was field evaluated in 2021. The F_2 population was genotyped using the 'Axiom_*Arachis* v02', a 48K single nucleotide polymorphism array that covers the whole genome. A genetic map with 751 informative wild-specific markers was constructed, with 23 linkage groups (LGs). Two sets of wild-derived QTLs were identified in the analysis: six QTLs associated with disease resistance and seven QTLs related to susceptibility. QTLs associated with lower disease ratings are all located at the LGs assigned to the A subgenome, derived from *A. stenosperma*. Most higher rating-associated QTLs are located at LGs assigned to B subgenome, derived from *A. valida*. The QTL results also confirm the stem rot evaluation in the greenhouse, where four allotetraploids derived from *A. stenosperma* showed relatively lower diseases than other wild-derived allotetraploids. In conclusion, *A. stenosperma* provides an additional resistance source and can be utilized to pyramid stem rot resistance. The beneficial and deleterious information is helpful to breeders in the effort to introgress wild-derived stem rot resistance.

Combining Wild Species Resistances to Early and Late Leaf Spots in Elite Genetics Peanut

M.C. GONZALES, S.C.M. LEAL-BERTIOLI, Department of Plant Pathology, The University of Georgia, Athens, GA. Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA, and **D.J. BERTIOLI*.** Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA, Department of Crop & Soil Sciences, The University of Georgia, Athens GA.

In the late 1960s crosses between cultivated peanut and the wild species *A. cardenasii* introduced new very strong resistances the crop including resistances to leaf spots, rust, nematodes. Experience in North Carolina and Brazil shows that introducing resistance to Early and Late Leaf spot respectively shifts disease pressure to the pathogen for which there remains susceptibility. This significantly reduces the benefit of the resistance. Here we show, for the first time, the combination of wild-species resistances to Early and Late Leaf Spot. In the medium term, we believe that the combination of resistances is the only viable path to reduction of fungicide sprays and lasting economic benefit.

Better Understanding Peanuts and its Relationship with the Wild Relatives

F.J. DE BLAS*, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621, Institute of Botany of Northeast – IBONE, Corrientes, Argentina; D.J. BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621, Department of Crop and Soils Science, The University of Georgia, Athens, GA 30621; B. ABERNATHY, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621; and S.C.M. LEAL-BERTIOLI, Institute of Plant Breeding, Genetics and Genomics, The University of Georgia, Athens, GA 30621, Plant Pathology Department, University of Georgia Athens, Athens, GA 30602.

Certainly, the origin of peanut (*Arachis hypogaea* L.) has been a topic of discussion among scientists and researchers for many years. While the most widely accepted theory is that peanut originated in South America, specifically in the Andean region, based on biogeographical, ethnobotanical, morphologic, cytogenetic and molecular studies, some scientists have recently put forward alternative theories based solely on DNA evidence. However, these alternative theories have not been widely accepted by the scientific community. The knowledge of the origin and history of domestication of the cultivated peanut is crucial for better understanding the feasibility of using the secondary gene-pool for peanut improvement. The work presented here aims to explore the genetic relationship between six varieties of cultivated peanut and the section *Arachis,* in particular, with the species indicated as peanut ancestors. It is based on previous research performed in the Wild Peanut Lab, UGA: a tree of genetic relationships of most *ex-situ* collected species in the section *Arachis* with unprecedented scope and detail that have been used to understand the structure of the Arachis section and better utilize wild germplasm for guiding interspecific crosses. We have used a 13K curated SNP molecular markers database that includes 276 well identified and non-redundant wild species accessions from the *Arachis* section. This database was used as reference panel to de aligned against with the same SNP data set of six *A. hypogaea* accessions: that include the botanical varieties *hypogaea*, *fastigiata* and *vulgaris*. A high-quality genome sequence for each of the cultivated accessions was used for *in silico* SNP detection using the 13K curated SNP database from the reference wild species panel. The *in silico* called SNP were dissected between A and B subgenome markers. These two data sets, peanut “A” and “B” subgenome markers were merged with the wild species panel and SNP for each sample were aligned. The distribution and genetic relationship between samples was visualized through phylogeny trees calculated applying a maximum likelihood model and finally plotted. The resulting phylogenetic tree shows a consistent clustering of peanut A-subgenome markers with all wild accessions of A genome, and closest to the sequences that grouped with the *A. duranensis* GK30065 accession from Río Seco (which was previously indicated as the likely origin of the A genome ancestor on the basis of chloroplast and ribosomal DNA haplotypes). While the peanut B-genome sequences clustered with *A. ipaënsis* GK30076 accession that was very likely a descendant of the same population that donated the B genome to *A. hypogaea*. The findings in this work attend the knowledge base of the South American peanut origin without dismissing the importance of considering multiple perspectives and sources of evidence in understanding the complex history of plant domestication and evolution. Even more importantly, the improved knowledge of species relationships with A. hypogaea should facilitate the utilization of wild species for crop improvement and bringing solution to farmers and industry with a more sustainable peanut production.

Botanically Curated SNP Analyses of Wild Species of the *Arachis* Section Aids Genebank Curation and Peanut Pre-Breeding Programs

S.C.M. LEAL-BERTIOLI*, F. DE BLAS, M.C.C. CHAVARRO, Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA; S. TALLURY, Department of Agriculture-Agricultural Research Service, Griffin, GA; C.E. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX; G.J. SEIJO, Institute of Botany of Northeast, IBONE, Corrientes, Argentina; M.C. MORETZSOHN, J.F.M. VALLS, Embrapa Genetic Resources and Biotechnology, Brasilia, Brazil; H.T. STALKER, Crop and Soil Department, North Carolina State University, North Carolina, NC and D.J. BERTIOLI, Department of Crop & Soil Sciences and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens GA.

Peanut belongs to the genus *Arachis*, which contains 83 described species grouped into nine taxonomical sections, according to their morphology, chromosome cytology, geographic distribution, and cross-compatibility relationships. From the 50's until recently, many trips were made in South America to collect wild *Arachis* species, generating a great body of knowledge and invaluable asset to the research and breeding communities. The main repositories of wild *Arachis* species are at EMBRAPA (Brazil), IBONE (Argentina), ICRISAT (India) and PGRCU (USA) and TAMU. PGRCU holds 65 out of all *Arachis* species. Its primary goal is to preserve this valuable germplasm for all researchers worldwide for use in breeding programs, genomics, or other scientific research. This resource is constantly utilized by peanut breeders and other researchers worldwide to provide the necessary genetic variability in their respective programs to improve cultivated peanut. The goal of this research is to genotype accessions of *Arachis* species in the USDA-PGRCU, TAMU, NCSU, IBONE, and EMBRAPA genebanks using the 48K Affymetrix chip to create a database that will help understand the structure of the genus and serve as a base for selection of accessions for crosses, create a software that instructs species identification. A positive and precise identification of Arachis species will help researchers select materials for bridge crosses for introgression programs. It will also help detect misidentified accessions, thus ensuring its high quality as a living legacy for the next generation of researchers, the industry, and the consumers.

Description and Characterization of Six Allotetraploids Derived from the Progenitors of Peanut *Arachis ipaensis* and *Arachis duranensis*

M.S. HOPKINS*, J. LEVERTT Center for Applied Genetic Technologies and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602, USA, M. GONZALES, Y-C. TSAI, Department of Plant Pathology, University of Georgia, Athens, GA, USA, D. GAO Small Grains and Potato Germplasm Research Unit, USDA ARS, Aberdeen, ID 83210, USA, D. J. BERTIOLI, and S.C.M. LEAL-BERTIOLI Center for Applied Genetic Technologies and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Athens, GA 30602, USA.

An event took place about eight thousand years ago that both improved and hindered the development of peanut, *A. hypogaea* (L). The polyploidization and domestication of tetraploid peanut into its present-day form has provided a nutritious edible seed. However, polyploidization also greatly limited the potential genetic gains due to incompatibility with their diploid wild relatives. To make the alleles of six wild species accessions directly available for breeding, we developed at the University of Georgia, six fertile artificially induced allotetraploids (also known as neotetraploids): GA-IpaDur1, GA-IpaCor1, GA-IpaVillo1, GA-BatDur1, GA-BatDur2, and GA-MagDur1. They derive from crosses between wild diploid species of peanut *Arachis baitzocoi x A. duranensis, A. ipaensis x A. correntina, A.ipaensis x A. duranensis, A. ipaensis x A. villosa, and A. magna x A. duranensis,* respectively. Cuttings from the sterile diploid F_1s were treated with colchicine. From some of these cuttings, fertile induced tetraploid seed were produced. These induced tetraploids are compatible with cultivated peanut, carry resistance to early and late leaf spot and root-knot nematode and are being used in breeding programs in the U.S. to produce resistant cultivars. Notably, GA-IpaDur1 can be considered a 'recreation' of the original peanut, as it uses both original progenitor species. This release makes the alleles of six different wild species directly available for breeding. All these neotetraploids are compatible with cultivated peanut, will be deposited at the USDA-NPGS and are being utilized in pre-breeding and breeding programs.

Marker-Assisted Selection for the Investigation of Additional *A. cardenasii* Introgressions

R.J. ANDRES*, C.S. NEWMAN, A.T. OAKLEY, and J.C. DUNNE, Department of Crop and Soil Science, North Carolina State University, Raleigh, NC 27695

Previously, high markers density from whole-genome sequencing (WGS) identified 34 unique introgressions from *A. cardenasii* present in the germplasm of the North Carolina State University peanut breeding program. Sixteen of these unique introgressions are smaller versions of a larger introgression subsequently broken up by recombination. In total, 111 PACE markers were designed and validated covering all 34 introgressions. Markers were designed near the ends of the introgressions blocks and near recombination breakpoints identified by WGS. For smaller introgressions (<10Mb), assays were placed approximately every 1Mb within the introgression. For larger introgressions, markers were interspersed throughout but enriched towards the ends of the introgressions. Crosses are currently underway between lines carrying different introgressions in order to create populations segregating for each introgression. This will enable the phenotypic effect of each introgression to be determined. Additionally, an automated marker-assisted selection (MAS) pipeline was developed starting with DNA isolation and culminating in actionable genotypic data.

2:00 – 3:00	**Weed Science and Entomology** Meeting Room: Oglethorpe/Cumberland *Moderator: Eric Prostko, Univ. of Georgia*	Pres. #
2:00	**Peanut Tolerance to Reviton® (tiafenacil)** **E.P. PROSTKO*,** N.J. SHAY, and C.C. ABBOTT, Dept. of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793-0748.	60
2:15	**Introduction of a Herbicide Selector Tool for Peanut** G.S. BUOL and **D.L. JORDAN***, North Carolina State University, Raleigh, NC 27695	61
2:30	**Biology and Management of the Peanut Burrower Bug in Georgia** **M.R. ABNEY*** and B.L. AIGNER, Department of Entomology, The University of Georgia, Tifton, GA 31793.	62
2:45	**Landscape Factors Affect Relative Abundance and Pod Injury of Rootworm Species in Georgia Peanuts.** A.L. SKIPPER, Department of Population Health, University of Georgia, Athens, GA 30602; **K.L. SUTTON*** and M.R. ABNEY, Department of Entomology, University of Georgia, Tifton, GA, 31793	63

Peanut Tolerance to Reviton® (tiafenacil)

E.P. PROSTKO*, N.J. SHAY, and C.C. ABBOTT, Dept. of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793-0748.

Reviton® (tiafenacil) is a new, non-selective, burndown herbicide labeled for use in various crops. Current label restrictions prohibit peanut planting for 120 to 150 days after application depending upon rate. Little information is known about the response of peanut to preemergence (PRE) or postemergence (POST) applications. Therefore, the objective of this research was to determine the effects of Reviton® applied PRE or POST on peanut growth and yield. Irrigated, small-plot field trials were conducted in 2021-2022 at the University of Georgia Ponder Research Farm near Ty Ty, Georgia. The soil type at this location was a Tifton sand (0.91% OM, 94% sand, 0% silt, 6% clay, 6.0 pH, and 3.6 CEC). Twin-row peanuts (GA-06G) were planted on May 3 in both years. In 2021, herbicide treatments included Reviton® 2.83SC applied PRE @ 2 oz/A or POST [30 days after planting (DAP), R1 stage] at 1 or 2 oz/A. Treatments were arranged in a randomized complete block design (RCBD) with 3 replications. In 2022, treatments were arranged in an RCBD with a 3 (rate) by 4 (timing) factorial arrangement with 4 replications. Reviton® 2.83SC rates were 0, 1, and 2 oz/A. Application timings were PRE, 30, 60, or 90 DAP. In both years, POST applications included Induce @ 0.25 v/v. All herbicides were applied with a CO_2-powered backpack sprayer calibrated to deliver 15 GPA (38 PSI, 3.5 mph, 11002AIXR nozzles). The plot areas were maintained weed-free using a combination of labeled herbicides and hand-weeding. Data collected included peanut injury (leaf necrosis/stunting), canopy height/width, and yield. All data were subjected to ANOVA and means separated using Fisher's Protected LSD Test ($P<0.10$). PRE applications of Reviton had little or no effect on peanut injury and did not negatively impact yield. POST applications caused significant peanut injury in the form of leaf necrosis, stunting, and canopy height/width reductions. In 2021, POST applications had no effect on peanut yield. However, peanut yields were significantly reduced by 15%-25% with all POST applications in 2022. Thus, Reviton® is not likely a suitable candidate for in-crop use but peanut rotation restrictions could be significantly reduced.

Introduction of a Herbicide Selector Tool for Peanut

G.S. BUOL and **D.L. JORDAN***, North Carolina State University, Raleigh, NC 27695

To assist North Carolina peanut growers with weed manage, a web based herbicide selection tool has been developed. The tool allows users to select weeds and indicate known weed herbicide resistances. Based on weeds selected and herbicide resistances, weed competitive indices and herbicide efficacies, the application ranks registered herbicide treatments on the calculated overall potential control. Herbicide treatments can be filtered based on application timing (i.e. preemergence, postemergence, etc.). For each herbicide treatment, details on potential control of each selected weed is provided.

Development of the herbicide selection tool involved the development of a Microsoft (MS) SQL database, MS Visual Basic .Net RESTful Web service, and JavaScript based web client user interface. Weed competitive indices for peanut were obtained from a previous developed herbicide selection web application, WebHADSS. Weed herbicide efficacies published in the 2021 North Carolina Agricultural Chemicals Manual were utilized to populate the database. Additionally, the herbicide selection tool and related database are designed to handle addition crops.

Biology and Management of the Peanut Burrower Bug in Georgia

M.R. ABNEY* and B.L. AIGNER, Department of Entomology, The University of Georgia, Tifton, GA 31793.

The peanut burrower bug, *Pangaeus bilineatus*, is a sporadic but potentially devastating economic pest of peanut in the Southeast USA. Though native to the region, reports of injury to peanut were rare until the 1990’s, and serious losses were not observed in Georgia until the late 2000’s. A dearth of knowledge concerning peanut burrower bug biology and ecology posed a significant challenge to the development of effective integrated pest management tactics. A multi-faceted research program was initiated at the University of Georgia to improve understanding of the insect’s biology in the peanut agroecosystem with the goal of identifying risk factors associated with burrower bug infestations and ultimately reducing losses through effective management. A study using light traps showed the insect to be widely distributed across Georgia’s peanut production area. Though peanut burrower bug was collected in every light trap over multiple locations and years, injury was reported in only a few fields. Reduced tillage was confirmed to increase the relative risk of infestation. Factors including rainfall and crop species richness in a given geographic area were also shown to be related to the incidence of burrower bug injury. Laboratory studies elucidated areas of basic developmental biology and fecundity. Evaluation of management tactics in the field showed that no currently registered insecticide provides adequate control. Host plant resistance may hold promise for reducing losses to burrower bug, but currently available cultivars showed little variation in susceptibility to feeding.

Landscape Factors Affect Relative Abundance and Pod Injury of Rootworm Species in Georgia Peanuts.

A.L. SKIPPER, Department of Population Health, University of Georgia, Athens, GA 30602; **K.L. SUTTON*** and M.R. ABNEY, Department of Entomology, University of Georgia, Tifton, GA, 31793

The southern corn rootworm, *Diabrotica undecimpunctata howardi*, is native to the U.S. where it is a pest of peanut. The banded cucumber beetle, *D. balteata*, is native to the tropics, but its range has expanded and currently includes most of the US peanut production area. The purpose of this study was to define seasonal variation in adult rootworm populations in peanut fields and to determine if proximity to a putative early season host (i.e. corn) as well as presence or absence of irrigation contributes to infestation and pod injury in peanut. Seasonal abundance of adult rootworms in commercial peanut fields in Georgia was monitored in 2021and 2022 using plant volatile lures attached to yellow sticky traps. Traps were located at 45, 90 and 180m from the field edge in peanut fields with and without a corn border and irrigation. Two peaks in abundance were observed for both species in 2021 and 2022. Though peak abundance for the two species occurred nearly simultaneously, *D. balteata* was much more abundant than *D.u. howardi.* Beetle abundance was higher in fields bordered by corn with irrigation. Pod injury was greater in fields bordered by corn in both years, but irrigated fields had higher pod damage only in 2022. The number of beetles captured and incidence of pod injury did not differ with distance from field borders.

3:15 – 5:00	**Production Technology and Economics** Meeting Room: Oglethorpe/Cumberland *Moderator: Simer Virk, Univ. of Georgia*	Pres. #
3:15	**A Novel Application of the Production Function to US Peanut Harvest Progress** **F.D. MILLS, JR.***, JLA International, Abilene, TX 79606 and S.S. NAIR, School of Agricultural Sciences, Sam Houston State University, Huntsville, TX 77341	64
3:30	**Revised Thresholds for Runner Peanut Harvest Maturity in South Carolina** **D.J. ANCO***, K.R. KIRK, and J.B. HIERS, Edisto Research and Education Center, Clemson University, Blackville, SC 29817.	65
3:45	**Evaluation of the New Formulation of Prohexadione Calcium, Kudos OD, for Management of Vine Growth, Disease, and Yield Response in Peanut (*Arachis hypogaea* L.).** S. WARREN, **W.S. MONFORT***, and R.S. TUBBS, Crop and Soil Sciences Dept., University of Georgia, Tifton, GA 31793 and J. SCRUGGS, Fine-Americas, Inc., Franklin, NC 28734.	66
4:00	**Use of Crop and Drought Spectral Indices to Support Harvest Decisions for Peanut Fields in Southeastern USA.** **M.F. OLIVEIRA***, B.V. ORTIZ, A. SANZ-SAEZ, Crop, Soil, and Environmental Sciences Department– Auburn University, Auburn, AL, USA, 36849; S. L. H. ALMEIDA, J.B.C. SOUZA, J.L.P. OLIVEIRA, Department of Engineering and Mathematical Science - São Paulo State University, Jaboticabal, SP, Brazil 3209-7100; C. PILON and G. VELLIDIS, Department of Crop and Soil Sciences – University of Georgia, Tifton, GA, USA, 31793.	67
4:15	**Optimum Seeding Rate for Replanting Peanut Dependent on Initial Plant Population.** **R.S. TUBBS***, Z.A. CROMER, and W.S. MONFORT, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793.	68
4:30	**Seed Metering Performance of Different Peanut Seed Meters at Varying Seeding Rates and Planting Speeds** **S.S. VIRK***, T.D. LARIMER, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31793; C. BYERS, College of Engineering, University of Georgia, Athens, GA 30602; and G.C. RAINS, Department of Entomology, University of Georgia, Tifton, GA 31793.	69
4:45	**Influence of Crop Rotation and Fungicide Spray Programs on Peanut Productivity in Mississippi** **B. ZURWELLER*,** J. MAY, Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762; B. RUSHING, Coastal Plain Branch Experiment Station, Newton, MS 39345; and A. HENN, Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State, MS 39762	70

A Novel Application of the Production Function to US Peanut Harvest Progress

F.D. MILLS, JR.*, JLA International, Abilene, TX 79606 and S.S. NAIR, School of Agricultural Sciences, Sam Houston State University, Huntsville, TX 77341

As peanut harvest progresses each fall, the volume of peanuts delivered to US buying points is reported daily by the Federal State Inspection Service (FSIS). Deliveries and the rate of harvest advancement fluctuates as different market-types mature, weather conditions change and harvest comes to completion by geographic area. Yet, having some idea of the rate of harvest progress is beneficial in effectively staging trucks, drying trailers, dryers, personnel, etc., and potentially estimating total tonnage for the crop year.

In economics, the production function represents the physical or technical relationship between resource inputs and the associated output. In the physical sciences, this relationship is often referred to as the growth curve. By using a novel application of the production function to US peanut harvest progress, is it possible to estimate when the rate of harvest progress has reached a peak, the point when peanuts are being delivered most efficiently to buying points, and the potential total tonnage for the year?

Daily tonnage reports from 2012-2022 were accessed from Georgia FSIS, the compiler of national harvest information. Total physical product (TPP) or output, the cumulative farmer stock tons delivered to all US buying points, were averaged by day across the 11-year period. Average physical product (APP), a measure of input conversion efficiency, was calculated by taking the 11-year daily TPP means and dividing each one by the number of days harvest had been underway. Marginal physical product (MPP), which measures the rate at which harvest was progressing, was calculated by taking the daily change in TPP. Sixth order polynomial trend lines were applied to the data with exceptional fit. The coefficients of determination for the resulting equations were TPP (R^2=0.999), APP (R^2=0.9986) and MPP (R^2=0.9502). Over the 11-year period, the average length of harvest was 135 days with a standard deviation of four days. The fitted trend line for MPP indicated that the rate of harvest progress peaked October 15 (49% of crop delivered) with the non-fitted peak occurring on October 21 (63% of the crop harvested). The MPP trend line bisected the APP trend line from above on November 9 (90% of the crop harvested) with the non-fitted points bisecting on November 6 (88% of the crop harvested). This is the day on which tonnage is being most efficiently delivered across the US peanut belt. When using the regression equation to estimate tonnage delivered by day, apart from high error during the early days of harvest, predictability is good from day 38 (September 18) onward as error values decline and remain low. This trend information can be helpful in scheduling harvest and immediate post-harvest processing activity.

Revised Thresholds for Runner Peanut Harvest Maturity in South Carolina

D.J. ANCO*, K.R. KIRK, and J.B. HIERS, Edisto Research and Education Center, Clemson University, Blackville, SC 29817.

In the absence of complicating factors, economic value of harvested farmer stock peanut is greatest at optimal maturity. Traditional harvest maturity thresholds for runner market type peanut have included when approximately 75% of pods exhibit characteristics of physiological maturity, i.e., coloration of the endocarp or seed testa, or pod mesocarp color being brown or black or orange, brown, or black (OBB). However, these thresholds were developed based on cultivars (e.g., Florunner) released more than 5 decades ago that are no longer commercially grown with appreciable market share. Production data in South Carolina from 2018 to 2022 indicated relative optimal economic value for FloRun 331, Georgia-16HO, or TUFRunner 297 was reached prior to acquiring 75% OBB pods. Updated pod maturity thresholds more reliably predicted periods of optimal harvest compared to the traditional pod maturity threshold and several environment or degree-day-based criteria. Rate parameters of pod maturity increase for runner peanut approaching or subsequent to having reached optimal economic value differed (0.82 to 1.6% and 0.42 to 0.81% per day, respectively), incorporation of which further improved harvest decision thresholds in instances where environmental conditions adversely affected maturity development. Results are anticipated to afford farmers greater flexibility in scheduling digging times for applicable fields while preserving corresponding economic value.

Evaluation of the New Formulation of Prohexadione Calcium, Kudos OD, for Management of Vine Growth, Disease, and Yield Response in Peanut (*Arachis hypogaea* L.).

S. WARREN, **W.S. MONFORT***, and R.S. TUBBS, Crop and Soil Sciences Dept., University of Georgia, Tifton, GA 31793 and J. SCRUGGS, Fine-Americas, Inc., Franklin, NC 28734.

The plant growth regulator Prohexadione calcium is used to reduce vine growth, and increase pod yield of peanut. Since being labeled for peanut, Prohexadione calcium has been formulated as a water dispersal granule (Kudos WDG or Apogee WDG). However, a new oil dispersion formulation (Kudos OD) has been developed and is being evaluated for use in peanut. The objective of this study was to evaluate the efficacy of Kudos OD compared to Kudos WDG in on-farm trials for managing vine growth and yield response. Kudos OD was applied at 140 g ai/ha, 105 g ai/ ha, and 70 g ai/ha. Kudos WDG at 105 g ai/ha along with an untreated control were used for a comparison. Initial treatments were applied when 50% of the lateral vines were touching and again 14 days later. Mainstem height, disease incidence, yield, grade, and return on investments were assessed. Kudos OD suppressed mainstem height by > than 6 cm and internode length by > than 0.45 cm compared to the untreated control. Kudos OD at 105 g ai/ha had a stronger inhibition of main stem growth over time compared to Kudos WDG at 105 g ai/ha. In evaluating disease response, all prohexadione calcium treatments reduced *Rhizoctonia solani* incidence compared to the untreated control. Kudos OD at 70 g ai/ha and Kudos WDG at 105 g ai/ha increased yield compared the untreated control. However, due to extreme environmental conditions throughout 2021 and 2022, prohexadione calcium regardless of the rate or formulation did not significantly increase net revenue. In summary, Kudos OD provided increased vine growth management compared to the Kudos WDG at the 105 g ai/ha rate while providing similar yield response. Incidence of *Rhizoctonia solani* was reduced when utilizing prohexadione calcium. Increase yields were observed for the Kudos WDG and the Kudos OD at 70 g ai/ha compared to the untreated control. While weather may have influenced the yield response in both years, the 140 g ai/ha rate of Kudos OD showed trends of lower yields similarly to Kudos WDG at 140 g ai/ha seen in other studies.

Use of Crop and Drought Spectral Indices to Support Harvest Decisions for Peanut Fields in Southeastern USA.

M.F. OLIVEIRA*, B.V. ORTIZ, A. SANZ-SAEZ, Crop, Soil, and Environmental Sciences Department– Auburn University, Auburn, AL, USA, 36849; S. L. H. ALMEIDA, J.B.C. SOUZA, J.L.P. OLIVEIRA, Department of Engineering and Mathematical Science - São Paulo State University, Jaboticabal, SP, Brazil 3209-7100; C. PILON and G. VELLIDIS, Department of Crop and Soil Sciences – University of Georgia, Tifton, GA, USA, 31793.

Harvest efficiency expressed in quantity and quality of peanut fields could increase if farmers are provided with tools to support harvest decisions. Peanut farmers still rely on a visual and empiric method to assess the right time of peanut maturity but this method does not account for within-field variability of crop growth and maturity. The integration of spectral vegetation indices to assess drought, soil moisture, and crop growth to predict peanut maturity can help farmers strengthening decisions on when and where to start the harvesting process. In 2022, the within-field peanut variability was studied on a 55-hectare irrigated commercial peanut field located at Eufaula, Alabama. The field was divided into square grids (0.01-hectare size), and 20 grids of contrasting soil characteristics were selected for data collection. Starting 97 days after planting, peanut biomass samples were collected weekly from 0.66 m row length inside each grid. Assessment of peanut maturity was done manually on a 200-pod sample using the hull-scrape method and the peanut profile board. A correlation analysis was used to investigate the relationship between the spectral indices and peanut maturity. Step-wise regression was used to select the best predictor variables and predict peanut maturity. Crop vegetation indices (NDVI, GNDVI, NLI, and MNLI), moisture index (NMDI), and drought index (NDMI) of the study field were estimated from Sentinel 2 satellite images. All spectral indices correlated negatively with peanut maturity; i.e., as the peanut maturity increased, the spectral indices showed lower values. The step-wise multiple regression method identified four spectral indices, NDMI, NMDI, GNDVI, MNLI, as best peanut maturity predictors. Multiple linear regression was able to predict peanut maturity with an error of 9% (MAE) and R^2 of 0.79. Future research should focus on integrating other explanatory variables, mainly related to variables that drive within-field peanut maturity variability, like soil temperature and weather data, and also develop more robust methods e.g., machine learning algorithms.

Optimum Seeding Rate for Replanting Peanut Dependent on Initial Plant Population.

R.S. TUBBS*, Z.A. CROMER, and W.S. MONFORT, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793.

Determining whether to replant a poor stand of peanut (*Arachis hypogaea* L.) is dependent on several factors. If conditions and timing are favorable for a supplemental replant to improve the original plant population, an important determination is the optimum seeding rate for the replanting operation. Since the objective in supplemental replanting is to reach an acceptable plant population, the seeding rate needed to achieve this is dependent on the initial plant population already established. To test, experiments were planted in Tifton, GA from 2019-2021, and in Plains, GA from 2020-2021 during late April to early May, and thinned by hand to populations of 3.3, 4.9, 6.6, and 8.2 plants/m of row. Each of these populations were established five times, so each population could be replanted with seeding rates of 0.0, 6.6, 9.8, 13.1, or 16.4 seed/m to increase stand, occurring 3 weeks after initial planting. A check with an optimum original population of 13.1 plants/m was also established. Replanting increased plant populations to equal or greater stand as the check, and always greater than not replanting. Yield was highly correlated with final population, and incidence of tomato spotted wilt virus (TSWV) (*Orthotospovirus*) was negatively correlated with final stand. Without replanting, yield was reduced compared to the check when the initial plant population was 6.6 plants/m or less. Replanting always increased yield compared to not replanting, but the replant seeding rate needed to maximize yield was dependent on the initial plant density. When initial population was 3.3 plants/m, yield was maximized when a replant seeding rate of 9.8 seed/m was used. At initial population of 4.9 plants/m, yield was maximized with a replant seeding rate of 9.8 seed/m. With initial populations of 6.6 or 8.2 plants/m, replanting with a seeding rate of 6.6 seed/m was satisfactory to optimize yield. Although there was no difference between the 8.2 and 13.1 plants/m populations, replanting the 8.2 plants/m stand still benefited from replanting. This is likely because of increased population and expanding the maturity window for termination timing since initial plants becoming overmature are offset by replanted plants continuing to progress in maturity. Linear regression of plant population, yield, and TSWV revealed a 230 kg/ha increase in yield and a 1.3% decrease in TSWV for every additional 1 plant/m in stand, and a 66.4 kg/ha decrease in yield for every 1% increase in TSWV. Supplemental replanting of peanut has the potential to greatly improve production and reduce TSWV incidence when plant populations are not optimal. Additional research is needed to further examine the benefits of secondary planting of established peanut fields even when the initial plant population is adequate, to possibly expand the maturity window and improve yield and overall grade of the peanut crop.

Seed Metering Performance of Different Peanut Seed Meters at Varying Seeding Rates and Planting Speeds

S.S. VIRK*, T.D. LARIMER, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA, 31793; C. BYERS, College of Engineering, University of Georgia, Athens, GA 30602; and G.C. RAINS, Department of Entomology, University of Georgia, Tifton, GA 31793.

Planting technology has seen tremendous improvements in recent years with newer, advanced seed metering systems available for most row crops including peanut. However, peanut planting differs from other row crops due to higher seeding rates, which also necessities seed metering and consequently planting at lower than nominal planting speeds. Currently, information on the performance of various commercially available and commonly used peanut seed meters is limited as well as on if newer electrically-driven seed meters provide any benefits over the traditional mechanically-driven seed meters. Therefore, a study involving static seed metering performance testing was performed for three different peanut seed metering units (John Deere, Monosem, and Precision Planting) at six seeding rates (3, 4, 5, 6, 7, and 8 seeds per ft) and six planting speeds (2.5, 3.0, 3.5, 4.0, 4.5, and 5.0 mph). The tests were conducted on a Precision Planting seed meter test stand equipped with sensors on the seed tube and a monitor to measure and display real-time seed metering performance data including actual population (seeds/ac), singulation (%), skips (%), multiples (%), meter speed (rpm), and seed release index (SRI). The tests were arranged and conducted as a factorial arrangement of seed meter x seeding rate x planting speed. Results from the static testing showed that seed singulation (%) decreases with an increase in seeding rate and planting speed regardless of the seed meter type. Additionally, the Monosem and Precision Planting seed meter provides better singulation performance compared to the John Deere seed meter, mainly due to the differences in the seed disc design and performance among the three manufacturers. Both John Deere and Monosem seed meters provided comparable singulation (>80%) up to 4.0 mph planting speed and under the 6 seeds/ft seeding rate, and then the singulation dropped significantly as the seeding rate or planting speed increased. The Precision Planting seed meter did perform slightly better than the other two seed meters at both higher seeding rates and planting speeds but only up to the seeding rate of 7 seeds/ft and planting speed of 4.5 mph. More testing is currently underway to thoroughly understand the performance of all three seed meters with the addition of quantifying the effect of varying vacuum pressure on meter performance.

Influence of Crop Rotation and Fungicide Spray Programs on Peanut Productivity in Mississippi

B. ZURWELLER*, J. MAY, Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762; B. RUSHING, Coastal Plain Branch Experiment Station, Newton, MS 39345; and A. HENN, Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State, MS 39762

Crop rotation is a critical management decision that has been documented to reduce disease incidence and maximize yield potential in peanut. However, commodity markets may not always support the implementation of longer crop rotation sequences. Therefore, the objective of this research was to: (i) evaluate the short-term effects of two- and three-year crop rotation sequences on peanut disease incidence and productivity in a field with no recent history of peanut cultivation; (ii) determine if additional fungicide sprays mitigate near-term peanut pod yield loss associated with short crop rotation sequences. A field trial was established in Central Mississippi that consisted of seven crop rotation sequences including continuous peanut cultivation, two-year, and three-year crop rotation sequences. After two cycles of the two-year crop rotation sequences, and one cycle of the three year sequences, each crop rotation sequence was treated with fungicide treatments consisting of a non-treated control, three, and four fungicide applications. The two-year crop rotation sequences of peanut-cotton and peanut-corn had similar pod yields when compared to the peanut-cotton-cotton rotation sequence. However, these three rotation sequences had greater pod yield when compared to peanut-corn-soybean, peanut-cotton-soybean, peanut-soybean, and continuous peanut rotation sequences. Rotation sequences of peanut-cotton, peanut-corn, and peanut-cotton-cotton not treated with fungicide had similar pod yield as the other rotations with four fungicide treatments. These research results demonstrate that additional fungicide applications may not compensate for poor crop rotation sequences.

8:30 – 9:45	**Symposium – Opportunities and Challenges Facing U.S. Peanuts in International Markets** Meeting Room: Oglethorpe/Cumberland *Moderator: Richard Owen, APRES Exec. Director*	Pres. #
8:30	**Richard Owen, Executive Officer, APRES**	
8:35	**Richard Owen, Executive Officer, APRES**	ST-1
8:55	**Panelist** **Dr. Darlene Cowart, Vice President of Food Safety and Quality, Birdsong Peanuts**	ST-2
	Panelist **Dr. Foy Mills, Vice President of Ag Systems, JLA International**	ST-3
9:35	**Announcements and Updates** **R. SCOTT TUBBS, Technical Program Chair; and SIMER VIRK, Local Arrangements Chair**	

10:00 - 12:00	**Breeding, Biotechnology, and Genetics II** Meeting Room: Cumberland *Moderator: Josh Clevenger, HudsonAlpha*	Pres. #
10:00	**Tools to Mine and Explore Genetic and Genomic Data at PeanutBase** **S. DASH***, C. CAMERON, A. CLEARY, A.D. FARMER, S. REDSUN, S. HOKIN, National Center for Genome Resources, Santa Fe, NM; J.D. CAMPBELL, S. CANNON, W. HUANG, B. JORDAN, S. KALBERER, H. LEE, and N.T. WEEKS, USDA-ARS, Corn Insects and Crop Genetics Research Unit, Ames, IA.	71
10:15	**MAGIC Peanut, a New Genetic Resource for High-Definition Trait Mapping and Breeding Selection** E. THOMPSON, H. WANG, S. GANGURDE, A.K. CULBREATH, University of Georgia, Department of Plant Pathology, Tifton, GA; W. KORANI, J.P. CLEVENGER, HudsonAlpha Institute for Biotechnology, Huntsville, AL; B.D. TONNIS, M.L. WANG, USDA-ARS, Plant Genetic Resources Conservation Research Unit, Griffin, GA; C.C. HOLBROOK, and **B. GUO***, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA.	73
10:30	**Towards Development of a Near-Isogenic Introgression Population of Peanut.** **M. D. BUROW***, Texas A&M AgriLife Research, Lubbock, TX 79403, and Texas Tech University, Dept. of Plant and Soil Science, Lubbock, TX 79409; T. TENGEY, and R. OTENG-FRIMPONG, Savanna Agricultural Research Institute, Tamale, Northern Region, Ghana; R. S. BENNETT, USDA-ARS, Stillwater, OK 74075; T. A. WHEELER, Texas A&M AgriLife Research, Lubbock, TX 79403; T. GAUS-BOWLING, Amarillo College, Amarillo TX, and Texas Tech University, Dept. of Plant and Soil Science, Lubbock, TX 79409; V. MENDU, Montana State University, Department of Plant Sciences and Plant Pathology, Bozeman MT 59717; H. PHAM, Texas A&M AgriLife Research, Lubbock, TX 79403; J. CASON, and C. SIMPSON, Texas A&M AgriLife Research, Stephenville, TX 76401.	74
10:45	**Quantitative Genomic Responses to Drought Stress in Cultivated Peanuts** Q. ZHANG, A. SANZ-SAES, Y. FENG, **C.Y. CHEN***, Auburn University, Auburn, AL 36849; P.M. DANG, USDA-ARS National Peanut Research Lab, Dawson, GA 39842; J. LOVELL, and J. SCHMUTZ. HudsonAlpha Institute for Biotechnology, Huntsville, AL 35806, USA	75
11:00	**An Enhanced Whole Genome Sequencing (eWGS) Panel for Intraspecific and Interspecific Peanut Genomics** **J. CLEVENGER***, W. KORANI, Z. MYERS, and P. SANMARTIN, HudsonAlpha Institute for Biotechnology, Y. CHU and P. OZIAS-AKINS, University of Georgia, Institute of Plant Breeding, Genetics and Genomics, K. CHAMBERLIN, USDA-ARS, Crop Genetics and Breeding Research, J. BALDSSARI, INTA, D. FONCEKA, ISRA/CERAAS, J.C. DUNNE and R. ANDRES, North Carolina State University, Department of Crop Science	76
11:15	**Genome-Wide Association Study of Seed Oil Content and Weight in a Subset of USDA Cultivated Peanut Collection** **B. TONNIS***, M.L. WANG, S. TALLURY, Plant Genetic Resources Conservation Unit, USDA-ARS, Griffin, GA 30223, J. CLEVENGER, W. KORANI, Hudson Alpha, Huntsville, AL, 35806; Y. CHU, and P. OZIAS-AKINS, IPBGG, University of Georgia, Tifton, GA, 31793.	77
11:30	**Cracking the Genetics of Pod Hardness in the Israeli Virginia-type Germplasm** G. BEN-ISRAEL, S. KUNTA, Y. LEVY, and **R. HOVAV***, Department of Field Crops, Institute of Plant Sciences, Agriculture Research Organization - the Volcani Center, 7505101 Rishon LeZiyyon, Israel.	78

Tools to Mine and Explore Genetic and Genomic Data at PeanutBase

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

PeanutBase as the community portal of genetic and genomic data for peanut researchers has emphasized data integration in Phase II of the International Peanut Genome Initiative. The outcome of this effort includes the ArachisMine, JBrowse2 and Genome Context Viewer (GCV) tools, among others.

ArachisMine is an instance of InterMine, a data warehouse for complex biological data, with an interface that enables users to search either simply using keywords or construct precise queries to interrogate the data. A particular strength of the "Mines" is their ability to operate on collections of biological lists, for example looking for enrichment in functional categories or visualizing expression across sets of genes. Query templates are provided to help users quickly address common biological questions.

The Genome Context Viewer is a web application for analyzing and visualizing genomic synteny across a collection of genomes. This allows exploration of gene-level microsynteny and chromosome-scale macrosynteny among peanut and its diploid relatives and can also connect to sources with genomes of other legume species and integrate them with the data maintained in PeanutBase The tool first conducts genome-wide scans to identify potentially syntenic regions, then aligns groups of collinear genes according to their membership in gene families or assignments to pangene sets. The correspondences determined between genes are a powerful way to understand conserved and variable functional content.

JBrowse2 is the recent, highly enhanced and multigenome-capable version of the JBrowse genome browser. It is capable of improved structural variant and comparative genomics visualization, and supports many common data types such as markers and genes, variant data, and expression. It is capable of providing views of dot plots, breakpoints, multiple chromosomes, simultaneous views of multiple data types, etc. Peanutbase has deployed JBrowse2 to enhance the comparative genomic and variants data visualization capability at PeanutBase. As a result, users can now visualize, for example, multiple genomes simultaneously such as *A. cardenasii* and *A. duranensis,* with dot plots pointing to the regions with structural changes in the genomes, and coordinated linear representations that allow corresponding views of variation between genomes to be enhanced with displays of gene content and other data enabling assessment of the functional consequences of variation.

These three tools are interconnected with one another and other tools and together provide mechanisms for exploring a wide variety of data on the Peanutbase site.

MAGIC Peanut, a New Genetic Resource for High-Definition Trait Mapping and Breeding Selection

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Peanut (*Arachis hypogaea* L.) is an economically important legume crop worldwide as a major source of protein and vegetable oil. In peanut genetic mapping studies, bi-parental populations, derived from two parent crosses, have been the “standard” for mapping traits of interest due to the limited recombination and the complexity of peanut genomes, hindering previous marker-trait studies. Recent advances in genome sequencing and computational bioinformatics provide unprecedented possibilities for trait discovery and identification of genetic markers for breeding. Therefore, we have developed a multi-parent advanced generation inter-cross (MAGIC) population with 2,775 recombinant inbred lines (RIL) derived from eight diverse peanut lines, called MAGIC Peanut. The characterization of 310 MAGIC Core peanut lines shows that this MAGIC Peanut population is a balanced and evenly differentiated mosaic of chromosomal segments from the eight parents. Total of 138,151 SNPs have been identified using the Khufu informatics pipeline for genomic analyses. Here we demonstrate that this subset of MAGIC Peanut achieves high mapping power and resolution across different analyses for single locus and multi-locus traits such as high oleic acid and shelling percentage, respectively. Therefore, in the “post genomic” era, genotyping of large complex populations by whole genome sequencing is feasible, however, precise phenotyping is required for dissection of complex traits.

Towards Development of a Near-Isogenic Introgression Population of Peanut.

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Peanut wild species are a reservoir of relatively-untapped genetic variation; however, introduction of useful novel alleles for resistance to biotic stress and tolerance to abiotic stress can be accompanied by linkage drag for alleles for low yield or undesirable agronomic traits. We have begun a program of marker-assisted backcrossing to develop near-isogenic introgression lines in a common cultivated genetic background. We have obtained 9,589 polymorphic high-resolution SNPs to add to the KASP map of the BC_1 population already developed. We have used marker maps from the BC_3F_6 generation to select parents that have produced the BC_4F_1 generation. The BC_3-derived population is being phenotyped for resistance to root-knot nematodes and resistance to *Aspergillus flavus* colonization. Further crosses by selected BC_3-derived lines have developed populations to validate resistance to leaf spots and *A. flavus* colonization in different runner and Spanish backgrounds. Phenotypic characterization has indicated that alleles for resistance to leaf spots and *A. flavus* contamination have been introduced and are being expressed in Spanish populations.

Quantitative Genomic Responses to Drought Stress in Cultivated Peanuts

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In the U.S., peanut is often grown in sandy soils with low water-holding capacity and in environments with variable rainfall. Therefore, without irrigation, peanut may be frequently subjected to drought stress. Drought results in the reduction of transpiration, and thus photosynthesis, which results in a reduction of biomass accumulation and yield losses of approximately 20% every year (Tardieu & Tuberosa, 2010; Sinclair et al., 2010). Ongoing NIFA funded project entitled “Dissection and Exploitation of Gene Networks That to Improve Peanut Yield Under Drought” aims to develop molecular targets that will enhance efforts to breed drought tolerant peanut varieties through an integrated test of molecular and physiological responses to drought. In 2021, we built a new reference genome for the highest yielding cultivar under drought (“Line-8”) and document all sequence variants between Line-8 and the recently published “Tifrunner” peanut genome. By testing the relative expression of alleles from drought-tolerant and susceptible parents in F1 hybrids, we will be able to define the potential causal variants that regulate gene expression and affect downstream physiology and whole-plant phenotypes. To test the physiological and molecular responses to drought among these genotypes, we grow 8 parents and F1 hybrids of 7 crosses in the control and drought treatments. Analysis of the drought/control RNA sample with physiological data of relative water content (RWC), specific leaf area, carbon isotope ratio, leaf water potential and leaf density moisture content (LDMC) and photosynthesis rate is undergoing.

An Enhanced Whole Genome Sequencing (eWGS) Panel for Intraspecific and Interspecific Peanut Genomics

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Enhanced whole genome sequencing (eWGS) is a method of sequencing library preparation that combines both targeted and whole genome sequencing that was developed by Twist Bioscience. In a pilot experiment, eWGS showed remarkable accuracy, recovering 99.9% of targeted sites even at extremely low sequence coverages (<0.1x). The method is tunable for need, either sequencing at a higher coverage (~1x) to attain more genome wide markers, or sequencing at lower coverage (<0.5x) to recover only targets and decrease cost. Through collaborations over the past year, we have generated genome-wide genotypes for core collections from the US, Argentina, the continent of Africa, and India. We have tracked introgression from interspecific datasets that represent important wild species. We have helped identify haplotypes linked to phenotypes of interest ranging from disease resistance and stress tolerance to quality traits. These datasets present a rare opportunity to develop a panel of targets that not only represent global diversity, but also represent current interspecific populations, and represent much of the known functional markers. The efficacy of the peanut eWGS panel provides genomics solutions across all aspects of breeding, genetics, and genomics for peanut.

Genome-Wide Association Study of Seed Oil Content and Weight in a Subset of USDA Cultivated Peanut Collection

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As part of an ongoing effort to characterize USDA germplasm collections, about 8,000 individual inventories from the peanut collection housed at the Plant Genetic Resources Conservation Unit in Griffin, GA were phenotyped for oil content and seed size and color. A large amount of variation was observed in these traits. For 100-seed weight, the mean was 49.44 g and ranged from 21.84 – 148.36 g (6.8-fold difference). For seed oil, the mean was 48.94% and ranged from 36.51 – 59.45% (1.6-fold difference). In addition to these phenotypic data, genotypic data has also been collected on ~2,400 accessions that originated from Africa using the peanut SNP array. In these accessions, the mean seed weight was 47.08 g (range 21.84 – 117.29 g), while the mean oil was 48.96% (range 39.5 – 58.48%), which are similar in range to the entire collection. The observed variation and large size of the dataset suggests that meaningful information could be obtained on the genetic basis of the measured traits. We will conduct a genome-wide association study as a preliminary investigation into the genetics of seed oil content and weight, and the results from this analysis will be presented. The obtained results may help us in the design of future field studies to confirm these traits in identified accessions as well as to conduct further investigations in the genetic components of seed oil content and weight.

Cracking the Genetics of Pod Hardness in the Israeli Virginia-type Germplasm

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Yield loss due to shell breakage is a serious issue in the Israeli in-shell peanut market. Shell breakage reduces the percentages of exported pods and lowers the revenues for growers. Pod hardness (PH) is the major trait that affects shell breakage. PH has a significant genetic component, as cultivars intended for the in-shell market usually have harder shells than those intended for shelling. Yet, the genetics of PH in peanut is unclear. Also, the method to rank it for selection is qualitative and subjective. We studied the genetics of PH in a series of cultivars and recombinant inbred lines (RIL) that are segregating for the trait. Initially, a quantitative method was developed to measure PH by using TA1 texture analyzer (Stable Micro). It was found that using a P/5 punching probe and the proximal part of isolated shells gave the most significant difference of *g* values between two Virginia-type cultivars, Hanoch (hard; Av_g = 5200) and Harari (soft; Av_g = 3900) ($p<0.0001$; $R^2 = 0.495$). Applying this method in different cultivars and growing plots found a significant negative correlation between PH and the % of cracked pods (r=-0.73). Subsequently, PH was measured in a set of ~220 RIL derived from Hanoch X Harari cross. A medium heritability estimation (H = 0.52) was found for PH in the population. PH mapping was performed using an existing genetic map based on the Axiom_*Arachis*2 48k SNP array. One QTL was found for PH on LG B02 (*qPHB02*), between markers AX-9846838_B03 - AX-102443563_B03, with a relatively major effect (LOD=11.3; %PVE = 21.2). Applying the best markers for *qPHB02* in a group of historical cultivars representing four decades of peanut breeding in Israel found significant correspondence between the allelic situation and the designation of the cultivar (i.e., for in-shell or shelling), suggesting that specific selection for the *qPHB02* locus may have a significant role in shaping the Israeli peanut industry. General components analysis of isolated shells showed that cellulose and hemicellulose are more abundant in Hanoch than in Harari. Currently, additional microscopic and metabolites and candidate genes analyses are being performed to gain more insight into the molecular and biological role of *qPHB02*.

10:00 - 11:45	**Plant Pathology and Nematology** Meeting Room: Ossabaw *Moderator: Emily Cantonwine, Valdosta State Univ.*	Pres. #
10:00	**Fungicide Sensitivity of *Aspergillus flavus* from Peanut Seeds in Georgia to the Fungicides Prothioconazole, Fluopyram, Fludioxonil, and Thiobendazole** **M.D. AKTARUZZAMAN***, T. BRENNEMAN, A. CULBREATH, J.E. OLIVER, and M.E. ALI. Department of Plant Pathology, University of Georgia, Tifton, GA 31793, USA.	79
10:15	**Estimating Growth Rates of Passalora arachidicola and Nothopassalora personata on Media** **E.G. CANTONWINE*** and R.M.S. HUNTER, Department of Biology, Valdosta State University, Valdosta, GA 31698	80
10:30	**A Short History of Penthiopyrad for Management of Peanut Leaf Spot 2004-2022.** **A.K. CULBREATH***, T.B. BRENNEMAN, and R.C. KEMERAIT Department of Plant Pathology, Univ. of Georgia, Tifton, GA 31793-5766.	81
10:45	**The Struggle is Real: Characterizing Damage Caused by the Northern Root-knot Nematode on Virginia-type Peanuts** **M.B. DA SILVA*** and D. LANGSTON. Virginia Tech, Suffolk- VA.	82
11:00	**Tomato Spotted Wilt Incidence, Leaf Spot-Incited Defoliation, and Yield Response of Selected Commercial Peanut Cultivars in an Irrigated Production System from 2017 to 2022** **A.K. HAGAN***, A. STRAYER-SCHERER, H. L. CAMPBELL, K. L. BOWEN, Department of Entomology and Plant Pathology, Auburn University, AL 36849; and C. PARKER, Wiregrass Research and Extension Center, Headland, AL 36345	84
11:15	**Evaluation of Peanut Rx Spray Programs for Peanut Disease Control in Southeast Alabama** **A. STRAYER-SCHERER***, H.L. CAMPBELL, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849; and C. PARKER, Wiregrass Research and Extension Center, Headland, AL 36345	85
11:30	**On-going Fungicide and Growth Regulator Research in Louisiana Peanut** **P. PRICE***, LSU AgCenter, Macon Ridge Research Station, Winnsboro, LA 71295 and B. PADGETT, LSU AgCenter, Dean Lee Research and Education Center, Alexandria, LA 71302.	86

Fungicide Sensitivity of *Aspergillus flavus* from Peanut Seeds in Georgia to the Fungicides Prothioconazole, Fluopyram, Fludioxonil, and Thiobendazole

MD. AKTARUZZAMAN*, T. BRENNEMAN, A. CULBREATH, J.E. OLIVER, and M.E. ALI, Department of Plant Pathology, University of Georgia, Tifton, GA 31793, USA.

Peanuts (*Arachis hypogaea* L.) serve as a significant source of protein and oil and are considered one of the most crucial oilseeds crops worldwide. It is estimated that 68% of all peanuts grown in the United States are produced in the Southeast region including Georgia. *Aspergillus flavus*, a virulent pathogen for seeds and seedlings causes a significant decrease in seed germination. Fungicides applied either in furrow or as seed treatments are the primary means of managing this pathogen, but repeated use has led to reduced sensitivity to azoxystrobin in *A.flavus* in the United States. To investigate the sensitivity of *A. flavus* to fungicides, we conducted an experiment at the University of Georgia. A total of 78 *A. flavus* isolates were obtained from seven infected peanut seed lots in Georgia in 2020. To evaluate their *in vitro* sensitivity to prothioconazole, fluopyram, fludioxonil, and thiobendazole, a mycelial growth inhibition assay was conducted on potato dextrose agar (PDA) medium. The effective concentration that resulted in 50% inhibition (EC_{50}) was estimated based on the relative mycelial growth of *A. flavus* on PDA versus PDA amended with various concentrations of each fungicide. The results showed that 71 isolates (91.0%) were sensitive (0.12 to 0.49 µg/mL) to prothioconazole, while 7 isolates (9.0%) were less sensitive (0.53 to 0.81 µg/mL). For fluopyram, 73 isolates (93.6%) were sensitive (0.005 to 4.62 µg/mL), while 5 isolates (6.4%) were less sensitive (5.6 to 8.04 µg/mL). As for fludioxonil, 65 isolates (83.3%) were sensitive (0.001 to 0.7 µg/mL), 9 isolates (11.6%) were less sensitive (1.02 to 2.9 µg/mL), and 4 isolates (5.1%) were resistant (10.05 to 205.93 µg/mL). For thiobendazole, 2.0 µg/mL completely inhibited the growth of all isolates, but it had little if any effect on growth at 1.0 µg/mL. The findings of this research provide important information for selecting appropriate fungicides to ensure consistent stand establishment in future crops.

Estimating Growth Rates of Passalora arachidicola and Nothopassalora personata on Media

E.G. CANTONWINE* and R.M.S. HUNTER, Department of Biology, Valdosta State University, Valdosta, GA 31698

Passalora arachidicola and *Nothopassalora personata*, the causal agents of early and late leaf spot, respectively, have extremely slow growth rates on media that make measurements of growth using traditional methods difficult. An experiment was conducted to evaluate the effectiveness of image analyses to assess changes in radial growth over time. Two isolates of *P. arachidicola*, PA16 and PA18, and three of *N. personata,* NP16, NP18B, and NP18R, were evaluated. All isolates had a morphotype consistent with the original brown morphology typical to these fungi, except NP18R, which had a red morphotype. Propagule suspensions, prepared from conidia grown on potato dextrose agar (PDA), were inoculated onto fresh PDA plates as 20 µl aliquot drops. After the inoculum drops were dry, plates were maintained at room temperature (20 to 22ºC), under continuous light, without Parafilm for the duration of the experiment. Viable propagules were quantified after 2 days of incubation (doi) for three aliquots per isolate to standardize area estimations by propagule. Starting at the first visual signs of growth, 2 doi for *P. arachidicola* and 6 doi for *N. personata*, a 1.55 cm cork borer was pressed into the media around the fungal tissues to imprint a standard area. Images, taken every 2 days until 24 doi using diascopic illimitation, were analyzed with ImageJ to estimate the percentage of the plug area with fungal tissue. At each assessment date, the brown isolates of *N. personta* had significantly less tissue area per propagule than the *P. arachidicola* isolates. Tissues of NP18R exceeded those of the *P. arachidicola* isolates near the end of the experiment. Growth rates, calculated using derivatives of the quadratic models for each isolate-replicate ($R^2>0.95$; $P<0.01$), were statistically similar for NP16 and NP18B (0.005 to 0.009 mm^2 per day) and did not significantly change throughout the experiment. PA16 had a faster growth rate at each assessment date (0.014 to 0.026) than PA18 (0.009 to 0.020 mm^2 per day), with the rates of both significantly decreasing between 6 and 22 doi. Growth rates of NP18R, which were among the slowest at 6 doi (0.003 mm^2 per day), were over twice as fast at 22 doi (0.061 mm^2 per day) than the fastest rates measured for the PA isolates. This study demonstrates that the ImageJ method to measure radial growth of *P. arachidiola* and *N. personata* is sensitive enough to detect differences between NP morphotypes and PA isolates. As long as the starting morphotype remains stable, ImageJ analyses should be an effective method to assess treatment effects in other *in vitro* experiments with these fungi.

A Short History of Penthiopyrad for Management of Peanut Leaf Spot 2004-2022.

A.K. CULBREATH*, T.B. BRENNEMAN, and R.C. KEMERAIT, Department of Plant Pathology, Univ. of Georgia, Tifton, GA 31793-5766.

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. In 2008, full season applications of the succinate dehydrogenase inhibiting (SDHI) (FRAC Group 7) fungicide penthiopyrad (Fontelis 1.67 SC) at 0.20 kg a.i./ha per application or higher was reported to provide control of late leaf spot similar to that provided by 1.26g kg a.i./ha of the protectant fungicide chlorothalonil (Bravo WeatherStik 720F). The objective of this study was to examine the effects of penthiopyrad compared to chlorothalonil on leaf spot epidemics since 2014. Field experiments were conducted in 2014-2022 in which penthiopyrad and chlorothalonil were compared to each other and a nontreated control. Leaf spot severity ratings (Florida 1-10 scale) were used for the comparisons. In four experiments, full-season applications of penthiopyrad and chlorothalonil were compared to a nontreated control. In 2014, leaf spot ratings were 2.8, 4.3, and 9.2 (LSD = 0.7) for 0.23 kg a.i./ha of penthiopyrad, 1.26 kg a.i./ha of chlorothalonil, and the nontreated control, respectively. Across two experiments in 2017 and 2018, leaf spot ratings were 6.5, 6.8 and 8.7 (LSD = 0.6) for 0.12 kg a.i./ha of penthiopyrad, 1.26 kg a.i./ha of chlorothalonil, and the nontreated control, respectively. In 2019, leaf spot ratings were 5.3, 6.0, and 9.2 (LSD = 0.9) for 0.23 kg a.i./ha of penthiopyrad, 1.26 kg a.i./ha of chlorothalonil, and the nontreated control respectively. In 2021, leaf spot ratings were 8.8, 6.8 and 9.8 (LSD = 1.1) for 0.15 kg a.i./ha of penthiopyrad, 0.84 kg a.i./ha of chlorothalonil, and the nontreated control, respectively. In 2017, 2018, 2021, and 2022, applications of penthiopyrad at 0.24 kg a.i./ha in sprays 3,4,5 with 1.26 kg a.i./ha of chlorothalonil in all other sprays were compared to full season applications of 1.26 kg a.i./ha of chlorothalonil and a nontreated control. Leaf spot ratings were 5.9, 7.1, and 8.0 (LSD = 0.5) in 2017; 7.6, 8.1, and 9.6 (LSD = 0.7) in 2018; 5.5, 4.7, and 9.2 (LSD = 0.8) in 2021; and 4.6, 4.1, and 7.4 (LSD = 0.7) in 2022 for the penthiopyrad, chlorothalonil, and control treatments respectively. These results indicate that penthiopyrad provides leaf spot control comparable to that of chlorothalonil in many cases. However, similar efficacy for the two fungicides is not consistent.

The Struggle is Real: Characterizing Damage Caused by the Northern Root-knot Nematode on Virginia-type Peanuts

M.B. DA SILVA* and D. LANGSTON, Virginia Tech, Suffolk- VA.

Meloidogyne hapla, the Northern root-knot nematode, is a plant parasitic nematode that has been shown to infect a wide range of crops including peanuts. In peanuts, *M. hapla* can lead to the development of small galls in the roots, which may be very difficult to detect with the naked eye as compared to lesions on pods caused by the peanut root-knot nematode (*Meloidogyne arenaria*). Two field trials were conducted in 2022 to assess nematicides for reducing losses to root-knot nematode (RKN) and damage on peanut roots and pods. Both trials were planted on May 19 to Virginia-type cultivar 'Bailey II' and plots were arranged in randomized blocks with four replications per treatment. Initial RKN populations of J2s per 100cc of soil ranged from 1 to 4 in trial 1 and between 0 and 7 in trial 2. Despite low initial RKN populations, high numbers of J2s were observed in soil samples collected at harvest for all treatments. Although no significant differences were observed at-harvest on RKN populations, yield or pod damage, the untreated control showed the highest numbers of RKN, 236 in trial 1 and 1044 RKN in trial 2. While freshly dug roots didn't show apparent signs of symptoms or galling, staining with phloxine B revealed the presence of RKN egg masses in the roots. Peanut pods exhibited areas of dark discoloration, small (≤ 1 mm diameter) pock marks, and raised, dark cracks that were ca. 5mm in diameter. Although no nematodes were found in pock marks, raised cracks contained transparent dry carcasses of RKN females. DNA was extracted form at-least 5 RKN females and *Meloidogyne*-specific primers were used to identify RKN species using PCR. Results of PCR were positive for *M. hapla*. The absence of discernible root galls and less prominent pod damage compared to *M. arenaria* impedes accurate visual assessment of root and pod damage caused by *M. hapla* on peanut. Methodology that employs root staining and further characterization of pod damage caused by *M. hapla* may provide more accurate and efficient assessment schemes.

Tomato Spotted Wilt Incidence, Leaf Spot-Incited Defoliation, and Yield Response of Selected Commercial Peanut Cultivars in an Irrigated Production System from 2017 to 2022

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In 2017, 2018, 2019, 2020, 2021, and 2022, incidence of tomato spotted wilt (TSW) and defoliation attributed to early and late leaf spot along with yield was assessed for AU NPL-17, FloRun 331, Georgia-06G, Georgia-09B, Georgia-12Y, Georgia-14N, Georgia-16HO, TifNV-High O/L, and TUFRunner 297. In each study year, cultivars were planted on site maintained in a 3-year out rotation at the Wiregrass Research and Extension Center in Headland, AL. A factorial design arranged in a split-plot with year as the whole plot, cultivar as the split plot arranged in four replications, was used. Over the study period, greatest rainfall totals (42.7 in) were recorded in 2018 and lowest (14.6 in) in 2022. Plots were irrigated as needed with a lateral irrigation system. As indicated by a significant year x cultivar interaction, the relative ranking for each cultivar in each study year differed significantly in terms of TSW indices, defoliation (%), and yield. Except for Georgia-09B in 2018, similarly low TSW indices were recorded for all cultivars in 2017 and 2018. Subsequently, disease incidence were often greater for each cultivar in 2021 and 2022 compared with 2019 and 2020. When compared with each cultivar in 2019, 2020 and 2022, TSW incidence were often significantly lower for Georgia-12Y and to a lesser extent AU NPL-17 and Georgia-14N, while FloRun 331, Georgia-06G, and Georgia-16HO had among the higher disease indices. Leaf spot defoliation rankings significantly differed for individual cultivars by study year with the lowest disease ratings being recorded in 2019 for all cultivars except for Georgia-16HO. The greatest defoliation was noted in 2021 and to a lesser extent 2022 and 2017 with AU NPL-17, FloRun 331, Georgia-16HO, and TUFRunner 297 suffering excessive premature leaf loss in two of latter three years. While Georgia-14N suffered less defoliation in the above years of elevated disease pressure, leaf spot defoliation for the remaining cultivars were typically intermediate. Across all cultivars, yield was greatest in 2018 and equally low in 2021 and 2022. AU NPL-17, Georgia-06G, Georgia-12Y, TUFRunner 297, and Georgia-16HO had similarly greater yield in four of six study years. Yield for Georgia-14N often ranked significantly less than the former cultivars, particularly in 2017, 2018, 2020, and 2022. Over the study period, TSW did not selectively intensify in Georgia-06G alone but across all cultivars with disease incidence sharply increasing across all cultivars from negligible levels in 2017 and 2018 to likely significant yield losses in 2021 and 2022. Possible reasons for this intensification of TSW will be presented.

Evaluation of Peanut Rx Spray Programs for Peanut Disease Control in Southeast Alabama

A. STRAYER-SCHERER*, H.L. CAMPBELL, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849; and C. PARKER, Wiregrass Research and Extension Center, Headland, AL 36345

Fifteen peanut Rx spray programs designed for low-, medium-, or high-risk fields were evaluated for their efficacy in controlling early leaf spot (*Passalora arachidicola*), late leaf spot (*Novopassalora personatum*), and stem rot (*Athelia rolfsii*) in southeast Alabama at the Wiregrass Research and Extension Center (WGREC) in Headland, AL on 'Georgia-16HO' peanuts. One spray program containing seven applications of chlorothalonil was used as a positive control. Treatments were arranged in a randomized complete block design with six replications and peanuts were planted on May 31st, 2022. Leaf spot intensity was evaluated using the Florida 1-10 leaf spot scoring system. Stem rot incidence was assessed immediately after plot inversion by counting the number of disease loci per row. Yields were reported at 9.88% moisture.

Early leaf spot first appeared the last week of Aug and progressed throughout Sep. Late leaf spot developed in late Sep and progressed rapidly throughout Sep and Oct. Leaf spot intensity was significantly lower for all fungicide programs when compared to the nontreated control, which suffered considerable premature defoliation. Except for Syngenta's low risk and Nichino's low risk spray programs, the remaining Peanut Rx spray programs provided similar disease control when compared to the chlorothalonil (Echo 720) only control. White mold pressure was low in this trial, but all spray programs significantly reduced white mold incidence when compared to the nontreated control. Only FMC's low risk and Syngenta's medium risk programs were significantly higher than the chlorothalonil only control. All programs significantly increased yield when compared to the nontreated control. All programs provided similar yields to the chlorothalonil only control with Syngenta's high risk, BASF's high risk, and FMC's medium risk having the top three yielding spray programs.. Thus, these results demonstrate the importance of utilizing the Peanut Rx guide to determine the risk of a field and select the best spray program to control leaf spot diseases.

On-going 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 begun investigations into fungicide application timing and efficacy as well as growth regulator effects in peanut in Louisiana.

On-farm efforts at three locations during 2021 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. Preliminary 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 initiated in Winnsboro and St. Joseph, LA during the 2021 growing season. 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. On-farm and small plot research will continue during the 2022 and 2023 seasons.

1:30 – 3:00	**Breeding, Biotechnology, and Genetics III** Meeting Room: Cumberland *Moderator: Nino Brown, Univ. of Georgia*	Pres. #
1:30	**Genetics of Leaf Scorch/Pepper Spot Disease Resistance in Cultivated Peanut.** **N. BROWN***, W.D. BRANCH, Dept. of Crop and Soil Sciences, University of Georgia,Tifton, GA; W. KORANI, and J. CLEVENGER, Hudson Alpha Institute for Biotechnology, Huntsville, AL.	87
1:45	**Progress in Breeding for Resistance to Spotted Wilt in Florida.** **B.L. TILLMAN***, M. GOYZUETA, M. GOMILLION, University of Florida, North Florida Research and Education Center, Marianna, FL, and A.K. CULBREATH, University of Georgia, Coastal Plain Experiment Station, Tifton, GA.	88
2:00	**Investigating Pod and Seed Grading Methods among Breeding Populations for Improved Seed Quality of Cultivar Releases** **J.C. DUNNE***, A.T. OAKLEY, N.K. GARRITY, R.J. ANDRES, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695; and M.W. KUDENOV, Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27695	89
2:15	**A Summary of Research Conducted on the Black Pod Peanuts** **M.D. GOYZUETA***, and B.L. TILLMAN, University of Florida, North Florida Research and Education Center, Marianna, FL.	90
2:30	**Development of Peanut Cultivars with Resistance to Leaf Spot and Their Evaluation Under Different Production Systems** **C.C. HOLBROOK***, United States Department of Agriculture-Agricultural Research Service, Tifton GA 31793, M.C. LAMB, United States Department of Agriculture-Agricultural Research Service, Dawson, GA 39842, P. OZIAS-AKINS, and Y. CHU Department of Horticulture, The University of Georgia, and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Tifton, GA 31793, A.K. CULBREATH, and T.B. BRENNEMAN Department of Plant Pathology, The University of Georgia, Tifton, GA 31793.	91
2:45	**Development of a Small Peanut Evaluation Panel to Identify Physiological and Yield Traits for Drought Tolerance** **P.M. DANG***, M.C. LAMB, USDA-ARS National Peanut Research Lab, Dawson, GA 39842; A. SANZ-SAEZ, and C.Y. CHEN, Auburn University, Auburn, AL 36849.	92

Genetics of Leaf Scorch/Pepper Spot Disease Resistance in Cultivated Peanut.

N. BROWN*, W.D. BRANCH, Dept. of Crop and Soil Sciences, University of Georgia, Tifton, GA; W. KORANI, and J. CLEVENGER, Hudson Alpha Institute for Biotechnology, Huntsville, AL.

Several peanut cultivars with resistance to the peanut root knot nematode (RKN) have been released since the development of COAN, the first peanut cultivar with resistance introgressed from TxAG-6, a tri-species, interspecific hybrid. To date, all RKN-resistant cultivars are descended from this source of resistance and are also susceptible to leaf scorch/pepper spot disease (LSPS), a foliar disease caused by the fungus *Leptosphaerulina crassiasca* (Sechet) Jackson and Bell. Although LSPS rarely causes significant economic loss under typical, high-input fungicide programs in the southeastern US, it can reach lethal levels in greenhouse situations and has caused significant economic loss in some anecdotal field examples. A recently released runner cultivar, Georgia-18RU, has demonstrated a strong level of genetic resistance to LSPS in the field and in the greenhouse. Crosses were made between Georgia-18RU and RKN-resistant, LSPS-susceptible cultivars, Georgia-14N and Tifguard during the winter of 2018/2019. The resulting F_2 populations were phenotyped on an individual plant basis in 2020 and genotyped using genotyping-by-sequencing. The $F_{2:3}$ progeny rows were grown in a randomized complete block with two replications for further phenotyping in 2021. Mapping analyses revealed several potentially influential quantitative trait loci (QTL) in both populations, however, the largest, most consistent effect identified in both populations were on Chr. 9 and Chr. 16. Loci with smaller, less consistent effects were identified on Chr. 2, 6, 11, 12, 19, 20. Further work to validate and fine-map these putative QTL are ongoing.

Progress in Breeding for Resistance to Spotted Wilt in Florida.

B.L. TILLMAN*, M. GOYZUETA, M. GOMILLION, University of Florida, North Florida Research and Education Center, Marianna, FL, and A.K. CULBREATH, University of Georgia, Coastal Plain Experiment Station, Tifton, GA.

Peanut breeders in the southeastern USA have made tremendous progress in breeding for resistance to spotted wilt (SW) caused by Tomato Spotted Wilt Tospovirus (TSWV). In the early 1990's, Florunner was a major cultivar, and it proved to be very susceptible to SW and was assigned 50 risk points on the TSWV Risk Index at the time. In the late 1990's, Georgia Green was released and was shown to have better resistance and was assigned 30 risk points. By the mid 2000's, Georgia-06G and similar cultivars were found to have even better resistance to SW than Georgia Green and were assigned 10 risk points. However, even cultivars with 10 risk points can suffer loss in situations where other risk factors are elevated such as early planting, thin stand, single rows, and no Phorate in-furrow. For this reason, we need cultivars with even better resistance to SW. In the late 1990's and early 2000's *hirsuta* genotypes from North Carolina State University were being tested in Marianna, FL and were found to have the highest levels of resistance to SW yet observed. Crosses with representatives of that material were made in 2002 and were found to have similar resistance to the parental *hirsuta* lines. Subsequently, crosses were made in 2008, 2014, and 2015 and a several news lines with outstanding resistance to SW were identified among progeny from the 2014 and 2015 crosses. After several years of testing under high-risk situations (early planting, single rows, no Phorate), some of these lines have shown outstanding levels of resistance to SW that appears to be similar to the parental *hirsuta* lines. On average over a four-year period (2019-2022), five new lines had spotted wilt scores (on a 1-10 scale) of 1.4 to 1.9 compared to 3.4 to 3.9 for Georgia-06G and 4.9 to 5.3 for FloRun™ '331'. The PeanutRx spotted wilt risk index assigns 10 risk points for Georgia-06G and 15 points for FloRun™ '331'. In 2022, the lines were compared with two varieties with 5 spotted wilt risk points, Georgia-12Y and TifNV-HiOL in two tests in Marianna, FL. On average, the new lines scored between 1.4 and 2.5 on a 1-to-10 scale compared to 2.2 for Georgia-12Y and 3.4 for TifNV-HiOL. In Georgia in 2022, two of the lines had less than 8% TSWV symptoms and two had around 40% symptomology compared to 62.5% TSWV symptoms in Georgia-06G, 41.3% in TifNF-HG, and 22.5% in Georgia-12Y. Based on these results, at least one of the four lines would likely be characterized by risk points less than 5. Thus far, it has not been found to have more than traces of SW even in severe epidemics and under increased risk factors including single rows, thin stand, early planting, and no Phorate. It appears likely that this highly SW resistant line could obviate other major risk factors, planting date, twin rows, or Phorate, and allow early planting with limited risk of loss from SW.

Investigating Pod and Seed Grading Methods among Breeding Populations for Improved Seed Quality of Cultivar Releases

J.C. DUNNE*, A.T. OAKLEY, N.K. GARRITY, R.J. ANDRES, Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695; and M.W. KUDENOV, Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27695

Recent advances in imaging technology provide drastic improvements to data acquisition, efficiency and precision, particularly for the evaluation of pod and seed grade in peanuts. From a peanut breeding perspective, improved data quality would enhance resolution in genetic mapping, standardize the grading process for all market-types, and improve the time for processing grade samples from yield trials. The objectives of this project include the development of novel machine-learning tools for the automated phenotyping of peanut grades from field trials; developing and translating genomic selection tools within plant breeding programs by identifying fundamental insights into the peanut genome; and translation of optical phenotyping tools to reduce labor bottlenecks in peanut research programs and state inspection services across the US. In order to collect pod and seed characteristics, three methods were implemented to compare and contrast efficacy metrics, including standard grading procedures defined by the USDA; pod imaging on a stationary platform and seed evaluations using a QualySense Qsorter Explorer; and a custom-designed optical sensor mounted on the existing pod sorting and peanut shelling equipment used in the USDA standardized procedure. Data were collected using these three methods on advanced yield trials in the N.C. State University peanut breeding program from 2021-2022 on 265 advanced peanut breeding lines. Significant correlations among grading methods exist ($P<0.0001$); however, there is a reduction in the time per sample among the alternative grading methods during the data collection process, improving the efficiency of grade data collection without compromising data quality. In addition to the implementation of these methods, open-source web applications corresponding to pod and seed data collected in the alternative methods have been developed for ease of downstream data processing and analysis.

A Summary of Research Conducted on the Black Pod Peanuts

M.D. GOYZUETA*, and B.L. TILLMAN, University of Florida, North Florida Research and Education Center, Marianna, FL.

Peanut (*Arachis hypogaea* L.) has its center of origin in South America, several genotypes have been introduced from this region to the United States for their use in breeding programs. One of those genotypes is the “Black Pod” peanut (“Vaina Negra” in Spanish). Past work has shown that this trait is controlled by a single dominant gene, which was also confirmed in research completed at the University of Florida. This peanut line expresses a dark coloration on the pod as it develops, therefore it was theorized that this coloration could be used as an indicator of seed maturity. The peanut breeding program has found a link between the exocarp and mesocarp coloration of this genotype as it matures. Mathematical models have been developed to use the Black Pods coloration to determine maturity based on this relationship, which could potentially reduce the time and efforts needed from the farmer to determine maturity. Additional studies with the Black Pods shell extracts have also demonstrated that the capability to reduce the growth and sporulation of *Aspergillus parasiticus* when compared to extracts from Georgia-06G and controls where shell extracts were not added. *Aspergillus parasiticus* growth was reduced 30% and 17% when compared to the controls and Georgia-06G, respectively. These results led to the desire to understand better the genetic background of the darker coloration present in this genotype. Whole genome sequencing was completed following a bulk segregant analysis and a QTLseq pipeline. Sequencing results showed that there were three candidates genes tied with the expression of the Black Pod trait. KASP markers were developed for these candidate genes, and they were used to analyze an F_2 population generated from a cross between the Black Pod line and FloRun ‘331’. Two of these three KASP markers were successful in separating the lines that expressed the black pod phenotype from those that did not. Results from these studies showed how the Black Pod peanuts could contribute to breeding programs and ultimately to growers in the southeast of the United States.

Development of Peanut Cultivars with Resistance to Leaf Spot and Their Evaluation Under Different Production Systems

C.C. HOLBROOK*, United States Department of Agriculture-Agricultural Research Service, Tifton GA 31793, M.C. LAMB, United States Department of Agriculture-Agricultural Research Service, Dawson, GA 39842, P. OZIAS-AKINS, and Y. CHU Department of Horticulture, The University of Georgia, and Institute of Plant Breeding, Genetics & Genomics, University of Georgia, Tifton, GA 31793, A.K. CULBREATH, and T.B. BRENNEMAN Department of Plant Pathology, The University of Georgia, Tifton, GA 31793.

Late leaf spot (LLS) caused by *Northopassalora personata*, is a foliar disease that plagues peanut production worldwide. Chemical control is expensive, sometimes inaccessible and can be difficult to apply. One effective solution to control this disease would be the development of resistant cultivars. Three well-defined segments of wild *Arachis cardenasii* chromosomes confer excellent resistance to late leaf spot. We have been using MAS in an accelerated backcross breeding scheme to develop leaf spot resistant cultivars. We began replicated yield trials with selections from the first backcross in 2019. We added selections from the second backcross in 2020. We continued testing these selections along with common check cultivars in 2021 and 2022. All genotypes are tested under three production systems. We used a full fungicide regime (five sprays) in one system and no fungicide in another. For the third system we used one application of Convoy at 60 days after planting to provide a moderate level of control for white mold. Leaf spot severity in all years confirmed that the backcross selections have excellent resistance to late leaf spot. Several leaf spot resistant selections exhibited excellent yield and grade when grown under reduced sprayed conditions. The highest net revenue per acre was obtained by growing leaf spot resistance genotypes under reduced or non-sprayed conditions. All of these genotype/reduced spray production combinations resulted in higher net revenue per acre in comparison to Georgia-06G under a full fungicide regime. We expect that growers will be able to use these cultivars to increase their profitability.

Development of a Small Peanut Evaluation Panel to Identify Physiological and Yield Traits for Drought Tolerance

P.M. DANG*, M.C. LAMB, USDA-ARS National Peanut Research Lab, Dawson, GA 39842; A. SANZ-SAEZ, and C.Y. CHEN, Auburn University, Auburn, AL 36849.

Drought is an important abiotic stress in peanut that can significantly reduce yield depending on the duration and severity. Plants respond to drought stress by modulating plant physical characteristics, physiology, biochemistry, and gene expression to maintain homeostasis for survival and may have limited productivity. Progress in the development of drought tolerant peanut lines has been difficult due to the multi-allelic affect and variable environmental factors. Yield trait is complex since it represents a composite of all the interactions of biotic and abiotic components and can significantly varied depending on year and location. A small peanut evaluation panel of 12 genotypes have been assembled based on previous studies indicating the potential drought tolerance, middle tolerance, and susceptibility to targeted progressive drought challenge. Among these, C76-16 is a tolerant check and AP-3 is a consistent susceptible line. AU-NPL 17, a peanut variety released in 2017, was included since it demonstrated a potentially different drought tolerant mechanism than other lines. Evidence of drought plant response based on physiological traits and yield will be discussed for various peanut lines. This select peanut panel will be evaluated further in physiological and genetic studies to associate specific physiological traits to gene expression and/or genetic alleles for molecular breeding applications. This research will facilitate the development of drought tolerant peanut varieties.

1:45 – 3:00	**Physiology and Seed Technology** Meeting Room: Pulaski *Moderator: Gurpreet Virk, Univ. of Georgia*	Pres. #
1:45	**Does Prohexadione Calcium Affect Yield, Kernel Size, and Peanut Maturity?** **M. BALOTA***, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437; J. RATHORE; and A. CHANDEL, Biological Systems Engineering Department, Virginia Polytechnical Institute and State University, Blacksburg, Virginia 24060	93
2:00	**Effect of Historical Climate Regimes on Stomatal Properties in *Arachis hypogaea*** **E.R. BUCIOR*** and R.B. SORENSEN. USA USDA-ARS National Peanut Research Laboratory, 1011 Forrester Dr. SE, Dawson, Georgia 39842, USA	94
2:15	**Genotypic Differences in Photosynthetic Limitations to Carbon Assimilation in Peanut under Drought at the Onset of Flowering** **C. PILON***, J.L. SNIDER, L.A. MORENO, C.K. KVIEN, Crop and Soil Sciences Department, The University of Georgia, Tifton, GA 31793; P. OZIAS-AKINS, Department of Horticulture, The University of Georgia, Tifton, GA 31793; and C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793.	95
2:30	**Biological Nitrogen Fixation Under Drought Depends on the Capacity of the Plant to Maintain a Good Water Status** **A. SANZ-SAEZ***, Q. ZHANG, C. CHEN, Y. FENG, Department of Crop, Soil and Environmental Sciences, Auburn University, Auburn AL 36849, USA, P. DANG, and M. LAMB, USDA-ARS National Peanut Research Laboratory, Dawson, GA 39842, USA.	96
2:45	**Low Temperatures Impact on Photosynthetic Efficiency of Peanut Plants After Early Emergence and Recovery Potential of Seedlings** **G. VIRK***, C. PILON, J.L. SNIDER, L. MORENO, D. JESPERSEN, Department of Crop and Soil Sciences, The University of Georgia Tifton Campus, Tifton, GA 31793; and V. TISHCHENKO, University of Georgia, College of Agricultural and Environmental Sciences, Griffin, GA, 30223, USA	97

Does Prohexadione Calcium Affect Yield, Kernel Size, and Peanut Maturity?

M. BALOTA*, Tidewater Agricultural Research and Extension Center (TAREC), Suffolk, Virginia 23437; J. RATHORE; and A. CHANDEL, Biological Systems Engineering Department, Virginia Polytechnical Institute and State University, Blacksburg, Virginia 24060

In Virginia, growers use regularly prohexadione calcium (PC) to control vine growth and help with digging of peanut (*Arachis hypogaea* L.). There are expectations that PC treatment may provide increased yield over non-treated fields, but results are inconclusive. Inconclusiveness could be caused by several factors including differential genotypic responses, and potential PC effect on maturity and/or seed attributes of peanut. To address these potential concerns, in 2022, a replicated experiment was carried on at the Tidewater AREC using four virginia-type cultivars, ‘Bailey II’, ‘Emery’, ‘N.C. 20’, ‘Sullivan’, and ‘Walton’. Twice, 7.25 oz/A of Apogee with 16 oz UAN and crop oil were applied at vine touching and 14 days after the first application. Applications were performed on 6-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 100, 115, 130, and 155 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 (155 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. Even though yield was significantly (*P=0.0382*) affected by cultivar and field (each cultivar was planted in a different field, they were not planted side by side), yield was not significantly affected by the PC application. There were significant (*P=0.0001*) differences among cultivars for the 100-seeds weight, and Emery and Walton had the greatest weight in comparison with N.C. 20 and Bailey II. There were also significant (*P=0.0784*) differences between growth regulator treatments, with PC application resulting in reduced 100-seed weight across cultivars. In particular for the large-seeded Emery, Apogee produced a significant (*P=0.0369*) reduction in seed size. These preliminary data show the potential negative impact of PC on seed size, in particular for the large-seeded peanut varieties that may result in inconclusive overall benefit to pod yield.

Effect of Historical Climate Regimes on Stomatal Properties in *Arachis hypogaea*

E.R. BUCIOR* and R.B. SORENSEN. USA USDA-ARS National Peanut Research Laboratory, 1011 Forrester Dr. SE, Dawson, Georgia 39842, USA

Microscopic stomatal pores on the epidermal surface of leaves regulate water vapor and gas exchange between plants and their environment. The plant's continuous adjustment of stomatal conductivity maintains the balance between carbon gain and transpirational water loss, ensuring an optimal balance of resource acquisition for continued plant growth and function. In addition to its internal response, a plant's stomatal behavior is largely influenced by environmental signals, such as soil moisture, elevation, and atmospheric CO_2 concentration. The key mechanisms that influence stomatal development and function have been identified and widely studied, however, more data is needed to fully resolve how environmental variables contribute to genetic changes in the stomatal development pathway. Current data suggest that the light intensity, temperature, humidity, and carbon dioxide concentration a plant experiences during germination and juvenile growth, play a major role in influencing short term stomatal development. Plants can also create a long-term response to changes in environmental conditions through the production of new leaves with altered stomatal size and stomatal density per area. This plasticity in new tissue production not only allows for ideal functioning during the plants lifetime but can influence subsequent offspring's stomatal characteristics. Additional studies have found that growing the same genotype under altered climate conditions (treatments) produce significant differences in stomatal characteristics. Therefore, the objective was to build upon this growing knowledge of how historic environmental variables such as mean annual precipitation, maximum summer temperature, and elevation has on stomatal properties. We studied 175 diverse genotypes from the GRIN "Core Peanut Collection", which were grown under field conditions. Stomatal peels were taken at 60 days, imaged using a scanning electron microscope, and analyzed for anatomical attributes. Attributes such as stomatal density, area, and pore length were correlated with each genotype's historic climate data which was obtained through the WorldClim dataset. This information will help us understand ways in which forced manipulation of stomatal properties in breeding programs may improve yield and biomass production in domesticated peanut varieties.

Genotypic Differences in Photosynthetic Limitations to Carbon Assimilation in Peanut under Drought at the Onset of Flowering

C. PILON*, J.L. SNIDER, L.A. MORENO, C.K. KVIEN, Crop and Soil Sciences Department, The University of Georgia, Tifton, GA 31793; P. OZIAS-AKINS, Department of Horticulture, The University of Georgia, Tifton, GA 31793; and C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793.

Drought is one of the main factors decreasing photosynthesis in plants, and its magnitude, duration, and plant stage define the level of limitation of the photosynthetic process. This limitation can be due to stomatal or non-stomatal factors. This research aimed to assess underlying limitations to carbon assimilation in peanuts (*Arachis hypogaea* L.) under drought at the onset of flowering. Ten peanut genotypes, including commonly grown in Georgia and advanced lines selected at the ARS/USDA and the University of Georgia that vary in drought tolerance/sensitivity, were planted in a field at University of Georgia Gibbs Experimental Farm in Tifton, Georgia. Water treatments consisted of an irrigated control and a drought stress at the onset of flowering (34 days after planting) for a duration of 40 days. A rainout shelter was used to cover the drought-stressed plots and prevent the plants from this treatment to receive rain and irrigation. Measurements included leaf gas exchange, chlorophyll fluorescence, and pigment content. The genotypes varied greatly in photosynthetic performance, with some indicating distinct response to drought conditions at early flowering. At the end of drought period, carbon assimilation was substantially limited by stomatal factors, whereas stability in the functionality of the thylakoid reactions was observed in some genotypes when comparing well-watered and drought plants. Overall, progressive drought caused an imbalance in the processes of the primary photochemistry and pigment content.

Biological Nitrogen Fixation Under Drought Depends on the Capacity of the Plant to Maintain a Good Water Status

A. SANZ-SAEZ*, Q. ZHANG, C. CHEN, Y. FENG, Department of Crop, Soil and Environmental Sciences, Auburn University, Auburn AL 36849, USA, P. DANG, and M. LAMB, USDA-ARS National Peanut Research Laboratory, Dawson, GA 39842, USA.

Drought is one of the most common abiotic stresses in peanuts which reduces around 20% yield. Peanut's biological nitrogen fixation (BNF) is negatively affected by drought. However, there are some cultivars that are able to show high BNF under drought which results in high yields under these conditions. It is not clear if the high BNF under drought is given by a more drought tolerant nitrogen fixation reaction or because the plants that show high BNF posses another concurrent drought tolerant trait that makes them show high BNF. We hypothesize that cultivars that show high BNF under drought show other type of drought tolerant traits that improves their water status and therefore maintains BNF. To accomplish this objective, 36 genotypes (2019) and 18 genotypes (2020) selected for their different mechanisms of drought tolerance and sensitivity were grown under drought in the rainout shelter facility at the National Peanut Research Laboratory in Dawson, Georgia. BNF and water use efficiency (WUE) of the cultivars was estimated using C and N natural abundance methods. Photosynthesis and leaf water content was measured to analyze the water status of the plants. We found that cultivars that were able to maintain good water status by saving water (high WUE) or cultivars that maintain the water status by extracting more water from the soil maintained high BNF. Although more research needs to be done, our study points that there are not cultivars that show high BNF under drought when the water status of the plant is not appropriate. Therefore, selecting for cultivars that are able to maintain good plant water status will allow.

Low Temperatures Impact on Photosynthetic Efficiency of Peanut Plants After Early Emergence and Recovery Potential of Seedlings

G. VIRK*, C. PILON, J.L. SNIDER, L. MORENO, D. JESPERSEN, Department of Crop and Soil Sciences, The University of Georgia Tifton Campus, Tifton, GA 31793; and V. TISHCHENKO, University of Georgia, College of Agricultural and Environmental Sciences, Griffin, GA, 30223, USA

Identification of performance and recovery potential of different peanut genotype seedlings under low temperatures can widen the scope of peanut growth and development even under less than optimal temperatures which are common during early season. Therefore, a controlled environment study was conducted in order to evaluate the impact of low temperatures on growth, photosynthetic efficiency and on recovery potential of five different peanut genotypes. Measurements were done at 15 and 22 days after planting (DAP) including dry weight and chlorophyll fluorescence (OJIP) measurements. For dry weight measurements, significant temperature effect was observed for all parameters except root dry weight per plant at both 15 and 21 DAP, and stem dry weight at 15 DAP. Significant cultivar effect was observed for leaf, stem, and root dry weight at 15 DAP and root to shoot ratio at both 15 and 22 DAP. Similarly, for chlorophyll fluorescence significant temperature at 15 and 22 DAP and cultivar effect at 22 DAP was observed for some of the measured parameters. For OJIP parameters, at 15 DAP low temperatures resulted in smaller values whereas at 22 DAP higher temperatures had lower OJIP values. On comparing different peanut cultivars, GA-16HO and GA-06G had the higher OJIP parameters and GA-09B resulted in significantly lowest photosynthetic efficiencies.

1:45 – 3:00	**Extension Techniques II** Meeting Room: Ossabaw *Moderator: Mark Abney, Univ. of Georgia*	Pres. #
1:45	**Comparing Aerial vs. Ground Applications of Plant Growth Regulator in Georgia-06G Runner Peanuts** **S.T. MCALLISTER*** Terrell County ANR Agent, University of Georgia Cooperative Extension. Dawson, GA, B. CREWS, Marion/Webster Counties ANR Agent, University of Georgia Cooperative Extension. Buena Vista, GA, and W.S. MONFORT, University of Georgia Cooperative Extension Peanut Agronomist.	98
2:00	**Evaluation of Peanut Varieties in Southeast Georgia** **W. PARKER***, Area Agronomy Agent, University of Georgia, Athens, GA, 30602; W.S. MONFORT, Extension Peanut Agronomist, University of Georgia, Athens, GA 30602; and S. POWELL, Treutlen County Extension Agent, Soperton, GA, 30457	99
2:15	**Early Season Insecticide Applications for Lesser Cornstalk Borer Management in Peanuts** **B.L. REEVES***, UGA Extension Berrien County. 516A County Farm Rd, Nashville, GA 31639 and M.R. ABNEY, UGA Dept of Entomology. 2360 Rainwater Rd, Tifton, GA 31793	100
2:30	**Evaluating Peanut Fungicide Programs for White Mold Efficacy** **T. PRICE*,** Extension Agent, University of Georgia, Cook County, Adel, Georgia 31620; and R.C. KEMERAIT, Extension Plant Pathologist, Department of Plant Pathology, University of Georgia, Tifton, Georgia 31793.	101
2:45	**Evaluating Peanut White Mold Fungicide Programs 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; and A.R. SMITH, Agricultural and Applied Economics, University of Georgia, Tifton, GA 31793.	102

Comparing Aerial vs. Ground Applications of Plant Growth Regulator in Georgia-06G Runner Peanuts

S.T. MCALLISTER* Terrell County ANR Agent, University of Georgia Cooperative Extension. Dawson, GA, B. CREWS, Marion/Webster Counties ANR Agent, University of Georgia Cooperative Extension. Buena Vista, GA, and W.S. MONFORT, University of Georgia Cooperative Extension Peanut Agronomist.

Runner peanuts have the lion's share of peanut acreage in Georgia, the nation's leading peanut producing state. Modern varieties are prone to rank vine growth that inhibit harvest efficiency. Typically, prohexadone calcium is applied using ground application to ensure efficacy. However, the weather causes growers to be late on their application of the growth regulator potentially reducing the management of the vine growth. Therefore, the goal of this trial was to compare a standard application of prohexadone-calcium (trade name kudos) at 5.4 oz/acre using a ground applicator JD 4023 using red AIXR 11004 nozzles, and an aerial applicator Thrush 510G 54 CP-11 using 6040 nozzles, along with an untreated check. The Trial was conducted in a 62-acre irrigated field in Terrel County, GA. The high boy used 20 gallons of water as a carrier and the aerial application used 10 gallons of water. Treatments were arranged in a randomized complete block design with three replications. The treatments were applied when 50% of the lateral vines were touching and a 2nd application 14 days later. Main stem heights (cm) and node counts were evaluated before initial treatment and again 14 Days after the 2nd application for all three treatments. The results indicated that there were no statistical differences between the aerial and ground treatments for main stem height. Both treatments had statically lower plant height compared to the untreated control. The aerial application treatment had the lowest number of nodes compared to the untreated check. There were no differences observed in yield among the treatments.

Evaluation of Peanut Varieties in Southeast Georgia

W. PARKER*, Area Agronomy Agent, University of Georgia, Athens, GA, 30602; W.S. MONFORT, Extension Peanut Agronomist, University of Georgia, Athens, GA 30602; and S. POWELL, Treutlen County Extension Agent, Soperton, GA, 30457

Peanut cultivar selection is an important production decision in Southeast Georgia and the entire state. Two research trials were conducted at the Southeast Georgia Research and Education Center (SGREC) at Midville that consisted of large and small plot formats. Varieties assessed in both trials included: GA-16HO, GA-06G, GA-18RU, and GA-12Y. Additional varieties assessed in the small plot trial included: GA-20VHO, GA-09B, Fl-T61, AUNPL-17, TIFNV, and FloRun-331. GA-12Y and GA-06G were the top performers in the small and large plot trials, respectively. GA-06G is the benchmark variety used for statistical comparison. In most cases, no significant differences in yield were noted, with the exception of FloRun-331 and GA-18RU. TSMK% were historically lower due to adverse temperatures and moisture levels, with significant differences expressed in several varieties. Varieties were also assessed for TSWV and leaf spot.

Early Season Insecticide Applications for Lesser Cornstalk Borer Management in Peanuts

B.L. REEVES*, UGA Extension Berrien County. 516A County Farm Rd, Nashville, GA 31639 and M.R. ABNEY, UGA Dept of Entomology. 2360 Rainwater Rd, Tifton, GA 31793

The Lesser Cornstalk Borer (LCB) is the most economically challenging insect pest in Georgia peanuts. LCB thrives in hot dry conditions, allowing it to have several generations a year. Larvae will burrow into stems at or near the soil line. This causes the plant to wilt, while also leaving an entry point for disease. Additionally, larvae will feed on the peanut pod, causing further damage. In 2022, early season conditions were hot and dry, which led to high LCB pressure. As a result, UGA Peanut Entomologist Dr. Mark Abney collaborated with Berrien County Extension and a local peanut farmer to assess early season insecticide applications for LCB.

The insecticides Diamond (novaluron) and Vantacor (chlorantraniliprole) were applied on June 7th in a dryland peanut field and compared to a nontreated control. Weekly pitfall trap captures were monitored for LCB presence for 7 weeks. Yield data was then taken at harvest on September 26. The results show that both Diamond (6042 lb/a) and Vantacor (5,832 lb/a) had a significantly higher yield than a nontreated control (4,475 lb/a). The weekly trap captures showed that both products significantly reduced LCB presence over the span of 40 days after treatment. LCB numbers were near zero in the Vantacor treated peanuts. Diamond treated peanuts still had some LCB present, however that did not appear to have an effect on yield in this study.

Evaluating Peanut Fungicide Programs for White Mold Efficacy

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Peanut production in Cook County, Georgia comprised $10,651,520 of the county's total $118 million-dollar farm-gate value in 2021. 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. Eight fungicide programs were tested in the replicated trial using programs common among peanut producers in the southeastern United States. Disease ratings and yield for each treatment were recorded. Local Agri-suppliers provided data on cost of fungicides. WM total percent infection varied from 1% to 38%. LS severity in the trial was low (LS < 2.5) and was assessed using the Florida 1 to 10 scale (1 = no disease, 10 = complete defoliation). WM incidence average varied among the 3 reps with lowest in rep 1 (6.8%) and highest in rep 3 (17.6%). In peanut production there is generally a strong negative trend between yield and incidence of WM. This trend was not observed in 2022 which is an indication that some other factor had greater effect on yield than did disease. This data shows that under moderate disease, the most profitable fungicide program is not necessarily the most expensive. The WM program that involved Excalia (3 oz) applied twice, was the 2nd most expensive ($114.66/A) of the 8 tested. It ranked 2nd in highest yield (5,497 lbs.) and profit ($861.11) per acre. The most expensive fungicide program that involved 3 applications of Elatus (7.3 oz) cost $140 and produced 5,425 pounds of peanuts per acre for a profit of $823.04 per acre. According to this trial's data, a 100-acre field treated with the less expensive program will cost $11,466 and return $86,100 while same field treated with the most expensive program (T7) in this trial cost $14,000 and will return $82,304 = difference of $3,796.

Evaluating Peanut White Mold Fungicide Programs in Bulloch County, Georgia

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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 with regard to use of newer fungicides and application strategies for the management of white mold. In this demonstration conducted in 2022, the effectiveness of nine different fungicide programs was evaluated. The experimental design was a complete block design with three 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.

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2	**Change in Thrips Suppression by Imidacloprid in North Carolina from 2013-2022** **R. BRANDEBURG***, B. ROYALS, D. REISIG, and D.L. JORDAN, North Carolina State University, Raleigh, NC 27695	104
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4	**Disease and Yield Response of Two Peanut Cultivars to Recommended Fungicide Programs in Southeast Alabama** **H.L. CAMPBELL***, A. STRAYER-SCHERER, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849; and C. PARKER, Wiregrass Research and Extension Center, Headland, AL 36345	106
5	**Characterizing the Highly Conserved Translational Control Module, GCN2-eIF2alpha, in Peanut Seedlings in Response to *Aspergillus niger* Infection.** **A. LOKDARSHI*,** E.G. CANTONWINE, Department of Biology, Valdosta State University, GA 31698; and B. JORDAN, Department of Pathology Isolate, University of Georgia, Tifton, GA 31793.	107
6	**An Evaluation of Calendar Based Fungicide Applications in Two Peanut Genotypes between 2021 and 2022** **E.T. CARTER*,** UF/IFAS Jackson County Extension, Marianna, FL 32446, B.L. TILLMAN, M.W. GOMILLION, and L.C. ICHAZO, North Florida Research and Education Center, Marianna, FL 32446, and N.S. DUFAULT, Plant Pathology Department, The University of Florida, Gainesville, FL 32611.	108
7	**Developing High Oil Peanuts for the Renewable Fuel Industry.** **J.M. CASON***, C.E. SIMPSON. B.F. MCCUTCHEN, Texas A&M AgriLife Research, Texas A&M University System, Stephenville, TX 76401; E. KIMURA, W.S. RAVELOMBOLA, Texas A&M AgriLife Research, Texas A&M University System, Vernon, TX 76384; D. KUROUSKI, Department of Biochemistry and Biophysics, Texas A&M University, College Station, TX 77843; and M.D. BUROW, Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX, 7940 and the Department of Plant and Soil Science, Texas Tech University, Lubbock, TX, 79409.	109
8	**Whole Genome Sequencing Reveals QTL Associated with Sclerotinia blight Resistance in Peanut** **K.D. CHAMBERLIN*** and R.S. BENNETT, USDA-ARS, Stillwater, OK 74075; J.P. CLEVENGER and W. KORANI, Hudson Alpha Institute for Biotechnology, 601 Genome Way Northwest, Huntsville, AL 35806.	110
9	**Use of Sustainability Indicators to Evaluate the Benefits of Conservation Management Practices on Field with Peanut and Cotton Rotation** **M.D. DE VAL***, B.V. ORTIZ, Department of Crop, Soil, and Environmental Sciences, Auburn University College of Agriculture, Auburn, AL, USA, 36849, M. WOROSZ, Department of Agricultural Economics and Rural Sociology, Auburn University College of Agriculture, Auburn, AL, USA, 36849, M. THURMOND, and A. GAMBLE, Department of Crop, Soil, and Environmental Sciences, Auburn University College of Agriculture, Auburn, AL, USA, 36849	111

30	**Small UAS based spectral imaging and machine learning for peanut maturity estimation** **J. RATHORE***, A. K. CHANDEL, Department of Biological Systems Engineering, College of Agriculture and Life Sciences, Virginia Tech, Blacksburg, VA 24601; and M. BALOTA, School of Plant and Environmental Sciences, College of Agriculture and Life Sciences, Virginia Tech, Blacksburg, VA 24601.	132
31	**Machine Learning Approach for Genomic Selection of Oil Content In Peanuts** **W.S. RAVELOMBOLA***, A. MANLEY, S. MALANI, Department of Soil and Crop Sciences, Texas A&M AgriLife Research-Vernon, TX 76364; J. CASON and B.D. BENNETT, Department of Soil and Crop Sciences, Texas A&M AgriLife Research-Stephenville, TX 7601; M.D. BUROW and H. PHAM, Department of Soil and Crop Sciences, Texas A&M AgriLife Research-Lubbock, TX 79403; and D. WANN, International Peanut Group, 1995 B Country Road 290, Brownfield, TX 79316.	133
32	**Assessing Fungicide Spray Deposition within Peanut Canopies at Different Carrier Volumes and Droplet Sizes** **M. SAPKOTA*****,** S.S. VIRK, E.P. PROSTKO, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; and G.C. RAINS, Department of Entomology, University of Georgia, Tifton, GA 31793	134
33	**Promoting Irrigation Efficiency and Educational Opportunities Through the UGA AgWET Program** **S. TANNER***, University of Georgia Cooperative Extension, Emanuel County, Swainsboro, GA 30401; B. CARTER, Univ. of Georgia Cooperative Extension, Effingham County, Springfield, GA 31329; S. CARTER, University of Georgia Cooperative Extension, Ware County, Waycross, GA 31503; C. CLOUD, University of Georgia Cooperative Extension, Grady County, Cairo, GA 39828; P. EDWARDS**,** University of Georgia Cooperative Extension, Tifton, GA 31794; S. INGRAM, University of Georgia Cooperative Extension, Thomas County, Thomasville, GA 31792; D. HALL, University of Georgia Cooperative Extension, Bleckley County, Cochran, GA 31014; R. JOYCE, University of Georgia Cooperative Extension, Laurens County, Dublin, GA 31021; M. LUKE, University of Georgia Cooperative Extension, Macon County, Oglethorpe, GA 31068; J. MALLARD, Univ. of Georgia Cooperative Extension, Southeast District, Statesboro, GA 30458; S. MCALLISTER, University of Georgia Cooperative Extension, Terrell County, Dawson, GA 39842; C. MOON, University of Georgia Cooperative Extension, Bleckley County, Cochran, GA 31014; J. PORTER, University of Georgia Cooperative Extension, Pulaski County, Hawkinsville, GA 31036; J.P. SAPP, University of Georgia Cooperative Extension, Burke County, Waynesboro, GA 30830; J. SHEALEY, University of Georgia Cooperative Extension, Echols County, Statenville, GA 31648; A. SHIRLEY, University of Georgia Cooperative Extension, Tattnall County, Reidsville, GA 30453; A. SMITH, University of Georgia Cooperative Extension, Coffee County, Douglas, GA 31533; W. TYSON, University of Georgia Cooperative Extension, Bulloch County, Statesboro, GA 30458; and W. PORTER, University of Georgia Cooperative Extension, Faculty Crop and Soil Science Department, Tifton, GA 31793	135
34	**Seed Shrinkage Trait in Peanut and Its Macromolecular Compound Observation.** Y-J. CHU, H-E. LIN, Department of Agronomy, National Chiayi University, Chiayi City, Taiwan 600355, H-Y. DAI, Crop Science Division, Taiwan Agricultural Research Institute, Taichung City, Taiwan 413008, and **Y-C. TSENG*,** Department of Agronomy, National Chiayi University, Chiayi City, Taiwan 600355.	136
35	**Influence of Soil Sampling Grid Size on Application Accuracy and Economics of Site-Specific Soil pH Management in Peanut** **M.W. TUCKER***, S.S. VIRK, G.H. HARRIS, 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; D.S. CARLSON, Worth County Extension, University of Georgia Cooperative Extension, Sylvester, GA 31791; J. KICHLER, Colquitt County Extension, University of Georgia Cooperative Extension, Moultrie, GA 31788: P. SAPP, Jefferson County Extension, University of Georgia Cooperative Extension, Louisville, GA 30434: S. MCALLISTER, Terrell County Extension, University of Georgia Cooperative Extension, Dawson, GA 39842: and J. HAND, Tift County Extension, University of Georgia Cooperative Extension, Tifton, GA 31793	137
36	**Development of Rapid Molecular Tools for Detection and Quantification of Aflatoxigenic Strains of *Aspergillus flavus* in Peanut Seeds** **S. WALIULLAH***, T. BRENNEMAN, A. CULBREATH, and M.E. ALI, Department of Plant Pathology, University of Georgia, Tifton, GA 31793, USA	138

Genetic Studies on Resistance to Late Leaf Spot Disease in Peanut

F.D. BOSOMPEM*, A.G. GYIMA, R.Y. OWUSU, K.A. BEDIAKO, M.B. MOCHIAH, W. KYEREH, M. LAMPTEY, and J.Y. ASIBUO, Council for Scientific and Industrial Research - Crops Research Institute, Kumasi, Ghana; and D.L. JORDAN, North Carolina State University, Raleigh, NC 27695

Late leaf spot (LLS) caused by *Phaeoisariopsis personata*, is an important foliar fungal disease of peanut (*Arachis hypogaea* L.) which causes substantial economic losses worldwide to the crop. Inheritance of resistance to LLS disease was studied in two crosses and their reciprocals involving two Spanish susceptible cultivars and one resistant interspecific derivative. This is to understand the strategy for LLS resistance breeding. The traits associated with LLS resistance, measured in the field conditions were studied following generation mean analysis. High narrow sense heritability was recorded for DAP 105 in Crops Abakan x CS 16. The results suggest that inheritance of late leaf spot (LLS) resistance is governed by nuclear gene effect with no maternal or cytoplasmic influence. The results imply that additive gene action controls resistance to LLS for DAP 105. Therefore, selection for improvement of the trait would be effective in early segregating generations. Further, narrow sense heritability was low for both DAP 90 and DAP 105 in Crops Pion x CS 16, suggesting that selection for improvement of the trait would not be effective in early segregating generations. Values of A, B, and C scaling tests were significantly different from zero for all crosses except scaling test A of Crops Pion x CS 16 cross. The results imply that the additive dominance model was inadequate in explaining the mode of inheritance of resistance to LLS disease. There is therefore the implication of nonallelic interactions or epistasis (additive x additive, additive x dominance and dominance x dominance) in the inheritance of LLS resistance in peanut.

Change in Thrips Suppression by Imidacloprid in North Carolina from 2013-2022

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Thrips (*Frankliella* spp.) are an economically important insect pest in peanut in North Carolina. Several systemic insecticides can be applied in the seed furrow at planting to suppress thrips. Imidacloprid has been used to control thrips when applied in the seed furrow at planting for over a decade. As a part of larger studies at the Peanut Belt Research Station near Lewiston-Woodville, NC, peanut injury caused by thrips feeding (using a scale of 0 to 5 where 0 = no injury and 5 = plant death) was determined approximately 5 weeks after planting when phorate (Thimet at 5 pounds product per acre) or imidacloprid (Admire Pro at 12 oz product per acre) were applied in the seed furrow at planting from 2013-2022. Acephate (Acephate or Orthene at 8 oz product per acre) was applied to peanut foliage 3 weeks after emergence in 9 of 10 years. A non-treated control was included. When injury from thrips was regressed against years (2013 = year 1, 2022 = year 10) using a liner function, the following equations were generated: imidacloprid applied in the seed furrow at planting ($Y = 0.27x – 0.05$, $r^2 = 0.49$, $p \leq 0.0001$), phorate applied in the seed furrow at planting ($Y = 0.17x + 0.05$, $r^2 = 0.38$, $p \leq 0.0001$), acephate applied to peanut foliage 3 weeks after emergence ($Y = 0.02x + 1.29$, $r^2 = 0.01$, $p = 0.6557$), and non-treated peanut ($Y = 0.11x + 2.4$, $r^2 = 0.16$, $p = 0.0095$). Standard errors ranged from 0.12 to 0.30.

Results from this analysis for data collected for a decade suggest that thrips tolerance to imidacloprid and to a lesser degree phorate has increased. The rate of increase in tolerance for phorate was lower than the rate of increase for imidacloprid. Tolerance to acephate applied to peanut foliage did not change over this period of time. Resistance of thrips populations to imidacloprid was not confirmed using appropriate experimental methods. In addition to possible increased tolerance or evolved resistance, impacts of weather conditions on insecticide performance cannot be ruled out as reasons why insecticide decreased over this period of time. Injury from thrips feeding for non-treated peanut also increased over this period of time.

A Tool to Estimate the Financial Value of Digging Based on Pod Maturity

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Determining when to dig peanut is one of the most important steps in maximizing yield, quality, and profitability. To assist peanut producers and extension personnel, a Microsoft Excel workbook has been developed to evaluate potential yield gain by harvesting at the optimal time based on information from pod sampling prior to harvest. The user starts by enter the number of samples they have collected and projected peanut selling price. Using the sample number, a table is generated with a data line for each sample. Required data for each sample includes a sample name, sample date, total acres represented by sample, expected yield per acre, and days before optimal digging based on sample pod blasting. Based on the input data, the optimal digging date, percent potential yield gain, potential yield gain, economic gain per acre, and total economic return for the area represented by the sample are calculated and displayed to the user. Potential yield gain is determined by using the days before optimal digging and performing a table lookup which returns the percent potential yield gain. The percent potential yield gain is then multiplied by the expected yield to get the potential yield gain. Economic returns are then calculated using the potential yield gain. The data table used to look up percent potential yield gain covers a period thirty days and less to optimal digging and contains information on percent potential yield gain per day. Finally, to visualize the percent potential yield gain related to days before optimal digging, a graph with the curve using a gradated background representing pod color can be viewed by the user.

Disease and Yield Response of Two Peanut Cultivars to Recommended Fungicide Programs in Southeast Alabama

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Recommended fungicide programs were evaluated and two market-type peanut cultivars were evaluated for their reaction to early leaf spot (*Passalora personatum*) and late leaf spot (*Nothopassalora arachidicola*) along with stem rot (*Athelia rolfsii*) in southeast Alabama at the Wiregrass Research and Extension Center (WREC). Leaf spot intensity was evaluated using the Florida 1-10 leaf spot scoring system then converted to percent defoliation. Stem rot incidence was assessed immediately after plot inversion by counting the number of disease loci per row. Yields were reported at 9.04% moisture.

At WREC, leaf spot ratings were significantly lower for AU-NPL-17 than Georgia-06G. When compared with the non-treated control for AU-NPL 17, leaf spot defoliation was significantly reduced with all fungicide programs. All fungicide programs also provided similar leaf spot control when compared with the Echo only standard. For Georgia-06G, all fungicide programs significantly reduced leaf spot severity when compared to the non-treated control. With the exception of Echo/Lucento/Convoy + Tebuzol/Convoy +Echo and Aproach Prima/Fontelis/Echo, the remaining fungicide programs provided similar leaf spot control to the Echo only standard. Additionally, for both cultivars, Echo/Provost Silver had the lowest leaf spot defoliation value, which was equaled by Echo/Umbra + Echo, Alto +Echo/Echo/Elatus + Miravis, and Mazinga/Muscle ADV/Echo. For white mold, Georgia-06G had significantly higher disease incidence than AU-NPL 17. All fungicide programs significantly reduced white mold incidence when compared to the non-treated control. AU-NPL 17 had significantly higher pod yield than Georgia-06G. With the exception of the Aproach Prima/Fontelis/Echo fungicide program, all remaining fungicide programs significantly increased yield when compared to the non-treated control.

Characterizing the Highly Conserved Translational Control Module, GCN2-eIF2alpha, in Peanut Seedlings in Response to *Aspergillus niger* Infection.

A. LOKDARSHI*, E.G. CANTONWINE, Department of Biology, Valdosta State University, GA 31698; and B. JORDAN, Department of Pathology Isolate, University of Georgia, Tifton, GA 31793.

Peanut (*Arachis hypogea*) is one of the most important food/cash crops cultivated across the globe. Among the plethora of abiotic and biotic factors that limit peanut production, infection from the filamentous fungus*, Aspergillus* species represents an ongoing agronomic challenge. Although different approaches exist for controlling *Aspergillus* infection (e.g., synthetic fungicides), there is an urgent need to identify new molecular signaling nodes associated with *Aspergillus* pathogenesis.

Regulation of protein synthesis (translation control) provides a unique node for stress management in all plants. Among the few known ones, the phosphorylation of eukaryotic translation initiation factor, eIF2alpha by the protein kinase, GCN2 (General Control of Nonderepressible 2) is one of the most widely studied stress response mechanisms. The GCN2 phosphorylates eIF2alpha in response to a wide variety of abiotic, xenobiotic and biotic stresses, resulting in downregulation of cytosolic protein synthesis to conserve cellular energy. Interestingly, overexpression of GCN2 in tobacco, wheat and *Arabidopsis* has been shown to increase resistance towards multifactorial stress. Given the high value of GCN2-eIF2alpha module in plant stress management, we have tested the hypothesis that *Aspergillus niger* infection in peanut seedlings involves activation GCN2 leading to phosphorylation of eIF2alpha. Using immunoblot experiments we show that eIF2alpha is phosphorylated within 72 hr of *Aspergillus* infection while the total eIF2alpha protein remains unchanged. The GCN2-eIFalpha module is presented as a potential candidate for future studies engaged in the development of peanut cultivars with better stress resilience.

An Evaluation of Calendar Based Fungicide Applications in Two Peanut Genotypes between 2021 and 2022

E.T. CARTER*, UF/IFAS Jackson County Extension, Marianna, FL 32446, B.L. TILLMAN, M.W. GOMILLION, L.C. ICHAZO, North Florida Research and Education Center, Marianna, FL 32446; and N.S. DUFAULT, Plant Pathology Department, The University of Florida, Gainesville, FL 32611.

Fungicides are a critical component of an integrated peanut disease management plan; however, their utility in a plan are often determined using one peanut cultivar. The interactions of calendar-based fungicide programs with different peanut genotypes across years is unclear. The objectives of this experiment were (1) to quantify the disease response of peanut genotypes FloRun 331™ (FR331) and Georgia 06G (GA06), and (2) assess the efficacy of common calendar-based fungicide programs to reduce disease on the two genotypes over a two-year period at one location. Late leaf spot (*Nothopassalora personata*) was observed mid-season (75 to 90 days after planting) with a lower Florida 1 to 10 scale rating in the non-sprayed plots at the end of season in 2022 (6 scale rating) compared to 2021 (8 scale rating). Stem rot (*Athelia rolfsii*) was observed between 60 and 75 days after plantings for both years with fungicide programs having no statistical ($p > 0.1$) impacts on disease incidence. Stem rot incidence across years was approximately 79% lower with FR331 compared to GA06. Yield responses related to fungicide program varied between genotypes, however, both genotypes saw significant ($p < 0.01$) yield savings when fungicides were applied. These yield savings were larger on average for GA06 (1,836 lb./acre) than FR331 (1,548 lb./acre), especially for chlorothalonil alone applications (GA06 = 1935 lb./acre, FR331=1421 lb./acre). Cultivar resistance as well as yield potential is critical to determining the impact fungicide programs will have on yield savings and this should be accounted for integrated peanut disease management programs.

Developing High Oil Peanuts for the Renewable Fuel Industry.

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Texas A&M AgriLife Research is developing high oil peanut breeding lines that could be used in the renewable fuel industry. Renewable fuels can help lower the carbon intensity of transportation fuels and do not require any modifications to existing engines. Previous wild species peanut introgressions produced lines with up to 62% oil content but were low oleic. Subsequent crossing programs introduced the high oleic trait and began the development of disease resistance into the populations for *Sclerotinia minor* (Jagger) resistance. In 2022 a randomized complete block design (RCBD) yield trial was planted in Comanche Co. Texas with selected high oil breeding lines. Plots were 2 rows 1x3 m plots replicated 3 times. The top high oil breeding line produced approximately 6855 lbs. per acre compared to 6845 lbs. per acre for Georgia 16HO which was used as a commercial check. Another high oil breeding line had the highest Total Kernels (TK) at 77% compared to 74.9% for Georgia 16HO. Additionally in Dewitt Co. Texas a seed increase of approximately 80 additional F2:3 breeding lines were grown and harvested. Following harvest, the lines were tested for total oil content using Near Magnetic Resonance (NMR) in the spring of 2023 and values ranged from a low of 33.7% to a high of 62.4%. The most promising lines will be used for future breeding for high oil. Results will be presented.

Whole Genome Sequencing Reveals QTL Associated with Sclerotinia blight Resistance in Peanut

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Sclerotinia blight, caused by *Sclerotinia minor* Jagger, is a fungal disease of peanut that is widespread throughout 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. Two RIL populations were developed to map (Tamrun OLO2 x PI 497429) and validate (Okrun x PI 497429) quantitative trait loci associated with Sclerotinia blight resistance in peanut. Populations were phenotyped over 3 years (2018-2020) in fields inoculated with *S. minor* and genotyped using the Axiom Arachis v2 SNP array. Correlation of phenotypic and genotypic data identified 3 potential QTL associated with resistance to Sclerotinia blight. In the current work, the mapping population was subjected to whole genome sequencing via the Khufu platform and sequence information was correlated with previous phenotyping data. Approximately 65,000 single nucleotide polymorphisms were scored. Results identified significant QTL associated with resistance on chromosomes 5 and 15. A minor QTL was also identified on chromosome 18. Phenotyping experiments to validate these QTL in selected members of the Okrun x PI 497429 population will be conducted in the 2023 and 2024 growing seasons. If validated, the QTL 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.

Use of Sustainability Indicators to Evaluate the Benefits of Conservation Management Practices on Field with Peanut and Cotton Rotation

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In recent times, consumer awareness regarding the environmental impact of agriculture has increased, leading to a need for sustainable crop management practices that balance productivity and profitability. Despite producers' concerns about minimizing environmental impact while increasing yield, adopting sustainable methods remains limited. This study aims to evaluate the environmental impact of conservation practices on fields following a peanut-cotton rotation and utilize the Fieldprint Calculator to identify areas where sustainable metrics can be improved. The research analyzes three farms in central Alabama, using four years (2019 to 2022) of crop management data. Two farmers do strip-till, and the other does conventional tillage. The Fieldprint Calculator from the Field to Market alliance was utilized to evaluate the environmental impact of crop management based on eight sustainability indicators: biodiversity, energy use, greenhouse gas emissions (GHG), irrigated water use, land use, soil carbon, soil conservation, and water quality. Preliminary analyses facilitated a comparison of crop management among farms, with a particular emphasis on the impact of conservation practices on soil health, GHG emissions, and energy use. All three farmers decreased their energy use by more than 60% when cultivating peanuts. However, the conventional tillage showed higher scores among all years of cotton and peanut rotation than the strip-till. The results of this study will be presented during farmers' meetings to increase awareness of the impact of specific crop management practices on sustainability metrics. Future work will utilize sustainability indicators as benchmarking tools to promote knowledge exchange and encourage farmers to adopt conservation practices.

Assessment of Repeated Organic Herbicide Applications in Peanut

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Field experiments were conducted to determine if timely applications of organic herbicides would improve in-row weed control without reducing yield in irrigated and non-irrigated peanut. This study was conducted as a randomized complete block design with a split-split-plot restriction on randomization with four replications per treatment. Tifton loamy sand (Fine-loamy, kaolinitic, thermic Plinthic Kandiudults) was the soil type at both the irrigated and non-irrigated 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. Even when applied 7 times, all organic herbicide treatments did not improve in-row weed control after lapping occurred. This combined with high input costs warrants further evaluation of how to best utilize these products in peanut.

Assessment of Peanut Fungicide Programs and Sulfur in Irwin County, GA, 2020-2022

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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 between 2020 and 2022 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 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 immediately prior to harvest. 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 4.4/2.8/2.8 (treatment 1, Umbra program), 3.8/1.2/2.8 (treatment 2, Umbra sulfur program), 4.5/3.1/3.1) (treatment 3, Convoy/Echo program), and 4.8/1.5/3.4 (treatment 4, Lucento/Elatus/Convoy program) for 2020, 2021, and 2022, respectively. Stem rot ratings (hits per 200 ft) were 7.5/2.5/4.8 (treatment 1),6.5/5/9.3 (treatment 2), 9.8/9.3/7 (treatment 3), 4.5/1.8/7 (treatment 4) for 2020,2021 and 2022, respectively. Average yields from treatments 1-4 in 2020, 2021, and 2022 were (1. 6,192), (2. 6476), (3. 6090) and (4. 6134) lb/A. 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 Microthiol Disperss (5 lb/A) for Echo (1.0 pt./A) and maintain yield, reduce cost, and slightly improve leaf spot control.

The *acdS* Gene in a *Bradyrhizobium japonica* Strain Does not Affect Peanut Root Nodulation

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Aminocyclopropane-1-carboxylic acid (ACC) deaminase interferes with the production of a plant stress hormone, ethylene, and has been implicated in nodule formation and rhizobial competitiveness in legumes. However, little information is available on the effect of ACC deaminase on nodulation in peanuts. Here, we evaluated the effects of rhizobial ACC deaminase on nodulation of two peanut genotypes. Two rhizobial mutant strains, one with ACC deaminase gene knocked out and the other over-expressed, as well as the wild type, were inoculated onto pre-germinated seeds in Leonard jars and uninoculated plants served as controls. The dry weights (shoot and root) for inoculated plants were similar. The nodule numbers and N concentrations in shoot differed between the uninoculated and the inoculated treatments, but there were no significant differences among plants inoculated with different rhizobial strains. Based on the N balance method, the amounts of N fixed in the shoots for treatments inoculated with mutant strains were not significantly different from those inoculated with the wild strain. The results show that the absence or over-expression of the ACC deaminase gene in rhizobia did not impair its ability to form root nodules in peanuts. Furthermore, the nodulation assay suggests that symbiotic nitrogen fixation was not affected by ACC deaminase activity.

Building Global Capacity: Training and Knowledge Dissemination by the Feed the Future Innovation Lab for Peanut

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Building global capacity is a major objective of the Feed the Future Innovation Lab for Peanut. Applying appropriate technology for the needs of the consumer, the lab has created learning opportunities for US and international students, including scholarships, in-country workshops, online courses via the Groundnut Academy, animated SAWBO videos, production guides, and a phone app under development. Each will be described.

Influence of Variety and Tillage Practices on Leaf Spot Control with Sulfur

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Chlorothalonil is the most popular fungicide used to protect peanut from leaf spot disease in part because of low financial cost and multi-site efficacy for resistance management. However, there is concern about the long-term use of chlorothalonil in peanut, especially as discriminating export markets are pursued. Research was conducted to determine if sulfur (Mircrothiol Disperss) at 5 pounds/acre was as effective as chlorothalonil in traditional use patterns for this fungicide. Two experiments were conducted to compare leaf spot incidence, canopy defoliation, and peanut yield with sulfur and chlorothalonil treatments. In one experiment, peanut was planted into a cereal rye cover crop or no cover using either strip tillage or no till planting. In a second experiment in conventional tillage, fungicide treatments were compared with the Virginia market type cultivars Bailey II, Emery, Sullivan, NC 20, NC 21, Walton, and Tif-NV H/O Jumbo HO and the runner market type cultivars Tif-NV H/O Runner, Florunner 297, and Florunner 511.

Leaf spot incidence, defoliation of peanut caused by leaf spot, and peanut yield varied based on tillage system (strip till vs. no till), cereal rye treatment (with or without), and fungicide treatment. Minor and inconsistent differences in leaf spot incidence and canopy defoliation were noted when comparing tillage and cover crop treatments. Peanut yield was lower in no till compared with strip till on a finer-textured soil while yield was similar on a coarser-textured soil. On both soils, peanut yield was lower when planting in cereal rye compared with planting in absence of cereal rye. Generally, when chlorothalonil was compared with sulfur as a component of each spray in a 5-spray program, leaf spot incidence and canopy defoliation were lower when chlorothalonil was used. However, when sulfur or chlorothalonil were applied as the first spray and the last spray of a 5-spray program, leaf spot control and yield were similar.

In the second experiment, Bailey II, Sullivan, and NC 20 had less disease than other varieties when evaluated at digging. Chlorothalonil provided better protection from leaf spot incidence and defoliation and yield when comparing fungicide programs with either chlorothalonil or sulfur as the only leaf spot component. When applied as the first and last spray in a 5-spray program, leaf spot incidence and canopy defoliation were similar with chlorothalonil or sulfur, however, yield was greater when chlorothalonil was used.

Snails in Row Crops in the Florida Panhandle: Information to support IPM

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Snail populations have been reported in row crop fields across the Florida Panhandle. Identification of samples performed by Florida Department Consumer Services (FDCS) indicated the species to be *Bulimulus, bonariensis* (Rafinesque, 1833) (Stylommatophora: Bulimulidae)***.*** Studies performed by the Entomology program at West Florida Research and Education Center WFREC, IFAS/UF had the objectives of documenting the overwintering populations in fallow areas, association with winter weeds, and dispersal capacity*.* The trapping was performed during the fallow season, in 2019 to 2022 in experimental areas at WFREC and commercial fields, using the cardboard method. The association with winter-growing weeds were documented by counting the number of the snails on plant canopy of the eight predominant species in the region. The species include cut leaf primrose, dandelion, desert-chicory, purple cudweed, southern rockbell, clover, wild radish, and burn weed. The dispersal capacity of snails in peanut, cotton, soybean, and corn was documented by marking approximately 800 snails with nail polish, using a color code for each crop and replication. The experimental area at WFREC was composed with the four crops in combinations, cultivated side by side at WFREC, in a Complete Randomized Block Design, with four replications. The plot inspection to record of dispersal distance of the marked snails was performed four times in a period of 22 days.
The snail trapping in the fallow season indicated an increase in the number of trapped snails on the cardboard at the end of the winter and early spring. Cutleaf primrose and dandelion had the higher infestation of snail on and around canopy area. Based on the Euclidean distance traveled by the marked snails, the dispersal capacity of snail was estimated in in 10 meters. Peanut was the preferred crop, with higher recovery of marked snails, which can be explained by the growing prostrate of the canopy and providing shelter and high moisture The results of this study provide tools to support IPM programs for snails.

Peanut Variety Response to Pyroxasulfone and Application Timing

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Field experiments were conducted in south Texas, the Texas High Plains area, and in southwestern Oklahoma during the 2019 and 2020 growing seasons to evaluate the runner peanut cultivar (Georgia-09B) and the Virginia cultivar (Wynne) tolerance to pyroxasulfone at 0.09 and 0.12 kg ai/ha applied at peanut cracking (CRACK), early postemergence (EPOST) or mid-postemergence (MPOST). No injury from pyroxasulfone was noted at the Texas locations; however, stunting was noted in Oklahoma in both years and was greatest with pyroxasulfone at 0.09 kg/ha rate. Pyroxasulfone rate affected peanut yield only in 2019 at the High Plains location as the untreated check resulted in higher yield than pyroxasulfone at 0.09 kg/ha. The effect of application timing was only evident at the south Texas location in 2019 when the CRACK application produced higher yield that the MPOST application. Peanut grade (SMK+SS) was not affected by pyroxasulfone rate or application timing at any location. Pyroxasulfone rate and application timing had an occasional effect on peanut yield but did not seem to adversely affect quality. Although these trials were conducted under weed-free conditions, pyroxasulfone, in other trials, has been observed to provide excellent control of problem weeds found in peanut.

Scaling for Impact: the Next Five-year Phase of the Feed the Future Innovation Lab for Peanut

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The Feed the Future Innovation Lab for Peanut was awarded a five-year extension in January 2023. This phase will focus on scaling research findings from the previous five years to have impact in target countries in Africa. This scaling will be accomplished in various ways, including through social science approaches such as tri-cot, building on the Groundnut Improvement Network for Africa (GINA) and using Gender Action Learning Systems (GALS) to understand how gender-based decisions affect peanut producing households.

Crabgrass and Texas Panicum Control with Group 15 Herbicides Applied Preemergence in Peanut Crop

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Gramineous weeds continue to be challenging to control in crops, especially in crops where herbicide tolerance traits are not available, such as peanuts. The objective of this study was to compare the efficacy of four Very Long-chain Fatty Acid (VLCFA) Inhibiting herbicides for preemergence control on two grass species with different seed sizes. The study was conducted in two sites in central and south Alabama during the 2022 growing season. The seeds of *Digitaria anguinalis* and *Panicum texanum* were spread onto tilled 1.83 x 1.83 m plots and incorporated with a rotary tiller, and then treated with herbicides immediately after. Plots were hand weeded to remove all other weed species as needed. Data collection involved weed counts and visual rating at 14, 28, and 42 days after treatment (DAT). Additionally, a handheld greenseeker and a multispectral imaging camera on an unmanned aerial vehicle were used to assess growth plus biomass collected at 42 DAT. Imagery was analyzed in QGIS 3.22 and statistics were conducted in SAS 9.4. The results showed a control over 94% for all products on *Digitaria*, and overall *Panicum* presented more difficult to control. The treatment that consisted of pyroxasulfone plus carfentrazone had the highest level of control for *Panicum*, while all treatments had same level of control for *Digitaria* when compared to non-treated control (NTC). Both *Panicum* and *Digitaria* presented no significant difference for stand counts across products even at 42 DAT, but pyroxasulfone plus carfentrazone was numerically lower for both species. Similar to stand count, no significant difference for dry biomass for *Digitaria*. In conclusion, the research findings demonstrated that while all VLCFA-inhibiting herbicide products performed well in controlling Digitaria, only pyroxasulfone plus carfentrazone was significantly effective in controlling Panicum compared to the untreated control. The study revealed noticeable species-specific differences in control efficacy for the two grass species, emphasizing the importance of following the correct herbicide recommendations for specific weed species at a given site before the planting season.

Summary of Activities and Results from the Feed-the-Future Innovation Lab for Peanut Production Package Project in Peanut in Ghana.

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Peanut (*Arachis hypogaea* L.) yields are often low among smallholder farmers in Ghana. The Innovation Lab for Peanut project entitled “Development and Delivery of Production Packages to Farmers in Ghana” included four primary objectives. The first objective had two components and included 1) scaling production packages and 2) assessing uniformity and quality of seed sources. The second objective centered on a cropping sequence trail (maize-maize-peanut vs. peanut-maize-peanut) with low, medium, and high input packages for both crops implemented at the same level over the duration of the trail. The third objective included development of risk tools for northern and southern Ghana based on the North Carolina Peanut Risk Tool using excel. The final objective included establishment of the Ghana Groundnut Working Group (GGWG) based on the APRES model. Health and logistical issues surrounding the COVID-19 pandemic prevented scale up of production packages. However, this enabled a PhD student to focus on interactions of planting date, variety, and production practices to determine what combinations improved pest management, increased yield, and minimized aflatoxin contamination. Planting Sarinut 2 rather than Chinese and using legume fertilizer increased yield and had positive returns on financial investment. Increased pest management also made a positive contribution to finical returns but was more incremental than variety selection or fertilizer. Differences in peanut yield in the final year of the rotation study was greater when fewer years of peanut were included. Yenyawoso and Chinese performed similarly, in part because leaf spot disease was relatively low in the experimental area. Increasing levels of input in production packages increased peanut yield and financial return across varieties and crop rotations. Quality of seed from various sources was determined using molecular markers and phenotyping. The Ghana Peanut Risk Tool has been used to inform the peanut industry in Ghana on the effectiveness of various practices in minimizing risk and the cost associated with those practices. The GGWG will meet for the fifth time in July 2023. Participation has increased from primarily researchers in the public sector to private sector groups. Results from activities associated with these objectives are currently being used to develop appropriate production packages and varieties for scaling to farmers through outgrower businesses models and their service providers in northern Ghana.

Developing Statistical Models of Aflatoxin Risk in Peanut using Historical Weather Data

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Aflatoxin contamination in peanuts is a significant public health risk that is typically only identified at the buying point, leaving growers and shellers in a precarious position. To address this challenge, this study aimed to develop and evaluate multiple statistical models to estimate regional status of peanuts contamination with aflatoxin based on temperature and moisture conditions from ten counties in Georgia State for 2018-2021. Selected weather variables such as daily minimum, maximum, and average air temperatures, total rain, number of dry days, and number of dry periods of different lengths were used as independent variables to predict the risk of aflatoxin-PGT20, the proportion of samples with greater than 20 ppb aflatoxin. The developed and tested modeling methods included Linear Stepwise Regression, least absolute shrinkage, selection operator (LASSO), Classification and Regression Tree (CART), Support Vector Machine (SVM), K-Nearest Neighbors (KNN), and Random Forest (RF). The resulting models achieved good performance, explaining more than 80% of the variability in aflatoxin contamination for training datasets, and greater than 90% for the test datasets. In addition, maximum daily temperatures averaged over three- and four- weeks (MaxT3wk and MaxT4wk) were a strong predictor variable for PGT20. This study results in an adaptive approach to monitoring and managing aflatoxin risk through statistical modeling. Model output can be helpful for farmers, food industries, regulatory authorities, and public health safety organizations. Future research should be conducted to evaluate the efficacy of this model in greater geographical areas, and climate scenarios.

Enhancing the Genetic Potential of Peanut in Ghana

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One thousand one hundred and thirty-two (1132) African peanut (*Arachis hypogaea* L.) germplasms from East, West and Southern African countries were genotyped using the high-density Axiom_Arachis2 SNP array to generate a core set panel of 300 accessions that was phenotyped for better understanding of the genetic diversity. These accessions were grouped by their maturity dates of which 192 belonged to the short cycle (extra early and early) accessions and 108 belonged to the long cycle and medium. The peanut core collection was evaluated for the two seasons of the 2021 major and minor, to access the phenotypic diversity within the 300-peanutt core collection and select better accessions to fill breeding gaps in Ghana. Data were collected on both quantitative and qualitative traits. Analysis of variance revealed that days to first flowering, days to 50% flowering, days to maturity, plot pod weight, plot seed weight and shelling percentage, were highly significant at ($p<0.001$) for accessions in the peanut core collections. Coefficient of variation had a greater dispersion for plot pod weight and plot seed weight. A perfect significant positive association of days to first flowering and days to maturity at individual seasons for both short and long cycle indicated that effective improvement in yield could be achieved through selection based on these characteristics. Tukey test comparison extrapolated the mean performances of short and long cycle traits which was used to select best extra early maturing accession like MZG-ICGV-SM 03520 and medium maturing accession like MAL-ICG 14630. Disease assessment resulted in identification of tolerant accessions for early leaf spot, late leaf spot and groundnut rosette disease. Frequency distribution of qualitative trait such as seed coat offered a wide diversity of seed coat colours with desirable agronomic traits for commercial usage and breeding studies. There was a high genetic variability among the accessions for days to first flowering, days to maturity, tolerance to diseases, and yield. These traits will be useful to develop tolerant varieties through breeding.

Effect of 90 Day Peanut Supplementation on Nutrition and Health Status of School Children Aged 6-9 Years in Mukono District, Uganda

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Consumption of certain dietary patterns have been found to remarkably modify the community structure of gut-microbiota, leading to the change of nutritional status and host health outcomes. Peanuts are a good plant source of protein, fats, vitamins and minerals hence suitable for use as supplement, intervention of malnutrition as well as varied non- communicable diseases. To assess the effect of peanut consumption on the nutrition and health status of growing children, a randomized experimental study comprising of a 90-day peanut snack supplementation and 30 day post intervention follow-up was conducted amongst 100 children (52 female; 48 males) aged 6-9 years living in Nama Sub-County, Mukono District, Uganda. Monthly data collected included child nutritional status based weight and height measurements, dietary consumption, presence of fecal helminths plus physical activity, mood and general health status. Data analysis included bivariate analysis, ordinal logistic regression, ANOVA and generalized estimating equations (GEE).

Peanut supplementation had no significant effect on the children's weight for age or height for age by study period, gender and study group. Dietary score was higher in the intervention group (7.58) compared to the control group (6.42). Average dietary diversity scores differed significantly by study period (p-value=0.005) and study group (p-value 0.0049) but not by gender. High levels of physical activity was observed amongst male children and control group. Physical activity significantly varied by gender (p-value 0.031) at Day 30. More male children and those in the intervention group reported being happy. The children's general mood varied statistically by study at Day 120 (p-value 0.015). Majority (over 80%) of the children were reported to be well especially in the intervention group. Health status varied by study group on Day 90 (p-value 0.002) and Day 120 (p-value 0.001). Of the 115 children fecal samples assessed for presence of helminths, only 16 (13.9%) tested positive over the 90-day intervention period, with 10 (62.5%) being female and six (37.5%) males.

From Day 0 to Day 90 of the study period, between 5.0% and 6.4% of the children were found to have helminths especially in the control group. In summary whereas no variations were found in nutrition status by study group, children the intervention group had a higher diversity score, were happier and of better health status with less helminth infestation. Peanut snack consumption should be continually encouraged as it helps boost the children dietary diversity score and health status. As further research, a community based strategy should be piloted to ensure availability and provision of safe, affordable and sustainable peanut snack supplementation for school going children.

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Effect of Weed Size and Adjuvant on Texas Panicum Control in Peanut

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Soil residual products available for peanuts during the growing season (i.e., Dual Magnum, Warrant, Zidua, etc.) provide limited control of Texas panicum (TP). In addition, TP extended emergence pattern requires herbicides, such as clethodim, postemergence for in-season management. The efficacy of clethodim is determined by TP growth stage and stress level at time of application. If clethodim applications are delayed due to poor weather conditions, TP becomes more difficult to control. The objectives of this project were to evaluate the efficacy of one- and two-pass clethodim applications at six different TP growth stages and the effect of selected adjuvants at two different growth stages on TP control. In study 1, TP was treated with clethodim at 12 fl oz/A at the 2-4, 4-6, 6-8, and 8-12 inch growth stages and 16 fl oz/A at the >12 inch growth stage. In addition, sequential treatments (12 or 16 fl oz/A) were applied 2 wk after the 6-8, 8-12, and >12 inch growth stages. Rescue single and sequential treatments were used to simulate a delayed clethodim application. In study 2, Crop Oil Concentrate (COC), Methylated Seed Oil (MSO), and Ammonium Sulfate (AMS) alone and in combination were evaluated for TP control at two growth stages. An untreated check was included for comparison. Experimental design was a randomized complete block with plot dimensions of 4 rows wide by 40 ft long with four replications. Percent visual weed and crop injury ratings were evaluated at 14 and 28 days after each application (DAA) timing. In study 1, SelectMAX at 12 fl oz/A provided excellent control (>90%) of Texas panicum when applied at the 2-4- and 4-6-inch growth stages. Texas panicum control declined to 70% at 28DAA as size increased in the study. When the rate of clethodim was increased to 16 fl oz, control increased to 82% on large TP. The 16 fl oz/A rate of clethodim increased control by 11% compared to the 12 fl oz/A rate. Sequential applications of clethodim improved TP control (100% at 28DAA) at the 6–8-inch growth stage compared to the single application (84% at 28DAT). In addition, control was better with the sequential application of 12 fl oz/A at the 8–12-inch growth stage (93% versus 71%). At the largest growth stage (>12 inches), a sequential application of 16 fl oz/A did improve TP control (82%). In study 2, adjuvant type was an important factor in the efficacy of SelectMAX on TP. The crop oil concentrate (COC) provided 94% control at the 4–6-inch growth stage. Control of TP with NIS and MSO was significantly lower than the COC. The addition of AMS did increase TP control with MSO at both growth stages, but control was similar as the COC alone and COC+AMS. Weed size played a role in the efficacy of clethodim on TP where efficacy was better with smaller growth stages. In addition, adjuvant impacted clethodim efficacy on TP. Growers are advised to treat TP at the 2-6 inch growth stage and use COC or MSO+AMS adjuvants with clethodim.

LSD

Optimizing Peanut Harvest Timing with the aGDD Tracker

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Peanuts are a major agronomic crop in North Florida. Optimizing harvest timing is essential to maximize both yield and grade but can be challenging for growers because temperature and available moisture greatly impact the speed of maturity. Timing harvest based on the accumulation of adjusted growing degree days (aGDD) is the most effective strategy. To assist growers with optimizing harvest timing members of the Florida Peanut Team developed and published the *aGDD Tracker. The Tracker* presented aGDD data generated by Peanut Field Agronomic Resource Manager (PeanutFARM), an online platform that is tied to Florida Automated Weather Network (FAWN) weather stations. *The Tracker* showed the number of aGDDs accumulated by 140 and 88 different hypothetical fields in 2021 and 2022 respectively (2021: 10 locations, 14 planting dates; 2022: 8 locations, 11 planting dates). Growers could follow whichever field(s) most closely approximated their own and see how aGDDs accumulated throughout the season, providing valuable insight for harvest decisions. *The Tracker* generated no new data – it was a way to combine, organize, and share aGDD data that otherwise would not have been easily accessible by growers. Fourteen editions of *The Tracker* were published on the Panhandle Agriculture eNews website throughout the 2021 and 2022 growing seasons. Each posting of *The Tracker* was accompanied by a “Peanut Update” consisting of a weather summary, field observations, and IPM recommendations. The posts were viewed approximately 1,600 times on the Panhandle Agriculture eNews website. Several of the posts were republished in trade publications furthering their reach. Input from producers and agents indicated that both the information in *The Tracker* and the updates were useful and served the intended goal of helping to inform harvest timing and IPM decisions. The *aGDD Tracker* was an excellent utilization of pre-existing resources (PeanutFARM, FAWN, Panhandle Agriculture eNews); combining them in a way that delivered timely, specific, and actionable information to growers.

Alternative Sources of Calcium and Recommendations for Providing Calcium to the Pegging Zone of Peanut in the Southeast

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Providing calcium fertilizer to the pegging zone of peanut can be extremely important to avoid reduced yields, pod rot, and poor germination of peanuts saved for seed. Traditionally, calcium has been provided by applying either lime at planting or gypsum (calcium sulfate) at early bloom. However, in recent years lime and gypsum have been harder to obtain. Therefore, alternative sources of calcium such as liquid lime, liquid calciums, polysulfate and even incinerated chicken litter are being explored. Replicated field trials analyzing the effectiveness of these alternative calcium fertilizers to increase both yield and calcium levels in the harvested nuts will be presented.

In addition, an alternative way of recommending gypsum applications based on pegging zone soil sample results will also be presented. The University of Georgia currently recommends gypsum application when the soil test calcium in a pegging zone sample is less than 500 lb/a and/or the calcium to potassium ratio is less than 3 to 1. If gypsum is needed according to these criteria, then the recommended application rate is 1000 pounds of gypsum per acre. An alternative recommendation scheme that accounts for different levels of calcium, the calcium to potassium ratio, and the calcium to magnesium ratio is currently being used by at least one private soils laboratory in Georgia. Eight different scenarios can lead to eight different gypsum application rates being recommended, ranging from zero to 1250 pounds per acre, and includes rates as low as 300 and 500 pounds of gypsum per acre. Replicated field trials testing this alternative recommendation scheme will also be presented.

Predicting Below and Above-Ground Peanut Biomass and Maturity Using Multi-Target Regression.

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Accurate prediction of peanut growth and maturity is crucial for farmers and breeding programs to improve crop management. Remote sensing technology, such as satellites and drones, can provide in-season crop monitoring through the collection of spectral reflectance data. Current empirical relationships between crop biomass and spectral reflectance enable the prediction of single variables, such as aboveground crop biomass and pod weight, but robust algorithms for predicting multiple peanut growth variables have not been proposed. This study aimed to develop experiments to predict multiple peanut growth variables using a multi-output regression (MTR) approach. The experiment was conducted in two irrigated commercial peanut fields near Auburn, Alabama, using 20 grids of contrasting soil characteristics for data collection. Peanut biomass samples were collected weekly from each grid, and peanut maturity was assessed manually on 200-pod samples using the hull-scrape method and the peanut profile board. MTR models were built to establish a functional relationship between peanut aboveground biomass, maturity, and spectral reflectance changes of the canopy over time. Reflectance from individual specific spectral bands and vegetation indices (VI) of the study field were extracted from satellite images. The algorithms were developed using toolkits available in the Scikit-learn python library and were evaluated using the mean absolute error (MAE) metric. The RF algorithm was able to output multiple numeric values of peanut maturity indices (PMI) upon VI and spectral bands, supporting the hypothesis that MTR can predict peanut maturity at the field level. The use of spectral reflectance from satellite images resulted in a small prediction error of 9% for PMI using brown to black pods and 10% when predicting PMI using orange to black pods. The MTR model was also accurate in predicting aboveground biomass (MAE = 1301) compared to pod weight (MAE = 1103). The study demonstrated a promising method to assess within-field variability of peanut maturity using remote sensing images, which could reduce the subjectivity of the manual method. Spatial and temporal prediction of peanut aboveground and belowground biomass could support farmers and researchers in making decisions related to harvest, market, and plant breeding.

Genotype by Environment Studies on Confectionery Peanut Genotypes in Ghana

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Confectionery products and its nutritive values of peanut are gaining more importance in the peanut industry rather than the oil content. Peanut seed size is highly important as farmers and end-users prefer varieties with large seeds. Drought, low soil fertility, rain-fed agriculture, diseases and pests are major contributing factors accounting for low productivity in peanut production. The objective of the study was to determine the genotype by environment (G x E) interaction effect on seed mass and yield of 20 confectionery peanut genotypes across five different environments. Nineteen of the genotypes were fixed lines (F7) developed by the CSIR-CRI Legumes and Oil seeds division and a check, Oboshie. The trials established in 2020 minor, 2021 major and minor cropping seasons at Fumesua and Ejura. The trials were laid out in 5 x 4 alpha lattice design with three replications per location. The analysis of variance for pod yield and 100 seeds weight showed that there were highly significant differences ($p<0.01$) among environments and genotypes. Positive correlation was observed for pod yield and plot pod yield, pod yield and hundred seed weight, and pod yield and days to maturity. The GGE bi-plot analysis, the principal component axis (PC1 and PC2) explained 90.7% (PC1 = 76.9% and PC2 = 13.8%) and 83.4% (PC1 = 61.8% and PC2 = 21.6%) of total variation for pod yield and 100 seed weight respectively. Generally, genotype Oboshie x Nkosour-4-19 was stable and highest yielder (2.644kg/ha) with high 100 seed mass (62.46g). However, additional multi-location trial and proximate analysis are required to make recommendation for release as a variety.

High-Density SNP Map of BC_1 Peanut Population.

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Using marker-assisted backcrossing, we are currently developing near-isogenic introgression lines (BC_1 population) in a common cultivated genetic background. To improve the resolution of our current map of the TxAG-6 x UF439-16-10-3-2 (Florunner component line) population, we are developing a high-density map using the Axiom Arachis_array2 SNP chip. Fifty-nine BC_1 accessions were developed from the cross between TxAG-6 x UF439-16-10-3-2. Seed chips from 59 BC_1 accessions were extracted for DNA that was then quantified using the Quantifluor dsDNA System (Promega, Inc, Madison WI) kit on a Tecan Infinite F200 plate fluorometer. DNA was sent to Affymetrix for genotyping. We have received 9,589 polymorphic high-resolution SNPs. We are currently using these to develop a high-density SNP map of the population. This map will be used to enhance the resolution of the marker-assisted backcrossing program.

Impacts of Early-Season Deficit Irrigation on Aflatoxin Formation, Drought Stress and Yields in Peanut (*Arachis hypogaea* L.)

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Losses from aflatoxin and drought stress in peanut represent major threats to both human and economic health. For these reasons, mitigation of aflatoxin and improvement of drought tolerance in peanut are paramount. Empirical evidence shows relationships between soil environmental conditions (drought and temperature) and aflatoxin formation in peanut, however, quantification of the role that irrigation regiments, plant physiological status, genotypic selection and soil environment play in aflatoxin formation remains understudied.

The purpose of this research is multi-pronged during which we assessed impacts of early-season deficit irrigation (ESDI) and genotypic selection on aboveground physiology and aflatoxin formation. To assess these relationships, four peanut cultivars of varying drought tolerance and shell characteristics (UF150303, 10x34-4-4-1-2, a Bolivian outcross with a unique, dark shell composition and 10x10-3-3-1-1) were exposed to an ESDI or full irrigation across two growing seasons in a common garden study. Weekly measurements of aboveground physiology (pre-dawn leaf water potentials and maximum quantum yield (FvFm)) were recorded across the entire season. Following 100 days after planting, severe drought was initiated across all treatment groups and changes in physiology were measured until harvest. Results were compared across irrigation treatments and genotypes.

Results showed three of the four genotypes exposed to ESDI (all but 10x34-4-4-1-2) maintained significantly less negative pre-dawn leaf water potentials, indicative of reduced drought stress, both prior to and during drought. FvFm, another proxy for drought stress, was also higher in deficit exposed genotypes, suggesting priming responses beneficial to reducing drought stress are evident under ESDI. Post-harvest aflatoxin levels were shown to be lower in plants exposed to deficit irrigation in all genotypes aside from 10x34-4-4-1-2, though only two genotypes fell below the FDA limit of 15 ppb (the novel Bolivian outcross (2.14 ppb) and 10x10-3-3-1-1 (5.23 ppb)). Though plants exposed to ESDI demonstrated evidence of lowered drought stress and aflatoxin levels it should be noted that this came at the cost of reduced yields when compared to plants receiving full irrigation. Investigation of these mechanisms as well as the influence of elevated soil temperature in combination with drought is warranted and will also be discussed. The role of ESDI and soil temperatures on plant physiology and aflatoxin formation are currently being assessed though manipulative study, allowing for the decoupling of water statuses in both plant and pegging environments.

Small UAS based spectral imaging and machine learning for peanut maturity estimation

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Identifying optimum peanut harvest time is challenging as the crop continues to flower and produce pods amid supportive agroclimatic conditions. We evaluated high-resolution spectral imagery to quantify peanut pod maturity. Four recently developed Virginia-type cultivars, ‘Bailey-II’, ‘Emery’, ‘N.C.20’ and ‘Walton’, were planted in randomized strips, with and without prohexadione calcium growth regulator (Apogee® BASF). A small unmanned-aerial-system (SUAS) with a multispectral imaging sensor on-board was used to image the plots at different growth stages beginning 15-weeks after planting and continued during pod and seed maturity. Concurrently, peanut maturity (PM) was determined using the pod mesocarp color method and peanut maturity index (PMI) was computed as PMI (ratio of number of oranges, brown pods to total pods).

A total of 24 vegetation indices (VIs) were extracted and evaluated for correlation with the PMI. The normalized difference red edge (NDRE) and modified nonlinear index (MNLI) showed the closest relationship to the PMI. Specifically, for Bailey-II the best association between PMI was with NDRE ($r = 0.87$, $p < 0.001$); for Emery, GEMI ($r = -0.71$, $p<0.001$); for N.C.20, MSR ($r = -0.72$, $p<0.001$); and for Walton, NDRE ($r = -0.82$, $p<0.001$). Machine learning models RF, SVM, KNN, PLSR and LASSO were formulated using reflectance features to predict the PMI. KNN yielded highest prediction accuracy ($R^2 = 0.70$ RMSE= 24%), and lowest observed with PLSR ($R^2 = 0.62$, RMSE= 27%), while for others R^2 ranged, 0.63-0.70, and RMSE ranged 24%-30%. High-resolution spectral imagery coupled with data-run approaches can be effective in accounting and predicting PM to guide precision peanut harvest.

Machine Learning Approach for Genomic Selection of Oil Content In Peanuts

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Oil content is one the most economically important traits for the peanut industry. Developing high oil peanuts has been one of the major outputs in peanut breeding programs. Breeding for high oil can be expensive and time consuming. Genomic selection (GS) has been successfully used to rapidly improve oil content in other crops such as soybean and canola. However, the accuracy of genomic selection to predict oil content has not been fully investigated for peanuts. Therefore, the objective of this study was to develop a machine learning approach used for genomic selection of oil content in peanuts. We used a total of 775 USDA peanut accessions that were genotyped using 30,000 SNPs. Oil content of the USDA accessions is available from the USDA-GRIN database. A total of five models were used to build genomic selection machine learning. These models consisted of ridge regression best linear unbiased predictor (rrBLUP), genomic best linear unbiased predictor (gBLUP), Bayesian least absolute shrinkage and selection operator (Bayesian LASSO), support vector machines (SVMs), and random forest (RF). For each model, genomic selection accuracy was conducted using a 5-fold validation approach with 1,000 replications for each run. Results showed that GS accuracy was model-dependent with rrBLUP having the highest accuracy (r=0.7) and SVMs having the lowest accuracy (r=0.2).

Assessing Fungicide Spray Deposition within Peanut Canopies at Different Carrier Volumes and Droplet Sizes

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Effective management of diseases and pests in peanut requires adequate spray deposition and penetration into the dense canopy, especially at the bottom of the plants. Limited information is available on how spray volume and droplet size effects deposition within the peanut canopies. Therefore, a study was conducted in 2021 and 2022 to assess spray deposition within the peanut canopies at three application volumes i.e. 94, 140, and 187 L ha^{-1} (10, 15, and 20 gallons per acre) and three different droplet sizes (medium, very coarse, and ultra-coarse droplets). The study was organized as a factorial arrangement of spray volume by droplet size and was implemented in 4-row plots that measured 12 ft wide and 80 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 from 2021 indicated that the interaction between spray volume and droplet size affected spray deposition within the peanut canopies, with higher spray volumes (140 and 187 L ha^{-1}) providing improved coverage up to the middle of the canopies, and medium and very coarse droplets providing comparable coverage in the middle of the canopies. However, spray deposition at the bottom of the canopies did not differ significantly among the application volumes and droplet sizes. The data from the 2022 study is currently being analyzed and will be used to determine if a similar trend for spray volume and droplet size existed during both years or not. The data from this study will be used to help understand the performance of current spray volumes and nozzles used for fungicide applications in peanut and guide future research efforts in improving the efficiency of fungicide applications.

Promoting Irrigation Efficiency and Educational Opportunities Through the UGA AgWET Program

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The availability of water in the state of Georgia is very important to the overall state economy, especially in agriculture. Georgia's agricultural producers have a desire to use irrigation water as efficiently as possible. Having access to information and trainings on efficient irrigation practices is very beneficial to producers in South Georgia. The UGA Extension Water Team and County Extension Agents worked together with agricultural producers on irrigation water management and the use of technologies available in an effort to promote education on the efficient use of irrigation water resources. During 2022 soil moisture sensors were installed in 26 producer fields across 17 counties, impacting over 1450 acres of row crop production in the state of Georgia. There was a consistent flow of information between UGA Faculty and producers to ensure success of this program. Two irrigation field days were hosted to demonstrate types of sensors available, pros and cons of each, installation methods, funding available and irrigation scheduling methods. There have been multiple benefits received from this programming which include increased knowledge and experience along with an astounding water savings. UGA Extension Agents and farmers gained experience and comfort in implementing new technologies on the farm through guidance of the UGA Water Team. Through their experience monitoring soil moisture with sensors, farmers and agents have seen how soil type affects available water, how weather affects crop water use and the importance of pivot uniformity. According to recent research, the average water saving by use of soil moisture sensors is 3.75 inches per acre in peanuts and 2.25 inches per acre in cotton.
These savings applied to 300 acres of peanuts and 1150 acres of cotton yields a water savings of over 100 million gallons of water. As a result of these efforts, producers see the value in managing irrigation through use of technology and are conserving our State's water supply.

Seed Shrinkage Trait in Peanut and Its Macromolecular Compound Observation.

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Peanut (*Arachis hypogaea*) is one of the important oil crops in the world. Its seeds contain many different macromolecular compounds, which involves in seed dormancy and seed germination. The occurrence of seed shrinkage may be due to the changes in the composition of internal compounds, and it could affect the seed germination rate, seeding vigor and subsequent plant growth. The seeds with shrinkage trait have been observed in a segregation population, which was derived from a cross between Nongyu 68 and PI599592. The F_2 and F_3 populations were investigated and the data was analyzed by R. It was found that the degree of shrinkage was significantly negatively correlated with the shelling percentage. The shrunken seed has been planted in the field and after the germination, the phenotypes have been measured and compared with the plants germinating from the normal seeds. However, the phenotypes did not show the significant difference between shrunken seed and normal seed. In addition, both paraffin and frozen sections were performed to observe the seeds under microscope. Under methyl blue staining, the outer cells of the cotyledons of the shrunken seeds were dented and arranged closely. Through iodine solution and Sudan No. 3 staining, the shrunken seeds had less starch grains and oil compared with the normal seed, while the seed coat and embryo had no significant difference. The change of the compound composition of shrunken seed in the cotyledon may increase the water osmotic potential and cause the seed shrinkage phenomenon after harvesting and drying process. On this study, we can preliminarily understand the macromolecular compound differences in the cotyledon between shrunken seed and normal seed. Therefore, the future plan will be through the study of related genes in the sugar and lipid synthesis pathways to understand the mechanism.

Influence of Soil Sampling Grid Size on Application Accuracy and Economics of Site-Specific Soil pH Management in Peanut

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Proper soil pH management is important to attain high peanut yield and quality. Most agriculture fields in Georgia have a significant amount of soil spatial variability due to soil type, texture, topography, and other factors. Soil sampling is an important component of site-specific nutrient management in precision agriculture. Grid-based soil sampling is the most widely used practice in the southeastern US for site-specific soil pH management in peanut. Selecting an optimal grid size for soil sampling is always of interest to both consultants and growers to best capture spatial nutrient variability within the fields while being economical. To better understand how some of the commonly-used grid sizes influence the depiction of soil pH variability, and consequently the application accuracy and economics of site-specific soil pH management in peanut, a study was conducted across nine different fields in Georgia in 2022. Soil samples were collected within each field using grid sizes of 1.0, 2.5, 5.0, 7.5, and 10 ac. Spatial nutrient maps for soil pH and the corresponding variable-rate lime application maps were created based on each grid size, and compared to the reference application maps that were assumed to represent actual soil pH variability within the fields A comparative spatial analysis was conducted to determine the amount of on-target, under- and over-application associated with each grid size strategy in all fields. The total amount of lime required for each grid size along with the lime cost ($/ton) was used to calculate and compare the application costs and economics of different grid sizes. The results showed that, on average, a grid size of 2.5 ac or less provided an application accuracy of 80% or greater in most fields. The application accuracy decreased considerably (<60%) thereafter for the grid sizes of 5.0, 7.5 and 10.0 ac. The overall application costs (when considering the total costs of soil sampling, soil analysis and lime) among different grid sizes were not significantly different. These results indicated that the smaller grid sizes of 1.0 and 2.5 ac were also economical, even with the increased soil samples due to high under- or over-application associated with larger grid sizes of 5.0 ac or greater. The findings from this study implied that the increase in application accuracy from smaller grid sizes may come at a little higher upfront cost to the grower (due to more soil samples); however, the total application costs are still similar to the larger grid sizes. Based on these findings, it is recommended that the grid size for soil sampling should not exceed 2.5 ac to capture soil pH variability in peanut fields and ensure high application accuracy.

Development of Rapid Molecular Tools for Detection and Quantification of Aflatoxigenic Strains of *Aspergillus flavus* in Peanut Seeds

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Aspergillus flavus is an opportunistic pathogen of crops including peanuts worldwide and has a major impact on crop losses through mycotoxin contamination. This pathogen affects peanuts with aflatoxin production which poses a continuing health risk to consumers. However, only 40–50% of *A. flavus* strains can produce toxins, creating a need for differentiation between toxigenic and non-toxigenic strains. Conventional methods to distinguish between aflatoxin-producing and non-producing isolates include morphological and chromatographic techniques. Morphological classification is laborious, time-consuming, and requires a high level of skill. Likewise, measuring using chromatographic techniques is dependent on culture conditions such as media type, age, temperature, and nutrient sources which can impact the aflatoxin production of isolates. Here we have developed rapid molecular tools to differentiate between non-aflatoxigenic and aflatoxigenic *A. flavus* isolates. *Aspergillus* isolates were collected from seven seed lots around southern Georgia. The identification of the isolates was confirmed as *A. flavus* initially by morphological characteristics and further with a species-specific PCR-sequencing method. A total of five sets of qPCR primers specific for *A. flavus* were designed based on the aflatoxin regulatory genes *afl*R and *Ord*1 CDS sequences. Among those, the most suitable, stable, and robust primer set from both genes was selected through primer condition optimization for the detection and quantifying of *A. flavus* aflatoxigenic isolates. Two additional genes involved in the aflatoxin biosynthetic pathway (*nor*1 and *omt*A) were also amplified to identify aflatoxin-producing isolates using existing qPCR primers to verify the newly designed primer's efficiency. Our results showed a clear gene expression distinction between aflatoxin-producing and non-producing isolates. Expression of all four regulatory genes was observed among aflatoxigenic isolates, while non-toxigenic isolates remained unexpressed. These data demonstrate the specificity and efficiency of the newly designed and optimized primer sets. This assay can be useful to determine the infection levels due to aflatoxin-producing *A. flavus* in peanut seed lots, representing a valuable tool in the management of this notorious pathogen.

Fungicide Application Timing and Tank Mixtures for Controlling Soil Borne Disease in Mississippi

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Southern stem rot (*Athelia rolfsi*) is a costly disease in peanut production systems due to its difficulty to control once developed and potential to cause substantial pod yield loss. Therefore, southern stem rot is typically actively management by implementing fungicide spray schedules occurring on a 2 to 3 week interval with the most critical applications occurring from approximately 60 to 105 days after planting (DAP). The aim of this study was to evaluate the timing and efficacy of fungicide applications to control soil-borne disease during the middle portion of the growing season. Fungicide applications of flutolanil occurred at: 60/90 DAP, 75/90 DAP, 75/105 DAP, and 60/90/105 DAP. Additionally, treatments of flutolanil, flutolanil + chlorothalonil, flutolanil + azoxystrobin, inpyrfluxam + chlorothalonil, inpyrfluxam + azoxystrobin, and benzovindiflupyr + azoxystrobin occurred at 75 and 105 DAP. Application timings of flutolanil were similar with a slight numerical pod yield increase when applied sequentially at 75 and 90 DAP. However, flutolanil + azoxystrobin applied at 75 and 105 DAP had increased pod yield when compared to all other flutolanil only application timings. The flutolanil + azoxystrobin also had similar pod yield to inpyrfluxam + chlorothalonil, inpyrfluxam + azoxystrobin, and benzovindiflupyr + azoxystrobin when all treatments were applied at 75 and 105 DAP. Overall, these results suggest that tank mixtures of single active ingredient fungicides targeting soil-borne disease can be improved when tank mixed with azoxystrobin.

Modeling Peanuts Yield Losses due to Early Leaf Spot in Oklahoma

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Quantifying yield losses associated with early leaf spot (*Passalora arachidicola*) is essential to evaluate the effectiveness of control strategies. To that end, a meta-analysis was conducted to assess the heterogeneity in the relationship between early leaf spot (ELS) defoliation (%) and peanut yield (kg ha^{-1}) in Oklahoma (OK). Data were mined from fungicide efficacy trials performed in small plots across OK between 1990 and 2021. Fifty-three studies over 25 years met the criteria of ELS defoliation ≥ 40% in the untreated check for inclusion in the analysis. Disease class (low defoliation = ≤76 and high defoliation = >76%) and yield class (low = ≤ 2,976 and high = > 2,976 kg/ha) were included as categorical moderators. A random-coefficient model was successfully fitted to the data using maximum likelihood. The estimates of population-average of the intercept and slope were $\hat{\beta}_0$ = 4,259.3 kg ha^{-1} (SE = 107.4) and $\hat{\beta}_1$= 13.4 kg ha^{-1} %$^{-1}$ (SE = 0.7), 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 $\hat{\beta}_{0H}$= 4,661.5 kg ha^{-1} (SE = 118.6) and $\hat{\beta}_{0L}$ = –833.9 kg ha^{-1} (SE = 170.6), respectively, with a study-specific slope of $\hat{\beta}_1$= 14.0 kg ha^{-1} %$^{-1}$ (SE = 1.0). Due to that, the calculated damage coefficients for high and low yield classes were 0.30%$^{-1}$ and 0.36%$^{-1}$, respectively. These results indicate that yield losses due to ELS in OK are greater in low-yield environments than in high-yield environments.

3:15 – 5:00 Poster #	**MS Poster Competition** Meeting Room: Madison	Pres. #
39	**Identifying resistance to Early Leaf Spot (*Passalora arachidicola*) in nascent allotetraploids cross-compatible with cultivated peanut** **A.K. DONG*** Department of Plant Pathology, University of Georgia, Athens GA 30602, 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, and S.C.M. LEAL-BERTIOLI Department of Plant Pathology, University of Georgia, Athens GA 30602.	140
40	**Correlating Image Analyses and Biomass of *Passalora arachidicola* and *Nothopassalora personata* on Solid Media** **R.M.S. HUNTER***, A.D. MANCHESTER, and E.G. CANTONWINE, Department of Biology, Valdosta State University, Valdosta, GA 31698	141
41	**Proximate Composition and Fatty Acid Profile of Newly Released Groundnut Varieties** **M. MATANDARA*.** Lilongwe University of Agriculture and Natural Resources (LUANAR), Lilongwe, Malawi.	142
42	**Preliminary Characterization of Newly Acquired Wild *Arachis* Species Accessions** **M. MOBLEY***, B. TONNIS, M. WANG, and S. TALLURY, USDA-ARS, PGRCU, Griffin, GA 30223; A. BROOKS, University of Georgia, Griffin, GA 30223; and C. SIMPSON, Texas Agrilife Research, Stephenville, TX 76401.	143
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45	**Stomatal Conductance and Fluorescence in Rainfed Peanuts: Spatial and Temporal Variability Assessment** **M. SYSSKIND***, C. PILON, S. KUKAL, G. VELLIDIS, University of Georgia, Crop and Soil Sciences Department - Tifton, Georgia- USA; A. PEDUZZI, University of Georgia, Warnell School of Forestry and Natural Resources - Athens, Georgia- USA; and T. BOURLAI, University of Georgia, School of Electrical and Computer Engineering - Athens, Georgia- USA.	146

Identifying resistance to Early Leaf Spot (*Passalora arachidicola*) in nascent allotetraploids cross-compatible with cultivated peanut

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Peanut (*Arachis hypogaea*) is a major oil and food crop grown worldwide. One of the main constraints for peanut crop management is fungal diseases, including early leaf spot *(Passalora arachidicola*). This fungal pathogen causes severe defoliation and can account for large yield losses. Whereas only moderate levels of disease resistance have been identified in the cultivated peanut, high levels of disease resistance have been found in wild Arachis species. The objective of this study is to identify early leaf spot resistance from wild-derived hybrid plants. These plants were originated from species that have never been introgressed, but are compatible with cultivated peanut. Disease resistance in wild allotetraploid hybrids was evaluated with in-vitro detached leaf bioassays and determined by evaluating the total number of lesions and sporulating lesions per leaf area to determine the AUDPC value. Four hybrids (MagDio1, MagnaHoehnei1, MagnaKuhlmannii, and ValMicro1) showed significantly higher disease resistance when compared to GA-06G and Tifrunner, the cultivated controls. These hybrids and their parents will be further analyzed to identify the parental source of resistance. Future work will be conducted to identify QTLs that confer this observed disease resistance. The potential for wild peanut disease resistance introgressions is promising and can be used to lower yield losses due to early leaf spot.

Correlating Image Analyses and Biomass of *Passalora arachidicola* and *Nothopassalora personata* on Solid Media

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Passalora arachidicola and *Nothopassalora personata* are two hemibiotrophic, foliar pathogens of peanut that cause early leaf spot and late leaf spot, respectively. Both species grow slowly on media and convert to stromatic growth soon after germination. Because of this, fungal biomass across solid media is unequal, making radial growth assessments using traditional methods difficult. Experiments were conducted to compare image analyses of these fungi growing on solid media to direct measures of biomass. In the first experiment, conidia were transferred to potato dextrose agar (PDA) and incubated for 5, 7, 9, 12, and 15 days, after which plugs with and without tissues were transferred to pre-weighed slides, photographed, and dried. Images were taken with an Olympus Tough TG-6 camera at 1.6X using diascopic illumination and processed with ImageJ as follows: images were converted to 8-bit format, plugs were outlined to define the assessment area, and thresholds were adjusted to highlight the fungal tissues. Tissue areas (mm^2) were computed as the percent threshold coverage x plug area, and tissue volume (mm^3) as area x colony height. Heights were measured at 400X using an ocular micrometer. Biomass (mg) was estimated as the dry weight difference of comparable media plugs with and without fungal tissues. A significant positive correlation between area and biomass and volume and biomass was observed for *P. arachidicola* (r=66 and r=81, respectively, P<0.01), but not for *N. personata* (r=24 and r=0.14, respectively, P≥0.21). In a second experiment, homogenate solutions of *P. arachidicola* and *N. personata* were applied to PDA as 20 µl aliquots at 6 homogenate concentrations, 10, 20, 40, 60, 80, and 100%. After 10 days of incubation for *P. arachidicola* and 14 days for *N. personata,* images of the tissue plugs were used to compute tissue area (mm^2), and biomass (mg) was measured for fungal tissues that had been extracted from the media and dried. Even though the biomass of *N. personata* in the most diluted treatments were below the limits of the scale (≤0.000 g), a significant correlation between tissue area and dry weight was detected for *N. personata* in this experiment (r=0.76, P<0.01). The Pearson's correlation coefficient between area and biomass was higher for *P. arachidicola* in this experiment than the first (r=0.91, P<0.01). This research demonstrates that tissue estimates using ImageJ correlate well to direct measures of biomass for both species when biomass measures are done with accuracy. Therefore, ImageJ analysis is an effective method to measure the radial growth of *P. arachidicola* and *N. personata.*

Proximate Composition and Fatty Acid Profile of Newly Released Groundnut Varieties

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The nutrient profile of groundnuts is an important concept in the groundnut chain, as it impacts the utilization, processing, marketing, and breeding of groundnut varieties. This study aimed at determining the nutrition profile of the newly released groundnut varieties. Twelve groundnut varieties grown under controlled conditions were examined for oil content, crude protein, total carbohydrates, moisture fiber, and Fatty acid content. The oil content of the groundnuts ranged from 50.19% to 43.98%, protein from 31.95% to 25.0%, carbohydrates from 20.32% to 12.22%, fiber from 4.58% to 3.59%, and ash from 2.69% to 2.14%. On fatty acid oleic content ranged from 61.18% to 48.97%, linoleic acid from 30.53% to 19.94%, and palmitic acid ranged from 8.13% to 9.83%. CG13 had the highest oil (49.64%) content and quality (O/L=2.4) of oil among the newly released groundnut varieties. None of the newly released groundnuts are high oleic groundnuts however CG 10 and CG 13 had the highest oil content compared to CG7 (old variety). In summary, there is a substantial varietal difference in the nutrient composition of the newly released groundnut varieties which can be utilized in food processing, nutrition, and groundnut breeding field.

Preliminary Characterization of Newly Acquired Wild *Arachis* Species Accessions

M. MOBLEY*, B. TONNIS, M. WANG, and S. TALLURY, USDA-ARS, PGRCU, Griffin, GA 30223; A. BROOKS, University of Georgia, Griffin, GA 30223; and C. SIMPSON, Texas Agrilife Research, Stephenville, TX 76401.

Acquisition and maintenance of *Arachis* species accessions is one of the primary goals of the USDA-ARS managed genebank in Griffin. In the past few years, new wild *Arachis* species accessions have been acquired in collaboration with Texas AgriLife Research. Characterization of species accessions is necessary to find their potential value for the genetic improvement of cultivated species, *A. hypogaea* L. We attempted a preliminary characterization of 38 different accessions of 11 *Arachis* species belonging to four taxonomic sections. The characterizations included 100-pod weight, total oil content, fatty acid composition and total protein content. Six to eight plants of each species accession were grown in individual containers in the greenhouse. Routine management practices were followed with growing of the plants. Pods were harvested separately from containers and pooled for each individual accession. Digital images of pods and seeds were captured. A random sample of 100 pods of each accession was weighed which ranged from 4.6g in *A. cardenasii* (KSSc 36033 YF, PI 476012) to 26.7g in *A. stenosperma* (VSPmSv 13682) with a mean of 12.6g. The biochemical characterizations are being conducted and results will be discussed. It is anticipated that accessions with desirable traits may be used for enhancing the seed nutritional quality of *A. hypogaea*.

Effects of Protease Concentration and Hydrolysis Time on the ACE-Inhibitory Activity of Alcalase Hydrolyzed Peanut Protein Concentrate

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Many food-protein derived peptides showed potential antihypertensive properties. The main targets for antihypertensive peptides are renin and angiotensin converting enzyme (ACE). However, the cost to produce specific peptides from food protein is costly due to the tedious separation/purification process. The purpose of this study is to optimize the protease treatment condition to produce peanut protein hydrolysate (PPH) with high ACE-Inhibitory activity for possible food therapy of hypertension. A two-factor factorial design was used for the optimization. The peanut protein concentrate (PPC) with 80% protein content, which was made from partially defatted peanut flour, was hydrolyzed with 2.4L Alcalase at concentrations of 0, 3, 4, and 5% for 3-10 hours at pH 8 and 40 ºC. The suspensions were centrifuged after hydrolysis and supernatants (PPH) were collected. The protein/peptide concentrations of supernatants were determined using the Bicinchoninic Acid (BCA) method. The free amino acid (AA) concentration was measured using the Ninhydrin reagent. The ACE-inhibitory activity was determined using ACE from rabbit lung and substrate FAPGG at protein/peptide concentrations 1 and 2 mg/ml. Captopril, the commercial ACE inhibitor, at 1µM or 0.217mg/ml was used as positive control. The protein/peptide and the free AA concentrations of PPH increased significantly as a result of Alcalase hydrolysis compared with the control sample. At same enzyme concentration the free AA increased linearly with treatment time ($P<0.0001$, $R^2=0.886$-0.974) and the percentage of ACE inhibition increased with hydrolysis time in sigmoid pattern, while the protein/peptide concentration decreased near linearly ($R^2=0.811$-0.887). At same treatment time, the protein/peptide concentration did not change significantly with Alcalase concentration, while free AA and ACE-inhibition% increased significantly ($P<0.05$). The ACE-inhibition of captopril at concentration of 0.217 mg/ml was 82%, while the highest ACE-inhibition of PPH hydrolyzed for 8 hours by 5% of Alcalase was 50% at 2 mg/ml and there was no further increase in ACE-inhibition when the hydrolysis time was extended to 10 hours.

This study shows that the extensive hydrolysis of PPC by Alcalase can result in PPH with moderate ACE-inhibitory activity. The PPH could be consumed as dietary supplement or food at relatively higher dose to regulate blood pressure for people with hypertension. However, further optimization of hydrolysis may be needed to produce PPH with higher ACE-inhibitory activity.

Screening the U.S. Peanut Mini-Core Collection for Resistance to Stem Rot Disease Caused by *Sclerotium Rolfsii* Using Slurry Method of Inoculation

S. SUBEDI*, Plant and Environmental Science, New Mexico State University, Las Cruces, New Mexico; D. LOZADA, Plant and Environmental Science, New Mexico State University, Las Cruces, New Mexico; S. SANOGO, Department of Entomology, Plant Pathology and Weed Science, New Mexico State University, Las Cruces, New Mexico; S.R. STEINER, Department of Economics, Applied Statistics, and International Business, New Mexico State University, Las Cruces, New Mexico; S. MADUGULA, Agriculture College, NAIRA Srikakulam ANGRAU, Andhra Pradesh, 532185 – India; and N. PUPPALA, Agricultural Science Center at Clovis, New Mexico State University, Clovis, New Mexico.

A soil-borne fungus, *Sclerotium rolfsii* Sacc., causes a devastating stem rot disease on peanuts (*Arachis hypogaea* L.) during humid and warm environmental conditions. Identification of stem rot resistant germplasm is an important step towards host-resistance development for effective disease management. The objective of this study was to screen and evaluate 105 peanut accessions from U.S. mini-core collection for stem rot disease resistance reaction using slurry method of inoculation. The experiment was conducted under growth chamber and greenhouse conditions. Also, three peanut varieties: 'G03L' as a resistant, 'G07W' as a moderately resistant and 'Valencia-C' as a susceptible check were used. Disease scores and lesion length (cm) were recorded for each plant from day 5 to 17 post-inoculation at 2-3 days interval. Data were analyzed using GLIMMIX procedure with germplasm as fixed effect. Under growth chamber study, all accession, including three check varieties were infected with disease. While under greenhouse, some accessions were not infected. Evaluating the mean disease score under both growth chamber and greenhouse conditions, none of the accessions were immune or resistant, eleven accessions, viz. PI 313129, PI 295309, PI 493717, PI 343398, PI 274194, PI 290536, PI 355268, PI 461427, PI 494034, PI 576614 and PI 497395 were moderately resistant, and the remaining 94 accessions were susceptible and highly susceptible. Overall, results indicated potentially higher disease pressure under growth chamber conditions than greenhouse conditions. The accession with relatively lower disease score (moderately resistant) could be used for further tests and breeding to develop stem rot resistant peanut cultivars.

Stomatal Conductance and Fluorescence in Rainfed Peanuts: Spatial and Temporal Variability Assessment

M. SYSSKIND*, C. PILON, S. KUKAL, G. VELLIDIS, University of Georgia, Crop and Soil Sciences Department - Tifton, Georgia- USA; A. PEDUZZI, University of Georgia, Warnell School of Forestry and Natural Resources - Athens, Georgia- USA; and T. BOURLAI, University of Georgia, School of Electrical and Computer Engineering - Athens, Georgia- USA.

Peanuts (*Arachis hypogaea* L.) are susceptible to variations in the soil and weather conditions when performing photosynthetic processes. Different photosynthetic parameters, such as stomatal conductance, are sensitive to environmental changes. Leaf fluorescence is another photosynthetic parameter that becomes a limiting factor for photosynthetic efficiency under drastic environmental changes. However, the spatial and temporal variability in photosynthetic parameters within a rainfed peanut field and their relations with soil matric potential and soil texture have not yet been documented. The objective of this study were to determine the photosynthetic parameter that contributes most to variability in a peanut field as well as the effects of soil texture and soil matric potential on temporal and geographical variability. A commercial rainfed peanut field located in Pearson, Georgia was used for this experiment. The experimental layout included 31 plots with three subplots and was completely randomized. Biweekly measurements were taken with a LI-600 for stomatal conductance (gsw), actual quantum yield (PSII), electron transport rate (ETR), transpiration (E), and leaf temperature (Tleaf). Findings revealed that Principle Components 1 and 2 (PC1 and PC2) were responsible for 71% of the variance in the data. Stomatal conductance contributed 53% more than any other photosynthetic parameter to the variability in the peanut field. Soil matric potential and soil texture did not impact spatial variability in stomatal conductance for this field, whereas air temperatures and rainfall did not influence temporal variability in leaf stomatal conductance.

3:15 – 5:00 Poster #	PhD Poster Competition Meeting Room: Madison	Pres. #
46	**Genetic Analysis of Pre-harvest Aflatoxin Contamination Resistance in Peanut in Ghana** **J. ABOGOOM*,** R. AKROMAH, C.K. KWOSEH, Department of Crop and Soil Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; and D. JORDAN, Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC 27695.	147
47	**Laboratory Investigation of Peanut Burrower Bug, *Pangaeus bilineatus*, Biology** **B.L. AIGNER*** and M.R. ABNEY, Entomology Department, University of Georgia, Tifton, 31793	148
48	**Dynamics of Weed Species in Peanut – Cereal Cropping and Input Systems in Ghana** **S. ARTHUR***, G. BOLFREY-ARKU, M.B. MOCHIAH, J.Y. ASIBUO, A. G. GYIMAH, D. ABINTERA, V. KLUTSE and M. YORKE, Council for Scientific and Industrial Research - Crops Research Institute, Kumasi, Ghana; R. AKROMA and J. SARKODIE-ADDO, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; G. MAHAMAH, J. NBOYINE and A. SEIDU, Council for Scientific and Industrial Research-Savana Agricultural Research Institute, Wa, Ghana; D.L. JORDAN and R.L. BRANDENBURG, North Carolina State University, Raleigh, NC 27695; and D. HOISINGTON, and J. RHOADS, Feed the Future Innovation Lab for Peanut, University of Georgia, Athens, GA 30602	149
49	**The Potential of Using Wild Peanut Genotypes to Enhance Photosynthetic Heat Tolerance in Peanuts** **K.J. AWORI*,** C. PILON, J.L. SNIDER, Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793-0748. S. BERTIOLI Department of Plant Pathology, The University of Georgia, Athens, GA 30602 - 0000 and D. BERTIOLI, Department of Crop and Soil Sciences, The University of Georgia, Athens, GA 30602 - 0000 and V. TISHCHENKO, Department of Crop and Soil Sciences, The University of Georgia, Griffin, 1109 Experiment Street, Griffin, GA 30223	150
50	**Utilizing Wild Peanut Species to Introgress Traits for Drought Tolerance and High Oil Content into Cultivated Peanut (*Arachis hypogaea* L.)** **K. COSTELLO*,** D. STELLY**,** Texas A&M, Department of Soil and Crop Sciences, College Station, TX, 77840, J. CASON, C. SIMPSON, Texas A&M AgriLife Research, Texas A&M University System, Stephenville, TX 76401, J. VERCHOT, Texas A&M, Department of Soil and Crop Sciences, Department of Plant Pathology and Microbiology, College Station, TX, 77840, and M.D. BUROW, Texas A&M AgriLife Research, Texas A&M University System, Lubbock, TX, 79403	151
51	**Influence of Planting Pattern and Herbicide Program on Sicklepod [*Senna obtusifolia* (L.)] Control in Peanut** **O.S. DARAMOLA***, G.E. MACDONALD, P. DEVKOTA, H. SINGH, B.L. TILLMAN, Department of Agronomy, University of Florida, Gainesville, FL, 3261; and R. KANISSERY, Department of Horticulture, University of Florida, Immokalee, FL, 34142.	152
52	**Application of DSSAT Crop Modeling and Spatial Analysis to Indicate Parameters Correlated with Aflatoxin Contamination in Peanuts** **S. MAKTABI***, G. VELLIDIS, C. PILON, and M. SYSSKIND; University of Georgia, Crop and Soil Sciences Department - Tifton, Georgia USA.	153
53	**Spatial variability in yield and quality of peanut in irrigated fields and adjacent rainfed areas** **R.A.C. MELO***, C. PILON, W. PORTER, L. BASTOS, Crop and Soil Sciences Department, The University of Georgia, Tifton, GA 31793; R. KEMERAIT; Plant Pathology Department, The University of Georgia, Tifton, GA 31793; J.P. SAPP, J. MALLARD, D. HALL, and B. HAYES, Georgia Cooperative Extension, The University of Georgia, Athens, GA 30602	154

54	**Peanut Response to Postemergence Applications of Chlorimuron (Classic®)** **N.S. SHAY***, E.P. PROSTKO, and C.C. ABBOTT, Dept. of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793.	155

Genetic Analysis of Pre-harvest Aflatoxin Contamination Resistance in Peanut in Ghana

J. ABOGOOM*, R. AKROMAH, C.K. KWOSEH, Department of Crop and Soil Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; and D. JORDAN, Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC 27695.

Studies on sources of genetic resistance to aflatoxin contamination in peanut in Ghana are scanty, despite the increasing efforts to minimize aflatoxin contamination in peanuts. The study is aimed at identifying stable and reliable sources of resistance to pre-harvest aflatoxin contamination in peanuts in Ghana. Peanut accessions including improved varieties, landraces and conserved germplasm will be collected across the country from research institutes and farmers. The collected genotypes will be screened on the field under natural conditions at two locations and two planting dates. The accessions will be subjected to *in vitro* seed colonization test. Data will be collected on percent natural *A. flavus* seed infection, seed infection incidence at the laboratory, seed infection severity and aflatoxin content. The genetic basis of pre-harvest *A. flavus* seed infection resistance will also be assessed through Quantitative Trait Loci (QTL) analysis. To perform the QTL analysis, F_2 mapping population will be generated by crossing a resistant genotype (55-437) to a susceptible variety (JL 24) cultivated by farmers in the country. The F_2 population along with the parents will be phenotyped in the field and data will be collected on percent natural *A. flavus* seed infection and aflatoxin content. Also, the F_2 population will be genotyped using polymorphic SSR markers selected from a public database. A genetic map will be constructed using both the phenotypic and genotypic data. QTLs analysis will then be performed to identify possible QTLs conferring resistance to pre-harvest aflatoxin contamination resistance. The study expects to identify peanut genotypes with consistent levels of resistance to pre-harvest *A. flavus* seed infection as well as quantitative trait loci conferring this resistance.

Laboratory Investigation of Peanut Burrower Bug, *Pangaeus bilineatus*, Biology

B.L. AIGNER* and M.R. ABNEY, Entomology Department, University of Georgia, Tifton, 31793

Peanut burrower bug (PBB), *Pangaeus bilineatus* Say (Hemiptera: Cydnidae), is a severe pest of peanut, *Arachis hypogaea* L., in the Southeast US. Adults and nymphs feed directly on peanut seed with piercing sucking mouthparts reducing seed quality and value. Little is known of the insect's biology; therefore, multiple studies were conducted to describe PBB developmental biology, morphometrics, fecundity, longevity, and behavioral ecology. Adults were paired in 266 mL resealable plastic containers (11×8×5cm) with screened lids, 70g of sterile sandy loam soil wetted to ~15% VWC, and peanut seed for food. To define PBB life cycle, soil was cycled to collect fresh eggs each day. To define fecundity and longevity, virgin adults were collected by maturing 5th instar nymphs in isolation, then placed in containers. In either study, containers were checked daily for eggs, nymphs, and adults; date, time, no. of eggs, no. of nymphs and their life stage, and/or no. of adults were recorded. Time of development from oviposition to adult eclosion completed in 39.5 ± 3.0 days through 5 nymphal instars. Instars last 3.7 – 8.1 days and head capsule width (.46 – 1.68 mm) progressively increase as nymphs age. Females produced a mean total of 78.5 ± 25.2 offspring after pairing 14 days and lived an average of 88.7 ± 31.2 days. Behavioral ecology studies indicate first instar nymphs need an adult female present to molt to successive instars. All studies were conducted in a growth chamber on a 14:10 L:D cycle, a constant temperature of 29°C, and 55% RH ± 10%.

Dynamics of Weed Species in Peanut – Cereal Cropping and Input Systems in Ghana

S. ARTHUR*, G. BOLFREY-ARKU, M.B. MOCHIAH, J.Y. ASIBUO, A. G. GYIMAH, D. ABINTERA, V. KLUTSE and M. YORKE, Council for Scientific and Industrial Research - Crops Research Institute, Kumasi, Ghana; R. AKROMA and J. SARKODIE-ADDO, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; G. MAHAMAH, J. NBOYINE and A. SEIDU, Council for Scientific and Industrial Research-Savana Agricultural Research Institute, Wa, Ghana; D.L. JORDAN and R.L. BRANDENBURG, North Carolina State University, Raleigh, NC 27695; and D. HOISINGTON, and J. RHOADS, Feed the Future Innovation Lab for Peanut, University of Georgia, Athens, GA 30602

The presence and abundance of different weed species are influenced by several factors including soil fertility and moisture, cropping systems, input usage, tillage, weed management practices among others. To improve peanut yields, two 2 x 3 factorial experiments arranged in split plot design were conducted in Tamale and Wa in the Northern and Upper West Regions of Ghana respectively from 2019 - 2021. Two levels of three – year crop rotation systems consisting of Peanut – Corn – Peanut (P-C-P) and Corn – Corn – Peanut (C-C-P) were the main plots and three levels of pest and crop management packages consisting of Low input Package (LIP), Medium input package (MIP) and High input package (HIP) randomly distributed in sub plots. 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, $N-P_2O_5$, K_2O) 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), 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 dynamics of weed species as influenced by the input and cropping systems were studied, as well as observe for species that could act as alternate host of important insect pests of peanut and corn. Data were collected on the weed species and their population, square root transformed and analyzed with Statistix 9 data analysis software. ANOVA was generated and significant means separated by LSD at 5%. In Tamale, 23, 20 and 33 weed species were encountered in the 2019, 2020 and 2021 seasons respectively; and in Wa, 21, 25 and 31. At Tamale, while the density of *Ageratum conyzoides* was 41 – 56 plants/m^2 more for HIP x P-C than the other interactions at 3 WAP, the density of *Mitracarpus villosus* was 20 – 38 plants/m^2 more for LIP x P-C than the other interactions at 12 WAP. The densities of *Gomphrena celosioides, Corchorus tridens, Ludwigia hyssopifolia, Cyperus rotundus, Brachiaria lata* and *Digitaria ciliaris* were 15 – 100% lower on HIP plots than the MIP or LIP at 3 WAP. At Wa, the density of *Digitaria ciliaris* was 25 - 35 plants/m^2 more for LIP x C-C compared with MIP or LIP x P-C, or HIM x P-C or C-C rotation. The density of *Hyptis spicigera* was 41 – 57 plants/m^2 less for HIP x P-C-P or C-C-P or, MIP or LIP x C-C-P compared with LIP x P-C-P. The density of *Cyperus rotundus* was 34 or 22 plants/m^2 more on P-C rotation than on C-C rotation at 3 or 12 WAP respectively. After the 2nd season in both locations, *Commelina benghalensis, Euphorbia heterophylla, Ageratum conyzoides* and *Ludwigia hyssopifolia* were the predominant weed species recorded on the HIP system plots. Pendimethalin application may be alternated with pre or post emergence herbicides with strong broadleaf activity at least every two years. *Brachiaria lata* and *Rottboellia cochinchinensis* recorded Fall Army Worm (FFAW) infestation, whereas white grubs invaded *Ipomoea involucrata* roots in all three years at Tamale and Wa.

The Potential of Using Wild Peanut Genotypes to Enhance Photosynthetic Heat Tolerance in Peanuts

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Production of enough food to sustain the ever-increasing global population requires ingenious scientific and technological strategies focusing on crops, land, and the environment. Climate change and its impacts however may jeopardize the process of achieving global food security. Increasing global temperatures has been predicted to result into yield losses of major global crops, with increasing severity felt in developing nations. The need to identify and grow heat tolerant crops might play a crucial role of stabilizing yields even at higher global temperature.

This research looks at peanut as a major crop of global importance and as a crop that can help fight global hunger. Peanut is not exempted to experiencing heat stress just like any other field crops as a result of heatwaves. Therefore, the objectives of this research were 1) to screen and identify heat tolerant peanut genotypes using photosynthetic parameters, and 2) To determine which parameter within the photosynthetic component is more heat sensitive. This study was conducted at the University of Georgia, Griffin campus. Sixteen peanut genotypes, including wild genotypes possessing a wider genetic pool and commercially available cultivars, were used. The genotypes were grown in growth chambers under controlled conditions. A heat stress of 35 ^{o}C was induced 60 days after planting for seven consecutive days. Photosynthetic measurements of gas exchange and chlorophyll a fluorescence were taken using LI-6800 Portable Photosynthesis System at the last day of heat stress and 7 days after the end of heat stress to assess genotype recovery. After recovery, little differences in photosynthetic capacity among the genotypes was observed. Data set is currently being used to calculate the T_{15} for each parameter (i.e., the temperature to cause a 15% decline in the given photosynthetic parameter) for the development of the model to rank genotypes according to their thermotolerance.

Utilizing Wild Peanut Species to Introgress Traits for Drought Tolerance and High Oil Content into Cultivated Peanut (*Arachis hypogaea* L.)

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Cultivated peanut (*Arachis hypogaea* L.*)* is an allotetraploid species with low genetic diversity that currently has few cultivars with traits related to drought tolerance and high oil content. In Texas, irrigation is necessary to produce a high-quality, high-yield peanut harvest. However, drought severity and duration has increased in Texas while the water availability of Texas aquifers has decreased, affecting the ability of farmers to produce peanuts efficiently. This has led to the need for cultivars with increased drought tolerance. Additionally, peanut oil also has the potential to be used as renewable fuel based on its high-quality oil. The high relative oil content of the peanut makes it an attractive crop for development as a renewable fuel crop. However, research needs to be done to create cultivars with the highest oil content possible that can be grown specifically for fuel use. As an additional benefit, these high-oil cultivars would not be held to same quality standards as peanuts grown for food and might not need to consume as much water. Previous research suggests the wild peanut species *A. dardani* and *A. pflugeae* have drought tolerance traits while *A. paraguariensis* potentially possesses traits related to high oil content. This project will attempt to hybridize these wild species to produce diploid wild hybrids with the traits of interest. Additionally, a new procedure for doubling the chromosomes of these diploid hybrids will then be developed which will allow for crossing with tetraploid cultivated peanut (*A. hypogaea* L.). These hybrids can then be backcrossed to elite cultivated lines to produce new cultivars with drought-tolerant traits and high oil content. If successful, these cultivars could be transformative to Texas Agriculture by opening new land to possibly grow peanuts in areas of Texas with critical water shortages thus opening a new market for peanut producers.

Influence of Planting Pattern and Herbicide Program on Sicklepod [*Senna obtusifolia* (L.)] Control in Peanut

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Sicklepod is one of the most difficult-to-control weeds in peanut production due to its long emergence pattern. Peanut growers in the southeastern United States rely on postemergence application of paraquat plus bentazon for sicklepod control; however, this herbicide program lacks residual activity, causes injury to peanut, and has a limited window of application. An integrated approach may improve sicklepod control in peanut, but there is limited information available on integrated management of sicklepod in peanut. The objective of this study was to evaluate the effect of planting pattern and herbicide program on sicklepod control in peanut. The experiment was conducted in 2022 in Jay, Florida. The experiment was arranged in a split-plot design, with planting pattern (single vs. twin-row) and herbicide program as main-plot and subplot factors, respectively. Twin-row pattern reduced late-season sicklepod density and biomass by 47% and 39%, respectively, but did not improve peanut yield compared with the single-row pattern. Preemergence (PRE) application of flumioxazin or fluridone + flumioxazin provided ≥90% control of sicklepod with ≥85% reduction in sicklepod density compared with the untreated control but caused 15 to 25% peanut injury 4 weeks after treatment (WAT). PRE application of fluridone alone provided 80% control of sicklepod with ≤5% peanut injury 4 WAT. Regardless of the planting pattern, fluridone + flumioxazin (fb) paraquat + bentazon + *S*-metolachlor (fb) imazapic + Dimethenamid-p + 2,4DB provided ≥95% control of sicklepod and resulted in the lowest sicklepod density, and biomass at 4WAT and highest peanut yield. All the herbicide programs without early post-application of paraquat + bentazon + *S*-metolachlor provided poor sicklepod control. This study showed that twin-row spacing improved late-season sicklepod control, but did not reduce the need for herbicide input, particularly paraquat + bentazon in peanut.

Application of DSSAT Crop Modeling and Spatial Analysis to Indicate Parameters Correlated with Aflatoxin Contamination in Peanuts

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Aflatoxin contamination in peanuts (*Arachis hypogaea L.*) is a persistent concern due to its detrimental effects on both agricultural productivity and public health. Understanding the correlation between stress-inducing factors and contamination levels is essential for effective management strategies. This study aims to use the DSSAT CSM-CROPGRO-Peanut crop growth model to identify stress-inducing factors that may indicate the potential of aflatoxin contamination in peanut fields. Several factors, including soil temperature, soil moisture, soil properties, weather conditions and agronomic practices, will be analyzed in conjunction with aflatoxin contamination levels. The levels of stress factors will be quantified and correlated with corresponding aflatoxin contamination measurements. Over the life of the 3-year project, data are being collected from nine farmer fields and one experimental field. Once calibrated, the CSM-CROPGRO-Peanut model will also be used to evaluate the spatial distribution of aflatoxin in peanut fields by running the model individually for areas in the field that are characterized by different soil texture and elevation. The ultimate goal of the project is to use the CSM-CROPGRO-Peanut model to identify areas that have the potential to become aflatoxin hotspots. This knowledge will allow peanut growers to differentially harvest their peanuts to avoid contamination. This will also allow peanut shellers to segregate peanuts from potential hotspot areas for additional testing prior to storage. The poster will present results from the initial evaluation of using the CSM-CROPGRO-Peanut model stress-inducing factors as indicators of potential aflatoxin contamination.

Spatial variability in yield and quality of peanut in irrigated fields and adjacent rainfed areas

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Water is one of the most yield-limiting factors in peanut (*Arachis hypogaea* L.) production areas. Significant peanut quality and value increases are associated with irrigation in dry years. However, yield and quality can be impaired in irrigated fields that have adjacent rainfed areas (also known as “dryland corners”) if peanuts are mixed in the same load. Supra-optimal temperatures and sub-optimal precipitation, particularly in the late season, promote in-field drought with potential aflatoxin contamination, decreasing the quality of peanuts in dryland corners. In addition, yield and quality preservation through segregation of peanuts during harvest based on irrigated (IRR) and adjacent dryland (DRY) areas has not been fully understood. Thus, this study aimed to assess spatial variability in peanut yield and quality in commercial irrigated fields with dryland corners in Georgia. The experiment was conducted in 2022 using five fields across four counties: Burke (Field 1 and Field 2), Decatur, Mitchell, and Twiggs. All fields were planted with the cultivar Georgia-06-G. Yield (kg ha^{-1}) was estimated after field inversion from 3.3-m^2 sections collected in four sampling points in a 50-m radius from the sensor location and adjusting to 7% moisture. Pod samples were also collected for total sound mature kernels (TSMK). A multi-site mixed-effect ANOVA model was used with site, irrigation, and their interaction as fixed effects, sensor nested in the site as random effects, and a compound symmetry error correlation structure on irrigation to account for the unrandomized nature of this factor. The yield was affected by site and site x irrigation interaction ($p<0.01$). The yield was similar for irrigation treatments at all sites, except Field 1 in Burke County (6,460 kg ha^{-1} for IRR and 5,161 kg ha^{-1} for DRY) and Mitchell (2,652 kg ha^{-1} for IRR and 5,758 kg ha^{-1} for DRY). TSMK was affected by site x irrigation interaction ($p = 0.08$). TSMK was similar for irrigation treatments at all sites, except Field 1 in Burke County (73% for IRR and 62% for DRY). Over-irrigation likely resulted in a decrease in yield and quality for the Mitchell County area. These results can in part be attributed to adequate agronomic practices and normal climatic patterns for this year, with precipitation throughout the season not promoting substantial drought stress.

Peanut Response to Postemergence Applications of Chlorimuron (Classic®)

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Recently, there has been a renewed interest in the use of chlorimuron (Classic®) to combat late-season Florida beggarweed (*Desmodium tortuosum*) in peanut. Postemergence (POST) applications of chlorimuron are one tool to help reduce economic losses from late-season Florida beggarweed populations. However, prior research has shown that peanut cultivar tolerance to chlorimuron has been variable and that applications can also increase the expression of tomato spotted wilt virus (TSWV). Therefore, small-plot field trials were conducted in 2021-2022 near Ty Ty, Georgia to evaluate the response of seven newer peanut cultivars to POST applications of chlorimuron. Three separate field trials were conducted. Trial 1 was arranged in a split-plot design with main plot (cultivar) and sub-plot (4 timings) with 3-4 replications. Peanut cultivars included the following: AU-NPL17; FloRun '331'; GA-18RU; GA-20VHO; and TifNV-High O/L. Trials 2 & 3 were arranged in a randomized complete block design with 3 replications. Peanut cultivars included were GA-12Y (Trial 2) and GA-16HO (Trial 3). Using a backpack sprayer calibrated to deliver 140 L/ha using AIXR-11002 nozzles, chlorimuron at 9 g ai/ha + Induce @ 0.25% v/v was applied at 65, 75, and 90 days after planting (DAP) for all trials. A non-treated control was also included. All data were subjected to ANOVA using PROC GLIMMIX and means separated using the Tukey-Kramer method (P = 0.10). Results in Trial 1 indicated that there was no interaction between chlorimuron timing and peanut cultivar. When averaged over five cultivars for Trial 1, chlorimuron applied at 90 DAP resulted in a 7% increase in TSWV. Classic had no effect on TSWV in Trial 2 (GA-12Y). However, results from Trial 3 (GA-16HO) indicated that chlorimuron applied at 75 and 90 DAP resulted in an increase in TSWV by 26% and 29%, respectively. Applications of chlorimuron resulted in height reductions regardless of timing for all cultivars except in Trial 2 (GA-12Y). Regardless of height reductions and TSWV increases, peanut yield was only reduced (9.6%) in Trial 2 (GA-12Y) when chlorimuron was applied at 90 DAP. Results suggest that these new cultivars, excluding GA-12Y, are sufficiently tolerant to POST applications of chlorimuron. Additional research is needed to confirm the tolerance of GA-12Y. Thus, peanut growers with late-season populations of Florida beggarweed can use chlorimuron without concern for causing yield losses when tolerant cultivars are planted.

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