The 46th Annual Meeting of the

NATIONAL SWEETPOTATO COLLABORATORS GROUP

February 11 – 12, 2022

New Orleans, LA

2022 TECHNICAL PROGRAM & 2021 PROGRESS REPORT

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NATIONAL SWEETPOTATO COLLABORATORS GROUP
PROGRESS REPORT
2022

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AGENDA AND TECHNICAL PROGRAM
National Sweetpotato Collaborators Group

Chairperson: Ms. Michelle McHargue, Lamb Weston

Friday February 11, 2022

7:30 Registration

8:00 Call to Order and Announcements

8:15 State Reports

8:45 Discussion

Master of Science Student Competition

Presiding: Michelle McHargue

9:00 **Impact of Fall-Planted Cover Crops and Tillage on Weed Control in Four Sweetpotato Cultivars.** Colton D. Blankenship[1*], Katherine M. Jennings[1], David W. Monks[1], David L. Jordan[2], Jonathan R. Schultheis[1], and Stephen L. Meyers[3]. [1]Horticultural Science Department, North Carolina State University, Raleigh, NC 27695, [2]Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC 27695, [3]Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN 47907. (cdblank3@ncsu.edu)

9:15 **QTL analysis of the 'Tanzania' x 'Beauregard' Sweetpotato Mapping Population for Resistance to *Meloidogyne enterolobii.*** Simon Fraher[1*], Tanner Schwarz[2], Bonny Oloka[3], Ken Pecota[1], Chris Heim[1], Adrienne Gorny[2], and G. Craig Yencho[1] [1]Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695 [2]Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC 27695 [3]Root Crops Program, National Agricultural Research Organization, Entebbe, Uganda. (spfraher@ncsu.edu)

9:30 **Effect of Preemergence Herbicides in Covington Sweetpotato.** Stephen Ippolito[1], Katherine M. Jennings[1], David W. Monks[1], David L. Jordan[2], Sushila Chaudhari[3]. [1]Horticultural Science Department, North Carolina State University, Raleigh, NC 27695. [2] Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC 27695. [3]Department of Horticulture. Michigan State University. East Lansing, MI 48824. (sjippoli@ncsu.edu)

9:45 **The Use of Winter Cover Crops for Nitrogen Management in Organic Sweet Potato Production.** Lily Kile, Alex Woodley[1], Anders Huseth[2], David Suchoff[1], and Luke Gatiboni[1]. [1]Crop and Soil SciencesDepartment , [2] Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC 27695. (lkile@ncsu.edu)

10:00 Evaluation of Alternative sweetpotato Slip Planting Orientations. Alyssa Jane Woodard[1*], Jonathan Schultheis[1], and David Suchoff[2]. [1]Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695, [2]Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695. (ajwooda2@ncsu.edu)

10:15 Analyzing Big Data Generated During Sweetpotato Production to Predict Shape Features. Shelly Hunt[1], Daniela Jones[1], Cranos Williams[2]. [1]Department of Biological and Agricultural Engineering, [2] Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27695. (rlransom@ncsu.edu)

10:30 Break

PhD Student Competition

Presiding: Scott Stoddard

10:45 Exploring and Quantifying the Chemical Constituents Responsible for Consumer-preferred Flavors in Sweetpotatoes. Modesta Abugu[1], Suzanne Johanningsmeier[2], Matthew Allan[2], Massimo Iorizzo[1,3], Craig Yencho[1]. [1]Department of Horticultural Science, NC State University, Raleigh, NC 27695-7609, USA. [2]USDA_ARS, Southeast Area Food Science and Market Quality & Handling Research Unit, 322E Schaub Hall, Raleigh NC, 27695 USA. [3] Plants for Human Health Institute, Department of Horticultural Science, North Carolina State University, Kannapolis, North Carolina, USA. (mnabugu@ncsu.edu)

11:00 Integration of Genomic and Quantitative Strain-level Metagenomic Profiles by using qRRS in the Sweetpotato Phyllosphere. Alison Adams[1*], Priya Voothuluru[2], Brandon Kristy[3], Harper Kirby[4], Phil A. Wadl[5], G. Craig Yencho[6], Bode Olukolu[7]. [1]UT-ORNL Graduate School of Genome Science and Technology, University of Tennessee, Knoxville, TN 37996, [2]The Center for Renewable Carbon, The University of Tennessee Institute of Agriculture, Knoxville, TN 37996, [3]Oak Ridge National Laboratory, Oak Ridge, TN 37831, [4]Department of Biochemistry & Cellular and Molecular Biology, University of Tennessee, Knoxville, TN 37996, [5]United States Department of Agriculture, Agriculture Research Service, U.S. Vegetable Research, Charleston, SC 29414, [6]Department of Horticultural Science, NC State University, Raleigh, NC 27695-7609, [7]Department of Entomology and Plant Pathology, University of Tennessee, Knoxville, TN 37996. (aadams76@utk.edu)

11:15 Characterizing Temporal Sweetpotato Production Trends Through In-season Environmental, Biomass, and Grade Data. Mariella Carbajal Carrasco[1*], Anders Huseth[2], Natalie Nelson[1]. [1] Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695, [2]Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC 27695. (mcarbaj@ncsu.edu)

11:30 Variation in Root System Response to Local Phosphorus Availability at the Onset of Storage Root Formation among Sweetpotato Cultivars. Jeffrey C. Gregorie* and Arthur Q. Villordon**,** LSU AgCenter Sweet Potato Research Station, Chase, LA 71324. (CGregorie@agcenter.lsu.edu)

11:45 Investigating the Use of Biologicals and Re-curing for the Management of Rhizopus Soft Rot on Sweetpotato Roots. Waana Kaluwasha and Christopher Clark. Department of Plant Pathology and Crop Physiology, Louisiana State University, Baton Rouge, LA 70801. (WKaluwasha@agcenter.lsu.edu)

12:00 Lunch

PhD Student Competition

Presiding: Dani Jones

1:15 Evaluating Electrical and Mechanical Methods for Palmer Amaranth (*Amaranthus palmeri*) Control in Sweetpotato. Levi D. Moore[1*], Katherine M. Jennings[1], David W. Monks[1], Michael D. Boyette[2], Ramon G. Leon[3], David L. Jordan[3], Stephen J. Ippolito[1], Colton D. Blankenship[1], and FNU Chitra[1], [1] Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695, [2]Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695, [3]Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695. (ldmoore8@ncsu.edu)

1:30 Deployment and Analysis of Instance Segmentation Algorithm on Cellphone for Grade Estimation of Sweetpotatoes In-field. Hoang M. Nguyen, Sydney Gyurek, Russell Mierop[2], Kenneth V. Pecota, G. Craig Yencho, Michael W. Kudenov. Department of Electrical and Computer Engineering and Department of Horticultural Science, North Carolina State University, Raleigh, NC 27607. (hmnguye3@ncsu.edu)

1:45 Statistical Phenotyping of Sweetpotatoes by Imaging Bins: Preliminary Results from a High-throughput Truck Scanner. Enrique Pena Martinez, Michael Kudenov, Hoang Nguyen, Russel Mierop, Kenneth Pecota, Craig Yencho, Cranos Williams. Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27606. (eepena@ncsu.edu)

2:00 Evaluating Sweetpotato Varieties for their Allelopathic Effects on Growth of Different Weed Species under Field Conditions. Varsha Singh[1]*, Isabel Werle[2], Mark W. Shankle[3], Stephen L. Meyers[4], Te-Ming Tseng[1]. [1]Mississippi State University, Starkville, MS; [2]University of Arkansas, Fayetteville, AR; [3]Mississippi State University, Pontotoc, MS; [4]Purdue University, West Lafayette, IN. (vv219@msstate.edu)

2:15 Computer Vision to Assess Root Development and Crop Yield Estimates. Shana McDowell[1], Daniela Jones[1], Michael Kudenov[2], and Shelly Hunt[1]. [1]Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC

27695. [2]Department of Electrical and Computer Engineering, Raleigh, NC 27606. (smmcdow2@ncsu.edu)

2:30 **Unsupervised Grading of Sweetpotatoes Based on Shape, Size and Canonical Features Using Reconstructed Error.** Hangjin Liu[1]*, Michael Kudenov[1], and Mike Boyette[2], Cranos Williams[1], [1]Department of Electrical and Computer Engineering, North Carolina State University Raleigh, NC 27606, [2]Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695, (hliu25@ncsu.edu)

2:45 **Effect of Flumioxazin and *S*-metolachlor on 'Covington' Sweetpotato Planted Vertically or Horizontally.** Keith Starke*, Colton Blankenship, Katie Jennings, Jonathan Schultheis, and David Monks. Department of Horticultural Science, North Carolina State University, Raleigh 27695. (kdstarke@ncsu.edu)

Processing and Marketing

Presiding: Dani Jones

3:00 **Sweetpotato Analytics for Produce Provenance and Scanning**. (Sweet-APPS). Daniela Jones. Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695 (danielasofiagonzales@gmail.com)

3:15 **Sweetpotato Marketing Alterations During the COVID-19 Pandemic.** David H. Picha, School of Plant, Environmental and Soil Sciences, Louisiana State University Agricultural Center, Baton Rouge, LA 70803. (dpicha@agcenter.lsu.edu)

3:30 **Break**

Plant Biology and Crop Production

Presiding: Arthur Villordon

3:45 **Overview of the Nation's Sweet Potato Industry Challenges, Research Needs, and Clean Seed Adoption Rates.** Rachael M. Carter[1]*, Mark W. Shankle[2], Lorin M. Harvey[2], Donna J. Peterson[3], and Elizabeth P.G. North[4]. (rdm1@msstate.edu)

4:00 **Choice under Stress: The Fate of Storage Root Development Under Reduced Phosphorus Availability.** Luis Duque. Penn State University. (loduque@psu.edu)

4:15 **Yield and Quality of Sweetpotato Grown Under Protective Culture Systems.** Luis Duque, Penn State University. (loduque@psu.edu)

4:30 Evaluation of Sweetpotato Slip Burn-off and In-Row Skips. Callie J Morris, Mark W. Shankle, Stephen L. Meyers, Mark A. Hall, Trevor F. Garrett, Lorin M. Harvey. Pontotoc Ridge-Flatwoods Experiment Station, MS State University, Pontotoc, MS 38863. (cjw521@msstate.edu)

4:45 Performance of Specialty Sweetpotato Cultivars in Dominant Production Areas of Florida. Mussoline, W.[1], Hochmuth, R.[2], Christensen, C.[3], Guzman, S.[4], and Z. Grabau[5], [1]UF/IFAS Agriculture Extension Agent, East Palatka, FL, 32131, [2] UF/IFAS North Florida Research and Education Center- Suwannee Valley, Live Oak, FL, 32060, [3] UF/IFAS Hastings Agriculture Extension Center, Hastings, FL, 32060, [4] Agricultural and Biological Engineering Department, University of Florida, Indian River Research and Education Center, Fort Pierce, FL, 34945, [5] Entomology and Nematology Department, University of Florida, Gainesville, FL, 32608. (wmussoli@ufl.edu)

5:00-6:00: Poster Session

Sweetpotato Response to Incremental Rates of Potassium Fertilizer. Mark A. Hall, Lorin M. Harvey, Callie J. Morris, Mark W. Shankle, Pontotoc Ridge-Flatwoods Branch Experiment Station, MS State University, Pontotoc, MS 38863. (mah1140@msstate.edu)

A Multi-State Effort to Contain and Manage *Meloidogyne Enterlobii* in Vegetable Crops. Jennifer Corbin*[1], Paula Agudelo[1], Johan Desaeger[2], Adrienne Gorny[3], Zane Grabau[4], Zhengfei Guan[2], Abolfazl Hajihassani[5], John Mueller[1], Lina Quesada-Ocampo[3], Will Rutter[6], Phillip Wadl[6]. [1]Clemson University, Department of Plant and Environmental Sciences, Clemson, SC 29634. [2]University of Florida Gulf Coast Research and Education Center, Department of Entomology and Nematology, Wimauma, FL 33598. [3]North Carolina State University, Department of Entomology and Plant Pathology, Raleigh, NC 27695. [4]University of Florida, Department of Entomology and Plant Pathology, Gainesville, FL 32611.[5]University of Georgia, Department of Entomology and Plant Pathology, Tifton, GA 31793. [6]USDA-ARS, Charleston, SC 24914. (corbin@clemson.edu)

Evaluating Fumigation Efficacy on Root-knot Nematode (*Meloidogyne* spp.) on Sweetpotatoes in North Florida. Chang Liu, Zane Grabau, Entomology and Nematology Department, University of Florida, Gainesville, FL 32611. (c.liu@ufl.edu)

Evaluation of Host Status of Sweetpotato Cultivars to Sting Nematode *Belonolaimus longicaudatus* in Greenhouse. Chang Liu, Zane Grabau, Rebeca Sandoval-Ruiz. Entomology and Nematology Department, University of Florida, Gainesville, FL 32611. (c.liu@ufl.edu)

Impact of Reduced Rates of Glufosinate and 2,4-D Choline on Sweetpotato. Donnie Miller. LSU Ag Center. Louisiana State University, St. Joseph, LA 71366. (dmiller@agcenter.lsu.edu)

Effects of Early-season Drought, Ultraviolet-B, and Low Nitrogen Stress on Growth, Developmental, and Physiology of Sweetpotato Cultivars. Purushothaman

Ramamoorthy[1], Raju Bheemanahalli[2], Stephen Meyers[3], Mark Shankle[4], K. Raja Reddy[2]. [1]Geosystems Research Institute, Mississippi State University, Mississippi State University, MS, 39762, USA.[2]Department of Plant and Soil Sciences, Mississippi State University, Mississippi State, MS, USA. [3]Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette IN 47907, USA. [4]Pontotoc Ridge-Flatwoods Branch Experiment Station, North Mississippi Research and Extension Center, Mississippi State University, Pontotoc, MS 38863, USA. (purush@gri.msstate.edu)

Sweetpotato Breeding Line Resistance to *Meloidogyne enterolobii* and *M. incognita*.
David Galo[1], Josielle Rezende[1], Christopher A. Clark[1], Don R. Labonte[2], Tristan Watson[1]. [1]Department of Plant Pathology and Crop Physiology, [2]Department of Horticulture, LSU AgCenter, Louisiana State University, Baton Rouge
dgalo@agcenter.lsu.edu

Saturday February 12

8:00 Call to Order and Announcements

Plant Biology and Crop Production

Presiding: Mark Shankle

8:15 Does a Sleeve Adaptor Using Variable Plant Lengths for Sweetpotato Planting Improve Yields? Brandon Parker[1]* and Jonathan R. Schultheis[2], [1]North Carolina Coop. Extension Service, 2736 NC Hwy 210, Smithfield, NC 27577 and [2]Dept. Hort. Sci., North Carolina State Univ. 2721 Founders Dr., Raleigh, NC 27695. (bkparker@ncsu.edu)

8:30 Effect of Potassium Fertilization Rate on Sweetpotato Sugar Content. David H. Picha, School of Plant, Environmental and Soil Sciences, Louisiana State University Agricultural Center, Baton Rouge, LA 70803. (dpicha@agcenter.lsu.edu)

8:45 Potassium Fertilizer has Minimal Impact on Sweetpotato Production in California. C. S. Stoddard. UC Cooperative Extension, 2145 Wardrobe Ave, Merced, CA (csstoddard@ucan.edu)

9:00 Development of an Experimental System for Studying the Interaction of Essential Elements and Non-essential Heavy Metals in Sweetpotato: Preliminary Findings. Arthur Villordon, Jeffrey C. Gregorie. LSU AgCenter Sweet Potato Research Station, Chase, LA 71324 (avillordon@agcenter.lsu.edu)

9:15 'Are We Staying Clean? Detection of Sweetpotato Viruses on Multiple Seed Generations in North Carolina'. Christie Almeyda[1], Tamara Abernethy[1], Chunying Li[1], Ken Pecota[2] and Craig Yencho[2]. [1]Micropropagation and Repository Unit, Department of Entomology and Plant Pathology, [2]Department of Horticultural Science, North Carolina State University, Raleigh, NC 27607. (cvalmeyd@ncsu.edu)

Disease, Insect, and Weed Management

Presiding: Mark Shankle

9:30 Production of Green-engineered Silver Nanoparticles Against the Root-knot nematode *Meloidogyne incognita* and the Evaluation of their Nematicidal Activity in Sweetpotato. Gregory C. Bernard, Naresh Shahi[2], Byungjin Min[2], Marceline Egnin, Ivi Mitchell, Andrea Lockett, Inocent Ritte, Osa Idehen, Adrianne Brown, and Conrad Bonsi Dept of Ag., Dept of Nutr. Sci[2]. College of Ag. Envr. and Nutr. Sci. Tuskegee University, 1200 W. Montgomery Rd. Tuskegee, AL 36088 (gbernard@tuskegee.edu)

9:45 How Much are We Under-estimating the Effects of Sweetpotato Viruses on Yield in the U.S.? C. A. Clark[1], C. D. DeRobertis[1], and J. A. Davis[2], [1]Dept. Plant Pathology & Crop Physiology, and [2]Dept. Entomology, Louisiana State University Agricultural Center, Baton Rouge. (cclark@agcenter.lsu.edu)

10:00 Evaluation of Plant Hormones as Herbicide Safeners in Sweetpotato. Matthew Cutulle[1], Phillip Wadl[2] and Giovanni Caputo[1] [1] Clemson University Coastal Research and Education Center. 2700 Savannah Hwy Charleston SC 29414m [2] USDA-United States Vegetable Lab (USVL). Savannah Hwy Charleston SC 29414. (mcutull@clemson.edu)

10:15 Break

Disease, Insect, and Weed Management

Presiding: Chris Clark

10:30 Development of an IPM Program for the Sweet Potato Weevil, *Cylas formicarius* in Puerto Rico. Wanda I. Almodóvar[1], Martha C. Giraldo[2]. Department of Agroenvironmental Sciences, University of Puerto Rico, [1]Mayaguez and [2]Rio Pierdas, San Juan. (martha.giraldo@upr.edu, wanda.almodovar@upr.edu)

10:45 Sweetpotato Response to Reduced Rates of Dicamba. Lorin Harvey, Mark Shankle, and Callie Morris, North Mississippi Research and Extension Center-Pontotoc Ridge–Flatwoods Branch Experiment Station, Mississippi State University, Pontotoc, MS, USA. (lh1853@msstate.edu)

11:00 Resistance to Wireworm/*Diabrotica*/*Systena* among Sweetpotato Cultivars and Advanced Lines. T. J. Douglas[1], Stephen Meyers[2], Ashli Brown[3], Blake Layton[3], Fred Musser[3]. [1]Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Mississippi State, MS 39762 (currently at Auburn University). [2]Pontotoc Ridge-Flatwoods Branch Experiment Station, Mississippi State University, Pontotoc, MS 38863, (currently at Purdue University). [3]Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Mississippi State, MS 39762. (fm61@msstate.edu)

11:15 Integrating Winter Cover Crops and Weed-Suppressive Sweetpotato Cultivars for Weed Management. Isabel S. Werle[1], Matheus M. Noguera[1], Srikanth K. Karaikal[1], Gustavo B. de Lima[1], Te-Ming Tseng[2], and Nilda Roma-Burgos[1]
[1] Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR 72704, [2] Department of Plant and Soil Sciences, Mississippi State University, Starkville, MS 39759. (iswerle@uark.edu)

11:30 Integrated Nematode Management: a Louisiana Perspective. Tristan T. Watson, Josielle S. Rezende. Department of Plant Pathology and Crop Physiology, LSU AgCenter, Baton Rouge, LA 70739 (TWatson@agcenter.lsu.edu)

<u>Business and Planning Meeting</u>

Presiding: Michelle McHargue

11:45 (Working Lunch)

12:00 Call to Order and Review of 2020 Minutes Michelle McHargue

12:10 Graduate Student Contest Results Michelle McHargue

12:20 National Impact Award Mark Shankle

12:30 Resolutions Resolutions Committee

12:40 Collaborator's Trial Discussion Theresa Arnold

12:50 Nominations Committee Report Nominations Committee

1:00 2023 Meeting Location Michelle McHargue

1:15 National Stakeholder Group Update Tara Smith

1:30 CleanSEED Update Mark Shankle

1:45 Multistate Project Update David Monks

2:00 Extension Publication Progress Report Jonathan Schultheis

2:20 Adjourn

ABSTRACTS

Friday February 11, 2022

Master of Science Student Competition

Presiding: Michelle McHargue

9:00 Impact of Fall-Planted Cover Crops and Tillage on Weed Control in Four Sweetpotato Cultivars. Colton D. Blankenship[1], Katherine M. Jennings[1], David W. Monks[1], David L. Jordan[2], Jonathan R. Schultheis[1], and Stephen L. Meyers[3]. [1]Horticultural Science Department, North Carolina State University, Raleigh, NC 27695, [2]Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC 27695, [3]Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN 47907. (cdblank3@ncsu.edu)

A study was conducted from September 2020 to October 2021 in Clinton, NC to determine the effect of fall-planted cover crops and tillage on weed control in four organically grown sweetpotato cultivars. Treatments consisted of a factorial of 2 tillage types (conventional tillage and no-tillage), four sweetpotato cultivars ('Covington', 'Beauregard', 'Murasaki', and 'Monaco'), and eight cover crops (crimson clover, wheat, cereal rye, daikon radish, wheat + crimson clover, rye + crimson clover, weedy, and weed-free). In the fall prior to sweetpotato planting, conventional plots were clean-tilled while beds were formed and shaped in reduced-tillage plots. Cover crops were immediately broadcast seeded. Cover crops were terminated in no-till plots via roller-crimping in the spring. In early May conventional beds were formed and shaped. Non-rooted sweetpotato cuttings were transplanted into conventional plots and directly through the crimped cover crop onto the raised beds in reduced-tillage plots using a commercial mechanical transplanter. Data collected included visual weed control, weed counts, canopy cover, cover crop biomass, and sweetpotato yield and quality.

9:15 QTL analysis of the 'Tanzania' x 'Beauregard' Sweetpotato Mapping Population for Resistance to *Meloidogyne enterolobii.* Simon Fraher[1], Tanner Schwarz[2], Bonny Oloka[3], Ken Pecota[1], Chris Heim[1], Adrienne Gorny[2], and G. Craig Yencho[1] [1]Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695 [2]Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC 27695 [3]Root Crops Program, National Agricultural Research Organization, Entebbe, Uganda. (spfraher@ncsu.edu)

Due to its highly heterozygous hexaploid nature, sweetpotato (*I. batatas*) lags behind other crops in terms of genomic tools. New tools and strategies have afforded opportunities to associate sequence data with phenotypic data though QTL analysis, especially the publication of a diploid reference genome for *I. trifida* in 2018, and open-source software packages like QTLpoly and MAPpoly. QTL analysis is expected to be instrumental in accelerating breeding in this crop, notably for nematode resistance and nutritional factors.We analysed the progeny of the sweetpotato biparental mapping population 'Tanzania' x 'Beauregard' (TB) representing 250 genotypes (including 4 check lines) for resistance to the emergent plant parasitic nematode, *Meloidogyne enterolobii* (*M.e.*). Parent 'Tanzania' is highly resistant, and parent 'Beauregard' is highly susceptible. Bioassays showed clear bimodal segregation for

resistance, suggesting a simplex major allele conferring resistance. Using the R package QTLpoly and the *I. trifida* reference genome, we discovered a major QTL peak at base pair 7,039,636 (79.21cM) of linkage group 4 of I. batatas associated with resistance to *M.e.* This analysis suggests variability in *M.e.* resistance within the TB population can largely be ascribed to genetic differences amongst the progenies (h^2 =66.9%). Next steps will search for flanking markers associated with these genotypes and attempt to identify markers which can be screened in the seedling stage, reducing the need for costly and laborious bioassays with this quarantined pest.

9:30 Effect of Preemergence Herbicides in Covington Sweetpotato. Stephen Ippolito[1], Katherine M. Jennings[1], David W. Monks[1], David L. Jordan[2], Sushila Chaudhari[3]. [1]Horticultural Science Department, North Carolina State University, Raleigh, NC 27695. [2] Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC 27695. [3]Department of Horticulture. Michigan State University. East Lansing, MI 48824. (sjippoli@ncsu.edu)

Limited herbicides are registered for application in sweetpotato and yield can be reduced by weed competition. Therefore, a field study was conducted to determine the effect of PRE herbicides applied POST to sweetpotato on sweetpotato growth, yield, and quality in Clinton, NC in 2021. Treatments included sulfentrazone at 160 g ai ha^{-1}, ethafluralin at 4038.26 g ai ha^{-1}, *S*-metolachlor at 1120 ga ai ha^{-1}, pyroxasulfone at 175 g ai ha^{-1} , isoxaflutole at 210.16 ga ai ha^{-1} , metribuzin at 560 g ai ha^{-1}, linuron at 1681.28 g ai ha^{-1} , simazine at 2240 g ai ha^{-1}, acifluorfen at 1346.09 g ai ha^{-1} , and clomazone at 4485 g ai ha^{-1}. Treatments were applied to 'Covington' sweetpotato one d after transplanting. Sulfentrazone injury was 16 and simazine was 55% 3 wk after application. All other treatments were similar to the nontreated check. Isoxaflutole, clomazone, *S*-metolachlor, and linuron did not reduce total yield (sum of canner, no. 1, and jumbo grades). Linuron and isoxaflutole are not registered for use in sweetpotato and may provide novel modes of action that could aid in herbicide resistance management.

9:45 The Use of Winter Cover Crops for Nitrogen Management in Organic Sweet Potato Production. Lily Kile[1], Alex Woodley[2], Anders Huseth[2], David Suchoff[1], and Luke Gatiboni[1]. [1]Crop and Soil Sciences Department, [2] Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC 27695. (lkile@ncsu.edu)

Three cover crops were evaluated on their impact on nitrogen supply and management in organic sweet potato production at two locations in the coastal plain of North Carolina, in 2020 and 2021. These cover crops included cereal rye (Secale cereale), crimson clover (*Trifolium incarnatum*), and Austrian winter pea (*Pisum sativum*). In addition to the cover crop treatments, fallow plots were grown for comparison with sodium nitrate applied at 0%, 25%, 50%, 75%, 100%, and 150% recommended rate of nitrogen for sweet potato growth. Nitrogen availability in the soil and plant tissue nitrogen was measured throughout the growing season. In 2020, the use of Austrian winter pea as a cover crop provides more nitrogen to the soil than the cereal rye or crimson clover. The data also indicates that the use of any of the legume cover crops led to more available nitrogen in the soil than a fallow plots at 0% nitrogen application. Suggesting some reduction of nitrogen could be possible if sufficient cover crop biomass was produced.

10:00 Evaluation of Alternative Sweetpotato Slip Planting Orientations. Alyssa Jane Woodard[1*], Jonathan Schultheis[1], and David Suchoff[2]. [1]Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695, [2]Department of Crop and Soil Sciences, North Carolina State University, Raleigh, NC 27695. (ajwooda2@ncsu.edu)

Traditional field establishment of sweetpotato [*Ipomea batatas* (L.) Lam.] in the United States involves transplanting unrooted stem cuttings with a vertical orientation in the soil. However, some international growers position cuttings horizontally in the soil. Empirical evidence from North Carolina producers suggest that this alternative planting method may improve yields. Therefore, an on-farm field study in Nash County, North Carolina was carried out in 2020 and 2021 to investigate the impact of planting orientation on sweetpotato yield. 'Monaco' stem cuttings of two lengths (10 inches and 15 inches) were planted using a standard transplanter (vertical), a standard transplanter equipped with a sleeve attachment (part of stem oriented horizontally), or a horizontal transplanter. Additional treatments included an early (~108 days) or late (~126 days) harvest. In 2020, horizontally planted stem cuttings had marketable yields that were 16% higher than vertically planted stem cuttings. However, in 2021 stem planting orientation had no significant effect on marketable yield. In both years, the yields of US No 1 roots were higher for stem cuttings that were planted horizontally than either sleeve or vertical orientations. Results of this study suggest switching to a horizontal planting orientation could yield a higher proportion of US No 1 roots, thus increasing farmer profits and improving land use efficiency.

10:15 Analyzing Big Data Generated During Sweetpotato Production to Predict Shape Features. Shelly Hunt[1], Daniela Jones[1], Cranos Williams[2]. [1]Department of Biological and Agricultural Engineering, [2] Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27695

The monetary value of sweetpotatoes is largely based on appearance, even though the nutritional value of the storage root largely remains the same. Undesirably sized or shaped sweetpotatoes are often not harvested, leading to unnecessary food waste. With an ever-growing world population straining the global food supply chain it is imperative to make strides towards increasing efficiency and optimizing crop production. There is limited work investigating which factors influence sweetpotato shape. This study is dedicated to the collection, curation, and analysis of large data collected during sweetpotato production to predict shape quantifiers which were found to influence sweetpotato grade. Shape features of interest, length to width ratio and curvature, have been captured through high throughput imagery analysis for thousands of sweetpotatoes grown at three North Carolina State University Horticultural Crops Research Stations for two seasons. Environmental and cultural management practices data were also collected. Machine learning regression models were created using to predict shape features and analyze variable importance. Algorithms were simultaneously trained in SAS Model Studio and champion models were selected based on calculated F1 score values. The objective of this work, a part of the NC State University funded Sweetpotato Analytics for Produce Provenance and Scanning (Sweet-APPS) research project, is to put a data-driven decision support tool into the hands of producers.

10:30 Break

PhD Student Competition

Presiding: Scott Stoddard

10:45 Exploring and Quantifying the Chemical Constituents Responsible for Consumer-preferred Flavors in Sweetpotatoes. Modesta Abugu[1], Suzanne Johanningsmeier[2], Matthew Allan[2], Massimo Iorizzo[1,3], Craig Yencho[1]. [1]Department of Horticultural Science, NC State University, Raleigh, NC 27695-7609, USA. [2]USDA_ARS, Southeast Area Food Science and Market Quality & Handling Research Unit, 322E Schaub Hall, Raleigh NC, 27695 USA. [3] Plants for Human Health Institute, Department of Horticultural Science, North Carolina State University, Kannapolis, North Carolina, USA. (mnabugu@ncsu.edu)

The growing consumer demand for sweetpotatoes (SP) in the US has made flavor an important breeding target. Current knowledge suggests that SP flavor comes from the interaction of sugars and volatile organic compounds (VOCs). In raw roots, sucrose, glucose, fructose, are the dominant sugars, while maltose is the dominant sugar in baked/fried roots. Similarly, seven VOCs (phenylacetaldehyde, methyl geranate, 2-Acetyl furan, 2-pentyl furan, 2-acetyl pyrrole, geraniol and β-ionone) are known to be the most potent odorants in baked SP. Despite this information on the flavor constituents of SP, little is known about consumer preferences. This study seeks to investigate the relationship between flavor compounds, and consumer preferences in baked and fried roots. SP genotypes (n=450) in a DC (DM04-0001 x Covington) mapping population segregating for high levels of sucrose, glucose, fructose, and beta-carotene will be grown in the field and evaluated for: 1) sugars and volatile contents of raw, baked and fried roots; 2) instrumental measurement of volatile compounds and 3) relationship between chemical components, sensory attributes and consumer preferences. These results would be beneficial in a consumer-targeted breeding program for developing SP that better meet consumer preferences.

11:00 Integration of Genomic and Quantitative Strain-level Metagenomic Profiles by using qRRS in the Sweetpotato Phyllosphere. Alison Adams[1*], Priya Voothuluru[2], Brandon Kristy[3], Harper Kirby[4], Phil A. Wadl[5], G. Craig Yencho[6], Bode Olukolu[7]. [1]UT-ORNL Graduate School of Genome Science and Technology, University of Tennessee, Knoxville, TN 37996, [2]The Center for Renewable Carbon, The University of Tennessee Institute of Agriculture, Knoxville, TN 37996, [3]Oak Ridge National Laboratory, Oak Ridge, TN 37831, [4]Department of Biochemistry & Cellular and Molecular Biology, University of Tennessee, Knoxville, TN 37996, [5]United States Department of Agriculture, Agriculture Research Service, U.S. Vegetable Research, Charleston, SC 29414, [6]Department of Horticultural Science, NC State University, Raleigh, NC 27695-7609, [7]Department of Entomology and Plant Pathology, University of Tennessee, Knoxville, TN 37996. (aadams76@utk.edu)

Functional and quantitative metagenomic profiling remains challenging and limits our understanding of plant-microbiome interactions. We present a novel quantitative reduced representation sequencing (qRRS) strategy, which leverages the strengths of shotgun and amplicon sequencing. We characterized the sweetpotato leaf microbiome in two biparental

populations (total of 764 F1 progenies) and one diversity sweetpotato panel (767 accessions). The metagenome profiles and high-density SNP data were integrated to identify host genetic factors that underpin host-microbiome interactions. Using the metagenome profile as a covariate for GWAS revealed increased statistical power for 49.4% of plant-microbe interactions (2.4% lost statistical power). Correlation network analysis revealed that strain/species-level profiles were more sensitive at detecting microbe-microbe interactions and microbial hubs. These signals rapidly dissipated at higher taxonomic levels. Potential biocontrols were found to be enriched within the microbiome (relative abundance) and are likely key modulators of the microbial community, possibly through quorum sensing. The metagenomic profile prediction of population structure, particularly in the biparental populations, agreed with SNP data-derived population structure. The F1 progenies from the biparental population mostly recruit the same microbes recruited by their parents, thus demonstrating the strong impact of host genetics on microbiome recruitment. This study highlights a low-cost, quantitative and strain/species-level metagenomic profiling approach; new tools that complement the assay's novel features and provide fast computation; and the potential for advancing functional metagenomic studies.

11:15 Characterizing Temporal Sweetpotato Production Trends Through In-season Environmental, Biomass, and Grade Data. Mariella Carbajal Carrasco[1*], Anders Huseth[2], Natalie Nelson[1]. [1] Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695, [2]Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC 27695. (mcarbaj@ncsu.edu)

Crop growth models serve to evaluate tradeoffs between crop productivity and management constraints. There is a lack of research in sweetpotato modeling and limited understanding of the environmental conditions that minimize yield gaps and root quality. The overall goal of this study is to develop a sweetpotato simulation model to be included in the Decision Support System for Agrotechnology Transfer (DSSAT) to estimate crop yields and quality, with quality being defined as desirable size and shape for consumers. The first study objective was to collect observations for model calibration and validation. In 2021, a field study was conducted in the eastern coastal plain of North Carolina. To determine varietal response to similar environmental conditions, four sweetpotato varieties were grown in a randomized block design with four repetitions. Plant-level measurements were collected every ten days to document the growth and development of aboveground and belowground biomass. We used non-destructive measurements (i.e., Leaf Area Index, canopy height and width) and destructive sample measurements (i.e., fresh and dry biomass, component counts, root shape and size) on each sample date. Environmental data were gathered from a weather station and in situ soil moisture sensors spread across the plot treatments. Plot-level aerial images were acquired at main crop stages to document spatial variability in soil and vegetation. A spatio-temporal analysis of sweetpotato growth and environmental plot conditions among sweetpotato varieties and repetitions were performed. This modeling pre-analysis will help to develop a sweetpotato model that identifies key production factors that can be used to optimize sweetpotato production.

11:30 Variation in Root System Response to Local Phosphorus Availability at the Onset of Storage Root Formation among Sweetpotato Cultivars. Jeffrey C. Gregorie* and Arthur Q. Villordon**,** LSU AgCenter Sweet Potato Research Station, Chase, LA 71324. (CGregorie@agcenter.lsu.edu)

This study focuses on species-specific root system architecture (RSA) modifications due to variation in local phosphate (Pi) availability at the onset of storage root formation in three sweetpotato cultivars. To test the hypothesis that sweetpotato plants modulate their RSA based on local soil Pi availability, a greenhouse split-root experiment was conducted where plants were grown in pots with two compartments containing media with contrasting Pi conditions: Pi sufficient 13g P/kg media (+P) and Pi deficient 3g P/kg media (-P) (+P/-P). Pots containing +P/+P and -P/-P were used as positive and negative controls, respectively. RSA attributes were measured after 17 days among the cultivars: Evangeline (EV), Bayou Belle (BB), and Orleans (OR). Roots in the -P compartment had 33% and 42% increase in lateral root length (LRL) for BB and OR, respectively, compared to roots in the +P compartment. Main root length (MRL) in OR grown in the -P compartment increased 24% vs roots grown in the +P compartment. No differences were observed in BB and EV. Variation in Pi status across compartments did not alter adventitious root (AR) number across cultivars. EV showed no overall response to the split Pi treatment. EV and OR grown in negative control conditions produced 50% and 57% more ARs, respectively than the positive control. OR grown in negative control conditions had a 9% increase in MRL compared to OR in the split Pi pots. LRL showed no treatment effect across cultivars grown in control treatments. These data provide evidence of cultivar-specific RSA response to variation in local Pi availability and supports the hypothesis that in sweetpotato, RSA response to local Pi availability is controlled at the local and whole plant level.

11:45 Investigating the Use of Biologicals and Re-curing for the Management of Rhizopus Soft Rot on Sweetpotato Roots. Waana Kaluwasha and Christopher Clark. Department of Plant Pathology and Crop Physiology, Louisiana State University, Baton Rouge, LA 70801. (WKaluwasha@agcenter.lsu.edu)

Rhizopus Soft Rot (RSR) caused by the fungus *Rhizopus stolonifer* is a devastating postharvest disease of sweetpotato *(Ipomoea batatas*). In the presence of a favorable wound, the fungus infects sweetpotato roots to cause a soft watery rot resulting in significant losses. Preventative applications of synthetic fungicides have been relied on for years but increasing concerns of fungicide residue on sweetpotato roots poses a need for non-chemical control options. The objective of this two-year project was therefore to evaluate the effectiveness of the biological product BioSave 10LP (*Pseudomonas syringae* strain ESC-10), applied as spray or dip to sweetpotato roots and re-curing for 24h on the incidence of RSR, both alone and in combination. Five sweetpotato cultivars Beauregard, Bayou Belle, Bellevue, Orleans, and Covington were grown according to standard practices. At 120 or 145 days in storage in year 1 and 130 or 150 days in year 2, sweetpotato roots were wounded and inoculated with a *R. stolonifer* spore suspension. The inoculated roots were then subjected to the treatments and incubated for 14 days under storage conditions (15^{o}C, 85% RH) to observe the development of RSR. The response variable percent RSR was subjected to ANOVA using the PROC GLM procedure in SAS. Significant differences among the treatments, cultivars, and sampling times in each year suggested the need for cultivar and time-specific

recommendations. Additionally, significant interactions were observed suggesting the need to consider all possible variables when developing management programs for RSR. Overall, in both years, the Bio-Save regardless of application method was effective especially at the second sampling time.

12:00 Lunch

PhD Student Competition

Presiding: Dani Jones

1:15 Evaluating Electrical and Mechanical Methods for Palmer Amaranth (*Amaranthus palmeri*) Control in Sweetpotato. Levi D. Moore[1*], Katherine M. Jennings[1], David W. Monks[1], Michael D. Boyette[2], Ramon G. Leon[3], David L. Jordan[3], Stephen J. Ippolito[1], Colton D. Blankenship[1], and FNU Chitra[1], [1]2721 Founders Dr., Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695, [2]3100 Faucette Dr., Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC 27695, [3]101 Derieux Pl, Department of Crop and Soil Science, North Carolina State University, Raleigh, NC 27695. (ldmoore8@ncsu.edu)

Using electricity to selectively control weeds taller than the crop canopy has recently sparked interest in many conventional and organic growers as an alternative to hand weed removal. In addition, machinery to mechanically remove tall weeds from crops are available. However, little research has compared these weed control strategies or evaluated application timings that will result in optimal weed control and crop yield and quality. Palmer amaranth (*Amaranthus palmeri*) is a problematic weed in the United States and can reach heights over 2 m tall, whereas sweetpotato grows less than 0.5 m in height. Thus, field studies were conducted to determine recommendations for electrical and mechanical Palmer amaranth control in sweetpotato. Treatments were arranged in a three by four factorial of electrical (The Weed Zapper), mechanical (Bourquin Organic Weed Puller / Roguing Machine), or hand removal applied when Palmer amaranth were less than 0.3, 0.6, 0.9, or 1.2 m in height. In addition, a nontreated check was included for comparison. All treatments resulted in at least 78% Palmer amaranth control 6 wk after planting. Palmer amaranth control from electrical treatments were similar to the hand removal treatments when applied before weeds were 0.6 m in height. All electrical and mechanical treatments yielded less than early (Palmer amaranth less than 0.3 m in height) hand removal. Electrical and mechanical weed control can be effective alternatives to hand Palmer amaranth removal but should be incorporated into management systems rather than utilized as the primary weed management strategy.

1:30 Deployment and Analysis of Instance Segmentation Algorithm on Cellphone for Grade Estimation of Sweetpotatoes In-field. Hoang M. Nguyen, Sydney Gyurek, Russell Mierop[2], Kenneth V. Pecota, G. Craig Yencho, Michael W. Kudenov. Department of Electrical and Computer Engineering and Department of Horticultural Science, North Carolina State University, Raleigh, NC 27607. (hmnguye3@ncsu.edu)

Shape estimation in sweetpotatoes is inherently challenging due to their varied size and shape characteristics, which can occur even within the same variety. This can also complicate manual measurements in that measuring even “simple” metrics, such as length and width, require significant time investments either directly in-the-field or afterwards using automated graders. In this paper, we present initial results of an algorithm that can be used to perform grading and yield estimates directly in-the-field with higher accuracy than manual measurements. Detectron2, a library consisting of several deep-learning object detection models, was used to implement Mask R-CNN, an instance segmentation model. This model was deployed and tested for in-field grade estimation of sweetpotatoes (SPs), and its performance was evaluated against an Exeter sorter. Cellphone images of various SP clones, taken during field trials in 2020 and 2021, were used in the model’s training and validation to finetune a pre-trained model for detecting SPs against natural backgrounds. The model was then deployed in which cellphone imagery was sent to an edge device (a small-form-factor PC) for model inference in the field. Initial analyses of the SP segmentation results demonstrate that the model was able to identify and singularize SPs in various environmental conditions and was robust to variation induced by lighting and shading differences. Variability across clones, such SP skin color and shape, also did not appear to significantly impact segmentation performance. This approach will be used to estimate counts as well as length, width, and weight distributions of SPs, enabling a means for rapid yield estimates in the field.

1:45 Statistical Phenotyping of Sweetpotatoes by Imaging Bins: Preliminary Results from a high-throughput Truck Scanner. Enrique Pena Martinez, Michael Kudenov, Hoang Nguyen, Russel Mierop, Kenneth Pecota, Craig Yencho, Cranos Williams. Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27606. (eepena@ncsu.edu)

Irregularly shaped sweetpotatoes (*Ipomoea batatas*) usually do not meet U.S. #1 grade standards and, consequently, are less valuable in the market. To farmers’ disadvantage, little is known about the environmental factors that drive these irregularities, partly due to ambiguities that exist in current processing pipelines. One of the biggest bottlenecks is that sweetpotatoes from different bins are mixed in a dump tank prior to the sorting and grading process. Due to this ambiguity, current processes are unable to associate sweetpotato phenotypes with a specific bin. Thus, incorporating a top bin imaging system, prior to the dumping process, could facilitate sweetpotato tracing and help to establish how sweetpotato phenotypes correlate to their environment. It may also reduce stakeholder waste and increase profitability by improving storage practices to maximize efficiency when bins are selected to fulfill orders. In this presentation, we examine the efficacy of this imaging system by conducting a study at a stakeholder facility in NC. Our objectives include: (1) testing if detections of sweet potatoes, located on the top layer of a bin, are representative of the entire bin; (2) building an imaging system that can capture recently harvested sweet potatoes loaded on truck beds as they arrive from the field; and (3) analyzing correlations between the output images from this new top bin scanning system and the Exeter machine. To this end, we will describe the experimental setup of our top bin imaging system, as well as the machine learning algorithms we are deploying to characterize the size and shape of sweet potatoes imaged in the top layer. Preliminary results of top bin classification results will also be presented, as well as discussions about the future work needed to further develop the technique.

2:00 Evaluating Sweetpotato Varieties for their Allelopathic Effects on Growth of Different Weed Species under Field Conditions. Varsha Singh[1]*, Isabel Werle[2], Mark W. Shankle[3], Stephen L. Meyers[4], Te-Ming Tseng[1]. [1]Mississippi State University, Starkville, MS; [2]University of Arkansas, Fayetteville, AR; [3]Mississippi State University, Pontotoc, MS; [4]Purdue University, West Lafayette, IN. (vv219@msstate.edu)

A more sustainable approach for weed management is critical in agriculture to meet the growing need to feed the global population. The excessive use of herbicides has resulted in the development of resistance in weeds, and mechanical methods are laborious, and cause soil erosion. Keeping that in view, the current study was conducted at two locations in Mississippi, under the field conditions to determine the allelopathic effect of sweetpotato varieties on weed density. Six sweetpotato varieties that showed significant allopathic suppression of weeds in the greenhouse experiment were planted in two-row plots along with a commercial variety Beaurgard. After three weeks of sweetpotato transplanting, seeds of three weed species were sown in between the rows of all the plots. Weed cover by weed species including the natural weeds present in the field was recorded at 14, 21, and 28 days after sowing (DAS) of the weed seeds. At 14 DAS, only native weeds were able to grow in the plots. Even at 21 and 28 DAS, the growth of other native weeds was 20-90% higher than the three studied weeds in plots at both places. Analysis of variance showed that after 21 and 28 DAS, only broadleaf signalgrass cover was significantly variable in the periphery of different sweetpotato varieties. In the periphery of the five varieties, the overall weed density at both locations was lower than the commercial variety Beaurgard. Among all the varieties, the weed density was highest in the presence of variety Heart-O-Gold, followed by Beaurgard. The findings of this study will help in identifying sweetpotato varieties able to suppress the growth of different weeds in the field and reduce the dependency on herbicides in sweetpotato fields.

2:15 Computer Vision to Assess Root Development and Crop Yield Estimates. Shana McDowell[1], Daniela Jones[1], Michael Kudenov[2], and Shelly Hunt[1]. [1]Department of Biological and Agricultural Enginnering, North Carolina State University, Raleigh, NC 27695. [2]Department of Electrical and Computer Engineering, Raleigh, NC 27606. (smmcdow2@ncsu.edu)

Sweetpotatoes vary widely in shape and size, and consumers prefer particular characteristics over others. Optimizing the yield of preferred sizes would reduce waste and increase grower's profits. However, little is known about what contributes to size variation. Therefore, we will use machine learning algorithms to highlight the environmental factors or conditions that contribute to sweetpotato shape and size throughout the growing season as well as gaining a better understanding of the sweetpotato supply chain. Root images of sweetpotatoes will be used as input into computer vision algorithms to compare and calculate the average root growth and to determine an optimal harvest window. Growth estimates obtained from this analysis will be compared to growth measurements of previous growing seasons. This analysis will aid in the development of farm-to-market decision models resulting in a data-driven agri-food supply chain, an optimized crop yield, and a better use of grower's resources.

2:30 Unsupervised Grading of Sweetpotatoes Based on Shape, Size and Canonical Features Using Reconstructed Error. Hangjin Liu[1]*, Michael Kudenov[1], and Mike Boyette[2], Cranos Williams[1], [1]North Carolina State University Department of Electrical and Computer Engineering, 890 Oval Drive, 3114 Engineering Building II, Raleigh, NC 27606, [2]North Carolina State University Department of Biological and Agricultural Engineering, Campus Box 7625, Raleigh, NC 27695-7625, (hliu25@ncsu.edu)

Crop quality grading consists of classifying crops into categories associated with their value, which is a very important area of research. Low quality in crops can lead to food waste, decreased farm profits, poor consumer satisfaction, and inefficiencies across the supply chain. Many crop analysis techniques combine different features like shape, color, size, and texture to assign grade. Among them, shape and size are the main criterion to determine the products quality and grade, and in turn, its value to the consumer. We access crop grades based on these features and treat sweetpotato as an example. It is important to increase the need for crops of desired shape and consistency with the growing demand for sweetpotato used as French fry and other processed products. Therefore, it is important to classify the shape of crops so that industry can plan packaging, transportation ahead to reduce financial loss and through understanding how environmental factors determine crop shapes, growers could revise their cultural practices to increase productivity. In many cases, supervised machine learning methods are applied for crop grading based on shape values related problems. However, supervised methods require experts to grade based on perceived value, which can be time consuming and inconsistencies. Moreover, many real worlds crop grading applications involve visual categories that do not exist in standard benchmark data sets. For instance, the sweetpotato grading has very loose standards associated with their values. A major obstacle, however, to implementing crop shape and size classification is the absence of accurate labeling data due to labor intensive and biased labeling process. In this research, we develop a grade model that will apply different features descriptors, such as elliptic Fourier descriptor and some non-homogeneity descriptor to extract feature and size related features directly from 2D industrial imaging infrastructure effectively. Then we use them in unsupervised or semi-supervised approaches without waste of unlabeled data. To have better result, we also combine the reconstruction error-based outlier detection model with parametric unsupervised machine learning model to classify sweetpotatoes based on their shape and size features. We treat 20% dataset to as testing set, and then separate training set as labeled data and unlabeled data. As the result, the accuracy for unsupervised and semi-supervised machine learning is around 0.77 and 0.8 respectively, all higher than supervised method, which only using labeled dataset.

2:45 Effect of Flumioxazin and *S*-metolachlor on ‘Covington’ Sweetpotato Planted Vertically or Horizontally. Keith Starke*, Colton Blankenship, Katie Jennings, Jonathan Schultheis, and David Monks. Department of Horticultural Science, North Carolina State University, Raleigh 27695. (kdstarke@ncsu.edu)

The majority of commercial sweetpotato production in North Carolina is currently done by using a mechanical setter that orients nonrooted cuttings (slips) vertically in the furrow, however, more recently some growers have begun to change the plant orientation in furrow by using a mechanical setter to plant the slips horizontally. A study was conducted to evaluate the effect of flumioxazin PREPLANT at 3 oz/A and *S*-metolachlor at 12 or 24 oz/A 10 days after transplanting and two planting methods (vertical or horizontal) on ‘Covington’

sweetpotato in Nash County, NC in 2021. Overall horizontal planted sweetpotato produced greater no. 1 storage roots than the vertical planted sweetpotato. *S*-metolachlor at both rates in horizontal sweetpotato resulted in the greatest marketable yield. Flumioxazin in horizontal sweetpotato and *S*-metolachlor at 12 oz/A resulted in the lowest yield.

Processing, and Marketing

Presiding: Dani Jones

3:00 Sweetpotato Analytics for Produce Provenance and Scanning. (Sweet-APPS).
Daniela Jones. NC State University, Raleigh (danielasofiagonzales@gmail.com)

Consumers demand their produce be fresh but the only indicator of freshness available to a shopper is appearance. To attract sales, breeders and growers have worked hard to achieve produce uniformity for common items like cabbage, potatoes, peaches plums or strawberries. Sweetpotatoes, a produce estimated at $324 million in North Carolina in 2019, vary the most in size and shape when compared to all fresh produce items. As an example, the price per pound of an overly large, overly small or misshaped sweetpotato is frequently discounted as much as 80- 90% of the value of a root grading US No. 1. Consistent produce/food quality may be achieved by bridging knowledge gaps between natural ecosystems and anthropogenic agricultural production dynamics. Over the past several years, the sweetpotato industry has moved toward optical sorting and grading technologies to improve packing efficiency. Although this technology has been a significant step forward for the industry, the addition of tailored technologies developed by the NC State Sweet-Apps project will provide new value to the industry by building capacity to distinguish defects in stored sweetpotato roots that reduce marketability and limit profit margins (e.g., root shape, internal necrosis, surface blemishes). The long-term goals of this project will advance fundamental and applied research, transdisciplinary training, and stakeholder engagement opportunities associated with the North Carolina Plant Science Initiative housed at North Carolina State University.

3:15 Sweetpotato Marketing Alterations during the COVID-19 Pandemic. David H. Picha, School of Plant, Environmental and Soil Sciences, Louisiana State University Agricultural Center, Baton Rouge, LA 70803. (dpicha@agcenter.lsu.edu)

The COVID-19 coronavirus pandemic resulted in significant produce marketing alterations in the U.S. beginning in the spring of 2020 and continuing through 2021. The sweetpotato industry as a whole remained strong and resilient during the pandemic. However, the impact of the pandemic varied widely between individual operations and market channels. The wholesale and foodservice market sectors suffered the worst economic losses during the period from late March through early May when many restaurants, educational institutions, malls, and most businesses were closed, air travel was severely restricted, and entertainment venues were canceled. Fresh produce and sweetpotato sales to fine-dining restaurants suffered declines of about 80% year-on-year. The nationwide stay-at-home orders during the early stages of the pandemic resulted in record fresh produce and sweetpotato sales by grocers, supermarkets, and other retail market channel outlets that remained open during the pandemic. Sweetpotatoes were among the produce items that benefited the most from an increase in retail sales. A number of retailers switched from bulk to bagged sweetpotato packaging, as consumers made fewer trips to the store, and preferred the convenience and perceived safety of packaged sweetpotatoes. Consumer purchasing patterns for fresh produce, including sweetpotatoes, shifted to all-time highs for online orders.

3:30 Break

Plant Biology and Crop Production:

Presiding: Arthur Villordon

3:45 Overview of the Nation's Sweet Potato Industry Challenges, Research Needs, and Clean Seed Adoption Rates. Rachael M. Carter[1]*, Mark W. Shankle[2], Lorin M. Harvey[2], Donna J. Peterson[3], and Elizabeth P.G. North[4]. (rdm1@msstate.edu)

Like most agricultural producers, sweet potato growers are faced with many challenges. For research, extension, and policy makers to help this industry thrive, we must understand producer and industry stakeholder needs. It is also essential to determine gaps in knowledge, barriers, and producer perception and adoption of new technologies. To determine ways to increase the viability and profitability of this agricultural product, MSU Extension and Researchers collaborated with industry representatives, the National Clean Plant Network, and the United States Sweet Potato Council to distribute a needs assessment survey of producers, packers, researchers, and outreach specialists to identify perceived threats to the industry. Clean seed adoption rates and future research and technology needs were also documented. The survey had 195 respondents (66% were producers, and 26% were packers and shippers) who reported growing in total over 73,000 acres of sweet potatoes. According to USDA NASS, 156,800 acres of sweet potatoes were planted in the United States in 2020. Therefore, it is estimated that the survey respondents are involved in 47% of overall U.S. sweet potato production indicating the high level of importance and relevance of the results. The results from this survey were used to determine which issues were a top priority for stakeholders. This presentation will share the results of this needs assessment as well as strategic goals identified by industry stakeholders that will be used to guide future research and outreach goals for the U.S. sweet potato industry.

4:00 Choice under Stress: The Fate of Storage Root Development Under Reduced Phosphorus Availability. Luis Duque. Penn State University. (loduque@psu.edu)

The storage root is a prime example of a type of specialized organ that can accumulate and store the products of photosynthesis allowing plant survival under abiotic stress episodes. When phosphorus (P) availability is limited, plants use a multifaceted set of strategies to increase the availability of P in the soil. In sweetpotato, the favorable or lack thereof of storage root development under suboptimal P availability is not understood and provides an opportunity of research as a novel storage root model organism to further our understanding of storage root formation under stress. Recently, we have observed sweetpotato genotypes displaying variable responses to suboptimal P availability. The overall objective is to elucidate the mechanisms and the genetic architecture underlying the reduced secondary root growth of developing roots in sweetpotato. We will: 1) Measure the extent of reduced secondary root growth and anatomical components that stimulate decreases in root radial thickening under

P-stress, 2) Assess the physiological mechanism of root non-structural carbohydrate flux under P-stress, and 3) Identify quantitative trait loci, candidate genes, and gene pathways underlying the natural phenotypic variation in root secondary root growth and carbohydrate status. This project will characterize these areas of research in sweetpotato that are novel and the data we present is the first demonstration of the physiological value of the mechanisms under reduced P availability.

4:15 Yield and Quality of Sweetpotato Grown Under Protective Culture Systems. Luis Duque, Penn State University. (loduque@psu.edu)

Horticultural protected culture systems such as high and low tunnels are increasingly adopted across the United States as a flexible and sustainable tool to advance the production of vegetables, small fruits, herbs, cut flowers, and ornamentals. High and low tunnels are especially common as part of the farm infrastructure among small and diversified farms that market their products directly to consumers and/or specialty markets. These relatively low-cost cultivation systems provide an added protected environment relative to the field and allow an extended growing season. The application of protected culture systems such as low and high tunnels to sweetpotato crops in Pennsylvania could address some of the challenges mentioned above contributing to increase yield stability and quality, thereby opening new market opportunities. Production of already available commercial sweetpotato germplasm under high and/or low tunnels could be a profitable enterprise for vegetable growers in Pennsylvania and the Northeast region given the potential season extension afforded by high and low tunnels systems, which could allow growers to diversify their operations and introduce a new crop in their rotation system.

4:30 Evaluation of Sweetpotato Slip Burn-off and In-Row Skips. Callie J Morris, Mark W. Shankle, Stephen L. Meyers, Mark A. Hall, Trevor F. Garrett, Lorin M. Harvey. Pontotoc Ridge-Flatwoods Experiment Station, MS State University, Pontotoc, MS 38863 (cjw521@msstate.edu)

Field research was conducted at the Pontotoc Ridge-Flatwood Experiment Station over four years simulating slip burn-off and in-row skips. Slip burn-off was simulated by clipping the slip at soil level, leaving plant material underground. Slips for the in-row skip treatments were completely pulled by hand after planting. Treatments consisted of six percentages (0%, 20%, 40%, 60%, 80%, 100%) of slips that were pulled or clipped randomly. An additional treatment was included that consisted of 100% of the slips pulled and then replanted with different slips a week later. Data for canopy coverage, yield and quality was taken. Sweetpotatoes were graded into Jumbo, Canner, US No. 1, and Cull with total marketable consisting of the sum of Jumbo, Canner and US No. 1.

4:45 Performance of Specialty Sweetpotato Cultivars in Dominant Production Areas of Florida. Mussoline, W.[1], Hochmuth, R.[2], Christensen, C.[3], Guzman, S.[4], and Z. Grabau[5], [1]UF/IFAS Agriculture Extension Agent, East Palatka, FL, 32131, [2] UF/IFAS North Florida Research and Education Center- Suwannee Valley, Live Oak, FL, 32060, [3] UF/IFAS Hastings Agriculture Extension Center, Hastings, FL, 32060, [4] Agricultural and Biological Engineering Department, University of Florida, Indian River Research and Education Center, Fort Pierce, FL, 34945, [5] Entomology and Nematology Department, University of Florida, Gainesville, FL, 32608.

(wmussoli@ufl.edu)

Florida sweetpotato production is relatively small with only 5,678 harvested acres reported by the 2017 USDA Census. There are currently three distinct regions that have limited commercial production – Live Oak (Covington), Homestead (Boniato), and Hastings (Charleston Purple). Expanded cultivar selections suitable for Florida are necessary to promote production among more growers. Multi-site trials in Live Oak, Fort Pierce and Hastings were conducted with slips obtained from NC State - Covington, Beauregard, Averre, Monaco, NC16-0193, NCP13-0030 (Purple Splendor), and NCP13-0315 (Purple Majesty), LSU - 18-161P and 1965, and CAREnergy - Charleston Purple. Slips were planted between May 26 and June 1 in a random complete block design with four replications arranged in 40" rows with 12" interrow spacing. Sample plots (25 plants per replication) were harvested at 133 DAP in Live Oak, 147 DAP in Fort Pierce and 146 DAP in Hastings and graded according to USDA standards. Results were statistically analyzed using ANOVA followed by mean separation with Fisher's LSD test when ANOVA results were significant ($P<0.05$). The highest performing cultivars based on average marketable yields (t/A) in Live Oak were Beauregard (11.5) and Purple Majesty (11.3), in Fort Pierce were Beauregard (12.1), Averre (12.0), and Purple Splendor (11.4), and in Hastings were Purple Splendor (5.6) and Purple Majesty (4.4). Hastings had the lowest marketable yields, with 44% of the total harvest removed as undersized culls. Live Oak was the only site with evidence of wireworm and weevil pressure, with 138 weevils trapped in 7 days before harvest. Susceptible cultivars with slight impacts were Beauregard, Covington, 1965, 18-161P, and NC-160193.

5:00-6:00: Poster Session

Sweetpotato Response to Incremental Rates of Potassium Fertilizer. Mark A. Hall, Lorin M. Harvey, Callie J. Morris, Mark W. Shankle, Pontotoc Ridge-Flatwoods Branch Experiment Station, MS State University, Pontotoc, MS 38863. (mah1140@msstate.edu)

Field research was conducted at the Pontotoc Ridge-Flatwoods Branch Experiment Station over 2 years to evaluate the response of sweetpotato yield to incremental rates of potassium fertilizer. The trial consisted of 4 replications in a randomized complete block (RCBD) with 2 row plots measuring 6.67ft x 30ft. Beauregard and Orleans slips were transplanted after field preparation and fertilizer treatments were applied. Treatments consisted of 7 incremental rates of 0-0-60 Muriate of Potash, consisting of 60, 120, 180, 240, 300, 360, and 420lbs per acre and an untreated check which received no potassium. Sweetpotatoes were harvested approximately 119 days after transplanting. Sweetpotatoes were graded according to USDA standards to determine US No. 1, Canner, Cull, and Jumbo yield grades. Total marketable yield was recorded as the sum of US No. 1, Canners and Jumbo grade yields. Analysis of variance was conducted using Fisher's protected LSD ($\alpha=0.05$). Yield of Beauregard ranged from 333 to 401 boxes per acre of US No.1 and 513 to 598 boxes per acre total marketable, however, yield across all potassium rates was not different for either US No. 1 or total marketable yield compared to the untreated check. The yield of Orleans ranged from 339-432 boxes per acre of US No. 1 and 546 to 624 boxes per acre for total marketable. However, yield across all potassium rates for either yield category was not different compared to the untreated check.

A Multi-State Effort to Contain and Manage *Meloidogyne Enterlobii* in Vegetable Crops. Jennifer Corbin*[1], Paula Agudelo[1], Johan Desaeger[2], Adrienne Gorny[3], Zane Grabau[4], Zhengfei Guan[2], Abolfazl Hajihassani[5], John Mueller[1], Lina Quesada-Ocampo[3], Will Rutter[6], Phillip Wadl[6]. [1]Clemson University, Department of Plant and Environmental Sciences, Clemson, SC 29634. [2]University of Florida Gulf Coast Research and Education Center, Department of Entomology and Nematology, Wimauma, FL 33598. [3]North Carolina State University, Department of Entomology and Plant Pathology, Raleigh, NC 27695. [4]University of Florida, Department of Entomology and Plant Pathology, Gainesville, FL 32611.[5]University of Georgia, Department of Entomology and Plant Pathology, Tifton, GA 31793. [6]USDA-ARS, Charleston, SC 24914. (corbin@clemson.edu)

FIND*Me* (Focused Investigations on the Distribution and Management of *Meloidogyne enterolobii*) is a project sponsored by the USDA National Institute of Food and Agriculture's Specialty Crop Research Initiative. Research partners include Clemson University, North Carolina State University, the University of Georgia, USDA-ARS and the University of Florida. The spread of *Meloidogyne enterolobii* (*M.e.*), a highly virulent root-knot nematode (RKN) species, is potentially devastating to specialty crop production in the southeastern United States. This species can cause losses in yield and quality, and its quarantined status jeopardizes interstate and international trade. *M.e*. can infect and damage crop genotypes that are resistant to the other major species of RKN, including sweetpotato. Our goal is to reduce the vulnerability of growers to the emerging agricultural threat posed by *M.e,* and we hope to achieve it by using a systems-based approach involving five interconnected research and extension objectives: 1) Study the prevalence and distribution of *M.e*. in vegetable crops in the Southeast, and characterize the genetic variability encountered; 2) Evaluate and develop vegetable germplasm with resistance to *M.e*.; 3) Evaluate the efficacy of nematicides, cover crops, and rotations as management strategies for *M.e*..; 4) Assess the costs and returns of management tactics such as rotations, cover crops, and nematicides for the mitigation of *M.e*. on sweetpotato, cucumber, watermelon and tomato crops; 5) Develop print and web-based educational materials on management and containment strategies for *M.e*. It is critical for commercial growers and home gardeners to learn about *M.e.* so they can prevent and manage the infestation.

Evaluating Fumigation Efficacy on Root-Knot Nematode (*Meloidogyne* spp.) on Sweetpotatoes in North Florida. Chang Liu, Zane Grabau, Entomology and Nematology Department, University of Florida, Gainesville, FL 32611. (c.liu@ufl.edu)

Sweetpotato (*Ipomoea batatasis*) production is fast growing in Florida with its long, hot summer desirable for sweetpotato production. However, sweetpotato yield in Florida suffers from nematode damages, including root-knot nematode (*Meloidogyne* spp), reniform nematode (*Rotylenchulus reniformis*) and lesion nematode (*Pratylenchus* spp). In 2020 and 2021, field studies aimed at comparing different fumigant efficacy on root-knot nematode were conducted in Suwannee county, FL. Sweetpotato cultivar used was a moderately resistant cultivar 'Covington'. Treatments included broadcasting Telone (1,3-Dichloropropene) at 5.4 gallon/a, K-pam (Potassium N-Methyldithiocarbamate) at 37.2 gallon/a with single shank and double shank respectively. Soil samples were taken at pre-plant, mid-season and harvest, and nematode abundance was assessed under microscope. Sweetpotato tubers were dug at harvest and total tuber yield was measured. A subsample from each plot was taken and sorted

into marketable and unmarketable categories. In 2020, Telone and K-pam with double shank showed better nematode control at end of the season, and Telone showed better yield potential ($P<0.05$). In 2021, no differences in yield were observed across different treatments.

Evaluation of Host Status of Sweetpotato Cultivars to Sting Nematode *Belonolaimus longicaudatus* in Greenhouse. Chang Liu, Zane Grabau, Rebeca Sandoval-Ruiz. Entomology and Nematology Department, University of Florida, Gainesville, FL 32611. (c.liu@ufl.edu)

Sting nematode (*Belonolaimus longicaudatus*) is a plant-parasitic nematode that can cause severe damages to many crops. They were commonly found in sandy soils in southeast Florida, where sweetpotato (*Ipomoea batatasis*) is an important production crop in this region. However, the host status of different sweetpotato cultivars to sting nematode is not well-defined. The objective of this study is to evaluate the relative host status of two sweetpotato cultivars to sting nematode under greenhouse conditions. A known sting nematode host field corn (*Zea mays*), poor host sunnhemp (*Crotalaria juncea*), and sweetpotato cultivars susceptible ('Beauregard') and resistant ('Covington') to southern root-knot nematode (*Meloidogyne incognita*) were inoculated with sting nematode at 0, 25, and 150 nematodes per pot. Plants were grown for 70 days, and growth parameter as well as nematode abundance per 100 cm^3 soil were assessed. This trial was a factorial randomized complete block design with 5 replicates and was ran twice. In both runs of the greenhouse trial, field corn showed greater ($P<0.05$) final sting nematode soil abundances than sunnhemp or either sweetpotato cultivar.

Impact of Reduced Rates of Glufosinate and 2,4-D Choline on Sweetpotato. Donnie Miller. LSU Ag Center. Louisiana State University, St. Joseph, LA 71366. (dmiller@agcenter.lsu.edu)

A field study was conducted near Crowville La in 2021 with the objective to evaluate the impact of reduced rates of glufosinate (Liberty 280 SL) co-applied with 2,4-D choline (Enlist One) on sweetpotato. A four-replication factorial treatment arrangement was utilized and included herbicide application timing (Factor A: 10 or 30 d after planting (DAP)) and reduced use rate (Factor B: 0 (nontreated), 1/10, 1/32, 1/64, or 1/100 of use rate). The use rates utilized for reduced rate herbicide calculations were 0.66 kg ai/ha^{-1} for glufosinate and 1.06 kg ae/ha^{-1} for 2,4-D choline. Treatments were applied to each 3 x 7.62 m plot at the scheduled timing following planting of 'Orleans" sweet potato on June 2. Parameter measurements included visual crop injury (chlorosis, stunting, twisting, leaf crinkling) 7, 14, and 28 d after application (DAT) and yield (U.S. #1, canner, jumbo, and total). A significant herbicide application timing and reduced rate interaction was noted for injury at all evaluation intervals.

At 7 DAT, within the 10 DAP application timing injury was greatest at the highest reduced rate (71%) while the 1/32 x rate resulted in greater injury than lower rates (36 vs 15 and 11%). Within the 30 DAP application timing, injury was equivalent for all reduced rates except the lowest (38 to 50 vs 19%). Within each reduced rate, injury was equivalent at both application timings except 1/10x (71% at 10 DAP vs 50% at 30 DAP) and 1/64x (39% at 30 DAP vs 15% at 10 DAP).

At 14 DAT, within the 10 DAP application timing injury was greatest for the highest reduced rate (75%) compared with lower rates that resulted in equal injury ranging from 13 to 20%. Within 30 the DAP application timing, injury was equivalent for all reduced rates except the lowest (41 to 50 vs 16%). Within each reduced rate, injury was equal for both application timings except 1/10x (75% at 10 DAP vs 50% at 30 DAP) and 1/64x (41% at 30 DAP vs 13% at 10 DAP).

At 28 DAT, within both 10 and 30 DAP application timings, injury was greatest at the highest reduced rate (75 and 18%, respectively) while injury at all other reduced rates was 0 to 11%. Within each reduced rate, injury was different among application timings only at highest reduced rate (75% at 10 DAP vs 18% at 30 DAP).

Significant treatment impacts were observed for U.S.#1, canner, and total yield for only the reduced rate effect. Averaged across application timings, U.S. #1, canner, and total yield were only reduced at the highest reduced rate applied (50, 40, and 49%, respectively) in comparison to the nontreated.

Producers with multi-crop operations including sweet potato are cautioned to thoroughly follow all labeled sprayer cleanout procedures when previously spraying one of the combination herbicides evaluated or to devote separate spraying equipment. Producers are also cautioned to follow all label restrictions to prevent off target movement to adjacent sweet potato fields.

Effects of Early-season Drought, Ultraviolet-B, and Low Nitrogen Stress on Growth, Developmental, and Physiology of Sweetpotato Cultivars. Purushothaman Ramamoorthy[1], Raju Bheemanahalli[2], Stephen Meyers[3], Mark Shankle[4], K. Raja Reddy[2]. [1]Geosystems Research Institute, Mississippi State University, Mississippi State University, MS, 39762, USA.[2]Department of Plant and Soil Sciences, Mississippi State University, Mississippi State, MS, USA. [3]Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette IN 47907, USA. [4]Pontotoc Ridge-Flatwoods Branch Experiment Station, North Mississippi Research and Extension Center, Mississippi State University, Pontotoc, MS 38863, USA. (purush@gri.msstate.edu)

Drought, ultraviolet (UV)-B, and nutrient availability are the major stress factors limiting sweetpotato productivity. Identification of phenotypes that govern tolerance in sweetpotato is beneficial to developing elite cultivars. In this study, ten sweetpotato cultivars were grown under non-stress (100% replacement of evapotranspiration (ET)), drought (50% ET, DS), UV-B (10 kJ), and low nitrogen (20% LN) conditions. Morphological and physiological traits responses and their association with storage root numbers (SRN) were examined across treatments. All stress factors caused significant changes in physiological and biomass-related traits. DS reduced shoot developmental traits (20% - 38%) to maintain root growth. UV-B induced changes in leaf pigments and decreased photosynthetic rate. LN decreased the shoot growth by 11% and increased the root growth by 18% compared to the control treatment. Leaf number (r = 0.39) and stem biomass (r = 0.40) were positively associated with SRN under UV-B and LN stresses. Under DS, vine length and leaf number showed a negative relationship with SRN. The association of root surface area (r = 0.69) and root volume (r = 0.73) with SRN across treatments indicates that it could be considered a potential proxy trait to screen cultivars for higher yield. Based on the total stress response index, Evangeline, Orleans, Beauregard-14, and Covington were identified as tolerant and Vardaman as sensitive across stress treatments. This information would help determine which plant phenotypes are desirable for better productivity under stress conditions. Identified highly stable cultivars within

and across stress treatments could be used as trait/s donors for abiotic stress tolerance breeding programs.

Sweetpotato Breeding Line Resistance to *Meloidogyne enterolobii* and *M. incognita*.
David Galo[1], Josielle Rezende[1], Christopher A. Clark[1], Don R. Labonte[2], Tristan Watson[1].
[1]Department of Plant Pathology and Crop Physiology, [2]Department of Horticulture, LSU AgCenter, Louisiana State University, Baton Rouge (dgalo@agcenter.lsu.edu)

Sweetpotato response to *Meloidogyne enterolobii* (Me) and *M. incognita* (Mi) infection was evaluated in 26 sweetpotato breeding lines under greenhouse conditions. Sweetpotato vine cuttings were transplanted into PVC pots (4-inch diameter, 9-inch height) filled with construction sand, and approximately 3,000 eggs of either Me or Mi were added to each pot three days after planting. The cultivars Beauregard and Jewel known to be susceptible to Me and Mi and resistant to Mi, respectively, were included as controls. Plants were watered every other day alternating between 150 ml of deionized water and 150 ml of prepared fertilizer solution. Entire root systems were washed free of sand and rated for the presence of galls (0 – 5 scale) 56 days after inoculation. Nematode eggs were extracted from each root system using diluted sodium hypochlorite solution and enumerated with a dissecting microscope at 20X magnification. Statistical differences ($P < 0.001$) in gall ratings and the total number of eggs produced were observed among breeding lines for both Me and Mi. For Me, Jewel and seven breeding lines (14-31, 16-186, 19-53p, 19-59p, 19-65, 19-81w, and 8-21p) were resistant. For Mi, breeding line susceptibility showed a wide spectrum of responses ranging from resistant to highly susceptible. Three breeding lines (14-31, 19-53p, and 8-21p) demonstrated resistance to both nematode species. Overall, resistance to Me and Mi exists in LSU AgCenter sweetpotato breeding lines. Our future work will be aimed at characterizing the resistance mechanisms in sweetpotato breeding lines.

Saturday February 12

8:00 Call to Order and Announcements

Plant Biology and Crop Production

Presiding: Mark Shankle

8:15 Does a Sleeve Adaptor Using Variable Plant Lengths for Sweetpotato Planting Improve Yields? Brandon Parker[1]* and Jonathan R. Schultheis[2], [1]North Carolina Coop. Extn. Serv., 2736 NC Hwy 210, Smithfield, NC 27577 and [2]Dept. Hort. Sci., North Carolina State Univ. 2721 Founders Dr., Raleigh, NC 27695. (bkparker@ncsu.edu)

A horizontal (H) planter was introduced to improve sweetpotato (SP) yields and quality in 2018. This planter orients the SP transplant H to the soil surface versus a commercial clip style transplanter which orients the plant vertical to the soil surface. Soon after the H planter was available a sleeve (SL) was developed that could be attached to “modern” clip style transplanters. The hypothesis was the SL attachment would cause a portion of the transplant to have a more H orientation by bending the plants and potentially mimic some of the potential advantages of a H planter. Attachment of the metal SL adaptor is easy and the cost much less than the purchase of a H planter unit. The primary goal of this research was to determine if the addition of a SL adaptor improved SP yields. A secondary goal was to determine how plant length impacted yields using a clip style planter with and without the SL, and work towards optimizing the use of the SL. Research to compare this adaptor with longer plants to a transplanter without the adaptor was conducted in the spring of 2020 and was repeated in 2021 as plant lengths were varied at 6, 10, 14, and 18 inches. Additional treatments included an early harvest and late harvest, and in-row spacings of 10.5 and 14 inches. Initial work from 2020 showed no differences in using the SL sleeve adaptor versus not using the SL adaptor regardless of plant length. Yield was influenced by plant length, with a 14 inch plant consistently resulting in the highest yields. A later harvest and the closer in-row spacing increased yields. Data from the 2021 growing season are not yet complete and will be presented and compared with 2020 results.

8:30 Effect of Potassium Fertilization Rate on Sweetpotato Sugar Content. David H. Picha, School of Plant, Environmental and Soil Sciences, Louisiana State University Agricultural Center, Baton Rouge, LA 70803. (dpicha@agcenter.lsu.edu)

Potassium (K) is one of the macroelements found in highest amounts in sweetpotato leaf and root tissue. However, limited information exists on the effect of K fertilization rate on sweetpotato root composition. A two-year field study was conducted to determine the effect of eight levels of potassium fertilization, ranging from 0 to 420 lbs of K per acre, on root sugar content. Three cultivars of sweetpotatoes were grown at the Pontotoc Ridge-Flatwoods Experiment Station in Pontotoc, Mississippi in 2019 and 2020 and analyzed for individual sugar composition by HPLC in the LSU Postharvest Horticulture Laboratory in Baton Rouge. No consistent trend or change was found with increasing K level on root glucose and fructose contents in the raw roots. Sucrose, which is the main sugar in raw roots, decreased with increasing K levels higher than 180 lbs/acre. Total root sugar content in the raw roots also decreased in each of the 3 cultivars at K rates greater than 180 lbs/acre. Maltose, which is the main or secondary sugar in baked roots, decreased with increasing K levels in Beauregard and Bayou Belle cultivars in 2019. Sucrose decreased in concentration in baked roots at the highest K rates in Beauregard and Orleans cultivars in 2020. The total sugar content in the baked roots generally decreased at the highest K rates.

8:45 Potassium Fertilizer has Minimal Impact on Sweetpotato Production in California. C. S. Stoddard. UC Cooperative Extension, 2145 Wardrobe Ave, Merced, CA (csstoddard@ucan.edu)

The response of sweetpotatoes (*Ipomea batatas*) to various rates and sources of potash fertilizer were evaluated over several years in California, most recently 2020 – 21. Trials from 2002 – 2004 with potash rates of 0 – 300 lbs K_2O per acre showed a significant positive linear response in soil test K as fertilizer increased ($p < 0.01$, $R^2 = 15\%$), however, there was no significant correlation between soil test K and yield with the Beauregard variety used in these trials. Similar results were observed in 2008 with Beauregard on a soil with low soil test K (25 ppm), using potash rates of 0 – 400 lbs per acre split between potassium sulfate applied preplant and potassium nitrate through the drip irrigation system. Leaf tissue and root K concentrations increased with increasing rates, but sweetpotato yield response was modest. Highest yields were obtained with rates of about 250 lbs K_2O per acre, but were not significantly different than the other rates. In 2019, coated and uncoated potassium sulfate was evaluated at 380 and 500 lbs/A in a commercial 'Murasaki' field. All potassium fertilizers significantly increased total marketable yield (TMY) over the standard grower program by an average of 21.6%. There was no significant difference between the standard granular potassium sulfate (19.2 bins/A) and 380 or 520 lbs/A (18.7 bins/A) coated fertilizer. In 2020, no significant crop or yield response was observed in trials in a commercial 'Diane' field with coated and uncoated potassium sulfate with rates ranging from 120 to 600 lbs K2O per acre. Unlike the other trial locations, this field tested high in potassium, >200 ppm K and base saturation > 9% in the top 12" soil, and as such the lack of a fertilizer response was not unexpected. Similar results were observed in 2021 with cultivar 'Bonita'. As a result of the lack of response to applied potassium, a crop response index has not been developed for sweetpotatoes in California. Fertilizer rate guidelines are instead based on crop removal of potassium of approximately 5 lbs K_2O per 1000 lbs harvested.

9:00 Development of an Experimental System for Studying the Interaction of Essential Elements and Non-essential Heavy Metals in Sweetpotato: Preliminary Findings. Arthur Villordon, Jeffrey C. Gregorie. LSU AgCenter Sweet Potato Research Station, Chase, LA 71324 (avillordon@agcenter.lsu.edu)

The main objective of the study was to adopt an existing experimental growth system for testing the hypothesis that some non-essential heavy metals (HMs) compete with essential elements for entering the root system. The current growth system was developed to optimize storage root formation in standard cultivars using a sand-based growth substrate with Hoagland's No. 1 (H1) solution as source of nutrients. To reduce the possible confounding effects of HMs on initial root growth, 'Beauregard' plants were grown for 30 days for consistent storage root development. Subsequently, 80 ml each of 8 mg•L^{-1} arsenic (As) and 4 mg•L^{-1} cadmium (Cd) was applied 3X per week for treated plants while control plants received 80 ml of distilled water. After application of controls and experimental treatments, 100 ml of control nutrient solution, - P (H1 with P omitted), and -Zn (H1 Zn omitted) was added depending on the treatment combination. The following treatment combinations were used: control + distilled water, control + As, control + Cd, -P + As, and -Zn + Cd. Sampling of storage roots was performed at two and three weeks after the start of HM treatment. The omission of P increased As presence in unpeeled storage roots by 54%. The omission of Zn increased Cd presence in unpeeled roots by 169%. Growth substrate levels of As and Cd increased 73% and 694%, respectively, when treatment duration was increased from two to three weeks. The preliminary data demonstrate the potential of a growth system for studying HMs in sweetpotato. In addition, the preliminary results corroborate existing available evidence that As and Cd compete with P and Zn, respectively, with respect to entering plant roots via nutrient-specific transport systems.

9:15 'Are We Staying Clean? Detection of Sweetpotato Viruses on Multiple Seed Generations in North Carolina'. Christie Almeyda[1], Tamara Abernethy[1], Chunying Li[1], Ken Pecota[2] and Craig Yencho[2]. [1]Micropropagation and Repository Unit, Department of Entomology and Plant Pathology, [2]Department of Horticultural Science, North Carolina State University, Raleigh, NC 27607. (cvalmeyd@ncsu.edu)

Accumulation and perpetuation of viruses in sweetpotato is a major constraint for production of seed and the commercial crop. The potyvirus complex is prevalent in North Carolina and comprises Sweet potato feathery mottle virus (SPFMV), Sweet potato virus G (SPVG), Sweet potato virus C (SPVC) and Sweet potato virus 2 (SPV2). The mission of the Micropropragation and Repository Unit (MPRU) is to provide growers with the opportunity to “start clean and stay clean” by utilizing these sources of clean nuclear stock to meet the ever expanding demands of the U.S. sweetpotato industry. Under the economic study initiative, the National Clean Plant Network for sweetpotatoes started an experiment aimed to assess the value of clean seed in comparison to older generation seed. The goal of this study was to evaluate the performance and quality of the foundation seed after it had been integrated into commercial sweetpotato operations for Covington and Beauregard varieties. G1 seed was used as a reference to compare the yield and virus incidence of growers’ generation 2 (G2), generation 3 (G3) and generation 4 (G4) seed roots (grown in the growers’ seed production fields 1, 2 or 3 years following the year of foundation seed production). Virus data suggest a low incidence of viruses (mainly SPFMV) on G1 material for both cultivars. Potyviruses (mainly SPVG, SPVC and SPFMV) started to be prevalent on G2 and G3 material. In the older generation evaluated (G4), all potyviruses (SPVG, SPVC, SPFMV and SPV2) were detected. Sweet potato leaf curl virus (SPLCV) and Sweet potato chlorotic stunt virus (SPCSV) were not found on any root for both cultivars. This experiment was harvested on the first week of November 2021. Yields were taken and a second virus testing will be done on the 20% of roots following the same methodology.

Disease, Insect, and Weed Management

Presiding: Mark Shankle

9:30 Production of Green-engineered Silver Nanoparticles Against the Root-knot nematode *Meloidogyne incognita*, and the Evaluation of their Nematicidal Activity in Sweetpotato. Gregory C. Bernard, Naresh Shahi[2], Byungjin Min[2], Marceline Egnin, Ivi Mitchell, Andrea Lockett, Inocent Ritte, Osa Idehen, Adrianne Brown, and Conrad Bonsi Dept of Ag., Dept of Nutr. Sci[2]. College of Ag. Envr. and Nutr. Sci. Tuskegee University, 1200 W. Montgomery Rd. Tuskegee, AL 36088 (gbernard@tuskegee.edu)

According to previous reports, the root-knot nematode Meloidogyne incognita ranks number one in scientific and economic significance among plant-parasitic nematodes. M. incognita is a devastating pathogen of many root crops, including sweetpotato, initiating physiological and morphological changes, often resulting in decreased quality and yields of storage roots. Reductions in chemical treatment options for root-knot nematodes have poised a need for new nematicidal active ingredients which are equally effective and environmentally sound. The use of nanotechnology in research is well-established as an area of intense and dynamic scientific area with new applications in agriculture. Our previous studies have developed chitosan-based silver nanoparticles (CSNPs), which demonstrated near 100% lethality in juvenile nematodes under aqueous conditions. CSNPs were synthesized by the redox reaction of silver nitrate using chitosan, a naturally occurring polymer of N-acetylglucosamine, by microwave treatment. Our current objective is to test the efficacy of the CSNPs on sweetpotatos housed under greenhouse conditions to determine their potential nematicidial effects in nematode-infested soil. Our resultant information may lead to additional studies, including field evaluation to evaluate benefits for mitigating damage caused by root-knot nematode in sweetpotato.

9:45 How Much are We Under-estimating the Effects of Sweetpotato Viruses on Yield in the U.S.? C. A. Clark[1], C. D. DeRobertis[1], and J. A. Davis[2], [1]Dept. Plant Pathology & Crop Physiology, and [2]Dept. Entomology, Louisiana State University Agricultural Center, Baton Rouge. (cclark@agcenter.lsu.edu)

Four potyviruses (Sweet potato feathery mottle virus, Sweet potato virus G, Sweet potato virus C, Sweet potato virus 2) are very common in sweetpotatoes in the U.S. and are spread very rapidly by aphids. Several attempts have been made in Louisiana to measure the impacts of viruses on yield and quality of sweetpotato with varying results. In 2021, National Clean Plant Network - Sweetpotato initiated an economic study aimed at assessing the value of clean seed, using G-1 seed as a clean reference and older generation seed to represent naturally infected. In Louisiana, no viruses were detected in any of the three G-1 seed lots of Beauregard and Orleans used and the incidence of re-infection during the growing season was lower (30-35%) than in experiments conducted in previous years (100%), possibly due to low populations of aphids. G-3 seed obtained from growers (Beauregard from south-central LA and Orleans from northeast LA) had different levels of infection, but all yielded about 28-29% less TMY than the G-1 seed of the same cultivar, regardless of source of the G-3 seed. Comparison of 2021 data to prior experiments suggests that use of G-1 seed that has high levels of virus infection especially when combined with high rates of re-infection during the current season may contribute to under-estimating the true potential of clean seed.

10:00 Evaluation of Plant Hormones as Herbicide Safeners in Sweetpotato. Matthew Cutulle[1], Phillip Wadl[2] and Giovanni Caputo[1] [1]Clemson University Coastal Research and Education Center. 2700 Savannah Hwy Charleston SC 29414m [2]USDA-United States Vegetable Lab (USVL). Savannah Hwy Charleston SC 29414. (mcutull@clemson.edu)

Weed management is essential to maximize yield in sweetpotato production. Currently, there is a lack of herbicides registered in sweetpotato to suppress nutsedge species. Yellow nutsedge is a problematic weed to control due to its ability to quickly generate high numbers of tubers and shoots. Expanding the bentazon label to include sweetpotato would be beneficial for growers as this would be able to control yellow nutsedge during the season. Experiments were conducted to evaluate interactions between bentazon and plant hormones on weed control and sweetpotato crop safety. Treatments included a non-treated check, melatonin (100 g ai ha-1), brassinosteroids mixture (BSM) (1000g ai ha-1), bentazon (200g ai ha-1), bentazon + melatonin, bentazon + BSM, and bentazon + melatonin + BSM. The experiment was conducted at two locations in South Carolina. Evaluations consisted of percent yellow nutsedge control, percent sweetpotato injury, and sweetpotato yield. Results indicate bentazon applied alone had a stunting effect on sweetpotato plants, reducing the final yield by 50% in Cameron, SC and 79% in Charleston, SC compared to tank-mix of bentazon + plant hormones. The addition of plant hormones mixed with bentazon reduced sweetpotato injury by 50% without impacting weed control. Also, yield from plants treated with bentazon and plant hormones was 50% and 74% greater in Cameron and Charleston, respectively, than the non-treated check. These results indicate the use of plant hormones could improve sweetpotato tolerance to postemergent applications of bentazon without reducing weed control.

10:15 Break

<u>Disease, Insect, and Weed Management</u>

Presiding: Chris Clark

10:30 Development of an IPM Program for the Sweet Potato Weevil, *Cylas formicarius* in Puerto Rico. Wanda I. Almodóvar[1], Martha C. Giraldo[2]. Department of Agroenvironmental Sciences, University of Puerto Rico, [1]Mayaguez and [2]Rio Pierdas, San Juan. (martha.giraldo@upr.edu, wanda.almodovar@upr.edu)

The major limitation in the production of commercial quality sweet potatoes in Puerto Rico is the insect Sweet Potato Weevil (SPW) *Cylas formicarius*. *Cylas formicarius* is an Asian species but is usually found throughout the tropical regions worldwide including North America, the Caribbean, Europe, Africa, Asia, and Oceania. The insect was first reported in Puerto Rico in 1915. Losses are estimated at 60%–100% during periods of drought making SPW the major source of economic loss on the island. The severity of its damage is due to its capacity to reach high populations during the planting season since it completes its life cycle in approximately 50 days. The harvest time of the crop is 150 days, which is equivalent to three generations of the weevil during the development of the crop. IPM practices for the sweet potatoes growers in Puerto Rico are missing. Our project of Integrated Pest Management (IPM) seeks to implement preventive practices to avoid crop losses from pests and diseases. The use of varieties or cultivars that show resistance, biological control agents, agronomic practices, traps with pheromones, and application of insecticides based on an economic threshold are recommended. This project aims to propose an IPM plan to control SPW, allowing farmers to produce sweet potatoes with commercial quality to cover the local demand for this crop. The implementation of an IPM program to control SPW on the Island is critical to guarantee the availability of seed that ensures the chances of improvement of the crop when it is needed, as well as improve the quality of its local production.

10:45 Sweetpotato Response to Reduced Rates of Dicamba. Lorin Harvey, Mark Shankle, and Callie Morris, North Mississippi Research and Extension Center-Pontotoc Ridge–Flatwoods Branch Experiment Station, Mississippi State University, Pontotoc, MS, USA. (lh1853@msstate.edu)

A field study was conducted in Mississippi to determine the effect of reduced dicamba rates on sweetpotato crop tolerance and storage root yield, simulating off-target movement or sprayer tank contamination. Treatments included a nontreated control and four rates of dicamba; 1/8×, 1/16×, 1/64×, and 1/512× rates applied either 3 d before transplanting (DBP) or 1, 3, 5, or 7 wk after transplanting (WAP). An additional treatment consisted of 1× rate dicamba applied 3 DBP. Crop injury ratings were taken 1, 2, 3, and 4 wk after treatment (WAT).

Across application timings, predicted sweetpotato plant injury 1, 2, 3, and 4 WAT increased from 3% to 22%, 3% to 32%, 2% to 58%, and 1% to 64% as dicamba rate increased from 0 to 1/8×, respectively. As dicamba rate increased from 1/512× to 1/8×, predicted No. 1 yield decreased from 127% to 55%, 103% to 69%, 124% to 31%, and 124% to 41% of the nontreated control for applications made 1, 3, 5, and 7 WAP, respectively. Similarly, as dicamba rate increased from 1/512× to 1/8×, predicted marketable yield decreased from 123% to 57%, 107% to 77%, 121% to 44%, and 110% to 53% of the nontreated control for applications made 1, 3, 5, and 7 WAP, respectively. Dicamba residue (5.3 to 14.3 parts per billion) was detected in roots treated with 1/16× or 1/8× dicamba applied 5 or 7 WAP and 1/64× dicamba applied 7 WAP with the highest residue detected in roots harvested from sweetpotato plants treated at 7 WAP. Collectively, care should be taken to avoid sweetpotato exposure to dicamba especially at 1/8× and 1/16× rates during the growing season.

11:00 Resistance to Wireworm/*Diabrotica*/*Systena* among Sweetpotato Cultivars and Advanced Lines. T. J. Douglas[1], Stephen Meyers[2], Ashli Brown[3], Blake Layton[3], Fred Musser[3]. [1]Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Mississippi State, MS 39762 (currently at Auburn University). [2]Pontotoc Ridge-Flatwoods Branch Experiment Station, Mississippi State University, Pontotoc, MS 38863, (currently at Purdue University). [3]Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Mississippi State, MS 39762. (fm61@msstate.edu)

Commercial cultivars and advanced sweetpotato lines were tested in Mississippi from 2017-2020 for resistance to the wireworm-*Diabrotica*-*Systena* (WDS) insect complex. Numerous lines were more resistant to WDS than the commercial standard Beauregard cultivar. However, yield on the more resistant lines tended to be lower. The one exception was the cultivar Bayou Belle, which showed both good yield and some resistance to WDS when compared to Beauregard and other high yielding varieties. While the advanced lines that appeared to be most resistant to WDS were not commercially acceptable, the range in resistance observed indicates that improved WDS resistance is a reasonable goal for plant breeders.

11:15 Integrating Winter Cover Crops and Weed-Suppressive Sweetpotato Cultivars for Weed Management. Isabel S. Werle[1], Matheus M. Noguera[1], Srikanth K. Karaikal[1], Gustavo B. de Lima[1], Te-Ming Tseng[2], and Nilda Roma-Burgos[1] [1] Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR 72704, [2] Department of Plant and Soil Sciences, Mississippi State University, Starkville, MS 39759. (iswerle@uark.edu)

Integrated weed management (IWM) systems that include non-chemical tactics for weed control are necessary as weed resistance to herbicides increases. Nine sweetpotato cultivars were evaluated for weed-suppressive ability, growth traits, and yield. Experiments were conducted at Fayetteville and Kibler, AR. The split-plot studies evaluated weed infestation (broadleaf spp., grass spp., or weed-free) as mainplot and nine sweetpotato cultivars as subplot. 'Beauregard-14' had the longest vines, whereas 'Hatteras' and 'Heartogold' had the tallest canopy at 5 and 7 WAT in Kibler and Fayetteville. 'Heartogold' had the largest leaf area at both locations. This cultivar reduced weed biomass 2- to 4-fold in both locations. Yield ranged from 27218 kg ha^{-1} to 77935 kg ha^{-1} in weed-free plots and was reduced by 53- and

63% with grass and broadleaf weeds across locations, respectively. 'Beauregard-14'and 'Bayoubelle-6'were the high-yielding cultivars in Kibler and Fayetteville. The best performing cultivars were integrated with cereal winter cover crops in Kibler and Augusta. The split-split plot tests included weeding (with or without) as mainplot; cover crop (winter wheat+clover, cereal rye+clover, fallow) as subplot; and sweetpotato cultivar (four) as sub-subplot. A 4.9-fold and 2.4-fold decrease in yield was observed in weedy plots in Augusta and Kibler, respectively. 'Bayou Belle-6' was the highest yielding cultivar at both locations. In Augusta and Kibler, rye+clover increased yield by 38 and 73%, respectively. Cultivars 'Bayou-Belle-6' and 'Beauregard-14' and mixed cover crops such as rye+clover are viable tools to reduce weed interference in IWM.

11:30 Integrated Nematode Management: a Louisiana Perspective. Tristan T. Watson, Josielle S. Rezende. Department of Plant Pathology and Crop Physiology, LSU AgCenter, Baton Rouge, LA 70739 (TWatson@agcenter.lsu.edu)

In Louisiana, the reniform nematode (*Rotylenchulus reniformis*) and southern root-knot nematode (*Meloidogyne incognita*) are economically important pests of sweetpotato that are well established in the growing region. Since 2018, a new root-knot nematode species, *Meloidogyne enterolobii,* has been intercepted entering Louisiana twice on contaminated sweetpotato planting material imported from North Carolina. This new pest poses a serious threat to Louisiana sweetpotato production, as commercially available root-knot nematode resistant varieties do not protect against this new species. The aim of this study was to preemptively develop an integrated management plan for *M. enterolobii,* should it successfully establish in the state, as well as evaluate management strategies for other economically important nematode species. Greenhouse and laboratory studies were conducted in 2020 to evaluate the suitability of soybean varieties, winter cover crops, and next generation nematicides for management of *M. enterolobii*. All soybean varieties were susceptible to *M. enterolobii* parasitism; however, variation in susceptibility was observed. Only winter rye and winter wheat were non-hosts for *M. enterolobii*. *In vitro* nematicide exposure studies showed similar sensitivity between *M. incognita* and *M. enterolobii* to nematicides. Growth chamber nematicide efficacy trials demonstrated similar efficacy toward both nematode species when nematicides were applied at the label recommended rate. On-farm nematicide evaluation for reniform nematode management showed a reduction in *R. reniformis* soil population densities at harvest when Velum (active ingredient: fluopyram) was applied in-furrow at 6.84 fl oz/A on 'Bayou Belle'.

Business and Planning Meeting:

Presiding: Michelle McHargue

11:45 (Working Lunch)

12:00 Call to Order and Review of 2020 Minutes Michelle McHargue

12:10 Graduate Student Contest Results Michelle McHargue

12:20 National Impact Award Mark Shankle

12:30 Resolutions Resolutions Committee

12:40 Collaborator's Trial Discussion Theresa Arnold

12:50 Nominations Committee Report Nominations Committee

1:00 2023 Meeting Location Michelle McHargue

1:15 National Stakeholder Group Update Tara Smith

1:30 CleanSEED Update Mark Shankle

1:45 Multistate Project Update David Monks

2:00 Extension Publication Progress Report Jonathan Schultheis

2:20 Adjourn

State Report – Arkansas

Shaun Francis, Extension Specialist
University of Arkansas at Pine Bluff

Planted acreage in 2020 and 2021: 5,205.5 (2020); 5,391 (2021)

Harvested acreage in 2021: 5,391

Percent of crop marketed for fresh and processing: 65/35

Anticipated acreage for 2022: 5,500

Varieties grown and estimated percent of acreage: Orleans – 60%; Beauregard – 40%

Percent of acreage irrigated: 10%

Major pest problems (weeds, insects, diseases): None. Minor problems with Southern Root Knot nematode

Abiotic disorders (herbicide, nutrient, weather-related): Heavy rainfall at the beginning of the planting season delayed planting by some small-scale farmers.

Other major challenges to production (lack or storage, labor issues, water rights, etc):

State Report – California

Scott Stoddard
UC Cooperative Extension

Planted acreage in 2020 and 2021: 2021, about 22,500

Harvested acreage in 2021: 22,495

Percent of crop marketed for fresh and processing: Most (>80%) fresh

Anticipated acreage for 2022: down 2000 acres

Varieties grown and estimated percent of acreage:

- Covington
- Bellevue
- Diane
- Vermillion
- Bonita
- Murasaki
- Stokes:

Percent of acreage irrigated: 100%

Major pest problems (weeds, insects, diseases): armyworm pressure little higher this year.

Abiotic disorders (herbicide, nutrient, weather-related): very hot and smoky summer

Other major challenges to production (lack or storage, labor issues, water rights, etc):
yes

State Report – Florida

Zane Grabau, Assistant Professor in Nematology
University of Florida

Bob Hochmuth, Qingren Wang, and Wendy Mussoline, Extension Agents
University of Florida

Planted acreage in 2020 and 2021: 4305
Harvested acreage in 2021: 4305
Percent of crop marketed for fresh and processing: 64% fresh, 36% processing
Anticipated acreage for 2022: 4650

Varieties grown and estimated percent of acreage: Boniato (70%, most common variety in south Florida), Covington (17%, at least 90% of acreage of traditional varieties which are grown in North-Central Florida). Other varieties: Beauregard, Mercati, Charleston Purple, and various boniato cultivars

Percent of acreage irrigated: 34% (100% of traditional varieties grown in north Florida, 20% of boniato-type varieties in south Florida)

Major pest problems (weeds, insects, diseases): (1) wireworms [lack of effective insecticide options a complicating factor], (2) broadleaf weeds including purple and yellow nutsege, pigweed, spiderling [lack of herbicide options complicating factor], (3) sweet potato weevil and related quarantine issues, (4) southern root-knot nematode and guava root-knot nematode (concern for introduction into acreage and restrictions from quarantine). (5) root diseases including Fusarium, Rhizoctonia. (6) other: white rust detection which seems minor so far, armyworm

Abiotic disorders (herbicide, nutrient, weather-related): production limited to well-drained soils, burn from Dual herbicide if improperly managed, nitrogen management. Particularly in south Florida, rainfall is a major factor and ranges from excess to deficient.

Other major challenges to production (lack or storage, labor issues, water rights, etc): Lack of controlled environment storage, labor is challenge and expensive, Best Management Practices are now being regulated in the Suwannee Valley area (and other areas of Florida) for nitrogen and phosphorus. Irrigation water permits are also getting tougher. Fluctuating prices and profitable price margins for the Florida market window are of constant concern. Rigorous food safety requirements in field and packinghouse. Potential issues with seed tuber supply due to guava root-knot nematode issues in NC (and concern for introduction of this pest)

Other comments: **Small commercial acreage in Florida makes it difficult to receive special pesticide labels (see broadleaf herbicides and insecticides for wireworms).** Lack of any effective labeled wireworm insecticide is a major problem. Pending loss of Lorsban will make this even more difficult.

State Report – Louisiana

Myrl Sistrunk, Extension Associate
Tara Smith, Specialist and Research Coordinator
LSU AgCenter Sweet Potato Research Station

Planted acreage: 2020-6,772
2021-7,077

Harvested acreage in 2021: 7,077

Percent of crop marketed for fresh and processing: Fresh Market-45%
Processing-55%

Anticipated acreage for 2022: 7,000

Varieties grown and estimated percent of acreage:

Beauregard	38%
Orleans	55%
Bayou Belle	6%
Other	1%

Percent of acreage irrigated: 73%

Major pest problems (weeds, insects, diseases):
Weeds-Alligator Weed, Smell Melon, Nutsedges, and Pigweed.
Insects-Cucumber Beetles
Guava Root Knot Nematodes-Prevent Introduction

Abiotic disorders (herbicide, nutrient, weather-related): During the spring seed bed and transplanting most locations experienced wetter than normal conditions. This continued throughout the season up to harvest. These rain events were excessive at times and contributed to poor growth and development in plant beds and delays in field preparation work for planting. Weed control was an issue due to rain events and unable to apply timely herbicide applications. However, most of the crop was able to be planted in our typical planting window with growers experiencing good plant establishment.

Other major challenges to production (lack or storage, labor issues, water rights, etc): Available land for crop rotation, sourcing adequate labor, weather events, and decline in number of producers and acreage.

Other comments:
Even with the challenges producers faced they remain very optimistic

State Report – Mississippi

Lorin Harvey, Extension Sweetpotato Specialist
Mississippi State University

Planted acreage in 2020 and 2021: 27,750 (2020) 29,500 (2021);

Harvested acreage in 2021: 28,500

Percent of crop marketed for fresh and processing: 85% fresh / 15% processing

Anticipated acreage for 2022: 29,500

Varieties grown and estimated percent of acreage:
Beauregard: 75%
Orleans: 15%
Other: 10%

Percent of acreage irrigated: less 5%

Major pest problems (weeds, insects, diseases): Yellow and purple nutsedge, army worms and deer.

Abiotic disorders (herbicide, nutrient, weather-related): Above average rainfall and flooding conditions were experienced shortly after planting and lasted through August. Wet conditions near harvest created delays and resulted in some crop loss and quality issues.

Other major challenges to production (lack or storage, labor issues, water rights, etc): Labor shortages, cost of labor, and supply chain issues continue to hinder production across the state.

Other comments: Late planted fields missed the early season flooding events and experienced above average yields. Mississippi continues to promote clean plant material and has completed their 3-year transition plan to increase clean plant production by growers.

STATE REPORT- North Carolina - 2021

Jonathan R. Schultheis, Professor
North Carolina State University

Planted acreage in 2017, 2018, 2019 and 2020: 90,000 (2017); 82,000 (2018); 98,000 (2019); 106,000 (2020); 2021 comparable to 2020

Harvested acreage in 2017, 2018, 2019 and 2020: 89,500 (2017); 78,500 (2018); 97,700 (2019); 105,300 (2020)

Percent of crop marketed for fresh and processing: 70/30

Anticipated acreage for 2022: ?, difficult to determine, but likely comparable levels or somewhat less than 2021.

Varieties grown and estimated percent of acreage:

Covington: 91%
Beauregard: 2-3%
Bayou Belle: 2%
Muraski-29: 4-5%
Others: ~1% (Bonita, Evangeline, Purple Majesty, Purple Splendor) Very limited acreage for direct, fresh-market or specialty market sales

Percent of acreage irrigated: ~5%

Major pest problems:
Weeds: Palmer amaranth, Yellow nutsedge
Insects: Wireworm
Disease: *Meloidogyne enterlobii* (Guava root-knot nematode)

Abiotic disorders: Darkening of skin on some roots.

Other major challenges to production: Increased labor cost; Increase fertilizer costs of 400 to 600%. Increased labor costs of $1.01 over last year.

Other comments: The 2021 grower season was very wet through July, growing conditions then turned relatively hot and dry in August into September, with dry and warm conditions into October. A couple of timely rains coupled with a longer growing season before frost occurred allowed enough time for storage roots to size resulting in relatively good yields.

Yields generally averaged – 375 bu/acre No. 1, 460 bu/acre marketable roots (No. 1, canner, jumbo). Supply of sweetpotatoes in 2021 is comparable to that in 2020.

Meloidogyne enterlobii root-knot nematode continues to be of concern in North Carolina.

State Report – Puerto Rico

Martha C. Giraldo, Associate professor
University of Puerto Rico

Planted acreage in 2020 and 2021: The last census year for sweet potato from USDA from PR was 2015. We don't have recent data. From the farmers what we know from 2020 -2021 the planted acreage approximately was 50.

Harvested acreage in 2021: 50

Percent of crop marketed for fresh and processing: 70%

Anticipated acreage for 2022: 50

Varieties grown and estimated percent of acreage: Canol 80%, Canolia 10%, and Camuy 10%.

Percent of acreage irrigated:80%

Major pest problems (weeds, insects, diseases): *Cylas formicarius* var. *elegantulus*, *Bedellia somnulentella* (Zeller).

Abiotic disorders (herbicide, nutrient, weather-related): Herbicide damage similar to viral disease.

Other major challenges to production (lack of storage, labor issues, water rights, etc): Lack of storage, seed selection, and decontamination.

Other comments: The major limitation is the production of a marketed crop, since the damage of sweet potato weevil.

TABLE 1. SUMMARY YIELD DATA OF U.S. NO.1 'S OF ENTRIES IN THE 2021 SWEETPOTATO COLLABORATOR TRIALS (50 LBS. BU/A)

CULTIVAR	CLEMSON EREC SC	LIVINGSTON CA	WYNNE AR	MEAN	RANK	MEAN RANK
LA13-81	589	237	528	451	3	3.0
LA14-31	321	.	.	321	8	6.0
NC09-122	507	335	.	421	6	2.5
NC11-0234	458	.	.	458	2	5.0
Covington	482	329	.	406	7	3.5
Orleans	251	.	676	464	1	4.5
Beau. B14	260	472	596	443	4	3.3
Bellevue	578	280	.	429	5	3.0

TABLE 2. SUMMARY YIELD DATA OF CANNING ROOTS OF ENTRIES IN THE 2021 SWEETPOTATO COLLABORATOR TRIALS (50 LBS. BU/A)

CULTIVAR	CLEMSON EREC SC	LIVINGSTON CA	WYNNE AR	MEAN	RANK	MEAN RANK
LA13-81	159	68	319	182	1	1.7
LA14-31	133	.	.	133	4	5.0
NC09-122	137	37	.	87	7	4.5
NC11-0234	73	.	.	73	8	8.0
Covington	173	42	.	108	6	2.5
Orleans	108	.	147	128	5	4.5
Beau. B14	79	41	280	133	3	4.3
Bellevue	206	62	.	134	2	1.5

TABLE 3. SUMMARY YIELD DATA OF JUMBO ROOTS OF ENTRIES IN THE 2021 SWEETPOTATO COLLABORATOR TRIALS (50 LBS. BU/A)

CULTIVAR	CLEMSON EREC SC	LIVINGSTON CA	WYNNE AR	MEAN	RANK	MEAN RANK
LA13-81	280	39	362	227	5	3.3
LA14-31	110	.	.	110	8	7.0
NC09-122	236	303	.	270	2	2.5
NC11-0234	222	.	.	222	6	4.0
Covington	212	130	.	171	7	4.5
Orleans	94	.	413	254	4	4.5
Beau. B14	156	319	389	288	1	3.0
Bellevue	365	167	.	266	3	2.0

TABLE 4. SUMMARY YIELD DATA OF TOTAL MARKETABLE ROOTS OF ENTRIES IN THE 2021 SWEETPOTATO COLLABORATOR TRIALS (50 LBS. BU/A)

CULTIVAR	CLEMSON EREC SC	LIVINGSTON CA	WYNNE AR	MEAN	RANK	MEAN RANK
LA13-81	1028	344	1208	860	2	3.3
LA14-31	564	.	.	564	8	6.0
NC09-122	880	675	.	778	5	2.5
NC11-0234	752	.	.	752	6	5.0
Covington	867	501	.	684	7	4.0
Orleans	454	.	1236	845	3	5.0
Beau. B14	495	832	1267	865	1	3.0
Bellevue	1149	509	.	829	4	2.0

TABLE 5. SUMMARY YIELD DATA OF PERCENTAGE NO.1 ROOTS OF ENTRIES IN THE 2021 SWEETPOTATO COLLABORATOR TRIALS (%)

CULTIVAR	CLEMSON EREC SC	LIVINGSTON CA	WYNNE AR	MEAN	RANK	MEAN RANK
LA13-81	57.60	68.30	44	56.63	4	2.2
LA14-31	56.70	.	.	56.70	3	4.0
NC09-122	57.60	52.10	.	54.85	6	3.8
NC11-0234	61.40	.	.	61.40	2	1.0
Covington	55.80	68	.	61.90	1	3.5
Orleans	55.50	.	55	55.25	5	3.5
Beau. B14	52.70	57.70	47	52.47	8	4.0
Bellevue	50.60	55.80	.	53.20	7	6.0

TABLE 6. SUMMARY YIELD DATA OF ENTRIES IN THE 2021 SWEETPOTATO COLLABORATOR TRIALS (50 LBS. BU/A)

CULTIVAR	US #1	MEAN RANK	CANNERS	MEAN RANK	JUMBOS	MEAN RANK	TMY 2021	MEAN RANK	TMY 2019	MEAN RANK	TMY 2018	MEAN RANK	TMY 2017	MEAN RANK	WILT	ROOTKNOT	SOIL ROT	DROP	RETAIN
LA13-81	451	3.0	182	1.7	227	3.3	860	3.3	481	3.8	288	8.4	633	6.7	R	S	R		
LA14-31	321	6.0	133	5.0	110	7.0	564	6.0	396	5.5	424	7.0	.	.	.	S	.		
NC09-122	421	2.5	87	4.5	270	2.5	778	2.5	396	4.3	390	6.3	507	6.2	R	R	R		
NC11-0234	458	5.0	73	8.0	222	4.0	752	5.0	517	3.3	.	.	.	.	.	.	.		
Covington	406	3.5	108	2.5	171	4.5	684	4.0	566	3.4	473	4.6	574	4.6	R	R	MR		
Orleans	464	4.5	128	4.5	254	4.5	845	5.0	517	3.8	524	4.5	730	2.9	R	S	MR		
Beau. B14	443	3.3	133	4.3	288	3.0	865	3.0	529	4.0	540	4.1	636	3.9	R	S	MR		
Bellevue	429	3.0	134	1.5	266	2.0	829	2.0	729	2.7	545	4.0	618	4.5	R	R	R		

TABLE 7. NATIONAL SWEETPOTATO COLLABORATORS ENTRY FORM
2022 Trial

ENTRIES	BREEDER	COMMENTS

DON R. LABONTE, LSU DEPT OF HORTICULTURE
137 J.C. MILLER HALL, BATON ROUGE, LA 70803
225-578-1024, FAX 225-578-1068, DLabonte@agctr.lsu.edu

PHILLIP WADL, USDA/ARS, US VEGETABLE LAB
2700 SAVANNAH HWY, CHARLESTON, SC 29414
843-402-5308, FAX 843-573-4715, Phillip.Wadl@ARS.USDA.GOV

G. CRAIG YENCHO, NCSU DEPT OF HORTICULTURE
214A KILGORE HALL, RALEIGH, NC 27695
919-513-7417, FAX 919-515-2505, Craig_Yencho@ncsu.edu

For NCSU entries please contact:
KEN PECOTA, NCSU DEPT OF HORTICULTURE
212 KILGORE HALL, RALEIGH, NC 27695
919-218-1537, FAX 919-515-2505, Ken_Pecota@ncsu.edu

NATIONAL SWEET POTATO COLLABORATORS SUMMARY OF DATA

2021

BUSHELS PER ACRE (50 lbs.)

STATE AND LOCATION REPORTING: Arkansas, Pine Bluff Agricultural Farm.

DATE TRANSPLANTED: 6/30/2021 DATE HARVESTED: 10/14/2021 NO. GROWING DAYS: 106.

DISTANCE BETWEEN ROWS (in.): 36" DISTANCE IN ROW(in.): 12"

PLOT SIZE: NO. OF ROWS: 2 LENGTH (ft.): 20 NO.REPLICATIONS: 4

IRRIGATION (AMOUNTS AND DATES): Furrow irrigation at planting and as needed during the season

FERTILIZER: N 40 lbs., P_20_5 140 lbs., K_20 180 lbs. (PER ACRE)

SELECTION	US #1'S	CANNERS	JUMBOS	TOTAL MARKETABLE	PERCENT US #1'S	CULLS
Beauregard (G-1)	128.75a	46.50a	21.00a	194.50a	64.50a	10.00a
Beauregard (G-3)	45.75a	44.75a	1.00a	93.25a	49.00a	6.25a
LSD P=0.05	107.49	17.78	54.52	150.70	18.03	6.41
CV	54.75	17.32	220.26	46.54	14.12	35.08

US #1's - Roots 2" to 3 1/2" diameter, length of 3" to 9", must be well shaped and free of defects.
Canners - Roots 1" to 2" diameter, 2" to 7" in length.
Jumbos - Roots that exceed the diameter, length and weight requirements of the above two grades, but are of marketable quality.
Percent US #1's - Calculated by dividing the weight of US #1's by the total marketable weight (Culls not included).
Culls - Roots must be 1" or larger in diameter and so misshapen or unattractive that they could not fit as marketable roots in any of the above three grades.

A low area in the field which gathered water affected the yield of Replicate #2. As a result, G-1 and G-3 yield for this rep were almost identical.

NATIONAL SWEETPOTATO COLLABORATORS SUMMARY OF DATA

2021

STATE AND LOCATION REPORTING: Livingston, CA

DATE TRANSPLANTED: 5/24/2021. DATE HARVESTED: 10/13/2021. No. GROWING DAYS: 142

DISTANCE BETEEN ROWS (in): 40. DISTANCE IN ROW (in): 10

PLOT SIZE: NO. OF ROWS: 1 LENGTH (ft): 60 NO. OF REPS: 4

IRRIGATION: drip irrigation. 1.5 to 2 inches per week during summer, total 30".

FERTILIZER: PPI 60 gpa 8-8-8 followed by drip applied 10-0-10. About 175-50-175 N-P2O5-K2O.

			-------	50	lb Bu/A	-------		%	%
#	**SELECTION**	**CLASS**	**US #1's**	**CANNERS**	**JUMBOS**	**MKT YIELD**	**BINS/A**	**US #1's**	**CULLS**
20	L-13-81 G2	red	589	159	280	1028	64.2	57.6%	4.9%
21	Bellevue G2	yam	578	206	365	1149	71.8	50.6%	5.0%
13	NC-13-151	red	576	128	97	801	50.1	72.0%	12.0%
3	NC-09-122	red	507	137	236	880	55.0	57.6%	17.5%
5	Cov.	yam	482	173	212	867	54.2	55.8%	7.8%
14	NC09-119	yam	470	101	305	877	54.8	53.7%	13.6%
11	L-16-173 G2	yam	465	144	188	796	49.8	58.4%	7.9%
4	NC11-0234	red	458	73	222	752	47.0	61.4%	16.5%
10	Diane	red	396	153	200	749	46.8	52.7%	16.3%
18	L-17-171	red	364	162	135	661	41.3	55.3%	17.3%
17	L-14-11	red	341	205	22	568	35.5	60.1%	11.2%
9	Bonita	sweet	325	138	35	499	31.2	65.1%	12.9%
2	L-14-31	red	321	133	110	564	35.3	56.7%	6.8%
16	NC15-0185	yam	313	195	63	571	35.7	54.4%	19.1%
19	Beauregard G2	yam	260	79	156	495	30.9	52.7%	21.9%
6	Orleans	yam	251	108	94	454	28.3	55.5%	23.1%
12	NC-13-604	sweet	134	33	39	206	12.9	65.2%	7.6%
15	NC10-0118 *	yam	506	98	220	823	51.5	63.3%	12.3%
	Average		402	137	162	701	44	57.9%	13.0%
	LSD 0.05		89.6	45.9	82.6	155.2	7.8	5.9%	7.2%
	CV, %		15.7	23.6	35.8	15.5	15.5	9.0	48.3

US #1's	Roots 2 to 3.5 inches in diameter, length 3 to 9 inches, well shaped and free of defects.
Mediums	Roots 1 to 2 in diameter, 2 to 7 inches in length.
Jumbos	Roots that exceed the size requirements of above grades, but are marketable quality.
Mkt Yield	Total marketable yield is the sum of the above three categories.
bins/A	bins/A are estimated based on market box yield assuming 20 boxes (17.6 Bu) per bin.
% US #1's	Weight of US #1's divided by total marketable yield.
% Culls	Roots greater than 1" in diameter that are so misshapen or unattractive as to be unmarketable.
LSD 0.05	Least significant difference. Means separated by less than this amount are not significantly different (ns).
L:D	Length to diameter ratio (10 root sample)
CV, %	Coefficient of variation, a measure of variability in the experiment.
NC10-0118 *	not included in statistical analysis

SCORE SHEET FOR EVALUATION OF SWEETPOTATO SPROUT PRODUCTION - NSPCG TRIAL

Date bedded:	2/23/21	Location:	Bear Creek Ranch, south of Hwy 140
Date Evaluated:	4/14/21	Type of bed:	cold bed (no gin trash)
Evaluated by:	S. Stoddard		Botran & Devrinol at bedding

	Selection	Roots presprouted yes/no	Plant Production 1-5 (1)	Uniformity of Emergence 1-5 (2)	Earliness 1-3 (3)	Root Conditions 1-5 (4)	
1	L-13-81 G5	yes	4	3	2	5	dark green
2	L-14-31	yes	2	2	1		dark green, slow
3	NC-09-122	yes	3	2	2		lg lvs, vining
4	NC11-0234	yes	3	4	2		dark green uniform
5	Cov.	yes	3	3	2		
6	Orleans G5	yes	2	2	1		late, slow, variable
7	Beauregard G5	yes	2	2	1		late, slow, variable
8	Bellevue	yes	1	1	1		dk purple, poor emergence
9	Bonita	yes	3	4	1		slow but uniform
10	Diane	yes	5	5	3		good
11	L-16-173	yes	---	---	---	5	different bed
12	NC-13-604	yes	5	5	3		all green
13	NC-13-151	yes	4	4	3		dark green
14	NC09-119	yes	3	4	1		dk green/purple, slow
15	NC10-0118	yes	2	1	2		green and variable emergence
16	NC15-0185	yes	4	3	2		dark green
17	L-14-11	yes	4	4	2		dark green/purple
18	L-17-171	yes	4	4	3		all green

(1) Plant production rated from 1 – 5 based on observation during pulling season. A rating of 1 indicates low plant production, while 5 indicates good plant production.

(2) Uniformity of emergence rated from 1 - 5. One (1) indicates poor uniformity while 5 indicates the highest degree of uniformity of emergence

(3) Earliness of plant production is rated form 1 – 3. One (1) indicated late emergence while 3 indicates early production.

(4) Root conditions six weeks after first pulling, rated 1 – 5. One (1) indicates complete rotting, while 5 indicates perfectly sound conditions. Not applicable this year

(5) Notes on size of root, decay in beds, etc.

2021 NATIONAL SWEETPOTATO COLLABORATOR TRIAL DESCRIPTORS

STATE AND LOCATION REPORTING: Scott Stoddard, UCCE Merced County, CA.

SOIL TYPE:__sand____________________

COMMENTS:

The first of two screening trials. This location was with Quail H Farms, south of Livingston, CA. Soil type was Hilmar loamy sand, slightly saline (pH 6.4, EC 1.87, Na 12.6% base sat). Conventional field, fumigated with metam-K prior to planting. Drip irrigated, water quality marginal. Dry winter with below average precipitation, windy spring and fall, summer temperatures above average + wildfire smoke. 1 -row plots, 75 plants long, 10" spacing. machine harvested and sorted by grower crew. Cracks, splits, RC and RKN damage in some.

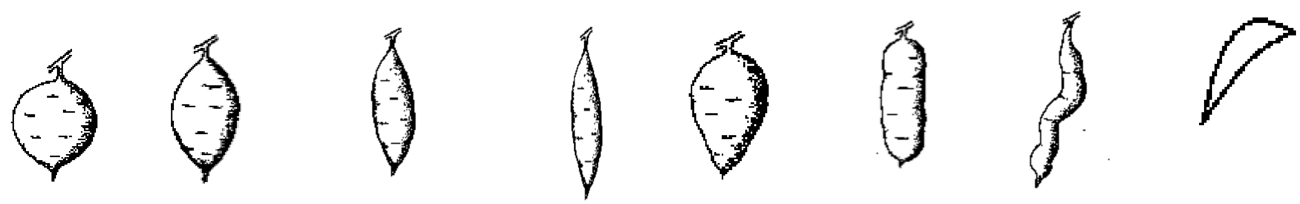
SELECTION	Skin color	Skin texture	Flesh color	Eyes	Lenticels	Shape	Shape uniformity	Season	L/D	Overall appearance	Comments
LA 13-81	purple	8	4	9	7	2, 3, 8	7	1		9	excellent
LA 14-31	dusty red	7	4	7	5	5,6	7	1		7	CV
NC05-198								1			--- Not in trial ---
NC09-122	dull purple	7	3	7	5	3,8	8	1		7	Good shape
NC11-0234	dull red	5	4	7	3	2, 3, 6	5	1		6	Skin color, lents
Covington	Rose Cu	7	3	5	5	3,6	7	1		7	Dull color
Orleans	Cu	3	3	5	5	2,6	5	1		4	grooves, bumps, rough skin
Beauregard	Rose Cu	5	3	7	7	3, 6, 8	5	1		6	lumpy, rough, CV, RKN
Bellevue	Orange	9	4	9	7	2, 8	5	1		7	chunky tear drops, some CV

Skin color	**Skin texture**	**Flesh Color**	**Eyes**	**Lenticels**	**Shape**	**Shape uniformity**	**Season**
white	1 = very rough	0 = white	1 = very deep	1 = very prominent	1 = round	1 = very poor	4 = early
cream	3 = moderately rough	1 = cream	3 = deep	3 = prominent	2 = round-elliptic	3 = poor	3 = mid to early
tan	5 = moderately smooth	2 = yellow	5 = moderate	5 = moderate	3 = elliptic	5 = moderate	2 = midseason
copper (Jewel)	7 = smooth	3 = orange	7 = shallow	7 = few	4 = long elliptic	7 = good	1 = mid to late
orange (Hern.)	9 = very smooth	4 = deep orange	9 = very shallow	9 = none	5 = ovoid	9 = excellent	0 = late
rose (Beau)					6 = blocky		
purple					7 = irregular		
					8 = asymmetric		

L/D	**Overall appearance**
length to diameter **ratio**	1 = very poor
	3 = poor
	5 = moderate
	7 = good
	9 = excellent

Shapes

1 2 3 4 5 6 7 8



NATIONAL SWEET POTATO COLLABORATORS SUMMARY OF DATA

2021

BUSHELS PER ACRE (50 lbs.)

STATE AND LOCATION REPORTING: Louisiana – plot in Wynne Arkansas .

DATE TRANSPLANTED: 5/31/21 DATE HARVESTED: 10/5/21 NO. GROWING DAYS:127 .

DISTANCE BETWEEN ROWS (in.): " 38 DISTANCE IN ROW(in.): " 12

PLOT SIZE: NO. OF ROWS: 8 LENGTH (ft.): 20/entry NO.REPLICATIONS: 3

IRRIGATION (AMOUNTS AND DATES): N/A .

FERTILIZER: N __, P_20_5 __, K_20 __ (PER ACRE)

SELECTION	US #1'S	CANNERS	JUMBOS	TOTAL MARKETABLE	PERCENT US #1'S	CULLS
LA 13-81	528b	319a	362a	1208a	44%	
Beauregard	596a	280ab	389a	1267ab	47%	
Orleans	676a	147bc	413a	1236a	55%	

US #1's - Roots 2" to 3 1/2" diameter, length of 3" to 9", must be well shaped and free of defects.
Canners - Roots 1" to 2" diameter, 2" to 7" in length.
Jumbos - Roots that exceed the diameter, length and weight requirements of the above two grades, but are of marketable quality.
Percent US #1's - Calculated by dividing the weight of US #1's by the total marketable weight (Culls not included).
Culls - Roots must be 1" or larger in diameter and so misshapen or unattractive that they could not fit as marketable roots in any of the above three grades.

NATIONAL SWEET POTATO COLLABORATORS SUMMARY OF DATA

2021

BUSHELS PER ACRE (50 lbs.)

STATE AND LOCATION REPORTING: Clemson U. - EREC.

DATE TRANSPLANTED: May 27 DATE HARVESTED: Sept 16 NO. GROWING DAYS: 113 .

DISTANCE BETWEEN ROWS (in.): 48” DISTANCE IN ROW(in.): 12”

PLOT SIZE: NO. OF ROWS: 1 LENGTH (ft.): 20 NO. REPLICATIONS: 4

IRRIGATION (AMOUNTS AND DATES): Daily drip – Total = 15.08” .

FERTILIZER: N 163 , $P_2 0_5$ 35 , $K_2 0$ 223 (PER ACRE)

Bushels Per Acre (50 lbs) - **2021**						
Selection	Ones	Canners	Jumbo	Market	% Ones	Cull
04-136	401	57	469	927	45.4	408
09-130	504	73	302	879	57.0	334
B94-14	446	56	320	822	54.1	291
Beauregard	472	41	319	832	57.7	133
Bellevue	280	62	167	509	55.8	325
Burgundy	233	24	142	399	59.9	292
Covington	329	42	130	501	68.0	475
LA 13-81	237	68	39	344	68.3	334
NC 04-531	351	37	143	531	66.7	146
NC 05-198	590	63	134	787	75.0	97
NC 09-122	335	37	303	675	52.1	404

US #1's - Roots 2" to 3 1/2" diameter, length of 3" to 9", must be well shaped and free of defects.
Canners - Roots 1" to 2" diameter, 2" to 7" in length.
Jumbos - Roots that exceed the diameter, length and weight requirements of the above two grades, but are of marketable quality.
Percent US #1's - Calculated by dividing the weight of US #1's by the total marketable weight (Culls not included).
Culls - Roots must be 1" or larger in diameter and so misshapen or unattractive that they could not fit as marketable roots in any of the above three grades.

NATIONAL SWEET POTATO COLLABORATORS SUMMARY OF DATA

2021

BUSHELS PER ACRE (50 lbs.)

STATE AND LOCATION REPORTING: Puerto Rico.

DATE TRANSPLANTED: November 2021 DATE HARVESTED: February to March 2022 NO. GROWING DAYS: 90-120 .

DISTANCE BETWEEN ROWS (in.): 3ft DISTANCE IN ROW(in.): 1 ft

PLOT SIZE: NO. OF ROWS: 5 LENGTH (ft.): 15 NO.REPLICATIONS: 5

IRRIGATION (AMOUNTS AND DATES): NA .

FERTILIZER: N 10 , P_20_5 5 , K_20 20 (PER ACRE)

SELECTION	US #1'S	CANNERS	JUMBOS	TOTAL MARKETABLE	PERCENT US #1'S	CULLS
CANOLIA						
CAMUY						
04-006						
04-180						

US #1's - Roots 2" to 3 1/2" diameter, length of 3" to 9", must be well shaped and free of defects.
Canners - Roots 1" to 2" diameter, 2" to 7" in length.
Jumbos - Roots that exceed the diameter, length and weight requirements of the above two grades, but are of marketable quality.
Percent US #1's - Calculated by dividing the weight of US #1's by the total marketable weight (Culls not included).
Culls - Roots must be 1" or larger in diameter and so misshapen or unattractive that they could not fit as marketable roots in any of the above three grades.

2020 Minutes of the National Sweetpotato Collaborators Meeting
January 24-25, 2020
Nashville, TN

Lina Quesada opened the meeting by thanking the organizers, moderators, and facilitators.

Lina Quesada – Chair
Michele McHargue – Chair-elect
Theresa Arnold – Secretary, Treasurer, and Editor
Mark Shankle – US Sweetpotato Council meeting Liaison
Mike Boyette – Previous-Chair
David Monks – SERA advisor

Moderators and facilitators:
Sylvia Clark
Madison Stahr
Jeff Standish
Hunter Collins
Camilo Parada
Tara Smith

She thanked the sponsors.

NC State Extension and NC State Agricultural Research Service
Lamb Weston
AgBiome
Valent
Marrone Bio Innovations
Corteva Agriscience
Bayer Crop Science
Syngenta
AMVAC
The Louisiana Sweet Potato Commission
Black Gold Farms
J. R. Simplot Company

And then went on to address the changes in meeting format. The number of oral talks were limited so that presentations could be 20 minutes instead of 15 on a first come basis, and after oral slots were full the remaining presentations overflowed to posters. Registration went up substantially in order to provide meals. Including meals in the room allowed for additional networking and helped to keep people from returning late for sessions following lunch. A keynote speaker was added at the beginning of the meeting, and industry updates were added at the end of the meeting. Lina continued by suggesting additional changes to future meetings including not having the meeting on weekends, having fewer presentations in order to have time for breakout groups and grant/project discussion. Arthur Villordon mentioned that the state reports were at the end of the meeting, and that maybe in the future they should be presented at the beginning of the meeting so that any problems or concerns could be discussed at the meeting. Craig Yencho agreed. Chris Clark mentioned that we could follow up state meetings with group discussions. Lina proposed creating a web manager position; the officer must be based at NC State because the website is through NC State. Lina also suggested an online Google group to manage membership, but it requires a Gmail account. Some were opposed to this idea as it would be "one more login and password to remember" and people are less inclined to check a special email account regularly. Smartphone apps with texting capability were also discussed as an option. It seemed people were more open to something that was linked to your phone or to your regular email account. Craig made a motion to let the Executive Committee decide the best option. Finances are currently housed with the LA Sweet Potato Association and at NC State. Moving forward she proposed that we need to have an account that can take credit card registration or donations and have the ability to pay out with a credit card for purchases and checks for awards. Lina proposed setting the registration cap at $250. Craig Yencho said he was an advocate for the onsite lunches. And that graduate students should have a reduced registration half of the actual cost. Tara Smith mentioned that in the future when we are with SAAS we will have that registration fee also. Muquarrab Qureshi Asked about NIFA grants from the USDA and Lina said that they required reports to be turned in. Mark Shankle made a motion to allow the organizing committee to set the registration as needed to include in room lunches and coffee. Michelle seconded the motion and it passed unanimously. Tara Smith made a motion to allow the executive committee to decide on the registration fee and let all members know in advance. Arthur Villordon seconded the motion and it passed unanimously.

Lina asked about location of next year's meeting whether it will be with the National Convention in AL or SAHS in Irving, TX. David Monks brough up that it does not have to be with either. It has previously been held at LSU. Craig Yencho said that we should go back to last year's minutes. In 2022 the national convention will be in California and SAHS will be in Mobile, AL. Don LaBonte said that he thought meeting with SAHS was valuable to the group. Katie Jennings disagreed with Don, and she thinks keeping the meeting with the National Convention is more beneficial. It was decided that we will be with SAHS in Irving, TX in 2021.

David Monks said that it is time to resubmit for SERA, and that moving to a Multistate group may help people get funding got meetings. Lina ask about the web manager position to manage the website. Michelle McHargue agreed that it was a valuable position. David Picha ask what the cost would be, and Lina replied it would be time only. Craig Yencho asked Lina if she would be willing to fill the position and she said yes. Craig made a motion to nominate Lina Quesada to the web manager position that will maintain the website and handle online registrations. Mark Shankle shared the nominations of the nomination committee:

Kate Jennings – Chair Elect

Theresa Arnold -- Secretary/treasurer

Arthur Villordon – Chair for the Graduate Student Contest

Jonathan Schultheis moved to close the floor to nominations and accept proposed candidates. Arthur Villordon seconded. No vote was taken.

Lina passed the gavel to Michelle, and all applauded.

Michelle McHargue, Chair of the Graduate Student Contest, stated that the scores were close, and she thanked the judges. Then she said that she would email out score sheets, and announced the winners: first place, Madison Stahr for her presentation “Identifying insect vectors of Ceratocystis fimbriata, causal agent of black rot, within North Carolina sweetpotato storage and packing systems”, second place Cole Smith for his presentation “Evaluation of reduced-tillage production system in sweetpotato”, and third place, Levi Moore for his presentation “Evaluation of high density polyethylene cloth row coverings to simulate palmer amaranth (Amaranthus palmeri) competition in sweetpotato”. She also presented Dr. David Monks the annual National Research Impact Award and he thanked the committee and members.

David Monks stated that the SERA renewal must be in by June, and can do a 1 year extension. He also said that we need to decide if we are going to move to a Multistate which will be more formal and have reporting to be documented. Muquarrab Qureshi went into more detail about how Multistate groups work. And Tara Smith made a motion to file for the 1-year extension for SERA to give the executive committee time to decide whether a Multistate would be a better option. Craig seconded the motion; and it passed unanimously.

Chris Clark presented the resolutions to the group. Theresa Arnold took entries for the variety trials. Louisiana will release 13-81 in 2020. 14-31 will stay in the trials and 16-173 will be added. Checks will be Bellevue and Orleans. North Carolina will release 09-122 for processing and keep 11-0234 in the trials. Checks will be Covington and Beauregard.

Lina closed the meeting and Tara Smith said, “Good job, Lina” and all applauded.

This report respectfully submitted by Theresa F. Arnold.

RESOLUTIONS

National Sweetpotato Collaborators Group
January 24-25, 2020
Nashville, TN

Whereas, for the first time the National Sweetpotato Collaborators Group (NSCG) was graced with a keynote speaker in the person of Dr. Robin Buell, who presented a fascinating and thought-provoking presentation on “Changing the paradigm for breeding improved potato varieties: the power of genomic approaches”; and

Whereas, Dr. David Monks was presented the fourth annual National Research Impact Award in honor of his numerous contributions to weed science and production practices that have benefitted the national industries for sweetpotato and other specialty crops; and

Whereas, the Student Competition, which included 13 presentations, was chaired by Michelle McHargue, and was greatly facilitated by the assistance of judges Christie Almeyda, Steve Myers, Jeff Standish, and Phil Wadl; and

Whereas, the 2020 winners of the NSCG Student Competition were first place, Madison Stahr for her presentation “Identifying insect vectors of *Ceratocystis fimbriata*, causal agent of black rot, within North Carolina sweetpotato storage and packing systems”, second place Cole Smith for his presentation “Evaluation of reduced-tillage production system in sweetpotato”, and third place, Levi Moore for his presentation “Evaluation of high density polyethylene cloth row coverings to simulate palmer amaranth (*Amaranthus palmeri*) competition in sweetpotato”; and

Whereas, the 2020 meeting of NSCG was supported by generous contributions from NC State Extension, NC State Agricultural Research Service, Lamb Weston, AgBiome, Valent, Marrone Bio Innovations, Corteva Agriscience, Vayer Crop Science, Syngenta, AMVAC, Louisiana Sweet Potato Commission, Black Gold Farms, J. R. Simplot Company, and with support from the Mississippi Sweet Potato Commission and Sylvia Clark and Mark Shankle; and

Whereas, the 2020 meeting of the National Sweetpotato Collaborators Group proceed smoothly and efficiently under the leadership of Lina Quesada and efforts of secretary-treasurer Theresa Arnold with able help from moderators Hunter Collins, Camilo Parada, Madison Stahr, and Jeff Standish; and

Whereas, Lina Quesada developed a website that greatly facilitated all aspects of preparation for the 2020 NSCG meeting and has agreed to manage the website for the next year; and

Whereas, Dr. David Monks, Administrative Advisor to NSCG provided thoughtful comments and advice for our group; and

Whereas, during 2019 we lost Dr. Charles Averre and Dr. William Mulkey, both long-time, highly esteemed members of the NSCG;

Now therefore be it resolved, that the NSCG and its members express our sincere gratitude for all of the above-mentioned contributions, which serve the greater good for the national sweetpotato community and international collaborators.

Respectfully prepared and submitted by Chris Clark, Tara Smith, Scott Stoddard, and Craig Yencho.

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