

## Joint Meeting of the Regional Soil Testing Workgroups

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North Central Region (NCERA-13)  
Southeastern Region (SERA-6)  
Northeastern Region (NECC-1012)  
State College, PA  
July 18-20, 2016

### Monday Afternoon, July 18, 2016

*Welcome and Introductions* – John Spargo of Penn State welcomed everyone and participants were asked to introduce themselves. John gave an overview and logistics of the conference.



Participants of the joint meeting of the Regional Soil Testing Workgroups.

### After the introduction, a series of talks related to soil health were given by various participants:

1. **Development of Soil Health Assessment** by Danial Mobius-Clune. Danial discussed about the general logic of soil health assessment framework that includes soil function and processes involved, indicator selection, scoring, reporting of data and interpretation, and medium and long term management recommendations.

<http://aesl.ces.uga.edu/sera6/filehost/Development%20of%20a%20soil%20health%20assessment%20framework%20G%C3%87%C3%B4%20Danial%20Mobius-Clune.pdf>

2. **Soil Health Assessment and Conservation Planning** by Brandon Smith. Brandon discussed about NRCS soil health program as the centerpiece of its conservation planning. He also indicated that NRCS and its partners helped install soil health practices on more than 40 M acres of working agricultural lands.

<http://aesl.ces.uga.edu/sera6/filehost/Soil%20health%20assessment%20and%20conservation%20planning%20G%C3%87%C3%B4%20Brandon%20Smith.pdf>

3. **Using Active Organic Matter Measurements to Predict Agronomic Performance** by Steve Culman. Steve defined organic matter and its importance, discussed ways to measure active organic matter and shared his results with the group.

<http://aesl.ces.uga.edu/sera6/filehost/Using%20active%20organic%20matter%20measurements%20to%20predict%20agronomic%20performance%20G%C3%87%C3%B4%20Steve%20Culman.pdf>

4. **Do You Need a Soil Health Test?** By Charlie White. Charlie reviewed various research projects that address soil health and weighed in on the pros and cons of soil health testing.

<http://aesl.ces.uga.edu/sera6/filehost/Do%20you%20need%20a%20soil%20health%20test%20G%C3%87%C3%B4%20Charles%20White.pdf>

5. **Proficiency of Soil Health Methods** by Robert Miller. Bob discussed about the various methods of assessing soil health and showed some data uncertainties and lack of precision likely due to sample preparation and other factors.

<http://aesl.ces.uga.edu/sera6/filehost/Proficiency%20of%20soil%20health%20methods%20G%C3%87%C3%B4%20Robert%20Miller.pdf>

The session on oral presentations was followed by an open discussion on how can soil health testing be used to inform management decisions. The Monday afternoon session adjourned at 5:30 p.m.

After the meeting adjourned, the group was treated to a nice cocktail Hors d'Oeuvres reception while viewing the exhibits of the meeting sponsors: ALP, NAPT, EA Consumables, Elementar, Spectro Analytical, Texas Scientific Products, Timberline.



## Tuesday Morning, July 19, 2016

The group visited the Agronomy Farm. Penn State and USDA researchers graciously presented their research activities to the group.



The farm visit was followed by a tour of the Agricultural Analytical Services Laboratory led by John Spargo, the director of the lab. John and his team showed various instrumentation, described the various tests offered and their research projects.



## Tuesday Afternoon, July 19, 2016

Two research papers were given:

1. ***Testing of Undried Soil Samples to Improve Assessment of Potassium Needs by Crops*** by Antonio Mallarino

<http://aesl.ces.uga.edu/sera6/filehost/Testing%20of%20undried%20soil%20samples%20to%20improve%20the%20assessment%20of%20potassium%20needs%20by%20crops%20G%3%87%C3%B4%20Antonio%20Mallarino.pdf>

2. ***Evaluation of Sulfur Needs for Corn in Pennsylvania*** by Doug Beegle.

<http://aesl.ces.uga.edu/sera6/filehost/Evaluation%20of%20sulfur%20needs%20for%20corn%20in%20PA%20G%3%87%C3%B4%20Doug%20Beegle.pdf>

Three meeting sponsors, Spectro Analytical, EA Consumables, and Elementar, were given fifteen (15) minutes each to present their products that have utility in soil testing laboratories.

After the afternoon break, each regional workgroup conducted their business meeting. Notes for the SERA -6 Workgroup Meeting are presented at the last section of this minutes.

### **Wednesday Morning, July 20, 2016**

***A brief history of soil testing, beginning with see, smell, and taste, and culminating with soil health testing*** – Charles Mitchel, Auburn University

<http://aesl.ces.uga.edu/sera6/filehost/History%20of%20SERA-6%20and%20soil%20testing%20in%20the%20South%20G%C3%87%C3%B4%20Charles%20Mitchel.pdf>

***Land grant university fertilizer recommendations: An overview and call to action, again*** – Brad Joern, Perdue University

<http://aesl.ces.uga.edu/sera6/filehost/Land%20grant%20university%20fertilizer%20recommendations%20An%20overview%20and%20call%20to%20action%20G%C3%87%C3%B4%20Brad%20Joern.pdf>

***Better fertiliser decisions for cropping systems in Australia*** – Tom Bruulsema, IPNI

<http://aesl.ces.uga.edu/sera6/filehost/Better%20fertiliser%20decisions%20for%20cropping%20systems%20in%20Australia%20G%C3%87%C3%B4%20Tom%20Bruulsema.pdf>

***Discussion, Soil Test Calibration in the 21<sup>st</sup> Century***

***ALP update*** – Robert Miller, ALP

<http://aesl.ces.uga.edu/sera6/filehost/ALP%20update%20G%C3%87%C3%B4%20Robert%20Miller.pdf>

***NAPT update*** – Grant Cardon, Utah State University

<http://aesl.ces.uga.edu/sera6/filehost/NAPT%20update%20G%C3%87%C3%B4%20Grant%20Cardon.pdf>

The meeting adjourned at 12:00 p.m.

## SERA-IEG 6 BUSINESS MEETING

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**Tuesday 3:30 pm, July 19, 2016 – SERA – IEG 6 Regional Workgroups**

**Welcome and Introductions, Larry Oldham Presiding**

### **Administrative Adviser Remarks**

**Dr. Steve McKinney** (Research): Dr. McKinney expressed appreciation to the group's research activities and involvement in the discussion of Soil Health Initiatives pushed by NRCS. McKinney encouraged the leadership of SERA-6 to think about making application for the Experiment Station Section Award for Excellence in Multistate Research. The criteria and timeline for the award shown in Appendix A. McKinney suggested that data indicating stakeholder impact will be a key factor in the competitiveness of a SERA-6 package. He also encouraged SERA-6 to write a letter to the Southern Association of Agricultural Experiment Station Directors and the Association of Southern Region Extension Directors regarding the concerns with the soil health index.

**Dr. Tom Obreza** (Extension): Dr. Obreza commended the group for their work and make extension relevant to the needs of the growers, researchers, students and the general public. As the liaison to the Association of Southern Region Extension Directors (ASRED), he provides two-way communication and support for the mission of SERA-IEG-6. The most recent issue surrounds the NRCS Soil Health Initiative and the concerns SERA-6 has about the insufficient science base to support the soil health concept. The group's concern was conveyed to Sonny Ramaswamy by ASRED Executive Director Ron Brown. That communication led to high-level talks in Washington DC between NIFA and NRCS leadership about soil health education and the role of the Land Grant Universities. Those with knowledge of what happened at this meeting said that it "went well," but the effect on NRCS management of the Soil Health Initiative remains to be seen. I will keep SERA-6 informed as I learn more.

### **Soil Health Issues**

Leticia informed the group about the outcome of the Soil Health Meeting/Workshop at the Noble Foundation in Ardmore, OK. The said workshop called "National Soil Health Assessment Indicators Meeting" was intended for participants to focus on building consensus on soil health indicator methods that would be ready for production labs – private and university labs. She described the meeting to be filled with questions with no answers and that several participants expressed the need for more research to be able to understand the data and make appropriate recommendations. The participants were divided into subcommittees to critically review indicator SOPs. A follow up meeting was proposed.

### **New Leadership and Election of Officer**

Leticia Sonon will move to the Chairmanship of the SERA-IEG 6 Workgroup as Larry Oldham's 2-year tenure as Chair will complete in 2016. Gobena "Gobi" Huluka of Auburn University was unanimously elected to be the incoming secretary of the SERA-IEG 6 Workgroup. He will succeed Tony Provin, who will be the Vice Chair in the coming year, replacing Leticia.

## SERA-IEG 6 STATE REPORTS

### **Alabama** (Gobena Huluka)

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The total number of routine soil samples we analyzed is about the same as it was last year (~25,000 samples). Our non-routine soil samples are also about the same they were last year due to limited grant activities and availability of other research labs that provide services at lower costs. The same is true for plant analysis.

Our forage analysis has gone through big changes. We started offering NIR analysis almost two years ago and raised our overall prices from \$10.00 per sample to \$15.00 for our basic analysis. Because of this, our number of samples is down by about 40% from pre-NIR pricing. Now, our customers can submit their samples online, get reports and make payment and have unlimited access to report. We also conducted a very successful Forage Test Advisory Committee meeting that involve academic, extension and producers.

Our number of water remains much lower that what it was three years ago, but about the same as last year. More than any of our services, our water samples are affected by research sample since the overall non-research number of are small. We started offering an **Alabama Soil Quality Index (SQI)** test services. For \$50.00, we provide Routine soil test, ECEC, base saturation, soil group, extractable micronutrients (Cu, Fe, Zn, Mn, B, Pb, Co, Cr, Ba, and Cd, soil organic matter, soil respiration, aggregate stability/slaking test and EC. Also, Solvita test is offered on a limited capacity for clients who request the service. Dr. Charles Mitchell has officially retire on April 1, 2016, but he will also be around to help. We are finishing up interviews to find a replacement for his position. Dr. Mitchell will be a great ambassador and a spokesperson for our lab always even if he is retired.

### **Arkansas** (Soil Testing and Research Laboratories, Marianna & Fayetteville) – Nathan Slaton, Diane Lafex, Cindy Herron, and John Hatten)

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#### ***Laboratory Analyses and Operation***

The Marianna Laboratory analyzed 146,179 client samples in 2015 (January – December) which is slightly below the 5-year average (~164,500/year). Grid samples (102,554) accounted for 70.2% of the total samples analyzed at Marianna – more than double the number of ‘field-average’ samples 43,625. October and November are now the two busiest months (30,000 to 45,000 samples submitted each month) for routine soil analysis at the Marianna Laboratory due primarily to grid soil samples. Turnaround time is a major issue with clients with the expectation of results in less than 1 week. Waypoint lab (formerly A&L) in Memphis continues to offer next day turnaround analytical services to clients.

Table 1. Laboratory analyses performed by the University of Arkansas Fayetteville and Marianna laboratories during 2015 (January-December).

Sample Category	Fayetteville Lab	Marianna Lab	Total
Forage/Feed	1,112	--	1,112
Diagnostic Plant	318	--	318
Diagnostic Soil	158	--	158
Manures-Total	1,192	--	1,192
<i>Dry Manures</i>	999	--	999
<i>Liquid Manures</i>	193	--	193
Strawberry Monitoring	245	--	245
Orchard Monitoring	13	--	13
Growing Media	18	--	18
Plant Samples	9,250	768	10,018
Soil Samples	2,088	146,179	148,267
Prepared Samples	12,301	--	12,301
Totals	28,090	146,947	175,037

### ***Personnel Changes***

Three long-term laboratory employees retired in 2015 or early 2016 including Doug Carroll (Marianna Lab), Betsy Murdock (Fayetteville Lab) and Nancy Wolf (Fayetteville Lab).

Dr. Morteza Mozaffari was transferred to the Keiser Research Station to continue his research effective January 1, 2016. Diane Lafex and Cindy Herron were promoted to manage daily activities at Marianna and Dr. John Hatten was hired to manage the Fayetteville laboratory. Nathan Slaton is now serving as the lead administrator for the two laboratories which were combined to form the 'Soils Unit' of the Agricultural Experiment Station.

### ***Facilities and Instrumentation***

Substantial completion of Phase 1 of the Marianna Lab construction project was achieved in October 2015 and we moved into the new laboratory building in early October 2015. Phase II (renovation of the old lab and office building) has been temporarily delayed.

We are examining a complete LIMS system to use in both lab locations that will allow both rapid (on-line) and traditional (county CES office) sample check-in and result delivery methods. Some restructuring of individual laboratory missions is being considered.

The Marianna laboratory has added two ICPs (Spectro Arcos), a new pH/nitrate robot (JKEM, St. Louis, MO) and a deionized water station robot (JKEM). The Marianna laboratory now contains a total of 5 ICPs.

Routine soil analysis in Arkansas continues to be free-of-charge with sufficient funding provided by Fertilizer Tonnage Fees. However, beginning January 1, 2016 analysis of electrical conductivity and nitrate became fee-based analytes for samples submitted to the Marianna Lab unless they are standard measurements for the crop code. Fees for manure, plant, and soil analysis were increased at the Fayetteville Lab on January 1, 2016.

Both labs continue to sign an annual APHIS agreement (annual requirement) requiring soil samples be processed (heated to 150°F) to minimize or prevent the spread of fire ants. Both the Marianna and Fayetteville Laboratories are located in areas that are listed as not being infested with fire ants.

### ***Publication***

The annual summary of soil-test data and selected soil fertility and plant nutrition research was published in the Wayne Sabbe Arkansas Fertility Studies 2015 which is available on-line <http://arkansasagnews.uark.edu/633.pdf>.

## Florida (Rao Maylavarapu)

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The total samples for all four labs was 45,781. Last year, the total was 45,975. The change was -0.42%. It breaks down as follows:

	FY15-16	FY14-15
ARL	25,452	26,091
EWQL	2,998	1,306
ESTL	16,976	18,298
LWTL	355	280

There has been some changeover in lab personnel since the retirement of two people and another two leaving in the last year. We have hired a new chemist for ICP analysis and have advertised for another chemist.

### ***New Instrumentation***

We purchased a new Spectro ARCOS near the end of last year. We have recently purchased a new Elementar Vario Max Cube CNS analyzer and a LabFit AS-3010 pH Analyzer. These will be delivered soon.

## Georgia (Jason Lessl)

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### ***Sample Numbers:***

The total number of samples received at the Agricultural and Environmental Services Laboratories (AESL) of the University of Georgia slightly decreased (~4.4%) relative to last year's submission. The breakdown is shown in the table below.

Sample Type	May 2014 - April 2015	May 2015 - April 2016	Difference
Soils	73128	66883	-6245
Manures	1379	1581	+202
Waters	7867	9084	+1217
Plants	5073	4617	-456
Feed and Forages	5114	4777	-337
Microbiology	2576	2989	+413
Georgia EPD contract	764	1796	+1032
<b>TOTAL</b>	<b>95901</b>	<b>91727</b>	<b>-4174</b>

### ***New Initiatives***

- **Began the process of certifying the AESL laboratory for ISO 17025:2005 accreditation**  
This is in response to the requirement for Georgia fruit and vegetable producers have their wash water routinely analyzed by an ISO certified lab before selling to chain stores.
- **Started offering Radon testing in water by liquid scintillation August 2015.**  
This is in response to the identification of high concentrations of uranium in private well water, especially in homeowners living on or near the fall-line, the boundary between the piedmont and coastal plain regions in Georgia.
- **Created a water test package specific for Home Loan Closings in January 2016.**  
Many mortgage and home loan companies changed their requirements for water testing on private wells. This test package (*E. coli*, total coliform, nitrate, nitrite, and lead) was created to cover the most common tests required to reduce confusion for home buyers.
- **Crop and Environmental Quality Laboratory**  
This newly established laboratory consolidated the Pesticide and Crop Quality lab which conducts pesticide residue analysis and flavor quality analysis. The flavor quality tests include brix, onion pungency, lachrymatory factor, sugar profile, methyl sulfide analysis, fatty acid profiles and lipid analysis of horticultural crops such as onion, blueberry, watermelon, olive oil, and wine grapes.

### ***New Fee Schedule***

Fee increases were instituted Jan 2016. Routine analysis of soil remained the same price (\$6 per sample) while all other fees were increased 15-25%.

### ***New Instrumentation/facility***

- 1) Mars 6 CEM Microwave Digestion System
- 2) Kjeltex 8400 Automatic TKN Analyzer
- 3) FOSS Tecator Line Digestion System 2520
- 4) ANKOM A2000 Fiber Analyzer
- 5) Orion Star A212 Conductivity Meter

## Kentucky (Frank Sikora)

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Number of samples in both Lexington and Princeton remained similar to annual number over last 15 years at approximately 50,000.

Soils lab supervisor position in Princeton is open due to retirement of Paula Hill. Applications now being received until August 7<sup>th</sup>.

Solomon Kariuki filled the position of Feed/Fertilizer/Milk lab manager in March 2015.

Our department is preparing to sample and analyze lime samples as a contract lab to Kentucky Department of Agriculture in enforcing the Kentucky Lime Law.

Frank Sikora has completed 3 years in his new position as lab director of all labs in the department (Feed, Fertilizer, Seed, Bulk Milk, Soil).

Spectro Blue ICP was purchased and is being used for initial screening analysis of P and K in fertilizer.

A new LIMS system was purchased from LabLynx and has been in operation for the last year. The program took 2 years to develop and customize for our use. A lot of customization involves use of MS Access to prepare worksheets and enter lab data.

Frank is involved with the fertilizer proficiency sample program in the American Association of Plant Food Control Officials (AAPFCO) and will send out information on the program to the SERA6 listserve for any that may be interested (<http://www.magrunderchecksample.org/>).

## Louisiana (Michael Breithaupt)

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Fiscal Year 2016					
<i>Test</i>	<b>Soil</b>	<b>Plant</b>	<b>Water</b>	<b>Soilless Media</b>	<b>Total Number of Samples analysis by STPAL For FY 2016</b>
<i>Number of analyzed</i>	17,768	8,026	430	65	26,289
<i>-/+ over FY 2015</i>	+5%	+9%	+69%	+30%	7%

For the FY 2016, STPAL analysis total 26,289 samples which was the highest volume in recent years. Water testing increase because the recent drought and to track salt water intrusion to northern Louisiana.

Changes in equipment are Hach 900 for testing of nitrates and LECO CN 628. The CN 628 will be dedicated to the testing plant tissue and the older LECO TruSpec for soils. Beta testing a LIMS system and hopefully a working version before the end of the year.

### **Mississippi (Keith Cruse)**

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Soil and tissue samples analyzed in year 2015-2016 were 22,019 and 1,735 respectively. Which is approximately 11% increased from FY 2015. MSU-ES Soil Testing had a technician retired in June 2016. Due to budget constraints and sample load, Dr. Cruse is not expecting to be able to fill the vacant position.

### **North Carolina – Soil Testing (David Hardy)**

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The Soil Testing Section analyzed 306,117 soil samples in **FY2015**: 284,357 predictive; 15,732 expedited; 2,707 diagnostic; 2,100 research; 783 from witchweed-infested areas; and 438 heavy metals. Reports issued with fertilizer/lime recommendations totaled 36,790. For the FY just ended- **FY2016**, sample volume was down due to an extremely wet winter.

The lab placed an automated dispensing station online this past year; this was mentioned in last year's report. It is a custom-designed unit that dispenses 12 bottles of Mehlich 3 and also 12 vials of NaOH for humic matter analysis at one time. Bottles are loaded / placed on a conveyor belt that moves bottles to a dispensing manifold where solutions are delivered; afterward, the belt moves the bottles to the opposite end for unloading. This will increase our efficiency and also improves ergonomics and safety concerns for chemists.

The lab has purchased another robot for humic matter analysis. It is expected to be online in September, 2016. The lab has also purchased another ICP- Spectro Arcos Multiview with it being online in September 2016. The lab is now outfitted with 6 ICPs. Although this ICP can provide axial and radial view, it will be dedicated radial for soil testing.

With the above improvements, the goal is to analyze 3600 samples (100 sets) in an 8-hour day. To do this, we also plan to stagger work hours for chemists to extend the time the lab is in operation.

The lab made extensive revisions to its SOPs and QA manual this past year.

The Division continues its efforts in research. During the summer of 2016, the second year of a lime study continued with corn for the evaluation of lime source and rates. A B study with flue-cured tobacco continued for a second year. A soil K calibration / validation study began with soybeans; this project is planned for 3 years. All studies are being conducted in conjunction with faculty from NCSU- Crop and Soil Science Dept.

## North Carolina - Plant tissue, Waste, Solution and Soiless Media

(PWSM) (Kristin Hicks)

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For Fiscal Year 2016, we analyzed 10,995 plant samples, 15,918 waste samples and 4,548 solution and media samples for a total of 31,461 samples which was the highest volume since 2007. We had fewer plant samples this year due to the poor wheat crop.

**Equipment:** We are in the process of switching from TKN to combustion N for liquid animal waste. This is looking to be a lengthy and cumbersome process as we will need approval for NCDEQ for the change in methodology. If anyone has been through this process and would like to offer some input, that would be most welcome. We are likely purchasing an Elementar Rapid Exceed this fiscal year and have evaluated it with our MAP samples, NCDEQ proficiency samples and in-house samples and have been pleased with it's accuracy and precision.

We purchases a second ICP from Spectro. It is an Arcos II Multiview

We bought a new solid waste grinder, replacing a 30 year old wiley mill. It is a variable speed Retsch SM 300 and is much faster and has better capture of particulates.

**Methodology:** We are in the process of changing our method of measuring plant petiole nitrate from an ion selective nitrate electrode (Thermo) to auto-segmented flow analyzer. That change will likely to take place in the fall. It may affect our recommendations for petiole nitrate nitrogen for strawberries and possibly cotton. The electrode tends to read higher than the colorimeter and the research and recommendations reported in the Reference Sufficiency Ranges for Plant Analysis guide were likely developed using an electrode.

We changed our sufficiency ranges for P and Ca in Fraser Fir based on research done by my predecessor.

## **Oklahoma (Hailin Zhang and Kendal Henderson)**

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The total number of samples analyzed was 64,240 in 2015. We tested 28,760 routine soils, 6,015 other soil, 1,907 water, 4,944 forage, 1,152 animal waste, 3,113 other types of samples and 18,349 various research samples during the year.

We replaced our old Lachat Quickchem with a new Quickchem 8500. We will add a new Spectro Arcos ICP replacing our Ciroc by the end of this year.

No new price increases.

## **South Carolina - Clemson University Agricultural Service Laboratory (Shannon Alford)**

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Total samples analyzed (Jan-Dec 2015)

1. Soil: 49,401
2. Compost: 67
3. Animal waste: 1604
4. Irrigation water: 690
5. Plant tissue: 2067
6. Feed and Forage: 713
7. Other- Research/Commercial (non-agricultural): 4182

### ***New equipment***

1. FOSS Kjeltex 8400 instrument for nitrogen analysis; installed 4/29/16

### ***Personnel Changes***

2. Dr. Kathy Moore retired from Lab Director position June 30, 2016.
3. Dr. Shannon Alford replaced Dr. Kathy Moore as Lab Director June 2016.

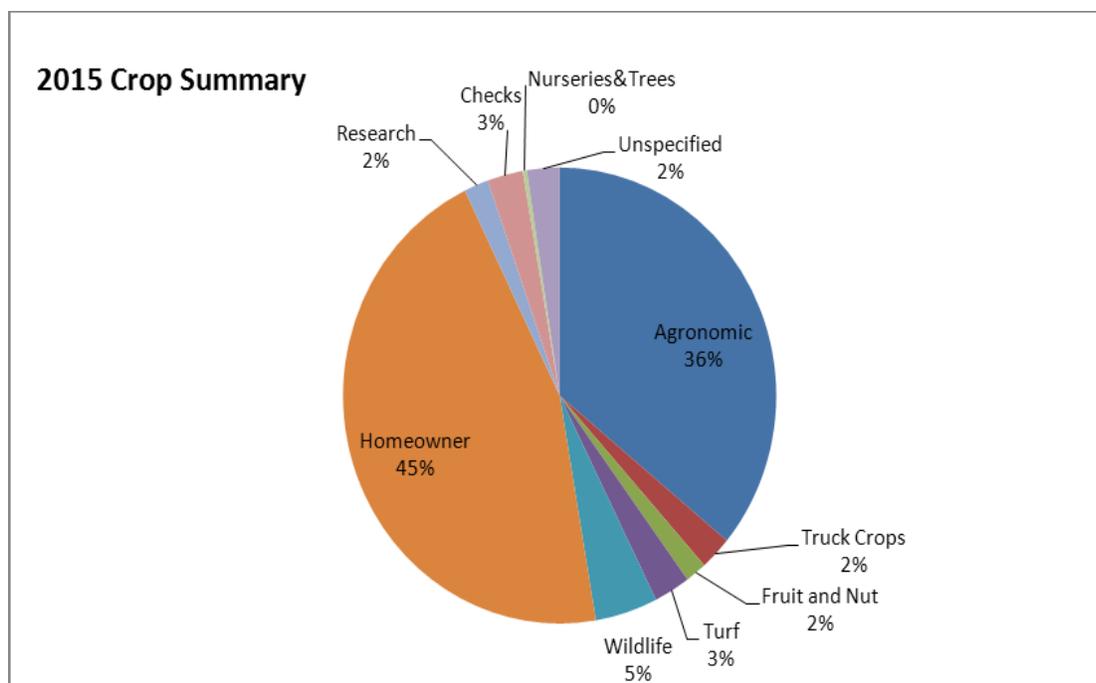


Figure 1. 2015 Crop Summary for Soil Samples

## Tennessee (Debbie Joines)

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SPPC analyzes soil, forage, plant tissue samples with additional services of plant disease and insect diagnosis for producers, homeowners and researchers in all 95 counties of the state. All are fee based services with exception of weed id.

January 2015 thru December 2015, our sample totals were as follows:

Soil – 19,465 (16% decrease)

Forage/Plant Tissue – 3,092 (28% decrease)

Plant Problem/Disease/Insect ID – 572 (16% increase)

### **Equipment**

Purchased SCP Science DigiPREP Jr. 24 position block digestion system

### **Personnel**

We have 1 full time lab technician, 1 full time diagnostician, 2 full time administrative support personnel and 1 seasonal employee.

Minutes prepared by:

Leticia Sonon

9/8/16