## NCERA13 Meeting Minutes February 13-14, 2017 Iowa City, Iowa

#### **Meeting convenes**

- The meeting began at 1 pm.
- Attendees are Antonio Mallarino (IA, Chair), Andrew Stammer (KS), Dorivar Ruiz-Diaz (KS), Jon Dahl (MI), Daniel Kaiser (MN), Manjula Nathan (MO), Steve Culman (OH), Carrie Laboski (WI), and Robert Florence (WI).
- Secretary David Franzen (ND) is not present. Laboski will be acting Secretary.

### Approved minutes of last the meeting.

### Administrative issues.

- For future state reports, try to include information that will be needed for the next renewal of the project. Ruiz-Diaz will share a template. We should all use same format for reports.
- Committee membership: Some states do not have a representative, and some current representatives are not in the NIMMS web site:
  - Nebraska A new person is listed on the NIMMS web site but the committee Chair was not contacted. Mallarino will contact the person listed and will include the name in the committee email addresses list.
  - Illinois Has had no representative since Fabian Fernandez left the university. Mallarino will contact Department Chair Herman Bollero about who may be interested of participating and to be appointed as representative; perhaps Cameron Pittlekow?
  - South Dakota Has had no representative since Ron Gelderman retired. Mallarino will contact Department Chair David Wright about who may be interested of participating and to be appointed as representative.
  - North Dakota Dave Franzen is not listed in the NIMMS web site, he needs to talk with his administrators.
  - Ohio Steve Culman is not listed in the NIMMS web site, he needs to talk with his administrators

### NCERA-13 North-Central Workshop update.

- The 2017 North-Central Region Soil and Plant Analyst Workshop will be held after this committee meeting ends, from 1 pm February 14 until noon February 15.
- Everything is ready, and its organization through committee members' work with Brent Pringnitz, Coordinator of the Iowa State University Agriculture and Natural Resources Extension Programming Office has been very good. A specific website for the workshop includes information about program, registration, and lodging.
- Attendee fees were set at \$70 or \$90 for early or late (and on-site) registrations. We have nine sponsors (laboratory equipment manufacturers) that contribute \$300 each.

Sponsorship includes one complimentary registration, a table for tabletop displays during a social hour. It was decided that sponsors will not give short presentations as in the past, but the length of the social hour was extended for interacting better with them. The registration and sponsors fees should approximately balance the total costs of the workshop.

• A pre-registration list from one week ago includes 68 attendees, including committee members who also have to register and contribute with the fee, and excluding sponsors.

## Committee website update.

• Nothing to report. Nathan posts information when needed. She suggested that the committee should be more proactive at providing information to improve the site.

# NAPT report.

- Florence is the current NCERA-13 representative to the NAPT until Fall 2018.
- There was discussion about improving plant analysis proficiency. Switch from dry ash, microwave, digestion block to dry ash and wet ash. S is problematic as is B.
- Brief discussion of soil health assessment tools. Solvita (CO<sub>2</sub> burst) is offered by some labs separately or as part of the Haney's assessment tool. There is ongoing research in the region about its actual significance for N fertilization needs and as part of a soil health assessment tool (there will be talks about this in this week NCERA-13 Workshop). There is concern in that if the NAPT includes proficiency testing for the Solvita test, it will suggest that it should be done. For any test, there should be at least 6 labs doing it.

# State reports.

- Committee members from each state provided brief state reports, distributed summary handouts, and there was discussion.
- See the summaries of the state reports in an Appendix at the end of the minutes.

# Methods publication update.

- P chapter Mallarino started reviewing the introduction and methods for P chapter in collaboration with Nathan. The main update will consist on including a section for extracted P determination by ICP analysis. The goal is to complete it by end of year.
- Correlation/calibration of soil test Ruiz-Diaz has been leading discussions about a chapter for these topics. The committee unanimously decided that this should be a separate publication. It will consist of explaining what is correlation and calibration providing a couple examples. It is not intended to be as large as the old SSSA special publication.
- K chapter Mallarino has been working on its update. The main update will consist on tying it better to the chapter on sample preparation, which now includes both procedures for dried and field-moist/slurry samples. There was discussion about the equivalence of ICP vs AA measurements of extracted K, assumed 1:1, but ICP can drift higher than AA. The goal is to complete it by end of year.

- Micronutrients Kaiser has been leading an effort to update this chapters (two). There
  was discussion at including comparisons between DTPA and Mehlich 3 tests for some
  micronutrients. Need to discuss and consider separate correlation/calibration for each
  test and nutrient. Data available includes correlations of amounts extracted, mainly
  form Iowa and Kansas, but the problem is that seldom there is sufficient numbers of
  sites with a crop response in the region. Also, the chapter will need some discussion of
  ICP determination regardless of the extraction method.
- Organic matter Nathan is leading an update. Florence suggested some edits, but the work continues.
- Plant tissue testing, including corn stalk nitrate what do we do about it? It was decided that there is a need for this and should be a good addition to the methods publication or as a separate publication. Although the committee agreed that this is not a high priority at this time, Dahl volunteered to begin putting together some plant analysis methods.

### Hot topics discussion.

- 360 SoilScan for field measurement of soil nitrate Several issues were discussed. There
  are no university or USDA/ARS comparisons of this method with the traditional
  laboratory method. Since this is a field test, involving sample handling procedures and
  extraction/analysis methods, how should we evaluate/certify this and others like it?
  Should we develop a one page set of criteria for adding a method to our methods
  publication? The committee decided that Culman will lead a subcommittee to discuss
  this.
- Challenges with a colleague from another state of the region saying things that discredit the value of soil testing and suggest using only nutrient removal only for fertilizer recommendations. Could this be addressed with a joint newsletter article?
- Value of a public laboratories Is a regional NCERA-13 white paper needed? Could use a as a starting point a very good article written by David Kissel. There was no decision; perhaps a topic for next meeting.

### Next committee meeting date:

- It was decided that the next meeting will be November 14 and 15, 2017.
- We decided to invite a member from SERA-6 and NECC-1312 committees to attend.
- 2020 is the year for the next joint meeting of the three committees. The last was in 2016 in Pennsylvania. According to the locations history, the next joint meeting should be in southern region, to be organized by SERA-6.

Meeting adjourned: 11:45 am, members will attend the Workshop which begins at 1 pm.

## Appendix, State Reports

## Iowa (Mallarino)

The following summarizes the developments in the Iowa State University Soil and Plant Analysis Laboratory lab from January 2016 to December 2016 (provided by Renuka Mathur):

- 1. The lab analyzed approximately 23,000 samples in 2016. Nearly 70% of samples submitted were from ISU researchers.
- 2. We evaluated POXC method for measurement of active C. We observed that the variability in C measurement was higher as the active C increased in the samples.
- 3. Currently evaluating H3A extraction method for determination of Inorganic N, P, K and micronutrients in a collaborative study.
- 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. We purchased a new PE atomic absorption spectrometer with an autosampler for the laboratory with partial funding support by the department. This instrument is frequently used by students in the department to analyze their samples and also, it serves as a backup for ICP when it is down.
- 6. We renewed our soil permit for importing and analyzing foreign samples.
- 7. The lab continues to integrate with several courses taught in the Agronomy Department. The lab is now involved in preparation of AGRON 354L (Soil and plant growth laboratory), which is a required soil laboratory for junior and senior undergraduates. It is a 1-credit lab offered 3 times a week every spring and fall semester. The laboratory receives financial support for this effort.

The most significant soil-testing related extension activities during 2016 were significant updates of two Extension publications. One publication was 'Take a Good Soil Sample to Help Make Good Fertilization Decisions' (CROP 3108) by Mallarino and Sawyer, and major improvements were for the sections about grid sampling and soil sampling for pH and lime requirements. The other publication was 'Using Manure Nutrients for Crop Production' (PMR 1003) by Sawyer and Mallarino, and major updates were for the section about P availability of beef cattle manure and N availability of dairy cattle manure. Major applied soil/plant testing related research/extension activities included the following: Correlation/calibration of tissue tests for P and K in corn and soybean based on sampling of plants at the V6 stage or leaves at early reproductive stages (Mallarino). Effect of sampling time on soil-test K measured by dry and field-moist sample handling procedures and non-exchangeable K plus relationships with corn and soybean yield response(Mallarino). Correlation/calibration of the 3HA weak organic acids P extractant included in the Haney's soil health tool with crop yield response to P and water quality (Mallarino). Continued work on correlation/calibration of the late spring nitrate test (LSNT or PSNT) for corn (Sawyer). Relationships between the Solvita test (CO2 burst) with rotations and N fertilization of corn (Sawyer). The State of Iowa decided an \$8.5 million budget reversion. However, we were lucky in that ISU Extension contributed a very small amount to the reversion. Further cuts are expected for the next fiscal year for research and extension.

#### Kansas (Ruiz-Diaz, Stammer)

Services Offered: 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. We analyzed 11,604 farmer and gardener soil samples during the fiscal year 2016; and 6,382 samples for the current year (a 10% increase over previous year). 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 the Kansas Department of Agriculture.

Lab Methods: The lab is currently evaluating the soil test K method and considering changing from the ammonium acetate to the Mehlich-3 method. We analyzed 700+ public samples for K using both ammonium acetate and Mehlich-3 in 2016. The tests show a strong positive correlation, and we are considering using Mehlich-3 to extract both P and K for public samples pending review with our advisory committee.

The DTPA-sorbitol extraction is under evaluation for B. Kansas State recommendations have B recommendations for the SE part of the state and contribute to interest in testing B.

Customer Service: We have made a number of changes over the past year in an effort to make our services more easily accessible to our clients. These include electronic reports including email and website. Also offering shipping labels through the university contract with UPS at a low rate. A customer account access portal on our website provides the flexibility of viewing test results and invoices as well as online payment.

Extension Support: Most of our public samples are submitted through extension offices around the state. One service we offer to agents is free diagnostic tests and testing for trials. We also support the department's online newsletter by tweeting about soil testing and nutrient management articles (@KStateSoilTest).

### 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. Utah State Extension is looking at using our self-mailer website as a model for their state to reduce the workload for their Extension educators making fertilizer recommendations on homeowner samples. Pre-sidedress nitrate tests were performed on 150 samples. 11,000 nitrate extracts for research samples were analyzed by our Lachat system. Thus far, in 2017, the lab has received in over 100 cores as part of the Golf Course greens study initiated by Dr Trey Rogers four years ago. The program has helped fund the replacement of 3 main instruments in the lab during a normally very slow period of time. In October we replaced our LabFit pH robot (16 years old) with a new one. The old one worked fine, but the software was outdated. The university initiated a fee for service study this past spring looking at all the fees charged by the lab for testing with the intent of raising their take from 3% to somewhere between 5 and 26%. After a comprehensive look at our fees and income, the university decided not to increase the fee for service charge to the lab.

Departmental news: MSU has established a new research unit on campus: the MSU Plant Resilience Institute. It is a collaborative lab and field research effort to increase understanding of the genes and mechanisms that contribute to plant resilience against abiotic and biotic stresses including drought, high temperature, disease and insect pests.

The department has hired Erin Burns to the position of Assistant Professor – Weed Science. She comes from Montana State University and will start on April 1, 2017. Dr. Krista Isaacs was hired as Assistant Professor in Seed Systems for International Programs. She comes from the International Crops Research Institute for the Semi-Arid Tropics and will start on July 1, 2017. The positions currently open in the department are: Faculty position in Maize Genomics, Assistant Professor position in Potato and Sugarbeet Pathology, Sugarbeet Extension Specialist and a Dry Bean Systems Research and Extension Specialist.

#### Minnesota (Kaiser)

The University of Minnesota soil testing laboratory is still currently operating under the direction of Brian Barber. The lab is currently in the process of updating and remodeling and has added over \$650K in new analytical instrumentation. The lab currently has 7 full time staff which includes 6 Scientists or Researchers and several part-time staff and students. The U of M lab has increased sample throughput by nearly 3X since taking over 5 years ago and are accredited in soil, botanicals and soybean testing through various lab proficiency testing programs (ALP & AOCS). Finally, STRAL will be getting a 3.2 million dollar renovation during the summer of 2017, returning to a state of the art facility in September. The number of samples coming in from farmers to the U of M lab still is far less than going to the two private labs instate, MVTL in New UIm and Agvise in Benson and Northwood, ND. The U of M lab has remained solvent primary as a research and analytical lab serving research on campus. The lab still offers analysis to farmers and homeowners. There currently is no breakdown in the number of samples coming to the U of M lab or private labs across the state. In talking to the lab managers reports are that numbers of samples submitted remain strong in spite of low commodity prices.

Current research continues in Minnesota related to soil test correlation and calibration. A study was just completed comparing the Haney H3A and Methlich-III ICP test to the two tests suggested for Minnesota, the Bray-P1 and Olsen. At this time no changes are anticipated to the suggested tests but we are currently considering adding the Mehlich-III colorimetric test as an option for acidic soils (pH<7.4) in Minnesota. Research is also on-going comparing the field moist and air dry K test for soils across the state. Research on this area has been slow due to a lack of yield increases due to K application across the state. One consideration being made is adjustments to K guidelines on sandy low CEC soils. Currently the Minnesota guidelines are made across soil types but recent research is suggesting some low CEC soils do not respond to K when testing in the current Low classification. Work was started in 2016 studying boron response in corn. This trial will be completed in 2017 and will determine how well corn yield response can be predicted with the hot water extractable B test and B concentration in corn leaf tissue.

#### Missouri (Nathan)

Dr. Mun Choi was hired as the President for University of Missouri in November, 2016. Dr. Choi was the Provost at University of Connecticut. The University is currently in the process of hiring a Chancellor to lead the Columbia campus. Dr. Marshall Stewart, director of college leadership and strategy at the North Carolina State University (NCSU) College of Agriculture and Life Sciences, has been appointed as the Vice Chancellor of Extension and Engagement effective August 2016. Dr. Rob Kallenbach was appointed as the Assistant Dean for Agriculture and Natural Resources and Director of Commercial Agricultural Programs. The CAFNR Dean Payne retired and college going through the search process to hire a new Dean for CAFNR. With the retirement of Dr. Mike Collins, Dr. Jim English was appointed as the Director for the Division of Plant Sciences.

State budget has been cut down by the Governor Grietens due to unexpected drop in state income tax than what was projected. The Governor withheld 31 million from the 2016-2017 fiscal year budget and cutting down another 40 million for 2017-2016 On top of it, drop in number of students registered has added to the financial crisis at MU. The state funding of the budget has been down to 33% of the MU budget and more 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 32,553 soil samples, 4127 special soil tests, 2939 plant, 247 water, 49 greenhouse media, 110 compost, 225 manure and 262 environmental tests. Both labs together analyzed a total of 40,512 samples last year. The lab developed a web based data acquisition program to automate the process of accessing data from the lab equipment as replacement for the DOS based data acquisition program. The lab purchased new AA, Spectrometer and upgraded Lachat Auto-Ion Analyzer. MU soil testing labs continues to function as totally self-supporting labs based solely on fee generation. We continue to train visiting scientists, and students in soil testing methods, lab instrumentation, interpretations and recommendations. Conduct educational programs adults and school children to bring awareness of the importance of soils and testing soil for proper nutrient management.

John Lory and Peter Scharf got a big NIFA grant is trying to set up a statewide strip trials by getting funding from the commodity groups and Extension to study P 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):

The report was shared verbally during the meeting.

#### North Dakota (Franzen, submitted via email)

The past year (01/1/2016-12/15/2016), the soil-testing lab at the North Dakota State University tested approximately 20,000 soil samples. Of these 700 were lawn and garden samples submitted by individual home owners. The rest of the samples were field and research samples. Routine soil testing was performed based on the NCERA-13 methods and recommendations were provided as required. The lab has been certified for the year 2017 by the Minnesota Department of Agriculture though the NAPT. Over 200 water, 500 plant tissue samples and 50 manure samples were also analyzed.

Over the past year, the lab was awarded the North Dakota EPSCoR grant for equipment repair. This fund, together with matching funds from the Soil Science department, helped in the continued use of the CNS analyzer in the lab. We are currently conducting tests to calibrate the instrument for total S analysis in soil and plant samples.

### Wisconsin (Laboski, Florence)

The University of Wisconsin Soil and Forage Analysis laboratory currently offers soil fertility, forage quality, manure, plant, and lime quality analysis. We are staffed with four analysts, one office manager, and one technician. In our current system, one analyst focuses on farmer and researcher routine soil analysis. One focuses on plants, total mineral analysis by nitric digestion, and helps with soil calcium and magnesium. One analyst focuses on mineral content in forage and manure by dry ashing, forage starch and nitrate, and soil total nitrogen, nitrate and ammonium. Another analyst focuses on forage wet chemistry and NIR. We also employ local high school students and college students from nearby UW-Stevens Point.

This past six months have not brought too many changes. Our sample demand for soil and plant analysis is consistent with the previous year. We have had an interest in soil copper analysis form organic growers, to ensure soil copper levels from organic fungicides are not rising too high. We have also had an interest by professional turf managers in Mehlich-3 analysis for macro, secondary, and micro-nutrients.

We purchased and installed a new Lignin pH robot. One of the challenges to implementing the new robot was fitting it into our procedure. In WI, soil Sikora buffer pH values are measured immediately after a 10 minute shake. A local machinist created plastic trays for our sample cups with snap caps to correspond the robots locations for reading pH. This robot reduces the read time for 50 samples from 40 minutes to 15 minutes. It also automatically posts pH and buffer pH values in Microsoft Excel. We recently purchased a Unity Spectra Star NIR for forage analysis, which will be installed in the next 40 days.

A field based corn and soybean plant analysis interpretation study is ongoing. Three of five field seasons have been completed. Treatments include with and without N, P, K, S, Zn, Mn, and B in a fractional factorial with 2 replications. Corn tissue samples are collected at V4 (whole plant), V10 (uppermost leaf with collar exposed), VT (ear leaf), and harvested grain. Soybean tissue samples are collected from the uppermost fully developed leaf and petiole at R1, R3, R5, and harvested seed. When the study is completed we will have three site-years at Arlington, and two sites years at both Marshfield and Hancock.