**NCERA-13 Meeting Minutes July 19 2016**

 **State College, PA**

The NCERA 13 Committee was held during the 2016 Joint Regional Soil Testing Workgroup Meeting. The regional workshop meeting was held July 18th-20th in State College, PA at the Penn Stater Conference Center Hotel.

The NCERA-13 meeting was held from 3:30-5:30 pm of Tuesday, July 19, at the Penn Stater Conference Center Hotel.

**Present**:

Antonio Mallarino- Iowa State University

Manjula Nathan – University of Missouri

Jon Dahl – Michigan State University

Carrie Laboski – University of Wisconsin-Madison

Robert Florence – University of Wisconsin-Madison

Steve Culman – Ohio State University

Shiny Mathews – North Dakota State University

Brad Joern – Purdue University

Andrew Stammer – Kansas State University

Dorivar Ruiz Diaz – Kansas State University

**Not able to Attend**

Dave Franzen– North Dakota State University

Daniel Kaiser – University of Minnesota

No representative for University of Nebraska

No representative for University of Illinois

No representative for South Dakota State University

**The meeting began at 3:30 p.m.**

The meeting was open by Chair Dorivar Ruiz-Diaz.

Minutes from the previous meeting were approved.

Review of officer’s cycle:

- October 1 2014 to September 30 2016, Chair Kansas (Ruiz-Diaz), Secretary Iowa (Mallarino).

- October 1 2016 to September 30 2018, Chair Iowa (Mallarino, Secretary ND (Franzen).

16-18 IA, 18-20 ND, 20-22 MO, 22-24 NE, 24-26 MI, 26-28 IN, 28-30 WI, 30-32 IL, 32-34 OH, 34-36 MN, 36-38 SD, 38-40 KS.

**Administrative Advisor’s Report**

Ken Grafton was not present to provide the Advisor’s Report.

**Sub-committee reports:**

Education - Workshop Update: Began discussing the organization of the due NC Region NCERA-13 Workshop in 2017. Decided that a subcommittee lead by Mallarino with members Franzen, Laboski-Florence, and Ruiz-Diaz will start work on it with tentative date sometime in February 2017. Since there were good comments about the venue for the 2015 workshop, probably will be held again in Iowa City. Preliminary discussion of some potential topics and sponsors.

Website:Discussion about future of the Committee web site. Nathan thinks she and MO can maintain it for now, but doubts about the future. Please see website activity during the previous year at the end of this document.

**Publications**

1. P methods chapter: Mallarino is delayed, will work with Nathan to speed up work on this chapter.
2. Sulfur chapter: Done, congratulations to Franzen who lead the effort
3. Micronutrients: Kaiser is working on it, but couldn’t make it to the meeting
4. Organic matter: Discussed possible update lead by Nathan in collaboration with Robert Florence.
5. K Chapter: Discussed Mallarino could update this chapter perhaps by making more clear what should be extracting solution ratios for the moist test (referred to in the sample preparation chapter) and perhaps collect some data to make some comments about comparing extracted K by AA and ICP K determination. Joern offered to collaborate.

**General Discussion and New Initiatives:**

NCERA-13 committee renewal: The project was successfully renewed for the period starting October 2016 to September 30, 2021.

Heavy metal testing: There was some discussion about testing for lead. However, the committee decided not to pursue this given that are not within the objectives of the committee.

**Next Committee Meeting**

The committee meeting will be held in February 2017 in conjunction with the NCERA-13 NC Workshop February 2017.

**State Reports**

Iowa (Mallarino)

*1. Update for the ISU Soil and Plant Analysis Laboratory (SPAL) – Renuka Mathur*

The following summarizes the developments in the lab from January 2015 to December 2015:

1. The Soil and Plant Analysis Laboratory (SPAL) analyzed approximately 26,000 samples in 2015 (Table 1). Nearly 70% of samples submitted were from university researchers.

*Table 1: Sample numbers analyzed at SPAL in 2015 and their distribution.*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample Type  | ISU Research  | Private  | Total  |
| Soil (dry) | 7,545 | 4,224 | 11,769 |
| Soil (moist analysis for P&K) | 1,521 | 870 | 2,391 |
| Plant | 2,549 | 2,550 | 5,099 |
| SME |   | 9 | 9 |
| Saturated paste |   | 24  | 0 |
| Compost | 7 | 3 | 10 |
| Limestone | 54 | 237 | 291 |
| Client analyzed | 2,443 |   | 2,443 |
| TC/TN pre-weighed | 2,952 |   | 2,952 |
| Solutions | 1,507 |   | 1,507 |
| Total  | 18,578 | 7,893 | 26,471 |

1. There has been an increase (~ 11%) this year in the plant tissue samples submitted to the lab for total nutrients, Total N and Total C determinations.
2. Re-evaluated and established the method detection limits for various test methods.
3. We hired a student to develop a Laboratory Information Management System (LIMS) for increasing laboratory efficiency in the Fall 2014.
4. Implemented new LIMS in the lab in March 2016 to better streamline research and grower samples submission and tracking, automatic invoicing and billing, and results report generation of grower samples.
5. Evaluated modified soil particle size analysis methods (Pipette and Hydrometer methods) for quick determination of soil texture.
6. Validated soil sulfate-S measurement by turbidimetric method.
7. Implemented Sodium Citrate Dithionate extraction method for determination of iron oxides in soils.
8. Currently in the process of preparing our 5 year soil test summaries.
9. The lab continues to integrate with several courses taught in the Agronomy Department.

*2. Research updates – Antonio Mallarino*: The most significant soil-testing related extension activities during 2015 related to continue outreach about a recently complete major micronutrient research project (B, Cu, Mn, and Zn) for corn and soybean and the fall 2013 update of Iowa interpretations and recommendations for P, K, and lime in Extension publication PM 1688. The major recommendations updates involved eliminating consideration of subsoil P and K for interpretations, including interpretations for the moist test for K, updating K interpretations using dried soil samples (recommended levels were increased), adjusting crop nutrient concentrations (were reduced for most grain crops) to estimate nutrient removal, and include equations for variable rate application of P and K for corn and soybean. The soil-test P and pH interpretations were not changed since new research supported previous guidelines. Other major fertility-related activities were to continue explaining the Iowa Nutrient Export Reduction Strategy, recently updated N and S extension publications by Dr. Sawyer, and providing guidelines for N, P, K, S, and lime management with prevailing low crop prices.

Kansas (Ruiz-Diaz)

*Services:* The Kansas State Soil Testing Lab currently offers soil, plant, irrigation water, and lime analysis. Soil analysis is split about even between farmers and researchers. Last fiscal year we analyzed 11,604 farmer and gardener soil samples. Plant nitrate analysis is commonly run for farmers. Most plant analysis work is performed for private and university researchers. Lime analyses are run for farmers, quarries, and Kansas Department of Agriculture.

*Funding:* The lab is 100% fee supported, with the exception of salary of the faculty member assigned to the project (Dorivar Ruiz-Diaz, 20% time assigned) and a portion of the salary of a Research Assistant (Andrew Stammer, 0.8 time).

Personnel: This year Dr. Dorivar Ruiz-Diaz has replaced Dr. Dave Mengel as director, preceding Dave’s retirement in June. We have three full times analyst, one each dedicated to farmer’s soil (Lynn), researcher’s soil (Jake), and plant analysis (Kathy). We also have a part time office administrator (Melissa). One to two undergraduates also gain experience by working in the lab. A part time research assistant and graduate student (Andrew) answers farmers and researchers questions, checks fertilizer recommendations, and works on lab research projects.

*Research projects:* We have begun a project to compare different methods of plant tissue analysis including nitric perchloric digestions (currently used in the lab), nitric digestion, dry ashing, and microwave digestion.

*Software upgrades*: We transitioned to a new system (working with Schroth Systems) that replaced the ALIS program. There are still some small changes needed, however currently we handle billing, compile results, produce reports and calculate lime and fertilizer recommendations.

*Additional*: We have implemented several changes this year designed to reduce wait time for results, including emailing soil test reports and offering discount overnight shipping for overnight samples, and provide online access for customers for the status of their samples and view results. These changes are focused on delivering better service to our customers

North Dakota (Franzen)

The past year (07/1/2015-06/30/2016), the soil testing lab at the North Dakota State University tested approximately 14,000 soil samples. Of these 3000 were field and lawn and garden samples and the rest were research samples. Routine soil testing was performed based on the NCERA-13 methods and recommendations were provided as required. During this period the lab transitioned from an ALP certification system to an NAPT system to be consistent with the other labs under the NCERA-13. Dr. David Franzen, Extension Soil Specialist at NDSU, worked on the sulfate-sulfur methodology and revised the sulfur analysis chapter in the NCERA-13 methods section (2015). He was the author of this chapter. Dr. Franzen will have a draft circulated this summer among participants for posting on the NCERA-13 website later this fall.

Wisconsin (Florence & Laboski)

The University of Wisconsin laboratory currently offers soil fertility, forage quality, manure, plant, and lime quality analysis. This past year activities mostly involved consolidating the Soil and Plant Analysis Lab in Madison (SPAL) to the Soil and Forage Analysis Lab in Marshfield (SFAL). This consolidation brought changes to the suite of analyses offered, personnel, equipment, plant analysis method, and soil drying process. SFAL also is in the process of buying a soil pH robot, and updated its lead screening report to prevent litigation.

Lab Consolidation

*Suite of Analyses:* In an effort to keep a focus on soil fertility and forage quality, not all analyses that were performed at SPAL were moved to SFAL. Analyses that were discontinued were WI-DNR certified water samples, total heavy metal analysis, and other analyses outside the scope of agriculture. Plant analysis, total mineral analysis of manure, lime, and lead screening along with professional turf and forest soil analyses were moved to SFAL.

*Sample load at SFAL:*

*Plant*: From 2012 to 2014, SPAL analyzed 1,580 plant samples per year, on average*.* Since the hiring of a research specialist to focus plants at SFAL in March of 2016, SFAL has analyzed 1,166 samples with an additional 1,241 samples submitted, as of July 14th.  This represents 52% more plant samples than SPAL did in an average year. With efficiencies in minimizing the number of dilutions, and the research specialist gaining experience, SFAL can now expect to analyze 190 samples per week. The current limiting factor is the time required to analyze samples on the ICP. A batch of 38 samples, with checks, and standard curves requires nearly five hours of run time, not including dilutions or re-runs.

*Soil*: SPAL’s three year average of public soil samples from 2012 to 2014 was 21,174, while SFAL averaged 10,397. SPAL’s closure dramatically increase soil analyses conducted at SFAL. In 2015, SFAL analyzed 17,136 samples, an increase of 65%. This increase in sample demand has continued in 2016. From Jan 1, 2016 to July 1, 2016, SFAL has analyzed 22% more public soil samples than it did from Jan 1, 2015 to July 1, 2015. Figures 1 shows the cumulative number of samples analyzed in the past two and a half years, excluding research soil sample. The date that SPAL’s closure was announced (mid-November 2014) and when SPAL stopped accepting soil samples (September 1, 2015) are indicated on the graph. Thus far in 2016, homeowner samples represent 21% of the total public soil samples analyzed.

Figure 1.



*Personnel:* With the increase in sample volume, SFAL hired a research specialist to focus on soil analysis. The previous person analyzing soils moved from soil analysis to preparation of all samples. With one person prepping soil and one running analysis we have maintained a 3-7 business day turnaround time in low and high demand times. SFAL also hired another research specialist to focus on plant and total mineral analysis. Current staffing is provided in Table 1.

Table 1. SFAL staffing

|  |  |  |
| --- | --- | --- |
| Staff | Focus | Years of Service |
| Lab Director |   | 1 |
| University Staff | Billing/reporting | 10 |
| University Staff | Preparation  | 5 |
| Sr. Research Specialist | Forage/manure | 17 |
| Sr. Research Specialist | Forage/manure | 27 |
| Research Specialist | Plant/total mineral  | <1 |
| Research Specialist | Soil/Lime | 1 |
| Students (2) | Forage/manure | <1 |
| Student | Soil/Lime | <1 |

*Equipment/LIMS:* In anticipation of SPAL’s closing, a Perkin-Elmer ICP was purchased and installed at SFAL. Soil drying trays and sample handling were modified in early 2015 to reduce drying time. The procedural change has allowed the lab to keep pace with increased sample submissions without installing another dryer. SFAL’s laboratory information management software (LIMS) is extremely cumbersome, outdated, and we have no ability to modify it. We are in the process of finding a replacement LIMS.

*Plant analysis modifications:* SPAL previously digested plant samples in nitric acid for 16 to 18 hours overnight. A time trial at SFAL was performed to see if shorter times would match SPAL’s numbers and meet NAPT check sample limits. Results indicated that a 4 hour digestion was sufficient for plant analysis.

*pH Robot:* SFAL has performed soil and buffer pH by hand. With the increase in sample demand, SFAL is buying a refurbished Lignin pH robot. A study to examine the difference between shaking and stirring for Sikora pH, may be pursued.

*Lead Screening Report*: SFAL offers an affordable ($15) lead screening analysis (1 N Nitric acid) with explicit caveats that the values reported are not certified numbers of any kind. The report also explicitly states that values reported are not total lead values as published in EPA or WI-DNR publications. These caveats were developed in consultation with legal counsel to prevent litigation against the lab.

*Soil & Plant Analysis Calibration Field Research*: Phosphorus and K response trials for notill corn and soybean were established in 2011 and 2012 at the Arlington Ag Research Station. These trials continue to be maintained and are providing preliminary data for future grant proposals that will focus on statewide P and K calibration research and soil test methods. Long-term low fertility plots at four Ag Research Stations are being sampled this summer in preparation for future studies.

A plant analysis interpretation study for corn and soybean was established at the Arlington Ag. Research Station in 2014 and the Marshfield Ag. Research Station in 2016. Plots at Arlington will move to the Hancock Ag. Research Station in 2017. The goal is to have eight site-years of data. A fractional factorial experiment with two replications is being used to evaluate N, P, K, S, Mn, Zn, and B. Crops are being sampled at multiple times during the growing season.

Michigan (Dahl):

The number of soil tests analyzed by the lab went up for the first time in 3 years. The lab tested 9,270 grower/homeowner samples this past year with 3,190 of those being the self­ mailers for homeowners. The split between farm and homeowner samples is about 50/50.

Pre-sidedress nitrate tests were performed on 150 samples. 11,000 nitrate extracts for research samples were analyzed by our Lachat system. The university initiated a fee for service

study this spring looking at all the fees charged by the lab for testing. It will probably mean that the university will end up taking a larger percentage of the lab revenues. Currently the university takes 3% of revenues but this could be increased to 5% or maybe more.

Departmental news: The Michigan Wheat Program agreed to fund 50% of a fixed-term specialist for research and extension. Dennis Pennington was hired to fill the position. Dr Erin Hill was hired as an Academic Specialist-Outreach with 50% plant/herbicide diagnostics and

50% cover crop integration and research. Dr. Monique Sakalidis was hired as Forest Pathlogist. Dr. Maninder Singh from the University of Florida was hired into the Cropping Systems Agronomist position. The College of Ag and Natural Resources hired a new dean, Ronald Hendrick formerly interim VP for Ag Administration and interim dean at The Ohio State University. He started July 1, 2016.

Report from Kurt Steinke, Soil Fertility Specialist on the Solvita soil N test: We have continued to run the C02 burst method on select studies and continue to see much ado about nothing. Respiration rates trend higher on soils that we expect them to (higher OM, CEC, etc.) but differences are marginal; We began running the in-field (fresh) basal respiration test as we were told that Michigan soils typically do not dry out and hence running a respiration test on oven-dry soil wouldn't lead to applicable results. The in-field method hasn't proven any different. We have run both of these on several cover crop studies and again haven't come across too much. We have picked up on some moderate spikes in soil respiration when organic amendments are applied and have tracked those throughout the season.

We have also run the SLAN test for Amino-N and haven't noticed any differences from the other respiration tests thus far.

With all of the soil DNA work we are doing, we have NOT seen any correlation between respiration and microbial diversity.

The respiration results appear to be highly dependent upon soil moisture at time of sample as would be expected. So as the moisture goes is how the overall respiration trend has gone.

Side note: We have met with regard to revising the Tri-State Fertilizer Rec's; one change of note was that the group agreed that STP results and recommendation will likely be changed to Mehlich and no longer Bray as this is the method used for the bulk of Midwest samples.

Missouri (Nathan)

We had big changes in the University administration due to concerned students being upset about their rights. These students started a hunger strike asking for their concerns to be addressed by the administration. This ended up in the resignation of President Tim Wolfe from the president position in November 2015. Chancellor Dr. Bowen Loftin was forced to stepdown in December 2015 from his positions as Deans of colleges were not happy with his administration. Dr. Mike Middleton (Deputy Chancellor- emeritus) was hired back as the Interim President and Dr. Hank Foley was named as the interim Vice Chancellor for the Columbia campus. Dr. Garnett Stokes joined MU as the Provost in February 2015. Prior to joining MU, Dr. Stokes served as provost and executive vice president for academic affairs and interim president at Florida State University (FSU), a public research university in Tallahassee.

The emphasis of the university is to build upon strong research foundation to solidify the status in the Association of American Universities (AAU) and there were some cluster hires of renowned faculty in the Division of Plant Sciences. Dr. Blake Myers (Chair, Crops and Soils Department at University of Delaware) with research focus on plant genomics joined division of plant sciences under this program and has a joint appointment with Division of Plant Sciences at MU, and the Dan Forth Center. State has been cut down by the Governor due to unexpected fall in state income tax than what was projected. On top of it, drop in number of students registered has added to additional stress on the budget. The emphasis is on generating funds through grants and fee generation.

The MU soil and plant testing labs at Columbia campus and Delta Center analyzed a total of 31,125 soil samples, 4043 special soil tests, 5271 plant, 445 water, 60 greenhouse media, 118 compost, 205 manure and 444 environmental tests. Both labs together analyzed a total of 41,771 samples last year. A web based soil test database and recommendation program is under development. MU soil testing labs continues to function as totally self-supporting labs based solely on fee generation. We had visiting scientists and students going through training in soil testing methods, lab instrumentation, interpretations and recommendations.

Peter Scharf is working on a multi-state funded grant on climate change research. John Lory is trying to set up a statewide strip trial by getting funding from the commodity groups and Extension to study P and K response in corn and soybean. A soil quality lab & soil characterization lab continues to function under NRCS funding and fee generation under the new name of Soil Health Institute, in the College of Agriculture Food and Natural Resources. There seems to be more and more emphasis on soil health by NRCS and the lab receives samples under the cost share program. Research on the use of cover crops for row crops is continuing in Missouri.

Ohio (Culman)

Culman joined Ohio State less than a year ago and has started the process of updating field crop fertilizer recommendations in Ohio (Tri-State Fertilizer Recommendations). This work will be mostly on-farm and 2014 started with soybeans, but will add corn and wheat in 2015. Soil test levels, R1 tissue test levels and grain nutrient concentrations will all be updated with new data. The time-frame for updated recommendations is 3-4 years.

**Website update of activity during the previous year**

