

Minutes of the 2021 Joint Regions Soil-Testing Workgroup Speaker Series

Prepared by: Shannon Alford, PhD; Director of Clemson University Agricultural Service Laboratory,
SERA6 Secretary 2020-2021, Host for 2021 Meeting

The joint regions meeting was held in 2021 after it was postponed in 2020 because of the COVID-19 pandemic. For 2021, there were 87 individual registrants for the meeting, with > 50 participants per session. The meeting was converted to a speaker series and was entirely virtual, utilizing the Zoom platform, and hosted by the Clemson University Agricultural Service Laboratory. Additionally, a [webpage](#) was developed to provide updated information to participants.

Participating regional groups were the following:

- NCERA-13 North Central Extension Research Activities: Soil Testing and Plant Analysis
- NECC-1312 Northeast Coordinating Committee for Soil Testing
- SERA-IEG-6 Southern Extension and Research Activities Information Exchange Group 6

Table 1. Schedule for the Joint Regions Soil-Testing Workgroup Speaker Series

2021 Joint Regions Soil-Testing Workgroup Speaker Series			
SERA-IEG-6 Southern Extension and Research Activities Information Exchange Group 6			
NECC-1812 Northeast Coordinating Committee for Soil Testing			
NCERA-13 North Central Extension Research Activities: Soil Testing and Plant Analysis			
<i>*All times in Eastern Daylight Time (EDT)*</i>			
Tuesday June 15			
Time	Speaker	Affiliation	Topic
10:00 AM	Shannon Alford	Clemson University, Host	Brief Introduction
10:00-10:15 AM	Steve Cole	Clemson University	Welcome and Update from SC
10:15-10:30 AM	Gobena Huluka	Auburn University, SERA-IEG-6 Rep	Opening Remarks
10:30-11:25 AM	Deanna Osmond & Nathan Slaton	NC State University University of Arkansas System Division of Agriculture	Keynote- National Soil Test P and K Database & Minimum Data Set
11:30 AM-12:10 PM	Antonio Mallarino	Iowa State University	Potassium in Soil
12:15-12:55 PM	Quirine Ketterings	Cornell University	Nutrient Management
1:00 PM	Shannon Alford	Clemson University	Closing Reminders
Tuesday June 22			
Time	Speaker	Affiliation	Topic
10:00- 10:05 AM	Bruce Hoskins	University of Maine, NECC-1812 Rep	Opening Remarks
10:05- 11:00 AM	Frank Sikora	University of Kentucky	Keynote- Hemp Testing and Proficiency Program
11:05- 11:45 AM	Andrew Margenot	University of Illinois	Soil Health
11:50 AM- 12:30 PM	Charlie White	The Pennsylvania State University	Nitrogen Recommendations
12:35 PM	Shannon Alford	Clemson University	Closing Reminders
Tuesday June 29			
Time	Speaker	Affiliation	Topic
10:00- 10:05 AM	Dave Franzen	North Dakota State University, NCERA-13 Rep	Opening Remarks
10:05- 11:00 AM	Newell Kitchen	USDA-ARS	Keynote- Nitrogen Calibration
11:05- 11:45 AM	Audrey Gamble	Auburn University	Soil Health
11:50 AM- 12:30 PM	Kristin Hicks	North Carolina Department of Agriculture	Hemp Testing
12:35 PM	Gobena Huluka	Auburn University, SERA-IEG-6 Rep	Closing Remarks

1st Session, June 15, 2021: 59 participants

- The southern region chair, Gobena Huluka (Auburn U), provided opening remarks and served as the moderator for the session.
- Deanna Osmond (NC State U) and Nathan Slaton (U of Arkansas) provided the keynote address covering a National Soil Test P and K Database and the minimum data set for the project.
- Antonio Mallarino (Iowa State U) presented his research findings regarding soil test potassium in moist and dry samples.
- Quirine Ketterings (Cornell U) presented her research findings regarding nitrogen nutrient management with respect to updating N recommendations for corn in New York.

2nd Session, June 22, 2021: 54 participants

- A representative from the northeastern region, Bruce Hoskins (U of Maine), provided opening remarks and served as the moderator for the session.
- Frank Sikora (U of Kentucky) provided the keynote address covering cannabis testing and a proficiency program.
- Andrew Margenot (U of Illinois) presented his research findings on two biological soil health indicators, labile carbon and enzyme activities.
- Charlie White (The Pennsylvania State U) presented his work on a new nitrogen recommendation system including a mineralization model and credits for cover crops.

3rd Session, June 29, 2021: 61 participants

- The north central region chair, Dave Franzen (North Dakota State U), provided opening remarks and served as the moderator for the session.
- Newell Kitchen (USDA-ARS Missouri) provided the keynote address covering calibration of nitrogen application based on the economic optimal nitrogen rate.
- Audrey Gamble (Auburn U) presented her research findings regarding soil health indicators for soil-testing labs.
- Kristin Hicks (North Carolina Dept of Ag) presented her research findings regarding recommended nutrient sufficiency ranges for cannabis based on plant tissue data.

There were ten vendors/organizations who sponsored the meeting and sent promotional items to participants. They were the following:

1. Agricultural Laboratory Proficiency Program
2. EA Consumables
3. FIALab Instruments, Inc.
4. Leco Corporation
5. North American Proficiency Testing Program
6. SEAL Analytical
7. Soil and Plant Analysis Council
8. Spectro Analytical
9. Texas Scientific Products
10. Timberline Instruments, Inc.

Minutes of the 2021 SERA-IEG-6 Regional Session

**Prepared by: Shannon Alford, PhD; Director of Clemson University Agricultural Service Laboratory,
Host for 2021 Meeting**

SERA-IEG-6 Administrators:

- Gobena Huluka, Chair
- Jim Wang, Vice Chair
- Shannon Alford, Secretary
- Tom Obreza, Advisor
- Nathan McKinney, Advisor

The southern region held a regional meeting in 2021 after it was postponed in 2020 because of the COVID-19 pandemic. For 2021, there were 31 participants for the session. The meeting was entirely virtual, utilizing the Zoom platform, and hosted by the Clemson University Agricultural Laboratory. The regional meeting was open to all session participants, but the agenda included southern region state reports and regionally specific topics and business.

Table 2. Schedule for the SERA-IEG-6 Regional Session

2021 SERA-IEG-6 REGIONAL SESSION			
SERA-IEG-6 Southern Extension and Research Activities Information Exchange Group 6			
All times in Eastern Daylight Time (EDT)			
Tuesday June 22			
Time	Speaker	Affiliation	Topic
1:30-3:30 PM	Gobena Huluka	Auburn University, SERA-IEG-6 Chair	Opening Remarks and Moderating
	Representative from each state	State agencies	State Reports
	John Spargo	The Pennsylvania State University	Reivew of Survey Results from FRST
	Nathan McKinney & Thomas Obreza	University of Arkansas & University of Florida, Research and Extension Advisors	Research and Extension Update

State reports were provided by the following participants and are attached from reports submitted or data collected using a Google form:

- WV- Eugenia Pena-Yewtukhiw (West Virginia U)
- VA- Steve Heckendorn (Virginia Tech)
- TX- Tony Provin (Texas A&M U)
- TN- Robert Florence (U of Tennessee)
- SC- Shannon Alford (Clemson U)
- PR- not represented
- OK- Hailin Zhang (Oklahoma State U)
- NC- David Hardy, Kristin Hicks (North Carolina Department of Ag)
- MS- Keri Jones (Mississippi State U)
- LA- Jim Wang (Louisiana State U)
- KY- Frank Sikora (U of Kentucky)
- GA- Reuben Beverly (U of Georgia)
- FL- Jamin Bergeron (U of Florida)
- AR- Nathan Slaton (U of Arkansas)
- AL- Jessica Davis (Auburn U)

OTHER BUSINESS

- Robert Florence (U of Tenn) was elected as incoming Secretary for SERA-IEG6, as the transition of officers will happen sooner than normal since Gobena Huluka will not continue as president during his upcoming international stint.
- Bob Miller (ALP) addressed the group regarding updates for the ALP program.
- Kristin Hicks (NCDA) commented on the need to update the document for plant issue sufficiency levels because it is 15 years old.
- John Spargo (Penn State U) reviewed the soil test survey data collected for the FRST group.
- Nathan McKinney (U of Arkansas, SERA6 advisor) made some suggestions to the group including the following: create committees to accomplish tasks, document action items, track activities, update the website (fix broken links), and include faculty in relevant work.
- Tom Obreza (U of Florida, SERA6 advisor) made some comments to the group regarding university budgets and specifically impacts of the president's federal budget on agriculture.

STATE REPORTS

VIRGINIA

State Report for the Virginia Tech Soil Testing Laboratory – June 2021

- 1) Soil sample numbers took a COVID hit last year with the lab testing only 48,000 samples compared to 57,000 samples during the prior calendar year. That's despite lab employees being designated as essential workers and the lab never being closed except for a couple days. Sample numbers rebounded the first half of this year.
- 2) COVID did not really affect the lab fiscally, both in revenue or on the expenditure side.
- 3) In April of 2020, we were able to replace a full-time salaried lab position just before a hiring freeze took effect.
- 4) Plan to replace one of our two ICP instruments within the next 12 months.
- 5) Come July in Virginia, it will be legal to possess 1 ounce of marijuana and grow up to 4 cannabis plants. Extension will not be providing any programming around the production of marijuana since it is still a federally controlled substance and that VCE receives federal funds.

2020 Annual Progress Report

Hailin Zhang, Director Kendal
Henderson, Manager
Soil, Water and Forage Analytical Laboratory Oklahoma
State University

1. We analyzed 55,292 various samples in 2020, which was slightly lower than the average of the past 5 years. This was a result of tremendous effort of our lab personnel and state extension staff providing the critical service under the COVID-19 pandemic. Schedules and routine protocols had to be modified to comply with new safety guidelines. County extension offices created new procedures to accept samples from lab users (see examples below).



2. Most of our samples are shipped from county extension offices. Our lab started to pay for shipping using UPS state contract price, which saves money for the extension system and reduces shipping time. It has been working well for us.
3. We developed a method to screen for metals in moist samples using a portable x-ray fluorescence spectrometer. More information can be found at:

Zhang, H., Antonangelo, J., & Penn, C. (2021). Development of a rapid field-testing method for metals in horizontal directional drilling residuals with XRF sensor. Scientific Reports 11, 3901. <https://doi.org/10.1038/s41598-021-83584-4>

NORTH CAROLINA (SOIL TESTING LAB)

NCDA&CS Soil Testing Lab 2021 SERA6 State Report

The Soil Testing Section analyzed 291,292 in FY 2020 (July 1, 2019 – June 30, 2020) and presently our totals for FY 2021 are 278,887. Reports issued with fertilizer/lime recommendations totaled 32,855 for FY2020.

The lab implemented COVID-19 action plan to protect lab workers and also the public as it carried out its services. The building was locked down from public entrance and social distancing was enforced throughout the building and on the loading dock. A newly-constructed kiosk provided a physical protective barrier for customer interactions on the dock. Plastic barriers were placed in the lab to protect workers in soil receiving and also soil take-up. Floors were marked to help staff social distance. During FY 2021, an 80-set capacity (2880 samples) was the daily goal of the lab. Workers were assigned their own scoops and surfaces were wiped daily. Staff was quarantined if there was uncertainty of their health using CDC guidelines. We received assistance from the NC State Fairgrounds due to their employees being furloughed; they worked in soil receiving.

No new analytical equipment has been purchased. The lab is buying additional soil trays used for soil drying and bottle assemblies for extraction of Mehlich 3.

A portion of the peak—season funds that the lab generates for the period (approx. Dec. 1 – March 31) is now being used to fund a fee-based position in soil receiving.

We plan to investigate equilibration times for CaCl₂ pH. Currently we wait one hour before reading pH. We can find no record of why the time is 1 hour and there appears to be no good rationale.

Recommendations were established in our LIMS system for truffles (based on UGA recs) and also commercial sod production- zoysia, hybrid Bermuda, centipede, fescue, St. Augustine grass. Sod production recommendations involved input from NC State turfgrass specialists.

As his MS research project at NC State, Joseph Wilson, a chemist in our soil testing lab, has completed a 6-month lime incubation study using 11 soils from across the state. Lime rate field studies are also being conducted at four locations. The purpose of the studies is to re-evaluate our lime recommendations since methods (salt pH method in 2017 and Mehlich buffer- CaCl₂) have changed.

Luke Gatiboni, Asst. Professor in Crop and Soil Sciences at NC State and I are beginning P greenhouse and field rate studies to evaluate our recommendations.

I had planned to retire this year but have postponed my plans, likely for 2 to 3 years. In addition to overseeing our soil testing lab, I have accepted the role as Asst. Director of Agronomic Services with responsibilities over the Field Services management and our IT.

Respectfully submitted,

David H. Hardy,
Chief of Soil Testing
Assistant Director Agronomic Services- NC Dept. of Agriculture and Consumer Services

MISSISSIPPI

Keri Jones- Mississippi State University

Mississippi State Soil Testing Lab analyzed 16,851 soil samples for fiscal year 20-21 (up from 14,921 in 19-20). There 1,566 plant tissue samples analyzed in 20-21 (up from 1,030 in 19-20). Our sample prices remain \$8 for standard soil test (an additional \$2 is charged for Carbon/Nitrogen analysis). Plant tissue samples remain \$15 per sample.

LOUISIANA

**Louisiana State University
Soil Testing and Plant Analysis Laboratory
Report to SERA IEG-6**

2021

The LSU AgCenter Soil Testing and Plant Analysis Laboratory analyzed 17,722 routine soils samples in 2020. In addition, the lab analyzed 8,762 plant samples and 10, 484 optional soil tests. This reflects a decrease in routine soil samples by 12.1% and plant sample by 12.5%%. However, there was slight increase in optional test samples. The decrease was likely due to pandemic as the lab was shut down for three weeks.

Lab in the process to work with soil fertility researchers and commodity specialists to update fertilizer recommendation sheets, especially on fruits and vegetables.

Lab will work with several faculty members to conduct research on evaluation of locally available sugarcane bagasse biochar for potential recommendation as facilitated by NRCS.

GEORGIA

University of Georgia
Agricultural and Environmental Services Laboratory
Annual Summary 2021

AESL weathered the COVID-19 pandemic relatively unscathed. We utilized teleworking and staggered on-site work to limit exposure and transmission. We had a few relatively mild cases among staff, but thankfully no serious cases. With our mission to support both agriculture and public health, we were considered an essential service and we continued operations throughout the year, albeit with slightly reduced services for a short period of time.

Sample Volumes

Sample volumes by broad categories for FY2021 (year to date) compared to FY2020 and the average of the three previous years show that soil samples rebounded from the drop in 2020, reversing a three-year trend of declining soil samples. By the end of June, the soil sample volume will likely meet or exceed the FY2017-19 average of 63,504 samples. Similarly, water and microbiology samples continued a three-year trend in increasing samples. In contrast, the number of plant samples and feed and forage samples received declined, possibly due to suspension of research activities at UGA. Overall, we will likely exceed 90,000 total samples analyzed by the end of FY2021.

Fiscal Year	2017-19 Avg	2020	2021
Soils	63504	55432	62184
Plants	4526	6558	3424
Feed and Forages	7545	7216	4857
Water and Micro	11384	12989	13032
Other	3651	3286	4212
Total	90611	85481	87709

Personnel Changes

Partially related to COVID-19 and cost-cutting retirement incentives, AESL is experiencing a generational change in staffing. We have lost, or will soon lose, 177 years of technical, management and IT experience in 6 positions. We have been able to refill or rehire some of this lost staffing, but it is a challenging situation.

Instrument Acquisitions

New instruments acquired this year include an automated alkalinity and conductivity titrimeter for water analysis and an automated BOD analyzer for waste water analysis. We also purchased an automated microwave digestion system to replace an older system. We are considering purchasing a new instrument for TOC analysis in waters, as well as an automated weighing system to expedite soil organic matter analysis, and an XRF instrument for plant tissue analysis.

Research and Demonstration Projects

AESL faculty and staff have obtained external funding to support numerous research and demonstration projects which will generate over \$100,000 this year. Most of these are cooperative with other UGA research and Extension faculty and will generate numerous samples for our lab. Projects include the following: radon testing in water; hemp cannabinoid analysis; Vidalia onion quality and sulfur nutrition; citrus nutritional survey; fescue endophyte survey; and variable rate lime application in pastures.

New Initiatives

In addition, AESL is exploring potential new or expanded testing services. We are conducting a pilot project to explore soil test mapping as a value-added service, as well as offering training to UGA Extension staff. We are considering greatly expanding soil organic matter testing, and we are exploring the potential for a new soil health test. Finally, we

have the luxury of having an in-house custom-developed laboratory database and accounting system. But, with a change in responsibilities for our IT manager, we are faced with adapting to a new IT management paradigm. We will be updating our existing data management system to current languages and standards, hopefully with no interruption in services.

ALABAMA

Auburn University Soil, Forage and Water Testing Laboratory (AUSFWTL)

2021 State Report

The past year has been one of profound change for the Auburn University Soil, Forage and Water Testing Laboratory, in terms of organization and administration, staffing, and instrumentation and programming, again. In 2020, the pandemic slowed some of the work we normally do, as we were forced to run on minimal staffing. As a Service Center, the laboratory is expected to generate sufficient revenues to cover its operating expenses. Due to continuing revenue shortfalls, the management has been trying to find ways to reduce costs and increase revenues. We are in the process of increasing services and increasing prices for all current services. We are interested in adding hemp crop codes and hemp specific analysis to the lab; another option we are looking at is equine specific feed and forage testing packages. We have implemented a partnership with Soilkit for our routine analysis and will be using Auburn branded Soilkits; this partnership will increase the lab's profile and include easier to understand recommendations for homeowners and casual gardeners.

Dr. Jessica Davis began Oct. 1, 2020, as the manager of the Soil, Forage and Water Testing Laboratory, the lab is also hiring a new lab technician and the building is hiring an administrative assistant to assist the lab with sample intake and answering phone calls.

As reported last year, the Auburn University Soil, Forage and Water Testing Laboratory has been in a state of transition. In fiscal year 2020 the lab analyzed the following sample numbers:

Routine soil tests	19,369
Special soil tests	1,429
Plant tissues	386
Feed and forages	1701
Water	343
Chicken litter	59
Manure and compost	17
<u>Lime</u>	<u>14</u>
Total	23,318

TEXAS, NORTH CAROLINA (PLANT, WASTE, SOLUTIONS), TENNESSEE, SOUTH CAROLINA, KENTUCKY, FLORIDA, ARKANSAS, WEST VIRGINIA

Table 3. State reports for TX, NC, TN, SC, KY, FL, AR, and WV

State	Name	Organization	Sample Numbers	Personnel (changes, total numbers, etc.)
TX	Tony Provin	Texas A&M AgriLife Extension	42,751	no changes
NC	Kristin Hicks	NCDA&CS	14,129 waste & compost samples, 15,991 plant tissue samples, 2668 water samples, 396 soilless media samples. Total samples: 33,184. Slightly down from FY2019 due to Covid-19.	
TN	Robert Florence	UTIA - Soil, Plant, and Pest Center	The University of Tennessee Soil, Plant, & Pest Center currently offers soil, plant disease, insect ID, plant tissue nutrients, and forage quality analysis. Soil analysis is split about even between farmers and homeowners. In calendar year 2020 we analyzed about 12,852 soil samples, 50 greenhouse media, 223 bio-ponds, 750 plant disease and insect ID's, 346 plant tissue, and 916 forage samples.	The lab is currently staffed by a director, two office administrators, one plant diagnostician, and one soil lab associate. Dr. Fafa Adotey is the Extension Soil Scientist, and is based out of Jackson, TN.
SC	Shannon Alford	Clemson University	For 2020 calendar year, numbers were down for most sample types by ~20% because of COVID-19 restrictions on Extension Offices throughout the state. Soil: 37023 Plant Tissue: 324 Feed/Forage: 430 Water: 470 Animal Waste: 2516 Compost: 16 Research & Commercial: 4309 Total: 45088	During the pandemic, we were deemed essential employees, so we worked alternating schedules on-site up to 30 hours/week per person. In November 2020, lab staff went back to full-time on site. We have a total of 9 full-time employees. We had one 30+ chemist retire in Dec 2020 and another will retire at the end of this month. We have been permitted to rehire both positions. We were not allowed to hire student workers during the pandemic in 2020, but we finally were able to bring on one student worker for Spring and Summer 2021.
KY	Frank Sikora	University of Kentucky	34,381 soil samples in both Lexington and Princeton labs	4 staff in Lexington Lab and 3 staff in Princeton Lab
FL	Jamin Bergeron	UF/IFAS Anserv Labs	Laboratory ARL (Analytical Research) Samples processed July 2020-June 2021=27080 Samples processed July 2019-June 2020=16044 ESTL (Extension Soil Testing) Samples processed July 2020-June 2021=14611 Samples processed July 2019-June 2020=12523 EWQL (Environmental Water Quality) Samples processed July 2020-June 2021=1669 Samples processed July 2019-June 2020=1506 LWTL (Livestock Waste Testing) Samples processed July 2020-June 2021=161 Samples processed July 2019-June 2020=224	10
AR	Nathan Slaton	Arkansas Agricultural Experiment Station	The number of client samples analyzed by the Marianna Soil Test Laboratory was 153,921 in 2019 and 177,712 in 2020, up from 109,057 client samples analyzed in 2018. The increase in samples analyzed compared to 2018 is directly related to drier (but not ideal) field conditions in October and November. Samples received during the mid- and late-winter months (January – March) fluctuate depending on whether field conditions allow sample collection. Grid samples account for 74 (2019) – 77 (2020) % of the submitted client samples. Total number of samples across all sample types submitted to the Fayetteville Agricultural Diagnostic Lab increased slightly in 2019 and 2020 compared to 2018 (Table 1).	no changes to personnel from prior years A soil fertility endowed chair faculty position was created in spring 2021.
WV	Eugenia Pena-Yewtukhiw	West Virginia University	7,461	

Table 3 (continued)

State	Equipment (recent purchases, comments about equipment, etc.)	Fees (changes to fees, comments about fees, etc.)
TX	no major purchases in 2020	no changes
NC	Two new Thermo FlashSmart N combustion analyzers; one custom-designed robot for liquid manure samples; 3 IKA plant grinders, 1 TE chemiluminescence analyzer	
TN	New controller box for LabFit pH robot. New furnace for CE Elantech flash total carbon and nitrogen analyzer. New Fisher fume hood to replace a make-up air Hamilton fume Hood. Tried different filter paper companies, currently trying Midland Scientific. For software we added forage reporting to our in-house lab management system (STRUT). We are looking to add a poultry litter calculator to the system for farmers applying poultry litter. For the plant pest lab, we are looking at getting PClinic for reporting and distance diagnostic samples.	No changes to fees, but we currently charge \$15 for a pH and nutrient test.
SC	In 2020, we began the process of updating soil prep equipment- refurbished soil-drying oven, new dust collection system, and 2 refurbished grinders. The installation is ongoing. Our ~13-year-old FIALab nitrate analyzer died in 2020, and we were able to purchase a new Timberline ammonia and nitrate analyzer. Remote installation was not great, but with much perseverance, we now have a chemist who is very experienced with the instrument and maintenance.	There have been no changes to fees; however, since the pandemic, we have noted as much as 20% increase in some consumables, so the discussion about better state funding or increased fees is ongoing.
KY	Purchased 3 Spectro Blue instruments in 2019 (one in Princeton, two in Lexington). Purchased Elementar Vario Max Cube in Lexington this year.	We still charge \$6 per soil sample for routine test (pH, buffer pH, P, K, Ca, Mg, Zn)
FL	Xylem FS3700	
AR	Aedium-sized Wisconsin Oven that holds 1500 samples was installed at Marianna in January 2020. The Fayetteville Lab added a Elementar varioMax Cube CN classic in 2019 and is scheduled to receive a J-KEM pH/EC robot in 2021.	no major changes. Routine Analysis is still free in Arkansas.
WV	Lab personnel FTE's: 1 (12 months) + Student Labor	Routine analysis is free for WV residents. Organic matter content estimated by Loss on Ignition (LOI) is an additional analysis performed by our lab at \$6 cost. Electrical conductivity (EC) analysis has been added in March as a lab product since 2019 at \$3/sample.

State	New Initiatives/Projects (new services or methods in development, new collaborations, research projects, etc.)	Other (anything else you want your colleagues to know)
TX	Added Hemp testing	
NC	Methods: 1) Added As, Cr, and Se to the heavy metals suite for waste samples and made the full suite (As, Cr, Se, Cd, Pb, Ni) available for plants and solutions (for research purposes only). 2) We are changing our N combustion method from dried to as-received and have been validating that change. Research projects: 1) Completed year 3 of the nitrogen management in malting barley. Shelved year 4 due to covid restrictions and field conditions. We will begin year 4 in Oct 2021 instead. 2) Worked on acquiring enough data to establish hemp sufficiency ranges	I worked extensively on writing methods for the updated Recommended Methods for Manure Analysis guide. I authored the TKN, total N, total C, NO3-N, ICP, CCE and Lab sampling & handing chapters.
TN		
SC	Because of the need for contactless service, we set up a dropbox for customers to leave samples outside the lab. We also established credit cards payment as a payment option with a QR code for paying at the door. Our online soil-testing kits sales have skyrocketed (by 3-4x), which we think is completely attributable to the pandemic and increase in online shopping. We set up a soil-testing program using our online soil-testing kits with the SC Forage and Grazing Lands Coalition to make members more aware of the benefits of soil-testing. We provided several virtual lab tours using Zoom and YouTube videos for university classes and new farmer classes. We continue to improve our internal and customer data entry by moving to web-based forms and networked databases.	
KY	Began plant tissue testing in Princeton Lab. Charge \$16 per sample.	
FL		
AR	The soil-testing program funded >\$300,00 in research for the 2021-2022 funding cycle.	The annual summaries of soil-test data and selected soil fertility and plant nutrition research are published in the Wayne Sabbe Arkansas Fertility Studies, which is available on-line https://aaes.uada.edu/communications/publications/ . Both labs have been enrolled with ALP since 2019. Other proficiency programs: Minnesota Manure Analysis and National Forage Testing (Fayetteville), and Minnesota Soil Certification (Marianna)
WV	No funded research projects related to the West Virginia University Soil Testing Lab was performed in 2020 for M3 microelements determination (Al, Fe, Na, Mn, Ni, Cu). Soil health lab procedures are being researched.	WVU Extension Service continued improving the new hemp (cannabinoids, fiber, grain-fiber-fertilizer recommendations (no field calibration). The recommendations are responsibility of Dr. Ed Rayburn. He adapted existing recommendations from WV, Virginia, and Pennsylvania. We have seventy-five (75) recommendations. We are working on adding Hemp and Brambles recommendations.

SERA6 GROUP PICTURE

Recording... || ■

Nathan Slaton	Shannon Alford	Reuben Beverly	Gobena Huluka	JJ Wang
McKinney	Jamir Bergeron	Cheri Villines	Steve Heckendorn	Uttam Saha
Eugenia Pena Yewtukhiw	Kristin Hicks	Frank Sikora	Thomas Obreza	Jessica Davis
Robert Florence	Jay Lessl	MSU Keri Jones	John Thomas Spargo	Robert Miller
Cindy Herron	Diane Lalex	Larry Oldham	Hailin Zhang	David Hardy

Stop Video Security Participants 28 Polls Chat Share Screen Pause/Stop Recording Live Transcript Breakout Rooms Reactions More