

SERA-IEG-6

Nutrient Analysis of Soils, Plants, Water, and Waste Materials

Southern Extension and Research Activity Information Exchange

Group 6

Annual Meeting, June 4-6, 2006, Clemson University, Clemson, SC

In Attendance:

1. Administrative: Hugh Savoy, Chairman Hailin Zhang, Vice-Chair

David Kissel, Administrative Advisor, Extension

2. Local host: Kathy Moore

3. State Representatives: See Participants Listing

4. Sponsorship: a. Lignin - Keith Hensley b. Spectro - Bob Dussich c. Magnolia Scientific - Mark Johnson d. Labfit - Bob Isaacs e. US Borax - Jim Woodruff & Eldon Allen

June 4, 2005

-Registration and Social

June 5, 2006, Monday

-Breakfast; Registration continued

8:00AM Opening Remarks by Hugh Savoy, Chair and the meeting was called to order.

The group had a moment of silence in remembrance of Dr. Jim Adams.

Dr. Savoy requested that each state review Procedure Bulletin 190 a final time to check the accuracy of their state's information. The document is ready for the ISBN number and then will be posted to the web.

Dr. Neil Ogg, Associate Vice President, Public Service and Agriculture welcomed the group to Clemson. He described the history and importance of the fertilizer industry to Clemson University.

Dr. David Kissel reported that Dr. Westerman has a new assignment and it is unknown how he will work with the group in the future. A subcommittee should be set up to work on paperwork required for renewing SERA-6 activity for the next 5 years. The mission statement should be reviewed to be sure it is still addressing group mission.

Dr. Preston Jones from USDA-CREES addressed the group about the shift in funding from formula funding to grant support. This shift was not supported by the states and will not happen this year. Hatch funding is intact with slight increase. This program continues to be important to states especially the states with small agriculture program budgets. There are three aspects of the CREES program: NRI, the base program, and line items. Line items come through the legislative side and are the best way to fund applied research as this need is not met elsewhere. Dr. Jones stated that CSREES is funded through overhead and has the lowest operational overhead of any government agency.

The following presentations filled the remainder of the morning session:

Dr. Morteza Mozaraffari made a presentation entitled, "Revision of the University of Arkansas Soil Testing Program and the Lessons Learned". The soils lab has added an online data entry/retrieval component to their lab. Extension personnel can print the reports and change crop codes at their home offices. Dr. Mozaraffari described the new data stream process and the decision process they went through to revise their system. He also included some lessons learned during this process - everything takes more time, respect colleagues priorities and interests, training and public education is a must, avoid outsourcing, and communication is the key for success.

Dr. Leticia Sonon gave a presentation on the "Photometric Analyzer". This Aquachem 200 - robotic discrete analyzer was explained and demonstrated in the presentation. The machine is capable of doing simultaneous analysis and reagents are dispensed automatically through a syringe. The system can run 200 samples/hour. She discussed the costs associated with the system and gave estimated

cost/sample for several analytical procedures. She also presented some information on filter paper quality tests they ran and a comparison of costs. The group suggested that a fact sheet be written from her presentation.

Dr. David Kissel presented "UGA's Experiences with Soil pH Test". The University of Georgia has changed their soil test to 0.01 M CaCl_2 . Their experience is that the procedure works very well. The standard deviation is half that of water. The greatest difficulty for clients has been the lower pH value reported. Initially they reported both the measured pH and the equivalent water pH (measured + 0.6) but found that this still caused confusion. They have since gone to reporting the CaCl_2 value plus 0.6 on the reports. They have a statement on their website which explains how the pH was measured and reported.

10:35 Break

10:50 AM Morning session resumed with Frank Sikora's presentation entitled, "Replacement Buffers for SMP and Adams-Evans". Due to the toxic elements of the SMP and the Adams-Evans buffer, Dr. Sikora has been working on the development of safer buffers. He has developed a buffer that gives the same titration curve as the SMP buffer in the 8.0 to 5.5 range. After testing on Kentucky soils it was found to have excellent r^2 values. Close to 70% of the soils requiring lime fell on the 1:1 line. The Sikora buffer is now being used by several labs. In addition, Dr. Sikora has been working with Kathy Moore to develop a buffer to replace the Adams-Evans buffer. This buffer which is a combination of boric acid, MES & MOPS has shown to be an excellent replacement for the Adams-Evans buffer to date. A cost analysis of the buffers was presented in this presentation. This included just the chemicals not labor and disposal costs.

Dr. Gobena Huluka gave a presentation entitled, "Kinetic Reactions of the Modified Adams-Evans Buffer Solution with Soils for Rapid Field Prediction of Lime". Dr. Huluka presented work at Auburn to determine the shortest equilibrium time needed to model the kinetics of the reactions. It was determined that a simple linear algorithm kinetic relation can be used to predict equilibrium buffer pH values. Calculations in the field can determine the recommended lime application. More testing will be needed since making lime recommendations involves many factors that can significantly affect and alter a pH/buffer/soil reaction.

Dr. Huluka submitted a draft factsheet entitled, "A Modification to the Adams-Evans Soil Buffer Solution" for review.

12:00 PM Lunch

1:10 PM The afternoon session was started with a presentation by Charles Mitchell entitled, "Nutrients in Urban vs. Agricultural Soils". This was a presentation of data collected from several state labs by Dr. Mitchell. Soil test phosphorus in urban and agricultural soils was compared for seven states. Four states showed a U-shape curve for urban samples (largest number of samples was in the Low or Extremely High range). New construction was suggested as a possible explanation. The other three states had large number of urban soils testing high and very high. There is a trend across the southern US for urban-type soil samples to test higher in P than samples tested for agricultural use. Number of urban samples decreased when labs started charging for tests. Dr. Mitchell proposed releasing these findings as a fact sheet and submitted a draft for review.

1:50 PM Musser Fruit Tree Farm Tour

3:30 PM Agricultural Service Laboratory Tour - Kathy Moore

5:30 PM Dinner and Botanical Gardens

June 6, 2006

8:00 AM The mission statement was presented and comments taken for revision. It was suggested that the territories be added and to remove "correlation/calibration/interpretation" as this seems redundant. Hailin Zhang & Rao Mylavarapu will solicit additional comments.

The meeting site for next year will be Auburn, Alabama. The tentative dates for the meeting are June 3-5, 2007. Texas has delayed to 2008 due to impending building activities. The 2008 meeting will be a joint meeting with other regional groups.

Frank Sikora, University of Kentucky, was elected Secretary of the group replacing Rao as he assumes the position of Vice Chair.

Hugh Savoy thanked the group for the opportunity to serve as Chair and commented on the good record of cooperation and publications.

Current leadership:

Hailin Zhang - Chair, OSU

Rao Mylavarapu - Vice Chair, UF

Frank Sikora - Secretary, UK

Hugh Savoy - Past Chair, UT

Hailin Zhang thanked the sponsors and attendees.

Frank Sikora asked to add the PAP survey to the agenda.

Publications update:

Bulletin 190 - Hugh Savoy stated the Bulletin 190 will be finalized in the next 6 weeks and submitted for assignment of an ISBN no. and posting on our Web site. He asked that all states check the tables and be sure they are up to date within the next two weeks.

Cotton Publication - Charles Mitchell discussed the Cotton Publication. He intends to have a draft out before the next meeting for the Coastal Plains only. He suggested separate publications for the coastal and southern plains.

CEC Fact Sheet - All the states responded to a survey and results will be compiled for the CEC Fact Sheet.

Replacing SMP Buffer with Sikora Buffer for Determining Lime requirement of soil Fact Sheet - Frank Sikora has received the reviews back and will incorporate comments. He plans to have the Fact Sheet out in the next month.

A revision of a Bulletin which includes the buffer procedures for the Southern Region combining all fact sheets was proposed. Kathy Moore was asked to provide a Fact Sheet for the Moore-Sikora buffer. A review team for Gobena Huluka's draft fact sheet will be assembled.

ICP vs. Colorimetric Analysis of Phosphorus Fact Sheet - SERA -17 has produced a position paper on the same topic and will be reviewed. Data is available and fact sheet will progress.

Copper Deficiency symptoms in Cattle - Debbie Joines asked for more guidance on the direction this Fact sheet should take. They have data from 2003-2005 forage studies. Work will continue and may be reviewed by animal nutritionist.

Water Analyses - A survey will be done to determine who does water analysis/where are we now?

FAS - Forage Analysis Program - Tony Provin reported that FAS is developing new equations for warm season grasses. The first iteration should be ready soon and will be used to determine Relative Forage Quality.

Regional Video on Soil Sampling - A generic video will be produced with the ability to add each state's unique parts (soil test form, etc.) The full length video will be 12-15 minutes. Several shorter clips will be developed which will fit into different forums.

A soil organic matter fact sheet was proposed. This would include soil quality issues.

9:15 AM NCR-13 report by Manjula Nathan. The Performance Assessment program was completed with report on results sent to executive committee. The Education committee will be conducting soil testing workshops for industry as a joint state program. Extraction committee is revising procedures. They are looking at ICP versus colorimetric analyses. They are evaluating buffers and looking at bench life of modified Mehlich buffer. Interstate committee is working on regional recommendations for NPK.

David Hardy reported on the NAPT program. The official coordinator is Janice Kotuby. The program is up and running with 161 labs participating. Survey results indicated that the group did not want any regulatory program such as PAP. They wanted self assessment only. They did not want the NAPT to be required for certification due to prohibitive cost for state labs.

9:30 AM State Reports

Virginia : Steve Heckendorn reporting - 45,000 samples were analyzed during 2005. In September the lab started reporting lime recommendations based on the modified Mehlich buffer.

Texas: Tony Provin reporting - The lab analyzed 29490 soil samples, 1851 water samples, 1640 biosolids, 5956 forage/plant samples, and 6942 research samples. The lab is working with Univ. of Ark, Univ. of Georgia, the Noble Foundation, and Foss North America to develop new warm season NIR calibration equations for forage analysis. The lab is developing alkaline persulfate digestion procedures for determination of low N levels in liquid samples (biosolids) with suspended solids. This procedure will allow elimination of TKN and waste disposal issues. They are expanding crop codes (estimate expansion from current 200 to 2000) to significantly improve customer yield resolutions and cultural practices. New equipment includes a 53 cubic foot drying oven and the lab is evaluating a soluble TOC/TN analyzer. The laboratory is in the planning process for building a new building and moving out of the academic corridor to the edge of campus.

Tennessee: Debbie Joines reporting - 22,287 samples were analyzed in 2005. Forage testing has been very successfully outsourced to Sure-Tech Laboratories of Indianapolis, IN. In July, 2006 the Plant and Pest Diagnostic Center will merge with the soil and forage lab to form the Soil, Plant and Pest Center. Plant and pest services will move to a fee based program.

South Carolina: Kathy Moore reporting - Despite \$1 soil fee increase sample volume stayed fairly constant through the busy season. A new Labfit pH Analyzer with syringe pumps for buffer was purchased. The Adams-Evans buffer was replaced with the Moore-Sikora buffer in January. A new soil sample mailer was developed and is in use. It may be purchased through the lab website. Total soil samples processed were 34,763.

Oklahoma: Hailin Zhang reporting - Sample volume increased significantly to 54,000 due to research sample increase. Animal waste analysis was added as a routine test and about 1200 samples were analyzed the first year.

North Carolina: David Hardy reporting - The Soil Testing Section analyzed 313,648 soil samples and supplied lime and fertilizer recommendations through 37,000 reports. Samples volume was up 11.5% over FY2004. An automatic humic matter station was made fully operational and bulk chemicals tanks and three reciprocating shakers were purchased. A segmented flow autoanalyzer for analyzing nitrate, phosphorus and sulfate was purchased which facilitates timelier nitrate analysis and makes it possible to carry out special analyses for research purposes.

Brenda Cleveland reporting - Sample load for FY06 (partial year through May 2006) was 31328 which included 13098 plant samples and 16462 waste samples. Three hoods with a scrubber for acid digestion were purchased. Cross training of personnel from the Soil Testing Section in PWS procedures and vice versa is ongoing. The lab is providing cotton petiole P and K on a test basis this summer.

Louisiana: Jim Wang reporting - The lab analyzed 18,241 routine samples, 6,524 plant samples, and 249 irrigation water samples. Producers submitted 89% of the samples. The LSU lab changed to the Mehlich 3 P test in September, 2005. Flood impact test have been provided on agricultural soils since October, 2005. The test determines EC and sodium adsorption ratio using 1:2 soil to water ratio.

Kentucky: Frank Sikora reporting - The lab started using the Sikora buffer replacing SMP on July 1, 2005. A Labfit instrument for water and buffer pH measurement has been used and running well since July, 2005. 46,530 soil samples were analyzed in 2005.

Georgia: Paul Vendrell reporting - Sample count for the lab showed an increase of about 3% relative to the previous year. Soil pH and lime requirement have been run by LBC method for over a year and the procedure works very well and is more efficient. A stable pH reading is reached more quickly and the standard deviation is lower compared to water measurement. UG's Drinking Water Team was formed to design and oversee extension educational programming to address critical needs in the area of drinking water and human health. Development of NIR testing is continuing in order to provide Relative Forage Quality. The Tri-state Hay contest was judged using RFQ (relative feed quality) on hay samples from Alabama, Florida, Georgia, and South Carolina. The NIR workgroup are working to produce calibration equations that include southern grown forages.

Florida: Susan Curry reporting - The Extension Soil Testing Lab processed around 12,000 samples. The Analytical Research Lab processed around 100,000 samples including QC samples as it is a NELAP Certified Lab. The Florida Department of Agriculture and Consumer Services has implemented several BMPs which are now entering the monitoring phase. Certified water quality analyses are required for most of its programs being implemented through IFAS researchers. A new Water Quality section is being created at the ARL in Gainesville and the Everglades Research and Education Center in Belle Glade. Two ICPs and two Discrete Analyzers have been purchased for the sites.

Arkansas: Nancy Wolf reporting - The total number of samples analyzed was 26,101. The lab is running water soluble phosphorus for manure and soil samples by request and use the method of a 1:10 ratio (Moore). They are running many of the samples at the newer 1:100 ratio as a comparison and for data purposes. A strawberry monitoring program was restarted this year with samples received from AR, OK, MO, and IL. Prices for all analyses were raised effective September 2005.

Alabama: Hamilton Bryant reporting - The Soil Testing Lab analyzed nearly 28,000 routine soil samples for fertilizer and lime recommendations. Two thirds of the samples were from producers. For farm samples, half were rated low enough in P for application of phosphorus-containing fertilizer to be recommended. The lab

performed more than 13,600 special analyses including plant tissue samples, feed and forage analyses, etc. The lab occupied a newly constructed facility and implemented an online system for data management, development and delivery.

12:00 Noon Adjourn

Minutes submitted by Susan Curry