2022 STATE REPORTS

ANNUAL MEETING OF SERA-IEG-6

State reports were provided by the following participants and are attached from reports submitted.

AL- Jessica Davis (Auburn U)

AR- Nathan Slaton (U of Arkansas)

FL- Rao Mylavarapu (U of Florida)

GA- Jay Lessl (U of Georgia)

KY- Frank Sikora (U of Kentucky)

LA- Jim Wang (Louisiana State U)

MS- Keri Jones (Mississippi State U)

NC- Kristin Hicks, plant/waste/solution/media (North Carolina Department of Ag)

NC- David Hardy, soil (North Carolina Department of Ag)

OK- Hailin Zhang (Oklahoma State U)

PR- not represented

SC- Shannon Alford (Clemson U)

TN- Robert Florence (U of Tennessee)

TX- Tony Provin (Texas A&M U)

VA- Steve Heckendorn (Virginia Tech)

WV- Eugenia Pena-Yewtukhiw (West Virginia U)

Auburn University Soil, Forage and Water Testing Lab
2021 Fiscal Year SERA6 State Report

The Soil Testing laboratory analyzed 22,309 routine soil samples in FY 2021 (October 1, 2020 – September 30, 2021), 1925 non-routine soil samples, 601 plant tissue samples, 2,222 forage and feed samples, 643 water samples, 50 chicken litter samples, 26 manure/compost samples and 6 lime samples. For a total of 27, 782 samples for fiscal year 2021 an approximately 12% increase from the 2020 fiscal year. This had been partially attributed to the lockdown surge of customers gardening. Our partnership with Soilkit began in October 2021 and had a seamless introduction into our laboratory process.

The Auburn University lab has and continues to suffer from staffing shortages due to COVID-19 and a general complacency by our department to replace retired employees. Production was limited to about 200 samples daily during the peak time. Although staffing impacted lab production, turnaround time has decreased down to 14-20 working days during our soil and forage busy season.

Our laboratory was able to secure university funding for new equipment and personnel to work towards EPA certification for well-water/ drinking water testing. Our laboratory is in the process of purchasing a new ICP-OES and discrete analyzer system as well as a new nitrogen/carbon analyzer.

Recommendations for our crop codes have not changed this fiscal year, but the laboratory is working on developing a crop code for hemp, based on new and past research.

Our laboratory has hired a new lab technician and will be hiring a QC analyst in the upcoming fiscal year.

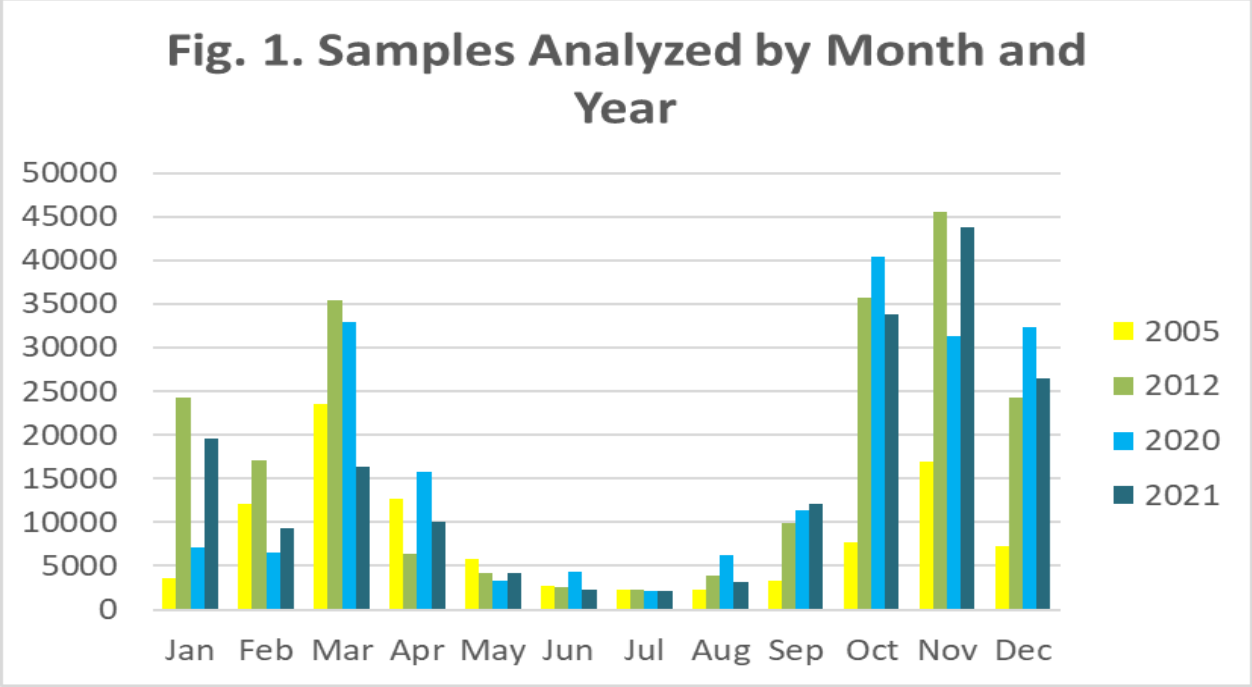
Currently, working with several of our equine faculty on developing equine specific testing and endophyte toxicity testing based on the background of our newest lab technician.

Respectfully submitted,

Dr. Jessica Davis
Director of the Soil, Forage and Water Testing Laboratory
Auburn University

Arkansas (University of Arkansas Soil Testing and Research Laboratories, Marianna & Fayetteville)
Nathan Slaton, Cindy Herron, Diane Lafex, & Cheri Villines

- The number of client samples analyzed by the Marianna Soil Test Laboratory was 183,264 (167,976 client samples and 15,288 quality control samples) in 2021 compared to 153,921 in 2019 and 177,712 in 2020. Grid samples accounted for 73% of the client samples analyzed in 2021.
- In 2021, sample residency time in the lab was ≤4 days for 10% of samples, ≤6 days for 30% of samples, ≤9 days for 58% of the samples, ≤14 days for 82% of samples, and ≤25 days for 100% of the samples. Client failure to check in all or some soil samples before delivery to the laboratory is among the most common client errors that delay sample analysis. This error causes issues when soil samples are delivered and must be stored because they will not scan. This year the laboratory had about 15,000 samples that were not logged in during November.
- October, November, and December are the months when most soil samples are submitted in 2021.



- Implementation of the LabLite LIMS was initiated in June 2019. We continue to make programming improvements to the LIMS system. The LIMS has not yet been completed for all analyses at the Fayetteville Laboratory.
- The total number of samples across all sample types submitted to the Fayetteville Agricultural Diagnostic Lab remained constant in 2021 compared to 2019 (Table 1).

- The Fayetteville Lab suffered damage from a water leak (frozen pipe) in February 2021. The floor was replaced in early 2022 and two new fume hoods were installed. A new roof was installed in fall 2021 (unrelated to leak damage).
- The Marianna lab landline phone system was discontinued in 2021 due to excessive cost ($1,500-2,000/month) and converted to VoIP system.
- The annual summaries of soil-test data and selected soil fertility and plant nutrition research are published in the 2021 Wayne Sabbe Arkansas Fertility Studies (Research Series 684), which is available online https://aaes.uada.edu/communications/publications/.
- Both the Fayetteville and Marianna labs continue to be enrolled with the ALP Proficiency program. Other proficiency programs: Minnesota Manure Analysis and National Forage Testing (Fayetteville), and Minnesota Soil Certification (Marianna and Fayetteville)
- A soil fertility endowed chair faculty position was created in spring 2021. Dr. Trenton Roberts was named as the first chair.
- The soil-testing program funded about $450,000 in research for the 2022-2023 funding cycle.
- New SPECTRO ICAPs (replacements for existing units) will be added to each lab in 2022 (ARCOS II for Marianna and ARCOS III for Fayetteville).
- Finding workers for full-time and seasonal hourly positions has become a significant situation for the Marianna Soil Test Lab.
- Dr. Gerson Drescher was hired and will start as an Assistant Professor–Soil Fertility later in 2022.

Table 1. Laboratory analyses performed by the University of Arkansas Fayetteville laboratory during 2019, 2020 and 2021 (January-December).

Sample Category	2019	2020	2021
Forage/Feed	1,879	1,487	1,468
Diagnostic Plant	292	459	395
Diagnostic Soil	200	107	176
Manures-Total	961	960	914
Strawberry Monitoring	224	246	194
Growing Media	24	160	157
Plant Samples	7,368	6,579	8,440
Soil Samples	3,387	5,010	4,144
Prepared Samples	3,389	4,824	1,816
Totals	**17,724**	**19,690**	**17,704**

SERA-6 -Nashville

State Report- Florida

Rao Mylavarapu, Professor and Director, UF/IFAS Analytical Services Laboratories

- The Extension Soil Testing Lab (ESTL) and the Waste Testing Lab (WTL) analyzed 14,228 soil, plant manure and water samples during 2021-2022 (July-June). In comparison, during 2020-2021, the number of samples analyzed at these labs were 15,255.
- In the Analytical Research and Certified Water Quality Labs, the total number samples analyzed was 23,715 during 2021-2022 (July-June). In comparison, during the same period in 2020-2021, the number of samples analyzed at these labs were 26,646.
- We had recently completed and published (Comms in Soil & PL Analysis), a method suitable to determine soil B, rapidly and with high accuracy. This was accomplished through a graduate Master students' research work in the Labs. Shortly, soil B determinations will be included in the soil test reports. Work on interpretation and guidance is being worked out currently.
- The Labs have currently two Spectro ARCOS and one PE ICPs. All are aging and need to be replaced.
- The labs have only one CNS analyzer (Elementar) and another C:N analyzer is needed to handle the sample loads and also act as a back up to the other one, as the S module, which is used rarely, is resulting in inefficiencies and frequent parts-replacements.
- The Extension Labs have a LabFit pH robot. The Lab is looking to add a companion EC probe to help simultaneous determinations and improve personnel and time efficiencies.
- The FL state legislature passed $8.6 million grant to UF-IFAS to be expended during FY 2022-2023, exclusively for nutrient management and soil test recommendations for selected major crops in the state. Most of these funds are allocated to fulfil equipment needs our Labs along with other faculty labs around the state.
- On behalf of the Labs, we have proposed nearly $700,000 for equipment. With these funds, we are now preparing to purchase two new ICPs, one ICP-IRMS (for stable isotope work- ^{15}N and ^{13}C), one C:N Analyzer, one new pH-EC robot, an EC module for the retrofitting the older robot, automated digestion blocks, one Active-C plate reader, etc. All of these instruments will be purchased, installed and commissioned during this year.
- All of the capacity building at the Labs is to directly support numerous large scale multi-location research and demonstration studies involving several and multi-

disciplinary faculty members and growers. Considerable increases in sample analyses is expected in the coming year or two.

- The recent shortage of skilled personnel all around post-covid has also affected the Labs and it took more than 5 months to locate suitable people to fill two vacancies at the Lab Tech1 level. We have 2-3 temporary student workers, who are hired every semester.
- The WebLIMS database that was designed and developed in-house to suit our needs with flexibility and 24x7 remote access is very robust and stable. The WebLIMS was fully deployed in 2018, after thorough testing, debugging and QC determinations.
- Will be recruiting a student, if possible, in the coming year, to conduct a study on buffer pH method to help replace the current Adams-Evans Buffer method to help use of para-nitrophenol, which is a hazardous waste.

FY 21/22 UGA Ag Services Lab

Year in Review

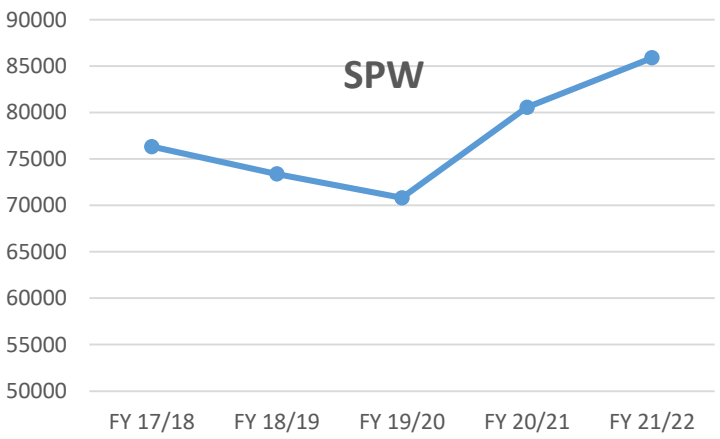
Test requests

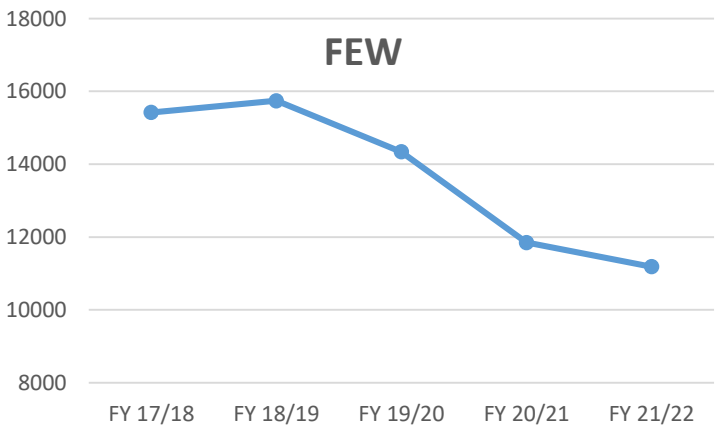
	County	Research	Total
SPW	63,063	20,133	83,196
	76%	*24%*	
FEW	4021	6656	10,677
	38%	*62%*	
AESL	67,084	26,789	93,873
	72%	*28%*	

Routine test requests

Routine samples			Income	
Soil	64,700	60%	$501,738	30%
Water	7,990	7.5%	$262,508	17%
Bacteria	5,215	4.9%	$187,740	12%
Plant	7,525	7.0%	$156,684	10%
Feed	5,873	5.5%	$128,821	8%
AW	1,296	1.2%	$53,841	4%
	Total	**86%**	Total	**82%**

Sample Trends over 5 years





Comments

Departures

8 positions were vacated including the Director, 3 FEW technicians, 3 support staff, and 1 SPW technician.

Hires

One FEW technician position was filled, and 1 IT position is currently posted along with 2 technician positions.

Upcoming expenditures

Offsetting the previous year's pay increase, HVAC renovations in the FEW building, and installation of a new dust collection system in SPW along with multiple equipment replacements.

University of Kentucky State Report
Frank Sikora
SERA-6 meeting
Nashville, TN
June 6-8, 2022

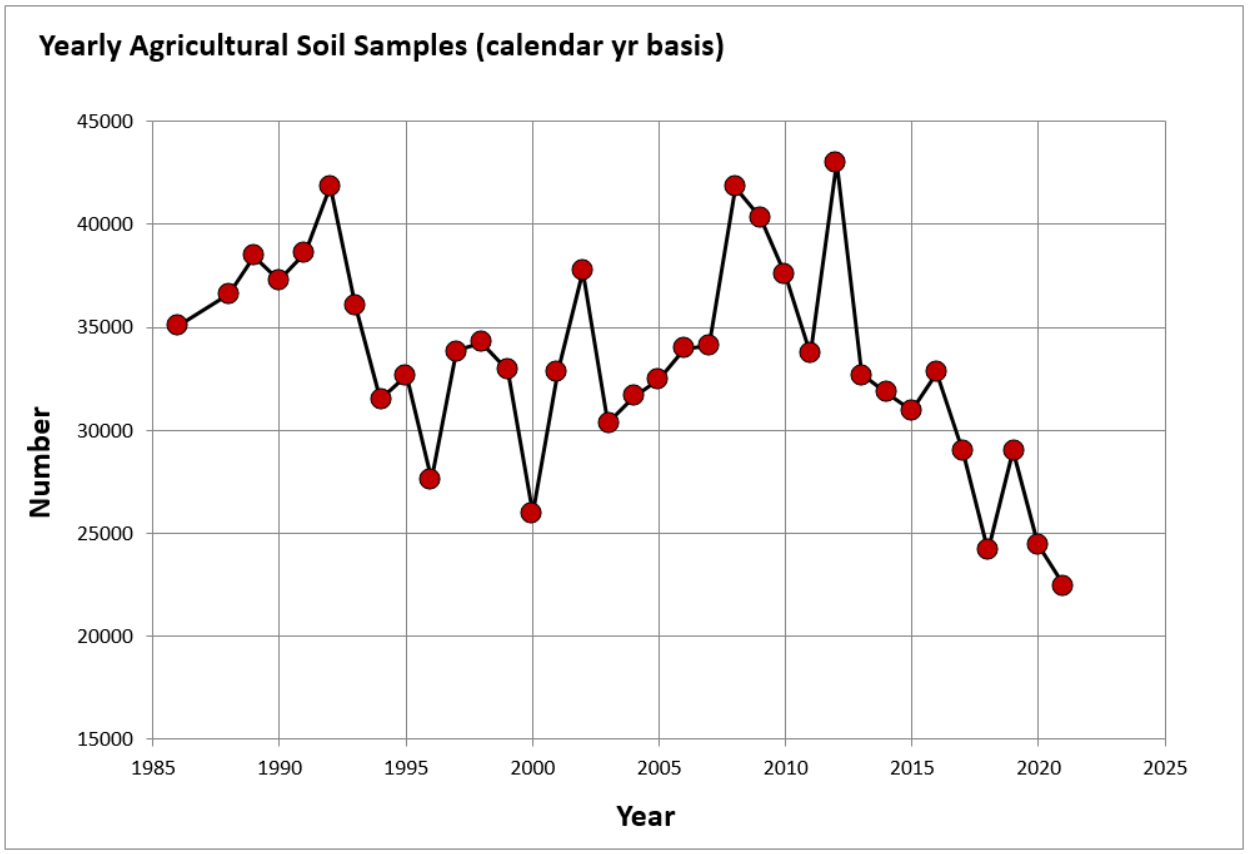
Our western KY lab has experienced significant changes in 2021. Princeton Soil Lab supervisor, Amanda Martin, left for a position at the Wisconsin State Laboratory of Hygiene at the Univ. of Wisconsin in early August, 2021. A replacement was hired in October that stayed only a week. She came from the oil industry and found a better job. A devastating tornado hit Princeton, KY on Dec. 10th, 2021 that destroyed the Experiment Station and the Soils lab. Rebuilding the station will take time. Temporary offices in trailers are being installed in summer of 2022. Temporary lab space in trailers is anticipated to be installed late in 2022. Plans are being developed for the new building which is anticipated to be complete in early 2025.

Lexington is receiving all samples until temporary lab space is available in Princeton. We had one retirement in Princeton in addition to Amanda leaving. These vacant positions will be filled when temporary lab space is available. The temporary trailer lab is planned to handle all aspect of testing soil except for ICP measurement. Mehlich-3 extracts will be transferred or shipped to Lexington. We started doing organic matter by LOI and plant tissue testing in Princeton. Organic matter will be done by combustion in Lexington and plant tissue testing is discontinued until the new building is in place.

The number of samples analyzed in 2021 with the percent change from 2010 is shown below. The numbers reflect samples testing in both Lexington and Princeton labs.

Type	Number	% change
Agriculture	22,415	-11
Home lawn and garden	9,394	+13
Commercial horticulture	1,073	+25
Greenhouse media	136	+79
Animal waste	168	-12
Nutrient solution	223	+156
Soil nitrate	4	-78
Research samples	15,915	+70
Agricultural Lime	143	+5
Plant tissue	90	
TOTAL	49,561	+12

We have experienced a significant decrease in agriculture samples since 2008 from approximately 42,000 samples in 2008 to approximately 22,500 samples in 2021 (see graph below).



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

2022

The LSU AgCenter Soil Testing and Plant Analysis Laboratory analyzed 15,226 routine soils samples in 2021. In addition, the lab analyzed 7,317 plant samples and 10,101 optional soil tests. This reflects a decrease in routine soil samples by 13% and plant sample by 15%, while optional test samples remained the same.

Lab is in the process of hiring a new lab director.

Lab is in the process of updating fertilizer recommendation sheets, especially on fruits and vegetables.

Lab works with several faculty members to conduct research on micronutrient fertility as well as evaluations on pyroligneous acid applications.

MSU Soil Testing Lab

Keri Jones | Lab Manager

Sample Numbers

The MSU Soil Testing lab processed 14,011 soil samples for fiscal year 2021-22. This is a 12% decrease in the number of soil samples processed for fiscal year 2020-21.

There were 3200 plant tissue samples processed for fiscal year 2021-22. This is a 51% increase in the number of plant samples for fiscal year 2020-21.

Personnel

Long time lab technician Le Edwards retired. Colby Jones was hired in April 2022 to fill the open position.

Equipment

No major equipment purchases were made, and none are planned for the near future.

NCDA&CS Plant/Waste/Solutions/Media Section

State Report to SERA-6 for FY2022

Samples analyzed:

- 13,000 waste & compost samples
- 16,000 plant tissue samples
- 2500 water samples
- 800 soilless media samples.
- Total samples: 35,000.

Soil section analyzed 300,000 samples

Numbers have come back up to pre-pandemic levels, particularly research samples

Equipment

- No new major equipment. All the major equipment has been updated. We will probably need a new ICP in the next couple of years. I think David is buying an new OM robot.
- The Division received funding from the state to build an annex onto our building. This would house soil samples and supplied be a central receiving area and will allow my lab to expand into the adjoining space that is currently used to store soil samples and supplies. This would roughly double the size of my lab. It's in the design phase.

Methods: 1) We changed our N combustion method on manure from dried to as-received

Research: 1) I completed year 4, the final year, of the nitrogen management in malting barley.

2) Established hemp sufficiency ranges. David is working on making changes to our soil P recommendations in collaboration with Luke Gatiboni from NCSU

Other: The updated Recommended Methods for Manure Analysis guide has been completed and should be available soon. I'm also working with UMN on a project designed to create a national manure database. It's funded by NRCS and would be housed at UMN and would allow labs to submit manure data that would be publicly accessible, minus personally identifiable information.

NCDA&CS Soil Testing Lab
2022 SERA6 State Report

The Soil Testing Section analyzed 282,585 samples in FY 2021 (July 1, 2012 – June 30, 2022) and 301,014 samples for FY 2022. Reports issued with fertilizer/lime recommendations totaled 34,823 for FY2021 and 36,458 for FY2022.

The lab had several staff shortages due to COVID-19 and two resignations. Production was limited to about 2900 sample daily during the peak time. Although staffing impacted lab production, turnaround time was down to about 10 working days by the end of February. No lab tours were provided to the public.

No new analytical equipment was purchased. This fall, we will be replacing an older automated station where humic matter is analyzed. The station is still operational, but we have concerns over attaining parts due to its age and supply chain issues.

The lab changed the equilibration time to read $CaCl_2$ pH to 15 minutes, from one hour.

Recommendations for P for grain crops were lowered with a 0 recommendation being given at a P-I = 50 which is equivalent to 60 mg P/dm^{-3}. The prior recommendation zeroed at a P of 84 mg P/dm^{-3}. In cooperation with NC State Crop and Soil Science department, a fact sheet provided the basis for this change. https://content.ces.ncsu.edu/changes-in-phosphorus-fertilizer-recommendations-for-corn-soybean-and-small-grains

Luke Gatiboni, Asst. Professor in Crop and Soil Sciences at NC State and I initiated 6 field P rate studies with corn for calibration purposes. Starter placement in corn is also being investigated.

Our Field Services section chief position is still vacant after being open for one year. I continue to serve in an acting role. My retirement plans are on hold with no definitive date.

Respectfully submitted,

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

Oklahoma State University
Soil, Water and Forage Analytical Laboratory

2021 Annual Report

Hailin Zhang, Director
Kendal Henderson, Manager

We analyzed a record number of 71,388 soil, plant, animal waste and water samples in 2021. It was significantly higher than the previous several years due mostly to the increase in research samples from all over country. This was a result of tremendous effort of our lab personnel and state extension staff providing the critical service even with the shortage of staff and sometimes supplies. No major equipment updates except for a new LECO 828 C/N Analyzer was installed. We started an evaluation of greenhouse growth media test to identify the most appropriate extraction solution and procedures.

AGRICULTURAL SERVICE LABORATORY
Regulatory Services

South Carolina State Report for SERA-IEG-6 2022 Annual Meeting
Shannon Alford- Director, Clemson University Ag Service Lab

Sample Numbers

For the 2021 calendar year, we continued to see the effects of the pandemic on sample numbers, as Extension Offices were closed at least partially through summer 2021. However, overall sample numbers increased for every sample type except animal waste, representing a 20% increase from 2020 for total numbers.

Soil: 41585
Plant Tissue: 593
Feed/Forage: 570
Water: 570
Animal Waste: 1142
Compost: 83
Research & Commercial: 9940
Total: 54483

Personnel

During the continuing pandemic, we were not permitted to have volunteers on site and only hired one student worker for the 2021 spring semester. We have a total of 9 full-time employees. We had one 30+ year chemist retire in July 2021, and her position was refilled in October 2021. We also had one 30+ year support staff member retire in February 2022, and her position was refilled in March 2022. We will hire an additional support staff member, starting August 2022. The Clemson Ag Service Lab was fortunate to submit a funding request to the SC State Legislature and receive funding for recurring and non-recurring requests including two new staff positions, to be distributed September 2022.

Equipment

A 2019 Spectro Arcos ICP-OES will be inherited from another lab Fall of 2022 when that lab moves out of the shared building.

New Initiatives

Clemson's Precision Ag group worked with Shannon to develop two calculator apps for farmers regarding fertilizer blends and fertility recommendations.

A new web-based soil sample portal was developed and launched in July 2021 for use by personnel at County Cooperative Extension Offices.

Annual Report of Soil Testing Activities in Tennessee to SERA-6
June 2022

University of Tennessee
Robert Florence

Services: 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 2021, 15,002 soil samples were tested for farmers and homeowners. In addition, 93 greenhouse media soil samples. The SPPC analyzed 59 plant tissue samples, for in season nutrient concentrations.

Bio-ponds in Metro Nashville are becoming more regulated. These bio-ponds are intended to provide a place to slow storm water runoff and prevent the storm water system from being overwhelmed. In 2021, the center tested 238 Bio-ponds for material venders, engineers, and contractors.

The plant diagnostic lab diagnosed 925 physical plant and insect samples for homeowners, landscape professionals, and farmers.

The SPPC collaborated with the UT Beef and Forage Center to analyze 972 forage samples.

Personnel: The lab is currently staffed by a director, two office administrators, one soil analyst, and one plant diagnostician. We usually have one student worker in the soil lab and one student worker in the plant diagnostic lab. Dr. Fafa Adotey is the Extension Soil Scientist, and is based out of Jackson, TN. UT Extension has a corn/soybean, cotton, and tobacco/hemp professor.

Equipment upgrades: New furnace for CE Elantech flash total carbon and nitrogen analyzer. Bought the remainder of the type of filter paper we used from Joe Murdoch's inventory.

Software upgrades: Added a poultry litter calculator to our lab information reporting online software (STRUT). For our plant diagnostic lab, we bought PClinic software to log samples and automatically report them to the National Plant Diagnostic Network.

Texas A&M State Report
Tony Provin

Sample Numbers: The Texas A&M AgriLife Extension Soil, Water and Forage Testing Laboratory analyzed 41,000 samples during calendar year 2021.

Equipment: The laboratory added robotic water pH, conductivity, bicarbonate and carbonate autoanalyzer, a discrete analyzer and new Leco 828 total N analyzer.

Lab Report for the Virginia Tech Soil Testing Laboratory – June 2022

Steve Heckendorn

1) For the 2021 calendar year, we processed 55,830 soil samples.
Which is 16% more than the year before, and it appears that the number of samples have rebounded from a COVID decline.

2) Replacing a 12-year-old Spectro Arcos SOP ICP with a Spectro Arocs-III DSOI.

SERA-6 Annual State Report For *West Virginia*

Reported June 2022 for period: Calendar 2021

Contact	Eugenia Pena-Yewtukhiw; Eugenia.Pena-Yewtukhiw@mail.wvu.edu
Mailing address	Division of Plant & Soil Sciences Davis College of Agriculture, Natural Resources and Design West Virginia University, Agriculture Science Building, Rm 1405 1194 Evansdale Dr Morgantown, WV 26506
Phone number	304.293.5375 & 304.293.2287
FAX number	
e-mail address	wvu.davis.soiltesting@gmail.com
Website address	https://soiltesting.wvu.edu/

Lab personnel FTE's: 1 (12 months) + Student Labor

Extractant(s): Mehlich III (since September 2018).

Instrumentation: ICP-OES - Optima 2100 DV (PerkinElmer Inc.)

Cost for routine test: $0 for WV residents, $10 for out of state clients.

Routine test includes pH (water 1:1), Ca, Mg, K, P, Mehlich buffer pH.

Sample Summary:

Category	Soil	SME	Plant
Total Samples	7,351		
Commercial MM	5,092*		
Homeowner MM	1,619		
Dept Research MM	560		
Nitrate/PSNT	N/A		
Teaching	80		
Misc – OM. Tex, SS, pH	325 OM 112 EC 45 Micro		
Cornstalk NO_3	N/A		
Total N – Elementar	N/A		
ICP Plant Tissue	N/A		

*** Identified as farmers (estimated)**

Summary of Research:
No funded research projects related to the "Soil Sampling Depth" in collaboration with FRST group was performed.

Other/News:
Organic matter content estimated by Loss on Ignition (LOI) is an additional analysis performed by our lab at a cost.
Electrical conductivity (EC) analysis has been added in March as a lab product since 2019 at $3/sample. We started selling a microelement analysis (Fe, Al, Na, Zn, Mn, Cu, Ni) for $5 (Released July 2021).
WVU Extension Service continued improving the 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.
New submission form was released.