Notes from Joint Regions Soil-Testing Meeting

June 3-5, 2024

NCERA013, SERA6, NECC1012 Joint Meeting

June 3-5th, 2024

Embassy Suites Airport, Bloomington, MN

Monday June 3

NRSP 11 Meeting (main room) -9:00 – 12:00 pm CDT

Breakfast – Hotel has a free hot breakfast bar for guests.

9:00 – 9:05 Welcome, Deanna Osmond

9:05 – 9:35 The Seeds of NRSP-11, John Spargo

9:35– 10:00 National Database and Archived Data Review and Summary by Regions, Crops, and Nutrients, Nathan Slaton

10:00– 10:20 P & K Minimum Dataset and Template Use Discussion, Deanna Osmond Moderate

10:20 – 10:30 Break

10:30 – 11:00 Sulfur Minimum Dataset Update & Discussion, Matt Yost

11:00 – 11:40 Committee Updates

Soil Depth Report, Steve Culman

Calibration Committee Report, Luke Gatiboni

Lime Committee Reports, John Jones/Bob Miller/Amy Shober

Regional CIG Reports, Huijie Gan, Jim Wang, Matt Yost, & Daniel Kaiser

11:40– 12:00 Business Meeting, Leadership/Officer appointments and Misc. NRSP Business, Slaton (Administrative Advisor) & Osmond (NRSP11 Project Lead)

12:00 - 1:00 Lunch provided for those attending NRSP11 meeting (a separate $25 registration will be required as part of the NRSP11 and Joint workshop to cover room costs and to get a headcount for lunch for those that wish to eat on site).

Joint meeting (main room)

Session 1: 1:00 – 2:45 – Regional.and.national.efforts.in.soil.testing.and.database.development.Panel.(Moderator¿ Nathan.Slaton)

1. Long term data management/control for correlation and calibration research (virtual) – Sylvie Brouder
2. Data Management though Ag Data Commons (Virtual) – Michal McCullough, Data Curator/Metadata Librarian, USDA - National Agricultural Library
3. Land Grant Institution perspective - Shannon Farrell U of MN Libraries
4. 2:30: Sponsor : FIA

Sponsor Break 2:45 – 3:00

Session 2: 3:15 – 5:30 – Current.efforts.in.soil.testing.and.soil.test.correlation.(Moderator¿Manjula.Nathan)

1. 3:15: Spatial and temporal soil sampling variability affects soil-test P and K concentrations and fertilizer recommendations - Muhammad Rasel Parvej, LSU
2. 3:45 A retrospective of developing P and K guidelines for Iowa – Antonio Mallarino, ISU
3. 4:30 Targeting the Unsampled Acre – Craig Struve, Soil View
4. 5:00: Sponsor: ALTA
5. 5:15 Sponsor : Elementar

5:30-6:30 (reception to allow for conversing with vendors/the hotel does offer a complimentary evening reception with alcoholic and non-alcoholic drinks and snacks)

Dinner on your own (Hotel offers free shuttle to Mall of America)

Tuesday June 4

Breakfast – Hotel has a free hot breakfast bar for guests.

Session 3: 8:00 – 9:45 – Sulfur.the.fourth.primary.macronutrient?.(Moderator¿John.Spargo)

1. 8:00: The Sulphur Institute report - David Vincent
2. 8:25: Sulfur response in the south: experiences and challenges with soil testing for S – Brenda Tubana LSU
3. 8:50: Identifying sulfur deficiencies with soil and plant tissue testing in Minnesota – Daniel Kaiser U of MN
4. 9:10: Sulfur research in the Northeast - John Spargo
5. 9:35: Sponsor: TSI

Sponsor Break 9:50 – 10:00

Session 4: 10:00 – 12:10 – Liming.and.soil.carbon.(Moderator¿John.Jones)

1. 10:00: Survey on lime guidelines in the U.S. – John Jones
2. 10:20: Lime work in the Northeast – Amy Shober
3. 10:40: Soil health and carbon testing – Andrew Margenot UI (Virtual)
4. 11:55: Sponsor : TSP

12:10 - 1:30 – Catered (working) lunch

Session 5: 12:30 – 1:45 – Sponsor.Time.(Moderator¿Daniel.Kaiser)

1. 12:25: Sponsor: Spectro
2. 12:40: NAPT report -Bryan Hopkins
3. 1:00: ALP report - Bob Miller
4. 1:20: Manure Database Update - Melissa Wilson/ Nancy Bohl Bormann

2:00 - 5:00 – Offsite Tour to MN Landscape Arboretum (https://arb.umn.edu/) to learn what is going on at the arboretum and how the arboretum is connecting urban MN with what is going on in rural MN

6:00 pm load buses for dinner reservations

6:30 - 9:00 pm – Sunset diner cruise on the Mississippi (https://riverrides.com/) (meal is included in registration and transportation will be provided, there will be a cash bar on site for those wishing to purchase drinks)

Wednesday June 5

Breakfast – The hotel has a free hot breakfast bar for guests.

8:00-12:00 - NCERA013, SERA6, NECC1012 committee meetings (breakout rooms - 3)

Noon - Adjourn

Meeting held in Bloomington, MN with virtual attendance available

Hosted by Daniel Kaiser, Associate Professor and Extension Soil Fertility Specialist, UMN

~42 attendees in person from 3 regions (NCERA013, SERA6, NECC1012); majority of attendees were from Southern region SERA6 group

For SERA6 Meeting June 5

SERA6 Group Meeting (June 5th, 2024)

8:00-8:05 AM Welcome

8:05-8:30 AM Regional Soil Testing: Validation of P and K fertilizer Recommendation for soybean in Tennessee - Nutifafa Adotey, UT

8:30-9:20 AM Exploring Myth of Unresponsive Soil Test Recommendations: Survey Results and Discussion- Tony Proven, Texas A&M

9:20-10:20 AM State Report

10:20-10:30 Am Break

10:30-12:00 AM Business Session

- Admin Reports Research advisor
- Extension advisor
- Committee Functions
- Publications
- Election of Secretary
- 2025 Meeting site/Introduction

ADJOUR

Attendees: 14 in person, 9 online

Mike Phillips, Extension Director at Auburn U, was introduced as our new Extension Administrative Advisor.

There was a discussion of what should be included in the state reports and how much time should be devoted to the oral reports on the agenda. Franta suggested we include the number of staff in the report. Tony Provin questioned the objective of the state reports. Jim Wang mentioned that the state reports inform administrators of activities and track activities of the group. The group in attendance agreed to present our reports as usual to allow for discussion. It was suggested that a template could be distributed to the group to facilitate assembling all the needed information from each state.

State reports were provided by the following participants:

AL- Jessica Davis (Auburn)
AR- Nathan Slaton (U of Arkansas)
FL- Yves Jean (U of Florida)
GA- Jay Lessl (U of Georgia); online
KY- not represented at meeting
LA- Franta Majs (Louisiana State U)
MS- Keri Smith (Mississippi State U); online
NC- David Hardy, Soil (North Carolina Department of Ag)
NC- Deanna Osburn for NCDA (North Carolina State U)
OK- not represented at meeting
PR- not represented at meeting
SC- Shannon Alford (Clemson U)
TN- Robert Florence (U of Tennessee); online
TX- Tony Provin (Texas A&M U)
VA- represented by faculty, but no state report at meeting
WV- Eugenia Pena-Yewtukhiw; document only

Jessica Davis of Auburn U was nominated for the incoming Secretary position. There was no discussion, and she was elected to the role.

Mike Phillips introduced himself and suggested we home in on impact-economic and sustainability for example. We need to get our group's info up to date in NIMMS. Eugenia asked about the general state of Extension and wanted Mike's perspective. Mike also commented that we can do a better job of multi-state collaborations, especially to advise new faculty and lab directors.

Nathan Slaton spoke about the fact that a new Research Advisor will be assigned since Nathan McKinney (U of AR) has retired. He also spoke about the need for some continuity of what is included in the state report with room for flexibility.

There was a discussion initiated by Kristin Hicks regarding the location for our meeting in 2025. Tony Provin (TX) is slated to host the next meeting, but Kristin is already hosting the International Symposium for Soil and Plant Analysis in NC in June 2025. The group agreed to meet in NC and to set aside significant time to meet as SERA6 while there. TX will postpone hosting until 2026.

AGRICULTURAL SERVICE LABORATORY
Regulatory Services

Clemson University, South Carolina
Shannon Alford- Director

Annual Report of Soil Testing Activities to SERA-IEG-6
June 2024
Bloomington, MN

Sample Numbers per Calendar Year 2023
Soil: 50363 (record sample volume since 2017!)
Plant Tissue: 413
Feed/Forage: 1055
Water: 323
Animal Waste: 1209
Compost: 88
Research & Commercial: 5640
Total: 59083

Impacts Made by the Program
Soil samples come to the Clemson Ag Service Lab from all 46 SC counties as well as from 38 other states in the US. Approximately 12,995 individual clients were served by the soil-testing services. In addition to providing analytical testing for Clemson University researchers, the lab has served ~10 other colleges/universities, several state & federal agencies, and local industrial entities in 2023.

Personnel and Facilities
We had a total of 10 full-time employees, 1 part-time (only for busy seasons), and 2 federally funded student interns each semester. 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 request in the 2022-2023 fiscal cycle, but funds have not been released as of June 2024. Minor upgrades to the space were completed in summer 2023.

Equipment
We are planning for purchases of a microwave digestion unit and a NIR unit.

New Initiatives
We have made some effort at reviewing our current recommendations for agronomic crops, and a few colleagues in Clemson Extension's Horticulture program have reviewed recommendations for horticultural crops. We continue making efforts to improve marketing of lab services, with videos, posters, printed materials, and attendance at vendor events.

Mississippi State University

Annual Report of Soil Testing Activities to SERA-6

September 27, 2024

Sample numbers and services:

Soil Analysis – 15,245 (8% decrease vs. last fiscal year)

Plant tissue – 5619 (80% increase vs. last fiscal year))

Potting Media – N/A

Manure – N/A

Forages – N/A

Lime – N/A

Water – N/A

Lab personnel numbers or changes:

No changes. Keri Jones, lab coordinator. 2 full-time employees and 1 part-time.

Equipment/supply notes or upgrades:

None

Software notes or upgrades:

None

Number of Extension /Research employees working on soil testing/soil fertility:

Vaughn Reed is the only employee I am aware of.

Annual Report of Soil Testing Activities in Tennessee to SERA-6
June 2024

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.

In 2023, 16,576 soil samples were tested for farmers and homeowners. Our price per sample is still at $15. A breakdown of the samples is below. This is about the same amount of soil samples as last year. We normally analyze soil samples by Mehlich-1 but have been using Mehlich-3 for some UT researchers. In addition, we also analyzed 116 greenhouse media soil samples.

2023 Soil Sample - 1st Crop Code Given

Category	Total	Percent
Row Crop	5,293	32%
Forage	4,040	24%
Landscape/lawns	2,729	16%
Home Garden	1,976	12%
Food plot / CRP	560	3%
Commercial veg	446	3%
Misc	340	2%
Commercial fruit	198	1%
Nursery Crops	117	1%
Turf	85	1%
Results only	792	5%
	16,576	

Bio-ponds in Metro Nashville are becoming more and more regulated. These bio-ponds are intended to provide a place to slow stormwater runoff and prevent the storm water system from being overwhelmed. In 2023, the center tested 510 Biopond up from 262 in 2022 for material venders, engineers, and contractors.

The SPPC analyzed 581 plant tissue samples, for in season nutrient concentrations. These were mostly submitted as research samples already digested.

In 2023, 434 Physical plant and insect samples were diagnosed with significant help from Katie Kilbourne the TDA plant pathologist. We also sent samples to Entomology and Plant Pathology faculty and grad students, and Auburn University for help with diagnostics. Sample numbers are down from 769 in 2022, and 925, in 2021. With the use of PClinic we can now easily record how many digital submissions we had as well. In 2022, there were 239 down from 460 digital submissions from agents and Tennessee Department of Agriculture.

The Soil, Plant & Pest Center, along with the UT Beef and Forage Center tested 1,305 forage samples this is up from 1,133 in 2022. The 2022 year was the most forage samples since at least 2016.

We have recently had an uptick in the number of samples we receive already extracted. In 2023, we received 2,922 Extracts for either ammonia, nitrate, or ICP were submitted to the soil lab. Some are from a greenhouse gas study, some are soil extracts from a soil class, and some are from column studies.

Center 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. 2023 was a year we lost both office administrators, and the plant diagnostician. We were able to fill the plat diagnostician role in September of 2024 with Dr. Sylvia Moraes.

UT Extension has specialists working on soil/crop nutrition (Dr. Fafa Adotey), corn/soybean production (Dr. Jake McNeal), cotton production (Dr. Tyson Raper), tobacco/hemp production (Dr. Dale Richmond), and forage specialist (Dr. Bruno Pediro), urban gardens (Dr Natalie Bumgarner), turf (Dr. Becky Bowling).

Equipment upgrades: no major equipment upgrades but had trouble getting filter paper from Midland Scientific on time.

Software upgrades: We are continuing to rebuild the soil and forage lab information software (STRUT) to include potting media, plant tissue. We hope it will be easier for users to create online accounts and submit samples. Clients can change their crop/plant codes to have dynamic recommendations. We will try to include latitude/longitude upload and download for samples.

University represented
Auburn University

Annual Report on Soil Testing Activities to SERA-6
June 2024
Bloomington, MN

Sample numbers and services:

Soils 20142

Plant tissue 424

Potting Media 173

Manure 26

Chicken Litter 77

Forage and Feed 1373

Impacts made by the program: none

Lab personnel numbers or changes: none

Equipment/supply notes or upgrades:

Software notes or upgrades:

Number of Extension /Research employees working on soil testing/soil fertility: Not sure

Other notes:

University of Georgia
Jay Lessl – Director
UGA Agricultural and Environmental Services Laboratories

Annual Report of Soil Testing Activities to SERA-6
June 2024
Bloomington, MN

Sample numbers and services:

Soils: 73822

Plant tissue: 8200

Water: 14161

Manure: 1018

Forages: 6362

Other: 4284

Total: 107847

Lab personnel numbers or changes:

Jay Lessl took over as acting Director in 2023
24 full time employees, 6 part time employees working in the UGA Ag services Labs

Equipment/supply notes or upgrades:

Purchased a Seal pH/EC robot, Elementar VarioMax, and Foss NIR

Number of Extension /Research employees working on soil testing/soil fertility:

1 faculty “state specialist” working on soil fertility
3 faculty working at testing

LSU AgCenter
Soil Testing and Plant Analysis Laboratory (STPAL)
In attendance: Franta Majs, Md. Rasel Parvej, Brenda Tubana, Jim Wang

Annual Report of Soil Testing Activities to SERA-6

June 2024
Bloomington, MN

Sample numbers and services: *This report is for the calendar year 2023*

Soils	*17,479*	*12% down from 2022*
Plant tissue	*4,064*	*0% change from 2022*
Potting Media	*386*	*102% up from 2022*
Manure	*NA*	
Forages	*550*	*83% up from 2022*

Impacts made by the program:

Lab personnel numbers or changes:

At the end of the calendar year 2023 the STPAL had four student workers and three full time employees. In comparison to the previous year the number of full-time employees decreased by one when Dr. Sue Chin resigned from her position of Extension Associate Specialist and Assistant Director in August 2023. The vacancy has not been filled yet. The School of Plant, Environmental, and Soil Sciences (SPESS) provides accounting service and general management for the lab. Forage Quality Laboratory continues its operation under the leadership of Dr. Kun-Jun Han.

Equipment/supply notes or upgrades:

The STPAL entered planning and then approval stages of renovation to sample drying and grinding facility.

Software notes or upgrades:

No software improvement yet. The STPAL has been using LIMS created in 1999.

Number of Extension /Research employees working on soil testing/soil fertility:

A copy of each test report is delivered to LSU AgCenter extension agents or regional extension offices. Agents use the analysis results for their extension programs. Therefore, approximately 70 agents are directly or indirectly involved in the soil lab services. Five researchers are working in soil fertility, and one research faculty is working on the forage testing.

Candidates were interviewed for the position for Soil Fertility Specialist with a primary emphasis on specialty crops such as vegetables, fruits, home gardens, turf, pasture, and ornamentals, but the position has not been filled in 2023.

Other notes:

Add notes

University of Florida (UF)
Institute of Food and Agricultural Sciences (IFAS)
Analytical Services (ANSERV) Laboratories
In attendance: Yvens Jean, report prepared by Franta Majs

Annual Activities Report to SERA-IEG-6

June 2024
Bloomington, MN

Sample numbers and services: *This report is for Fiscal Year 2024 (7/1/2023–6/30/2024)*

	FY24	Year to Year Trend	FY23
Soils	*36,595*	*53% up from FY23*	*23,865*
Plant Tissue	*9,328*	*8% up from FY23*	*8,608*
Potting Media	*194*	*80% up from FY23*	*108*
Manure	*112*	*66% down from FY23*	*170*
Forages	*NA*		
Other samples:			
Irrigation Water	*289*	*4% up from FY23*	*278*
Other Non-Potable Water	*1,837*	*17% up from FY23*	*1,573*
Solutions	*19,620*	*93% up from FY23*	*10,153*

Impacts made by the program:

The ANSERV labs played an important role in providing the UF | IFAS recommendations to Florida clientele as those were not adopted by any other soil or plant tissue testing laboratory either in or outside of the state. Over the last four years the Florida legislature appropriated about $20 million to the IFAS Nutrient Management Project (NMP) for recalibration of existing and development of new Best Management Practices (BMP) for crops grown around the state. The ANSERV labs involvement in the IFAS NMP was on two different fronts. First, the labs provide an unbiased and cost-effective way for researchers to get their samples analyzed. And second, the updated recommendations must be distributed to clientele and widely adapted across the state for the NMP to succeed. The ANSERV labs will be critically important in that implementation step.

The UF | IFAS soil fertility and nutrient management program, hereafter referred to as 'the program', provided solutions for growing conditions defined by seven USDA Plant Hardiness Zones (from 8b to 11b), three Level III Ecoregions, and diverse soils. The state is dominated by sandy Spodosols, Entisols, Alfisols and Ultisols. Histosols, and Entisols developed on limestone are prominent south of the Lake Okeechobee, while the northern half of the Panhandle along the Alabama and Georgia boarder features loamy Ultisols. Historically, nutrient runoff and leaching from coarse textured soils in agricultural and residential areas contributed to impairment of surface and subsurface water bodies. Nitrogen (N) and phosphorus (P) were the main nutrients of concern. Nitrogen management was of utmost importance in north Florida, while the P management was critical in southern part of the state.

Coarse texture also lowered nutrient use efficiency for potassium (K) fertilizers. To alleviate the environmental burden, the program developed new and reevaluated existing BMPs for carrots, citrus (grapefruit, orange, tangerine, and tangelo), corn (grain, silage, and sweet), cotton, forages (both hayfields and pastures), hemp, peanut, potato, snap beans, sugar cane, watermelon, and integrated crop-livestock operations. Agricultural productivity was improved, and water bodies impairment minimized through evaluation of BMPs such as the efficacy of P starter fertilizer in high testing soil, Controlled-Release Fertilizers (CRF), fertigation and petiole-sap testing in field crops, and sod-based agronomic rotation systems. Trials were located either directly on production farms or at one of the seventeen research and education centers distributed around the state. Recommendations were shared with growers and the public in workshops, blog posts, webinars, magazine articles, and extension bulletins. Electronic versions of the materials were distributed on social media including YouTube, Facebook, Instagram, and LinkedIn. Archival service for all electronic publications was provided by UF | IFAS Electronic Data Information Source or EDIS for short. All electronic media were monitored for clicks and downloads.

Northwest Florida's major crops in terms of acreage and revenue were peanut, cotton, and corn for grain and silage. Peanut grown on sandy soil was vulnerable to K and iron (Fe) deficiencies. Research explored application of chelated Fe, and split application of the recommended K fertilizer throughout the growing season compared to application of K in CRF form. Grain corn was evaluated for a variety-based N response, and CRF application combined with banding on both sides of the row was compared to fertigation. Ongoing were long-term trials focused on N leaching from sod, two years of Bahiagrass, included into the row crop-based rotations. The same grass was also evaluated in long-term cattle grazing operations. Suwannee Valley, a prominent agricultural area in northern Florida which spans over seven counties, saw CRF being successfully adopted over 1088 ac of watermelon and 5,000 ac of snapbeans, but CRF adaptation in corn proved to be challenging. However, the same research resulted in reduction of N leaching losses from conventional fertilizers over 600 ac of sweet corn by an estimated 60,000 lbs. In yet another effort the Suwanee Valley's Extension agents implemented a petiole-sap testing program in carrots which reduced fertilizer application over 5,000 ac by approximately 61,250 lbs. of both N and K_2O. Potatoes were grown statewide over 29,300 ac. Implementation of fertigation together with optimization of application rates resulted in decreased fertilizer application of between 879,000 and 1,172,000 lbs. Statewide, the education of residential property owners on local fertilizer ordinances decreased N leaching by 21,385 lbs. and an additional decrease of 1,910 lbs. was achieved through adaptation of CRF. Additional trials were ongoing in the other growing regions of the state.

Lab personnel numbers or changes:

Personnel structure at the end of FY24

	Occupied	*Vacancy*
Management / QA supervisor (FTE)	*1*	*1*
Administrative support (FTE)	*2*	*0*
Chemist (FTE)	3	*0*
Lab technician (FTE)	3	*0*
Student employees (students)	5	*0*

At the end of FY24 the labs had nine FTE and five student employees, which was one FTE and three student employees more than a year before. Faculty supervisor was Dr. Thomas Obreza, who retired at the end of the FY24. The labs also filled the vacant Director position starting at the beginning of FY25.

Equipment/supply notes or upgrades:

ICP-OES

- *Two Arcos 3 (Spectro, Kleve, Germany) installed.*

pH & EC robots

- *One AS-3020D (LABFit, Bayswater WA, Australia) pH/EC installed, and*
- *One AS-3010D (LABFit, Bayswater WA, Australia) retrofitted with addition of EC.*

Solution analyzers

- *One AQ400 Discrete Analyzer (Seal Analytical, Mequon, WI) installed,*
- *One FS3700 Automated Chemistry Analyzer (O-I-Analytical, College Station, TX) installed.*

Total C&N

- *One Vario Max Cube (Elementar, Hesse, Germany) installed.*

Digestion blocks and systems

- *One BD50S (Seal Analytical, Mequon, WI) installed for Kjeldahl nitrogen.*
- *Two DEENA II Automated Systems (Seal Analytical, Mequon, WI) installed for plant tissue.*

Software notes or upgrades:

Since 2016 the ANSERV has been using the same LIMS.

Number of Extension / Research employees working on soil testing/soil fertility:

Most employees focused on soil fertility and plant nutrition as in the past four years the State of Florida incentivized UF with over $20 million to update IFAS Best Management Practices for a variety of crops. Directly involved with this project were at least twelve researchers located across the state and domiciled at multiple UF | IFAS academic departments. Through collaboration at the county and district levels this work extends to many more employees.

Other notes:

A search for a mid-career faculty in soil fertility and plant nutrient management at UF / IFAS should open soon.

Stephen F. Austin State University

Annual Report of Soil Testing Activities to SERA-6

September 27, 2024

Sample numbers and services:

Soil Analysis – 2,010 Routine soil tests for fertilization recommendations, Metals, SAR, Textures, Organic Matter, Hot Water Boron, Nitrates and Ammonia

Plant tissue – 525 Nitric Digest mineral analysis

Potting Media – 45 water soluble extractions

Manure – 305 Nitric Digest and Carbon/Nitrogen analysis

Forages – 105 Routine Forage quality, Mineral Analysis, Prussic Acid, Nitrates, Protein

Lime – 40 Lime quality analysis

Water – 95 routine water analysis for irrigation and livestock purposes

Lab personnel numbers or changes:

Dr. Aakriti Sharma Director, Wayne Weatherford – Lab Associate

Equipment/supply notes or upgrades:

560 ASX Autosampler

Software notes or upgrades:

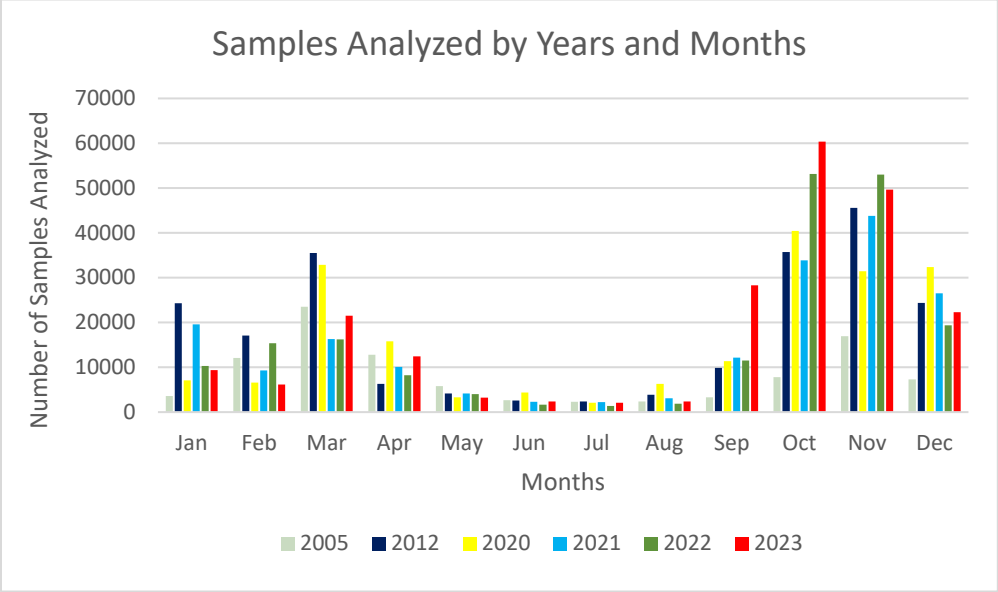
FIA Lab Cadmium Flow Injector software upgrade, 560 ASX Software, Qtegra ICP software upgrade, Leco 628 C/N Software upgrade, Metrohm Auto-titrator software upgrade

Number of Extension /Research employees working on soil testing/soil fertility:

Collaborated on graduate research work with four different professors (Dr. Mindy Faulkner, Dr. Brian Oswald, David Creech, Dr. Erin Brown) at Stephen F Austin State University. Research collaboration with Texas A&M at Overton and University of Texas at Tyler.

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

- The number of total samples analyzed by the Marianna Soil Test Laboratory was 220,032 (201,642 client samples and 18,390 quality control samples) in 2022 an increase from the total samples analyzed (195,948) in 2022 and an overall record. Grid samples accounted for 77% of the client samples in 2023. The submitted soil samples represented an estimated 1.52 million acres. The lab broke records for the number of samples analyzed in October (60,336).
- The turnaround time (sample residence time at the lab for soil analysis including days on the weekend and holidays) was ≤4 days for 28.5% of samples, ≤6 days for 49% of samples, ≤10 day for 74% of the samples, ≤15 days for 88% of samples, and ≤21 days for 100% of the samples. These values do not include time spent at the Extension office, post office, or in transit to the laboratory.
- All county offices (14) that use UPS were converted to a once per week pick up in April/May 2023 to reduce the fees paid to UPS. UPS cost was $58,167 in 2022 and $40,921 in 2023. October, November, and December are the months when most soil samples are submitted (see figure below).
- Organic matter by Weight Loss on Ignition was performed on 1,302 soil samples.
- Electrical conductivity was performed on 45 soil samples in 2023.
- Nitrate-N was determined on 1,763 soil samples in 2023.
- The laboratory ran soil texture on about 250 soil samples from around the USA in a FRST project aimed at understanding soil stratification and adjusting soil test results among different soil depths.
- Diane Lafex, Marianna Soil Test Lab, retired after 43 years on the job.



- We continue to make programming improvements to the LabLite LIMS system. The LIMS has not yet been completed for all analyses at the Fayetteville Laboratory. Overall, the program works very well for the Marianna Lab.
- During the fall rush solid-state generators went out on two Arcos II 160 model ICPs and were replaced at a price of about $24,000 each (November 2023 and January 2024)
- The total number of samples across all sample types submitted to the Fayetteville Agricultural Diagnostic Lab increased in 2023 compared to prior years (Table 1).
- The annual summaries of soil-test data and selected soil fertility and plant nutrition research are published in the 2023 Wayne Sabbe Arkansas Fertility Studies (Research Series 692), which is available online https://bpb-us-e1.wpmucdn.com/wordpressua.uark.edu/dist/3/599/files/2024/03/701_Sabbe_Arkansas_Soil_Fertility_Studies_2023-cd287c30beee9557.pdf
- 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)
- The soil-testing program funded about $450,000 in research for the 2024-2025 funding cycle.
- Manure data from 2005-2023 was published in Ag Data Commons in early 2024 and submitted to Univ. Minnesota Manure Db program
- An Elementar Rapid N Exceed ordered in June 2022 was installed in May 2023. The new Skalar SNC100 for carbon/nitrogen was installed in February 2023 after the initial instrument was damaged in shipping. The Fayetteville lab purchased and installed two table-top ovens, one gravity convection and one forced convection, in 2023.

Table 1. Laboratory analyses performed by the University of Arkansas Fayetteville laboratory during 2019, 2020, 2021, and 2022 (January-December).

Sample Category	2020	2021	2022	2023
Forage/Feed	1,487	1,468	2,154	1,861
Diagnostic Plant	459	395	676	733
Diagnostic Soil	107	176	132	184
Manures-Total	960	914	802	876
Strawberry Monitoring	246	194	132	183
Growing Media	160	157	172	330
Plant Samples	6,579	8,440	6,656	10,516
Soil Samples	5,010	4,144	2,928	6,095
Prepared Samples	4,824	1,816	2,053	1,543
Totals	**19,690**	**17,704**	**15,705**	**22,321**

Program Impacts (following the National format)

1. What is the Issue?
    a. Agricultural nutrient management is critical for maintaining fertile, healthy soils for profitable and sustainable crop and animal production and minimizing the environmental impact of fertilizer, manure, and soil nutrients. Tracking manure properties and soil fertility trends across time are important components of assessing the success or failures of statewide agricultural nutrient management practices that include soil-test-based recommendations.
2. What was done?
    a. The University of Arkansas Division of Agriculture maintains two agricultural laboratories in Marianna and Fayetteville, AR that focus on the analysis of soil, manure, and plant tissue for researchers and for stakeholders. Selected information from soil and manure analytical programs is archived and summarized annually. Likewise, soil-test correlation and calibration research is continually used to evaluate and develop accurate soil-test-based recommendations. A database including 19 years of manure physical and chemical properties was published in the USDA National Agricultural Library and the University of Minnesota's Manure Db project. More than 280 site-years of Mehlich-3 soil-test correlation data (11% of total data) from Arkansas were contributed to the Fertilizer Recommendation Support Tool (FRST) Project for public access to assist other states and laboratories and growers with validating or developing more accurate soil-test-based fertilization recommendations. Soil test results from Arkansas are summarized annually and published in the Wayne Sabbe Arkansas Soil Fertility Series.
3. What was learned?
    a. The annual soil-test summary data shows that over the last 17 years, soil-test sulfur concentration is declining by 0.2 to 0.4 ppm per year suggesting the risk of S deficiency may be increasing in Arkansas cropping systems. The annual median soil-test P is constant for most cropping systems. For soils used for cotton and warm-season grass forages, which have the highest median soil-test P values, soil-test P is declining by 1.8 to 2.4 ppm per year likely due to the movement of poultry litter outside of nutrient surplus areas. Both trends suggest overall responsible use of phosphorus-containing fertilizers. The median soil-test K values for multiple row crops are declining by 1.2 – 2.6 ppm per year. The decline in soil-test K for forages is 2.8 ppm per year over the last 16 years and is at a point that indicates that K deficiency in forages is highly probable on more than one-half of the acres in Arkansas. The manure data and soil test correlation data are

of great interest as they have been frequently downloaded or used in the FRST decision-support tools.

4. What were the impacts?
    a. The Arkansas soil test program provides analysis and recommendations on an estimated 80-90% of the soil samples collected in the state. The wide use of our soil testing service provides end users access to science-based recommendations on row and forage crops that are grown on more than 8 million acres in Arkansas annually. The analytical services performed by the two labs serve researchers and stakeholders alike. These data and summaries have been used to establish new research programs to validate current recommendations and educate stakeholders via research reports, field days, educational meetings, and contribute to nutrient management planning. The FRST database serves as an archive for Arkansas soil fertility research and ensures that the scientific basis of agronomic recommendations is not lost due over time and the data are transparent and available to the public.

Annual Report of Soil Testing Activities to SERA-6

June 2024

Bloomington, MN

WEST VIRGINIA UNIVERSITY SOIL TESTING LABORATORY

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*Sample numbers and services (year 2023)

Services:

The lab analyses only soil samples. The following services are provided:

Routine test includes: Ca, Mg, K, P, P saturation (%), water pH 1:1, Mehlich buffer pH. The routine soil analysis is at no cost for WV residents.

Other analysis: Organic matter (OM, loss by ignition), Electrical conductivity (EC, 1:1 water). Micronutrients and other elements: Na, Zn, Fe, Al, Mn, Ni, Cu (Micros extracted with Mehlich 3). The other analyses are at cost: $6 for OM, $3 for EC, and $5 for Micros.

Sample numbers:

Routine test

TOTAL SAMPLES ANALYZED in 2022 (**routine analysis**): *7116.*

Not "officially or disclosed" commercial samples: 4953

Homeowners' gardens samples: 1120

Research projects from WVU and other universities: 577

Other analysis

Total samples analyzed for Organic Matter: 1,126 (15.8%)

*Lab Personnel numbers or changes:

No personnel changes occurred in 2023:

Lab personnel FTE's: 1 + Special Payroll (2.5 months) + Student Labor

*Number of Extension /Research employees working on soil testing/soil fertility:

Research employees:

We have two collaborating undergraduate research assistants that are working primarily on a SARE grant related to Soil Health analysis.

*Equipment/supply notes or upgrades:

No upgrades occurred in 2023

Instrumentation: Perkin Elmer 2100 ICP, scales, muffle furnace (3 shelves), pH meters.

*Software notes or upgrades:

An in-house (cold fusion based) management data software that works with manual data entry and generates/emails reports is our present data management system. No software upgrades, only maintenance/updates were performed by WVU Extension personnel.

*Other notes:

The number of total samples decreased as compared to year 2022. The main decrease occurred in the lab research project samples analyzed. However, the number of private clients' out-of-pocket analyses increased.

The lab was contacted by WV schools, extension agents, and WVU instructors (courses) to provide tours and explain how the soil testing lab functions.

Conservation agencies have contacted the lab to request expedited analyses for late sample submission from farmers participating in cost share programs. We have worked with WVU Extension to fulfill other clients' information requests around the state.