**Southern Extension and Research Activity Information Exchange Group 6**
**Nutrient Analysis of Soils, Plants, Water, and Waste Materials**
**Annual Meeting**
**Mississippi State Univ., Starkville, MS**
**June 13-15, 2010**

**In Attendance**:
**1. Administrative**
--Rao Mylavarapu, Chair
--Frank Sikora, Vice-chair
--David Hardy, Secretary
--David Kissel, Extension Administrative Advisor
--Steve Workman, Research Administrative Advisor
--Others Group Participants: Charles Mitchell, Gobi Huluka, Doug Carroll, Cindy Herron, Morteza Mozaffari, Robert Miller, William d'Angelo, Leticia S. Sonon, Bob Issac, Uttam Saha, Jake Mowrer, Jim Wang, Keith Crouse, Larry Oldham, Manjula V. Nathan, Brenda Cleveland, Hailin Zhang, Kendall Henderson, Kathy Moore, Debbie Joines, Hugh Savoy, Tony Provin, J. Leon Young

**2. Local host: Larry Oldham and Keith Crouse**

**3. State Representatives: See Participants Listing**
(http://www.clemson.edu/agsrvlb/sera6/participants1.htm)

**4. Sponsorship:**
a. Elementar Americas, Inc. – Nathan Wreyford
b. Perkin Elmer – Jim Durrett & David Bass
c. Spectro Analytical – Bob Dussich
d. LabFit- Bob Issac
e. MSU Foundation for the Division of Agriculture, Forestry, and Veterinary Medicine- Charles Weatherly

**June 13, 2010, Sunday**

**6:00PM**
After registration, Keith Crouse welcomed the group and dinner was provided. The sponsors briefly introduced themselves. Bob Issac representing LabFit gave a brief presentation on the pH robot.

Rao thanked the sponsors and suggested self-introductions since new people were present.

**7:30PM**

**State Reports**

**Texas- Tony Provin**

Texas AgriLife Extension Service Soil, Water and Forage Testing Laboratory
Currently renovating building 806 for fall relocation of laboratory.

Soil salinity remediation of Hurricane Ike tidal area

- Over $4.5 million of savings to producers of input costs
- Interfaced with FEMA, state and local officials
- Recognized with two awards:
  - Superior Service Award for Extension Programming
  - Vice Chancellor's for Excellence

Profile N testing and outreach program

- Portion of this recognized last year (2009) for Texas Environmental Excellence Award in Agriculture

Current Projects and Outreach Focus

- Profile nutrient assessment for perennial forage (Potassium)
- Re-establishment of native grasses (soil analyses survey)
- Rice fertility recommendations
- In vitro Digestibility of Forage and NIR calibration
- Organic fertilizer rating and recommendations
- Pyrolysis oil and char analyses
- Fate of pyrolysis char in soil
- Loss of nutrients during pyrolysis
- Mehlich III standardization study

Lab analytical samples

| | 2009 | 2008 | 2007 |
|---|---|---|---|
| Soil | 29315 | 28120 | 28940 |
| Water | 1806 | 1257 | 1333 |
| Plant/forage | 6337 | 5378 | 6579 |
| Biosolids | 1363 | 1897 | 1799 |
| Research | 14040 | 9703 | 8738 |

**Tennessee- Debbie Joines**

**University of Tennessee Soil, Plant and Pest Center (SPCC) - Nashville**

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. These are fee based programs.

September 2008 thru August 2009, our sample totals were as follows:

- Soil – 25,447
- Forage – 1,104
- Plant Problem/Disease ID – 564
- Insect ID – 46
- Golf Course Problem – 61

New instrumentation includes addition of a Perkin Elmer Optima 7300 DV ICP in June 2010. Work is ongoing to upgrade software which processes invoicing and reports for all services provided. We have 1 full time lab technician, 1 full time diagnostician, 2 full time administrative support personnel and support for 3 student/part time employees.

**South Carolina- Kathy Moore**

1. Sample Totals
    a. Soil- 56720 (20% increase over last year)
    b. Plant- 4256
    c. Feed- 1193
    d. Manure- 1968
    e. Water- 365
    f. Compost- 137
    g. Other- 4529
2. Equipment- new Eberhach shaker
3. Operating off revenue now. Using a revenue carry over fund to pay salaries. Hopefully fertilizer tax money will be available to pay back the carry over and cover the salaries at the end of the fiscal year.
4. Technician passed away in May.

**Oklahoma- Hailin Zhang & Kendal Henderson**

1. The total number of samples analyzed was 60,055 in 2009. We tested 30,063 soil, 3,289 water, 3,978 forage, 1,352 waste, and 20,806 various research samples during the year.
2. We are in the process of replacing one of 2 flow injection auto-analyzers.
3. Ms. Kendal Henderson was promoted to Lab Manager to oversee the day-to-day operation of the lab. Mr. Mike Kress is still with the lab focusing on technical support and quality control.
4. A soil test interpretation for vegetable crops was established and integrated into the current computer system.

**North Carolina- Brenda Cleveland & David Hardy**

Plant/Waste/Solution/Media- NCDA&CS Agronomic Division

In FY09, the Plant, Waste, Solution and Media Section analyzed 30,400 total samples. This was a slight increase of 1.7% compared to FY08. Of these samples 10,370 were

plant (2% decrease compared to FY08), 16,586, waste (no discernible change) and 3,444, solution (a 24% increase).

In FY09, we began providing media analysis using the saturated media extract method. The above solution samples included about 240 media samples. Media Analysis is an important addition to our services as the North Carolina Greenhouse/Nursery/ Floriculture/Christmas Trees Industry is ranked number three in NC cash receipts.

I have been in the position for 4.5 years and there have been many changes in personnel. In August 2007, Dr. Michelle S. McGinnis was hired as the Agronomist for the Section. She took the lead developing every phase of the SME method. She also took charge of developing many educational tools such as the Methods and Guide for Waste and Compost Analysis, Irrigation Water Quality Guidelines for North Carolina, and the Methods and Guide for Plant Analysis. In June 2007, Mark O. Buchanan was hired as the Chemistry Lab Supervisor. He took on reviewing and implementing many improvements in QA/QC.

In summer 2009 the Section completed 3 years of a blackberry nutrient concentration baseline study because of the change in cultivars grown and production practices used in NC. This study led to revision of our blackberry sufficiency ranges. We are cooperating on a blackberry fertility experiment with NCSU Soil Science to further investigate blackberry sufficiency ranges.

A cotton nitrogen and potassium fertilizer experiment was begun in summer 2008 and continued in summer 2009. This project is investigating the application and potential benefit of petiole analysis for optimizing nutritional status and fertility management under NC production practices using the nitric acid digestion and spectrometry.

In January 2009, the Division began developing a new LIMS with a planned completion date sometime in 2011. This new system was made possible by a grant proposal written by Dr. David H. Hardy and funded by the Tobacco Trust Fund Commission.

The Division was certified as a STAR. This process was started a few years ago but really ramped up in late 2009 so it is really a FY2010 item. The Carolina Star Program is designed to recognize and promote effective safety and health management.

Soil Testing – NCDA&CS Agronomic Division

In FY2009, the lab analyzed 366,839 soil samples and issued 46,058 reports with fertilizer and/or lime recommendations. This workload set an all-time record for the Soil Testing Section, surpassing last year's record of 353,848 by 4%. Turn-around time never exceeded 6 weeks, and for much of the peak, samples were processed in about 3 to 4 weeks or less.

The Soil Testing Section placed a new Spectro Arcos ICP on-line in January- 2009 and purchased another Arcos ICP in December-2009; these purchases replaced two of the original Thermo 61E that were placed into service in 1995.

Fertility work includes soil test calibration for vinifera grapes and blueberry N fertility.

**Mississippi- Larry Oldham and Keith Crouse**

The Mississippi State University Extension Service Soil Testing Laboratory analyzed 21,286 soil samples and 1,936 tissue samples. In dealing with state, university, and laboratory budget issues, preliminary reviews of the laboratory mission and performance were conducted in early 2009 involving soils and Extension commodity faculty. Extensive market analysis of the MSU ES STL program was conducted and presented at the SERA 6 meeting.

Overall, the university has reviewed and initiated reorganization to streamline and reduce costs. Three days after the conclusion of the SERA 6 Annual Meeting, the MSU President and the Vice President of the Division announced that the Experiment Station, Forest and Wildlife Research Center (home of Brutus the bear), the College of Forestry and the College of Agriculture and Life Sciences would share administration under Dr. George Hopper, currently head of the Forest and Wildlife Research Center. The separate entities will still exist, however with the same administrators. The Extension Service is undergoing reorganization at the county level, the details of which will be announced soon.

Within the Department of Plant and Soil Sciences, Dr. Dan Reynolds is serving as interim head, and thus has administrative responsibility for MSU ES STL.

**Louisiana- Jim Wang**

The LSU Ag Center Soil Testing and Plant Analysis Laboratory analyzed 13,170 routine soils samples and 4,768 plant samples in 2009, which are similar to previous years.

The lab has begun to offer a levee test for turf grass establishment on levees. It includes measurement on nutrients, salinity, as well as sodicity.

The Lab had a price increase on all services offered. For routine soil samples, the price has increased from $7 to $10 if the number of samples is ≤10 or to $8 when the number of samples is > 10.

**Kentucky- Frank Sikora**

1. On Jan 1, we started using 1 M KCl for soil pH and Sikora II buffer for soil-buffer pH.

2. Both the Lexington and Princeton laboratory had 59,000 soil samples in 2009. 40,000 were agricultural samples.

3. Seeing a big jump in home lawn and garden samples. Sample numbers increased from 6500 in 2007 to 10,500 in 2009.

4. Updated NAPT database with data through 2008. Data are available in Access or Excel.

5. Soil test fees increased on Jan 1, 2010. Routine test increased from $4 to $5. Animal waste test increased from $20 to $25.

**Georgia- Leticia Sonon, Uttam Saha, & Dave Kissel**

Sample Numbers: The total number of samples received at the Agricultural and Environmental Services Laboratories (AESL) of the University of Georgia decreased by about 7.6% relative to last year's submission. The breakdown of these samples is shown in the table below.

| Sample Type | May 2008 - April 2009 | May 2009 - April 2010 | Difference |
|---|---|---|---|
| Soils | 80467 | 71961 | - 8506 |
| Manures | 2251 | 2412 | + 161 |
| Waters | 6126 | 7001 | + 875 |
| Plants | 4714 | 5118 | + 404 |
| Feed and Forages | 2513 | 2770 | + 257 |
| Microbiology | 1374 | 1597 | + 223 |
| Georgia EPD contract (water) | 2068 | 750 | - 1318 |
| Other | 1342 | 1547 | + 205 |
| **TOTAL** | 100855 | 93156 | - 7699 |

**Testing Fees:** The laboratories have implemented new fees adjusted to offset rising costs of chemicals and supplies. Except for routine soil test which remained at

$6/sample, all tests increased by at least 15%. New testing fees were adopted on November 23, 2009.

New Tests: The Feed and Environmental Water Laboratory has offered New Test Packages that include Non-Structural Carbohydrate for the Horse Industry. Details of these tests may be checked in the link below:

(http://aesl.ces.uga.edu/Forms/HorseTestPackages.pdf)

Certification Process: The AESL Water Testing Program is currently involved in procedures required to achieve National Environmental Laboratory Accreditation Conference (NELAC) certification. The laboratories have to accomplish additional requirements set by NELAC prior to obtaining the certification.

Instrumentation: The AESL has acquired a timberline NO3 and NH4 Analyzer.

**Florida- William d'Angelo**

- Extension soil testing lab analyzed over 13,000 which was an increase over 1,000 from last year, with more than half being homeowner samples and 25% from producers.
- Research lab analyzed over 25,000 samples with an increase of over 3,000 from last year- most of these were water samples.
- NELAC certified water quality lab analyzed about the same number as last year- 18,000 samples.
- Livestock Waste Lab that was started about 1.5 years ago, up 30%, doing over 300 samples.

Funding ourselves is a work in progress, with possibly increasing prices in the future. The cost for a soil analysis is $7.00 now and one proposal was to go up to $10 with inclusion of micronutrients. No new instrumentation. Some turnover in staff has occurred, with some full time people retiring with replacement of some with temporary staff. Presently, there is 16-member staff in the lab (temporary and full-time) and that is a large staff to fund.

**Arkansas- Morteza Mozaffari**

I. Soil Analysis

A. The total number of soil samples analyzed in 2009 was 130,258. Of this total, 119,381 were samples submitted by clientele and the remaining 10,877 samples were standard check soils analyzed for quality assurance. The number of grid soil samples analyzed in 2009 was 64,670 which are approximately 54% of all samples received which represents a 3% increase from 2008.

B. The Marianna Laboratory continues to participate in the North American Proficiency Testing Program (NAPT) coordinated by the Soil Science

Society of America. In 2009, results from quarterly soil samples continue to show the soil test results from the Marianna laboratory for Mehlich-3 extractable nutrients and soil pH are accurate and comparable to other laboratories using similar testing procedures.

Plant Analysis

A. The number of plant samples analyzed by the Marianna laboratory has decreased compared to 2008. Plant samples analyzed included 108 cotton petiole samples, and 1,023 samples were digested and analyzed for total elemental concentration (i.e., P, K, Ca, etc...), and 2,427 samples analyzed for total N. The Marianna laboratory will continue to provide analytical services for the Cotton Petiole Monitoring Program (CNMP).

II. Personnel

A. We have conducted a search to find a replacement for Mr. Josh Long (Program Technician I) who resigned to accept a position with Agrotain International in 2008. However, we were not able to identify a suitable candidate. We will continue to search for an appropriate employee.

III. Laboratory Analytical Methods, Instruments/Equipment, and Research:

- The soil pH robot system which was more than 14 years old was replaced with a new one. The manufacturer has just finished installation of the new pH robot.

- Cindy Herron prepared the documentation for renewing certification with the Arkansas Department of Environmental Quality (ADEQ).

- Organic matter analysis by Weight Loss on Ignition was performed on 794 soil samples in 2009.

- Of the laboratory's four inductively coupled plasma (ICP) units, one was purchased in 1991, two were purchased in 1997 and 1998, and the fourth unit was purchased 2006. It is becoming increasingly difficult, costly and labor intensive to maintain and operate these old instruments. We purchased a new Spectro-ARCOS ICP. We disposed of the ICP unit purchase in 1998 because that particular unit was breaking down very frequently. The instrument has been installed and we are currently testing a group of check samples on all four ICPs.

IV Service to the Public

A. Educational programs were developed and delivered at various events to increase public awareness of the U of A Soil Testing Program. There is a need to educate some of our clientele on proper preparation of soil test request forms (CES 435 form) and proper packaging of soil samples. The outcomes should reduce the turnaround time and our labor costs.

V. Miscellaneous Items

A. We need to continue purchasing new laboratory instruments for continuing soil testing services and reducing the turn around time for sample analysis.

B. Sediment/acid Trap Replacement: After the extraction of nutrients from soil, waste soil and extracting solution slurry is discharged into a sediment trap where the soil settles in the bottom and the liquid flows into the septic tank. The interior walls of the trap were crumbling due to more than 50 years of continuous use of acid-containing extracting solutions. This old trap was filled and capped off and sealed with concrete. A new 20' by 3' by 6' trap was built and is currently used for disposal of the waste soil and extracting solution slurry.

**Arkansas Laboratory in Fayetteville- Nancy Wolf** (by email)

The U of A Agriculture Diagnostic Service Laboratory located in Fayetteville analyzes plant tissue, manures, forages, research soils and plants as a fee based service.

For calendar year 2009, the total number of samples analyzed was 27,657. A breakdown of the major sample groups are forages- 902, manure-1,502, plant tissue-12,510 research soils-3,610, and partially prepared research samples at 8,752. The total number of samples was just about the same as last year. We have not increased individual analyses fees since 2005 but we are still able to continue covering salary and operating costs… for now.

We are still running analysis on manures in the Euchi-Spavinaw Watershed and gathering data on water soluble phosphorus using the 1:10 method as mandated by the courts involved in the poultry litter lawsuit. We are also now running all other manures requesting water soluble phosphorus using the 1:100 extraction ratio which is a more nationally accepted method.

We have purchased a new Spectro ARCOS radial ICP. Our 2000 model CIRROS axial ICP needed major repairs and was inoperable for almost 2 months. We are still using an Elementar Rapid N for analysis of nitrogen on plant tissue and an Elementar Variomax for C/N analysis on soils, manures, and liquid manures. We are using a Skalar SanPlus for inorganic nitrogen in soils and manures.

**Alabama- Gobi Huluka and Charles Mitchell**

- The total number of routine soil samples is about 10% less than it was last year this time and about 5% less than 2008 because of wet season in fall. Our forage, water and litter samples are about the same as last year when the research samples are excluded.
- Our routine turnaround time is 24 hours.
- We have made our services available online for payments, delivery options, lime and fertilizer calculators, and working on an improved website for our lab.

- We made temporary position to a permanent and hired a lab technician who is mostly doing data entry and some lab work.
- Our vario MACRO CHN analyzer from Elementar is doing well, but consumes more consumables that are expensive. Our existing Leco TruSpec CNS analyzer is giving us problem with frequent leak and electronic board burnouts.
- We conducted a very successful Forage Testing Advisory Committee meeting on August 28, 2009, with the presence of the dean of the College of Agriculture Dr. Richard Guthrie chairing the meeting. Departments, extension, and agricultural research experiment station attended the meeting. The state of the forage testing lab was discussed with Dr. Don Ball leading the presentation with the state forage production in Alabama. I am planning to have an annual meeting of the committee that will include agricultural consultants and producers. The main purpose of the committee is to discuss major issues pertained to the forage analysis service the lab provides and make necessary suggestions. A similar AU Advisor Committee for Soil Analysis was conducted on April 17, 2009.

**Monday, June 14, 2010**

**Administrative Session**
**Welcome**
**8:00 AM**
Larry welcomed the group to the morning session. He introduced Dr. Greg Bohach, Vice-President for the Division of Agriculture, Forestry, and Veterinary Medicine. He welcomed the group to MSU and noted he came from Univ. of Idaho about one year ago. He applauded the group's efforts and importance of such groups. He specifically commented about our website and the amount of information. The importance of our group will likely grow as population increases occur and food becomes more critical. MSU is striving to increase its enrollment over the next few years. He stated that Extension was strong and Extension planned to keep an office in all 82 counties. Maintaining balance between county staff, area staff and specialist is critical and important.

Rao introduced Dr. Steve Workman- Professor and Asst. Dean for Research- University of Kentucky who is our Research Administration Advisor and Dr. Dave Kissel, our Extension Advisor and asked for reports.

**8:15 AM**
Dr. Steve Workman mentioned that he was new to this group and said that he was impressed by the group's efforts and amount of activity on the listserve. He mentioned that budgets were suffering in every state and would likely continue; the need for documentation of achievements as related to this project will be important when it is time to write the new project; this project ends in 2012, so next year, the group will need to be discuss this.

Dr. David Kissel thanked Keith and Larry for their efforts in organizing the meeting. There were a couple of publications that received numbers this year.

- Methods Manual was updated by Hugh Savoy with number attained last fall.

- Cotton Publication was completed by Charles Mitchell with a number effective first of 2010.

**Technical Session**

**8:30AM**
**Southern Soil Testing History- Charles Mitchell, Auburn University**
Charles began with a historical overview of soil testing and soil fertility that included discussion of major contributors to our science, instrumentation and methods. Various acts were important to its development- Morrell Act and Hatch Act. Soil testing as we know it today really started in the Midwest with the work of Bray, Spurway, and Truog. By 1954, all southern states had a soil testing laboratory. Kathy Moore was called upon to present a manual from 1957 where studies from the 30's were documented to verify low pH and lime needs from some 2 million samples. This was instrumental in the efforts of southern labs beginning. He commented that the "father of soil testing for the south" was Dr. Adolf Mehlich. In 1954, the first meeting of a Southern Region Soil Testing Committee (same 13 states) was held. In 1962, it became an official experiment station-sanctioned group called the S52 Committee (Soil Test Work Group) and in 1983, the group's name was changed to SRIEG-18 (Southern Research Information Exchange Group); in 1981, the name was changed to SERA-IEG-6 (Southern Extension and Research Activity Information Exchange Group). The "6" is the order of the groups as they were established. The group is starting in its 5$^{th}$ rotation and the first meeting in 1954 was held in TN. In 1984, the first joint meeting with NCR-13 occurred and since then we have rotated between NCR and NE groups; joint meetings are held every 4 years. He then mentioned some key achievements of the group: 1) Adams and Evans Lime Buffer Method in 1962, 2) computer use in 1965 Dr. Tom Cope at Auburn, Mehlich's achievement (extractants and buffer method), 3) Dr. Rouse at Auburn published a bulletin called the Basis for Soil Testing in Alabama which contained calibration charts for different soils, and 4) Dr. Lancaster at MSU for his work soil test calibration. Scientists from each state who contributed significantly to the group were then discussed.

**9:15 AM**
**MS Soil Testing Summary and Current Markets- Larry Oldham- MSU**
Larry discussed soil testing summary data from MS and historical trends as related to significant events in agriculture and how these impacted soil sampling. His efforts in organizing the data are partly due to a need to review current markets and potential fee increases as budgets tighten. Key factors impacting sample volume: acreage in production with 1983 PIK program and 1995 Farm Bill decreasing acreage and decreasing samples, imposition of fees (July 1983- $3.00, 2001- $6.00) decreased sample volume but it stabilized afterward, shift to consultant-managed acreage in the past 25 years or so resulting in samples being sent to private labs (due to contracts with fertilizer companies or consultants and also differences in recommendation philosophies between public and private labs). There is no correlation between fertilizer sales (lb of nutrients sold) and soil sample volume over the past 36 years. Trends in sampling from early 70s to late 2000s indicate: cotton samples decreasing linearly from 25% to 5% of samples; feed grains (corn) showed significant increase to about 10% of sample volume today; soybeans is about 10% of volume today, greatly down from the past; pasture and hay samples have increased due

to cost-share programs and nutrient management plan requirements of NRCS. Projections show pasture and hay is growth area due to time series analysis. Cotton samples may totally disappear. Horticultural crops are about 6% of market and will likely not be a big growth. Lawns and turf increased until about 2006 but have leveled off. Vegetable gardens are about 400 samples per year, surprisingly low. Right now their total sample volume is about 18,000 to 19,000 samples per year but projections place them at about 16,000 in the future over the next 10 years. Since the lab's beginning, 2.2 millions samples have been analyzed over the past 62 years.

**10:15**

**The Mississippi Lime Requirement Contest- Michael Cox, MSU**

Michael presented data as related to comparison of exchangeable acidity and lime requirement methods currently used in the southeast (Moore-Sikora, Sikora, calcium hydroxide titration, modified Mehlich, modified Adams-Evans) against those from the Modified Woodruff buffer. They are interested in possibly changing buffer methods to avoid the hazardous compounds contained in the Modified Woodruff buffer. Eighteen soils were used with a range of pH and CECs. Results of the study were inconclusive and left unanswered questions. The group commented that this was a very difficult study to undertake in that running unfamiliar buffer methods is extremely hard. An exchange of soils with labs that run different buffers may help with this work.

**11:00AM**

**Nutrient Use and Reduction Strategies in the Mississippi Basin- Richard Ingram, DEQ, MS**

Richard gave an overview of water quality concerns due to nutrient enrichment in the MS river basin and Gulf of Mexico. He talked about nutrient management strategies and other BMPs used to improve water quality in the delta region in a project that began about 1.5 years ago.

**11:45 PM Sponsored LUNCH**

**1:00 PM**

**Renewed Interest in Blueberry N Sources for North Carolina Production- David Hardy**

David discussed the importance of blueberries to NC agriculture and also mentioned that most growers do not soil test. Part of the reason is that blueberries do not respond much to a wide range of nutrients- typically only N and P, and sometimes Cu. Current fertilization is a standard fertility program based on applications of 14-28-14 developed over 30 years ago with older varieties. Growers are interested in newer varieties and possible response differences. Plant growth and tissue nutrient analysis results were discussed from a 2009 N trial with varying N sources. No differences existed in N levels in leaves sampled in June among treatments; lower levels were found in the control. Visual growth differences and plant measurements among treatments were noted but variability was great.

**1:45PM**
**NCERA-13 Update- Manjula Nathan, Univ. of Missouri**
Manjula gave greetings from the NCAR-13 group. She commented that the NCR group had been losing membership due to some labs closing and the retirement of older faculty. Last year was a good one as most states had active participation. There were concerns with group's membership as well as activity. It was decided to invite selected private lab representatives to join us for an afternoon after the educational workshop the group conducts every other year in the area of soil and plant analysis, interpretations and recommendations. This will enable selected invited members from the private sector labs that attend the workshop to join the meeting and participate for a few hours and give their perspectives from the private labs. The group is in the process of revising the methods manual; it was decided that it will be an on-line publication for now so that revisions can be made when required. TheNCERA-13 group is in the process of developing a website and she said that the group would use the SERA-6 website as a guideline to develop theirs. The group continues to look at method development, extraction methods, SOM, and environmental aspects of P. The Sikora buffer method will be included in the method manual since some states now use it. The joint meeting with SERA-6 will be held in 2012 and the location will be determined soon. She also commented on a member from the SERA-6 group to attend the NCERA meeting; the chair of SERA-6 normally attends.

**2:30 PM – 5:30 PM TOURS: South Farm Arboretum, Deer Pens, The Teaching Landscape of Dorman Hall, Watermelon, Dairy Plant, The MSU Rose Garden, Soils Labs Tour**

**6:00PM – 8:30 PM Sponsored Dinner**

**Tuesday, June 15**

**CONCURRENT TECHNICAL SESSION**

**Laboratory Specific Issues Section**

**8:00AM**
**Electrode Rinsing in LabFit pH Equipment- Frank Sikora, UKY**

Frank discussed his work with pH rinsing using the LabFit. Rinsing amounts to about 30 minutes per 120 samples, so foregoing a rinse will save time. The water pH data presented showed that rinsing after reading all samples may provide a more accurate pH by about 0.2 pH units. If probes are rinsed only preceding samples with pH < 5 or > 7, a sample reading of 5.1 for example may still have an effect on the following sample. The control sample data for a sand and sandy loam soil showed failure of check samples outside of 2sd was due to either low or high pH samples preceding it without rinse. Silt loam controls had more buffering and did not show this. Experiments conducted with the buffer readings showed no need to rinse. The overall effect of whether samples may be affected if not rinsed would depend on the concentration of H of the preceding sample. The observation was also made with there being carryover of sample on the stir bar from sample to sample if not rinsed.

Changing the blades to a flat nature eliminated the carryover and the UKY lab has gone back to not rinsing unless prior sample were pH < 5 or > 7.

**8:20 AM**
**pH and ICP Quality Control and Maintenance- Kathy Moore, Clemson**

An overview of QC as related to the use pH electrode and ICP was presented. pH is run with 100 samples per set including 2 QC samples randomly placed and one blank. An additional QC rack contains 10 samples- QC samples, 1 blank and 6 duplicates from grower samples. The samples are set up to check both electrodes against each other. The readings must be within 0.1 pH units of each other. Maintenance occurs every Friday- clean solution and refill solution, ultrasonic clean, and storage in buffer pH 7. On Monday prior to use, refill with KCL solution, verify flow through filter, and refresh buffers are steps performed. Electrodes are rinsed in reading if samples are <4.5 and > 7. With the buffer pH, a blank (1:1 water:buffer solution) is also run. For ICP, a filter is placed on the probe to prevent particles getting into the nebulizer; filter attained from Leeman Labs. Tubing is checked for kinks and connections for leaks; look for smooth flow. Yttriium is aspirated to observe the red bullet; the tip should be adjusted to correct position for best optics for radial flow. Adjustments are made to nebulizer gas flow to change. Clean parts are important to prevent drift and contamination. Wire can be used to run through the nebulizer. Torch cleanup on TJA is not often- once yearly; on Arcos, it is necessary for salt buildup- clean as needed; humidifier may solve problem. It is important to get the flush time correct to prevent carryover (time scan feature used). Selection of lines to read elements should be considered; profile as needed for the TJA or run ICAL on Arcos. Check new standards against old standards. Run standard first before read samples in the run; also check in middle and end or runs.

**8:40AM**
**Soil Grinding and Type of Soil Grinder- Bob Miller CSU**

Bob's presentation showed:
1) lab analysis variability decreases as soil particles decrease
2) soil grinders / screens impacts mean and max particle size
3) lab analysis variability increases as sample scoop decreases

Information about various grinders used in soil testing labs was also shared; comparisons for Agvise-flail, custom made hammer mill, Bico plait, and Custom Labs-flail (Dynacrush, the industry standard) were given. Variability in P and K analysis occurred from soils in this order: Hammer mill < Agvise flail < Bico plait < Custom Labs- flail. Data on grinders illustrated that particle size was altered in this order Hammer mill > Agvise flail > Bico plait > Custom Labs. Improved homogeneity in sample analysis can be improved by use of a 1.0 mm sieve.

**9:00AM**
**$NH_4$ and $NO_3$ Analysis Following the Diffusion Conductivity Measurement Principles- Uttam Saha, UGA**
Uttam shared with the group:
1) an overview of various N components (TKN, nitrate, nitrite) found in environmental samples

2) common methods of determining N in the southern region
3) a description of the diffusion conductivity measurement
4) potential application of the method.

Components of total N in environmental samples are: TKN, nitrate, and nitrite. Organic N is commonly estimated by subtracting the free ammoniacal N from the TKN measurement. Total N is measured today by combustion technique used on solid and liquid samples. TKN is analyzed by digestion in sulfuric acid, potassium sulfate and a Cu catalyst at 380 C. This method converts organic N and free ammoniacal N to ammonium sulfate with subsequent determination by distillation titration or colorimetric procedure (both are EPA approved methods). Ammonium in water is often analyzed by colorimetric technique (630 nm); there are known interferences by organic N fractions. Nitrate is commonly measured by colorimetric procedure (520 nm), after reduction to nitrite via a Cd catalyst; a number interferences- Cl, Fe, Cu, and other metals. Measurement of ammonium and nitrate by diffusion conductivity is based on principle of ammonia gas diffusion followed by conductivity measurement; the method is very robust in concentration measurement.

**9:20 AM**
**QAPP, SOP, and EPA- It's All in the Letters- Tony Provin**
Tony mentioned that every project funded by EPA and also some other funding sources requires a Quality Assurance Project Plan (QAPP). A QAPP covers all phases of data collection, problems associated with the sampling and analysis, and all QA/QC associated with activities and analysis; it is a thorough "who, what, when, where, what if" type of document. Approval is required before work can begin. Standard operating procedures (SOPs) are essential to QAPPs. To the extreme, SOPs are required for writing a SOP. Uniform structure is required. Details are essential. Old SOPs are not destroyed but revised and archived. QAPP achieves some of the goals of NELAC but without the huge overhead.

**9:40 AM Other Issues: *(time did not allow for these topics)***
**1) Microwave Calibration and Use- Brenda Cleveland, NCDA&CS**
**2) Light and Super Light Samples- Weighing and Digestion- Leticia Sonon, UGA**

**Nutrient Management Section**

**8:00AM**
**Potentially Mineralizable-N from Organic Amendments- Dave Kissel- UGA**
Dave stated that a way to estimate potentially mineralizable nitrogen is much sought after, especially in reference to estimating N mineralized from winter cover crops. A model, Minimob, originally developed by Dutch scientists but improved at UGA, currently exists. Inputs into the model of soil and cover crop properties are required; most of these input values can be made by NIR spectroscopy, along with climate information that can be attained from weather stations. The NIR instrumentation provides very accurate analysis of the input parameters needed by the model. UGA will offer the NIR analysis for plant and soil for this technology when it is implemented.

**8:45 AM**
**Inter-laboratory Validation of the M3 Method for Extraction of Plant Available Nutrients- Hailin Zhang, OSU**

Hailin gave an overview of the validation work on Mehlich 3 soil test extractant that was published in the Journal of the Association of Analytical Chemistry. Information presented is found in the following articles:

1) Hailin et al. 2009. Interlaboratory validation of Mehlich 3 method for extraction of plant-available phosphorus. J.AOAC 92: 91-102.
2) Schroder et al. 2009. Interlaboratory validation of Mehlich 3 method as a universal extractant for plant nutrients. J.AOAC 92: 995-1008.

From this presentation discussion occurred and the following resolution was developed to be brought to the other group as updates were given.

*Resolution by SERA-6*

*The Soil and Plant Analysis Council (SPAC) and SSSA (S-889, S890 Committees) shall proceed to validate regionally accepted and published procedures for soil testing and provide these to agencies such as US-EPA and USDA-NRCS via web-based and/or printed media.*

**10:00 - 10:30AM Break and Presentation by Perkin-Elmer**

**10:30 – 10:45 AM**

**Updates from Concurrent Sessions**

Rao provided a summary of the two presentations in the nutrient management session.

He specifically brought to the group a resolution (see above) pertaining to validation of soil test methods. Specific points mentioned during discussion:

1) The concern is that many of our soil testing methods are not validated, so there is question about whether our fertility studies would be considered invalid by others. This may especially be the case as nutrient management plans are produced for NRCS and EPA guidelines. Our group should propose to SSSA via S889 Soil Testing Committee and the Soil and Plant Analysis Council (SPAC) that we do the validation in-house rather than go to AOAC. The protocol of AOAC could be used.
2) Bob Miller agreed with the initiative but pointed out that the “keepers of the methods” internationally are AOAC, ASTM, and EPA.
3) Concern was mentioned over work on Mehlich 1 not being done as Hailin has done for Mehlich 3.
4) Validation is a very involved procedure as Hailin did. Mehlich 3 is not validated but at least it was published by AOAC so it was peer reviewed. To validate a method costs $35K.

5) The two organizations (SSSA and SPAC) should provide a validation procedure regardless of how it is done.
6) Hailin suggested that we take advantage of NAPT or ALP programs. We need to follow up with data from these with statistics. Hailin thought we should follow AOAC since it was recognized worldwide. Miller would also like to see a robustness test that has to be done only in one lab to add to such work that Hailin did.
7) There needs to be some wording about new methods development. This stifles creativity and research.
8) **Rao called for vote by show of hands. The resolution passed unanimously with the agreement that the group work on the resolution by email to wordsmith what would be presented to SSSA and SPAC.**

Leticia gave an overview of the Laboratory Session and the great presentations made.

**10:45 – 11:45 AM**

**NAPT Update- Tony Provin**
The NAPT has several subcommittees and he is working on the web committee. They are working on more user friendly value added components. Submittal and retrieval of reports from the web are being worked on. Jan is stepping down and a new coordinator will be coming forward soon. There has been concern over western soils dominating NAPT so one goal is to get more SE samples. The committee meets about 3 times a year by phone conference.

**Soil Plant Analysis Council (SPAC) - Bob Miller**
SPAC has a new website and they are advertising for workshops**.** The next International Symposium on Soil and Plant Analysis (ISSPA), sponsored by SPAC, will be held on the island of Crete, Greece, June 5 – 10, 2011. Dave Kissel is the outgoing president and the incoming president is Rigas Karamanos who has worked in soil testing in Canada for the past 35 years. Lab tours in the US are being held now through SPAC. Tours are planned for next February and March; the cost is about $750 w/o airfare. See http://www.spcouncil.com/ for further information.

**Publications- Frank Sikora**
Frank is chair of Methods Manual Committee along with Debbie Joines, Kathy Moore, Larry Oldham, Dave Kissel, Bob Miller, and Gobi Hukula. They have met three times over the past year; all meetings' minutes are posted:
http://www.clemson.edu/agsrvlb/sera6/methods/.
The goal of first drafts within a year came close. This project is not considered to be long-term; this work needs to be done. Responsibilities are delegated to lead authors who are responsible for the first draft but also are responsible for setting up the review and seeing it complete. The committee was thanked for the progress made. A comment was made to try to get these methods validated as done with Hailin's work. Future deadlines were set as follows:
1) First drafts (not submitted as of yet) in by Sept 1, final draft by Dec. 1.
2) For papers where a first draft is submitted, final draft by Sept. 1.

Frank intends to go through all drafts once the final ones are submitted. He is the editor for the manual.

**11:30 – 11:45 AM**
**Charge Handover- Rao Mylavarapu to in-coming Chair.**

Charles Mitchell from the Nomination Committee (Charles Mitchell, Hailin Zhang, Kathy Moore, & Hugh Savoy) announced that Larry Oldham was nominated as secretary for the next two years. Other nominations from the floor were asked for. The group agreed Larry to be secretary so he will be serving a 6-year total term as he works through the rotation of offices.

Rao thanked the group for the opportunity given to him over the past six years in various positions. Before he turned over the honors to Frank, North Carolina was chosen for next year's meeting- a date of June 19 – 21, 2011. Rao and the group thanked the MS group for hosting the meeting and the sponsors.

Frank Sikora accepted the responsibility as chair for the group and spoke of his fondness of the group. He asked for feedback on the forum in splitting into sessions. He will request feedback by email.

**Next Meeting – North Carolina - June 19 – 21, 2011**

**12:00 NOON Adjourn**